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Oral Sessions

A-01

CENTRALLY INSERTED CENTRAL CATHETER IN THROMBOCYTOPENIC PATIENTS: AXILLARY VS JUGULAR APPROACH

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Introduction: Centrally inserted central catheter (CICC) insertion in thrombocytopenic patients may give rise to different and potentially severe complications. In these patients the jugular approach is the most used because it allows the possibility of compression, avoiding serious hemorrhagic complications. However, with the use of ultrasound guidance (USG) the puncture is performed more accurately and in the axillary vein (instead of the subclavian vein) which can make this approach safe.

Aim: compare hemorrhagic and other complications of USG axillary versus jugular approach in CICC placement in severely thrombocytopenic patients.

Methods: Retrospective analysis of a prospective database on all CICC related procedures in patients with thrombocytopenia (<50.000 platelets) performed in the Central Venous Catheters (CVC) Unit of Instituto Português de Oncologia de Lisboa Francisco Gentil, from November 2016 to May 2019. All procedures were USG and patients received 1 platelet unit before the procedure.

Results: Sixty-six procedures were recorded in our database in patients with acute leukemia. Of these, 49 (74%) were jugular, and 17 (26%) were axillar. The median age of the patients was 58 years old [46–66] and 56% were female. Median platelet count before the procedure was 25500 [13000–34000] (27000 JUG vs 20000 AXI group; $p = 0.097$). We report 57 (87%) vein punctures at first attempt (82% JUG vs 100% AXI; $p = 0.057$) and 64 (97%; 96% JUG vs 100% AXI, $p = 0.398$) were placed in the original punctured vein. There were two cases of hematoma (3%; 4% JUG vs 0% AXI; $p = 0.398$). We do not report more short-term complications such as pneumothorax, arterial puncture, hemothorax or other.

Conclusions: CICC placement with USG in thrombocytopenic patients is safe and it appears that both jugular and axillary approaches are safe to use by experienced professionals.

A-02

AXILLARY CICC PLACEMENT WITH HEAD PILLOW AND WITHOUT SPECIFIC POSITIONING

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Introduction: Real-time ultrasound imaging is the standard of care in central venous cannulation, namely axillary. Several maneuvers such as Trendelenburg tilt, Valsalva manoeuver, head rotation, shoulder roll, passive leg raise, hepatic compression, have been evaluated to increase the diameter of the subclavian/axillary vein for CICC placement. This maneuvers put the patient in an uncomfortable position which in turn can lead to anxiety and make CICC placement more difficult.

Method: Single, tertiary cancer center retrospective analysis (of a prospectively kept database) of axillary CICC placement without patient positioning, shoulder or back roll, head rotation and with a head pillow for patient comfort between January 2019 and December 2019. Every procedure was done with local anesthesia and ultrasound guidance. The primary objective was to evaluate immediate procedure complications such as arterial puncture, pneumothorax, and others. The secondary objective was to evaluate the number of venipuncture attempts.

Results: A total of 202 axillary CICC placements were performed during this period. Every patient was an oncological patient and the most common diagnosis was leukemia (13.4%); eight patients (4%) had thrombocytopenia (<50.000 platelet count). There was none immediate complication registered and 99% of the venipunctures were successful at the first attempt. In the other two patients (2%), venipuncture was successful at the second attempt.

Discussion & Conclusion: Axillary ultrasound CICC placement is safe and accurate with a head pillow and without patient positioning, namely Trendelenburg tilt, head rotation, shoulder or back roll.

A-03

USE OF 5FR SINGLE LUMEN MIDLINE IN ADULT PATIENTS CANDIDATE TO EXTRACORPOREAL PHOTO-APHERESIS: A SINGLE CENTER PRELIMINARY STUDY

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Background: Adult patients with graft versus host disease (GVHD) require repeated sessions of extracorporeal photo-apheresis (ECP); the procedure may be difficult in DIVA patients (difficult intravenous access) or in patients with contraindication to the placement of central venous catheters. In these situations, we have tested the use of 5 Fr and 4 Fr single lumen midline catheters for blood withdrawal during apheresis.

Methods: During a nine-month period, from January to October 2019, we recruited six patients with GVHD and difficult peripheral venous access. In order to allow the maximal blood aspiration, the tip of the midline was consistently placed in the axillary vein, below the clavicle, soon before the passage between axillary and subclavian vein, using ultrasound.

Results: Sixty-nine ECP procedures were carried out: in 51 cases, blood withdrawal was performed via a single lumen 5 Fr midline; in 18 cases,

via a single lumen 4 Fr midline. In two cases, 5 Fr midlines were used for both blood withdrawal and blood return: twelve ECPs were carried out (average flows of 45 ml/min for withdrawal and 46 ml/min for return; average time of 83 minutes per procedure). All midline catheters were removed after each session of ECP. Patients' tolerance was very good. There were no complications related to the intravascular devices.

Conclusions: The use of midline catheters allowed us to perform ECP in DIVA patients, avoiding the invasiveness of central venous access. We are currently using 5 Fr midline catheters also for other apheretic procedures, such as the collection of peripheral stem cells in the healthy donor with difficult venous access.

A-04

WHAT IS THE OPTIMAL TIME TO CREATE THE FIRST VASCULAR ACCESS IN OLDER ADULTS?

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Older adults have extremely low kidney transplantation rate, so vascular access is not a temporary option, but an important factor until the end of life. At the same time life expectancy is lower and the risks of cardiovascular events are much higher than in the general population of HD patients.

Methods: The study included 618 patients (age = 65).

Results: Only about 60% of patients begin HD within a year after the AVF creation (Figure 1). The proportion of patients with brachiocephalic AVF was significantly higher than in younger patients: 41.3% vs. 16.4%. It is known that proximal AVF have a much greater tendency to increase the volume blood flow than distal. Thus, elderly patients begin HD with a more adverse comorbid background. Elderly patients have an additional risk factor – the onset of HD after 65 years (Figure 2). Paradoxically, but according to our data, patients who started HD after 65 years had a worse prognosis than patients who reached 65 while already on HD. The HD onset with CVC with the subsequent successful conversion to AVF was not associated with risk of death significant increase («CVC-AVF» factor). This is indirect evidence in favor of the fact that in elderly patients, the AVF must be created closer to the expected HD start. Among patients who started HD with CVC, all patients received functional AVF or died within 11 months. Infections occur with the same frequency (CVC-AVF vs. AVF) and clinical manifestations of central venous insufficiency do not have time to occur during the expected life period in most patients: incidence rate ratio IRR 1.21 [0.91; 1.31] and IRR 1.11 [0.93; 1.19], respectively.

Conclusion: Given all the facts, in the older adults we tend to create an AVF closer to start of HD than in the general HD population.

A-05

PROSPECTIVE STUDY OF ULTRASOUND-DETECTED FIBROBLASTIC SLEEVE IN CANCER PATIENTS WITH PICC OR PICC-PORT

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Introduction: The aim of our study is to evaluate the incidence of asymptomatic fibroblastic sleeves in cancer patients with PICC or PICC - Port implantation by using ultrasound surveillance.

Method: In this prospective, observational cohort study, we enrolled patients with cancer aged >18 years requiring long-term CVC implantation for chemotherapy infusion. The demographic and clinical characteristics of the population were collected and the Khorana risk score for DVT was calculated. CVC and implantation features were also collected. Ultrasound surveillance was performed weekly after CVC implantation up to one month by the same experienced vascular sonographer.

Results: Among 20 enrolled patients over a 7-day period, 16 patients (7 males and 9 females, median age 64 years, range 39–80 years, BMI average 26.9 kg/m^2) completed US follow-up program. The types of cancer were the following: breast (5/16, 31%), stomach (3/16, 19%), colon (3/16, 19%), lung (2/16, 12.5%), ovarian (2/16, 12.5%), pancreatic (1/16, 6%). 10 PICCs and 6 PICC-Ports were placed (6 left side and 9 right side); the vein of choice was basilic (13/16) and brachial vein of (3/13), in 4 patients were performed more than 1 puncture. In 8 patients, after PICC placement, was observed fibroblastic sleeve formation during the first three weeks of follow-up. All the patients were asymptomatic, and the catheters worked. In the case of hypoechoic sleeve color Doppler is useful for an accurate diagnosis. In 1 patient, after PICC placement, was observed asymptomatic non-obstructive self-limiting thrombosis. Neither thrombosis nor sleeve was detected in 7 patients (1/10 PICC and 6/6 PICC-Ports).

Conclusion: In our first preliminary results, the development of fibroblastic sleeve is a frequent (8/16 patients, 50%) complication after PICCs placement. Standardization of the ultrasonographic aspect of the fibroblastic sleeve will allow an easy diagnosis without using radiation (e.g. line-o-gram).

A-06

CVAD RELATED SHEATHS, A PREDICTOR OF INFECTIVE AND THROMBOTIC INCIDENCE?

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Central vascular access device (CVADs) related sheaths, sometimes described as 'Fibrin sheaths', are a phenomenon that may result in minor or significant sequelae, from persistent withdrawal occlusion to infective sheaths associated with increased morbidity and mortality (Tang et al., 2015). This paper provides a summary of the literature, including an overview of the pathophysiology, development and composition CVAD related sheaths and the relationship between pathogenic microbes and sheaths. This study looks at 184 patients who underwent isotope scans, where isotope was infused via the CVAD. Isotope was found to bind to the sheaths around the catheter of some patients. The amount of uptake was taken to be an extent to which fibrin sheath had developed around the catheter. The degree of uptake of isotope was categorised into 3 groups: low uptake, moderate uptake and high uptake. Patients were then followed up from the date the CVAD was inserted to 12 months after the date of the isotope scan, or until the device was removed or to the date the patient died, to identify incidence of infection, thrombosis and persistent withdrawal occlusion (PWO).

Results: PWO all levels of uptake were around 5–7%, blood stream infections (BSI) for low 6.92% (n = 9) moderate uptake 10% (n = 3) and for patients with significant uptake 15.79% (n = 3). Thrombosis no uptake 0.77% (n = 1), moderate uptake 6.7% (n = 2), and significant uptake had no incidence of thrombosis. Total complications no uptake 27.69% (n = 36), moderate uptake 26.7% (n = 30) and significant uptake 36.84% (n = 19).

Conclusion: This single centre oncology based study showed that patients with isotope highlighted sheaths experienced higher incidence of infective, thrombotic and total complications.

A-07

REDUCING WAITING TIMES AND RELIANCE ON FLUOROSCOPY FOR PICC INSERTIONS THROUGH ACQUISITION OF A DEDICATED VASCULAR ACCESS PROCEDURE ROOM

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Introduction: The Venous Access Team used to insert PICCs under fluoroscopy within the radiology department with around 9–12 insertions every week, with a waiting time of 3 weeks. Due to the increasing demand for PICCs, the team acquired a dedicated procedure room with the aim of increasing the volume of insertions, reducing the waiting time and decreasing reliance on fluoroscopy-guided insertions. The transition started in early 2018.

Method: The VA procedure room accommodates one patient at a time, staffed with one practitioner doing the insertion and one coordinating. The room initially operated half days for 3–5 days per week with an average of 4 patients per day, but the service gradually increased to 5 days per week with an average of 5 patients per day.

Results: In 2017, the waiting time for PICC insertion was 3 weeks, with 872 done under fluoroscopy. In 2018 the waiting time decreased to 3–5 days, with only 260 fluoroscopy insertions. The waiting time consistently averaged to 3 days throughout 2019 with a further drop to 184 fluoroscopy insertions. Some patients were accommodated on the day of referral depending on the urgency. Consequently, there was a 552% increase in ECG guided (non-fluoroscopy) insertions over a 2-year period, with 260 inserted in 2017 to 668 in 2018, and 1200 in 2019.

Discussion & Conclusion: Having a dedicated procedure room resulted in more prompt and efficient insertion of PICC lines which prevented multiple cannulations and unnecessary acute central venous catheter insertions. This promoted vessel health and preservation and increased patient satisfaction as the waiting times decreased from 3 weeks to 3 days. Having a more controlled insertion environment also decreased insertion-related complication risks compared to bedside insertions. A significant increase in ECG guided insertions resulted in more cost savings for the organization as reliance on fluoroscopy decreased.

A-08

HOME I.V. ANTIBIOTIC COURSE IN A LARGE CF ADULT CENTER IN FRANCE: PREVALENCE OF SELF-CARE

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Introduction: In 2017, 227/469 patients followed by our centre had at least one I.V. antibiotic course a year and 7418 days of home I.V. antibiotic course were realized. Organized by the cystic fibrosis (CF) team, treatments are provided by private homecare nurses. However, some patients say they make some cares themselves. So it seems interesting to precise the frequency of self-care in adult CF patients during home I.V. antibiotic course, patient's training, which care are provided, the impact on their quality of life.

Method: In our CF center, patients who have at least one home I.V. antibiotic course in 2019 completed an auto survey.

Results: From May to December 2019, 152 patients (mean age: 34-years-old) answered the survey. 47% practice self-care at their request in 91.5%. Patients practice self-care with a Port (63%), a Peripheral Inserted Central Catheter (31%), a short peripheral cannula (SPC) (45%). Patient fills elastomeric pump (EP) dedicated to infuse antibiotics in 16%, primes EP´s extension line in 64%, flushes the catheter and connect the EP in 35.5%, disconnects the EP and flushes in 40%, inserts the non-coring needle in 1%, removes it in 6.5%, removes the SPC in 5%. Because of self-care, patients feel more free in their daily life (59/71), rarely tired (6/71) and do not feel insecure (61/71). 44 say they have been trained to do the techniques but only one had a real training session about Port handling. 28 self-cared patients would like to update their knowledge after our study; 20 who don't practice self-care are interested in being trained.

Discussion & Conclusions: Self-care is frequent, mainly with patients with Port and meets a real need of the CF patients. Patients don't inform systematically CF centre about their decision to do so. Self-care must be more monitored and controlled by the CF team.

A-09

TAILORED STRATEGIES OF VASCULAR ACCESS FOR CHEMOTHERAPY OF BREAST CANCER PATIENTS

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Objectives: PICC (peripherally inserted central catheter) can be used for short term chemotherapy of breast cancer while chemoport has not been considered for short term chemotherapy for 3–4 months by Korean breast cancer surgeon because of its relative invasiveness. Authors tried to analyze clinical results of PICC and chemoport placement for breast cancer chemotherapy and effectiveness of tailored strategies of vascular access for chemotherapy of breast cancer.

Methods: This is a retrospective study from prospectively registered data base of patient who underwent vascular access for chemotherapy. PICC was inserted for 3 months chemotherapy and chemoport (arm port or chest port) for more than 4 months' chemotherapy in Seoul St. Mary's Hospital from 2017 to 2019. PICC was inserted at bedside with ultrasound guided approach. Chemoport was inserted with ultrasound guided approach for puncture site and fluoroscopic guided approach for catheter tip position.

Results: Three hundred patients were enrolled in this study. Two hundred Patients underwent chest port or arm port placement in contralateral side for chemoport. In 100 Chest ports, there were catheter malfunction (0), infection (1) and early removal (0). In 100 arm ports, there were catheter malfunction (1), contact dermatitis (1), thrombosis (3) elbow discomfort (1) and infection (1). In 100 PICCs, there were catheter malfunction (0), infection (0), pulled out (1) and contact dermatitis (2) redness swelling (1) discomfort (neuropathy) (1) and chemoport placement for extended chemotherapy (1). Chemotherapy of breast cancer with tailored vascular access approach was successful in 99% (99% in chest port, 99% in arm port and 99% in PICC).

Conclusion: Chemotherapy of breast cancer can done safely with tailored strategies of vascular access depending on duration of chemotherapy.

A-10

PERIPHERALLY VERSUS CENTRALLY INSERTED CENTRAL CATHETERS IN BREAST CANCER TREATMENT – A COMPARATIVE STUDY

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Introduction: Totally implanted peripherally inserted central catheters (PICC-Port) are an alternative to totally implanted centrally inserted central catheters (CICC-Port) for chemotherapy (CTX) administration. Despite having a lower pneumohemothorax risk, PICC-Port have been claimed to have higher complication rates, namely infectious, thrombotic and mechanic. We aimed to evaluate our experience with these devices in breast cancer patients.

Methods: We performed an unicenter cohort study of PICC-Port and CICC-Port consecutively placed in adults with stage I to III breast cancer from 2/1/2018 to 30/06/2019. PICC-Port's immediate complications were prospectively recorded, and the remaining were retrospectively investigated by consulting patients' medical charts.

Results: During this period, 124 PICC-Port and 623 CICC-Port were inserted; the latter were randomized and only 124 analyzed. The median age of the cohort ($n = 248$) was 51 years (29–75), 98.8% were female and the majority had an ASA score of I or II (92.7%); 57.3% of the catheters were used for adjuvant CTX and 42.7% for neoadjuvant CTX. There were no differences between the populations regarding sex, age, ASA score, stage, CTX intent and catheter dwell time. There were 23 complications (18.5%) in the PICC-Port population (34.8% minor and 65.2% major) and 24 (19.4%) in the CICC-Port (58.3% minor and 41.7% major, one of which life-threatening and requiring intensive care support). These complications led to reintervention (either removal or repositioning of the catheter) in 4.8% of the PICC-Port and 4% of the CICC-Port. No statistically significant difference was found between the two populations concerning global complications, minor/major complications, reintervention rate, mechanical, thrombotic or infectious complications.

Conclusion: At our center, PICC-Port are not inferior to CICC-Port. Taking these findings into account along with a lower chance of potentially life-threatening complications such as pneumohemothorax and central artery puncture, PICC-Port appear to be a safe and promising option for CTX administration.

A-11

TOTALLY IMPLANTABLE VENOUS ACCESS PORT IN ONCOLOGICAL PATIENTS: A LATIN-AMERICAN EXPERIENCE

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Introduction: Cancer has presented with a progressive increase over the years, both worldwide and in Colombia. Totally implantable venous access for chemotherapy are essential to the management of patients with neoplasic pathology. Being a fourth level hospital, Fundación Cardioinfantil-Instituto de Cardiología manages a large volume of cancer patients and carries out the implantation of such catheters on a daily basis; therefore, the need arises to identify the frequency of complications identified during and after its implantation and its use over time, in order to evaluate our experience.

Materials & Methods: An observational descriptive cross-sectional study was conducted based on the manual review of the registry of oncological patients who underwent the implantation of "PORT" catheters at Fundación Cardioinfantil-IC during the period between January of 2016 and June of 2019 by the General Surgery Department.

Results: A total of 194 consecutive patients, with a median age of 53 years (IQR, 23 years), median BMI of 23.56 kg/m^2 (IQR, 5.5 kg/m^2) were enrolled in this observational, single centre study. "PORT" catheter was inserted in 194 patients and was most commonly used in solid malignancies ($n = 132$, 68%), followed by hematologic malignancies ($n = 62$, 32%). Chemotherapy was started wirh a median 9 days. The various complications developed in group in the order are as follows: 0 (0%) bloodstream infection, 0 (0%) local skin infection at the "PORT" insertion site, 1 (1%) fracture of the "PORT" catheter. One patient (1%) developed thrombosis as the complication of "PORT" catheter insertion.

Conclusion: Our experience with the insertion of "PORT" was found to be safe, with the increasing use of continuous infusional chemotherapy regimes and the need for improved quality of life of the patients.

A-12

CAN A CONVERSION OF AV FISTULA TO CENTRAL VENOUS CATHETER IMPROVE THE CLINICAL OUTCOME IN OLDER ADULTS?

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In some patients probably – yes. Since many elderly patients initially have heart failure and a reduced cardiac output (CO), the potential for compensating of AVF blood flow (Qa) is significantly less than in younger patients. We found that this leads to the fact that in the elderly, at a lower Qa value, a greater value of cardiopulmonary recirculation is noted. Even with a Qa value of 1.0–1.2 l/min, the Qa/CO value can reach ~25%, which is associated with a significant risk of death. But there is good news: in the older adults some criteria are more informative than in the general population of HD patients: AUC-ROC of ejection fraction (EF), estimated pulmonary artery systolic pressure (ePASP) and Qa/CO – 0.821, 0.804 and 0.846, respectively vs. 0.654, 0.726 and 0.764. The bad news: the decision to convert from a functional AVF to a CVC is a very difficult choice. Specific indications are still not determined. We believe that it is necessary to consider the conversion from AVF to CVC in a case of decompensated heart failure, with EF50–55 or Qa/CO$>$20–25%, if the reduction of Qa does not improve these parameters. In this case, conversion from CVC to AVF may improve the prognosis. Older patients require more careful monitoring than younger patients.

Conclusion: AVF is the optimal vascular access, but not in all elderly patients (even with a minimum acceptable Qa value). In some older adults patients, conversion to CVS should be considered to reduce the risk of death.

A-13

CENTRAL VENOUS CATHETER PLACEMENT INCREASES CEREBROVASCULAR ACCIDENT RISK IN HEMODIALYSIS PATIENTS

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Background: Central venous catheter (CVC) placement is a common procedure used for the treatment of those End Stage Renal Disease (ESRD) patients. Unfortunately, the risk of cardiovascular diseases, including stroke in patients with ESRD is 5–30 times greater than that in the general population. Specially, cerebrovascular accident (CVA) is one of significant complications after CVC insertion and the average annual stroke incidence is reported 19.5 per 10000 (person-years) in 2019. Therefore, it is important to understand the factors that predispose to CVA in this vulnerable population to better apply preventive strategies. Data and

Methods: 468 HD patients who underwent vascular access surgery over 2013–2018 in Hasheminejad Kidney Center were studied included 368 cuffed tunneled CVC and 100 non-cuffed CVC.

Results: Studied patients aged 12–86 (mean age, 54.85) years, containing 324 females and 144 males, during 5 years. Finally, 19 patients (4.06% of all HD patients) with CVA identified. Of these, more than three fourths, 15 (78.95%) and 12 (63.16%), of them were hypertensive and diabetic, respectively, with an overall proportion 52.63% (10 individuals) of them were males and the remaining were females. One of CVA patients has 37 years and the rest of the patients are 50–73 years old (mean = 61). Risk factor of CVA most is happened in HD patients with CVC insertion before AVF (16 of 19 = 84.21%).

Conclusion: There was no occasion to emphasize on young or old ages as the warning signs of stroke in HD patients. But it was concluded that "CVC placement before AVF", "hypertension" and "diabetes mellitus" are CVA risk factors, respectively; and eventually "In ESRD patients of any age, CVC placement can increase CVA incident" the investigators conclude.

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A-14

AN AUSTRALIAN FIRST: PLACEMENT OF CHRONIC DIALYSIS CATHETERS AND IMPLANTED PORTS AT THE BEDSIDE BY NURSES

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Introduction: Long term vascular access devices such as tunnelled haemodialysis catheters or implanted venous ports are typically placed in the interventional radiology (IR) suite or operating theatre (OT). Using ECG guidance technology has enabled nurse experts in vascular access to perform placement of these devices at the bedside. Undertaking these procedures in such a way is safe, limits radiation exposure, is cost effective, can reduce patient waiting times and allows access to IR and OT for other types of procedures.

Method: We became accredited in advanced procedures after consultation with the medical director and nurse unit manager of our ICU as well as the Director of Nursing. Accreditation was from a senior vascular surgeon in subcutaneous tunnelling techniques and surgical implantation of ports. We retrospectively reviewed 12 months' data to assess procedural characteristics and outcomes.

Results: Between January 2019 and December 2019 the service placed 73 tunnelled haemodialysis catheters and 19 implanted ports using ECG guidance at the bedside. All devices were placed safely with no complications. Patient and staff feedback has been positive with the majority of devices achieving expected dwell times. Calculated costs demonstrate substantial savings through bedside placement. Patient waiting times for chronic devices have been reduced for those who have accessed the service.

Discussion & Conclusion: Advancing the scope of expert vascular access nurses to include more complex techniques for placing tunnelled and implanted vascular access devices at the bedside has proven safe and cost effective. Use of ECG technology to guide device placement can free up dedicated spaces such as IR and OT suites for other procedures.

A-15

CATHETER SECUREMENT IMPACT ON PICC-RELATED CLABSI: A UNIVERSITY HOSPITAL PERSPECTIVE

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Introduction: The use of a subcutaneous engineered securement device (SESD) for peripherally inserted central catheters (PICC) in an acute care setting was found to have a direct impact on central line associated bloodstream infection (CLABSI) rates compared to traditional adhesive engineered securement devices (AESD). While the literature suggests the use of SESDs has had successful results for device securement, it is unknown to what extent they may impact CLABSI rates. Securement and stabilization performance among devices may be a direct risk factor for CLABSIs.

Methods: A retrospective quality review of 7,779 cases was conducted at a large academic medical center. The primary researcher implemented a quantitative design, which was analysed with demographics statistics and relative risk ratio.

Results: There was a 288% ($n = 47$) increase in relative risk of CLABSI found more likely in the AESD group compared to the SESD group. The results imply the use of SESDs may improve nursing practice and patient outcomes lowering CLABSI rates in patients with PICCs by a reduction of risks associated with securement design differences.

Discussion & Conclusions: Investigational analysis of patient data can yield valuable insight into outcomes related to nursing practice. This retrospective, observational quality review found a substantial difference in relative risk among securement devices utilized in their population. The difference in practice demonstrated direct positive impact on patient outcomes when using SESDs verses AESDs. The relative risk for CLABSI as related to securement device may have a significant impact on similar populations. The study has helped further the research in evaluating risks factors for CLABSI through the continuum of care. The results suggest the use of SESDs in a setting can be beneficial by potentially decreasing the risk of CLABSIs.

A-16

THROMBOTIC RISK FACTORS IN PATIENTS WITH SUPERIOR VENA CAVA SYNDROME UNDERGOING CHEMOTHERAPY VIA FEMORAL INSERTED CENTRAL CATHETER

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Introduction: Our study aimed to scrutinize the incidence and risk factors of femoral inserted central catheter (FICC)-related thrombosis in

patients with superior vena cava syndrome (SVCS) undergoing chemotherapy.

Method: A retrospective analysis of patients with SVCS undergoing chemotherapy who received FICC catheterization at the Xiangya Hospital, Central South University, Changsha City, Hunan Province between May 2012 and February 2019 was performed. Both asymptomatic thrombosis and symptomatic thrombosis were diagnosed by color Doppler ultrasound (CDUS). Univariate and multivariate logistic regression analyses were performed to identify patient-, insertion-, and catheter-related factors.

Results: Eight hundred and seventy-four patients with SVCS undergoing chemotherapy, with a total of 157,180 catheter days were enrolled in our study. FICC-related thrombosis was detected in 144 patients, and yielding an overall incidence of 16.47% or 0.92 events per 1000 catheter days. Of these, 19 (2.17%) patients had symptomatic thrombosis. The mean time interval between FICC insertion and thrombosis onset was (10.40 $\pm$ 6.32) days and the mean catheter indwelling time was (179.84 $\pm$ 46.15) days. The history of deep venous thrombosis, treatment with vascular endothelial growth factor (VEGF) inhibitor (bevacizumab), puncture site (mid-thigh, groin), tip position and catheter size showed association with FICC-related thrombosis. Treatment with VEGF inhibitor [odds ratio (OR) $=$ 2.779; 95% confidence interval (CI): 1.860–4.153; $p < 0.001$] and puncture site at the groin (OR $=$ 10.843; 95% CI: 6.575–17.881; $p < 0.001$) were identified as independent risk factors of FICC-related thrombosis.

Conclusion: FICC-related thrombosis is associated with history of DVT, treatment with VEGF inhibitor (bevacizumab), puncture site (mid-thigh, groin), tip position and catheter size. In addition, treatment with VEGF inhibitor (bevacizumab) and puncture site at the groin were proven to be independent risk factors for FICC-related thrombosis. Our study provide a theoretical basis for clinical intervention and effective reduction of FICC-related thrombosis.

A-17

"TAILORED FICC-PORT": COMMON FEMORAL VEIN AND CLUSTER ON THE VENTRAL SURFACE OF THE THIGH, A SAFE AND COMFORTABLE APPROACH

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Introduction: Mediastinal syndrome, superior vena cava syndrome or conditions of failure to access the cervical thoracic vessels on long-term therapies, resort to the positioning of a vascular port type access on the femoral vein, with a supply generally from the abdominal region or above the iliac crest. this often leads to rapid onset of mechanical and thrombotic complications and discomfort for the patient methods recruited 6 patients affected by mediastinal syndrome while evaluating the femoral vessels, it was identified a point on the ventral surface of the thigh where the cluster can be embedded, without interfering the daily habits of clothing or fitness. All patients had antithrombotic prophylaxis with LMWH for the underlying disease. Positioned 6 Fr catheter with titanium tank; usg puncture in common dominant femoral vein. Tip located in the inferior vena cava (between the vertebral bodies l3–l4), controlled by fluoroscopy. Cluster closure with cyanoacrylate. After 1–3–6 months eco-color-doppler lower limbs performed and functioning assessed. At 6 months, a questionnaire (Table 1) was administered to patients aimed at assessing device satisfaction and comfort.

Results: Table 2 the analysis of the questionnaires revealed – no perception of the device, nor pain or discomfort during rest or physical activity. No restrictions on dressing, no problems during chemotherapy. No patient wants to remove the device. Only one thrombotic complication was recorded, asymptomatic. No case of infection. No mechanical complications, no malfunctions no dispositioning. Comments the usg puncture and the choice of the common femoral vein, considering its pathway and size, with respect to the superficial femoral or large saphenous vein also contribute to the reduction of thrombotic risk. The packaging of the cluster on the fly surface of the thigh guarantees a straight course of the catheter, with reduced tunneling and less risk of traumatism and kinking, improving the quality of life.

A-18

MINIMIZING INTERACTION RISKS BETWEEN MEDICATIONS AND INFUSION TUBINGS: HOW MUCH DO MATERIALS COME INTO PLAY?

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Introduction: Medical infusion tubings in plasticized polyvinylchloride (PVC) are widely used but cause content-container interactions (drug loss and plasticizer release). Alternative tubings have been developed, but have rarely been evaluated. This study aimed to assess interactions between medications and infusion tubings made of different materials to help chose the most suitable infusion tubing.

Methods: Five alternative tubing materials were tested and compared to reference plasticized PVC tubing: three were PVC coextruded respectively with polyethylene (PE), polyurethane (PU) or Styrene-EthyleneButadiene-Styrene (SEBS) and two were monolayer tubings of SEBS or thermoplastic olefin (TPO). Each medication (diazepam, paracetamol and insulin) was quantified by liquid chromatography to evaluate a potential loss during a simulated infusion at 1 ml/h. Each material's surface was characterized by surface zeta potential (ZP) measurement. Plasticizer release was quantified by gas chromatography coupled with mass spectrometry.

Results: Evolution of drug losses are presented in Figure 1. For paracetamol, none of the studied tubings caused any loss >5%. Diazepam loss was worse for PVC and PVC/PU (>80%). PVC/PE and thermoplastic elastomers alone or coextruded with PVC behaved better, but still induced a higher than 20% loss. For insulin, all tested materials induced a loss (>50%) after 1 to 8 hours of infusion. PVC/SEBS and PVC/PE presented the lowest ZP with respective values of –39 mV and –36 mV and were related to the highest sorption of insulin while PVC/PU with the highest ZP (about –9 mV) presented the highest absorption of diazepam. Coextruded layered materials released less plasticizer than PVC (Table 1).

Discussion & Conclusion: PVC/PE and thermoplastic elastomers alone or coextruded with PVC were found to be interesting alternatives to PVC infusion tubings with regards to sorption phenomena and plasticizer release, and should be preferred to limit clinical impact, but none of the studied materials can be considered as interaction-free.

A-19

PRE- AND POST-REVIEW OF A STANDARDIZED ULTRASOUND-GUIDED CENTRAL VENOUS CATHETERIZATION CURRICULUM EVALUATING PROCEDURAL SKILLS ACQUISITION AND CLINICIAN CONFIDENCE

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Background: To evaluate novice and expert clinicians' procedural confidence utilizing a blended learning mixed fidelity simulation model when applying a standardized ultrasound-guided central venous catheterization curriculum.

Method: The objective of this quality improvement research was to evaluate both novice (50) clinicians' confidence across 100 ultrasound-guided central venous catheter insertion courses were performed at a mixture of teaching and non-teaching hospitals across 26 states within the United States between April 2015 and April 2016. A total of 1238 attendees completed a pre- and post-survey after attending a mixed-method clinical simulation course. Attendees completed a 4-hr online didactic education module followed by 4?hr of hands-on clinical simulation stations (compliance/sterile technique, needling techniques, vascular ultrasound assessment, and experiential complication management).

Results: The use of a standardized evidence-based ultrasound-guided central venous catheter curriculum improved confidence and application to required clinical tasks and knowledge across all interdisciplinary specialties, regardless of the level of experience. Both physician and non-physician groups resulted in statistically significant results in both procedural compliance (p?

A-20

CENTRALLY INSERTED, TUNNELED PICC CATHETERS. HYBRID METHOD FOR VENOUS ACCESS IN ONCOLOGY PATIENTS

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Purpose: We evaluated the feasibility of centrally placed non-cuffed tunnelled PICC in the chest as an alternative to conventional arm PICC.

Method: Patients referred for PICC and found to have inadequate peripheral venous access in the arms due to prior chemotherapy, were offered placement of the tunnelled PICC lines in the chest. Ultrasound guidance was used for venous access and fluoroscopy was used for tip positioning. Using internal jugular vein access, BARD Groshong valved 4F PICC was placed with its tip in cavo atrial junction. Proximal end of the catheter was brought out through the subcutaneous tunnel, so that the exit point of the PICC line lies over the upper chest. Extra length of the Catheter was trimmed, and extensions were attached. The device was stabilized with adhesive and sutures.

Results: Out of 19 patients, 18 patients were male (4–72 years). Technical success was achieved in 100% cases. No catheter related blood stream infection was noted within 30 days of placement. Overall, during 1966 catheter days, no catheter related blood stream infection was observed. The purpose of PICC was achieved in 15 patients (78.9 %), either in the form of completion of chemotherapy (8/15) or maintained PICC line till death (7/15). Partial or complete pullout was observed in four patients (20.1%), which required cuffed tunneled catheter or implantable port. External fracture was noted in one patient which was successfully corrected using repair kit. No exit site infection, bleeding, catheter occlusion, catheter dysfunction, venous thrombosis, venous stenosis or catheter embolization were noted in our series.

Conclusion: Centrally placed tunneled PICC is a promising alternative method, when conventional arm PICC placement is not feasible. Centrally placed PICC are comparable to conventional PICC in terms of catheter related blood stream infection and venous thrombosis.

A-21

BEYOND CONVENTIONAL TUNNELING FOR VASCULAR ACCESS. THE "L-SHAPED" AND THE "ARM-TO-CHEST" TUNNELING TECHNIQUES

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Introduction: Venous port catheters, are now the standard of care in patients requiring long term intermittent intravenous drug administration. Arm VAD placement on the other hand, is a valuable option for vascular access, often complicated or made impossible by the condition and size of peripheral veins.

Method: Both techniques use ultrasound-guided access in the internal jugular vein (IJV) or another appropriate central vein. For the "L-shaped" tunneling technique, we disect a port-pouch in the deltopectoral groove, in a "far-lateral-oblique" orientation, and then we create a retrograde subcutaneous tunnel between the port-pouch and the IJV venous access site in an "L-shaped" configuration, using a straight metal tunneler, in two stages. For the "Arm-to-chest" tunneling we first create a port-pouch -in case of a TIVAD- or a skin nick –in case of a PICC or a cuffed line - on the inner aspect of the mid-arm. Using a straight metal tunneler, we tunnel the line from the arm to the neck in two stages, externalizing and re-inserting the line at a skin nick made at the deltopectoral groove.

Results: The "L-shaped" configuration, prevents catheter kinking, but also allows us to place the port pouch pocket in a more discreet position, in order to offer a better cosmetic result to our patients. Using our other technique "Arm-to-chest" tunneling we can place an arm VAD, regardless of the condition of the arm veins.

Discussion & Conclusion: A lateral oblique port implantation site on the chest, along with the "L-shaped tunneling" technique offers doctors implanting TIVADs a useful alternative for a better cosmetic result. The ACT technique allows us to use larger arm VAD catheters from IJV access, irrespective of the arm veins condition. Thus, this technique has the advantages of arm VAD placement, with the added benefit of saving the arm veins.

A-22

USE OF SINGLE-LUMEN 5FR AND TRIPLE-LUMEN 6FR PICCS FOR CARDIAC OUTPUT ASSESSMENT BY TRANSPULMONARY THERMODILUTION

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Background: In a previous study (D'Arrigo et al., Crit Care Med 2019) we showed that single lumen 4 Fr and double lumen 5 Fr power injectable PICCs can be used for trans-pulmonary thermodilution (TPTD), though they overestimate cardiac index (CI), if compared to centrally inserted central catheters (CICCs). Though, the reliability of PICCs of larger size is still unknown.

Methods: We compared TPTD measurements via single-lumen 5 Fr or triple-lumen 6 Fr polyurethane power injectable PICCs vs. triple-lumen 7 Fr CICC. A TPTD-calibrated Pulse Contour hemodynamic monitoring system was used (VolumeView/EV1000).

Results: Out of 160 manual measurements in 15 patients, we did not found any difference in the estimation of CI using single-lumen 5 Fr PICC vs. 7 Fr CICC (3.2 $\pm$ 1.04 vs. 3.2 $\pm$ 1.06 L/min/m, $p = 0.824$; percentage

of error 14.7%); we also found no differences in the other hemodynamic parameters. On the other hand, estimated CI was slightly higher when using triple-lumen 6 Fr PICC vs. 7 Fr CICC (3.3 ± 0.8 vs. 3.0 ± 0.7 L/min/m, $p = 0.107$, percentage of error 19.0%), although this difference did not reach the statistical significance.

Conclusion: Single-lumen 5 Fr PICCs are accurate for TPTD use, whereas triple-lumen 6 Fr PICCs may lead to a slight overestimation of CI.

A-23

COMPLICATIONS OF PICCS AND CICCS USING CURRENT BEST PRACTICE: A CONTEMPORARY META-ANALYSIS

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Introduction: Central catheters are widely used to deliver medications in various medical settings. Despite their considerable benefit, both peripherally inserted central catheters (PICCs) and centrally inserted central catheters (CICCs) are associated with the risk of catheter-related complications (i.e. deep vein thrombosis [DVT] and central-line associated bloodstream infections [CLABSI]). Since 2006, various guidelines emphasizing procedure standardization and evidence-based bundling were introduced to reduce catheter-related complication rates. Previous meta-analyses regarding central catheters and related complications did not include these significant changes in practice. Herein, we present a meta-analysis of the contemporary literature evaluating the association between central catheters and DVT/CLABSI.

Methods: OVID MEDLINE, Embase, and EBM Reviews databases were used to identify peer-reviewed articles published between 2006 and 2018 that compared PICCs versus CICCs regarding their association with DVT or CLABSI. Risk ratios (RRs), incidence rate ratios (IRRs), and weighted event risks were analyzed. Study quality was assessed based on the Newcastle-Ottawa and Cochrane Risk of Bias scales.

Results: Of 4,609 screened abstracts, 31 studies were included in the meta-analysis. Across studies, PICCs were protective for CLABSI compared to CICCs (IRR = 0.52, 95% CI: 0.30–0.92). Overall, PICCs were associated with an increased risk of DVT versus CICCs (RR = 2.08, 95% CI: 1.47–2.94). However, we did not find an increased risk for smaller diameter and single-lumen PICCs. The absolute risk of DVT was 2.3% for smaller diameter PICCs and 3.9% for CICCs. The average dwell time was 11.6 days longer for PICCs versus CICCs ($p = 0.064$). Patient outcomes favored PICCs.

Discussion & Conclusion: We demonstrated that catheter-related complications regarding PICC use are minimized when best practices are used. Without the fear of potential complications, clinicians should consider PICC as a viable option when deciding the most appropriate vascular access device for each patient. Systematic reviews should frequently be repeated to capture the changes in medical practice.

A-24

USE OF AN ANTIMICROBIAL & ANTITHROMBOGENIC PICC – A PROSPECTIVE, MULTICENTER EXPERIENCE

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Introduction: This study evaluated the impact of an antimicrobial and antithrombogenic peripherally inserted central catheter (PICC) and its impact on associated complications within inpatient and outpatient populations. Various strategies are used in an attempt to decrease the incidence of catheter-related complications.

Methods: This IRB-approved, multicenter, prospective observational study was performed at 3 US academic hospitals. Adults who required PICC = 14 days were considered. Patients were monitored throughout entire catheter dwell, to a maximum of 90 days. Data was collected from hospital, outpatient and patient PICC records. Duplex ultrasounds were performed for thrombosis before insertion, dwell day 10–14 and at removal.

Results: 103 patients were enrolled through Interventional Radiology teams; 56% were male, mean BMI was 29 ± 8.8. Majority (79%) were high-risk groups - cancer, infectious diseases, transplant and trauma. Primary indications were antibiotics (66.99%) and chemotherapy (25.24%). Double lumen PICCs (59%) and basilic vein (71.84%) were highest selected. Fourteen (13.5%) remained inpatients, (46.6%) were discharged to home health, (20.38%) to outpatient therapy, and (19.4%) into family care. Seven (6.7%) were lost to follow-up. Mean catheter dwell was 38.74 ± 25.81 days ($n = 96$); Eight (7.7%) PICCs remained indwelling and functional at day 90. Three (3.1%) CRBSIs were reported at days 14, 27 and 60 and were all dual-lumen catheters (59.2%). Seven (7.3%) reported symptomatic catheter-related thromboses (CRT) and 2 (28.5%) used a standardized catheter-vessel ratio vein measurement. Several patients with asymptomatic CRT at initial screening had complete thrombosis resolution on follow-up scanning at removal.

Discussion/Conclusion: The incidence of CRBSI was 0.81/1000 days, compared to currently reported rates of 1.8–7.7/1000 days (Chopra et al, 2012; Kramer et al, 2016). Overall symptomatic CRT rate was 1.87/1000 days. The focus on patient harm and safety have contributed to the implementation of infection prevention and thrombosis-reduction strategies. Antimicrobial PICCs should be considered for use in high-risk populations.

A-25

NEEDLELESS CONNECTOR DECONTAMINATION STUDY

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Speaker Karen Slater Project team Karen Slater, Fiona Fullerton, Marie Cooke, Mike Whitby, Jennine Hay, Scott Lingard, Joel Douglas and Claire Rickard Title Needleless connector (NC) decontamination study

Introduction/Background: The optimal disinfectant and timeframe for NC decontamination has not been empirically established, recommended timeframes vary from 5–60 seconds. Decontamination prior to each injection is needed to prevent harmful blood stream infections. Aim/Objective To establish the most effective NC decontamination method, using 70% isopropyl alcohol (IPA) or 2% chlorhexidine (CHG) in 70% IPA with (scrubbing) times of 5, 10 and 15 seconds for peripheral intravenous catheters

Method: Factorial randomized control trial with two levels of intervention, (i) antiseptic type (IPA or CHG and IPA), (ii) duration of decontamination scrub. Randomization used a central web-based randomization service. There was no stratification and block sizes varied randomly. The sample size was 300. Adult patients on Medical Units were recruited. Inclusion criteria were PIVC insitu for >24 hours, patient verbal consent, NC free of an infusion. Allergy to CHG was an exclusion factor.

Results: There was no difference in the effectiveness of 70% IPA and 70% IPA with 2% CHG in decontaminating NC attached to PIVCs in the clinical environment ($p = 0.210$). Decontamination with 70% IPA resulted in

98.7% (76/77) of NC being cleaned successfully with 2% CHG in 70% IPA being effective 97.4% (74/76) of the time. There was no difference in NC decontamination times of 5, 10 and 15 seconds ($p = 0.620$).

Conclusion: There was no difference between 70% IPA and 2% CHG in 70% IPA, or decontamination times of 5, 10 and 15 seconds. Other factors such as low cost and low risk of allergy further support the use of alcohol as the preferred product. Needleless connector scrub times could be reduced to 5 seconds, if the decontamination technique is appropriate. Fifteen seconds decontamination does not always remove all micro-organisms.

A-26

REDUCING CENTRAL LINE ASSOCIATED BLOOD STREAM INFECTIONS IN A TERTIARY INTENSIVE CARE SERVICE: A KNOWLEDGE TRANSLATION STUDY

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Introduction: Central venous catheters (CVCs) are frequently inserted in critically ill patients. Due to its invasiveness, central line associated blood stream infections (CLABSI) can occur. Although a decrease in the incidence of CLABSI has been observed in recent years, it continues to be a significant iatrogenic complication.

Aims: The broad aim of this study was to reduce CLABSI rate in the Intensive Care Unit (ICU) of an Australian tertiary hospital.

Methods: This is a mixed method three-phase integrated knowledge translation study. In phase 1, CVC insertion and management practices were audited, and focus group and individual interviews conducted. Barriers and facilitators to adhering to evidence-based recommendations were identified. In phase 2, partnering with the clinicians working in the unit, we designed and implemented a complex intervention to address the barriers. Intervention components included: using chlorhexidine-gluconate (CHG) impregnated dressings on CVC insertion sites, revising the CVC insertion and management protocol, staff education, and ongoing audit and feedback. In phase 3, the effectiveness of the implementation was conducted. CLABSI rates and CVC insertion and management practices audit results 12 months before and after the implementation were compared.

Results: Total of 1368 patients were included in the 12 months before implementation, and 1252 patients in the 12 months after implementation commenced. There were no statistical differences between the two groups in age, gender, APACHE II and III scores. The CLABSI rates decreased from 1.7/1000 line days (before) to 0.7/1000 line days (after), however, this was not statistically significant. Staff adherence to evidence-based recommendations in CVC insertion and management improved over time.

Conclusion(s): Involving clinicians in the intervention design and implementation process contributed to practice improvements. Simple and clear evidence-based recommendations in the ICU's practice policy, staff education, and ongoing audit and feedback were perceived as effective in reinforcing evidence-based practice.

A-27

PERFORMANCE ASSESSMENT OF ANTIMICROBIAL CATHETERS IN REAL-TIME FOR PREVENTING BACTERIAL COLONIZATION, BIOFILM FORMATION & DISPERSAL

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Introduction: Various Antimicrobial (AM) Peripherally Inserted Central Catheters (PICCs) and AM-Central Venous Catheters (CVCs) were assessed as compared to Non-AM catheters in preventing bacterial colonization, biofilm formation & dispersal in real-time using an in-vitro flow test system.

Methods: Catheter segments from Non-AM and AM PICCs with chlorhexidine (CHX) technology, Non-AM and AM CVCs with either CHX or Oligon technologies were placed in separate flow cells. Each flow cell was pre-contaminated with a green-fluorescent Staphylococcus aureus strain and mounted on the stage of a confocal scanning laser microscope equipped with a digital camera. Flow of sterile Tryptic Soy Broth was initiated to allow for shedding of the bacteria growing in the flow cells upstream of the catheter segments for a 24-hour test period. Images were collected at 10-minute intervals and combined into a single image for each time point using Imaris™ software followed by combining images into video format. Amount of biofilm accumulated was then quantified by measuring the fluorescent area over time and plate count to determine total CFU present.

Results: On Non-AM PICC, Non-AM CVC, and the Oligon-CVC, bacterial colonies were visible within 1–4 hours with continuous increase in biofilm amounts for up to 10–15-hours; thereafter the amounts declined which was attributed to both biofilm shedding, and the thickness of accumulated biofilm that exceeded the z-stack starting point resulting in the fluorescence appearing to fade during imaging. Both CHX-PICC and CHX-CVC remained free of bacteria throughout the test duration.

Discussion & Conclusions: Considering the rapid biofilm growth and shedding (<24 hours) from the Non-AM PICC, Non-AM CVC and Oligon-CVC, there is a potential for these catheters for causing CRBSI if exposed to Staphylococcus aureus. In contrast, both CHX-PICC and CHX-CVC did not allow bacterial colonization, biofilm formation and subsequent shedding minimizing the precursor steps necessary for CRBSI to occur.

A-28

TISSUE ADHESIVE REDUCES PICC MIGRATION AND MICROBIAL CONTAMINATION

J. Ralph Webber

Introduction: With the advent, popularity, and clinical benefits of peripherally inserted central catheters (PICCs) use, growing evidence suggests a possibility for significant consequences due to unsatisfactory securement. Such consequences may be avoided if stabilization was optimal. Novel securement devices have shown effectiveness; however, each device has challenges. With the recognized need to endorse a technology aimed to reduce migration, is it plausible to think the use of a tissue adhesive would be a pioneering alternative to securement?

Method: A quantitative, causal comparative, descriptive design was proposed to evaluate the relationship between tissue adhesive applied at the PICC insertion site and the exposed visible catheter length, with intent to determine migration, affording an influence for change. Two groups were correlated for comparison; one group receiving the intervention; the other, an engineered stabilization device and a chlorhexidine impregnated dressing.

Results: The two-sample *t*-test and Pearson's chi-square analyzed the variables, equating baseline to innovation. The two-sample *t*-test teased down the raw data determining equality between the samples, showing no statistical significance between the groups. Chi-square (χ^2 6.64) verified the significant effect of the intervention, $p = 0.02$ (FE 0.02) with relevance to a reduction in migration rates; with no blood stream infections. Protocol

feasibility was recognized, describing the correlational relationship between tissue adhesive and the exposed visible catheter length indicating the effectiveness of the intervention. There was a significant reduction in catheter migration, from 19.35% to 1.42%, with no conveyed evidence of phlebitis, skin irritation, or microbial contamination in the 411 adult participants

Discussion & Conclusion: As satisfactory securement of PICCs remains a narrow explored area and fundamental indication is thin, this analysis furthered the body of relational evidence to promote a practice change. The evidence acknowledged the efficacy of tissue adhesive, clearly correlating a clinically significant change, illuminating statistical significance.

A-29

PERIPHERAL INTRAVENOUS CATHETER SECUREMENT WITH TISSUE ADHESIVE COMPARED TO CONVENTIONAL DRESSING: A RANDOMIZED CONTROLLED TRIAL

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Introduction: Premature failure of peripheral intravenous catheters is a significant problem and improved securement strategies may potentially reduce failures. While some evidence supports the use of tissue adhesives for securement, further trials are needed to assess effectiveness.

Methods: We are conducting a prospective, single-site, parallel, two-arm randomized investigation of catheter survival. Specifically, conventional securement with polyurethane dressing and tape is being compared with experimental securement with tissue adhesive, polyurethane dressing and tape. Eligible adult patients have an 18 or 20 gauge IV placed in the arm in the emergency department and are admitted to a step-down ICU. Patients are excluded if the IV is placed with ultrasound guidance, a non-standard polyurethane dressing utilized, or if there is an allergy to cyanoacrylate/formaldehyde.

Results: 350 patients are being enrolled between November 2019 and April 2020 (150 patients enrolled as of December 31, 2019). Reported results will include comparison of the two arms for the following endpoints: 1. catheter survival 2. etiology of failure 3.cost

Conclusions: TBD.

A-30

RANDOMIZED CONTROLLED TRIAL OF PICCSOX, A WEARABLE DEVICE MADE FROM BAMBOO FABRIC DESIGNED TO REDUCE THE DISLODGEMENT OF PICCS

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Introduction: Peripherally inserted central catheters (PICCs) are used to allow treatment outside of hospital, however, they may become dislodged when the external length is caught during activities of daily living. Also, the aesthetic appearance of the device may impede usual activities. We will present the results of a randomized controlled trial of an arm cover that is worn over the usual dressing (PICCsox) which will be undertaken at the Royal Adelaide Hospital, South Australia.

Method: This is a two-armed parallel non-blinded RCT of PICCsox versus standard care of adult patients undergoing PICC insertion between December 2019 and March 2020. The primary outcome measure is PICC dislodgement rate at 6 weeks. The secondary outcome is the patient experience of the PICCsox. Patients allocated to the intervention group will be provided with a PICCsox in addition to the standard dressing and securement. Patients allocated to the control group will receive the standard dressing and securement only. Allocation concealment will be by way of sealed envelopes with allocation selected at random by an independent statistician. Each trial participant will be contacted by telephone at 6 weeks post insertion to determine dislodgement status. A number of participants in the intervention group will be interviewed to determine their experience of the PICCsox. Assuming at 6 weeks a PICC dislodgment rate of 30% in the Control group, and 10% in the Intervention group, then a sample of 59 patients in each group would be required to show this difference to be statistically significant, with 80% power and a required alpha of 0.05, and using a chi-squared test. To allow for any patients lost to follow up, 70 patients will be recruited in each study arm. The trial has been registered with the Australia/New Zealand Clinical Trials Registry, and an Ethics application has been submitted for approval.

A-31

PICC-PORT: A RETROSPECTIVE ANALYSIS OF THE SINGLE INSTITUTE ON THE UTILITY AND SECURITY IN 716 CANCER PATIENTS

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Introduction: Since 2012, the Vascular Access Center has implanted "PICC-PORT" in cancer patients, device that ensure safe infusions of chemotherapy, pain and supportive therapy. Picc-Port has the advantage of being inserted with technique similar to a PICC in absence of immediate complications (pneumothorax, hemothorax, pinch-off).

Method: In this retrospective analysis were examined Picc-Port implantations ($n = 716$) from March 2012 to January 2020 in cancer patients with Picc-Port 5 Fr (Polysite®2000), PUR, reservoir "very low profile" (8.7 mm). Has been performed an ultrasound study with the RaPeVA and RaCeVA method and venipuncture performed on basilica (5%) or brachial internal vein (95%) of the arm. The tip-location was performed with ECG method.

Results: PICC-Port was successfully implanted in the upper arms in 711 patients (0.69% failure) on basilica vein ($n = 36$) o brachial internal vein ($n = 680$). The mean age was 49 $\pm$ 4 years (range: 28–70 years) and BMI was 27.82$\pm$ 3.20 kg/m^2 (range: 19.11– 36.54 kg/m^2); 30 patients were in stage II and 686 stage III of the TNM. PICC-Port were implanted in the right ($n = 480$) and in the left ($n = 236$) upper arm, in mean implantation time was 18 $\pm$ 10.60 min. The mean number of catheter-days was the 642 $\pm$ 60 catheter-days (range: 190–1095 catheter-days). Immediate device-related complication is was tachycardia ($n = 2$) during the tip-location with ECG method, treated pharmacologically. Late complications were 37: symptomatic thrombosis ($n = 21$), treated with therapeutic dosage LMWH; infectious complications ($n = 11$) were 3 subcutaneous pocket infection and 8 CRBSI, treated with systemic antibiotic and PICC-Port removal; complete catheter occlusion from blood clot ($n = 5$), treated with Urokinase.

Discussion & Conclusion: PICC-Port was implanted with the concept of "Targeting Zero" (minimizing failure rate, incidence of arterial/nervous puncture, risk of thrombosis) and improving patient comfort. The accuracy of the implant techniques and easy management make the PICC-Port a device safe, cost-effective for cancer patients.

A-32

DEVELOPMENT AND IMPLEMENTATION OF AN ASSESSMENT TOOL TO EVALUATE TECHNICAL SKILLS IN THE INSERTION OF IMPLANTABLE VENOUS ACCESS DEVICES

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Introduction: Current training and learning curve evaluations do not include a formal assessment of technical surgical skills. Surgical assessment is based mainly on the subjective impressions of the teacher. Based on the "Competency Assessment Tool" (CAT) developed for the evaluation of technical surgical skills in minimally invasive colorectal resection, we designed an assessment tool suitable to evaluate the implantation of central venous access devices performed by junior surgical trainees.

Material & Methods: The CAT was adapted to the insertion of implantable central venous access devices. Four major assessments during the different steps of the intervention were used in this evaluation. Each of these tasks was divided into four sub-domains according to surgical skill. Here we describe a prospective study for procedures performed between January 6 and June 30, 2014. In addition to the CAT score, the apprentices' skills were evaluated using a visual assessment that was quantified using an analogue scale (value from 1 to 10). The candidates were classified into junior and senior trainees depending on the number of procedures they had already performed and on their surgical experience.

Results: 71 procedures were evaluated during the study period. Seven senior trainees conducted 43 procedures and five junior trainees performed 28 interventions. The senior trainees had significantly higher CAT scores than junior candidates, and the scores fluctuated according to surgical experience, usually reaching their peak after 10 procedures.

Conclusions: The CAT model is well suited for the assessment of surgical trainees during central venous access device implantation. It enables a close assessment of the learning process and the technical skills of trainees, which helps them improving in a safe, standardized manner.

A-33

MULTICENTER 'PHLEBITIS ZERO' PROJECT IN SPAIN: BUNDLE COMPLIANCE EVALUATION AND POTENTIAL COST SAVINGS FOR THE 2015-2018 PERIOD

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Phlebitis associated with peripheral venous catheter (PVC) is an adverse event of great magnitude and significance linked to hospitalization. The 'Phlebitis Zero Project' was conceived as a multimodal strategy for the prevention of phlebitis. During the 2015–2019 period, 13,040 professionals have been trained and 12,039 patients, 26,155 PVCs and 54,522 PVCs maintenance actions monitored. In 2015 a pre-post intervention analysis was conducted to evaluate the impact during the first 6 months of execution, showing clinical effectiveness and cost savings when applying the strategy measures. Prospective multicenter study in 70 hospitals in Spain. All inserted catheters for 15 consecutive days of February in at least 2 medical and 2 surgical plants of each center were included. The same training program, action protocol, data collection app and defined variables were applied. The occurrence of phlebitis was assessed according to the Maddox scale by 2 trained observers. In order to estimate potential cost savings, we considered ratios of 1 catheter/patient and a cost of 400 €/phlebitis event. Overall bundle compliance, phlebitis cumulative incidence, incidence density (phlebitis for ‰catheter-days) and potential cost savings were calculated at different times during the life of the project. 2015-abril (baseline pre-): 27.2%/12.15%/39.09‰días-catéter 2015-noviembre (post): 42.2%/9.55%/30.30‰días-catéter/27,6M € 2017: 28.8%/12.03%/37.98‰días-catéter/1,3M € 2018: 34.2%/10.08%/33.6‰días-catéter/22,9M € Bundle compliance has shown variations from 27.2% minimum to 42.2% maximum. Minimun and maximun bundle compliance have coincided respectively with maximum and minimum cumulative incidence and incidence density results. Greater bundle compliance translates into lower incidence of phlebitis. The impact of the program has room for growth at improving the overall compliance of the bundle. The 2019 sample -still under analysis- does not show a clear trend. However, the data obtained confirms the standard for the incidence of phlebitis at 9–10%. The total estimated saving is approximately 52M € which further justifies the implementation of the program.

A-34

INCIDENCE, CHARACTERISTICS AND TIMING OF PERIPHERAL INTRAVENOUS CATHETER FAILURE IN PATIENTS RECEIVING CHEMOTHERAPY WITH HEMATOLOGICAL MALIGNANCY: A PROSPECTIVE DESCRIPTIVE STUDY

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Introduction: Patients with hematological malignancy often receive chemotherapy via peripheral intravenous catheters (PIVCs) for fear of central venous catheter-related bloodstream infection (CV-CRBSI). In particular, it is often the case in Japan that patients who are supposed to undergo conditioning regimens before hematopoietic stem cell transplantation are more likely to have PIVCs for chemotherapy other than conditioning regimen. However, incidence of PIVC failure is poorly recognised for these patients. This study aimed to reveal the detailed descriptive data of PIVC failure.

Method: The descriptive data were collected at the hematology and oncology ward of a tertiary hospital in Japan. Participants in this study consisted only of adult patients requiring PIVC for chemotherapy. This prospective study investigated PIVC failure incidence, defined as PIVC removal before completion of infusion therapy, as judged by ward nurses. A research nurse determined the causes of PIVC failures, directly assessing the condition with ultrasonography.

Results: Eighty-five patients (with 303 PIVCs) were observed over 1416.85 PIVC days, and 67 patients (with 280 PIVCs) were analyzed. Cumulative PIVC failure incidence was 43.2% of all analyzed PIVCs (89.97 per 1000 PIVC days). More than half of PIVCs were inserted for infusion therapy after chemotherapeutics' dosing period and these PIVCs accounted for 61% of overall PIVC failures.

Discussion & Conclusion: This study demonstrated that incidence of PIVC failure in patients with hematological malignancy was unacceptably high, and more PIVC failures occurred in the PIVCs inserted after the chemotherapeutics' dosing period. The findings of this study demonstrated that PIVCs have a very short life span to complete the treatment cycle, and the difficulty of considering appropriate vascular access devices for chemotherapy when comparing the risk of CV-CRBSI and PIVC failure. Future studies should consider alternative peripheral vascular access devices for patients susceptible to CRBSI.

A-35

THE APPLICATION OF INTRACAVITARY ELECTROCARDIOGRAM IN PICC TIP POSITION IN CHINA: A CROSS-SECTIONAL STUDY

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Introduction: The clinical application effect of intracavitary electrocardiogram has been extensively studied at home and abroad, and the feasibility and safety of this method have been confirmed. However, due to its late application in China, its status is unknown. Therefore, the purpose of this study is to investigate the status of the application of intracavitary electrocardiogram by PICC specialized nurses in China.

Method: A cross-sectional study of 1,577 PICC specialized nurse in 27 provinces (cities or autonomous regions) was conducted in China from July to August 2019. The data was collected through a questionnaire.

Results: A total of 1437 questionnaires were returned, 38.9% of PICC were located by intracavitary electrocardiogram. The P wave shape of intracavitary electrocardiogram was observed by ECG monitors (87.1%), and approximately 71.3% of the sterile lead wire were used. The ECG method was to be obtained via guidewire technique. Less than half of nurses thought that maximal amplitude P wave was advancing the catheter to the occurrence of negative and retreating of P wave to the disappearance of negative wave (48.8%). 35.6% of them thought the position of the catheter head corresponding to the peak P wave is the ideal position. The chest radiographs was necessary after the intra-procedural positioning of the tip according to the ECG method (76.7%).

Discussion & Conclusion: The result indicated the application of intracavitary electrocardiogram is lower than expected, and there are differences in the application of PICC tip localization method in intracavitary electrocardiogram. Medical constitions should pay attention to the application and training of this method, and need to develop standardized operation procedures of intracavitary electrocardiogram for PICC tip location.

A-36

EVALUATION OF THE ACCURACY OF A DEDICATED DEVICE SPECIFICALLY DESIGNED FOR TIP LOCATION BY INTRACAVITARY ECG IN ATRIAL FIBRILLATION PATIENTS

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Introduction: Intracavitary ECG (IC-ECG) is an accepted method for tip location of central venous catheters (CVC). A 'modified' IC-ECG method (MIC-ECG) has been proven to be accurate for tip location in patients with atrial fibrillation (AFib). Since one ECG device – marketed as dedicated for IC-ECG – claims to be accurate also for MIC-ECG, we have planned this study to verify this assumption.

Methods: We studied 10 AFib patients requiring simultaneously CVC and transesophageal echocardiography (TEE). For each patient, we evaluated the accuracy of the study device, when in the 'Afib' mode, (a) in identifying automatically the magnitude of Afib waves (f waves) and (b) in identifying automatically the proper tip location at the cavo-atrial junction (CAJ), in those cases where the f waves were properly identified (as verified by TEE).

Results: The study device was unable to properly identify f waves when the tip was in the superior vena cava (SVC) or in the right atrium (RA), with a highly significant discrepancy vs. the real values ($p = 0.001$ for SVC and $p = 0.003$ for RA); discrepancy was minimal when the tip was at CAJ ($p = 0.19$). Considering the cases of proper identification of the f waves, the study device was able to identify correctly the different position of the tip, with significantly different values: 17.61 (SCV) vs. 47.01 (CAJ) vs. 20.73 (RA) ($p = 0.002$).

Discussion: The study device is not accurate in its automatic evaluation of the magnitude of f waves, when the tip is placed in SCV and RA, being frequently subject to overestimation (due to the lack of recognition of the T wave, mistakenly interpreted as f wave). When using this dedicated ECG device, we suggest caution in the interpretation of the automatic evaluation of the magnitude of f waves for tip location of CVC in AFib.

A-37

TIP CONFIRMATION USING ELECTROCARDIOGRAPHY REDUCES THROMBOSIS RISK COMPARED TO FLUOROSCOPY FOR INSERTION OF PERIPHERALLY INSERTED CENTRAL CATHETERS – THE TERRIFIC STUDY. AN ANALYSIS OF 42687 PATIENTS

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Background: Peripherally inserted central catheter (PICC) tip placement at the cavo-atrial junction has been associated with reduced catheter-related thrombosis. Electrocardiographic (EKG) tip confirmation is convenient, economical and avoids radiation, however its direct correlation to reducing deep vein thrombosis (DVT) compared to radiological tip confirmation (X-Ray, fluoroscopy) is unknown.

Methods: Prospectively collected PICC data of adult, medical inpatients in 52 Michigan hospitals were analyzed. Patients' medical records were reviewed to verify method of tip confirmation (EKG vs. radiological). Radiological tip confirmation was defined as PICC placed at the bedside with post insertion X-Ray to confirm tip position. Descriptive statistics described group characteristics. Multivariate models (clustering by hospital and multiple PICCs within same patient) were fit to assess PICC-DVT when EKG- vs. radiology were used.

Results: A total of 42,687 PICCs (21,098 radiology confirmed vs. 21,589 EKG) were included in the analyses. Patients receiving EKG to confirm PICC tip position had fewer comorbidities than patients with PICC placed at the bedside and retrospective x-ray. Compared to radiology confirmed PICC tip placement, EKG-placed PICCs were more frequently inserted by vascular access nurses (96%) and in academic facilities (71.1% vs. 48.7%). Overall DVT complications occurred in 594 (1.3%) PICCs. Larger catheter size (OR = 1.32 [95% CI 0.93–1.90] per unit increase in size), history of DVT and cancer was associated with an increased risk of DVT (OR = 2.00 [95% CI 1.65–2.43] and OR = 1.62 [95% CI 1.16–2.26], respectively). Following risk adjustment, EKG confirmation was associated with a significant reduction in PICC-DVT, compared with radiological (OR = 0.74, 95% [CI = 0.58–0.93, $p = 0.0098$]).

Conclusion: EKG-placed PICCs led to significant reduction in PICC-DVT. Further efficacy randomized controlled trials are needed to confirm these results, particularly in high risk patients (history of DVT or cancer) and other vulnerable populations (pediatrics and neonates). Greater adoption of this method for PICC insertion might improve patient safety and reduce healthcare costs.

A-38

DEEP VEIN THROMBOSIS (DVT) ASSOCIATED WITH PERIPHERALLY INSERTED CENTRAL CATHETER (PICC): BRAZILIAN EXPERIENCE

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Introduction: PICC is a safe alternative for patients who require long-term intravenous therapy. This device has many advantages, associated with a low risk of complications and adverse events. At the hospital the procedure is performed by a vascular access nurse team of dedicated nurses with the modified seldinger technique, with completion of the procedure through the intracavitary electrocardiogram.

Objectives: To verify the rate of DVT associated with PICC in catheters of high infusion power.

Methods: This is a retrospective cohort study from January to December 2017 of patients with DVT symptoms associated with PICC confirmed on venous Doppler ultrasonography. RedCap was used as a data collection tool.

Results: From January to December 2017, 2419 catheters were inserted, the rate of DVT associated with PICC was 1.9% (46 patients), 54% were male, 61% of the thromboses were in the basilic vein, followed by the brachial vein (35%) and 67% used prophylaxis for DVT. The number of puncture attempts, 96% were in the first attempt, in 96% the puncture site was in the ideal zone, followed by the red zone with 2%. The vessel occupation, 54% were occupying 11 to 20% and 89% were located in the superior vena cava. The type of device 76% of the catheters used were the 5 Fr double lumen, followed by the 4 Fr monolumen with 13%.

Discussion & Conclusion: The use of technologies such as ultrasound and guidance systems such as the intracavitary electrocardiogram reduces the risk of DVT. In the mentioned hospital, the PICC line in high-risk patients is not associated with a higher incidence of thrombosis.

A-39

EARLY IDENTIFICATION OF RISK FACTORS FOR CATHETER-RELATED THROMBOSIS USING THE IMPLEMENTATION OF DECISION TREES

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Introduction: Continuous growth of chronic renal failure is one of the most common conditions, which requires the attention of managers and decision-makers in health. Present research recognizes one of the most important issues in the field of kidney disease and focuses on the practical application of data mining in the Hasheminejad Kidney Center. The research question in the field of health is the diagnosis of the factors affecting the thrombosis associated with the central venous catheter (CVC) for dialysis patients.

Method: The Cross-Industry Standard Process (CRISP) model which is a common methodology of data mining was used. The data preparation step of CRISP involved missing value imputation with the K-nearest neighbor algorithm, data discretization, noisy data removal with k-means algorithm, and feature selection using the filter and wrapper methods. For modeling, decision trees algorithms were applied. In the evaluation stage, the models were evaluated by Confusion Matrix and F-Measure. Qualified models were presented to the experts for qualitative evaluation.

Results: Of totally 1048 patients who were under CVC surgery between 2015 and 2019, considering suitable data for analyzing, finally 468 medical records were analyzed. In the quantitative evaluation, 70 to 82 percent of the predictions of approved models are accurate and the risk of catheter related thrombosis in these patients can be detected up to 58 percent.

Discussion & Conclusion: Patient's age, history of cancer and hypertension, fasting blood glucose, patient high blood pressure, normalized thrombin, vitamin D and blood urea levels during catheterization, use of Rocaltrol-Calcitriol and Nitrocontin-Hydralazine drugs were identified as the effective factors on thrombosis associated with the CVC in hemodialysis patients.

A-40

THE APPLICATION OF INTRACAVITARY ELECTROCARDIOGRAM FOR THE TIP LOCALIZATION OF FEMORAL VEIN CATHETERS IN CHEMOTHERAPY PATIENTS WITH SUPERIOR VENA CAVA OBSTRUCTION

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Introduction: The study aimed to explore the clinical value of intracavitary electrocardiogram for the tip localization of femoral vein catheters at mid-thigh in the chemotherapy patients with superior vena cava obstruction. Methods A total of 158 patients with femoral vein catheters from July 2016 to May 2019 were enrolled in the study. The patients were randomly divided into two groups by envelope lottery method, the observation group ($n = 79$) and the control group ($n = 79$). Thoracic-abdominal X-ray was used to conform the position of the catheter tip for the patients in the control group. Intracavitary electrocardiogram was used to conform the position of the catheter tip for the patients in the observation group, if the patients without the specific P waves on the ECG, thoracic-abdominal X-ray was used to conform the catheter tip. The general information of patients, clinical catheterization effects and catheter-related complications were compared between the groups. Results No significant difference in general information, catheter obstruction, catheter-related thrombosis, catheter exit-site bleeding, catheter exit-site infection was found between the groups. The accuracy of first localization and patient satisfaction score of the observation group were 97.5% and 9.49, significantly higher than 88.6% and 8.53 in the control group ($p < 0.05$). The mean time and cost of catheter tip localization and the incidence of catheter-related complications in the control group were 32.57 min and 140.51 Yuan and 21.5%, significantly higher than 6.94 min and 13.59 Yuan and 7.6% in the observation group ($p < 0.05$). Conclusion Intracavitary electrocardiogram could accurately localize the tip of femoral vein catheters at mid-thigh, reduce the incidence of catheter-related complications and the time and cost of catheter tip localization, and improve patient satisfaction. These findings indicated that intracavitary electrocardiogram localization was worthy of clinical application in patients with central venous catheters through the superficial femoral vein.

A-41

FASTER CHEAPER SAFER: A RANDOMIZED TRIAL ON THE USE OF INTRA-CAVITARY ECG FOR CENTRAL VENOUS ACCESS

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Introduction: Traditionally, confirmation of a central venous access device (CVAD) placed at the bedside is the chest x ray (CXR). If incorrect position by CXR after insertion, the device is required to be repositioned or reinserted. Intra-cavitary electrocardiography (IC-ECG) guided CVAD placement has been proposed as a more accurate alternative to traditional CVAD insertion. Most studies to date have tested the effectiveness of IC-ECG exclusively on central venous catheters or peripherally inserted central catheters and in specific patient cohorts. This study compared the clinical and cost benefit of IC-ECG in a broad patient population with a range of CVADs.

Method: Pragmatic, randomized control trial comparing the accuracy and cost between traditional CVAD and IC-ECG guided insertion. Eligible patients were randomly assigned to have catheter placed by traditional technique or IC-ECG in a 1:1 ratio (172 patients in each group). The primary outcome measure was the rate of catheters between the two groups observed to be malpositioned after initial insertion.

Results: In the IC-ECG group, 170 catheters (99%) were placed accurately and did not require repositioning compared to 139 catheters (81%) in the traditional group ($p < 0.001$). Median procedural time was 12 minutes (IQR 10–17 minutes) in IC-ECG group verses 30 minutes (IQR 24–43 minutes) in control group ($p < 0.001$). Average cost saving per patient was $54 Australian (or $64,800 annually for our service). When IC ECG was used for bedside chronic catheter placement (implanted ports, tunneled dialysis catheters) the cost savings were up to $599 per patient.

Discussion & Conclusion: IC-ECG has shown to be safe, accurate, with significant cost, organizational and patient benefits that include reduced radiation exposure, reduced sterile dressing interruptions and catheter manipulations.

A-42

MODIFIED GUIDEWIRE GUIDED INTRACAVITARY ELECTROCARDIOGRAPHY APPROACH FOR LOCATING THE CATHETER TIP OF THE UPPER ARM PORT IN BREAST CANCER PATIENTS

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Objectives: We aimed to explore the effects of a modified guidewire guided electrocardiography (EKG) approach for locating the upper arm port catheters in breast cancer patients.

Background: EKG is a reliable and safe method for real-time confirming the tip of central venous access devices. Saline and guidewire are the most commonly used intracavitary electrode for introducing EKG. However, there are certain drawbacks of both approaches using for upper arm port due to differences in catheter structure, type, and implantation path. Little information about EKG locating the catheter tip of arm port.

Methods: A prospective observational study was conducted in a tertiary cancer hospital from April 2018 to July 2018. Patients with breast cancer requiring upper arm ports implantation were recruited. The primary study outcome was to observe the operation time of locating catheter tip; The secondary study outcome was to test the correct rate of catheter tip position. The third study outcome was to view the stability of the EKG waveform.

Results: A total of 36 cases were enrolled in this study, the average operation time of EKG was 269.25 $\pm$ 52.79 seconds (range: 190–345 seconds). The correct rate of the catheter tip position was 97.22%. The tip located at the lower 1/3 SVC or CAJ in 35 cases and the upper right atrium in 1 case. All the waveform was stable and easy to read.

Conclusion: The modified guidewire guided EKG technique is valid and accurate for locating the upper arm port catheter tip, it is convenient.

A-43

ULTRASOUND GUIDED TIP LOCATION OF MIDLINE CATHETERS

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Introduction: Midclavicular Midline Catheters (MCs) are widely used in clinical practice. They are currently inserted by the modified Seldinger technique in the so-called Dawson's Green Zone. Proper placement of MC tip is usually assessed only by aspirating blood and flushing with normal saline without resistance.

Purpose: to describe the intraprocedural Ultrasound-Guided Tip Location (USGTL) of MCs and its catheter-related venous thrombosis (CRT) outcomes.

Methods: We are using USGTL for all MCs from 2018 July. The CRT outcomes of 20 cm MCs, inserted with USGTL, were compared with two historical control groups: (1) 25 cm MCs inserted without USGTL; (2) 20 cm MCs inserted without USGTL.

Results: We observed 981 MCs. In the study group, USGTL was easily feasible in 98.9% of patients. Incidence of CRT was 2.42% in control group 1, 9% in control group 2, and 2.62% in the study group.

Discussion: There are very important differences between 20 cm MCs inserted with or without USGTL. In the study group, the tip was specifically placed in the axillary vein, about 3 cm distal to the clavicle. In control group 2, using the same MCs, the tip was probably located at the transition between the axillary and the subclavian vein. It is possible that such position may have been associated with an increased incidence of CRT.

Conclusion: The tip of a MC should be identified using Ultrasounds and the ideal position might be (1) inside the axillary vein, about 3 cm distal to the axillary-subclavian transition, or (2) inside the subclavian vein, after the transition area. USGTL is safe, inexpensive, easy and potentially useful during MCs insertion. It is not so important if a 20 or 25 cm long MC is used, but is important to avoid the axillary-subclavian transition area during tip placement. USGTL should be routinely used for this purpose.

A-44

ULTRA LONG VERSUS STANDARD LONG PERIPHERAL INTRAVENOUS CATHETERS: A RANDOMIZED CONTROLLED TRIAL OF ULTRASOUND-GUIDED CATHETER SURVIVAL

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Background: Ultrasound-guided intravenous (US-IV) peripheral catheters have dismal dwell time with most failing before completion of therapy. Catheter length in vein is directly related to catheter longevity. We investigated survival of an ultra long (UL) US-IV compared to a standard long (SL) US-IV.

Methods: We conducted a single site randomized trial of catheter survival. Adults presenting to the Emergency Department with difficult vascular access were recruited/randomized to receive either SL 4.78 cm 20 gauge US-IV or UL 6.35 cm 20 gauge US-IV. The primary outcome was duration of catheter survival. The secondary outcome was the optimal length of catheter in the vein to maximize survival. Additional IV related endpoints included first-stick success, time to insertion, number of attempts, thrombosis and infection.

Results: Between October 2018 and March 2019, 257 patients were randomized with 126 in the SL US-IV group and 131 in the UL US-IV group. Kaplan-Meier estimate of catheter median survival time in the UL group was 136 hours (5.7 days) [95% CI 116–311 h] compared to 92 hours (3.9 days) [95% CI 71–120 h] in the SL group. The optimal catheter length-in-vein was 2.75 cm, and IVs with greater than 2.75 cm inserted had a median survival of 129 hours (5.4 days) [95% CI 102–202 h] compared to 75 hours (3.1 days) [95% CI 52–116 h] for IVs with = 2.75 cm in the vein. Insertion characteristics were similar between the groups: 74.1% vs 79.4% first stick success [95% CI for the difference –2% to 5%], 1.4 vs 1.3 number of attempts [95% CI for the difference –0.1 to 0.3], 6.9 vs 5.9 minutes to completion [95% CI for the difference –1.3 to 3.4] with UL vs SL respectively.

Conclusions: This study demonstrates increased catheter survival when using the UL compared to SL US-IVs, while insertion characteristics and safety appeared similar.

A-45

THE ASSOCIATION OF BARTHEL SCALE AND NRS 2002 WITH THE COMPLICATIONS OF THE DIFFERENT TYPES OF THE MINI- MIDLINE CATHETER

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Aim: Evaluation of complications between the different types of the mini-midlines and its association with the patient´s self-sufficiency and nutritional status.

Methods: The mini-midline catheters were introduced to the patients in Medical department, randomly either 6.5 cm straight cannula or 10 cm catheter by the direct Seldinger method. Before the insertion, the self-sufficiency using Barthel scale and the nutritional status by the NRS2002 questionnaire were assessed. Complications during hospitalization and their relationship to the above mentioned tests in both types of the mini-midline catheter have been compared.

Results: The mini-midline was introduced to 123 patients (median age 75 years, 77 women, 46 men), 10cm mini-midline in 75 and 6.5 cm in 48 patients. For both types of catheter, the median of dwelling time was 9 days. Fifteen complications were found in the 6.5 cm catheter (10 dislocation and 5 function failure), equivalent to 36/1000 catheters days compared to 9 complications of 10 cm catheter (5 dislocation, 1 function failure, 3 thrombosis), equivalent to 12/1000 days. In 6.5 cm mini-midline complications were significantly associated with Barthel scale (11% in self-sufficient v. 56% in non-self-sufficient patients, $p = 0.01$), while 10 cm mini-midline was associated with NRS2002 (4.7% in patients at low risk v.30.7% at high risk, $p = 0.02$), but not with Barthel scale (13.9% in self-sufficient and 11.1% in non-self-sufficient patients).

Conclusions: Complications in the shorter mini-midline catheter were more numerous and associated with the degree of self-sufficiency, while in the longer catheter the frequency of complications was associated with the nutritional condition.

A-46

THERMOSENSITIVE LIQUID CRYSTAL FILM EVALUATION FOR CATHETERIZATION SITE CONDITION JUST AFTER CHEMOTHERAPY

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Introduction: Extravasation incidence is exceptionally low; however, ulceration or necrosis occurs in severe cases, possibly requiring surgical treatment. Early extravasation signs or symptoms are not always evident at treatment day, and inflammation, which leads to ulcer or necrosis, may appear several days later. Therefore, to minimize damage, narrowing down the high-risk group and their appropriate follow-up to prevent delay of intervention timing is required. There are few studies regarding narrowing down the high-risk group at the end of chemotherapy. This study aims to investigate the relationship between early extravasation sign (subcutaneous edema) and skin surface temperature using a thermosensitive liquid crystal film that visualizes temperatures at 30–34° (Figure 1).

Method: Participants who received chemotherapy using peripheral intravenous catheter were recruited. Before catheterization, just after finishing chemotherapy administration, subcutaneous tissue around the catheterization site was observed for the presence of subcutaneous edema by ultrasonography. During chemotherapy initiation, a thermosensitive liquid crystal film was placed on the catheterization site. Color change of the film was observed, and each case was classified according to low-temperature distribution patterns. To investigate the factors associated with temperature distribution pattern, logistic regression analysis was performed using clinically selected independent variables.

Results: A total of 57 patients were analyzed. No obvious extravasation was observed during drug administration. In film analysis, the number of broadening low-temperature area from the vein (BLTA) was 34 and non-broadening low-temperature area from the vein (NLTA) was 23. Subcutaneous edema was observed in 18 patients; 17 in BLTA and 1 in NLTA. Age, total administration time? 120 min, vein depth, and subcutaneous edema presence were included in logistic regression model. Subcutaneous edema presence: OR, 21.76; 95 CI, 2.4–198.8.

Discussion & Conclusion: Skin temperature distribution pattern during chemotherapy was associated with subcutaneous tissue condition just after chemotherapy.

A-47

AUTOMATED ULTRASONOGRAPHIC DETECTION OF THROMBUS AND SUBCUTANEOUS EDEMA DUE TO USING PERIPHERAL INTRAVENOUS CATHETER

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Introduction: Assessment of blood vessels and subcutaneous tissue using ultrasound images has been shown to be effective in preventing catheter failure. However, the assessment of ultrasonographic images requires training and can often be subjective. This study aims to develop a system for determining the presence or absence of thrombus and edema through automated image processing (Figure 1).

Method: All ultrasonographic images were collected from patients using catheters. The evaluation items were subcutaneous edema and thrombus. The correct answer data were manually created by a trained research nurse regarding the ultrasound images. We performed supervised machine learning using 263 ultrasonic images and performed automatic estimation to detect subcutaneous edema and thrombus. The evaluation used 452 images that were not used for learning. The agreement between the manually created correct data and the automatically estimated data was determined in terms of accuracy, sensitivity, and specificity.

Result: In the test data setting, edema and thrombus were manually detected in 359 and 99 cases in 452 images, respectively. In the automatic estimation, edema and thrombus were detected in 360 and 102 images, respectively. The accuracy, sensitivity, and specificity were calculated to be 0.881, 0.928, and 0.697 for edema and 0.723, 0.383, and 0.818 for thrombus, respectively.

Discussion & Conclusion: In this study, the presence or absence of thrombus and subcutaneous edema in ultrasonographic images was detected using a newly developed tool. The proposed automated tool could accurately and reliably estimate the vein characteristics. Because this study only determines the presence or absence of edema and thrombus, future studies should confirm the coincidence accuracy rate of the area being estimated. This will aid in enhancing the accuracy and convenience of ultrasonographic imaging for peripheral venous infusions.

A-48

NOVEL, INTERMITTENT PNEUMATIC, WEARABLE COMPRESSION DEVICE FOR VEIN ENHANCEMENT AND VEIN DILATION HELPS WITH RENAL FAILURE CARE AND PHLEBOTOMY PROCEDURES

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Introduction: Delays in AV fistula (AVF) maturation cause increased costs. Poor arm veins delay phlebotomy procedures. Early use of non-invasive devices may help assist clinical AVF maturation and vein dilation.

Method: One week after AVF creation, a novel compression device [Fist Assist (FA)] was applied 15 cm proximal to the AVF in order to apply intermittent, cyclic compression for 60 mm Hg for six hours daily for 30 days. Forty ($n = 46$) AVF patients were enrolled in an IRB approved study to test vein maturation at baseline and with the FA. Controls ($n = 17$) used a sham device. Vein size was measured and recorded at baseline and after 30 days by duplex measurement. Clinical results (percentage increase) were recorded and tested for significance using standard *t*-tests.

Results: No patients experienced immediate thrombosis or adverse effects. After one month, the mean percentage increase in vein diameter in the FA treatment group for all fistulas was significantly larger ($p = 0.05$) than controls in the first 5 mm segment of the AVF vein. Forearm AVF veins dilated in all segments of the veins compared to upper arm veins. No fistulas had complications on dialysis or after needle placement.

Discussion: Vein enlargement and dilation occurred with intermittent pneumatic compression in a home environment. Patients tolerated the device and it worked with no reported complications leading to commercialization.

Conclusion: Early application of an intermittent pneumatic compression device may assist in AVF maturation and success. FA may assist in forearm vein dilation and may provide the first wearable for the renal community to assist in AVF dilation and superficial arm vein enhancement.

Oral Pediatric Sessions

AP-01

FAILURE OF PERIPHERAL INTRAVENOUS CATHETERIZATION GUIDED BY TRANSILLUMINATION IN HOSPITALIZED CHILDREN

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Introduction: Transillumination can be used to assist peripheral puncture in children to reduce the number of attempts and increase success of procedure but its effectiveness is not proven. This study aimed to verify the failure of first attempt of peripheral intravenous catheterization guided by transillumination and identify factors related to this failure in children.

Method: Randomized clinical trial conducted at a university hospital in São Paulo-Brazil, in 2019, with children who had risk factors for failure of puncture, who were hemodynamically stable and which are punctured with LED or NIR device. Ethical aspects were respected. Data collection was performed by evaluation of the patient, according to the decision-making flowchart for selection of children classified as a difficult catheterization, health interview and observation of the procedure implementation. Randomization was performed to verify which equipment would be used. The outcomes studies were successful on the first attempt, number of attempts and reason of failure. The association of demographic and clinical variables was carried out to verify the risk factors for failure.

Results: Composed GLED for 114 children with 43% of puncture failure on the first attempt with an average of 2.7. GNIR was composed by 110 patients with 36.4% of failure on the first attempt and average of 2.8. In both groups most children with puncture failure were preschoolers, eutrophic, with chronic disease, dark skin, no palpable and difficult-to-see veins, history of multiple punctures, complications associated with intravenous therapy and infusion of vesicant drugs. The main cause of failure was hematoma (61.8%).

Discussion & Conclusion: Children under six years old, with a chronic disease, dark skin, committed veins and history of multiple punctures should be punctured with the equipment that facilitates the visualization of the veins. But, transillumination was not effective for 39.7% of patients and perhaps these children should use ultrasound.

AP-02

SECURING UMBILICAL VENOUS CATHETER WITH GLUE: WHY NOT?

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Umbilical venous catheter (UVC) is the most used venous access in Neonatal Intensive Care Unit (NICU). The UVC is introduced into the umbilical vein up to the umbilic-portal confluence and then, passing through the venous duct of Aranzio, it reaches the junction between the inferior vena cava and the right atrium. Migration of UVCs was observed frequently in many NICUs in the following days after

placement despite different securing techniques were used (stitches, adhesive plasters to the abdominal wall, etc.). Malposition of UVCs has been associated with many complications at short and long term, such as pericardial effusion, thrombi, infections. Even though the UVC has been used for more than 60 years, there is no standard securing technique. Recently, regarding fixing of central venous catheters, cyanoacrylate glue has been widely used. This device, used in securing the UVCs, could therefore potentially reduce the percentage of tip migration, the complications associated with it and the infectious risk related to the presence of a UVC. To our knowledge, no study describes the association of cyanoacrylate to stitches as UVC securing technique. In this perspective, we designed a randomized controlled trial to evaluate the efficacy of the association between cyanoacrylate glue and stitch in fixing UVC versus only stitch, on reducing UVC migration. We reported a case series of five preterm infants (GA 32 w, BW 1.2 g). The UVCs have been secured with stich and cyanoacrylate glue. The tip was detected at placement time and every 24 hours by echo scanning (longitudinal subcostal view). No tip migration was detected; no TVP was detected. UVCs removal were easy and without complications (indwelling catheter time 5 days). We hope to contribute soon to the assessment of the best solution to guarantee a solid and stable sealing of the UVC exit site.

AP-03

EVALUATION OF INTRACAVITARY ELECTROCARDIOGRAM (IC-ECG) GUIDED PERIPHERALLY INSERTED CENTRAL CATHETER TIP PLACEMENT IN VERY LOW BIRTH WEIGHT INFANTS

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Introduction: Intracavitary electrocardiogram (IC-ECG) guided peripherally inserted central catheters (PICCs) placement has been widely used and shows many potential advantages in recent observational studies.

Method: This study used a historical comparison method. A total of 253 very low birth weight infants (the experimental group) were admitted to perform PICC guided by IC-ECG, from March 2016 to June 2017, compared to previous conventional anatomical landmarks in 214 very low birth weight infants (the control group), between January 2015 and February 2016. All the catheter tip position was confirmed by postinsertion chest x-ray. The first-attempt success rate, the sensitivity and specificity, and the range of the catheter tips at the presence of the characteristic P wave on intracavitary ECG were analyzed to evaluate accuracy and consistency of IC-ECG.

Results: The first-attempt success rate of the experimental group was 95%, 82% for the control group. The first-attempt success rate of the experimental group was significantly higher than that of the control group, and the difference between the two groups was significant, $p < 0.05$. When chest X-ray was accepted as gold standard for positioning the tip of PICC, the sensitivity and specificity of IC-ECG was 92.9% and 69.2%.The difference between these two methods was significant, $p < 0.05$.When the characteristic P wave was present on intracavitary ECG, the location of the catheter tip was mainly located between the 7th and 8th thoracic vertebrae.

Conclusion: Although the intracavitary ECG positioning method can not completely replace the X-ray positioning method, it showed high sensitivity, enabled a real-time awareness and instant correction of catheter tip malposition, and improved the first-attempt success rate of PICC placement. Thus, combined use of X-ray positioning and IC-ECG positioning was significant to clinical practice.

AP-04

IC-ECG LOCALIZATION METHOD OF PICC IN NEONATES: A 5-YEARS RETROSPECTIVE STUDY

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Introduction: Performing the effect of the intracavitary electrocardiogram (IC-ECG) location method in the application of PICC on neonates.

Method: A retrospective study between November 2015 and December 2019 in a university-affiliation hospital. All neonates who inserted PICC with IC-ECG location method were enrolled. Catheterization data, catheter tip location, and catheter-related complications were collected. According to the position of catheter tip, IC-ECG localization method and x-ray chest radiograph were tested by Kappa test. The sensitivity, specificity and accuracy of IC-ECG localization method were calculated.

Results: In total, 470 neonates were enrolled. Tip position: SVC 457 (97.2%), heterotopic 13 (2.8%) cases. Catheter indwelling 14.05 $\pm$ 11.55 days. The catheter was blocked in 39 (8.3%) cases, the catheter interface was damaged in 4 (0.09%) cases, and the puncture site was infiltrated in 3 (0.6%) cases. The consistency test kappa value was 0.74, with statistical significance ($p = 0.01$). The sensitivity, specificity and accuracy of IC-ECG localization method were 0.98, 0.92 and 0.98 respectively. Youden index is 0.91.

Conclusion: In neonatal PICC catheterization, the accuracy of IC-ECG is excellent, and it is consistent with X-ray chest film in judging the effect of catheter tip entering SVC. IC-ECG localization method is worthy of promotion in neonatal PICC catheterization.

AP-05

ULTRASOUND GUIDED INTRAVENOUS EDUCATION IN THE NEONATAL ICU: A SIMULATION EVALUATION

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Introduction: The use of ultrasound guided imagery to obtain peripheral intravenous access (USGIV) is a technique that can be used to increase IV success rates, decrease central venous catheter use, decrease time to treatment initiation, reduce cost, and improve patient satisfaction. However, the only current programs to teach nurses this skill focus on adult emergency department patients. In order to remedy this knowledge gap, an USGIV program aimed at the specific needs of the NICU nurse was developed and implemented.

Method: Twelve NICU nurses were trained in USGIV using a four-hour didactic and simulation-based program. Participants first took a pretest assessing baseline knowledge of USGIV access. After didactic training, nurses worked at stations focused on USGIV access. The participants then completed a post-test and a simulation-based test requiring at least 80% successful USGIV attempts on a mannequin.

Results: The pre-test to post-test scores increased by an average of 25% demonstrating increased knowledge. All of the participants ($n = 12$) successfully demonstrated proficiency by completing at least 80% of attempted USGIVs on a mannequin. Participants were required to successfully start 5 USGIVS in the NICU with a trained proctor prior to independent practice.

Discussion & Conclusion: This study demonstrated that NICU nurses can be successfully trained in USGIV and the skill can be tailored to specific

departments. After this program, participants successfully integrated USGIV into their practice.

AP-06

COMPARISON OF INSERTION OF ULTRASOUND-GUIDED CENTRAL VASCULAR ACCESS DEVICE VERSUS CONVENTIONAL METHOD IN PEDIATRIC PATIENTS OF A SECOND LEVEL HOSPITAL IN SOUTHEASTERN MEXICO (2017–2018)

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Introduction: In pediatric patients, different studies have shown that at a younger age and smaller caliber of their veins, the greater the difficulty of inserting a central vascular access device (CVAD), which is reflected in longer procedure time and higher rates of complications.

Objective: To compare in two groups, ultrasound guided CVAD (group 1) and conventional method CVAD (group 2), the number of attempts, time and complications.

Material & Method: Randomized clinical trial in a Hospital of Mexico, in the Pediatrics service. The population under study, all pediatric patients from 1 month to 15 years with 11 months, who were in the medical unit during January 1, 2017 to December 31, 2018 that required the insertion of a CVAD.

Results: A total of 585 patients with indication to insert CVAD were included, with distribution of 248 women (42.4%) and 337 men (57.6%), pediatric emergencies 388 (66.3%), pediatric hospitalization 94 (16.1%). In 471 patients it was addressed by central venous catheterization (CVC), (80.5%) and in 114, the insertion of peripheral inserted central catheter (PICC), (19.5%) was performed. Of the 585 patients, group 1 137 (23.4%) and group 2 448 (76.6%). Complications in group 2, 107 (23.8%) and group 1, 9 (6.5%); significantly lower (X2 = 19.80; $p = 0.0000$). From group 1, the procedure time took between 10 and 20 minutes, 92 (67.1%), and group 2 between 21 and 60 minutes, 326 (72.7%); that is, the procedure time was significantly shorter in group 1 (X2 = 129.45; $p = 0.0000$). For the number of punctures (1–2) for group 1 (91%), and group 2 (88.1%); (X2 = 1, $p = 0.3168$).

Conclusions: The insertion of ultrasound-guided DAVC in pediatric patients is an effective and safe technique, with which complications and procedure time are significantly reduced.

AP-07

ULTRASONOGRAPHIC COMPARISON OF CENTRAL VENOUS ACCESS SITES SUCH AS JUGULAR, SUBCLAVIAN AND BRACHIOCEPHALIC VEINS IN CHILDREN

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Introduction: A central venous puncture is often used for implanting short and long term central venous catheters. In recent years, it has demonstrated the feasibility of ultrasound-guided venous puncture of the brachiocephalic vein, particularly in children.

Methodology: This is a cross-sectional study with prospective data collection. With the patient anesthetized, we used the linear transducer of the ultrasound device to analyze the diameters of the internal jugular vein (IJV), subclavian vein (SCV) and brachiocephalic vein (BCV) diameters, as well as using a goniometer to demonstrate the angle of the largest diameter of the BCV, on both sides, correlating with the age and weight of patients from 0 to 18 years old. The examination was repeated in the Trendelenburg position at 10 degrees.

Results: The mean IJV anteroposterior diameter was 7.17 mm in the supine position and 8.31 mm in the Trendelenburg, while the mean VSC and VBC diameters were 4.6 mm and 7.2 mm, in supine position, and 4.88 mm and 7.62 mm, respectively, in Trendelenburg. The mean angle of demonstration of the largest diameter of the BCV was 42.15° in the supine position and 41.32° in Trendelenburg ($p < 0.001$).

Discussion: Regardless of weight or age, there was a slight increase in the mean of the anteroposterior diameter of IJV, SCV and BCV, when modified decubitus between supine and Trendelenburg; however, when we compare the angles, we observe their average reduction when in the Trendelenburg position. The diameter of the BCV show higher values when compared to the diameters of the SCV or even the IJV. It is possible to define a practical relationship between the diameters of the main filters of insertion of central poisons with age and weight, in children and associated with the diameters of the catheters in order to prevent side effects.

AP-08

COMPARISON BETWEEN EPICUTANEO-CAVAL CATHETERS (ECCS) AND SURGICALLY INSERTED CENTRAL VENOUS CATHETERS (SCVCS) IN NEWBORNS

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Background: Central venous access is essential in Neonatal Intensive Care Units (NICUs). For the last 4 decades, Epicutaneo-Caval Catheters (ECCs) were introduced to provide central venous access in neonates. Until then, umbilical and Surgically inserted Central Venous Catheters (SCVCs) were used to provide central venous access.

Methods: A retrospective cohort study was designed to compare between 1264 ECCs and 69 SCVCs in our NICU from January 2016 till December 2018. In this study, we compared the success rates and catheter - related parameters between the 2 groups. Statistical analysis was done using unpaired *t*-test and Chi-square test.

Results: The overall success rate was 88.4% in the SCVCs (61/69) compared to 90% in the ECCs (1137/1264) group ($p = 0.678$). However, the first prick success rate was 69.4% in SCVCs (43/69) compared to 63.6% in the ECCs (796/1264) group. Leaking and Central Line-Associated Bacterial Stream Infection (CLABSI) were significantly higher in SCVC group (Leaking 16.4%, CLABSI 8.2%) compared to ECC group (Leaking 2.3% $p < 0.0001$, CLABSI 3.1% $p = 0.031$). Elective removal after successful completion of therapy was significantly higher in ECCs (71.1%) compared to the SCVCs (48.3%) ($p = 0.0001$). Interestingly, in 2018, we came down with the number of surgically placed SCVCs to zero ($p < 0.0001$).

Conclusions: ECCs are safe, effective and reliable method of providing prolonged IV access in newborns. It also has less incidence of complications when compared to SCVCs. We recommend using ECCs as a first-choice device to provide central vascular access in neonates. Keywords: Epicutaneo-Caval Catheter (ECC), Surgically inserted Central Venous Catheters (SCVC), Neonate, Vascular Access (VA), Neonatal Intensive Care Unit (NICU).

AP-09

EXPERIENCE USING SUBCUTANEOUS TUNNELED PERIPHERALLY INSERTED CENTRAL CATHETERS (PICCS) IN PEDIATRIC POPULATION

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Getting a venous access from a pediatric patient is a nursing challenge due mostly to the anatomy and morbidity of this kind of patients. Peripherally inserted central catheters (PICCs) are frequently used as a system which allows administering hyperosmolar solutions, vesicant/irritant medication and parenteral nutrition. There are some pediatric patients with a limited venous capital which does not allow getting a safe venous access. This situation turns difficult to install PICCs because of increased thrombosis risk. Therefore, a subcutaneous tunneling technique becomes in an important method to get a safe device/vein relationship. The aim is to describe the experience of using tunneled PICCs in children with limited venous access.

Method: A descriptive study that includes children with limited venous capital tunneled PICCs installed with aid of ultrasound guidance by nursing team for 15 months period from September 2018 to December 2019 at Intensive Care Unit Pediatrics, Clinica Davila. Feasibility, location and accessed vein were evaluated using RAPEVA and Dawson´s ZIM zone.

Outcomes: During the period were placed 30 subcutaneous tunneled PICCs with ultrasound guidance, median dwell time was 441 days. Median age was 12 months (0.9–36 months range). Sixty percent was single lumen, 40% double lumen. Anatomical placement was 33% right femoral vein, 30% right axillary vein, 13.3% left jugular vein, 10% left axillary, 6.6% left femoral. Primary indication was 76.6% antimicrobial therapy and 16.6% parenteral nutrition. The causes of withdrawal: 63.3% were removed because term of therapy, 10% dislodgement, 6.7% suspected infection and 3.3% bloodstream infection.

Conclusion & Discussion: Tunneled PICCs is an option for children with limited venous capital. This technique reduces infection risk due to its peripheral skin exit site with less microbial load and reduces the risk of thrombosis related to the percentage of vein size occupation.

AP-10

A NEW APPROACH FOR EARLY RECOGNITION OF PERIPHERAL INTRAVENOUS (PIV) INFILTRATION: A PILOT APPRAISAL OF A SENSOR TECHNOLOGY IN A NEONATAL POPULATION

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Introduction: Due to their unique developmental characteristics preterm infants are more susceptible than most to iatrogenic harm arising from vascular cannulation and infusate infiltration or extravasation. It is widely accepted that healthcare staff should take measures to prevent, detect, promptly treat, and mitigate these risks. Internationally, most neonatal units have implemented bundles of measures to reduce and manage risks associated with vascular access. One key element of these 'care bundles' is directed towards early detection of infiltration/extravasation events; often using a variety of visual assessment tools.

Method: The aim of this pilot product evaluation was to explore the feasibility of using a particular novel optical sensor based infiltration detection technology (ivWatch®) in a neonatal unit. The device was used on 15 preterm infants receiving short term vesicant infusions whilst awaiting placement of central lines. Results Infiltration notifications were issued by the technology for fourteen (14) out of the fifteen (15) infiltrations confirmed by visual inspection. This corresponded to a sensitivity of 93.3% and importantly in all cases detected was earlier than was detected by staff using an hourly documented visual inspection tool.

Discussion & Conclusion: This pilot found that the technology was easy to use and apply with only minor additions to existing IV access practice. Continuous IV site monitoring using optical sensor technology offers the potential to detect infiltration/extravasation events earlier than when using intermittent observational tools alone. Further study is required on larger neonatal study populations with a broader range of gestational ages, weights and IV site locations.

AP-11

LONG PERIPHERAL CATHETERS IN NEONATES: BRIDGING THE GAP BETWEEN SHORT PERIPHERAL CANNULAS AND EPICUTANEO-CAVAL CATHETERS?

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Introduction: Non-critical neonates often need venous access for peripherally compatible infusions (antibiotics, fluids) for limited period of times (3–7 days); in these patients, 24G short peripheral cannulas (SPC) may not be appropriate for the expected duration of the therapy (average duration of a SPC is 2 days), while central lines like epicutaneo-caval catheters may be unnecessary. In our NICU, we utilized long peripheral catheters (LPC), 4 cm and 6 cm long, 2 Fr polyurethane catheters (Leaderflex, Vygon®), inserted by direct Seldinger technique.

Methods: In this retrospective analysis, we included all the neonates candidate to a peripheral venous access for an expected duration $>$ 3 days. From January to December 2019, we inserted 42 LPCs (19 4 cm LPC and 23 6 cm LPC). Insertion sites were selected after careful evaluation of the neonate's venous patrimony according to the RaSuVA protocol (GAVeCeLT). Data collected: gestational age, weight, diagnosis, vein selected, treatment administered, reason for removal, complications and device duration.

Results: Mean duration of LPCs 5 days (1–13); only 5 lasted less than 3 days. Mean gestational age was 37.1 weeks (27.3–41.4), mean weight was 2.6 kg (1.3–4.5). The most utilized vessels were the cephalic vein ($n = 13$), saphenous veins ($n = 10$), median antecubital vein ($n = 7$), basilic vein ($n = 7$), hand dorsal veins ($n = 5$). 88% of the LPC were utilized to infuse both antibiotics and fluids continuously, while 12% only for discontinuous delivery of antibiotics; when not in use, LPCs were flushed and locked with normal saline.

Conclusion: In our experience, LPC were a valid option in neonates requiring administration of peripherally compatible infusions for period longer than 3 days. The only limitations are (a) the necessity of training for learning the technique of insertion, and (b) the size (2 Fr), which needs a vein of 2 mm or larger, that may be difficult to find in very small neonates.

AP-12

CENTRAL VENOUS CATHETER TYPES INSERTED IN THE PEDIATRIC INTENSIVE CARE UNIT AND INVESTIGATION OF ASSOCIATION WITH INFECTION PROSPECTIVELY

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Introduction: Central venous catheters (CVCs) provide much convenience for hospitalized children in pediatric intensive care units (PICUs). However, CVCs also increase the risk of severe resistant infections. Catheter-associated bloodstream infections (CABSIs) are important causes of mortality and morbidity in PICU.In general, studies involving risk factors of CABSI mostly include adult patients. In this study, we aimed to prospectively examine the patients who were hospitalized and applied CVCs in terms of catheter types and infection rates in the PICU of our tertiary hospital.

Method: We conducted a monocentric, prospective, and cohort study including all CVCs, except port-line catheters, permanent catheters, tunneled catheters, and arterial lines, inserted from a month to 18 years of age between January 2019 and December 2019. The main topic we focused on is CABSIs associated with CVC types. We examined the relationship between infection and risk factors with binary logistic regression analysis.

Results: We included 98 CVCs with 16 CABSIs. The incidence rate was 7,66/1000 catheter- days. The infection rate is higher than specified in the literature. Catheter type, placement, indication, length, lumen number, and diameter were found not to affect CABSI frequency. Besides, receiving mechanical ventilator support, being the first catheter, urgent insertion of the catheter, and underlying diagnosis of immune deficiency did not show any statistical effect on the CABSI rate. The fact that total parenteral nutrition was given through the catheter increases the risk of CABSI even if it is not very high (OR: 0.019, *p*: 0.01, 95% CI: 0.001–0.381).

Discussion & Conclusion: The incidence of CABSIs in children hospitalized in our PICU is higher than reported in the literature. However, there is no relation with the selected catheter and its features. With the development of catheter infection prevention bundles, catheter infections can be reduced regardless of the characteristics and indications of the selected CVC.

Posters Topic: Education & Training

P001

REDUCING PERIPHERAL INTRAVENOUS CATHETER CRBSI IN A MEDICAL WARD

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Introduction: From 2014 onward Peijas hospital (a part of Helsinki University Hospital) have had no recorded incidence of CLABSI. However, there was 7 blood culture positive septic infections in hospitalized patients with caused by a PIV in 20181, causing a surplus cost of 175000€. In this patient group occurred 3 deaths, and in all of these cases CRBSI was deemed to have largely contributed to the death of these patients.

Method: After the apparent need to promptly reduce the amount of PIV related CRBSI, a meeting with the infection control nurses and the vascular access team took place in our hospital. Our measures to reduce the infection rate was to (1) change the open PIV catheter with an injection port to a closed catheter, as the nurses frequently use the injection port to give IV medication, which is a infection risk 2–3 and introduce the use of a neutral pressure needleless connector combined with an disinfectant port protector. (2) Increase the nurses' awareness of other infection risks and educate the staff nurses in rigorous hand hygiene, aseptic cannulation technique and use of the VIP-score to assess the PIV insertion site for infection.

Results: After the intervention period the infection rate decreased from 7 PIV CRBSI in 2018 to 1 in the year 2019.1 The estimated cost from the CRBSI decreased to 25000 €.

Discussion & Conclusion: An education model that involves tight collaboration between the staff nurses, the vascular access team and the infection control team is crucial for the success of CRBSI prevention. Due to staff changes the education has to be continuous and included in the new nurses orientation period. Infection prevention is not only about saving money, its about preserving health and preventing death.

P002

THE VICIOUS CYCLE OF VASCULAR ACCESS

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Background: Vascular Access Devices (VAD) are essential for the delivery of intravenous therapies. As patients often live with these devices in place for many months, it is important to understand how patients make sense of living with these devices.

Aim: To explore, in-depth, the lived experience of cancer patients with a Vascular Access Device (VAD).

Design/Methods: This study followed an Interpretive Phenomenological Analysis (IPA) approach. A purposive sampling technique was used to identify eleven patients who had a vascular access device in situ and were willing to share their experiences. Semi-structured interviews were the data collection tool. Interviews were digitally recorded, transcribed and analyzed using IPA.

Findings: Four superordinate themes emerged from the interview data: The self under attack; Being rescued; Protection of self/Protection of others; Bewilderment and dismay at the lack of staff competence. The study discovered that the insertion of a long – term VAD changes the self and affects the psychological, social, and personal self and impacts on self – esteem and self – image. The insertion of a VAD results in restrictions and limitations to life and can lead to living with distrust and fear. Despite this, VADs are accepted and are eventually embodied. These findings add to existing knowledge by developing the meaning of living with a VAD. To illuminate this understanding and articulate the new knowledge a conceptual framework entitled the vicious cycle of vascular access (ViCoVA) was developed.

Discussion: When the decision is made to insert a long- term VAD, both the body and mind should be considered. Patients must be educated, supported and prepared prior to device insertion. These interventions will help break the vicious cycle of vascular access and improve the lives of people with a VAD.

P003

ACTIVITIES OF THE 1ST PICC TEAM IN THE CZECH REPUBLIC IN 2019

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Introduction: PICC team is formed by nurses who introduce PICCs, midline, mini-midline catheters, but also create conditions for implementing the principle of optimal venous access

Method: Evaluation of activities of the 1st PICC team in the Czech Republic in 2019 at the Faculty Hospital Motol.

Results: In 2019, the nurses of PICC team introduced 821 PICCs, 481 mini-midline and 420 midline catheters. They made more than 3000 dressings of these devices. In cooperation with physician they dealt with complications during the introduction of vascular device. Once a month they organized courses on proper treatment of vascular devices including workshops for other nurses in the hospital. They have prepared another 6 courses for nurses from other hospitals in 2019. They gave lectures on vascular access at a number of professional conferences. They also participated in two certified courses of the Ministry of Health of Czech Republic, after which the nurse is authorized to introduce PICCs in Czech Republic. They used their results in the field of vascular access in their dissertations during their bachelor and master studies. They participated in the update of guidelines for vascular access of SPPK (Czech Society for ports and permanent catheters) and actively participated in the preparation of the SPPK conference in 2019.

Conclusion: Complex work of the PICC team is important in implementing the principle of optimal venous access.

P004

PICC RUPTURE AS A CLINICAL PRESENTATION OF PINCH-OFF SYNDROME

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Introduction: Peripherally inserted central catheters (PICC) are very common catheters used in oncological patients to deliver chemotherapy and other medications. We report a rare, but potentially critical complication – catheter rupture as a result of the pinch off syndrome (POS). POS is defined as a compression of the catheter in the space anterior to the first rib and posterior to the clavicle. Early detection requires only catheter removal, while no intervention may result in life-threatening complications caused by catheter fragmentation. Case-presentation: 56-year old female with duplex carcinoma (breast and ovarian cancer), requiring intravenous chemotherapy had her single lumen 4F PICC placed via the left vena basilica, ECG navigation as well as chest X-ray showed catheter position in cavo-atrial junction, no complications were described. Later on she experienced a catheter occlusion. When attempting to flush the catheter (not successful), the patient experienced a sharp pain under her left clavicular bone. Chest X-ray and fluoroscopy with iv. contrast was performed. The suspected PICC rupture was confirmed. The catheter was successfully removed under fluoroscopy control without complications.

Discussion & Conclusion: Pinch-off syndrome can present with pain or swelling of the shoulder, but patients can also be asymptomatic, and the syndrome can be accidentally identified on a chest X-ray. In our clinical case, the pain mentioned by the patient and X-ray, led us to the rare diagnosis of POS. The potentially dangerous situation was resolved successfully. We implanted over 1200 PICC catheters during a 5-year period (2015–2019). Only one catheter rupture was diagnosed (0.089%). Key words: Pinch-off syndrome, catheter rupture

P005

GLOBAL COST OF IMPLEMENTING SECUREMENT WITH TRANSPARENT DRESSING

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Introduction: Securement transparent dressing is implemented in our facility for different purposes, mainly for catheter insertion site protection applied for CVC, arterial catheters, hemodialysis catheters.

Method: This study's purpose is to assess the efficacy, wearing time, and the total cost between standard dressing (3MTM Tegaderm or Opsite IV3000) and 3MTM Tegaderm TM I.V. Advanced. A pre and post observational study was conducted in the ICU of 921 beds hospital between January and August 2018. Overall, clinical data were collected by an evaluation chart. The inclusion criteria are similar to the REA RAISIN system, which means hospitalized patients for more than 48 hours. The results of the bacteriological test were compared with REA-RAISIN, which is the bloodstream infection reference registered, from 2014, 2015, 2016. It was defined that no change in the protocol.

Results: In the post-intervention phase, no significant difference was found between infection rate from ICU facility versus REA RAISIN, 3M™ Tegaderm™ I.V. Advanced Securement Dressings provides superior wear time (doubled to tripled) versus standard dressing, the economic saving up to 8 423€ and nursing time considerably saved.

Conclusion: Findings suggest that the adoption of these advanced securement device in nurses' practice contributes to gain nursing time, by providing better wear time and securement, and to lead healthcare charges less costly.

P006

CASE REPORT: INTERNAL JUGULAR VEIN THROMBOSIS DUE TO WRONG PRIMARY PICC TIP PLACEMENT. IMPORTANCE OF THE INTRACAVITARY ECG METHOD

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Introduction: A PICC (Peripherally Inserted Central Catheter) is currently a treatment solution for total parenteral nutrition with a low risk of complications. Catheter tip confirmation procedure should be a totally objective method. Intracavitary ECG method is an economical, efficient, and safe system to identify the position of the PICC tip during insertion. An incorrect PICC tip placement involves patient safety and hospital costs. Clinical case: A 32-year-old male with Crohn's disease Ileocolonic. Symptoms: Cachexia. Malnutrition. 13/12/2018: PICC placement for TPN is requested prior to surgical intervention. Catheter insertion is performed by anatomical measurement. The catheter tip is checked using an x-ray. It's informed that tip is in right axillary vein. Three days after insertion, the patient refers pain and redness on the neck. 17/12/2018: Neck ultrasound is requested due to probable central thrombosis. Description: Catheter into the subclavian vein is observed, it passes from the infraclavicular to the supraclavicular approach to leave the subclavian and goes to the anterior jugular, where the catheter tip is visualized as thrombosed. PICC is withdrawn. Anticoagulant treatment (heparin 50mg every 12 hours) for two months is prescribed. 19/02/2019: After treatment, jugular thrombosis ECO-DOPPLER is requested. After exploration, no signs of thrombosis or sequelae are observed.

Conclusion: The case shows us that a simple chest x-ray is not a safe method for the correct confirmation of the central venous catheter tip, as it is a subjective method. A wrong first position assessment states that

it is in the right axillary vein and another ulterior assessment checks that it is in the jugular vein. Intracavitary ECG method does not depend on the observer. It is based on the evolution of the P wave. Poor catheter tip placement can lead to severe complications.

P007

ULTRASOUND GUIDED SHORT MIDLINE CATHETERS AS A SOLUTION FOR PATIENTS WITH VENOUS PATRIMONY PROBLEMS

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Introduction: Current clinical practice is characterized by the importance of patient care quality and safety and the need to reduce the costs of treatments. In intravenous therapy, we must look for alternatives that meet the patient's needs, reduce complications associated with the use of venous catheters, especially in patients with venous heritage problems.

Method: Descriptive analysis, based on the information taken from the GABEN database of 45 patients of the Hospital Arnau de Vilanova from 2016 to 2019 who required peripheral venous access for IV therapy and who had difficulty insertion due to having veins surface difficult to palpate and/or visualize. A short 11 cm Midline catheter was used with a Seldinger ultrasound technique, introducing 10 cm into a basilic vein leaving the tip in an axillary vein and leaving 1cm of external length, and one 4 Fr lumen. Patients were asked for the level of satisfaction of the insertion of the placed catheter. Variables as success rate at first attempt, dwell time of catheter and level of patient satisfaction with the technique are described. Patients with morbid obesity and children under 16 have been excluded.

Results: Success rate at first insertion attempt was 98% of short Midline catheters, fulfilling their function during the time they were needed. The dwell time was between 4 weeks and 3 days depending on the cases and needs, and a 98% patient satisfaction level with the technique.

Conclusion: Evidence shows short midlines with ultrasound-guided placement performed with Seldinger technique offer patients to receive their treatment without the need for repeated venipunctures and a reduced risk of extravasation, mechanical phlebitis and a high degree of satisfaction.

P008

SPAD-CARE: SEMI-PERMANENT ACCESS DEVICE CARE

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Introduction: In 2015, the Hospital Complex of Navarre adhered to the "Best Practices Spotlight Organizations" (BPSO®) project by implementing the guide of good practices "Care and maintenance of vascular accesses to reduce complications." The goal was to implement and improve nursing care strategies for Peripherally Inserted Central Catheters (PICC) based on the latest available evidence. To do so, specific nurse training was necessary. However, due to the high mobility of patients and professionals, traditional training was not enough.

Method: There was a need to design and develop an application (APP) for smartphones and tablets, referred to as SPAD-CARE (from Semi-Permanent Access Device CARE), which facilitates untrained professionals, patients and family members to carry out the necessary care of the patients' PICC safely. Different PICCs have been needed for testing the location of the chip, which can identify the access device based on Near Field Communications (NFC) technology. The patients were informed and accepted an informed consent to perform the tests.

Results: SPAD-CARE leverages the user's smartphone to identify the access device and validate it in the information system. All actions performed on the specific access device are documented, accredited, and conveniently stored in the information system. Once authenticated, the APP guides the user in the care of the catheter in sterile conditions following the procedure of the health care center. By the date of the congress, it is expected to have a proof of concept of the APP and to have performed X tests with real patients.

Discussion & Conclusion: The application of new technologies in the field of PICC could be a great advance for both professionals and patients, since it would help untrained professionals and empower patients, family members or caregivers in the proper management of them.

P009

CENTRAL VENOUS ACCESS DEVICES –ASSOCIATED BLOODSTREAM INFECTION PREVENTION BY STANDARDIZING PRACTICE FOCUSED ON IMPLEMENTING CLABSI CARE BUNDLE WITH EVIDENCE-BASED GUIDELINES: EXPERIENCE FROM DEVELOPING COUNTRY

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Introduction: Central Venous Access Devices (CVADs) are essential for the delivery of modern cancer care. Nonetheless, CVADs are subject to potentially life-threatening complications, cause substantial morbidity and incur excess costs.

Method: CLABSI was defined using CDC criteria. A multi-disciplinary team including microbiologist, infection control, vascular access nursing; refined and disseminated educational tools in early 2018. Education included 5 strategies each for insertion (hand hygiene, chlorhexidine skin antisepsis, maximal barrier precautions, optimal catheter site selection, need for the CVAD) and central line maintenance (hand hygiene, use of disinfectant for needless connector hub care prior to access, site and dressing care with chlorhexidine impregnated dressing, tubing care, assessment of need for catheter).

Results: During the study period from May 2018 – Dec 2019 428 CVADs were inserted (Hickman line 107 & PICC line 321). Out of these 140 CVADs were inserted in 2018 and 288 in 2019. Approximately 98% patients had hematological or oncological diagnosis. Patient age varied from 7 months to 80 years (median 34 years) with 151 females and 277 males. CLABSI rate reported in 2018 was 2.78 per 1000 CL days (2.883 for PICC and 2.56 for Hickman). CLABSI reported in 2019 after completion of CLABSI Bundle was 1.01 per 1000 CL days (1.22 for PICC and 0.79 for Hickman).

Discussion & Conclusion: A best-practice central line maintenance care bundle can be implemented, and quality improvement collaborative

found significant reductions in observed CLABSI rates in hematology/oncology patients. This program highlights the dramatic impact on CLABSI rates that can be achieved in the first year of a hospital wide CLABSI prevention program.

P010

FIRST PHASE TO IMPLEMENT EVIDENCE-BASED RECOMMENDATIONS IN PATIENTS WITH VASCULAR ACCESS DEVICES AS PRESCRIBED BY THE 'BEST PRACTICE SPOTLIGHT ORGANIZATION'

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Introduction: In 2012 the Healthcare Research Department (Investenisciii) promoted an international initiative based on the adoption of Guides in Clinical Practice (GCP) by the RNAO (Registered Nurses Association of Ontario, Canada) with the objective of introducing recommendations resulting from trials and evaluation. Son Llàtzer University Hospital (HUSLL), located in the Balearic Islands, was chosen in 2018, as a candidate to implement the recommendations from their Guide: "Assessment and Device selection for Vascular Access."

Methodology - **Objective:** To analyze the implementation and results obtained in the first year using GCP. Design: Comprehensive study of the implementation. Field: medical and surgical units at HUSLL Data: Access and barriers to implementation, strategies adopted by the institution, number of health care professionals trained.

Results: The main barriers encountered by team leaders and guide coordinators have been: differences in the clinical practices, lack of coordinated data, difficulties associated with multi-disciplinary focus. Among the facilitators have highlighted: motivation of health professionals, implantation in a computerized hospital, team building work and the diffusion campaign carried out. The strategy initiated in this first year has been mainly oriented to the dissemination of the Project for the recruitment of front-line professionals (defined as "champions" in the GCP), through an extensive advertising campaign at hospital level: through the Hospital Intranet, multi-disciplinary training sessions and posters, as well as off-site dissemination of the Project in various media. During the first year numerous health professionals have been trained: 50 nurses, 10 doctors and 1 pharmacist.

Discussion: The Best Practice Spotlight Organization (BPSO) Program has been widely accepted among healthcare professionals. The leadership and nursing work capacity has complied with the GCP. Multi-disciplinary work has been promoted favoring patient safety.

P011

OBSERVATIONAL STUDY AND ANALYSIS OF COMPLICATIONS IN PATIENTS CANDIDATE FOR THE POSITIONING OF PICC-PORT

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Introduction: The recent development of innovative materials and techniques of ultrasound-guided venipuncture of the deep veins of the arm has led to an increase in the diffusion of peripheral insertion central venous catheters (PICC). The same methodology applied to brachial ports has made these devices alternative to thoracic ports. The indications for positioning are the same as for the thoracic port: need for venous access for more than three months, with discontinuous use. The PICC-port has specific indications: radiotherapy or muscle-skin reconstructions in the thoracic region, tracheostomy, radiodermatitis or subclavicular skin alterations, monoclonal antibody therapies that determine the appearance of micro-pustules in the thoracic region, patient preference for psychological or aesthetic reasons.

Method: We analyzed data from a cohort of 150 PICC-ports in women with breast cancer during one year, using 5 F polyurethane catheter and mini-invasive ultrasound venipuncture technique with micro-introduction set. Procedures performed by expert operator with application of the local protocol for the prevention of infections and catheter-related thrombosis: chlorhexidine 2%, maximum barrier protection, catheter/vein ratio $<1/3$, ECG tip location, intradermal suture and cyanoacrylate glue. We focused on the cumulative of early and late complications.

Results: We had no significant complications during placement but we had a high incidence (31%) of post procedural ecchymosis with spontaneous regression in 48 hours. The total number of catheter days was 46240 with an average of 309 days per patient. In 2 cases the device was removed due to infection of the skin pocket. The cumulative incidence of CR-BSI was of 0.04 per 1000 catheter days (two cases). Two cases of symptomatic venous thrombosis with complete resolution after therapeutic dose of LMWH.

Discussion & Conclusion: The current PICC implantation techniques applied to totally implantable brachial devices make this device well tolerated and with a low risk of periprocedural and late complications.

P012

PICC DIFFICULT REMOVAL: AN EXPERIENCE OF AN INTRAVENOUS THERAPY TEAM

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Introduction: Reasons for difficult removal of PICC are fibrin sheath formation, vein thrombosis or stenosis and long catheter duration.

Method: The aim is to describe the incidence of difficult removal of PICC, its risk factors and the techniques implemented for removal. A descriptive study was carried out at Araba University Hospital between April 2015 and December 2019. The sample was all the PICC lines inserted by the Intravenous Therapy Team (ITT) during this period. The main variable was the difficult removal of PICC defined as the impossibility of catheter removal by continuous traction without resistance, checking the total catheter removal and consequently, the need of additional interventions of the ITT or radiological interventions. Risk factors of difficult removal (type of disease, catheter duration, laterality, thrombosis, migration, loop or knot and the fibrin sheath formation) and those related to removal techniques were collected. Variables were expressed in absolute frequencies and percentages.

Results: A total of 2910 PICC were inserted in 2393 patients, 52% were men. Of those PICCs, 73.78% were inserted in oncologic and hematologic patients. PICC difficult removal happened in 0.38% ($n = 11$). 54% ($n = 6$) were inserted in the right arm. The mean duration of PICC was 353.82 days (range 1–1519). Catheter patency alteration happened in 27% ($n = 3$). The PICC thrombosis rate was 36.36% ($n = 4$) and migration, knot or loop occurred in 45.45% ($n = 5$). Fibrin sheath was found in 27.27% ($n = 3$). ITT and radiological intervention for removal occurred in 36.36% and 63.63% of the cases, respectively.

Discussion & Conclusion The incidence of this event is very low. Some risk factors as thrombosis and fibrin sheath formation were found. The limitation of this study is the small sample due to the low frequency of this event which makes impossible a stronger statistical analysis. More evidence about this complication is needed.

P013

ADEQUATE PRELIMINARY ULTRASOUND VASCULAR ASSESSMENT, BASIC DECISION-MAKING POINT: A CASE REPORT

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Introduction: A 43-year-old woman affected by breast cancer with secondary metastasis at the lymph node, skin (thoracic and left subclavicular region), bones, pleura and lung. Clinical synthesis: left mastectomy after neoadjuvant chemotherapy treatment in 2015, radiotherapy on the left chest wall and adjuvant chemotherapy in 2016. Left axillary lymphadenectomy in 2017 with subsequent left upper limb lymphedema. Chemotherapy was performed by a totally implantable venous catheter removed in 2019 for CRBSI (catheter-related bloodstream infection).

Method: Need for stable venous access for continuous infusions, chemotherapy and high doses of intravenous opioids for pain management. Ultrasound assessment of the venous district of the upper right limb for the possible positioning of a PICC – Peripherally Inserted Central Catheter. RaPeVA (Rapid Peripheral Vein Assessment): right axillary venous ectasia in the axillary region with a very slow blood flow without evidence of venous thrombosis, the vein is totally compressible to probe pressure. The terminal tract of the right cephalic vein is also ectasic at its entry into the axillary vein. In the ultrasound evaluation of the neck veins, an enlarged lymph node determines a compression of the internal jugular vein with a reduction of the caliber at the level of its union with the subclavian vein in the supraclavicular region.

Results: Therefore we decided to place a PICC 5 F in polyurethane with proximal trimming like an FICC after performing RaFeVA (Rapid Femoral Vein Assessment), visualization of the common femoral vein in long axis and ultrasound-guided puncture in plane. Subsequently, a subcutaneous tunneling of the catheter was performed with an exit site above the right iliac crest. The catheter was fixed with a subcutaneous anchored sutureless device, SecurAcath® 4 F.

Discussion & Conclusion: An adequate preliminary ultrasound vascular evaluation is a fundamental point of the bundle for the correct insertion of a vascular access.

P014

SIMULATOR OF THROMBOTIC OCCLUSION AND SIGNIFICANCE OF SIMULATION TRAINING OF MEDICAL PERSONNEL IN TREATMENT OF THROMBOTIC OCCLUSION

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Introduction: Thrombotic occlusion is one of the reasons for interrupting therapy in patients with long-term CVC. The lack of the ability of staff to recognize the type of occlusion and choose the correct technique for administering a thrombolytic drug lead to an increase in the period without therapy or the loss of a vascular device.

Method: To develop the skill of diagnosing the type of occlusion and choosing the correct thrombolytic drug technique, an occlusion simulator was created on the basis of the Arduino microcomputer and two solenoid valves. One valve simulates complete occlusion, the second imitates partial valve occlusion.

Results: In the process of training, the instructor remotely simulates the clinical signs of one of the types of occlusion, offering the student to choose the optimal technique for administering a thrombolytic drug and implement it.

Discussion & Conclusion: As a result of the use of simulation training in diagnosing the type of thrombotic occlusion and choosing the required technique for administering thrombolytic drug, the number of catheter injuries due to occlusion decreased from 33 cases in 2018 to 23 cases in 2019

P015

THE ROLE OF SIMULATION TRAINING IN INCREASING THE TIME OF LESS-EVENT EXPLOITATION OF INTRAVASCULAR CATHETERS

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Introduction: One of the critical moments in the operation of short-term CVC in children's hospitals is catheter site dressing.

Method: The changes in the frequency of short-term CVC loss during catheter site dressing was assessed after the introduction of simulation training at the «Dmitry Rogachev National Medical Research Center of Pediatric Hematology, Oncology and Immunology».

Results: In 2018, before the introduction of the practice of teaching technical skills to catheter site dressing in an active and sleeping children, the proportion of catheter loss due to a violation of fixation technique amounted to 48% of all complications associated with the exploitation of vascular accesses. Of these, 9% of cases of catheter removal occurred during a dressing change. Since March 2019, the learning process has been changed. In addition to theoretical studies, technical skills are tested on models, including as part of simulation scenarios that simulate active and negatively-minded patients. As a result, in 2019, the proportion of catheter loss during the catheter site dressing decreased to 6%.

Discussion & Conclusion: The use of simulation technologies in the development of technical skills not only increases the professional level of medical personnel, but also allows specialists to be ready for their use in various clinical conditions.

P017

RESTORING PATENCY OF CENTRAL VENOUS PORT-CATHETER WITH LOW-DOSE THROMBOLYSIS

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Restoring patency of central venous port-catheter with low-dose thrombolysis.

Purpose: To report retrospective single center experience with low-dose thrombolysis of central venous port catheters using cryopreserved solution of recombinant tissue plasminogen activator (rt-PA).

Materials and Method: From September 2008 to December 2019 we implanted 5554 central venous port catheters and performed low-dose thrombolysis 294 times in 258 patients (63 males, 195 females, age from 19 to 79 years, mean 55 years) for port-catheter dysfunction. One hundred fifty one patients were treated for solid tumor, 85 for hematologic malignancy and 22 patients for non-malignant disease (cystic fibrosis, bronchial asthma, hypo-parathyroidism). Low-dose thrombolysis was performed with cryopreserved solution of rt-PA (Actilyse, Boehringer Ingelheim, Germany) which was prepared under sterile condition. Twenty milligrams of rt-PA was diluted in 20 ml solution, which was divided to 5 mg (from September 2008 to April 2014) or 4 mg (from May 2014 to December 2019) equal amounts and frozen at –20°C. We used only one dose of thrombolytic agent frozen solution for each thrombolysis.

Results: Mean dose of alteplase for thrombolysis was 3.5 mg (range from 1 mg to 5 mg). Successful restoration of port-catheter patency was 90.8 % (267/294). We recorded 7 (2.4 %) procedural complications. One major adverse event was observed in patient with polyvalent allergy. Two patients had shiver, two nausea and two had faintness.

Conclusion: Low-dose thrombolysis with cryopreserved rt-PA is very cost-effective method for patency restoration of central venous port catheter with acceptable complication rate.

P018

A PAN EUROPEAN REVIEW OF PERIPHERAL IV PRACTICES: CAN WE DO BETTER?

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Conducting observational assessments to measure compliance to best practices within Health Care institutions is needed to help prevent IV complications and improve patients' experience. However, those audits are challenging to implement and often not conducted. As W. Edward Deming said "You can't manage what you don't measure." A standardized practice review program focusing on peripheral IV therapy management, from insertion to removal, was implemented: BD Signature Solution™. Through an observational methodology, trained professionals, using an app-based tool, assess the compliance of the institution's HCPs to the INS 2016; EPIC3 2013; RCN 2016 & CDC 2011 standards & guidelines. Observations were conducted in 98 Health Care institutions across Europe in 13 countries from May 2016 to March 2019, in a wide variety of wards (326) from mostly Public Regional (40%) and University (42.3%) Hospitals. A subset of the compliance rates analyzed from a panel of 57 responses are as follows: • 49% Patients were not informed about the procedure or provided with any education • 44% Practitioners did not repeat hand hygiene before the procedure • 38 % Skin preparations prior to PIVC insertions were not compliant • 8% Insertion site selected were inappropriate • 75% PIVC insertions were successful upon the first attempt and 9% of insertions failed • 35% of the time, after more than 2 failed attempts, there was no escalation • 20% Inserted cannula were not flushed at all Overall, in Europe, there is good compliance to best practices, though significant practice variations within institutions and countries exists. Assessing peripheral IV practices, identifying key areas for improvement, implementing targeted training, education, and technology, and reassessing to monitor improvements is a fundamental quality process to better manage and prevent IV complications. One European consensus guidelines document and the resources to efficiently implement the latter in a sustainable manner may also improve the practices.

P019

IMPROPER REQUEST FOR VASCULAR ACCESS GROUP CONSULTANCY: CAUSES, INCIDENCE, CONSEQUENCES AND PREVENTIVE STRATEGIES

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Introduction: University hospital, 1144 beds, Advanced Vascular Access Group (AVAG) operating through bedside consultancy. Implant request made from wards doctors or nurses. Group made up of 2 dedicated nurses and other 12 with monthly availability in overtime. The high amount of activities to be delivered, associated with the extension of the hospital area (35 hectares), the small number of specialist staff, create the need to optimize the appropriateness of requests from hospital wards.

Methods: Retrospective analysis on consultancy requests from 01.01.2019 to 31.12.2019.

Results: Total consultancy provided: 4122. Implants 2915, consultancy on device management 606, improper requests 601. Improper request causes: 1. Poor knowledge of PICC and Midline devices across the ward's doctors and nurses. 2. Lack of a specialist figure in the departments with specific skills in Vascular Access area. Improper request consequences: 1. Non-optimization of the AVAG consultancy service, with consequent risk of delay in administration of patient's therapies. Preventive strategies: 1. Delivery of a Vascular Access management course in October 2019. Each hospital department sent a nurse, which mission is to instruct consequently all wards colleagues. 2. Drafting and dissemination, via the company intranet portal, of operating instructions and video tutorials relating to the correct PICC and Midline indication and management strategy. 3. Establishment by the AVAG of a telephone reference for any clarification, before requesting specific advice. 4. Diffusion of Italian Anesthesia and Analgesia Society good clinical practice indications about Vascular Access Management.

Discussion: The frequency of improper request for AVAG consultancy seems to be a determining factor regarding the optimization of the work. It will be up to the team to assess whether the establishment of the Vascular Access management course can be a valid tool for solving the problem. As regards the outpatient patient, previously selected by AVAG, the question does not arise.

P020

PROCEDURAL AND EDUCATIONAL INTERVENTIONS TO REDUCE CATHETER-RELATED COMPLICATIONS IN PATIENTS WITH INTESTINAL FAILURE RECEIVING HOME PARENTERAL NUTRITION

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Introduction: Patients with intestinal failure on home parenteral nutrition (HPN) are at risk for catheter-related complications; mainly infections and occlusions. Parenteral nutrition is delivered through central access such as Hickman™ catheters, subcutaneous ports and tunneled peripherally inserted central catheters (PICC). The aim of the present study was to compare complication rates between the various types of catheters, catheter locks, catheter care and catheter care education interventions.

Methods: Data of catheter-related complications were retrospectively collected from patients who received HPN between January 2010 and November 2019. We evaluated catheter-related bloodstream infection and occlusion incidence rates per 1000 catheter days. We also recorded a type of catheter, use of catheter locks, mode of catheter care. An 8-hour program of lecture and hands-on skills was developed. Using before and after study design the impact of a hands-on catheter care skills training program led by clinical nurse specialist was assessed.

Results: The incidence rates of bloodstream infections were comparable for Hickman and PICC catheters and were higher in subcutaneous ports. Before the implementation of catheter care education program the catheter-related infection incidence rates were 1.0/1000 catheter days for self-catheter care and 2.6/1000 catheter days for home nursing care ($p = 0.01$). The overall incidence rates of catheter-related infections dropped down from 1.3/1000 catheter days before to 0.52/1000 catheter days after the implementation of catheter care education program ($p < 0.01$).

Discussion & Conclusions: Our data suggest that in medium-term home parenteral nutrition a tunneled PICC catheter is safe alternative compared to Hickman catheter. These data also strongly suggest that improved catheter care education decreases catheter-related infections in home parenteral nutrition especially in patients on home nursing catheter care.

P021

THE IMPACT OF A STANDARDIZED, BLENDED LEARNING, SIMULATION-BASED EDUCATION PROGRAM ON CLINICIANS' CONFIDENCE IN PLACING ACUTE CENTRAL VENOUS CATHETERS: A MIXED METHODS REVIEW OF ATTENDEE EVALUATIONS

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Introduction: The 'Ultrasound-Guided Central Venous Access: Compliance within Practice Course' is an evidence-based, multimodal education program that supports clinicians to develop their knowledge, skills and competence to safely and effectively insert Central Venous Catheters (CVCs). This course was developed by the Clinical and Medical Affairs Team at Teleflex and was launched in the UK in 2017. The program has a blended learning approach with a particular focus on simulation, has been facilitated within six acute hospital trusts and has received accreditation from the Royal College of Anesthetists.

Method: A mixed methods approach has been utilized to evaluate the impact of the course on attendees' confidence in undertaking the CVC insertion procedure. Thus far there have been 12 courses with a total of 211 attendees, of which 186 have completed an online evaluation undertaken following the course. Within this each attendee was asked to state their level of confidence with specific components of the CVC insertion and management process before and after the course, evaluate organizational aspects of the course, while also allowing for open comments about their learning experience.

Results: The quantitative data demonstrates a significant increase in confidence among attendees following the course ($p < 0.01$) (graph 1). The learning experience is also rated consistently high, with an average score of 4.54 out of 5 (graph 2). The qualitative data shows common themes of praise for the simulation components of the course, approval of the content and gratitude for the opportunity to attend such an event.

Discussion & Conclusion: Analysis of the evaluation data demonstrates that this course significantly improves attendees' confidence with the process of inserting acute CVCs and supports the use of standardized, blended learning, simulation-based educational programs within healthcare education. Further investigation is needed, however, to evaluate its impact on attendees' clinical practice, patient experience and patient outcomes.

P022

ULTRASOUND-GUIDED HYDRO-DISSECTION FOR TOTALLY IMPLANTABLE CENTRAL VENOUS ACCESS DEVICE RESERVOIR POCKET: A NEW PROCEDURE FOR A BETTER OUTCOME

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Introduction: Correct positioning of the reservoir in a totally implantable central venous access device (TICVAD) is imperative. Failing to implant it above the pectoral muscle increases the risk that it may capsize while enhancing chances of overlying skin layers erosion. In addition, subcutaneous placement lets the reservoir and the catheter free to move increasing the risk of damaging the tunica intima along with venous thrombosis. Until now the pocket has been dissected surgically which does not provides certainty about the position. We've thought about performing an ultrasound-guided hydro dissection with an anesthetic solution that should guarantee the right positioning as well as an improvement in post-operative pain as the tissue trauma caused by surgical instruments is avoided.

Method: After making a skin and subcutaneous incision parallel to the inferior clavicular edge, the probe is positioned in order that the transductor short axis should corresponds to the lower border of the incision. The pectoralis muscle is visualized with its fascia and overlying tissue layers. The injection needle is inserted in in-plane (IP) view through the skin incision and visualized on sonography. Then hydro dissection is made over and along the pectoralis fascia with a solution of ropivacaine 0.5% creating a pocket immediately above the muscle with no surgical instruments. Port reservoir placement is therefore performed.

Results: This procedure has been performed on more than 60 patients. No complications were recorded. We've noticed a reduction in the average time of device implant and moreover, a decrease of postoperative pain complaints.

Conclusions: This technique is simple, quick to perform and safe being ultrasound guided. Therefore, short-term complications and mean operative time decrease and the correct positioning is guaranteed. The use of an anesthetic solution rather than surgical instruments can reduce postoperative pain which can be annoying especially in fragile patients.

P023

MULTIDISCIPLINARY TEAM OF VASCULAR ACCESS

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Introduction: Vascular access specialist team (VAST) are currently the best standard of care for vessel health and preservation (VHP). VHP is a pathway that begins with assessment of patient veins and selection of the lowest-risk device to deliver the treatment plan. Integration of research and guidelines into VHP is designed to result in the best outcomes for patients, allowing completion of treatment with fewer vascular access devices (VADs), less cost, fewer supplies and less time while limiting complications. Our institution is a tertiary cancer reference center with a high volume of oncological patients.

Method: We started in the beginning of 2019 the first VAST in our country, comprised of surgeons, anesthesiologists and nurses. This team was an evolution of a CICC unit that was formed in 2007.

Results: In this first year the team oriented the efforts for PICC sessions and courses (one of the surgeons had PICC training through WOCOVA), both in and outside our hospital. We started ultrasound PIV and PICC placement by nurses and performed multiple formative sessions throughout our hospital on the best VAD care both short and long-term. In September we were part of the organizing and scientific committee, as well as responsible for the pre-congress PICC and CICC courses, of the first International VA Meeting in our country. During this period, we placed a total of 123 PICC and 870 CICC. We have an hospital contact number available every weekday in order to help VA related problems. We also have a weekly office day for elective cases.

Discussion & Conclusion: The first year of the first VAST in our country has ended with a positive balance. We still have a long way to go and several projects to start in the future.

P024

COLLABORATIVE APPROACH TO IMPROVE PIVC OUTCOMES

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Introduction: An internal audit within the Organization highlighted that PIVC first stick success had decreased from 92% to 76%. Additional cannulation attempts increase patient discomfort and result in a waste of valuable resources of equipment and nursing time. A multifaceted collaborative approach between the Organization and BD was implemented to improve clinical practice.

Method: A systematic Practice vs Guidelines (PvG) review of the current peripheral IV Cannulation practice was performed by the BD clinical nursing team after discussions and systematic plan agreement with Organization's Lead Vascular Access Nurse. Replace the current open system PIVC with the Nexiva closed system PIVC which has been proven to reduce the number of manipulations required, reduce accidental dislodgement, lessen exposure to blood, lower the chance of mechanical phlebitis, and extend median dwell time. The BD clinical team supported the Organization by facilitating hands on training as required to clinical areas during the implementation phase. The training was bespoke and tailored to the staff needs in all clinical areas. Group training or 1 to 1 as required. Redesigned IV Training Program to include E Learning modules for venipuncture and cannulation and monthly classroom sessions overseen by a BD clinical nurse specialist and RMH Practice Educator. Followed up with clinical support and assessments/sign off by RMH Clinical Practice Educator. Regular repeat PvG reviews and adherence to current national and international best evidence-based guidelines.

Results: A repeat PvG review performed 8 months post implementation has shown an increase in the first stick success to 88%, with a 34% reduction in cannula waste. Blood exposure to blood during PIVC insertion reduced from 24% to 0%.

Conclusion: By combining our expertise, it has been possible to achieve improved patient and HCP outcomes whilst maintaining or reducing costs through the benefit of collaborative-based healthcare.

Posters Topic: Research & Innovations

P025

INVESTIGATION AND ANALYSIS OF PERIPHERAL VENOUS CATHETER INDWELLING TIME AND FAILURE IN THE HEPATOLOGICAL SURGERY DEPARTMENT

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Introduction: Peripheral intravenous catheter (PIVC) therapy is the most common hospital procedure. It's insertion and maintenance are easy to fail for a variety of reasons. This study investigates the duration of indwelling time and nursing quality of PIVC in the hepatological surgery department and the affecting factors of failure.

Methods: Vascular access device assessment form was implemented to prompt removal of redundant PIVCs, ensuring early detection and management of complications as well as promoting the nursing care. The clinical data of patients that received PIVC infusion from March to June 2019 was collected. All patients uniformly used 24-gauge safety-type closed PIVC and were fixed with a sterile transparent dressing. All catheters were sealed with 50 U/mL heparin saline.

Results: A total of 445 patients participated in the study. 773 PIVCs from the 395 patients were included in the study. The indwelling time varied from 0.5 h to 329 h, and the median indwelling time was 49.00 $\pm$ 0.86 h. The insertion positions were as follows: hand (61%), forearm (28%), wrist (6%), the upper arm (4%), finger (1%). The first-attempt success rate of insertion was 92%. The rate of PIVC failure was 46%. Women and the elderly tended to fail. Complications were independent risk factors for PIVC failure (OR: 26.98, 95% CI: 17.48–41.64, $p < 0.01$). There were no statistically significant differences in the incidence of infiltration (72%, $p = 0.720$), phlebitis (8%, $p = 0.174$), occlusion (5%, $p = 0.163$), and errhysis (4%, $p = 0.295$) during each 24-hour indwelling period.

Conclusion: Although the first-attempt success rate of PIVC is high, the quality of catheter indwelling is not optimistic. It's mostly related to age, gender and complications. Above all, complications are independent risk factors for PIVC failure.

P026

REAL-WORLD DATA OF THREE DIFFERENT VENOUS ACCESS DEVICES APPLICATION IN CHINA: A 200-HOSPITAL DATABASE ANALYSIS

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Introduction: Aim of this study is to understand demography, application, and costs of different venous access devices (VADs) in clinical practice, including central venous catheter (CVC), peripherally inserted central catheter (PICC) and totally implanted port (PORT), and to identify factors which influence treatment choice in real-world setting in China.

Method: We investigated a database, which contains electronic medical records from nearly 200 hospitals across the nation. Ambulatory, inpatient and medication records from Jan 1st, 2015 to Jun 30th, 2018 were examined for retrospective analysis. Demographic data and complication rate of each VAD (CVC, PICC and PORT groups) have been explored. Logistic regression analysis was performed to identify influential factors.

Results: 42,644 patients identified as receiving VADs implantation within the thirty-month period. Chemotherapy prescriptions were found in most of identified cancer patients in PICC and PORT groups (36.9%, 64.5%, 82.3% for CVC, PICC, PORT, respectively). By screening the level of care, the critical care was needed for 13.6%, 7.6%, and 0.4% of CVC, PICC, PORT groups, suggesting patient condition was relatively stable in the PORT group. Rates of post-implantation infection and thrombus formation were lower in PORT group (0.7%), comparing to CVC (9.5%) and PICC (6.7%) groups, and thrombus formation had the similar trend in the groups (10.7%, 8.1%, 0.9% for CVC, PICC, PORT, respectively). The logistic regression analysis demonstrated that age, insurance coverage, chemotherapy, and the level of care were key factors that might contribute impact on choosing which VADs should be used.

Discussion & Conclusion: The results demonstrated that chemotherapy prescription, and patient condition are crucial considerations to affect clinical practice. VADs selection is not only based on clinical needs, but also patient preference. Therefore, willingness-to-pay from patient's perspective should be investigated to address patients' needs in the future.

P027

COMPLETE OCCLUSION OF VENOUS PORT BY A BLOOD CLOT – THE EFFECT OF LOW-DOSE THROMBOLYSIS USING THE "2 NEEDLES METHOD"

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(a) Port occlusion caused by a blood clot may occur if the port is handled incorrectly. If the occlusion is partial, blood aspiration usually fails, but it is possible to deliver solutions. The problem arises when the occlusion is complete. Thus, the clot may be present in the port chamber and both, aspiration and application fail. (b) We have developed the „2 needles method" to resolve port obstruction. There were 30 patients enrolled between 2010 and 2019. Patients were indicated for low dose thrombolysis. The principle of this method is to introduce 2 Huber needles into the port, with the tips of the needles located on opposite sides of the chamber. Two 10 ml syringes are used, one containing 9 ml saline with 1 ml (1 mg) alteplase. We repeat flushing a thrombolytic solution from one syringe to the other every 15 minutes, repeated aspiration of released blood clots is provided. Finally, the port is flushed with saline and 2 mg alteplase, applied in continual infusion of 50 ml of saline for 2 hours. (c) In our group of 30 patients with complete occlusion, the success rate of low-dose thrombolysis was 86.6%. Medium time to achieve successful thrombolysis was 60 minutes. There were 4 unsuccessful cases (refractory blood clot occlusion in the chamber or an occlusion caused by precipitates of different drugs and parenteral nutrition). The replacement of port is about 8-times more expensive than thrombolysis. We have not experienced any side effects. (d) Low-dose thrombolysis using alteplase in combination with „the 2 needles method" represents an effective and relatively cheap technique do resolve the complete port occlusion caused by blood clot in the chamber or port-catheter. Currently, with adequate nursing care and the correct way to flush and remove the port needle, complete port occlusions appear rarely in our center.

P028

PRE-EMPTIVE VS. 'ON DEMAND' CORRECTION OF AV FISTULA ANEURYSMS

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Aim: to analyze the results of native AVF aneurysms surgical correction in hemodialysis patients.

Method: A retrospective observational study included 158 patients who underwent various surgical interventions. 87 patients (55.1%) underwent pre-emptive surgeries. 71 patients (44.9%) underwent surgeries after AVF thrombosis («on demand»).

Results: In the case of pre-emptive surgeries, secondary patency was 69% [95% CI 44.9; 84.2] after 4.8 years (maximum follow-up). In the case of on-demand surgeries the secondary patency was 45.6% [95% CI 23.6; 65.2] after 4.3 years (maximum follow-up). HR 0.296 [95% CI 0.147; 0.592], $p = 0.0002$. The risk AVF function loss was lower in patients who received pre-emptive surgeries compared with on-demand surgery: 2.642 [95% CI 1.406; 4.519] versus 6.268 [95% CI 3.927; 9.49] per 100 patient-years, incidence rate ratio (IRR) = 0.422 [95% CI 0.207; 0.834], $p = 0.0127$. The need for CVC was also lower in patients who received pre-emptive surgeries: 1.728 [95% CI 1.38; 2.136] versus 2.821 [95% CI 2.292; 3.434] per 10 patient-years, IRR = 0.6125 [95% CI 0.4576; 0.8185], $p = 0.0009$. Moreover, the number of operations was significantly higher in patients who underwent pre-emptive surgeries: 4.207 [95% CI 3.654; 4.821] versus 2.963 [95% CI 2.421; 3.59] per 10 patient-years, IRR = 1.42 [95% CI 1.124; 1.802], $p = 0.0031$.

Conclusion: Preventive surgical interventions can significantly extend the AVF patency and reduce the need for central venous catheters, however, this is achieved by significantly increasing the number of surgeries. The concept of routine monitoring of a normally functioning AVF by a surgeon should replace the concept of on-demand surgery in case of AVF thrombosis or development of other serious complications.

P029

BLOOD FLOW OF AV FISTULA AFTER RECONSTRUCTIVE SURGERY FOR VENOUS ANEURYSM OF THE FISTULA

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Fistula vein aneurysms have two specific associated complications: significantly increased volume blood flow (Qa) and stenosis of various vein segments. High Qa values contribute to a rapid aneurysm increase and increase the risk of cardiovascular complications (heart failure with high cardiac output). In turn, stenoses are a common cause of AVF dysfunction and increase the risk of its loss. Both of these complications are indications for surgical treatment of an aneurysm. We analyzed the hemodynamic effects of surgeries.

Method: A retrospective observational study included 158 patients who underwent various surgical interventions. In all cases, was performed aneurysmorrhaphy, which was supplemented by stenosis plasty with use of the resected aneurysm wall.

Results: In almost all cases, fistula vein aneurism has been associated with various hemodynamic disorders. The median volume blood flow Qa was 2.9 [interquartile range - IQR 1.9; 3.8] l/min., (minimum. 1 l/min., max. 4.5 l/min.). Reconstruction in most cases led to significant change in Qa ($p < 0.0001$). After reconstruction, the Qa median was 1.8 [IQR

1.6; 2.1] l/min. (minimum 1.4 l/min., max. 2.1 l/min). It is noteworthy that in patients with low Qa values, Qa increased slightly, and at high values, it decreased significantly. However, additional methods of blood flow reducing were not used. The median of the Qa difference was –1.2 [IQR –1.9; –0.2] l/min. (minimum –2.7 l/min, max. 1 l/min.).

Conclusion: AVF aneurysm plasty normalize the volume blood flow, regardless of the initial Qa value and without additional methods of blood flow reducing.

P030

COMPARATIVE ANALYSIS OF BALLOON ANGIOPLASTY WITHOUT STENTING – RESULTS FOR CENTRAL VEIN STENOSIS IN HEMODIALYSIS PATIENTS

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Method: A retrospective study included 80 patients with confirmed central vein stenosis (CVS). The main group included 39 patients who underwent percutaneous balloon angioplasty (BA). The control group included 41 patients who did not have balloon angioplasty for various reasons. In these patients we performed only «open» palliative interventions: thrombectomy, proximalization of arteriovenous anastomosis, AVF blood flow reduction.

Results: Functional primary patency did not differ. Primary patency after BA was statistically significantly better, but difference was minimal: median survival in the study group of 8 vs. 6 months. There was the strong negative correlation between the primary patency and functional primary patency in the main group ($r = -0.627$, $p < 0.0001$) but not in the control group ($r = 0.049$, $p = 0.7599$). Thus, the later manifestation of CVS related with lower effectiveness of BA. The functional secondary patency in the main group was significantly better: median survival was 47 vs. 34 months as well as secondary patency: median survival was 16 vs. 7 months. The need for open interventions was lower in the main group: 0.374 and 2.451 per 10 patient-months, incidence rate ratio (IRR) = 0.153, ? < 0.0001; as well as overall need for interventions: 1.511 and 2.451 per 10 patient-months, IRR 0.617 [95% CI 0.461; 0.825] $p = 0.0011$.

Conclusion: 1. Central vein stenosis inevitably leads to loss of vascular access on the ipsilateral side. 2. Balloon angioplasty allows to extend the period of AVF use but it is not a radical treatment method of CVS. 3. The results of balloon angioplasty are significantly affected by the length of the period from the start of AVF use to the CVS manifestation. 4. Multiple repeated BA are apparently justified in patients for whom the possibility of creating a new vascular access is doubtful.

P031

PRIMARY ISOLATED BALLOON ANGIOPLASTY VS. STENTING (BARE METAL STENTS)

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Aim: comparative analysis of the results of isolated balloon angioplasty (BA) and BA with stenting of central veins stenosis in patients on hemodialysis.

Method: A retrospective study included 62 patients with confirmed stenosis of the central veins. In 39 patients, stents are not used, in 23 patients we used bare metal stents.

Results: Functional primary patency did not differ in the groups. The use of stents leads to increase primary patency, primary assisted patency and secondary patency – Figure 1. The need for open reconstructive interventions after the first BA or BA with stenting was the same 0.374 and 0.45 per 10 patient-months, incidence rate ratio (IRR) = 0.831 [95% CI 0.471; 1.464], ? = 0.521. The need for endovascular interventions did not differ between isolated BA and BA with stenting 1.137 and 0.827 per 10 patient-months, IRR = 1.374 [95% CI 0.952; 1.999] $p = 0.09$. Total need for surgical interventions (open + endovascular) also did not differ: 1.511 and 1.277 per 10 patient-months, IRR 1.183 [95% CI 0.872; 1.612] $p = 0.2822$. We found a strong negative correlation between functional primary patency and primary patency ($r = -0.627$; $p < 0.0001$), as well as a between functional primary patency and secondary patency in patients after isolated BA ($r = -0.53$, $p = 0.0005$), but not after stenting ($r = -0.351$; $p = 0.101$ and $r = -0.304$; $p = 0.159$, respectively).

Conclusion: The results of BA without stenting are significantly influenced by the duration of the period between the start of AVF use and the manifestation of central vein stenosis. The use of stents can slightly improve the results of endovascular interventions in central vein stenosis, regardless the its time of development. The use of stents does not reduce the need for surgical interventions.

P032

INCORPORATION OF SECOND-GENERATION CHLORHEXIDINE-SILVER-SULFADIAZINE-IMPREGNATED CATHETERS IN AN ADULT INTENSIVE CARE UNIT

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Introduction: As part of an improvement program to reduce the catheter-related bloodstream infection (CRBI) rate, chlorhexidine-silver-sulfadiazine-impregnated central venous catheters (CHSS-CVCs) were placed. The objective of this work was to determine if CHSS-CVCs were able to reduce CRBI rate in an intensive care unit which has a low baseline infection rate.

Method: A quasi-experimental study with an interrupted time-series design (before-after) in a 12-bed polyvalent ICU was performed. The intervention was to add CHSS-CVC to patients who needed intravenous therapy for 7 days or more. Both CRBI rates were compared: pre-intervention period A (from May 2016 to September 2017) vs post-intervention period B (from October 2017 to April 2019). The previous CVCs strategies in place were: 2% alcoholic chlorhexidine to skin antisepsis, insertion and care bundles, chlorhexidine gluconate dressing, needleless connectors, exclusive Link Nurse. Our ICU infection control scheme includes healthcare-associated infections surveillance program, antimicrobial stewardship program, monitoring of hand-washing adherence, OMR surveillance program upon admission and weekly, cleaning staff for equipment. The definition of CRBI was taken from National Surveillance Program of Argentina (VIHDA). Patients with = 48 hours CVC in place were excluded. The following variables were analyzed: CRBI rate ‰ patients/days (SIR: standardized infection ratio, CI 95%), age and APACHE II (median, Q1-Q3).

Results: Male sex: 58% (250/431) vs. 60% (176/295) ($p = 0.645$), age 65 (50–76) vs. 61 (45–72) ($p = 0.0044$), APACHE II: 21 (15–27) vs. 20 (15–26) ($p = 0.2923$). CRBI rate: 1.78‰ (8/4486) vs. 0.55‰ (2/3604) (SIR (IC 95%) 0.251 (0.0281, 0.9049)).

Conclusion: under these conditions, patients with CVC CHG/SP had a statistically significant reduction in CRBI rate. The inclusion of CVCs CHG/SP further reduces a previously low baseline infection rate.

P033

PRELIMINARY RESULTS OF THE FIRST PICC-PORT NURSE INSERTION SERVICE IN MADRID

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In Spain, is a new technology to use PICC port catheters for cancer patients. Most of all, the SIP-2 protocol is not applied in all patients receiving this kind of catheter, and in some cases is not the nurse the professional who insert this line. However, a prepared and trained nurse using technology as US can offer a safe insertion and a cost-effectiveness solution to patients and hospital administration. In our tertiary hospital, this is a new service for oncology patients. Researches have decided to collect data regarding costs of the intervention, early and late complications, and patients' quality of life. Observational prospective study has been started in female cancer population (gynecological and breast cancer) accomplishing inclusion criteria (cancer stage, correct RaPeVA and RaCeVA criteria, normal BMI, dwell time, etc.). Ethical approval has been followed and informed consent asked in every patient. Follow up will be done at 10 days after insertion, and monthly, according to the chemotherapy administration. As a secondary goal, researches would offer information regarding the educational program developed for day hospital and wards nurses. Researchers consider finishing the study for the end of 2020, so in this presentation only partial and preliminary results will be shown.

P034

EFFECTIVENESS OF MECHANICAL RECANALIZATION FOR INTRALUMINAL OCCLUSION OF TOTALLY IMPLANTABLE VENOUS ACCESS PORTS

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Introduction: To evaluate that high-pressure mechanical injection of saline is effective in restoring patency of totally implantable venous access port (TIVAP) with intraluminal occlusion. Materials and

Methods: From January 2017 to June 2019, 64 cases were referred to interventional radiology suite for dysfunction of a TIVAP. Among these, sixteen cases showed normal function of TIVAPs, nineteen cases showed appearance of fibroblastic sheath, and twenty-nine cases showed intraluminal occlusion. Mechanical recanalization were performed for intraluminal occlusion of a TIVAP with an indeflator and 20G non-coring needle. Catheter tubography of all recanalized cases were performed. The success or failure of recanalization and pressure of indeflator were recorded. Catheter tubography was evaluated for breakage of catheter. Medical records were retrospectively reviewed to evaluate onset time of occlusion after insertion and last using of TIVAP, last purpose of using TIVAP, and free period of recanalization.

Results: Among the twenty-nine intraluminal occlusion cases, twenty-four cases (82.7%) were recanalized by mechanical saline pressure via the indeflator. The indeflator pressure ranged from 2 atmospheric pressure (atm) to 15 atm (median: 8 atm). Breakage of catheter of TIVAP was occurred in two failure cases on tubography. Median onset time of occlusion after insertion of TIVAP were 405 days (range: 43 days~1723 days). Median onset time of occlusion after last using of TIVAP were 8 days (range: 1 day~119 days). Last purpose of using TIVAP were blood sampling (12), chemotherapy (10), pharmacological treatment (5), and blood transfusion (2). Median recanalization free period after recanalization was 100.5 days (range: 6 days~859 days). Conclusions: Mechanical recanalization with saline was effective for restoring occluded catheters and sustaining function of catheters. Because breakage could be occurred during mechanical recanalization of TIVAP, catheter tubography should be followed up after mechanical recanalization.

P035

MINIMIDLINE CATHETER, A VASCULAR ACCESS ALTERNATIVE FOR PLASMA REPLACEMENT THROUGH CENTRIFUGATION

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Minimidline catheter, a vascular access alternative for plasma replacement through centrifugation Introduction Plasma replacements through centrifugation is a procedure progressively more used as treatment for some autoimmune diseases. This procedure requires 2 peripheral venous access, one for entrance and one for exit of blood uses flows between 5 and 140 ml/min (1,2). As first option 16–18G peripheral intravenous catheters (PIVC) must be considered, however, on occasion blind insertion of the catheter it is not possible. In these circumstances the next choice would be a central vascular access device (CVAD), given the possible complications related to this type of device a study has been conducted to establish whether the 18G minimidline placed with an ultrasound-guided technique is a valid device (3,4). The aim is to determine if the minimidline is a valid and safe device to conduct a plasma replacement technique in difficult intravenous access (DIVA) patients. Method Prospective descriptive study. January 2017–December 2019. Population: sessions of plasmatic replacement. Results 2017: N = 72 sessions: 2 minimidline combined with PIVC, 7 CVAD, 63 PIVC were used. 2018: N = 71 sessions: 28 minimidline, 4 minimidline combined with PIVC, 6 CVAD, 33 PIVC were used 2019: N = 105 sessions: 9 PIVC, 2 minimidline combined with PIVC 2, 61 minimidline, 21 CVAD, 6 AV graft were used.

Minimidline Results: Average flow rate 30 ml/ min. Vein- catheter ratio was 37%. Minimidline insertion sites: femoral vein 18.9%, basilica/brachial veins 81.05%. From 95 sessions conducted with minimidline; 5 inadequate flow, 0 thrombosis, 0 CRBSI.

Discussion & Conclusion The minimidline is a suitable device for plasma replacement due to its low risk of complications compared to the risks and limitations for everyday life related to an indwelling CVAD. However, more experimental and randomized studies would be necessary to stablish its effectiveness and efficiency.

P036

A NOVEL TECHNIQUE OF GROSHONG TIP PORT-A-CATH INSERTION UNDER LOCAL ANESTHESIA ON OUTPATIENT BASIS: AUDIT OF 1800 CASES FROM A TERTIARY CARE CANCER CENTER

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Introduction: The most commonly used technique for chemoport insertion is seldinger puncture technique. This utilizes blind puncturing of vein for catheter access and separate incision for subcutaneous pocket for chamber. It carries risks of inadvertent arterial puncture, hematoma, pneumothorax, hemothorax, brachial plexus injuries and increased radiation exposure. These risks can be avoided by our novel technique using Groshong tip catheter.

Methods: This audit includes 1800 patients over last 13 years from a tertiary cancer care center in southern India. All patients underwent Groshong tip chemoport insertion using novel cephalic vein cut down technique under local anesthesia on out patient basis. We use single incision for catheter and chamber placement. The most common indications for chemoport insertion were cancers from breast, colo-rectal, hematological malignancies, gynecological & stomach.

Results: We could access cephalic vein through this technique in 95% of cases. There were no immediate complications viz vascular injury, hematoma & pneumothorax. In 5% of patients seldinger technique was used, as cephalic vein was too small for the catheter in 60% & absence of predominant cephalic vein with predominance of branching tiny venous tributaries within delto-pectoral groove in 40%. 2.6% of cases developed port infection, among them 40% required chemoport removal remaining were salvaged with antibiotic lock. Most common organism isolated were stap- aureus, pseudomonas, ralstonia mannitolilytica. 0.3% patients had catheter break and 0.2% had flipped chamber. 1.2% cases had recurrent seroma at the port site. Long term patency maintained in 96% of the cases.

Conclusion: The main advantage is this technique can be done under local anesthesia with single incision. Direct visualization and catheter placement in cephalic vein makes procedure safe. Single fluoroscopic radiation exposure used to confirm the position of the catheter and no need of post procedure CXR to detect pulmonary complications. Groshong tip helps in long term patency.

P037

RISK FACTORS ASSOCIATED TO DEVELOPMENT OF VENOUS CATHETER- RELATED THROMBOSIS

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Risk Factors associated to development of venous catheter- related thrombosis. Introduction Catheter related thrombosis (CRT) is multifactorial and associated to factors such as demography, time, patients pathology, drug therapy and anatomy. Fluctuating taxes, 1.5–90% are being reported, this variability in results is due to the important heterogeneity of the variables involved. For this reason, a study to associate certain risk factors with the development of catheter-related thrombosis (CRT) has been conducted.

Method: Retrospective case-control study. January 2017 to December 2019. Population: adult patients with an indwelling venous access device admitted in a tertiary care hospital. N = 123.

Results: Cases n = 61: ¯x age 57.32 years, median 58.00 years SD 15.56 (19–87). ¯x catheter days 20.05, median 10.00 SD 26.62 (0–140). Male gender 63.9%, active neoplasia 26 (42.6%), anticoagulation/antiplatelet therapy 23 (37.7%), right side catheter 34 (55.7%), type of catheter CVAD 12 (16.4%), blindly inserted PICC (34.4%), minimidline 9 (14.8%), ultrasound-guided PICC19 (31.1%), active chemotherapy treatment 19 (31.1%), prothrombotic pathology 4 (6.6%), history of thrombosis 11 (18%), critically-ill patient 15 (24.6%). Controls n = 62: ¯x age 62.15, median 66.00 SD 14.45 (21–91), ¯x catheter days 31.23, median 12.50 SD 58.56 (2–320). Male gender 39 (62.9%), active neoplasia 22 (35.5%) anticoagulation/antiplatelet therapy 43 (69.4%), right side catheter 22(35.5%), active chemotherapy treatment 20 (32.3%), prothrombotic pathology 6 (9.7%), history of thrombosis 6 (9.7%), critically ill patient 25 (40.3%). Bivariate analysis with the medians test did not show significant differences relating age and catheter days with thrombosis. Fisher exact test was carried out for qualitative variables obtaining a statistical signification between no anticoagulation therapy and thrombosis $p = 0.001$. AR 0.32.

Discussion & Conclusions: Anticoagulation / antiplatelet therapy is confirmed in this study as a protective factor for thrombosis however conducting randomized clinical trials would be necessary to assess its efficacy.

P038

READY 1: A PHASE 3, RANDOMIZED, DOUBLE-BLIND, ACTIVE AND PLACEBO-CONTROLLED STUDY ON THE USE OF CUSA-081 FOR DYSFUNCTIONAL CENTRAL VENOUS ACCESS DEVICES

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Background: Central Venous Access Device (CVAD) occlusion is frequently caused by the formation of a thrombus within or around the catheter, resulting in patient discomfort, catheter replacement, and delayed or missed therapies. Fibrinolytic agent alteplase is the only FDA-approved drug for the management of thrombotically occluded CVAD. Third generation fibrinolytic agent reteplase has shown deeper clot penetration ex vivo, which may lead to faster clot lysis. However, a prospective study comparing reteplase to alteplase with standardized outcome assessments is still necessary to establish a definitive position.

Objectives: The READY-1 study will investigate the efficacy and safety of low-dose reteplase (CUSA-081) in subjects with thrombotically-occluded CVAD. Efficacy measures will include the evaluation of CUSA-081 superiority vs placebo and the non-inferiority/superiority of CUSA-081 vs alteplase in catheter clearance at different timepoints after study drug instillations. The study will evaluate also the safety and tolerability of CUSA-081 and the catheter re-occlusion rate within 30 days following study drug administration. Study design and

Methods: READY 1 is a phase 3, randomized, double-blind, active and placebo-controlled study of the use of CUSA-081 for dysfunctional CVAD. The study will compare CUSA-081 to standard-dose alteplase and placebo. Adult male and non-pregnant female, non-hemodialysis subjects with thrombotically-occluded catheters without active catheter related blood stream infection and without any unstable clinical condition will be enrolled. Eight hundred forty-one subjects across different countries will be randomized to receive either CUSA-081 0.7 mg/2 ml or alteplase 2 mg/2 ml or placebo 2 ml in a 9:6:1 ratio. Study drugs will be administered up to two times and CVAD patency will be assessed 30, 60 and 90 minutes after each administration.

Conclusion: READY 1 is the first large randomized controlled study will robustly evaluate for the first time the efficacy and safety of the third generation thrombolytic CUSA-081.

P039

PERIPHERALLY INSERTED CENTRAL CATHETER (PICC) ASSOCIATED COMPLICATIONS IN PATIENTS WITH HEMATOLOGICAL MALIGNANCIES: A RETROSPECTIVE COHORT STUDY COMPARING DIFFERENT CATHETERS

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Background: Patients with hematological malignancies (HM) or undergoing hematopoietic cell transplantation (HCT) require reliable vascular access (VA). While central venous catheters (CVCs) have traditionally been the catheter of choice, peripherally inserted central catheters (PICC) are increasingly meeting this need. Previous studies suggest that patients with HM or undergoing HCT have higher rates of PICC-associated complications such as central line-associated bloodstream infections (CLABSI) and upper-extremity deep vein thrombosis (UEDVT). This retrospective cohort study aims to determine if PICC type has an influence on the rate and incidence of complications in this high-risk population.

Methods: The four PICC types compared in this study were inserted at The Ottawa Hospital in patients with HM or undergoing HCT. Insertions, maintenance and troubleshooting was performed by a VA team. Prospectively collected data was extracted from the institution's VA database. The incidence and rate per 1000 catheter days was calculated and compared across PICC types for the following complications: CLABSI, UEDVT, complete and withdrawal occlusions, and migrations. Statistical analysis also included multivariable regression analysis.

Results: Four hundred and eighty-five dual lumen PICCs were inserted into 469 high-risk patients with HM or undergoing HCT: 161 Groshong®, 60 PowerPICC® Solo, 165 BioFlo®, and 99 Arrow®. The rates and incidences of all complications differed significantly across the PICC types. The rates and incidences of each complication type differed significantly across the PICC types, except for CLABSI complications. Following multivariate adjustment, PICC type was associated with the rate of PICC-related complications.

Conclusion: This study highlights that the type of PICC may influence the risk of complication. Interestingly, the use of antimicrobial PICCs did not result in a decreased rate of CLABSI. PICCs are safe to use in this population, however, the risk of complication should not be overlooked and the influence of PICC type should be considered in clinical decisions.

P040

LOOKING BACK 7-YEARS FROM BRACHIAL TO PICC PORT

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Chest ports has been the most popular and reliable access site of implantation for long-term indwelling treatments; however, chest ports might not be eligible for patients undergoing radiotherapy with chest wall involvement, or those with chest wall skin lesions. Upper arm ports have some advantages especially beneficial to breast cancer patients requiring radiotherapy, flap transferring for reconstructive surgeries, as well as those patients with radiodermatitis or compromised respiratory function. Currently upper arm has become the first choice as a comfortable, safe and painless devices in our patients. Here we report our experience, the evolution of brachial to PICC port and discuss the procedure and its potential advantages. This study aims to evaluate all arm port ($n > 500$) performed in our unit from November 2012 to May 2020. Success and complication between implantation techniques and brachial or PICC port were compared. All patients were similar characteristics. Shorts tunneling and the use of micro-puncture kit gave us less trauma and more comfortability, low risks of arterial puncture and mechanical complications. Insertion site with PICC port was in the yellow zone or upper green zone. No scars on the chest only a tiny scars upper arm with less risk of flipping than chest ports because of narrow pocket around 2–3 cm placed at the middle third of the arm; six cases with breast cancer where upper arm port was replaced by chest port due to basilic and axillary vein thrombosis. No high complications during insertion procedure. Transition from arm port- brachial port- PICC port has been an evolution and an improve in the insertion technique making it less aggressive, invasive, with lower risks of failures and benefit not only for professionals also for patients given them safety, comfort and better quality of life and similar clinical results as traditional long-term vascular access devices.

P041

MICROBIOLOGICAL PROFILE AND INCIDENCE OF CLABSI AMONG HEMATOLOGY AND ONCOLOGY PATIENT POPULATION – A SINGLE INSTITUTION EXPERIENCE FROM INDIA

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Introduction: Hemato -Oncological patients are at a higher risk of CLABSI due to immune-compromised state. As CLABSI have increasingly been recognized as preventable, reducing the rate of CLABSI has become an important patient safety goal. The Centers for Disease Control and Prevention (CDC) recently established infection prevention guidelines for outpatient oncology settings, including standards for the access and maintenance of CVCs. However, many of these recommendations are based on studies conducted in intensive care units, the results of which may not generalize to ambulatory settings. There is also paucity of data from developing countries including India.

Methods: A single-center prospective cohort study was performed from May 1st, 2018 to December 31st, 2019 to record the microbiological profile of all CLABSI cases on the consecutively inserted CVADs.

Results: Total of 428 CVAD's were inserted during this period (Males 277, females 151) with age range of 7 months to 80 years (median 34 years). All the patients had hematological or oncological diagnosis. Total of 321 PICC lines and 107 Hickman lines with total of 27512 CVC-days were analyzed. There were 45 CLABSI events during this study period. Majority of the microorganisms reported were gram negative (84.4%), while as gram positive bacteria contributed 13.3% and fungi was reported in one case 1 (2.22%). Eight isolates (17.8%) were categorized as multi-drug resistant. Seventeen (37%) out of the 45 CLABSI patients, required removal of the line. Out of the patients with CLABSI 63% survived.

Conclusion: Healthcare associated infections especially CLABSI is a major challenge in hematology and oncology patients. Gram negative infections contribute maximally to CLABSI in developing countries and MDR emergence is adding to the morbidity and mortality.

P042

THE EFFECT OF CONTINUOUS LOW FLOW ADMINISTRATION ON CENTRAL VENOUS CATHETER'S FUNCTION AND COMPLICATIONS

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Background: After cardiovascular surgery, some patients need to pump vasoactive drugs through central venous catheter to maintain a certain heart rate and blood pressure. During the continuous pumping of vasoactive drugs, if the catheter is forced to flush, the patient's blood pressure and heart rate will suddenly change and affect the prognosis of patients.

Objective: Performing the influence of non-flush on CVC in continuous low flow rate infusion.

Method: A retrospective study between July 2016 and October 2019 in a university-affiliation hospital. Patients undergoing cardiovascular surgery and CVC catheterization during this period were included. Information of catheterization, drug maintenance rate and duration, catheter outcome status, and complications were collected. The influence of different infusion speed on catheter function and the occurrence of complications were analyzed.

Results: A total of 184 patients were enrolled in this study, all using 3-chamber CVC catheters. Length of catheter indwelling was 140.6 ± 68.2 hours, time of drug pump with medial-cavity catheter was 82.6 ± 45.8 hours and proximal-cavity catheter was 57.9 ± 36.3 hours. The duration of medial-cavity and proximal-cavity was the longest within 1 to 3ml/hours, which was 46.7 ± 34.6 hours and 28.4 ± 25.2 hours. In the process of low flow rate injection, no obstruction occurred. 15 (8.2%) patients were obstruction after the use of vasoactive drugs was discontinued, 7 (3.8%) cases were occurred in medial-cavity and 8 (4.3%) cases were occurred in proximal-cavity among of them. There were 34 (18.4%) cases of puncture site redness, 2 (1.1%) cases of puncture site exudation and 2 (1.1%) cases of suspected catheter-related bloodstream infection.

Conclusion: continuous low flow pumping of vasoactive drugs does not cause catheter obstruction. Catheter obstruction is more likely to occur in the period of no medication than in the period of low flow pumping.

P043

PREVENTION OF VENOUS CATHETER DISLODGEMENT AS A WAY OF INCREASING PATIENT SAFETY AND REDUCE HEALTHCARE PROFESSIONAL'S RISK FOR EXPOSURE TO HAZARDOUS DRUGS AND CONTAMINATED BLOOD

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The most frequent invasive procedure in European healthcare is not safe. Around 80% of in-hospital patients receive intravenous (IV) therapy through a catheter and an average 10% of these are accidentally dislodged during treatment. Accident rate as high as 36% has been reported, with the most affected patient groups being children and the elderly. Dislodgement results in, for example, patient injury, wasted medication, increased plastic waste and increased workload for healthcare staff. The level of severity associated with an incident depends on IV catheter type, for example, peripheral venous, central venous, peripherally inserted central or midline catheters, where the highest average costs of €480 per incident can be found for central venous catheters. Dislodgement increases healthcare professional's risk of exposure to contaminated blood and hazardous drugs. Exposure to antineoplastic drugs is associated with acute health effects (especially for women), such as hair loss, headaches, infertility, spontaneous abortions, and congenital malformations. In addition, time spent by the healthcare personnel for each dislodgement spans from 18 to 44 minutes depending on catheter type, which heavily burdens an already time pressured profession.

Working alongside clinicians we are developing an innovative safety device to address this problem. The device is a two-part safety connector that is to be placed on the catheter. In case of an accidental pull to the IV tube, the two parts acts as a weak link and separate, thus preventing catheter dislodgement, patient injury and damage to medical equipment. A double vale system prevents spillage of blood and medication thus increasing the healthcare professional's safety. The constitution of the device allows for rapid reinstatement of IV therapy after an accident and the protection of the catheter and associated consumables, which otherwise would be thrown away after an accident, heavily decreases the amount of plastic being wasted. The possibility to protect the content of the IV bag is especially important for patients receiving chemotherapy since their doses are individually calculated and spilling an unknown amount can be devastating to their treatment protocol.

P044

POP TECHNIQUE: MECHANICAL AND PHYSICAL DESCRIPTION, CLINICAL IMPLICATIONS

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Introduction: Central or peripheral vascular access devices have been in use for many decades. However, despite adequate care and maintenance, complete occlusion may occur, and its impact cannot be overlooked. A new procedure using a percussion technique has been published and referred as "the POP technique."

Method: A hydrodynamic bench was used permitting both the recording of the movement of the piston with a fast camera and the pressure variations in the polyurethane and silicone catheters while connected to 2 and 3-pieces syringes.

Results: The results are twofold. First the upward movement of the piston leads to the installation of a saturation vapor pressure in the body of the syringe. During this sequence the clot is submitted to a force of aspiration. Then the release of the plunger leads to a pulse pressure whose dynamics and intensity are dependent of the types of syringes and catheters.

Discussion & Conclusion: The experiments bring to light the importance of practical features such as the orientation of the syringe and the nature of the polyurethane or silicone catheters. Then the analysis enables the definition of practical rules for safe practice of the POP technique. This study will impact clinicians as many may be tempted to use the technique in hope to resolve the occlusion safely, in a timely manner.

P045

DEMYSTIFYING MOISTURE VAPOR TRANSMISSION RATE (MVTR) FOR VASCULAR ACCESS FIXATION DRESSINGS

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Introduction: MVTR is a recognized standard for assessing semi-permeable films and is often a specification quoted for vascular access fixation dressings. This poster explores the methodology of MVTR measurement and discusses the clinical relevance of MVTR data for vascular access dressing.

Method: MVTR was determined by exposing the dressings to either moisture vapor or direct contact with water according to standard EN 13726-2:2002 sections 3.2 and 3.3. Leading vascular access dressings were tested according to this standard, by an independent testing laboratory in controlled conditions.

Results: All articles tested demonstrated a MVTR of 773 g/m²/day or higher, a level far above the usual trans-epidermal water loss (TEWL) of human skin (120–240 g/m²/day). The results show a large variation in MVTR values among manufacturers and between test methods. The range of values obtained when the article was tested in contact with vapor (upright apparatus) or liquid (inverted apparatus) was 773 to 2838 g/m²/day versus 845 to 30,530 g/m²/day. Testing also revealed some dressing distortion which can artificially increase the MVTR and would not occur in clinical use.

Discussion & Conclusion: Standard EN 13726-2 describes two MVTR test methods. The results vary depending on which method is used, and manufacturers often cite the higher values obtained with the inverted apparatus. Neither method is a direct reflection of the vapor transmission rate of a dressing in contact with skin. A minimum MVTR is required to prevent accumulation of moisture under the dressing from TEWL, and as long as this condition is reached, MVTR values exceeding the minimum threshold do not bring any additional benefit. There is currently no evidence of correlation between MVTR values above the threshold and more clinically relevant features such as adhesion to skin, wear time, and comfort.

P046

CATHETER TIP MISPLACEMENT DURING ULTRASOUND-GUIDED AXILLARY VEIN CENTRAL VENOUS CATHETER: SINGLE-CENTER RETROSPECTIVE STUDY

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Introduction: Axillary vein becomes a good alternative site for central venous catheter (CVC) insertion, other than subclavian approach. This study aims to determine the prevalence of catheter tip misplacement in between two common approaches, axillary and subclavian approaches.

Methods: Retrospective procedural data were collected based on sequential adult patients, age 18 years old and older, had CVC inserted at axillary vein and subclavian vein, in Critical Care Unit Premier Bintaro Hospital, Indonesia, from January 2018 to December 2019. The catheter tip position was determined by chest X-ray after the procedure. Insertion of CVC was conducted by intensivists and using ultrasound guided. Demographic data included age, sex, Body Mass Index (BMI). Data collected in this study included site of insertion (subclavian and axillary approaches), and catheter tip position misplacement was determined by those with tip position in the IJV.

Results: A total 119 of patients had CVC insertion (74 and 45 subjects in the axillary and subclavian groups, respectively) with mean age of 55.6 years, 52% female and mean BMI of 23.2 kg/m^2. This study found that there were 6 cases (8.1 %) with axillary approach had tip located at IJV, while there was only 1 case (2.2%) with subclavian approach.

Discussion & Conclusion: Misplaced catheters have been reported in almost every possible anatomical position, including the arterial system, mediastinum, pleura, pericardium, trachea, esophagus, subarachnoid space, and other aberrant sites. Catheter misplacement can occur at the time of insertion or after a period of time due to migration of the tip. Certain congenital and acquired abnormalities of the venous anatomy predispose to catheter misplacement. The prevalence of catheter misplacement during ultrasound-guided axillary vein approach was higher than those with subclavian approach.

Keywords

central venous catheter (CVC), axillary approach, catheter tip misplacement

P047

HOMECARE INTRAVENOUS TREATMENT AND SHORT PERIPHERAL CANNULA

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Introduction: The CDC doesn't recommend short peripheral cannula (SPC) when treatment exceeds 6 days. But in the daily practice, SPC are used to do so in homecare. Indeed, Homecare freelance nurses (HFN) care for patients with a SPC that has been already inserted in hospital or they place it themselves.

Objectives & Method: To know if SPC is safe and comfortable enough to treat patients in their home. HFN working in Paris assess a survey about SPC 'lifespan from insertion to removal. Moreover, the purpose is focused on catheters that have been placed since more than 96 hours to study SPC's maximum duration stay.

Results: From April 2018 to December 2019, 348 SPC were studied. Duration stay of 178 was over 96 hours. They were inserted in 121 adults and 1 child to administrate 134 treatments (antibiotics in most of the cases). I.V. courses were infused 24 hours a day (72) or discontinuously (an infusion a day at least in 44 cases). 116 catheters were placed in homecare and their mean duration stay was 9.5 days. 82/116 catheters were removed because treatment ended; others led to a complication (pain, extravasation, inflammation). By studying the whole 116 SPC and whatever the reason of their removal, the mean number of attempts before placement was 1.5. One patient asked for a midline for the next treatment.

Conclusion & Discussion: No serious complication, no treatment interruption: SPC is useful (quick availability, cost effectiveness) but when insertion gets difficult, isolation of HFN can be a problem to hand over the baton to a colleague.

P048

A RETROSPECTIVE STUDY OF THE SAFETY OF OVER 100,000 PERIPHERALLY INSERTED CENTRAL CATHETERS DAYS FOR PARENTERAL SUPPORTIVE TREATMENTS

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The type of central vascular access device providers chosen for providing parenteral supportive treatments has evolved over the past years, going from routinely used centrally inserted catheters to a more recent trend of peripherally inserted central catheters (PICCs) when expected treatment duration is less than 6 months. This multicenter retrospective study aimed to provide a comprehensive assessment of the safety of PICCs in administering parenteral supportive treatments. All adult inpatients and outpatients who had a PICC inserted for the administration of parenteral supportive treatments (i.e. parenteral nutrition, intravenous fluids, blood products, or antibiotics) between September 2007 and December 2014 in four public Italian hospitals were included. The primary outcome was PICC removal because of an adverse event (AE, defined as occlusion, exit-site infection, or symptomatic thrombosis). Among the 1,250 included patients, 178 PICC-related removals because of AEs (14.2%; 1.62 AEs per 1,000 PICC days) were reported. Rates of PICC removal because of occlusion, exit-site infection, and symptomatic thrombosis were 1.08, 0.32, and 0.23 per 1,000 PICC days, respectively. The median dwell-time between PICC insertion and its removal because

of an AE was 67 days (interquartile range 28–180 days). Risk of PICC removal due to AE was higher with open-system PICCs [hazard ratio = 2.75, 95% confidence interval 1.52–4.96]. In this study, we found preliminary evidence that PICCs can be safely used to administer parenteral supportive treatments lasting up to 6 months. PICCs may be a relevant alternative to centrally inserted catheters for medium-term parenteral supportive treatments.

P049

CLINICAL SURVEY OF ULTRASOUND-GUIDED PIV PRACTICES: UNCOVERING A NEED TO STANDARDIZE ASEPTIC PROCEDURES TO IMPROVE PATIENT SAFETY

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Introduction: The purpose of this study was to investigate ultrasound-guided peripheral intravenous (UGPIV) practices to assess if differences existed between supply usage of transducer/probe covers, glove types, gel and skin disinfectants of clinicians functioning in primary vascular access, emergency department, or other roles.

Methods: A voluntary cross-sectional descriptive survey was conducted via SurveyMonkey. Data collection included demographic information, practice-oriented information, and economic indicators of current and perceived procedural activities associated with UGPIV. Frequency distributions and results of Fisher's Exact test and one-way ANOVA were reported using R v.3.5.2.

Results: Survey results indicate aseptic technique reported as very important (90%), sterile technique less important (56%), sterile gel important (80%) but used less (64%). Personnel in vascular access roles had the highest percentage of aseptic glove use, sterile glove use, aseptic gel use, and sterile gel use with meaningful differences in all variables ($p < 0.0001$). There are substantial and meaningful inconsistencies in supplies and procedures used by vascular access specialists, emergency department personnel, and other personnel.

Discussion: In the results of this survey, almost one-third of all respondents reported no use of ultrasound transducer/probe or transparent dressing covers. The remaining two-thirds always or sometimes used the ultrasound probe protection. Some probe covers and gel-separating dressings may mitigate this contamination risk by removing gel from the insertion and puncture site. Gel-free insertion practices have been described in the literature and may increase procedural safety while reducing costs.

Conclusion: Inconsistency and lack of standardization exist within UGPIV practices and supply usage. Patient safety concerns are driving changes supporting increased vigilance of aseptic technique for ultrasound usage. Results demonstrate a wide variety of practices indicating the need for standardization, consistency, and understanding to safely perform UGPIV insertions. These results are suggestive of interventions that standardize procedures in keeping with guidelines and recommendations.

P050

THE ROLE OF VENOUS HEMODILUTION, FLOW AND IMPACT OF VALVES IN RETROGRADE BLOOD REFLUX

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Introduction: This study was to establish a greater understanding of the fluid mechanics associated with the human vasculature above the hand and below the antecubital fossa. In order to accurately capture this vascular anatomy a high-resolution SIEMENS ACUSON S1000 Duplex Vein Mapping System was used by a Registered Diagnostic Cardiac Sonographer (RDCS).

Methods: This prospective in-vivo study was conducted following IRB approval with 10 consented Healthy Human Volunteers. The study captured high resolution video images using color Doppler recording the vein diameter, velocity of blood flow and location of venous valves veins. Using traditional computation fluid dynamic calculations, collected data was numerically analyzed for velocity of the blood flow, separately with a tourniquet and with a catheter, and hemodilution of infused fluid. Pulse flushing associated with motion, forces and pressure, instantaneous opening and closing of venous valves, their natural turbulence of blood flow with related effect on motion, force and pressure was recorded.

Results: Demographics ranged from 26 to 65 years, 4'11 to 6'7 height, and weight 130 to 290 pounds. Diameter and blood velocity reported before and after catheter insertion into upper cephalic forearm. Turbulence measured in blood and retrograde blood reflux with valve opening, closing and flushing.

Discussion: Vein diameter size was not directly correlated with higher or lower velocity. Volumetric flow rates trended lower with vein diameters below 0.29 cm. The hemodilution calculations confirm natural turbulence in blood and retrograde blood reflux shown in video documentation. Areas of turbulence, with flushing, create backflow of blood around and into the catheter. Conclusions: Measurements and calculations provide evidence of hemodilution in veins of the forearm adequate for safe infusion of commonly used medications commonly used. Results suggest that forearm placement of catheters, with adequate hemodilution, reduce the need for Midline or PICC placement for patients requiring intravenous medication.

P051

EFFORTS TOWARD STANDARDIZATION OF UGPIV INSERTION THROUGH QUANTITATIVE CLINICAL EVALUATION

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Introduction: This study evaluated the impact of a transparent barrier dressing on standardization and efficiency of aseptic insertion of ultrasound-guided peripheral intravenous catheters (UGPIV).

Methods: This multicenter, prospective, in-vivo quantitative performance survey was conducted with a transparent barrier dressing and antiseptic non-touch technique (ANTT) (UltraDrape™ barrier and securement dressing, Parker Laboratories, Fairfield, NJ). Clinical staff at three hospital medical centers collected data using a validated five-scale Likert survey accessed through an online link.

Results: The 210 data entries reported separation of gel from skin (97%), good ultrasound image through dressing (84% agree/strongly agree), sufficient barrier and adherence (92%, 98%), acceptable window (99% agree/strongly agree), easy application over UGPIV (99% agree/strongly agree), improved aseptic technique (87% strongly agree), easier to use (88% strongly agree) and preferred to sterile probe cover (98%). Evaluation of current practice included variability with no probe cover, transparent dressing only, sterile cover, gel non-sterile and sterile used in procedure. Economic comparison of hospital supplies purchased for current practices versus the standardized dressing demonstrated a 57% reduction in cost

(prior cost $10.54 with probe cover versus ANTT transparent barrier dressing $4.47); 67% reduction over all sterile supplies $13.46.

Discussion: Quantitative responses were subjective in nature, based on opinion and judgment of the individual. Likert scales contain multiple items and are therefore likely to be more reliable than single item evaluations. The results of the study reflected agreement with the level of separation and asepsis achieved, the adequate image resolution, ease of use and a strong preference for the barrier dressing. Conclusions: Levels of agreement exceeded 84% for all evaluation parameters reflecting high performance of aseptic technique with the transparent barrier dressing. Prior to any product implementation, a value analysis review of product should involve performance evaluation with economic impact assessment as represented in the results of study.

P052

REACHING ONE PERIPHERAL INTRAVENOUS CATHETER PER PATIENT VISIT WITH MULTI-MODAL STRATEGY: THE PIV5RIGHTS BUNDLE

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Introduction: Peripheral intravenous catheter (PIVC) annual sales of 350 million exceed the number of people in the United States (US), 327 million. With 37 million US hospital patient admissions per year, these data indicate average usage of 10 PIVCs per patient admission suggesting low insertion success and high failure associated with PIVCs.

Methods: A prospective comparator single-center clinical superiority trial was conducted to determine the impact of bundled practices including device insertions of vascular access specialty team nurses versus current practice. The PIV5Rights Bundle multi-modal best practice intervention strategy measured bundle intervention outcomes and dwell time versus current PIVC practices.

Results: Group 2 vascular access team and bundle achieved statistically significant results with 89% PIVCs making it to end of therapy. Cost-saving per bed was $3,376 versus current practice (cost $4,781 vs team cost $1,405). Group 1 PIVCs reached the end of treatment in 15% of catheters. Consumption analysis was 4.4 catheters per patient hospital admissions with PIVC retrospective audits of current practice demonstrated more than 50% catheters failed within 24 hours.

Discussion: The cost associated with intravenous therapy can exceed $4 million per year reflecting an underutilized team. Hospitals without teams performing ultrasound-guided PIVC may have usage of nearly 8 catheters per patient bed, double the usage and cost associated with the current state at this hospital. Administrators have the potential to achieve savings easily in the millions by applying the PIV5Rights Bundle Conclusions: Implementation of the PIV5Rights Bundle with dedicated VAST proved a successful model, both from outcome and financial perspective. By centralizing ownership of vascular access with the team for insertion and management the PIV5Rights bundle Right Approach made for the Right Results in hospital infusion therapy. This application of LEAN methodology with infusion therapy resulted in a projected annual savings of $2.9 million.

P053

A PREVALENCE STUDY OF VENOUS CATHETERS AT THE UNIVERSITY CLINICAL CENTER LJUBLJANA (UCC), SLOVENIA

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Introduction: A safe and reliable venous access is essential in patients who require treatment with intravenous drugs or fluids. An entry port or venous access point is chosen individually for each patient while taking into consideration the type and duration of treatment that is needed.

Method: In November 2019, we conducted a prevalence study at the University Clinical Center (UCC) in Ljubljana, Slovenia, where we recorded data on all patients with venous access by venous catheter. We recorded the type of venous access, access site, number of lumens, number of active lumens, type of fixative used, type of material used to cover the puncture site, the site where the catheter was placed, visibility of the puncture site, type of attachments, the time of placement, time and method of catheter redressing and changes of infusion systems.

Results: The results of our prevalence study are being processed and will be presented on our poster. We included all patients hospitalized at the UCC Ljubljana, Slovenia on the study date.

Conclusion: We have very clear and well written professional standards of nursing care for care of venous catheters at the UCC Ljubljana, Slovenia, but we have no surveillance system to monitor compliance. By collecting this data, we will find out how compliant carers are to the standards of placement and care of venous catheters and we will prepare a set of recommendations to help carers choose the correct venous access and optimize the current standard of care. Our main goal is to analyze compliance to written standards for placement and care of venous catheters at UCC Ljubljana, Slovenia.

P054

OFF LABEL USE OF PICC IN YOUNG CANCER PATIENT WITH SUPERIOR VENA CAVA SYNDROME (SVCS)

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Introduction: Peripherally central inserted catheters (PICC) are usually inserted in to veins of the arm (basilic, brachial, cephalic or axillary), in patients with SVCS, chest canalization is contraindicated. In these cases, use “Off Label” with tunneled femoral canalization (FICC) is a safe and feasible option. Description: A 33-year-old male, diagnosed with extragonadal seminoma with SVCS due to large mediastinal mass. Needs 4 months of outpatient chemotherapy with cisplatin, etoposide and bleomycin. Dismissed by vascular radiologist for endovascular treatment due to the tumor’s high sensitivity to chemotherapy. The option Available was FICC in each cycle until SVCS remission.

Method: It is decided by multidisciplinary team (Intensivist and IV Team), following the DAV Expert Algorithm, canalization of 5 fr double lumen FICC, ultrasound guided with modified Micro-Seldinger technique, 10 cm subcutaneous tunneling to the thigh. The tunneling was done with 14G Abbocath, 133 mm length. Femoral vein canalization be performed by intensivist, then the tunneling is performed by IV team nurse. Application of cyanoacrylate in Insertion and exit site, confirmation tip position with anteroposterior (AP) and lateral (L) radiography.

Results: After Insertion, presented ecchymosis that gave up after 15 days, without pain or discomfort for the patient. After 45 days, there were no complications, its remains permeable and with very good acceptance by the patient. The FICC will remain until end of treatment.

Discussion: For the implantation of this type of vascular access, the first of these characteristics in our institution, the multidisciplinary team

work was decisive, because in Spain, nurses are not enabled for femoral vein canalization, and intensivists don´t tunnel catheters. This multidisciplinary work allows us to provide the patient the best option for their treatment. Tunneled FICC is a safe option in outpatient chemotherapy cancer patients.

P055

STAFF AND PATIENT EVALUATION OF A NEW CYANOACRYLATE TISSUE ADHESIVE WITH SPECIFIC APPROVAL FOR USE WITH VASCULAR ACCESS DEVICES

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Introduction: The last 60 years has seen the development of cyanoacrylate adhesive from an industrial to medical and now specifically vascular access use. European CE mark approval has been given to a new product - SecurePortIV tissue adhesive (Adhezion Biomedical LLC). The Venous Access Team at St George's Hospital in London had been using cyanoacrylate tissue adhesive since first seeing the product at WoCoVA in 2016. There was however a little unease about using a product 'off license' and the product that was being used tended to create a hard, crusty deposit around the vascular access device which could become uncomfortable for the patient. When the team became aware of the new SecurePortIV tissue adhesive, it was decided to evaluate it in practice.

Method: There is literature to support the use of cyanoacrylate tissue adhesive in vascular access and studies have shown its' particular benefits in clinical practice. The team decided to evaluate the performance of the SecurePortIV product through staff satisfaction and patient case study.

Results: The team evaluated the product very positively for ease of application, appearance of the catheter insertion site, seal around the catheter insertion site and ability to manipulate the catheter during care and maintenance. They also noted that the tissue adhesive was quite thin and needed time to dry. The case study patient evaluated the product very positively for appearance of the catheter site immediately after the procedure, appearance of the catheter insertion site 24 hours after the procedure and comfort of the catheter insertion site.

Discussion & Conclusion: SecurePortIV tissue adhesive is a cyanoacrylate tissue adhesive that has been approved for use with vascular access devices and performs well in the vascular access setting. Staff need to be aware that the product needs time to dry once applied.

P056

EVALUATING THE HOSPITAL ANNUAL BUDGET IMPACT OF ADOPTING A CLOSED, INTEGRATED PERIPHERAL INTRAVENOUS CATHETER SYSTEM

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Integrated-closed peripheral intravenous (IV) catheter system with stabilization can improve indwelling time as compared to open-safety IV catheter in patients requiring long indwell (i.e. catheters to remain in place for = 24 hours), but it is important to assess the economic impact on hospital budgets when switching from safety to integrated-closed IV catheter system. A budget impact tool was developed in MS Excel to estimate the annual economic impact of switching from safety to integrated-closed IV catheter systems with stabilization in long dwell settings. Using published and internal data, the tool calculated the economic impact of reduction in device utilization due to longer indwell times facilitated by the integrated closed IV catheter system. The base-case model assumed 100,000 PIVCs placed annually in long dwell settings, with each insertion requiring ~20 minutes nursing time. Based on published literature, dwell time increases from 99 hours with safety IV catheter to 144 hours with integrated closed IV catheter system such as BD Nexiva TM which translates to a 32% reduction in device utilization. Model calculated 68,000 integrated closed IV catheters will be needed annually as compared to 100,000 safety IV catheters in long dwell settings. Although total device cost increased slightly, overall budget reduced from $1.5 million with safety IV catheter to $1.2 million with integrated closed IV catheter system due to reduced device utilization and increased nursing efficiency. By making this switch, ~11,000 hours of nurse time can be freed up annually. If the safety IV catheter does not have a blood control mechanism, an additional ~$11,000 of annual savings from blood clean-up costs can be observed by switching to integrated closed IV catheter system with a blood control mechanism. Adopting integrated closed IV catheter system with stabilization may lead to hospital budget savings and can free up nurse time which can be dedicated to provide impactful care to patients.

P057

COMPARATION OF DIFFERENT COMBINATION OF CENTRAL VENOUS CATHETERS FOR PATIENTS UNDERGOING ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION

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Objective: To investigate the effect of combination of PICC with CVC, PICC with PICC and dual cavity of SOLO PICC in patients undergoing allogeneic hematopoietic stem cell transplantation (allo-HSCT).

Methods: A total of 180 patients who received allo-HSCT from January 2018 to July 2019 were retrospectively studied. Patients were divided into 3 groups according to different types of catheter. Combination of PICC and CVC was defined as group A, contained 66 cases; combination of PICC and PICC was group B, contained 55cases and dual cavity of SOLO PICC was group C, contained 59 cases. Catheterization success rate, complications and comfort level were compared between different groups.

Results: In group A, one-time success rate was statistically lower ($p < 0.01$) and the incidences of complications after catheterization including local infection, pain, skin damage and unplanned catheter drawing were significantly higher than the other groups ($p < 0.01$). The incidence of phlebitis in group B was much higher than that of group A ($p < 0.01$). Catheter plugging rate in group C was higher than the other groups ($p < 0.01$). The comfort level score was highest in group C and lowest in group A.

Conclusions: CVC was the main difference between group A and group B. In group A, local infection and skin damage were inescapable. Mechanical phlebitis in group B was also inescapable during the operation process, in despite that the incidence could be reduced after some intervention. Catheter plugging was the major defect in group C and might be effectively avoided though pulse pressure flushing the catheter according to some investigations. We conclude that dual cavity of SOLO PICC deserves to be generalized in the clinical work in consideration of this catheter perfectly met the needs of infusion of two groups of liquid simultaneously for allo-HSCT patients and demonstrated higher catheterization success rate, fewer complication and higher comfort level.

P058

INCIDENCE OF PERIPHERAL VENOUS ACCESS COMPLICATIONS IN THE TYPE 2 DIABETIC POPULATION. ANALYSIS OF RISK FACTORS AND COMPARATIVE STUDY IN MIDLINES®

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Introduction: Type 2 Diabetes Mellitus (DM2) is one of the most frequent metabolic diseases worldwide and has been independently associated with thrombosis and infective complications. Nowadays, there is a lack of evidence in the literature about the role of DM2 related to vascular catheters. The emergence of new medium-line peripheral devices (Midline®) are opening up new possibilities for the peripheral vascular approach of admitted diabetic patients, while increasing safety and comfort.

Objective: To assess the influence of DM2 on complications related to peripheral vascular catheters in admitted patients and whether the use of Midline® is associated with a lower risk of complications. Methodology: This study is ongoing in Hospital Vall d'Hebron in Barcelona (Spain). At present it is granted by Catalonia health department. It consists on descriptive study which we expect will contain analysis of 250 type 2 diabetic patients and 250 non-diabetic patients. We will evaluate medical history searching for general clinical and anthropometric variables as well as diabetic risk's factors and complications related to peripheral venous access. All patients included in this study were admitted at the hospital and were required Midline for treatment. We are collecting subject data from October 2019 until March 2020. Inclusion criteria are age $>$40 years, pathology that requires peripheral venous approach $>$7 days except emergence patients.

Results: It is intended to analyze what differences exist between the control group and type 2 diabetic patients group. We also intend to correlate the implicit complications of diabetic pathology with the fact of having implanted a Midline catheter.

Discussion: We are going to discuss about the lack of literature about peripheral access in diabetic population even several vascular complications are related. Furthermore, we could compare if there are significant differences between both groups knowing the prominent benefits about using Midlines® which are documented on bibliography.

P059

DESCRIPTION AND ANALYSIS OF THE INTRACAVITARY ELECTROCARDIOGRAM AT THE INSERTION OF THE PERIPHERAL CENTRAL INSERTION CATHETER (PICC) IN THE ADULT PATIENT

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Description and analysis of the intracavitary electrocardiogram at the insertion of the peripheral inserted central catheter (PICC) in the adult patient Revilla A1, Pastor MT1, Sánchez C1, Martín MD1 Fundación Jiménez Díaz. Madrid. España.

Introduction: The functioning of the PICC depends on the rigor in the insertion, the tip position and the maintenance. The intracavitary electrocardiogram (ECG-IC) locates the tip of the catheter by observing cardiac electrical activity from an intracavitary electrode.

Objective: To evaluate the tip position of the PICC from the changes of the p wave, QRS complex, and T wave of the ECG-IC.

Method: Descriptive series of cases study. Patient's selection for convenience that is inserted a PICC at Fundacion Jimenez Diaz. The ECG-IC changes are analyzed compared to the baseline electrocardiogram, establishing a relationship with the position of the catheter in the chest radiograph, where three zones are differentiated taking as reference the carina: Zone A: 20 mm, Zone B: $>$20 mm $=$ 54 mm, and Zone C $=$ 55 mm.

Results: 24 patients have been studied, 54.2% men, the mean age of 62 years, the main diagnoses, hematological cancer and post-surgical complications. PICC is located in Zone B in the 45, 8% and the 37.5% is located in Zone C. The "p" wave grows progressively in zones A and B reaching its maximum height in Zone C. The complex QRS grows in zone A until it reaches its maximum height in zone B. The T wave has no significant changes in any of the zones.

Discussion: Tip location is an indicator of quality and safety in the insertion of PICC. ECG-IC is a technique of tip location safe and accuracy.

Conclusion: ECG-IC changes that happen in the p wave and the QRS complex provide information about the catheter's path and position, while the T wave does not provide any information.

P060

A PERIPHERAL ZONE INSERTION METHOD (PZIM) FOR THE INSERTION OF SHORT PERIPHERAL VENOUS CATHETERS: A SINGLE CENTER PILOT STUDY

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Purpose: Short peripheral catheters (SPC) represent the most used intravenous device, but they are also associated with many complications. As some of these complications are related to the insertion site, we have tested a new Zone Insertion Method (peripheral ZIM: pZIM) to identify the most appropriate insertion site for SPC.

Methods: A pilot study was conducted in our Emergency Medical Unit, prospectively including all SPC placed in the forearm. SPC in the veins above the antecubital fussa were excluded. We have designed a pZIM for SPC including three different areas, from the wrist to the antecubital fossa, each one with a color code (red, green, yellow): the red zone is the ventral part of the wrist; the yellow zone is the dorsal part of the wrist and the antecubital fussa; the green zone is the central part of the forearm.

Results: 96 SPC were considered: 37 in the green zone, 2 in the red zone, 57 in the yellow zone. The average duration of SPC in the green zone was 4.05 days, vs. 2.17 days for SPC in the yellow zone.

Conclusions: Our pZIM for SPC was correlated to the duration of the SPC. Further studies are warranted for demonstrating correlation between the pZIM and the incidence of SPC-related complications.

P061

OFF LABEL USE OF PICCS – PROCEDURAL SAFETY COMPARED WITH PICCS

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Introduction: The use of peripherally Inserted Central Catheters (PICCs) has become extremely popular in several clinical situations. In cases that

basilic and brachial veins are unavailable due to the small vein diameter, previous lymph node dissection in both axillae due to breast cancer surgery or other local contraindications, the off label placement of PICCs in the internal jugular or the axillary vein and tunneling of the catheter in the infra-clavicular area is an acceptable option. The aim of the present study was to assess the safety of the off-label use of PICCs and compare the incidence of catheter related complications between the group of patients with PICC and those with off label PICC.

Method: A retrospective analysis of the procedures of PICC placement that were placed by the two nurses of a university nurse led vascular access unit of a 290-bed general oncology hospital was performed.

Results: A total of 476 procedures were performed. A PICC was placed at 433 patients and an off label PICC through the internal jugular or the axillary vein was placed in 43 patients. The comparison of both immediate and late complications incidence showed a statistically not significant but clinically important lower complication incidence in the off label PICC group of patients. In the PICC group central line associated bloodstream infection (CLABSI) incidence was 1.8%, tunnel infection was 1.8%, catheter related thrombosis (CRT) was 0.7% and catheter occlusion was 1.8% whereas in the off Label PICC group the incidence of CLABSI was 2.3% and 0% respectively for all the other late complications.

Discussion & Conclusion: Off label placement of PICCs is technically feasible for experienced VA nurses with high levels of procedural safety and low late complication rates indicating that perhaps is the best option when PICC placement at the arm is contraindicated.

P062

COMPARISON OF PERIPHERALLY INSERTED CENTRAL CATHETER (PICC) PORTS VS CENTRALLY INSERTED CENTRAL CATHETER (CICC) PORTS

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Introduction: PICC ports have become recently, a safe alternative to CICC ports because of the evolution of the related technology, port design, size and new biomaterials that are commercially available now days. CICC ports have been associated with serious procedural complications. PICC port implantation is considered to be a safe and minimally invasive procedure. The aim of our study was to compare the incidence of immediate and late complications between PICC ports and CICC ports using the same insertion procedures.

Method: A retrospective analysis of the patients that have received a PICC or a CICC port during a five-year period by the nurse led VA team of a general-oncology hospital was performed. All the procedures were performed by two experienced VAS nurses under real time ultrasound guidance with the method of ECG for tip location, using low profile ports and the same catheter diameter and material in both groups.

Results: A total of 542 procedures were performed. A PICC port was placed in 400 patients and a CICC port was placed in 142 patients depending on the available vein diameter, local contraindications and cosmetic results. The comparison between the two patient groups showed no statistically significant differences of the immediate or late complications incidence. The overall complication rate in both groups was quite low. In the PICC port group tunnel or pocket infection incidence was 1.3%, CLABSI 1.8%, CRT 1.3% while there were no CLABSI or CRT complications in the CICC Port group. Both PICC ports and CICC ports had a significant rate of dehiscence up to 5.3% and 2.1% respectively.

Discussion & Conclusion: Both port insertion sites and techniques have high success rate and low procedural and catheter related complications. PICC port placement is a well-established low risk procedure with many advantages for specific clinical conditions.

P063

TUNNELED PERMANENT HEMODIALYSIS CATHETER PLACEMENT IN A PATIENT WITH TWO CARDIAC IMPLANTABLE DEVICES

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Tunneled permanent hemodialysis catheter placement in a patient with two cardiac implantable devices A. Malagoli, E. Deganello, C. Crepaldi, F. Baratto, D. Montemurro. Ospedali Riuniti Padova Sud, Monselice, Italy

Case description - The clinical case we describe concerns a 77-year-old patient with chronic renal failure, type 2 insulin dependent diabetes mellitus and sick sinus syndrome that required implantation of a permanent pacemaker. The subject had been hospitalized for congestive heart failure and anuric renal failure and needed dialysis treatment through temporary CVC implantation in the right internal jugular vein. For failure to resume renal function, the patient needed permanent vascular access to continue chronic hemodialysis treatment. The heart disease (right ventricular dilatation, moderate mitral regurgitation and pulmonary hypertension), the late referral status on dialysis and the use of both subclavian veins for implantation of two pacemakers in the last 20 years (first right, then left) justified the choice of tunneled permanent CVC for hemodialysis to replace the temporary CVC in the right internal jugular vein as the definitive vascular access for hemodialysis. The high access in the right jugular vein (at medium neck level) of the temporary CVC and the scar results and the persistence of wires of previous pacemaker in the right sub-clavicular area required the use of a CVC of 32 cm, (Split-Stream R 14 F × 32 cm, 27 cm cuff tip, MedComp) normally used in the left jugular vein. It was also necessary to create a long subcutaneous tunnel made in retrograde way and in two stages through the creation of an intermediate supra-clavicular exit site subsequently sutured with suture thread and surgical glue. Fluoroscopy and chest X ray confirmed the correct position (photo 1)

P064

PRELIMINARY RESULTS OF THE MIDLINE TIP POSITION: AXILLARY VERSUS SUBCLAVIAN

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Background: little is known about the influence of the tip position of the midline in the chest veins. It is understandable that a tip in midclavicular position is less traumatic, but more research needs to be done in order to understand which vein is related to less complications when the tip of a midline of positioned.

Material & Method: in the context of the Spanish Master in Vascular Access, we will control for one month (March 2020) all midclavicular lines tip position by ultrasound in a tertiary hospital in Spain. Insertion will be done by vascular access expert and post-procedural control will be performed by the same nurse (Master degree candidate), both using infraclavicular axillary vision and supraclavicular subclavian vision. Variables as thrombosis, infection and malfunction will be collected. We cannot know exactly the number of midclavicular lines that will be checked, but

we estimate than not less than 30 lines. We hope to find that tip in subclavian vein is related with a reduction of complications in general, as the Italian preliminary study by Ariotti (GAVeCeLT, 2019) is suggesting.

P065

USER EVALUATION OF A PROTOTYPE OF THE VASCOSCOPE, AN AID FOR EASY ULTRASOUND GUIDED VASCULAR ACCESS

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Introduction: In hemodialysis (HD) shunt access is a critical moment. Failure to do so properly causes extra pain and stress for the patient and increases the risk of shunt damage. Ultrasound Guided Vascular Access (USGVA) is generally seen as an important method for improving vascular access. It is, however, only used to a limited extent in HD. The most important barriers are: 1. One hand is needed to operate the probe 2. The screen is often not in line with the puncture location: this makes USGVA difficult to learn. UMC Utrecht has developed an ultrasound device that takes away the barriers for USGVA: the Vascoscope. Most distinctive features are the possibility to fixate the probe to the arm of the patient and the use of video glasses, which allow for simultaneously watching the ultrasound image and the cannulation site. The purpose of this user evaluation was to gain insight into the added value of the clinical prototype and the identification of points for improvement.

Methods: The evaluation was of an exploratory nature: the working method was adjusted during the evaluation. The user evaluation consisted of three parts: 1. Written questionnaires 2. Individual interviews 3. User tests in a clinical setting.

Results: 19 questionnaires were completed; 12 nurses were interviewed, and 36 cannulations were done. Four user groups were identified, with different experiences with, and needs regarding, USGVA. Added value of the Vascoscope was seen by each group but for different reasons. The prototype tested needed, however, important changes in design, including the method used to fixate (a band) and the shape of the probe (round disk).

Discussion & Conclusion: This user evaluation has shown that lowering barriers for USGVA with the Vascoscope is possible, provided the wishes of different user groups are met. A second prototype is now being evaluated.

P066

VIRTUAL REALITY AND VAD INSERTION: MYTH OR REALITY?

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Introduction: In our cancer center, VADs are placed under local anesthesia. These insertions mark the actual entry into the disease and practitioners are looking for a tool to reduce pain and anxiety. We tried to assess the effectiveness of virtual reality (VR) on pain and anxiety during VAD insertion.

Materials & Method: monocentric prospective cohort study involving 80 patients randomized according to whether VR or not VR was used during the gesture. Two subjective parameters, acute pain and anxiety, were measured (numerical scale from 0 to 10) as well as satisfaction at the end of the procedure. The satisfaction. The analgesia nociception index (ANI) was monitored. The primary endpoint was acute pain.

Results: We included 2 groups of 40 patients during the first quarter of the year 2019. The groups are similar. VR reduces acute pain and anxiety, but not significantly. The maximum acute pain was 3.6 $\pm$ 2.3 in the virtual reality group versus 4.5 $\pm$ 2.3 in the control group (IC 95% [–0.8; 1.2]; $p = 0.19$). Other results are shown in Table 1. Satisfaction was similar in the two groups (9.2 $\pm$ 1 vs 9.3 $\pm$ 0,8). The evolution of the ANI during painful moments is significantly different in the 2 groups (see Figure 1).

Conclusion: Our study lacks the power to demonstrate that VR has clear analgesic properties. Impact of VR could be an anxiolytic effect.

P067

PICC PLACEMENT- INITIAL EXPERIENCE OF A MULTIDISCIPLINARY VASCULAR ACCESS TEAM

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Introduction: PICCs are increasingly used in daily practice. Our hospital started the first multidisciplinary vascular access team (MVAT) at the beginning of 2019 and PICC placement by the nurse team members started in May. It is the only hospital where nurses are doing this procedure in a MVAT in our country. We also started a weekly office practice for patients before and after PICC placement.

Method: Single, tertiary cancer center retrospective analysis (of a prospectively kept database) of the initial experience with ultrasound guided PICC placement by members of a dedicated MVAT. This study timeline was between May 2019 and January 2020. The primary objective was to evaluate immediate procedure results. The secondary objective was to evaluate long term complications such as infection and occlusion.

Results: A total of 121 PICC placements were performed by 4 nurses, proctored by a WOCOVA trained surgeon. Every patient was oncological and 73% were breast cancer women in an adjuvant setting. The preferred venipuncture site was the basilic vein (79%), followed by the brachial vein (21%). A tourniquet was used in 26% of patients. The median vein diameter was 4 mm and 57% of the venipuncture was successful at first try. Only 9% of the patients required more than 4 attempts and 21.5% had more than one vein punctured. In terms of procedure complications, we had 2 local bleedings that needed pressure dressing. In terms of late complications, we had 1 total occlusion, 1 thrombosis and 1 case of infection. A total of 77 patients still have the PICC being used, and 36/44 (82%) removed it because it was no longer necessary with a median time to removal of 95 days.

Conclusion: PICC placement, even done by inexperienced professionals, when done by a dedicated MVAT, is a safe procedure with few short and long-term complications.

P068

AN ANALYSIS OF PATENCY RATES IN BRACHIOCEPHALIC FISTULAS USED FOR HEMODIALYSIS

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Introduction: Hemodialysis via arteriovenous fistulas are plagued with complications including stenosis, bleeding and thrombosis. Despite that, they remain the most suitable vascular access for hemodialysis. We review the difference in patency rates of brachiocephalic fistulas for lesions in the cephalic arch that are treated with angioplasty and/or stent placement.

Method: The current literature was reviewed to identify randomized controlled trials, prospective and retrospective studies that described the patency rates of brachiocephalic fistulas following intervention for stenosis in the cephalic arch when using a stent grafts, cutting balloons, drug eluted balloons and plain old balloon angioplasty. A meta-analysis of proportions was performed to determine which modality demonstrated superior outcomes.

Results: A total of 9 studies were included in the analysis describing usage of stent grafts, bare metal stents and plain old angioplasty. There were insufficient studies documenting the potency rates of cutting balloons and drug eluting balloons or stents. Stent grafts were shown to exhibit a significantly higher patency rates when compared to bare metal stents. This was noted to be consistent at both six and twelve months following the intervention.

Discussion & Conclusion: Stenosis of cephalic arch is a recurring problem in brachiocephalic fistulas in view of the tortuosity of the cephalic arch as well as neointimal hyperplasia in this turbulent region. Given the significance of cephalic arch stenosis, stent grafts can offer longer patency rates for continued hemodialysis.

P069

NEW ELECTRONIC OPTICAL SENSOR FOR THE EARLY DETECTION OF PERIPHERAL IV INFILTRATION

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Introduction: A new optical sensor has been developed to aid clinicians in the early detection of peripheral intravenous infiltrations and extravasations. Introduction of this sensor expands the functionality of a currently available infiltration detection system using a fiber optic sensor. As a single-use device with a low profile and flexible materials similar to an IV dressing, the electronic sensor was designed to provide a disposable option for users and additional functionality for IV site placement, particularly for neonates and for monitoring IVs with longer dwell times. An IRB-approved clinical study has been performed to evaluate the sensor's sensitivity.

Methods: Device performance was assessed using a subcutaneous injection model to induce infiltrations. Ninety-eight healthy adult subjects received two peripheral IVs in the dorsal aspect of the hand or forearm. Ultrasound guidance was used to place the catheter in close proximity to the vein wall to ensure the fluid would disperse similar to a non-induced infiltration. Each research subject was randomly assigned a study configuration, which specified IV site location and IV flow rates from 5 to 150 mL/hr. IV sites were continuously monitored by the infiltration detection system with either the electronic or fiber optic sensors.

Results: The system issued yellow and red Check IV notifications with less than 10 mL of isotonic saline for 97 of the 98 infiltrations (99.0%, 95% confidence interval 94.5–100.0%) for both sensors. The Check IV notifications were issued at an average of 2.20 mL for the new electronic sensor. The red and yellow Check IV notifications were issued at an average volume of 2.20 mL and 2.09 mL, respectively.

Conclusion: The results of this study indicate there is no statistical difference in the performance of the currently available fiber optic sensor and the new electronic sensor. Both sensors are highly sensitive and can alert clinicians to early stages of an infiltrated PIV site. However, the electronic sensor provides users with additional functionality in terms of IV placement and disposability.

Posters Topic: World Wide Network

P070

A PREVALENCE AUDIT EVALUATING STANDARDS OF CARE FOR VASCULAR ACCESS DEVICES

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Introduction: Vascular access devices (VAD) are vital for the administration of intravenous therapy. Although essential, VADs put patients at risk of complications including catheter-related bloodstream infections. These complications are amongst the most dangerous for patients, but are largely preventable (Loveday et al., 2014). Consequently, reducing them has become the focus of prevention strategies. An audit of VADs conducted in our 500-beds hospital October 2013 demonstrated poor standards of care and low compliance to guidelines (McGuire, 2015). Strategies were implemented to raise standards and improve compliance, and the impact evaluated in 2018.

Method: The audit was conducted by two practitioners over 7 non-consecutive weekdays between 3 and 23 October 2018. Convenient sampling was used to capture all VADs in-situ in patients above 18 years on the audit days.

Results: A total of 158 devices were audited, and the result demonstrated a collective compliance rate of 87% with non-compliance of 13%. Of these, 99% ($n = 156$) were peripheral venous catheters (PVC) and 1% ($n = 2$) central venous catheters (CVC). 97% ($n = 154$) of PVCs were in-situ for 10 days or fewer, and 3% ($n = 2$) for longer; range 1–15 days.

Discussion: The 2013 audit demonstrated that change was required to improve standards. Implementing a standardized bundle strategy of training, education and standardization in VAD insertion, use and care was necessary to raise standards, improve patient outcome and reduce costs. Loveday et al. (2014) emphasized performance improvement through the implementation of bundle strategies as a benchmark for quality assurance. Additionally, 'educational interventions appears to have the most prolonged and profound effect when used in conjunction with audit and feedback' to improve patient safety.

Conclusion: The 2013 results demonstrated poor standards of care with overall compliance rate of 52%. The 2018 audit showed significant improvement in standards with a collective compliance rate of 87%. The result indicates that implementing strategies to improve practice has been effective.

P071

IBAVAS SURVEY: IBERO AMERICAN VASCULAR ACCESS STUDY

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In Ibero-American countries there is no a standardization of the vascular access educative curriculum. This produces a different development of

the vascular access clinical practices in the Hispanic countries. In many of these countries a vascular access association is present. In order to understand the general situation in these countries, we have created the survey called IBAVAS, divided in 5 groups: general information, education, knowledge actualization, clinical practice and follow up. Researchers will send a link by electronic invitation for the compilation of the survey, through "snow ball" system as well as by using social networks (RIHAV Facebook group, twitter and Instagram) from February 2020 to April 2020. Participants must be Health Care professionals in the vascular access field that voluntarily filled the survey from the first to the last question. Technicians, students and professional on Hemodialysis are not target population for the survey. Results will be analyzed in order to find significative inferences and numerical proportions. Researchers hope to receive at least 1000 completed questionnaires from at least 6 countries, based on the RIHAV analytics (Spain, México, Argentina, Perú, Colombia, Chile and Ecuador), but not limited. Researchers will accept any survey accomplishing the inclusion criteria. Researchers, based on results, will provide new working lines in vascular access for Spanish spoken countries participating in the survey, in order to standardized vascular access vision through WoCoVA network promotion.

P072

RIHAV EXPERIENCE: RED INTERNACIONAL HISPANA EN ACCESO VASCULAR

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After the international conference in México last June, researchers have noticed that Hispanic Spoken countries have a limitation regarding English documents reading (consensus, guidelines and evidence in general). This drive the clinical practice and the scientific research to a non-standardized language, concepts, practice and vision. Based on this, authors decide to start an international group on social media network called RIHAV, international Hispanic network in vascular access https://www.facebook.com/groups/RIHAV/. This group was created on July 2019 and since then more than 2000 people from more than 20 countries have being sharing information, education programs, papers and pictures related to vascular access. Most important, some papers and guidelines have been translated into Spanish for an easier comprehension, work groups have been created and on-line webinars have been delivered, causing a rich group of professionals under the same clinical goals. Researchers would like to underline the important tool that social networks represent for communication and collaborations between professional, reaching to many countries and professionals profiles. We present the data for the last 10 months.

P073

PATIENTS. . .VASCULAR ACCESS. . .WHICH CHALLENGES?

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Context Medical therapies require frequently a vascular access. Within an aging population and with the associated co-morbidities, the venous capital is often poor (1–2–3). In our 1920 beds' hospital, we use more than 207,000 peripheral catheters and 2300 central catheters per year. Therefore, there is a need to develop an institutional strategy for vascular access.

Objectives: To promote excellence in medical care practices related to vascular access within our institution.

Method: A multiprofessional group with thirty-six members, representing all our sectors of activities, was established in 2017. Strategies for resolving and anticipating needs derived from this group. Our support team for the insertion of central devices was completed with a support team dedicated to the care and the management of vascular access complications. An intranet site was created with all the standards of practice and recommendations based on scientific evidence. It is accessible to all our employees. A computerized monitoring system and a clinical audit of practices are currently being developed.

Results: To date, the website hosts more than 95 procedures and algorithms which are consulted more than 700 times/month. Eighteen subjects are treated within the group in an interdepartmental synergy. The practice of catheters' insertion with ultrasound has been developed. Access to new equipment and new methods are continuously considered and coordinated. Our intra-hospital community of practice has expanded beyond Switzerland and France.

Discussion: This team offers access to various scientific clinical expertise and partnerships. The latter strengthens us against this common international challenge. There is still potential for further developments.

Conclusion: In order to improve the quality and safety of patient care while integrating the economic stakes, the creation of an ambulatory platform should be explored.

P074

EXPERIENCES IN DEVELOPING AND RUNNING A SUCCESSFUL PICC TEAM IN THE CZECH REPUBLIC DURING A LEAN ECONOMIC PERIOD

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Experiences in developing and running a successful PICC Team in the Czech Republic during a Lean Economic period Martina Douglas, Andrea Drobilicova, University Hospital Olomouc, Czech Republic

Introduction: The successful development of a Peripherally Inserted Central Catheter (PICC) Team project at the University Hospital Olomouc in October 2017 was a Nursing Department initiative, with full hospital management support. To obtain a suitable budget it was imperative to convince the Financial Department that an investment in the PICC team would not only benefit the patient but also prove financially viable in the long term and reduce overall cost to the hospital.

Methods: An international literature search identified the benefit of PICC's over other invasive devices for a hypothetical patient with infective endocarditis. Comparison of costs related to insertion and maintenance of differing invasive catheters also proved favorable for the PICC. Based on this research, the Financial Department approved a 1,500 000 CZK (€$ 59,372, US$ 65422) budget for the PICC project and to minimize risk, funding was spread between four departments.

Results: During 2018, the PICC team inserted 248 PICC devices and 80 midlines. This resulted in extending the project to all hospital departments. The PICC team received overall control of the 2019 budget of 1,600,000 CZK. There was also a significant increase in PICC and midline catheter insertions, 455 vs.113 respectively with an overall complication rate kept below two percent. Consequently, a new approach towards catheter choice and cost calculation, front-line staff education and

device utilization was implemented. Statistical data tracking was used as a financial framework for the following year.

Conclusion: The PICC team demonstrated that safe and cost-effective care is achievable during a Lean Economic period.

P075

PERIPHERALLY INSERTED CENTRAL VENOUS CATHETERS (PICCS): A THREE-YEAR EXPERIENCE - THE SURGEON AND THE NURSE VASCULAR ACCESS TEAM

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Introduction: Peripherally inserted central venous catheters (PICCs) have emerged as viable alternatives to short-term, non-tunneled central venous catheters. In this study, we analyze complications and the effectiveness of long term PICCs with the purpose of establishing and reviewing insertion guidelines. Additionally, we establish suggestions in the management and care of PICCs, as a way to improve the process for the Surgeon and Nurse team.

Materials & Methods: An observational retrospective cohort study was conducted based on the manual registry of patients whom underwent PICC implantation at the Fundación Cardioinfantil-Instituto de Cardiología during the period between June of 2015 and January of 2018.

Results: A total of 1443 consecutive patients, with a median age of 40 years (IQR, 21 years) were enrolled in this study. "PICCs" catheter was inserted in 1443 patients, most commonly for antibiotic administration (80%), followed by chemotherapy treatment (6.5%), and lastly for inotropic use (3.5%). A complication rate of 4% was observed in the three years. After PICC insertion, the intended treatment was started immediately, with a catheter duration of a median 16 days (IQR, 15 days). The various complications observed, in order of occurrence, were: bloodstream infections ($n = 10$), local skin site insertion infection ($n = 7$), PICC catheter fracture ($n = 6$), and thrombosis at the insertion site ($n = 9$).

Conclusion: Thrombotic events and infectious complications were very uncommon following PICC insertion. Regardless, the PICC should always be removed once its use is no longer warranted to prevent these types of complications. Additionally, the implementation of a surgeon and a nurse-led PICC team strongly reduces these preventable complications.

P076

SAFETY OF VASCULAR ACCESS PROCEDURES AND INCIDENCE OF IMMEDIATE VASCULAR COMPLICATIONS – A SINGLE CENTER STUDY

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Introduction: Central Vascular access is an essential component of inpatient as well as outpatient care especially in oncology patients which however can lead to a number of serious immediate and late procedure related complications that every clinician should be able to recognize on time and manage successfully. Immediate or mechanical complications occur at the time of catheter insertion and include vascular, cardiac and pulmonary complications. They are highly related to the skills and the experience of the vascular access specialist.

Method: This is a single center retrospective observational study from a nurse led VA unit of a 290-bed general oncology hospital. The unit is operated by two nurses (vascular access specialists) who perform all the procedures under real time ultrasound guidance and use the ECG method for the verification of the catheters' tip position at the cavo atrial junction.

Results: A total of 2108 procedures were performed in a five years period. Almost half of the VADs were CICCs and were placed bedside. The other procedures were 433 PICCs, 46 off label PICCs, 401 PICC Ports, 145 ports and a relatively small number of 95 dialysis catheters. The procedures were 100% successful and there were no pulmonary or cardiac complications. In 4.5% of the cases there were minor procedural complications which were managed directly and onsite by the VA nurses. The most common complication was inability to advance the J wire or the catheter and subsequent change of the vein in 1.85% of the cases, multiple (>2) attempts in 1.3%, malposition in 0.9% and accidental artery puncture in 0.5% of the cases.

Discussion & Conclusion: The high procedural success and low complication rates presented suggest the important role of a dedicated nurse led VA team in improving patient health outcomes.

Posters Topic: Guidelines & Consensus

P077

CENTRAL INTRAVENOUS IMPLANTABLE DEVICE; ORGANIZATION PATIENT'S CARE, SURGICAL TECHNIQUE AND RESULTS; A SINGLE CENTER, ONE SURGEON TWO YEARS' EXPERIENCE, 1359 CASES

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Rémy Sindayigaya, Eric Lespessailles, Adel Abou-Mrad Central Intravenous implantable device; Organization patient's care, surgical technique and results; A single center, one surgeon two years' experience, 1359 cases.

Central Intravenous access implantable device is commonly used especially for chemotherapy enhancing comfort and patient's quality care. This is a descriptive retrospective review of one surgeon experience, presenting the managing care, specific operating technical guidelines, and outcome. From first January 2012 till end of December 2014, 1359 patients mostly with Brest cancer, were operated. Indications were mostly chemotherapy. Patients consult on a fixed day weekly. They're provided oral and written procedure's details and potential complications. General and specific local counter-indications were specified. They were called the eve of surgery to exclude intercurrent incidents influencing the operation. At the one-day surgery department a two hours hospital stay was planned. On a special day, once a week, an average of 12 patients (10–15) were operated on a 40mn course. Patients went on feet to and out of the operating theater. Under local anesthesia, through a vertical 2–3 cm incision on the delto-pectoral groove, a PEROUSE° Polysite° 6 or 7 F catheter was inserted in the cervical vein and placed radiologically 1 to 2 cm under the carina. Subclavian or echo-guided internal jugular vein were accessed in case of failure. Catheter were withdrawn mostly for secondary infection ($n = 45$), thrombosis ($n = 8$), catheter migration ($n = 3$), occlusion ($n = 2$), one extravasation, and one turned device. There were no pneumothorax, embolism, or primary infection. Most patients kept the device till the end or till cancer remission was pronounced. Preoperative assessment, careful selection, strict well-organized management and patient's flow to and out of the O.R. added to a standardized quick simplified surgical technique, enhance the

patient's quality care, and reduce psychological operative patient's impact and surgical morbidity.

P078

A PASSION FOR KNOWLEDGE: THE CANADIAN VASCULAR ACCESS ASSOCIATION (CVAA) GUIDELINES ON VASCULAR ACCESS AND INFUSION THERAPY

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Background: In 2014, CVAA membership survey results indicated that national practice guidelines were a priority. The Board of Directors pledged to support the initiative through the development of a steering committee, commitment of financial resources, and engagement of membership to participate in the Guideline Development Group (GDG).

Design: These guidelines were developed by a diverse working group comprised of CVAA members experienced in vascular access and infusion therapy across tertiary, complex continuing, and community care. The ADAPTE process, a methodology designed to take advantage of existing guidelines, was chosen for guideline development. Once selected, the GDG applied the Appraisal of Guidelines for Research and Evaluation (AGREE II) tool to assess the guidelines. A consensus-based approach was used for topic selection, template design, and content development. A project charter that outlined scope, timelines, deliverables, outcome indicators, and financial commitments was developed. Draft guidelines were reviewed externally by patients/caregivers and clinicians.

Results: Practice guideline recommendations were developed, reviewed, and accepted by the GDG. Major areas of emphasis included clinical practice, including core competencies, vascular access device selection, insertion, management of complications, infusion therapy, and other access. The guidelines were published in April 2019. They are available in both hard copy and electronic format in English and French. Topics were identified for subsequent toolkit development and a designated team was identified to develop these guideline supports. The first toolkit module, covering vascular access device management and complications was published in December 2019.

Implications for Practice: These recommendations can be broadly applied to support healthcare professionals where vascular access and/or infusion therapy is a core function of their role.

P079

THROMBOSIS AND EARLY CATHETER-RELATED INFECTIONS IN ONCOLOGY. ADHERENCE TO RECOMMENDATIONS

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Introduction: The most recent recommendations (IDSA, SRLF) on the prevention and treatment of catheter-related infections highlight the value of performing an echo-doppler or CT scan to assess an associated thrombosis. We have studied compliance with this recommendation when diagnosing an early-catheter-related infection in a cancer center (port infections)

Materials & Method: Retrospective study covering 4 years of surveillance of early catheter-related infections (ECRI) in the month following insertion of the implanted port (surveillance over 4 months in 2015, 2016 and 2017 and over the whole year in 2018). Selected infections are catheter-related sepsis, with or without associated local infection, analyzed from the blood culture file and the list of implanted ports sent for microbiological culture.

Results: The study involved 3935 implanted ports and all ECRI infections led to catheter removal. The diagnosis of ECRI was made in 16 patients: 11 Staphylococcus aureus infections (all methicillin-sensitive), 1 Staphylococcus lugdunensis infection, 3 Staphylococcus epidermidis infections, and 1 Enterobacter cloacae infection. An echo-doppler or a CT scan was performed in 12 patients (75%), 5 thrombosis were detected, (31% of patients with IPLC and 42% of patients explored).

Conclusion: The incidence of early-catheter-related infections in our cancer center is low and consistent with the data in the literature. Placement infections are mostly Staphylococcal infections, especially aureus. The incidence of thrombosis is high and reinforces the relevance of the recommendations. Adherence to the recommendation needs to be improved. The question remains whether these early-thrombosis –related catheters must be treated as others thrombosis-related catheters.

P080

SAVING THE BED DAY

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Introduction: Working in a tertiary hospital in Manchester, England myself and 2 medical colleagues were given a 6 month contract to explore the feasibility of an outpatient parenteral antimicrobial therapy (OPAT) service with the aim of 'saving' 500 bed days. The purpose of an OPAT service is to treat safe and suitable patients with an acute infection, requiring intravenous (IV) antimicrobials, as close to home as possible. In order to deliver this the patient needs reliable IV access and expert infection management; whilst the organization needs assurances that an OPAT service can deliver quality safe care.

Method: Drawing upon the British Society of Antimicrobial Chemotherapy (BSAC) good practice recommendations for OPAT for adults in the United Kingdom (2012) an OPAT service was established however quite quickly 3 main challenges were identified: 1. Lack of community IV services 2. Lack of line insertion services 3. Lack of OPAT resources.

Results: Each identified challenge was addressed: 1. An education program was developed for the local community nurses to enable the safe delivery of IV therapy and safely manage vascular access devices. 2. Established a line insertion service as part of OPAT, which inserts and manages PICC and midlines based upon the Royal College of Nursing (RCN) standards for IV therapy (2016), EPIC 3 and Vessel Health and Preservation (2016). 3. Developed a self-administration pathway, where patients or carers are taught to deliver their own IV medications at home. This pathway also included the introduction of elastomeric devices.

Discussion: The target of 'saving' 500 bed days was met after 3 months, leading to the OPAT service becoming a substantive/funded team.

Conclusion: • >20,000 bed days saved to date • ECG guided PICC insertions (accuracy rate of 99.4%) • Line infection rate 0.04 per 1000 catheter days for the OPAT team (based upon >20,000 catheter days)

P081

EXPLORING BARRIERS AND FACILITATORS IN PERIPHERAL INTRAVENOUS CATHETER CARE IN HOSPITAL WARDS AMONG HOSPITAL NURSES – A QUALITATIVE STUDY

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Introduction: Exploring the individual motivations, barriers and facilitators of one's own organizational environment will help us to know in depth and accurately the context and elements that support decision-making for PIVC care during the implementation of evidence.

Aim: to explore decision-making of nurses regarding perceived barriers and facilitators to PIVC care (insertion, maintenance and management) during intravenous therapy in hospital wards. Methodology: Qualitative research based in a critical paradigm, carried out between May and November 2018. We considered the inclusion of participants from three hospitals of the Balearic Health System. The participants were hospital nurses, intentionally selected by key informants through the snowball technique until data saturation. Semi-structured interviews were audio recorded and transcribed, anonymizing all responses prior to analysis. Sources and methods were triangulated by the researchers, performing the analysis in a continuous and circular form, through an iterative process.

Results: Five major themes were identified in the analysis related to determinants of care: (1) Decision-making uncertainty, demonstrated with the ambiguity about professional responsibilities of PIVC care or feelings of servitude toward the medical discipline; (2) Fragmentation of care, demonstrated with a lack of general overview and insufficient knowledge about expected standards; (3) Irrelevance of the care quality, neglect for existing hospital policy due to perceptions of flaws in the evidence used to support it; (4) Resources for the optimization of care, elements used to support adherence to the best recommendations related to the PIVC insertion, maintenance and removal; and (5) Value of caring, individual perception of the implicit act of caring demonstrated by feelings and reflections that manifest a management of tasks rather than a care management.

Conclusions: Fragmentation and lack of knowledge of care related to clinical practice, together with a perception of low risk on the PIVC impact, can lead to a significant gap in patient safety.

P082

ADHERENCE OF NURSES TO THE RECOMMENDATIONS FOR INSERTION, MAINTENANCE AND MANAGEMENT OF PERIPHERAL INTRAVENOUS CATHETERS ANALYZED USING A STRUCTURED AUDIT TOOL

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Background: Peripheral intravenous catheters (PIVCs) are the most widely used invasive devices worldwide. However, there have been few systematic attempts in Europeans hospitals to measure adherence of nurses to recommendations and mitigate PIVC failures. We aimed to analyze such adherence of nurses to international clinical practice guidelines for PIVC care on different clinical environments.

Methods: Observational study realized during December 2017 to May 2018. The adherence of nurses to recommendations for PIVC care was monitored via structured evaluations of all PIVCs in situ inserted in adults admitted to 13 hospital wards in three hospital. Context and clinical characteristics were collected by structured audit tool, analyzing data descriptively.

Results: 646 PIVCs inserted in 624 patients, mainly from medical wards (393; 63%) were audited. 474 patients did not present cognitive impairment, which almost 50% of patients did not recognized and identified inserted PIVC. Regarding PIVC insertion, 3.4% (22/646) patients had at least 2 PIVCs in situ simultaneously with 42.4% inserted in an anatomical site of non-flexure. The majority (319/646; 49.4%) were 20G and secured with transparent polyurethane dressing (605/646; 93.7%). Most PIVCs (357/646; 55.3%) had a free insertion site during the visual inspection at first sight. 342/646 (53%) transparent dressings in perfect condition (clean, dry and intact) were identified. Nurses in medical wards were much more likely to maintain dressings in perfect conditions than those in surgical wards (234/399, 58.7% vs 108/247, 43.7%). We identified 55/646 (8.5%) PIVCs without infusion in less than 24 hours and 58/646 (9.0%) PIVCs without infusion for more than 24 hours. Regarding PIVC failure, 74 (11.5%) adverse events were identified, reflecting clinical of manifestation of phlebitis.

Conclusions: Our findings indicate that adherence of nurses for PIVC care was moderate and a lower in surgical wards, reflecting a wide gap in knowledge and an optimal clinical practice.

Posters Topic: Prevention

P083

THE IMPACT OF A VASCULAR ACCESS TEAM AND VASCULAR ACCESS BUNDLES IN CLABSI PREVENTION

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Introduction: The use of a vascular access team (VAT) and bundles has been proven to have many advanta-ges.1–3 Yet it is still common in Finland that random anesthesiologists and residents are responsible for the insertion of PICC-lines and other venous access devices, even though there are new vascular access teams emerging in the country as the economical and qualitative aspects get more attention. The benefits of VATs are well-recognized, yet there are no full-time VATs in the country, as the VA-nurses main task still remains to function as anesthesia nurses in university hospital ORs. Due to the lack of anesthesia nurses in Finland, VATs are often considered a luxury commodity which often gives way so the OR daily activity is secured.

Method: We compared the CLABSI rates in Peijas hospital where our vascular access nurses insert most of the PICC, Midline-catheters and DIVA PIVs' with ultrasound guidance and the latest evidence-based vascular access bundles to another hospital, where anesthesiologists or medical residents selected at random do all the PICC insertions using various methods.

Results: In 2018 the vascular access team group placed 255 PICC and the non-vascular access team group placed 260 PICCs. In the vascular access team group there have not been any CLABSI since 2013, in the non-vascular access team group there was 5 PICC-related CLABSI in 20184.

Discussion & Conclusion: It has clearly been shown that there is a significant amount of CLABSI in the non-vascular access team group. The cost in the PICC-line CLABSI group alone was approximately 125 000 € in 2018. Although it cannot be extrapolated that these cases of CLABSI are solely due to the PICC inserting team, it is clear that the vascular access team makes a clear impact in infection prevention.

P084

ANALYSIS OF THE CAUSES OF 8 CASES OF PERIPHERAL INTRAVENOUS CATHETER-RELATED BLOODSTREAM INFECTION

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Introduction: Intravenous treatment is the most common invasive operation. Although the incidence of peripheral intravenous catheter-related bloodstream infection (PIVC-BSI) is only 0.1%, the amount of peripheral intravenous catheter used is very large. Once a bloodstream infection occurs, it will increase the patient's discomfort, risk of death, length of stay, and cost. Cases of PIVC-BSI were analyzed to explore the causes of PIVC-BSI and to propose preventive measures.

Method: Peripheral blood samples were taken from patients suspected of PIVC-BSI and samples were taken from the surface of the relevant objects, the environment and the hands of staff for bacterial culture. The clinical data, environmental hygiene indicators and laboratory findings of PIVC-BSI patients were analyzed and the patient's treatment outcomes were followed.

Results: All the 8 patients had chills within 0.5–3.5 hours after intravenous infusion, and the highest body temperature reached 41°C. The peripheral blood samples of 4 patients were cultured as Burkholderia cepacia infection, and the eluate from the catheter tip of 2 patients cultured the same bacteria as the blood culture. The air is humid in the treatment preparation room, and the humidity is 60–80%. All the patients were discharged after being treated with antibiotics. After the temperature and humidity were controlled and all the infusion devices were replaced, there was no chills and fever after the patient was infused.

Discussion & Conclusion: These 8 patients were PIVC-BSI caused by Burkholderia cepacia infection, and the high air humidity was the most likely factor. It is necessary to strengthen the control of environmental temperature and humidity and the management of items according to the regional climate characteristics.

P085

THE IMPACT OF HIGH QUALITY-IMPORTED PERIPHERAL VASCULAR CATHETER ON THE OCCURRENCE TIME TO PHLEBITIS AND NON-PHLEBITIS COMPLICATIONS WHEN PVCS WERE REPLACED AS CLINICALLY INDICATED

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Introduction: This study aimed to determine the frequency of PVC-related complications and the risk factors that have an impact on the occurrence time of complications when PVCs were replaced as clinically indicated. This study is based on the hypothesis that PVC quality may have an impact on the occurrence time of PVC-related complications.

Method: This was a prospective observational study. All of the catheters were followed-up at 12 hours intervals for the development of complications. Locally manufactured (Catheter A) and imported (Catheter B) catheters were used. The catheter dwell times were estimated using Kaplan-Meier analysis. The Log-rank test was utilized to investigate the catheter dwell times. Variables with a significance level were taken into Cox regression analysis.

Results: PVC-related complications occurred more frequently within the first 96 hours (56.3%). In the Cox regression analysis, poor skin elasticity (HR; 1.47 (CI 95% 1.07–2.02), $p = 0.015$), unsuccessful insertion on first attempt (HR; 1.35 (CI 95% 1.04–1.83), $p = 0.047$) and using of Catheter A (HR; 1.61 (CI 95% 1.18–2.20), $p = 0.002$) were identified as significant factors for shorter time to occurrence of phlebitis. Female gender (HR; 1.30 (CI 95% 1.01–1.66), $p = 0.039$), night shift insertion (HR; 1.30 (CI 95% 1.01–1.67), $p = 0.042$), sterile gauze dressing (HR; 1.78 (CI 95% 1.21–2.63), $p = 0.003$) and Catheter A (HR; 2.20 (CI 95% 1.05–4.60), $p = 0.045$) were identified as factors for shorter time to occurrence of non-phlebitis complications. When the two catheters were compared with regards to time to occurrence of complications catheter B was associated with longer dwell time (Figures 1 and 2). Discussion The quality of PVC was a major risk factor for the time to occurrence of complications. We firmly believe that the quality of PVCs should be considered in the routine selection process of PVC in hospitals and other health care organizations.

P086

THE FIRST FRENCH VASCULAR ACCESS UNIT: 10 FIRST YEARS OF EXPERIENCE

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In 2010 the institution began a collaboration between nurses and physicians for central venous catheters (CVC) placements. The first 2 years were experimental and regards of the good results, the law change in 2013 September permitting placements of CVC by nurses in a structured organization. Theory teaching performed by physicians was prolonged with a guided practice training for each type of catheter: The candidate watches 30 acts, do 30 acts with assistance, and were the supervised operator of 30 acts. 3 half-time nurses begun in 2010 and now 8 half-time nurses, increased the activity and the quality of the workflow, the patient's education, colleagues' teaching. They create this year the nurse pre-placement consultation. All characteristics of activity were collected each month during these ten years by nurses themselves in their own book and recopied on computer (excel software). Results; Since 2010, 22679 CVC were placed. 7395 PICC and 3400 CICC were placed between 2015 and 2019. Nurses called physician in 4% of cases for change the indication of type of CVC because of non-adaptation to the institutional decisional tree or because of hemostasis disorders regard of the pathology or treatments. Nurses called physician in 1% of cases for technical difficulties: $>$ 3 punctures, difficulties to push guide or introducer. We note 0.3% of arterial punctures and 2 carotid cannulations during jugular port placement without complications (micro-introducer) and 1 pneumothorax. ECG method permitted perfect CVC tip location. These results are interesting because there only few data in French hospitals with this organization. The limits are modalities of data collection. The originality of puncture out of plane with needle guide is also a specificity because of the lack of high quality of ultrasound machine. In plane puncture technique is developing this year. Advanced practice for CVC placement is efficient and safe.

P087

CATHETER LOOP IN A PORT-A-CATH INSERTED FROM THE LEFT AXILLARY VEIN

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Introduction: In our center the intravenous ports are inserted under sonography and ECG navigation without fluoroscopy. The majority of

catheters are introduced through the right internal jugular vein. Less often the right axillary vein and the left internal jugular vein is punctured. At least we use the left axillary vein. The following case describes the complication that we encountered when the catheter was introduced precisely from this approach. Case report 55 years old woman with the right breast cancer indicated for the introduction of a port-a-cath. On the basis of the sonographic examination the insertion through the left axillary vein was selected as the most suitable. Under sonographic and ECG navigation catheter was introduced without complications into the area of cavoatrial junction. At the end of the performance, the port-a-cath was fully functional. On the basis of the oncological indication, chest x-ray was performed, where a catheter loop was detected at the point of the connection of the let internal jugular vein with the left subclavian vein (see chest x-ray). For this reason, a revision of the catheter was carried out under fluoroscopy.

Conclusion: This case shows that when introducing a port-a-cath without the use of fluoroscopy, it is important to assess the length of the catheter placed in the vein, especially when it is introduced from the left axillary vein.

P088

THE APPLICATION OF WECHAT PLATFORM IN HEALTH EDUCATION FOR TUMOR PATIENTS WITH PERIPHERALLY INSERTED CENTRAL CATHETER

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Introduction: Peripherally inserted central catheter (PICC) is widely used in tumor patients and health education is of great significance to ensure the effective use of PICC. This study was designed to explore the effects of using WeChat platform to assist health education, including daily management knowledge, attitude and practice (KAP), Self-management, the incidence rate of early complications and the incidence rate of unplanned extubation.

Methods: Using a convenience sampling method, a total of 130 tumor patients who are in need of a PICC insertion from June 2016 to September 2016 were included from Shandong province. According to the parity order of catheterization, they were divided into observation group and control group with 65 cases. The control group received oral education and PICC handbook, while the intervention group used WeChat platform to assist health education. The outcomes were evaluated by the questionnaire survey before and one month after the catheterization.

Results: A total of 129 valid data were collected in this study. Before the intervention, the scores of daily management KAP in both two groups were very low, which were 49.77 $\pm$ 6.29 and 50.00 $\pm$ 5.33 respectively. The Post-intervention level of daily management KAP in both groups was higher than before, and the improvement was more obvious in the observation group. The level of daily management KAP and Self-management of the observation group were higher than the control. The incidence rate of catheter complications and unplanned extubation in the observation group was lower than the control group. The differences of all above results were statistically significant ($p < 0.05$).

Discussion & Conclusion: Using WeChat platform to assist health education for tumor patients with PICC can improve the level of daily management KAP and Self-management, reduce the incidence rate of catheter complications and unplanned extubation.

P089

DECREASE IN THE BACTEREMIA RATE RELATED TO THE USE OF THE CENTRAL VASCULAR CATHETER (CLABSI)

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Introduction: 248,000 CLABSI occur in UTIa in 1 year hospitals. During the 2008 the rate was; 16/2025 = (7.90‰) NNIS p, 90: 5.5.Due to this, a Bundle and a Check List were implemented during the CVC Insertion, based the I.HI.The reduction rate during for 2009–2017 was; (17/16629) = 1.02‰ p; 0,00; IC 95%, LI0,05–LS0,15.

Material & Methods: We observed retrospectively all the patients the intensive therapy. CVC who developed CLABSI. Retrospective descriptive analysis not interrupted in time, Period: 2008–2017. A Check List Worksheet, was designed and used. 1. Patient's admission data. 2. Previous Preparation of the CVC Insertion. 3. Procedure during the insertion. 4. Completion of the Procedure. The Bundle of insertion of the CVC: 1. Maximum protection barriers. 2. Use of 2 $\times$ 20 sterile fields to cover the patient. 3. Pre-cleaning and disinfection of the insertion site with 2% CHG aqueous solution. 4. Cap, Chinstrap, gowns and clean gloves for the assistant. 5. Use of IV sterile semi-permeable transparent dressing with stabilization tapes on the insertion site. 6. CVC insert checklist. During 2015–2016, new recommendations were incorporated 1 cleaning of the CVC insertion site, with wet 2% chlorhexidine gluconate cloths and semi-permeable transparent dressing with CHG pads and ribbons of stabilization, for the fixation of the cure.

Results: 10227 patients the 2008–2017, 2715 CVC. The CLABSI global rate, (2008–2017) 0.77% (33 CLABSI/42612, days of use of CVC); 95% CI (LS: 0.05/0.10% LI) P0.00. The fulfillment of the Bundle of insertion of the CVC, was 100% and the registration of the checklist form during the insertion of the CVC was 66.99% (1819/2715 CVC). We used the NNISS and NHSN system (CDC) for CLABSI definitions.

Conclusion: The Bundle and Check list, to be effective. the 2008 the rate was; (16/2025) = (7.90 ‰) NNIS p, 90: 5.5.and reduction rate for 2009–2017 was; (17/16629) = 1.02‰ p; 0,00; IC 95%, LI0,05–LS0,15.

P090

CHANGES IN BLOOD FLOW OF AV FISTULA AND IN CARDIAC OUTPUT BEFORE AND AFTER HEMODIALYSIS

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Background & Aims: cardiopulmonary recirculation (CRP) is one of the most informative instrumental parameters, which are widely used to predict adverse cardiovascular events. We observe a significant variability in CRP, the reason for which we have tried to explain.

Method: The prospective study included 88 patients with native AVF. We evaluated the inter- and inner-observer agreement of AVF volume blood flow (Qa) measurement with color duplex ultrasound. Two specialists with 5–7 years of experience measured Qa twice on the brachial artery, twice on fistula vein, after that – twice measured cardiac output before HD and one time after HD. Ultrafiltration during HD was 1.9 $\pm$ 0.5l.

Results: We observed good concordance between measurements on the brachial arteria by one specialist and by two specialists. There was poor concordance between the brachial artery and the fistula vein Qa, even if the measurement was performed by one specialist. Qa measurement on the fistula vein has a low repeatability, even if the measurement

was performed by one specialist. We observed a good concordance between measurements and between specialists in CO assessment. The main pitfalls of CPR-based cardiovascular risk stratification are related to the fact that CO changes significantly after HD. Qa values remain relatively stable: Qa before and after HD difference is statistically significant, but it is minimal (Figure 1). Median CO decrease was 13.4% (maximum 26.6%), while median of Qa decrease was 1.7% (maximum 6.1%). This leads to a significant increase of the CPR value after HD, which can reach 40%(!) in some patients (absolute increase–0.11).

Conclusion: After HD, there is a significant decrease in cardiac output with relatively stable AVF Qa. This leads to a significant increase of CPR value after HD in some patients. Assessment of CPR before HD may lead to underestimation of cardiovascular risk.

P091

PERIPHERAL INTRAVENOUS CATHETERS FAILURE IN ADULTS IN CHINA: CURRENT SITUATION AND INFLUENCE FACTORS

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IV therapy is one of the most common interventions in the acute care setting, with up to 90% of inpatients receiving their treatments through peripheral intravenous catheters (PIVCs). Over 228 million PIVCs are placed annually in China. Inappropriate maintenance of PIVCs which caused increasing rate of failure and related complications, lead to patient safety issues and heavy nursing workload. Around 35–50% of PIVC replaced due to avoidable complications, like phlebitis, occlusion and infections, prior to the completion of therapy. The objective of this study was to investigate the current indwelling situation of PIVCs in a tertiary hospital and to analyze the influence factors of PIVCs failure in adults.

Method: An observational prospective study was conducted from June 2017 to February 2018 in 10 wards of one tertiary hospital. Trained nurses helped collect information of injection, patients general background and indwelling data with an observational table. Adults (age = 18 years) with PIVCs were included. Statistical analyses were performed using SAS 9.4.

Results: 1751 patients were included (15.31%), and 268 (15.31%) occurred PIVC failure. The 15.31% the PIVC had to be prematurely removed because of the main complications: occlusion (8.79%), subjective pain (5.71%), drug extravasation (0.86%). Department, infusion duration, infusion interval, flushing techniques and flushing prior to infusion were the key influencing factors of PIVC failure. The protective factors were infusion interval >12 h (HR 0.49, 95% CI 0.25–0.95) and flushing prior to infusion (HR 0.46, 95% CI 0.28–0.76), while the risk factors were infusion duration > 12 h (HR 3.18, 95% CI 1.22–8.32) and the manually prepared saline/heparin (HR 2.87, 95% CI 1.07–7.72) relative to prefilled flush.

Discussion & Conclusion: This study shows that PIVC failure rate is still pretty high, occlusion and subjective pain account for most failure. It would be much helpful for complications reduction if flushing the vascular access device pre-injection and avoiding infusion on the same site for a long time.

P092

PERMANENT CATHETERS FOR HEMODIALYSIS. A SINGLE CENTER EXPERIENCE

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Background & Aims: Vascular access for hemodialysis is the centerpiece for good quality care The quality of venous capital of patients with CKD is declining One of the major consequences is the need to use permanent catheters for hemodialysis The aim of our study is to evaluate the frequency of use of permanent catheters and clinical features of its patients

Method: We included all patients with permanent catheters being on dialysis for more than one year during the period 01/01/2015 to 12/31/2019. We studied the clinical characteristics, the circumstances of placement and the outcomes of these patients

Results: A total of 52 catheters performed, 43 patients of a total of 365 dialyzed patients (11 %) Sex ratio (15/28), mean age 48 (12–78), mean duration on dialysis 8 years (1–23) Diabetes in 19 patients (44%) Site of insertion: RIJV (75%) LIJV (19%) RSCV (2%) RFV (4%) Indication of placement: venous capital depletion (66%) delayed AVF confection (21%) first vascular access (23%) Immediate complications: bleeding (8%), dysfunction (4%) Long term complications: Dysfunction (12%), externalization (5%), subcutaneous tunnel infection (26%), septicemia (2%) Mortality was high (33%) All in the group with venous capital depletion (50%) We highlight theses remarks: - High rate of mortality in capital venous depletion group - Young age of patients - High rate of long term complication - Difficulty to AVF confection as first vascular access.

Conclusion: Our series is a small sample, representing ESRD patients in the south of Algeria Our study, despite the small number of patients and its observational nature, helps us to make some recommendations: - Need for venous protection before dialysis and to perform AVF before dialysis especially in woman and diabetes patients - Need to educate nurses for the protection and preserving patients' catheters.

P093

NURSING ASSISTANCE IN PERIPHERAL INTRAVENOUS THERAPY

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Objective: To verify the quality indicators of Nursing care in peripheral intravenous therapy based on the action of the Infusional Therapy Team Hospital Vila Nova Star (TTIHVNS).

Method: Observational, descriptive, exploratory study, carried out in a Private Hospital, Brazil. This institution started its activities in May 2019, and the TTIHVNS was replaced in August 2019, due to events related to infusion therapy in peripheral venous catheter, there were 9 cases of Grade 1 Phlebitis (11%) in August that generated actions to prevent events related to the peripheral venous catheter. A retrospective analysis of the data generated by the actions of the TTIHVNS was carried out. These actions are a daily visit to patients with catheters in infusional therapy/or validity, presence of valvulated connectors and presence of 70% alcohol-impregnated buffer (caps). For data analysis, the calculation of nursing care quality indicators was used, which is the number of peripheral catheters / days, the degree of phlebitis (the number of phlebitis/the number of catheters / day X 100).

Results: 250 observations were made from August to December 2019, which corresponds to 96.62% in relation to opportunities and an average

of 25 observations/day, an average of 473 catheters/day. An average indicator was obtained after actions by the Team of 96.1% compliance regarding the identification of the peripheral venous catheter and 91.5% of the presence of a valve connector, 89% of the presence of a cap impregnated with 90% alcohol. In relation to phlebitis, the average after team actions was 3% grade 2 phlebitis, 1.3% grade 3 phlebitis and 0.1% Grade 4 phlebitis and 1% thrombophlebitis.

Conclusion: In relation to the indicators of quality of care in peripheral intravenous therapy, especially in the care of peripheral vascular catheters, it is concluded that it is still a challenge, but the presence of a care team that accompanies the processes can guarantee the best practice at the bedside and patient safety.

P094

USE OF IV CLOSED SYSTEMS AFTER QUALITY PROGRAM IMPLEMENTATION IN VALENCIAN COMMUNITY HOSPITALS

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Introduction: Different clinical practice guidelines, based on scientific evidence, establish, among other recommendations, the use of IV closed systems as key components to reduce the incidence of bacteraemias related to vascular catheters.

Objectives: Identify the material resources that are being used for the maintenance of venous access, the degree of implementation of the use of closed systems and the evaluation and monitoring of the impact after the implementation of a quality program in our hospitals.

Method: 9 observational cross sections were made in 2019. Trained and approved professionals recorded the data. Hospitals were classified according to their category. Patients admitted $>$ 14 years with vascular access were included. The materials used post-catheter, use of three-step keys, state of the lines, if the intravenous (IV) systems were opened/ closed among many other variables were recorded. Percentages and frequencies were calculated. Proportions equality in the evolution of the cross-sections was contrasted using the Bonferroni method and the independence between Chi-square variables taking 0.05 and 95% confidence as a level of significance.

Results: 49,175 vascular accesses were obtained. Closed intravenous system was in the first cut of 3,305 (58.6%) while in the ninth cut were 5,114 (88.34%) accesses with closed system. There was a percentage increase in the use of safety bioconnectors from 43.46% in the first cut to 71.88% in the last cut, it was found that the three-step keys went from being used in the first cut in a 71.91% to 44.43% in the ninth cut. The presence of phlebitis was also reduced from 4.45% to 1.17%

Conclusions/Discussion: The recommendations made by the quality program, based on scientific evidence on the most appropriate materials to be used in vascular accesses and the results obtained, have an impact on the improvement in the level of quality in vascular access care.

P095

THE FRACTURE OF THE POLYURETHANE POWER PICC AFTER DISLOCATION IN A PATIENT WITH ACUTE EXACERBATION OF ACUTE BRONCHITIS

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Introduction: Coughing increases significantly intrathoracic pressure, which can lead to dislocation of centrally located venous catheters. Case description: Polyurethane 4F power PICC was inserted via the right brachial vein in the upper third of the arm with tunneling to its central part to 81-year-old patient with acute exacerbation of chronic bronchitis. The catheter introduction was performed using ECG navigation. The correct position and course of the catheter were confirmed during the following X-ray examination. Two days after insertion, CT examination was performed using power PICC. During application, the patient experienced pain in the right shoulder area. After the procedure, a power PICC failure was detected and blood could not be aspirated. The fluoroscopic examination revealed a catheter loop at the catheter entry point into the brachial vein. When the contrast agent was applied, a catheter rupture was detected at this point and PICC had to be removed (see Figure).

Conclusion: Conditions in which abrupt changes in intrathoracic pressure are present may lead to dislocations of centrally located catheters. In our case, a loop was formed at the point of entry into a vein, where the power PICC ruptured during the CT examination.

P096

PATIENT OUTCOMES FROM AN AUSTRALIAN NURSE LED PICC INSERTION TEAM

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Objective: The aim of this study is to report positive patient outcomes from a Nurse led PICC insertion team despite recent publications highlighting high associated complication rates from PICC insertions.

Methods: We conducted a retrospective analysis of a prospective cohort study that included all patients that had a PICC line inserted between January 1, 2017 and December 31, 2017. We examined the rate of catheter related blood stream infection (CRBSI) and catheter related deep vein thrombosis (CRDVT).

Results: The total number of catheter days was 10732 and the average catheter dwell time was 22 days. We observed 4 cases of CRBSI (0.4 per 1000 catheter days). 5 patients had CRDVT (0.5 per 1000 catheter days).

Conclusions: We attribute our low rates to an experienced nurse led team, with high procedural volume rates and standardized insertion bundle. Additionally, quality improvement activities have been implemented and evaluated regularly to. We conclude that the benefits to our patients are attained with low risk complications.

P097

ARE CURRENT CLEANING METHODS EFFECTIVE AGAINST HAZARDOUS DRUGS?

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Introduction: This work was part of a quality improvement project to reduce occupational exposure risks to staff handling systemic-anti cancer therapies (SACT) and anyone else within chemotherapy outpatients at Gloucestershire oncology centre. Recent legislation in America, USP General Chapter (2019), sets out enforceable standards for cleaning in areas where SACT is prepared or administered. With no legislation in the UK, guidelines from the NHS (2018) and HSE (2019) are vague on correct cleaning procedures and it is up to individual Trusts to implement their own methods. Vyas et al. (2014) cited studies showing a direct relationship between exposure to cytotoxic drugs and DNA damage among nurses.

Methodology: To assess if the current cleaning methods in chemotherapy outpatients were effective against Hazardous Drug (HD) contamination, surfaces were swabbed before and after thorough cleaning. 6 key areas in the outpatient's unit were chosen for swabbing. The levels of Cyclophosphamide and 5-Fluorouracil were then compared.

Results: The results imply that current cleaning processes are not sufficient to remove or reduce HD contamination. Please refer to attached graph.

Conclusion: Whilst the current cleaning processes are effective against microorganisms that have the potential to cause infection, they may be spreading HD contamination rather than removing it. Since this piece of work we have created a business case to introduce a range of extra precautions; Purchasing HD clean wipes (Cox et al. 2017). Using disposable mop heads vs washable (NHS, 2018). Introducing closed systems for delivering HD via intravenous infusions and boluses. Introducing closed system transfer devices for preparing subcutaneous monoclonal antibodies. Re-swabbing yearly. Rolling educational awareness programs with staff. Review of current cytotoxic disposal methods.

P098

QUEST FOR CLOSED SYSTEMS

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Introduction: The aim of this study was to identify any advantages of using the BD Texium™ closed system. The Lead nurse on the chemotherapy suite had long since had concerns around working with cytotoxic drugs, citing the differences in PPE for nurses, compared to the pharmacists where the drugs are made. Several nurses experienced fatigue and ill health, plus chronic low staffing levels on this very busy unit provided even more reason to explore innovative ways to promote a healthy workforce and improve staff recruitment and retention. Methodology In May 2018 a pre and post closed system implementation study was conducted on the chemotherapy suite at the Queen Elizabeth Hospital, Kings Lynn, to look at the impact on nurses' wellness and fatigue levels and any resulting time and cost savings. Two anonymous questionnaires were also designed, the first around nurses' wellness and effects of working with SACT. The second to monitor daily step count and fatigue levels. Results Pre implementation of closed systems staff reported extreme tiredness, sore feet, hair loss, dry skin and a metallic taste in the mouth. Step counts averaged 6000–8000 per shift. Post implementation of closed systems staff reported feeling much less tired, the metallic taste had gone and the average step count had reduced to an average of 5000–6000 per shift, mostly through not having to repeatedly go back and forth for saline flushes. Cost savings of £95 per month were also noted on reduced number of flushes due to closed systems. Conclusion The introduction of BD Texium™ closed system has resulted in an improvement of staff wellbeing and team have found the infusion set up easier and safer to use. There is still extensive work to be done to raise awareness of safer SACT administration and exposure to hazardous drugs.

P099

ANALYSIS OF ADVERSE EVENTS RELATED TO THE ADMINISTRATION OF PERIPHERAL PARENTERAL NUTRITION IN ADULTS ADMITTED TO A SECOND LEVEL UNIVERSITY HOSPITAL

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Introduction: Reduction of adverse events (AE) related to venous catheters should be a priority in institutions to ensure patient safety. Osmolarity (OSM) suitable for infusion via peripheral venous catheter (PVC) is an unresolved issue that can cause complications. A common infusion with high OSM administered by PVC is Peripheral Parenteral Nutrition (PPN).

Method Objectives: (a) To analyze AE in patients with PVC and PPN prescription. (b) To determine if PPN with lower OSM reduces AE. Methodology: Retrospective observational study, over three periods: I-No intervention (July 2014–December 2015) II-Application of care bundle (CB) (January 2016–June 2017) III- Application of CB PPN (July 2017–December 2018). Subjects: Adult wards. Inclusion criteria: admitted adults, carriers of PVC, with PPN prescription. Variables: extracted from computerized medical reports (MR), based on lists of patients with PPN prescription (sociodemographic, relative to admission, characteristics of PVC and PPN, AE).

Results: 133 MR and 332 PVC were reviewed: Periods: I-59 MR, 164 PVC (49.40%) II-42 MR, 92 PVC (27.70%) III-32 MR, 76 PVC (22.90%) 69.3% of PVC presented AE: phlebitis the most frequent (35.8%), 1 case of bacteremia (0.3%), 11.8% presented other AE, highlighting that 21.4% had unspecified AE. Comparing AE between Periods I and II, a significant reduction of a 14.1% was observed. Phlebitis was reduced by 18.3%. There were not statistical differences in AE and in reduction of AE between Periods II and III. Age appeared as a variable related to the presence/absence of AE.

Discussion & Conclusions: Phlebitis did not decrease with change of PPN. More knowledge about proper use of PPN is needed. Implementation of CB to reduce AE was effective. The notification of AE could favor the appearance of an optimal PPN for its administration through PVC, since the life expectancy of patients increases to the detriment of venous access.

P100

DEVICE-RELATED INFECTION PREVENTION PRACTICE (DRIPP) - AN IMPROVEMENT COLLABORATIVE

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Introduction: The Infection Prevention Society and BD-Becton Dickinson along with National Infusion and Vascular Access Society and Association of Safe Aseptic Practice launched an Improvement Collaborative with the aim to spread best practice, reduce infections and improve outcomes for patients with intravascular devices. An initial workshop, with over 80 attendees, brought together front-line clinicians from acute and primary care with members of professional societies with expertise in managing patients with such devices.

Method: The workshop, led by facilitators, encouraged and directed discussions around key areas related to intravascular devices. The discussions

were divided into 4 workshops: Reality of current practice, Reasons why current practice varies, Identify stakeholders critical to ensuring best (evidence-based) practice and Small and Large Scale Actions needed.

Results: Clear themes emerged from the 'reality' workshop around the variation and inconsistencies in training, competencies, documentation, surveillance, aseptic technique and maintenance. The reasons for the variation included resistance to change, staff having the time to be released for training, nurses not feeling empowered, poor communications, lack of ownership and the problems largely ignored by relevant national bodies. The stakeholders identified included patients, specialist teams, frontline staff and both the influencers and the decision makers within organizations. The ideas for small and large-scale improvements and actions included • Standardized surveillance • Communications and documentation • Standardized training and competency • Standardized equipment • National policy and procedural guidance

Discussion & Conclusion: The evaluation of the first DRIPP meeting was seen as invaluable in the strategic journey to improve vascular access practice and provided the focus for the development of resources. The first phase of resource development includes a standardized vascular access pathway, core training standards and surveillance guidance to enable and empower frontline staff to deliver safer vascular care. These resources will be reviewed and evaluated in a follow-up collaborative event in May 2020.

P101

IV PASSPORTS: A MULTI – GEOGRAPHICAL/DISCIPLINARY COLLABORATIVE FOR CLEAR COMMUNICATION AND IMPROVEMENT OF PATIENT OUTCOMES

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Introduction: In today's climate, vascular access and therapy spans the whole health economy. In the UK, patients with vascular access devices (VADs) frequently move between primary and secondary care highlighting the need for clear communication between different sectors of the health economy to optimize patient experience and outcomes. IV passports already exist, predominantly where there are established IV teams. However, there is a need for the introduction of a standardized document which can be used and understood by all sectors.

Method: Led by the Infection Prevention Society (IPS), a multi- geographical/disciplinary group was established to develop the passport. The aim for the group was to produce a patient held document to aid communications between all healthcare personnel who care for a patient with a line; for the document to be a standard for line information, communication and on-going care; to assist patient engagement and promote patient centered care. The resulting passport was trialed in 2 hospitals. The trial ran for 8 weeks and was evaluated using pre and post questionnaires.

Results: Phase 1 Evaluation found that 74% of staff had not used an IV passport before when questioned before the passport was trialed. However, following the trial 92% of staff reported in the post questionnaire that they had found the passport provided them with the information they required.

Discussion & Conclusion: There is a great need for an improvement in communication between healthcare professionals. The IV passport will assist in patients being able to take an active role in their treatment. A further, more extensive evaluation (Phase 2) is now underway and the results of this evaluation will be available at the end of February, with a full launch of the passport in spring 2020.

P102

A BUNDLE APPROACH TO DECREASE CENTRAL LINE ASSOCIATED BLOOD STREAM INFECTIONS (CLABSI) IN A RESOURCE CONSTRAINED ENVIRONMENT, A SINGLE CENTER EXPERIENCE

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Introduction: CLABSI continues to be a major health care burden with significant associated morbidity and mortality consequences. We detail our experience from a single centre in Kolkata, India where we experienced a high CLABSI burden and implementation of a modified bundle tailored to a resource constrained environment helped significantly reduce CLABSI rates.

Method: All patients with a central line for for than >48 hours were included in the study. After a baseline period of 3 months (Sep'16 – Nov'16), an intervention period of 8 months was conducted in two phases. Phase 1 was the initial intervention period comprising Dec'16 – Feb'17 and Phase 2 was continuation period comprising Mar'17 – July'17. The interventions were: • Training on bundle care – both insertion phase and maintenance phase. Training given to doctors and nursing staff twice weekly. • Weekly training on hand hygiene, hand washing followed by hand rubbing before procedure. Audit and evaluation every month. • System changes implemented were 1. Selection of personnel with more training and experience on central line insertion 2. 2 health care worker (HCW) engagement during insertion 3. Introduction of scrubbing the central line port with 2% Chlorhexidine before opening 4. 2 HCW engagement while opening central line port 5. Introduction of chlorhexidine impregnated patch on central line puncture site 6. Introduction of needle free connector. • Audit on bundle care compliance, 2 audits every month during Phase 1 period, monthly during Phase 2.

Results: CLABSI rates reduced from 4.44/1000 catheter days prior to our intervention to 0.81/1000 catheter days. Overall bundle compliance was 87% at the end of Phase 2. Results and **Discussion:** A modified bundle as appropriate in the resource setting of a tertiary care center in a 3rd world country can achieve results at par with global standards. This has to be followed up with regular compliance and training audits to be sustainable.

P103

EFFECTIVENESS OF MULTI-DISCIPLINARY INTERVENTION FOCUSED ON THE PREVENTION OF ADVERSE EVENTS IN PATIENTS WITH PERIPHERAL VENOUS CATHETERS

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Introduction: Bacteremias related to Peripheral venous catheter (BRPVC) lead to prolonged hospitalization and increases patient illness and mortality. Few studies assess the effectiveness of the implementation of a bundle based on infection/prevention measures.

Methods Goals: To evaluate the effectiveness of a bundle of measures implemented by a multi-disciplinary Catheter Infection Team (CIT) in the

reduction of BRPVC. There were studied adult patients admitted to Son Llàtzer University Hospital (HUSLL) with PVC. The study was developed in the following phases: I- Observational phase. Base line situation analyzed by calculating the BRPVC index rate (IR). CIT created. (Aug -Dec 2015). II- Recommendations of clinical practice guidelines were followed by updating procedures for insertion and maintenance of PVC and using as implementation strategies: training sessions, educational safety rounds on wards, incorporating new venous catheter devices, involving the patient in their own care via training videos in rooms, dissemination of algorithm for selection of appropriate catheter according to pH, osmolarity and duration of intravenous treatment. (2016–2017), III- New strategies were defined to evaluate and sustain the implementation process. Institutionalization of CIT as a Sub-commission on Vascular Accesses. Adherence to Phlebitis Zero Program allowed action in phases prior to BRPVC. Improvement of computer records establishing quality indicators of nursing care related to PVC. (2018).

Results: In phase I, the BRPVC IR was 0.48 cases/1000 stays, in 2016 it was 0.34, in 2017, 0.29 and in 2018, 0.17 cases/1000 stays. It was a reduction of 35.41% in BRPVC in 2018 compared to 2015, in HUSLL.

Conclusions & Discussion: It was a reduction of BRCVP and an improvement of patient health and safety, due to the work of the CIT, active participation of patients for prevention of BRPVC and the collaboration of other areas (computer and purchasing).

P104

PROSPECTIVE FOLLOW UP OF HOME I.V. ANTIBIOTIC BOURSES IN PATIENTS WITH CHRONIC RESPIRATORY DISEASES: EFFICIENCY OF MANAGEMENT BY NURSE COORDINATORS

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Introduction: Nurses coordinators (NC) are in charge of organizing home I.V. antibiotic courses (HIVAC) in our patients with chronic respiratory diseases. They choose from and plan the insertion of vascular access, coordinate the interventions of homecare freelance nurses, private medical devices providers, chemists, medical laboratories. They're also involved in adjustments in the antibiotic doses, management of side effects including serious complications, interactions with patients and homecare caregivers through phone calls, evaluation of treatment efficiency. Our purpose here was to assess security (no hospital admission) and efficiency (concordance between planned and actual organization at home).

Method: In 2019, NC included all patients in a registry as part of routine clinical. Main events of interest were hospitalizations, perturbations in treatment plans (side-effects, premature interruption, transient suspension) and changes in the type of IV catheter.

Results: 173 HIVACs were organized (93 started in-hospital, 80 directly at home; mean courses duration: 10.7 days) in 118 patients. 158 ended at home as planned (91.3%). 78 HIVACs were started using short peripheral cannula (SPC), 3 with Midline, 58 with PICC, 34 with Port. Antibiotics were administered continuously in 131 courses. Among the 15 patients in whom treatment couldn't end at home, 5 were hospitalized (2.9% of the whole cohort). Catheter never caused HIVAC's interruption but 1 HIVAC started with a PICC and ended with a SPC, 1 Midline and 1 subcutaneous catheter replaced 2 SPCs. Others complications: pain in 6 patients (1 PICC must be replaced), 4 medical adhesive-related skin injuries. In 4 patients, initial SPC wasn't the appropriate device.

Discussion & Conclusion: Catheters choices met patient's needs in most cases. HIVACs proved efficient and safe. NCs are key in the multidisciplinary infusion team to improve outcomes, comfort and efficiency in patients with chronic respiratory diseases receiving HIVAC.

P105

RELATIONSHIP BETWEEN VASCULAR ENDOTHELIAL GROWTH FACTOR INHIBITORS (VEGF-I) AND WOUND HEALING DELAY AFTER PORT INSERTION

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Introduction: The VEGF-I hinder the growth of new blood vessels at tumor sites, but also inhibits the epidermal growth factor, and may adversely affect the wound healing process. Therapy should not be initiated for at least 28 days following major surgery and should be withheld for elective surgery. Complications in wound healing appear in 10%. At our hospital, in 2014 was detected the first dehiscence after PAC insertion.

Objectives: Identify the cases of dehiscence after PAC insertion in patients receiving VEGF-I at our hospital. Create hypotheses for randomized controlled experimental study Methods Descriptive and prospective study of dehiscence after PAC insertion in patients receiving VEGF-I before and after placement, between 01/Jan/2016 and 31/Mar/2018.

Results: 141 PACs were implanted: 31% ($n = 44$) received VEGF-I (42 bevacizumab and 2 aflibercept), and of these, the 28% ($n = 12$) had a dehiscence (all of them with bevacizumab). An only case of dehiscence was detected in patient not receiving VEGF-I. The average interval since the last dose of VEGF-I to the placement of PAC in patients without complications in wound healing was 76 days, and in those with dehiscence was 20 days. The two cases of dehiscence with longer time intervals (41 and 56 days) associated comorbidities like malnutrition and PAC infection with catheter related bacteremia. The average interval since the placement of PAC to restart of treatment with VEGF-I in patients without dehiscence was 57 days and 10 days in those who did.

Conclusion & Discussion: A number of case reports, without being conclusive, can help us in designing circuits that allows optimizing the time between VEGF-I and PAC placement. Increasing the time interval between VEGF-I and placement of PAC to 42 days and the time until restart of VEGF-I to 21 days may decrease the incidence of complications in wound healing and dehiscence

P106

EVALUATION OF CLINICALLY INDICATED REMOVAL VERSUS ROUTINE REPLACEMENT OF PERIPHERAL VENOUS CATHETERS

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Introduction: Latest clinical guidelines recommend that peripheral venous catheters (PVC) should be removed when clinically indicated and not routinely (Loveday et al. 2014). In 2017, King's College Hospital implemented clinically indicated removal/re-site (CIR) of PVCs. This was evaluated in 2019 across two sites to assess the impact.

Method: Between March and July 2019, 500 PVCs were audited across different specialties focusing on duration, Visual Infusion Phlebitis (VIP) score and need for the device. The aim was to capture a sufficient quantity of PVCs to represent dwell-time range for better comparison and assess the efficacy of changing from routine to CIR.

Results: Of 500 PVCs audited, 31% ($n = 155$) were in-situ >3 days (range 4–22 days). 92% ($n = 460$) had a VIP score of 0 on visual assessment, 72% ($n = 360$) a documented VIP score of 0, and 84% ($n = 420$) were needed. The combined data showed prevalence of phlebitis at 8% with variation in trends for each site for dwell-time >7 days. Despite the variation, prevalence was similar at 7% and 9% respectively.

Discussion: It is estimated that annually more than a billion PVCs are used globally. Although it is difficult to fully understand the impact of negative patient experiences and cost, steps must be taken to minimize both. Implementing CIR would allow 1:2 patients to complete a course of treatment with one PVC, as opposed to 1:5 with routine replacement (Loveday et al. 2014). A systematic review of CIR versus routine replacement found no clear difference in complication rates (Webster et al. 2019).

Conclusion: Implementing CIR resulted in better patient experience and reduced cost with fewer PVCs used. In 2017, 67,373 was recorded and 49,809 for the same period in 2018, a reduction of 17 564 (26%). This indicates an approximate cost saving of £70000 based on equipment cost of around £4 per insertion assuming only one attempt.

P107

CLINICAL, ECONOMIC AND EMOTIONAL BURDEN OF NEEDLESTICK INJURIES AND BLOOD EXPOSURE ON HEALTHCARE WORKERS I EUROPEAN UNION

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Introduction: Needlestick injuries (NSIs) and blood exposure remain a serious safety concern for healthcare workers (HCWs) across European Union (EU). With an imminent possibility of contracting blood-borne infections from NSI or blood exposure, it is important to understand the clinical, economic and emotional burden on HCWs associated with such events. However, a comprehensive review of burden associated with NSI and blood exposure on HCWs in EU is lacking.

Method: Systematic literature review of studies published in last 10 years was conducted using PubMed and Cochrane CENTRAL by employing an eligibility criteria. Studies were limited to human subjects, published in English, and focusing on key EU countries.

Results: Of 1330, 42 studies qualified for inclusion. Clinical burden was reported in 40 studies, economic burden in 7, and 3 studies reported emotional burden associated with NSI and blood exposure. Incidence of blood exposure was 3.2–8.9 per 100 beds with 71–90% being percutaneous exposures. Only one study reported varying cost of €65 and €620 per blood exposure event. Incidence of NSI varied largely from 1.4 to 13.2 per 100 HCWs or FTE, or 1.8–44.9 per 10,000 person-years, and cost per NSI event varied from €383 to €616. An NSI event was associated with stress, anxiety and fear leading to emotional burden on HCWs. Use of safety devices as well as providing educational training on biological risk of exposure was associated with lower frequency of occupational or percutaneous exposure. No studies were found that reported emotional burden associated with blood exposure highlighting a gap in literature.

Conclusion: This review highlights the clinical, economic and emotional burden on HCWs associated with NSI and blood exposure in the EU. Decision and policy at hospital and national level should promote the use of protective equipment and safety devices to enhance safety culture in healthcare institutions.

P108

CAN PERIPHERALLY INSERTED CENTRAL CATHETERS BE SAFELY PLACED IN PATIENTS WITH CANCER RECEIVING CHEMOTHERAPY? A RETROSPECTIVE STUDY OF ALMOST 400,000 CATHETER-DAYS

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Background: Peripherally inserted central catheters (PICCs) are central venous catheters (CVCs) that are commonly used in onco-hematologic settings for chemotherapy administration. As there is insufficient evidence to recommend a specific CVC for chemotherapy administration, we aimed to ascertain PICC-related adverse events (AEs) and identify independent predictors of PICC removal in patients with cancer receiving chemotherapy.

Materials & Methods: Information on adult patients with cancer with a PICC inserted for chemotherapy administration between September 2007 and December 2014 was extracted from six hospital databases. The primary outcome was PICC removal due to PICC-related AEs (occlusion, infection, or symptomatic thrombosis). Independent predictors of PICC removal were identified using a multivariate Cox regression model.

Results: Among the 2,477 included patients, 419 PICC- related AEs (16.9%; 1.09 AEs per 1,000 PICC-days) were reported. AEs increased when PICC was inserted at the brachial site (hazard ratio [HR], 1.37; 95% confidence interval [CI], 1.02–1.84) and with open systems (HR, 1.89; 95% CI, 1.24–2.88) and decreased in older men (HR, 0.63; 95% CI, 0.49–0.81).

Conclusion: Use of PICC for chemotherapy administration was associated with a low all-AEs rate. The basilic vein was the safer site, and valved systems had fewer AEs than open systems. More research is needed to explore the interaction between AEs, sex, and age.

P109

THE RISK OF ADVERSE EVENTS RELATED TO EXTENDED-DWELL PERIPHERAL INTRAVENOUS ACCESS

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Midline catheters (MCs) may be useful to avoid repeated venipuncture in patients requiring prolonged intravenous infusions with limited adverse events (AEs). We analyzed 2 Italian hospital databases to ascertain the safety of MCs. Among 1,538 adult patients, 154 MC- related AEs (10%; 2.49 AEs per 1,000 MC days) were reported. In total, 1,538 (97.1%) patients had an MC removed during the study period. The removal due to AEs was associated with a shorter dwell time compared to other reasons, when receiving supportive therapy and when a MC with an open system was inserted (Table 1). Most MCs ($n = 1,384$, 90%) were removed for reasons other than AEs: 719 (52%) for patient death, 586 (42.3%) for termination of therapy, 62 (4.5%) for accidental removal, and 17 for device expiration (1.2%). A significant difference in accidental removals was observed between MCs inserted on the right versus left side (64.9% vs 35.1%; $p = 0.03$). In total, 1,538 (97.1%) patients had an MC removed during the study period. The removal due to AEs was associated with a shorter dwell time compared to other reasons, when receiving supportive therapy and when a MC with an open system was inserted (Table 1). Most MCs ($n = 1,384$, 90%) were removed for reasons other than AEs: 719 (52%) for patient death, 586 (42.3%) for termination of therapy, 62 (4.5%) for accidental removal, and 17 for device expiration (1.2%). A

significant difference in accidental removals was observed between MCs inserted on the right versus left side (64.9% vs 35.1%; $p = 0.03$). The 154 AEs reported accounted for 10% of catheter removal, corresponding to a complication's incidence density of 2.49 AEs per 1,000 MC days.

P110

SUPERIORITY OF 2% ALCOHOLIC CHLORHEXIDINE (CHG) AND OF A BUNDLE OF DEVICES IN PREVENTING PERIPHERAL VENOUS CATHETERS (PVCS) COMPLICATIONS – THE CLEAN 3 TRIAL

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Introduction: Two billion peripheral intravenous catheters are sold globally each year, but the optimal skin disinfection and types of materials are not well established. We aimed to demonstrate the superiority of 2% chlorhexidine-alcohol over 5% povidone iodine-alcohol to prevent infectious complications (colonization and local or bloodstream infections) and of a combination of innovative devices over standard devices in extending time between catheter insertion and failure.

Methods: Between Jan 7, 2019 and Sept 6, 2019, we randomized 1000 adults (age = 18 years) via a secure web-based random number generator to one of four treatment groups based on skin preparation and type of devices. In the standard group, open catheters were used and continuously infused to prevent catheter occlusion until catheter removal. Treatments were administered through a three-way stop cock. In the innovation group, closed integrated catheters were used. Intravenous fluids or medications were administered intermittently through a zero-flow needleless connector after removal of a disinfecting cap. Catheters were flushed with pre-filled syringes before and after each drug administration.

Results: Risk of infectious complications was lower with chlorhexidine-alcohol (4 vs 72 events in the povidone iodine-group; HR 0.05 [95% CI 0.02 to 0.15]; $p < 0.0001$). Compared to standard group, patients assigned to innovation group had lower catheter failure rate (34.8% vs 47.5%; absolute risk difference 12·7% [–18·7 to –6·6%]; $p < 0.0001$) and longer time between catheter insertion and failure (HR 1.67 [1.35–2.00]; $p < 0.0001$). Minor skin reactions occurred in 1.8% and 1.4% in chlorhexidine-alcohol and povidone iodine-alcohol groups, respectively.

Discussion & Conclusion: For skin antisepsis, chlorhexidine–alcohol provides greater protection of peripheral venous catheters-related infectious complications than does povidone iodine–alcohol. Use of innovative solutions in combination extended the time between catheter insertion and failure.

P111

INTRODUCTION OF AN ANTIMICROBIAL PICC IN RESPONSE TO HIGH PICC CLABSI INCIDENCE

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Objective: To reduce the incidence of CLABSI in PICC lines through the introduction of an antimicrobial catheter as recommended in evidence-based guidelines and standards. Design: Quality improvement project comparing incidence of infections pre- and post-implementation of the new catheter. Setting: 582 bed community, teaching hospital in Northwest Indiana.

Methods: Ongoing analysis of surveillance data indicated that 50% of central line associated bloodstream infections (CLABSI) were occurring in patients with peripherally inserted central catheters (PICC) in situ. A gap analysis was performed to review institutional practices against evidence-based recommendations. The use of an antimicrobial catheter was supported in each of the documents consulted. Following introduction of the new device, performance was measured in a prospective manner using standardized Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) surveillance protocols for CLABSI and internal data sources for other measures.

Results: After 28 months of data collection, the PICC CLABSI incidence reduced from baseline rate of 1.83/1000 PICC days to 0.176/1000 PICC days (90.38% reduction, $p = 0.0003$)

Conclusion: Combined with continued compliance with basic prevention strategies (i.e. use of a central line insertion checklist/insertion bundle), and optimization of device selection and lumen justification, the introduction of an antimicrobial PICC was associated with a significant reduction in CLABSI.

P112

INDEPENDENT RISK FACTORS FOR DIFFICULT PERIPHERAL INTRAVENOUS CANNULATION. A MULTI CENTRE STUDY IN 8 HOSPITALS IN SPAIN

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Introduction: The study aim was to identify risk factors (RF) for difficult peripheral intravenous cannulation (DPIVC) in hospitals.

Methods: Case-control study carried out from February to December 2017. We included adult inpatients in need of a peripheral intravenous catheter (PIVC) in medical and surgical wards, critical care unit, A&E and surgical area of 8 public hospitals. The nurse responsible for the insertion registered anonymously his/her pre-insertion assessment and variables related to the intervention. Subsequently, a researcher extracted health-related variables from the patient's medical history. Case inclusion criteria included one of the following: two or more failed attempts, need for puncture support, need for central access after failure to achieve PIVC, or decision to reject the technique. Potential RF included health-related variables, conditions of the vascular access, area/setting and professional-related variables. After descriptive analysis, we performed a univariate logistic regression. Statistically significant variables were included in multivariate logistic regression together with hospital areas as potential predictors.

Results: We recruited 2662 patients, 50.3% were women. Age was 64.3 $\pm$ 17.6 years. 221 patients presented DPIVC, 8.3% of the sample. Univariate analysis offered 9 significant variables (Table 1). In multivariate predictive model, a previous history of DPIVC, non-palpable veins and acute upper limb alterations appeared as independent RF (Table 2). We also found significant differences among hospital areas. Multiple

catheterization was more frequent in medical and surgical wards, while upper limb alterations were more frequent in medical wards. We did not find statistically significant differences in any of the professional-related variables.

Discussion & Conclusion: Our study identifies independent RF for DPIVC in a diverse population. In addition, the kind of attention provided could influence the appearance of DPIVC. This information must be considered in interventions to prevent DPIVC, such as advanced cannulation techniques or vascular access teams.

P113

EXPLORATION OF OPTIMIZING MANAGEMENT OF VASCULAR ACCESS DEVICES FOR PATIENTS BASED ON REAL WORLD DATA ANALYSIS

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Introduction: Peripherally inserted central catheters (PICCs) and central venous catheters (CVC) are both vascular access device (VAD) which are commonly used in critically ill patients who need long-term therapy. Various VAD solutions have been practiced clinically, however the most appropriate VAD solution based on clinical scenarios have not be well evaluated. Based on real world data, this study is aiming to identify the most appropriate VAD solution for patients, as well as to explore the optimizing management pattern on VADs.

Method: This study extracted the VAD-specific data of patients from one large tertiary hospital in China from January 2016 to December 2018. General information (age, sex, diagnosis, hospital stay) and clinical information (CVC usage, PICC usage and all relevant nursing records, medical costs) were extracted. Patients were divided into three groups: CVC&PICC, PICC only and CVC only. Exploratory Data Analysis (EDA) and nonparametric tests were used for data analysis.

Results: 959 cases have been included, CVC&PICC 37, PICC 212, CVC 710; average age was 56.6 years, average hospital stay was 19.7 days, average medical costs are RMB 90,026.5. PICC only group had the lowest hospital stay (15.1 days), followed by CVC only (17.9 days), and CVC&PICC (30.8 days). Medical costs were lowest for PICC only group (RMB 61,301.2), followed by CVC only (RMB 91,553.9), and CVC&PICC (RMB 225,306.0). Nonparametric tests show that the results have statistically significance.

Discussion & Conclusion: Currently, PICC are always used for patients after CVC placement. Using PICC&CVC may significantly increase hospital stay, resource utilization, and medical costs as compared to PICC only for the full treatment. It is strongly suggested to take further research on target patients by establishing multi-disciplinary treatment (MDT) scheme including doctors, nurses and pharmacists to evaluate the VAD solutions.

P114

RISK FACTORS ASSOCIATED WITH DIFFICULT PERIPHERAL VENOUS CANNULATION: A META-ANALYSIS OF PUBLISHED STUDIES

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Introduction: Peripheral intravenous catheterization (PIVC) is a common technique in hospitals. Cannulation failure results in multiple punctures and degradation of the vessels. This situation termed difficult peripheral intravenous cannulation (DPIVC) is associated to delays in treatment and diagnosis, and a higher use of central lines. In order to prevent DPIVC, this study intends to identify risk factors associated to DPIVC in adults at hospital.

Methods: Systematic review of published studies (protocol PROSPERO 2018 CRD42018089160). Structured electronic searches were conducted using key words and specific vocabulary. Validity analysis was carried out with Newcastle-Ottawa validated tool. We calculated Odds ratios (OR) for statistically significant variables in every single study. Variables homogenously distributed were analyzed with meta-analyses, which were adjusted for study design and type of outcome.

Results: We selected 7 studies with observational methodology, with a relevant variability in the definition of DPIVC and in the variables included. Significant variables include demographic and anthropometric variables (i.e. gender, BMI), health conditions (i.e. diabetes, renal insufficiency, parenteral drug abuse, cancer, chemotherapy), and variables related to the vascular access (vein visibility/palpability, diameter of the vessel, previous history of difficulty). In some studies, variables related to the professional were also considered. Two variables met criteria for meta-analyses: gender and obesity/BMI. We found statistical significance for obesity with OR of 1.48; 95% CI (1.03–1.93; $p = 0.016$) (Figure 1).

Discussion & Conclusions: Our study identifies the most relevant variables to conform future research and points out obesity as a relevant element to be considered in clinical practice to prevent DPIVC. It is key to design further research with diverse populations and a wide selection of potential risk factors. Consensus must also be reached regarding the definition of DPIVC to allow the comparability among studies.

P115

VASOSPASM ASSOCIATED TO PERIPHERALLY INSERTED CENTRAL CATHETER (PICC): WHAT IS THE OUTCOME?

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Introduction: PICC has been diffused among venous access devices. Studies have shown that the teams of nurses dedicated to vascular access have contributed to reduce complications related to the device and its maintenance of patency until the end of intravenous therapy.

Objectives: to report the outcome of a possible vasospasm/pinch off associated with the PICC.

Methods: This is a case report of a patient who presented vasospasm during withdrawal of PICC. RedCap and Tasy were used as data collection tools.

Results: A 32-year-old female patient with a diagnosis of metastatic lung adenocarcinoma for lymph nodes performed a PICC 4 Fr monolumen in

the basilic vein of the left upper limb with the use localization technology for the administration of chemotherapy. Five months after insertion of the catheter, the patient returns to the hospital for periodic examination and removal of the catheter. During the removal of the catheter there was difficulty, a warm compress was performed at the site, and the removal of the catheter occurred without intercurrences, which it was intact. In PET scan CT scan after one week, a fragment of central venous catheter was identified in the bifurcation with the left pulmonary artery, the patient was hospitalized for the removal of the possible fragment, and a chest tomography with the same fragment diagnosis was performed. During the hospitalization period, she underwent cardiac catheterization, but no catheter fragment was found.

Discussion & Conclusion: The high infusion catheter is associated with a low risk of complications, and in the case reported there was no catheter fragment found during the examination, the probable outcome for CT PET finding was fibrin.

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CENTRAL AND PERIPHERIC VENOUS ACCESS DEVICES IN UNCOOPERATIVE PATIENTS WITH SEVERE ACQUIRED BRAIN INJURIES. EFFICACY, COMPLICATION AND FAILURES OF BEDSIDE ULTRASOUND-GUIDED POSITIONING WITH TWO OPERATORS

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Introduction: In uncooperative patients VAD positioning is made difficult by spasticity, paresis, fasciculations, etc. The presence of an "active second operator" to assist procedure has been adopted to overcome difficulties.

Method: 151 VAD has been performed (9124 total days) in 106 patients (age 66.5, range 19–93): CVC-nt 25 (days 1863), MIDLINE (mid-clavicular) 45 (days 2468), PICC 81 (days 4793). Failure categories adopted: accidental removal (AR), catheter related infection (CRI), malfunctioning (ML), symptomatic thrombosis (ST) and insertion site hematoma (IE). Positioning success rate, Failure type rate during first, second and third months of VAD indwelling time, failure Incidence rate/1000 days (IR) for overall VAD, for VAD Type, for Failure category and for insertion site (brachial vs not brachial) has been examined.

Results: Positioning success rate: 100%. 112 VAD (74.1%) out of 151 target 30 days indwelling time with 16 VAD Failures (10.5%) of which IRC 5 (3.3%), RA 7 (4.6%), ML 1 (0.6%), ST 2 (1.2%), IE 1 (0.6%). Overall and VAD type IR failure was: overall 7,0, CVC-nt 6,4, Midline 8,9, PICC 6,4. Overall Failure category IR was: CRI 3,3, AR 1,7, ML 1,5, ST 0,3, IE 0,1. Failure category for VAD type IR was: CVC-nt : CRI 4,2, AR 1,6, ML 0, ST 0,5, IE 0. MIDLINE: CRI 0,8, AR 2,0, ML 4,8, ST 0,8, IE 0,1. PICC: CRI 4,4, AR 1,4, ML 0,41, ST 0, IE 0. Failure category IR for insertion site was: Brachial: AR 2, CRI 3,4 ML 0, tot 4,86, Not brachial: AR 1,6, CRI 3,3, ML 2, tot 7.

Conclusion: Two operators approach: (1) provides 100% success positioning, (2) cancel need for sedation, (3) does not increase risk of CRI in first month, (4) can be achieved for peripherical and central VAD, (5) IR Failure accords to medical literature.

P117

A 3-STEP PROTOCOL TO SUPPORT VAD SELECTION FOR DIFFICULT VENOUS ACCESS PATIENTS BASED ON THE CURRENT LITERATURE

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Campos, C. Salinas Valley Memorial Hospital, Salinas, USA Introduction Approximately 70–80% of patients admitted to the hospital receive peripheral intravenous (PIV) access, some of which present with difficult venous access (DVA). Guidewire-assisted IVs (GAPIVs) (i.e. AccuCath®), which are inserted using ultrasound and demonstrate increased first-time success rates, may be a viable option for DVA patients. Therefore, standardized decision-making processes regarding vascular access device (VAD) selection and placement might be beneficial for these patients. The goal of this project was to perform a literature review to draft a step-by-step process to guide VAD selection for DVA patients in a large urban medical center in the US.

Methods: A literature search (2012–2017) was conducted using sources: ProQuest Central, Ovid, CINAHL, PubMed, Center for Disease Control, Association of Vascular Access, Emergency Nurses Association and the Infusion Nurse Society. 29 relevant articles were identified following a screening of 11,700 peer-reviewed articles. Applicable themes (i.e. limiting the number of attempts, knowing when to call for assistance) were synthesized to draft the final protocol.

Results: The workflow included three main steps: (1) identification of DVA patients, (2) calling for assistance, (3) PICC insertion if other attempts failed. Patient history and clinical criteria (i.e. requiring = 2 insertion attempts/nurse or four attempts total) were used to identify a DVA patient. After identifying a DVA patient, a specially trained nurse was called to insert a GAPIV using ultrasound. If the insertion failed, the case was escalated to an MD for PICC insertion. The workflow became official policy at the hospital following early improved cost and clinical outcomes.

Discussion & Conclusion: Hospitals may consider implementing clear guidance to identify DVA patients and utilizing novel insertion techniques to serve these patients' therapeutic needs. Further research is required to evaluate the impact of these protocols on health outcomes and patient experience.

P118

PROLONGING CATHETERIZATION TIME RELATED TO THE INTEGRATED THE BD NEXIVA® CLOSED PERIPHERAL VENOUS CATHETER

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Introduction: Short peripheral intravenous catheters (PIVCs) are the most commonly used medical devices in hospitals but adverse events related to vascular catheterization are highly common. We aimed to assess whether the use of a closed peripheral catheter system (CPVCS) might increase dwell time without increasing complications.

Method: A quasi-experimental study was performed in tertiary teaching hospital. Primary outcome was catheter failure (CF) defined as unscheduled removal because of phlebitis, extravasation, accidental removal or suspected infection. Rate of CF using scheduled PIVCs (Braun Introcan Safety®/Intima BD®) replacement at 72 hours (pre-intervention period, Feb-Mar 2013), was compared to rate of catheter failure using unscheduled replacement of a CPVCS (BD Nexiva™) (intervention period, May-July 2013). Catheters placed at study were daily

prospectively followed. This study was approved by the Clinical Research Ethics Committee.

Results: Of 822 patients, 915 PIVCs were placed and included for follow-up (2,851 catheter-days). In the pre-intervention period 620 PIVCs were placed (216 Introcan and 404 Intima) and 295 CPVCS in the intervention period. Rate of CF was 137 episodes/1,000 PVC-days in the pre-intervention period compared with 97 in the intervention period (Rate ratio: 1.4; 95% CI: 1.1–1.7). Analizing rates of CF according to type of PIVC, rate of CPVCS (97 episodes/1,000 PVC-days) were lower than rate of Introcan and Intima (167 episodes/1,000 PVC-days, $p < 0.001$ and 148, $p < 0.001$; respectively). Median dwell time for CPVCS was higher (3 days, IQR: 2–6) than Introcan and Intima (3 days, IQR: 1–3, $p < 0.001$ and 3 days, IQR: 2–3, $p < 0.001$; respectively). There were no local infections or catheter related bacteremia.

Discussion & Conclusion: In hospitalized patients, the use of a CPVCS demonstrated a lower rate of CF and significantly prolonged dwell time than PICVs. These results may contribute to a reduction of catheter insertions, patient discomfort, hospital cost and healthcare workload.

P119

HOSPITAL IV TEAM AND INDUSTRY COLLABORATIVE TO IMPROVE PATIENT OUTCOMES; PRACTICE VS. GUIDELINE AUDIT REVIEW AND SUCCESSFUL CHANGE IMPLEMENTATION

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In a large 15,000 bed general distract hospital over 2 sites in the south of England the IV team undertakes regular annual audits of vascular access devices, every patient with a vascular access device is audited to assess for appropriateness of device, indwell time and on-going requirement. The audit details are limited to inappropriate placements, phlebitis or other complication in real time, in particular the documentation surrounding the device. This audit is limited in the information it provides, it is not observational and doesn't examine practice issues or guideline implementation. A solution was required to firstly evaluate the current audit to ensure it was suitable and valuable with an observational element. As an organization, infections related to vascular access and IV therapy were well reported and the rate was low however other complications are not as well-known and areas of risk from poor practice and other environmental factors are unknown.

Method: BD was able to provide a review of our clinical practice in IV therapy and vascular access compared to our guidelines. A team of clinical specialists from BD undertook an observational audit over a 6-day period, 6 clinical areas across 2 hospital sites. The areas chosen were those with previously low audit success.

Results: The different approach to the observational audit was very successful. Some key aspects of practice which needed to change were identified and changes to our guidelines were required. The results were presented in a presentation and report. • 83 observations reported • 14 PIVC insertions • 59 care and maintenance episodes • 10 PIVC removals Overall compliance with Trust guidelines was 79%,

Discussion & Conclusion: The practice vs. guidelines observation audit allowed us to address areas of concern in practice that we were unaware off. Successful, innovative changes were made following the review.

P120

A HEALTHCARE SERVICES' INTERVENTIONAL TEAM FOR COMPLEX VENOUS ACCESS

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(a) The need to develop expertise, as well as support for healthcare teams for the management of complications linked to venous catheters has been highlighted (1). In 2017, an institutional group in charge of vascular access was constituted within our university hospital. (b) Out of this group, an operational team specialized in vascular access (IV Team) was created. It consists of 2 specialized nurses who meet clinical needs in complex situations, whatever the type of device. The IV team offers coaching, practical workshops, support in care and monitoring. The interventions, from Monday to Friday, are supported by procedures and evidence-based tools made available by the vascular access group. (c) The IV Team was in a position to respond to 82% of requests (n2026) in 2019. An increase in requests of 26.5% was recorded in one year. 47% (n957) of these interventions were linked to peripheral venous catheters, 95% of which justified the expertise of the IV Team scoring a difficult peripheral access that may require either insertion with ultrasound (43%) or insertion with an alternative venous device. The rest of the procedures are distributed as follows: 26% implanted port catheters, 21% PICC, 6% standard central catheters. The average duration of interventions, all devices combined, ranges between 40 and 60 minutes. (d) The increase in solicitations could underline the patients' profile evolution presenting an increasingly damaged venous capital. This is corroborated by patients' A-DIVA scores objectivized by the IV Team. The intervention time which is significant for each device, could illustrate the complexity of care required and justify the intervention of the IV Team. New development strategies could be required due to the increase of hospital healthcare teams' needs associated with the health issues and related clinical requirements growing complexity, as well as the requests' response that can no longer be guaranteed.

P121

APPROPRIATENESS AND COST-EFFECTIVENESS IN THE MANAGEMENT OF VASCULAR ACCESSES: BEFORE AND AFTER THE CONSTITUTION OF A VASCULAR ACCESS TEAM (VAT)

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Introduction: Organization of vascular accesses was historically guaranteed by different Units with low appropriateness in device choice, too many "urgent" CICC/FICC, long waiting list, underutilization of nursing skills. During 2017 a dedicated multidisciplinary and multi-professional medical-nursing group (VAT) was developed.

Method: The following data for the 2015–2016 pre VAT years were compared with those of the 2018–2019 period: type and number of catheters, appropriateness of CICC positioning, % of catheters positioned by nurses, % of catheters positioned by VAT's physicians or nurses. Cost analysis considered: devices and accessories costs, medical and nursing time, setting, patient transport, intracavitary Rx or ECG cost, reimbursement of the procedures.

Results: VAT led to: - Reduction of inappropriate CICCs from 60% to 5%. - Increase in catheters placed by nurses' VAT from 27% to 75.5% (87 % considering also implants involving VAT physicians). - Reduction in the positioning of CICC from 466 to 231 and PORT from 137 to 98 with a PICC increase from 188 to 417, Midline (from 3 to 252) and minimidline (from 40 to 381). - Despite an increase of implanted catheters (from 834 to 1379, +65.3%), cost analysis showed only a limited cost increase (from 388,887 euros to 561,313 euros Euro, +44%) with reduction of the average cost per catheter (from 466.29 euros to 407.04 euros). Reduction of catheters which can only be implanted in inpatients and have very little effect on the final DRG, together with the increase of catheters implantable in outpatient settings has led to a significant

increase in the reimbursement obtainable for this activity (from 67.255 Euro to 129,030 Euros; +91.8%).

Conclusion: VAT led to enhancement of nursing responsibilities within a multi-professional team where the Anesthesiologist has a central role in catheter choice, complications diagnosis and therapy, with important effects on patient's safety.

P122

DOES THE USE OF A CLOSED SYSTEM TRANSFER DEVICE FOR ADMINISTRATION WITH ELASTOMERIC PUMPS ALLOW A SAFE DISCONNECTION?

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Occupational exposure to cytotoxic drugs may cause adverse effects. Nurses may face exposure risk when disconnecting infusion lines, including elastomeric pumps (EP). Several recommendations relating to healthcare workers' safety support the use of Closed System Transfer Device (CSTD). The aim of this study was to evaluate the contamination risk with and without use of a CSTD (Vygon-Qimono®). Potential contamination when disconnecting infusion lines of EP (male Luer-lock) containing 5-fluorouracil from a female Luer-lock (LL) mimicking vascular access was monitored. Different connections were evaluated: - EP/female LL - EP/female LL+needleless connector (BD-QSyte®) - EP+QimoMale®/female LL+QimoFemale® During disconnection, potential leakage will contaminate the tissue mimicking patient's arm and the gloves used for protection. After disconnection, both end parts of the connection were cleaned with a wipe. Wipe, gloves and tissue were separately analyzed for contamination, using liquid chromatography. Ten EP (Baxter-Folfusor®) were used for each group. All disconnections were performed by a trained nurse. Contamination is found for all pumps, but the level differs a lot. The highest contamination is measured on wipes. It is substantially lower on tissues and gloves (no difference among the three connections). For wipes, a significant difference is found among the three connections ($p = 0.007$). Median contamination is 50% lower for connection 3 (76 µg) compared to connection 1 (152 µg; $p = 0.013$) and 44% lower compared to connection 2 (135 µg; $p = 0.031$). There is no difference in contamination between the connections 1 and 2. This was the first study to evaluate contamination risk at disconnection of EP. Qimono® significantly reduces the contamination risk, however it is impossible to evaluate the impact of remaining contamination since there is no knowledge about contamination levels inducing a risk for healthcare workers. Qimono® is a CSTD allowing disconnection of EP, with respect to good practices, since it allows nurses to flush with a standard syringe.

P123

INCIDENCE AND RISK FACTORS ASSOCIATED WITH SHORT PERIPHERAL INTRAVENOUS CATHETER FAILURE

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Introduction: Short peripheral intravenous catheters (PIVCs) are the most commonly used medical devices in hospitals but adverse events related to vascular catheterization are highly common, overlooked in many cases. We aimed to determine the incidence and characteristics of catheter failure (CF) in public hospital system from Barcelona metropolitan-south area.

Method: Multicenter observational retrospective cohort study of adults patients hospitalized in 2 hospitals, part of the Institut Català de Salut, from Barcelona south area (January 2016 to December 2017). Primary outcome was catheter failure (CF) secondary to phlebitis. Other data related to demographic, clinical characteristics, and health outcomes were collected. Data was obtained by the electronics health records. Statistical analyses were performed using SPSS version 25.0 software.

Results: Of 47,249 patients, 44,661 patients (94.5%) had at least one PIVCs during their hospitalization (190,559 days of catheter). Median days of catheterization were 2.4 (IQR: 1.0–5.6). Among them, 2,069 episodes of CF were recorded, resulting in a accumulative incidence rate of 4.6%. Gender was similar between two groups. Patient with CF were more often elder, unscheduled admission and with medical conditions. Multivariate analysis shows that independent factors related to CF were age, gender, unscheduled admission, medical condition, length of hospital stay, hemodynamic instability, extreme weight, uncontrolled pain and catheterization dwell days. Patients with CF more often had undesirable health outcome, as bloodstream related catheter bacteremia and in-hospital mortality (1.1% vs. 0.2%, $p < 0.001$ and 2.9% vs. 1.6%, $p < 0.001$; respectively).

Discussion & Conclusion: Identify factors related to CF during hospitalization can help to implement strategies for optimize the use and type of PIVCs. Furthermore, these results may contribute to a reduction of catheter insertions, patient discomfort, hospital cost and healthcare workload.

P124

COMPLIANCE TOWARDS THROMBOPHLEBITIS PREVENTION AND MANAGEMENT PROTOCOL: AN AUDIT

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Introduction: The incidence of phlebitis varies according to different settings (3.7–67.24%). Studies state that phlebitis is developed in patients receiving peripheral line infusions with vesicants/irritants drugs. An SOP for prevention and management of thrombophlebitis was initiated in our center. Therefore, this study was undertaken to identify compliance to laid down protocol.

Method: A survey design using non probability convenience sampling was used. An observation checklist was developed and validated. All nurses who cared for patients having a peripheral line from 15/01/2020 to 29/01/2020 were included. Patients were followed up for three consecutive days from day 1 of cannulation. The patient's clinical record was assessed for documentation.

Result: Thirty-seven nurses caring for 114 patients were assessed. Overall compliance of nurses to the protocol was 63%. More than 85% compliance was observed in correct gauge selection (87%), cannula site maintained clean and dry (99%), indicating date of cannula insertion (86%) and application of Tegaderm (80%). Only 37% had time label. Thrombophlebitis was identified in 20% cases. 57% had Grade 2 and 43% had Grade 1. Though timely intervention like stopping of IV fluid, removal of cannula, application

of ice pack/thrombophob and insertion of new line was initiated, only 4% of thrombophlebitis assessment/intervention was documented.

Discussion & Conclusion: Most of the nurses were adhering to laid down protocol. Reinforcement is required in documentation. Following set protocol can help early identification and management of thrombophlebitis. Timely audit will help improve compliance. Training of all new recruits and refresher session for current staff should be a part of continuing education program.

P125

COMPLICATION ASSOCIATED WITH PERIPHERALLY INSERTED CENTRAL VENOUS CATHETER (PICC): A SURVEY

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Introduction: Peripherally Inserted Central Venous catheter (PICCs) are widely used for patient requiring medium to long term intravenous therapy in the inpatient and outpatient settings. PICC related complication such as infection, thrombosis, and blockage may occur from insertion to removal. Early identification and prompt intervention will help in better outcomes.

Aim: To identify complication associated with PICC in a tertiary cancer care hospital.

Method: A prospective observational study was undertaken for all patients with PICC undergoing treatment at our center over a period of one year (January 2019 to December 2019). A prospective study was undertaken for all patients with PICC undergoing treatment at our tertiary care center. Patients whose PICC was inserted at our center was asked to follow up every 8 days for 1st month and whenever they identify problem with the PICC. An observational checklist was maintained, and all patients were assessed for any complication. All patients PICC site was reviewed and documented.

Result: 152 patients had PICC inserted in our center. Phlebitis (16.6%, $n = 25$) was the most common complication followed by Site rash (6.6%, $n = 10$) Lumen infection, (3.2%, $n = 5$) thrombosis (2.6%, $n = 4$), Malposition (2.6%, $n = 4$) Site infection (2.6%, $n = 4$), Blockage (1.3%, $n = 2$) fracture (0.6%, $n = 1$) Dislodgement (1.3%, $n = 2$). Among the patients who had Lumen infection, organisms was isolated in 2 patients. Eight PICCs were prematurely removed for Lumen infection ($n = 5$), Dislodgement ($n = 2$) and thrombosis ($n = 1$). Appropriate intervention was carried out for other complications and issues were resolved in 7 days to one month.

Conclusion: Ongoing surveillance for complication is important to provide an up-to-date assessment of risks associated with PICC use in our settings. Prompt intervention will help better patient outcomes. PICC can be successfully used & maintained in majority of patients requiring long term treatment.

P126

TEAMS IMPROVING VASCULAR ACCESS OUTCOMES: THE VGH EXPERIENCE

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Introduction: Evidence has shown peripheral IV catheters have a high failure rate and are associated with many complications, the practice of IV therapy can also pose a risk for healthcare worker safety related to exposure and needlestick injuries. At Vancouver General Hospital, with 1,500 acute beds and 86,000 annual discharges, vascular access is a critical function and not immune to those risks and complications. The Vascular Access Team was called up to 60 times a day to perform routine PIV insertions. Nurses were being exposed to blood during PIV insertion, and manipulation of catheter hubs to place extension sets was increasing the risk of complications. Furthermore, policies concerning asepsis and best practice vein selection were not being followed.

Method: The team wanted to change the way vascular access was delivered and needed data, to measure improvements in patient outcomes, and risks. VGH partnered with BD to obtain this information. Through the Vascular Access Management Program. Clinical experts conducted baseline assessments of VGH practices, comparing them with global and local clinical best practice guidelines. The pre-assessments included 145 vascular site assessments, 62 observations of PIV insertions, and 60 chart reviews. Based on this analysis, the VGH Team and BD implemented evidence-based changes to policies, practices, and products to help improve outcomes at every step of the vascular access continuum.

Results: PIV Dwell time increased 30%, first stick success up to 77% from 71%, PIV removal documentation rate up to 79% from 39%, blood exposure decreased to 0% from 25%, symptomatic removal rate and dislodgment decreased.

Discussion & Conclusion: With increases in first-stick success and longer dwell times, reductions in overall costs are anticipated. Most importantly, VGH has demonstrated improved clinical outcomes, reduced complications, and enhanced patient and staff safety.

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REVIEW OF VASCULAR ACCESS ASSESSMENT AND DECISION-MAKING ALGORITHM IN BRAZIL: THE POTENTIAL ROLE OF A PORTUGUESE VERSION OF THE DAV-EXP APP

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Background: Peripherally inserted central catheters (PICC) are used in Brazil and commonly inserted by skilled nurses, adopting international recommendations for good clinical practice, which includes ultrasound-guided puncture, modified Seldinger technique, tip location by intracavitary ECG. Though, there is no national guideline or algorithm to guide an appropriate selection of venous access device (VAD) and the choice between PICC and centrally inserted central catheter (CICC).

Method: We have conducted a multifaceted analysis to determine the availability of patient assessment algorithms for VAD choice in Brazil: (a) a review of the Brazilian literature on patient assessment and VAD selection (b) evaluation of local nursing guidelines and PICC workbooks; (c) interviews with local VAD teams.

Results: Three relevant articles were found: (1) Santolim (BJN 2012): reduction of peripheral phlebitis by using an algorithm for vascular access by a bedside nursing decision-making; (2) Lopes (JAVA 2014): diagnoses and drugs most frequently utilized for PICCs and implementation of hospital protocol; (3) Santolim (Acta Ortop Bras 2018): choice of IV device for vascular access. Nurses' guidelines and PICC workbooks indicates incompatible drugs but do not define a process for vascular access assessment. Some of the hospitals interviewed had considered the MAGIC app but it didn't meet their expectations as it discourages the

use of PICCs rather than to provide a tool to choose between PICC and CICC; thus MAGIC excludes the use of PICC in ICU, which is increasing due decreased insertion complications such as pneumothorax and carotid arterial puncture.

Discussion: As a result of our analysis, we concluded that there is not one satisfactory algorithm or app that can be used for vascular access decision-making in Brazil. We reviewed the DAV Expert app (developed by GAVeCeLT – the Italian Group of Venous Access Devices) and we judged it appropriate for applicability to the Brazilian approach to VAD selection and local product availability. We translated the DAV Expert from Italian to Portuguese and we will make it available on the web in 2020, for the benefit of all clinicians from Brazil and from other Portuguese speaking Countries.

P128

CENTRAL VASCULAR CATHETER MANAGEMENT IN ONCOLOGY

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Introduction: In Italy the incidence of malignant tumors is over 370,000 cases per year, the pathway of the cancer patient is closely linked to the administration of intravenous therapy, the widespread use of central venous catheter (CVC) requires that professionals involved in the care path develop specific skills by guaranteeing evidence-based performance. The aim of the Working Group Nursing of the Italian Association of Medical Oncology was to develop a document to standardize care for CVC in oncology.

Method: Five meetings scheduled on the national territory from May to October 2018, 132 nurses involved from 64 oncological realities. Nurses were divided into working groups which addressed the issues of: (1) device selection, (2) CVC management, (3) infections and thrombosis prevention, (4) MARSI-extravasation-mechanical complications prevention, (5) follow-up management.

Results: Each group produced a report on the assigned area based on the comparison between literature, protocols and clinical experiences, the report was used as a contribution for drafting the document. The document developed contains recommendations by type of device and summary tables of reference for each area of intervention.

Conclusions: The document is intended for all nurses involved in taking care of the cancer patient to ensure uniformity in CVC management throughout the national territory during the clinical-care path, witness to the commitment of the scientific societies to guide the choice of professionals in specific areas of expertise. The document is not intended as a substitute for clinical judgment and must be integrated and stimulate the revision of hospital protocols as a tool for clinical governance.

P129

AN OBSERVATIONAL STUDY OF THE BLOOD VESSEL AND SUBCUTANEOUS TISSUE PLACED PERIPHERAL INTRAVENOUS CATHETER DURING CHEMOTHERAPY: A DESCRIPTIVE STUDY

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Introduction: One cause of peripheral intravenous catheter (PIVC) failure is chemical irritation of vessels by pharmaceutical agents. This study aimed to describe, in detail, image findings of a catheterized vessel and subcutaneous tissue with and without cytotoxic agent using ultrasonography.

Method: Participants were inpatients of a hematology and oncology ward of a university hospital in Tokyo, Japan, over 19 years old, requiring a short PIVC for chemotherapy. PIVCs included in this study were the first of several placed throughout the duration of hospitalization. Patients were divided into two groups according the drugs used: the cytotoxic PIVC group and non-cytotoxic PIVC group. The subcutaneous tissue and vein were observed by ultrasonography immediately after placement; every approximately 24 hours; before and after removal; and 24 and 48 hours after removal. Transverse and longitudinal static images were obtained and qualitatively analyzed.

Results: The number of cases in the cytotoxic PIVC group and non-cytotoxic PIVC group were 21 and 26, the median duration times (min) were 7765 and 7805, respectively. Non-cytotoxic agents included antimicrobials, parenteral nutrition agents, etc. Only two images taken post-placement found subcutaneous edema. The thrombi observed often formed on the blood vessel wall, under and forward of the catheter tip. Although no thrombi were found in only one vessel in the cytotoxic PIVC group, four vessels in the non-cytotoxic PIVC group did not show it. Thrombus formation in the cytotoxic PIVC group was earlier than the non-cytotoxic group. Subcutaneous edema appeared around the blood vessels, and increased echogenicity diffusely, it was observed at any of the observation timing in all cases. These thrombi and edema remained at 24 or 48 hours after removal.

Discussion & Conclusion: Inflammatory findings, such as thrombus formation and subcutaneous edema, remained at 24 or 48 hours post-removal, so healthcare providers should avoid choosing these damaged veins.

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THE INCIDENCE OF PHLEBITIS ON ROUTINE VERSUS CLINICALLY INDICATED REPLACEMENT OF PERIPHERAL INTRAVENOUS CATHETER IN EAST COAST HOSPITAL MALAYSIA

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Introduction: The insertion of peripheral intravenous catheter (PIVC) has becomes the most common invasive procedure performed to patients in hospital. However, this procedure usually fail before the end of intravenous therapy due to irritation of the vein. The replacement of PIVC is agreed as the most widely intervention used in occurrence of phlebitis. The problem arises when there is an argument related the best optimal timing regarding reinsertion of PIVC. Some studies suggested that prolonged use of PIVC did not lead to a higher complication and suggested that the practice of routine replacement should be re-examined. The aim of this study to is to determine the occurrence of phlebitis with routinely and clinically indicated PIVC replacement.

Method: This is an observational study conducted at medical and surgical wards. Purposive sampling method was used to select the sample. Ninety respondents were involved in this study and the data was collected using checklist adopted from previous study. The data were analyzed using Chi-Square Test by SPSS Version 19.0.

Results: The result showed there is no significant association between gender, age, history of phlebitis, needle size, inserted by and site of insertion (p-value > 0.05) with incidence of phlebitis. The overall incidence of phlebitis (all degree of phlebitis), was 36.7%. In the clinically indicated group, a greater proportion of patients developed phlebitis on day 2 (23.5%) than on day 1 (6.2%) of PIVC insertion.

Discussion & Conclusion: The clinically indicated replacement of PIVC on day two showed the higher percentage of development of phlebitis. Therefore, this research supports the current Centers for Disease Control and Prevention guideline to remove PIVC based on clinical indication rather than standard interval.

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CLINICAL, ECONOMIC AND EMOTIONAL BURDEN OF NEEDLESTICK INJURIES AND BLOOD EXPOSURE ON HEALTHCARE WORKERS IN THE MIDDLE EAST AND AFRICA

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Needlestick injuries (NSIs) and blood exposure remains a serious safety concern for healthcare workers (HCWs) across Middle East and Africa. With an imminent possibility of HCWs contracting blood-borne infections from NSI or blood exposure, it is important to understand the associated clinical, economic or emotional burden. A comprehensive review of burden associated with NSI and blood exposure on HCWs in the Middle East and Africa is lacking. Targeted literature review in PubMed and Cochrane CENTRAL included high-quality studies reporting clinical, economic or emotional burden of NSI or blood exposure in HCWs. Sharp injuries were excluded. Studies were limited to human subject, published in English in last 10 years. Thirty-one of 1,330 studies met the eligibility criteria. Incidence of blood and body fluid exposure (BBFE) was 5.9/10,000 patient-days among HCWs in Saudi Arabia, 0.7% of 33,364 HCWs in Kuwait, 25–46.2% HCWs in East Africa. Incidence of percutaneous injuries (PI), including NSIs and sharp injuries (NSSIs) was 3.2–12.3 PIs/100 daily-occupied-beds in Saudi Arabia, 7.7–13.8% of HCWs in Egypt, 49–52.5% of nursing students in Turkey. About 15% HCWs were exposed to NSI and BBFE in South Africa. NSI/BBFEs were underreported (56–90% HCWs did not report), and nurses and physicians were most exposed. PI reduced with use of safety-engineered devices (SEDs) an training by 70%, with only one study in South Africa showing cost-effectiveness of this strategy. NSSIs negatively impacted quality of life with >50% of HCWs reporting feeling depressed, anxious and worried. This review highlights the clinical, economic, and emotional burden on HCWs associated with NSI and BBFE in the Middle East and Africa. Training and SEDs may reduce such burden and are cost-effective within certain parameters. Decision- and policy-makers at hospital and national level should promote the use of SEDs and training programs to enhance safety culture in healthcare institutions.

P132

VAD AND LUNG CANCER: WHICH VEIN TO CHOOSE?

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Introduction: Considering the respiratory risk in case of pneumothorax in this population and the risk of left-sided insertion difficulties in case of mediastinal compression, our team has chosen a right jugular elective route. A lot of these patients are coughing, leading to secondary tip malposition in the first third of the superior vena cava, the right jugular or even the right subclavian. We wanted to quantify this phenomenon.

Materials & Methods: Analysis of 325 successive patients with lung cancer requiring implanted ports. The files have all been reviewed. A chest-ray is systematic after insertion and every time the device has no blood return.

Results: Secondary tip malposition with no blood return was seen in 16 patients (5.4%). The time to onset of malposition was 2 months (15 days–24 months). All these patients were re-implanted by right subclavian route without new malposition. The level of implantation in the jugular vein and the implantation technique showed no difference in the risk of this malposition.

Conclusion: Right jugular insertion of a port device in this particular population is associated with a significant risk of secondary malposition of the distal end of the catheter, providing thrombosis risk and difficulties in device use leading to a risk of delayed treatment. Brachial ports may be of interest in this population.

P133

INFECTION OF LONG-TERM CENTRAL CATHETERS IN ONCO-HEMATOLOGICAL PATIENTS: A RETROSPECTIVE COHORT

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Introduction: The constant use of the venous network of patients with hematological diseases, makes it necessary to install a central catheter for drug infusion, collection of tests, transfusion of blood components, etc. Thus, the patient is exposed to the risks inherent to the use of vascular accesses, including bloodstream infection.

Method: The objective of this study was to analyze, through a retrospective cohort, the infection rate of long-term central catheters in patients admitted to an onco-hematological unit of a large hospital in southern Brazil.

Results: From 01/01/2019 to 12/31/2019 we obtained an infection rate of 0.4% of bloodstream infection related to the use of long-term central venous catheter, in the total of 1 infection in the study period. Adherence to hand hygiene during the study period was 92% in accordance with the 5 recommended moments for the practice, with 692 observations on hand washing and 637 were correct hand washing opportunities.

Discussion & Conclusion: Related to adherence to hand hygiene with the rate of infection of permanent catheters, we show that the month with the lowest adherence to hand hygiene coincides with the month in which we obtained our only infection. Hand washing is one of the main measures for controlling hospital infection, among other measures adopted by the study target hospital.

Posters Topic: Pediatric

PP01

INCATIV-PEDIATRICO: INTRAVENOUS THERAPY QUALITY INDICATORS PROJECT IN PEDIATRIC PATIENTS

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Introduction: Catheterization for intravenous therapy (IT) and related care are some of the most common procedures practiced by nurses in specialized pediatric and neonatal care. It is a complex and non-risk-free technique that requires qualification and knowledge, as well as nursing care for its maintenance. Our research team have designed a quality indicator (INCATIV index) to improve the quality care of IT in the pediatric population. It will be used in a main project called INCATIV-PEDIATRICO, a quasi-experimental study with periodic cross-sections (pre/post-intervention training) by nursing care professionals, monitoring of variables related to IT to be developed in 2020.

Method: To design the INCATIV index, a Delphi study was conducted with three rounds to a group of renowned experts in the field of Pediatric vascular accesses. At the first round, Delphi Group selected the main variables. After each variable was weighted with the distribution of 10 points among variables. Finally, a third round of weighting was done after teaching the anonymized results. Ad hoc design sheet (Excel program) was used for Delphi rounds.

Results: At the first round, Delphi Group (13 clinical nurses, research nurses, nurses professors, and nurses supervisors) selected eleven variables for the "INCATIV index." In the second round, only the score of three variables exceeded the weighting of 1 point out of 10. And only 1 variable did not reach a score $>$ 0.4. In the third round the first 3 variables reached greater power in the INCATIV index. And all the variables reached a score $>$ 0.4. A consensual data collection notebook will be used between the research team formed homogeneously by nursing professionals from each hospital.

Discussion & Conclusion: There was consensus among experts when defining the power of the different items of the INCATIV index. This can be used in the INCATIV-PEDIATRICO project.

PP02

REVI PROJECT. DETECTION OF PREDICTIVE FACTORS OF PAIN AND ANXIETY IN VENOUS CANALIZATION IN THE PEDIATRIC PATIENT

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The pediatric patients are predisposed to therapeutic processes. Among these, venous punctures are the diagnostic tests that generate the most fear as well as anxiety. These feelings are associated with adverse consequences, such as escape attempts, alteration in the metabolic pattern and sleep, and even manifestation of symptoms of posttraumatic stress. However, there is a clear deficit of publications that analyze the level of anxiety linked to invasive and painful processes in acute situations.

Method: Prospective study consisting of a sample of 148, from January-May 2019, includes children from the emergency services or extractions, who met the inclusion criteria (from 2 to 6 years old, undergoing venous puncture procedure and without situation of vital risk). A multivariable logistic regression analysis has been carried out using the step-by-step selection method, with the independent variable "parental attitude" and the control variables: pain level. In 73.5% of the cases the procedure consisted of a venous puncture and in 26.5% the canalization of a venous route. 46.8% did not present anxiety during the procedure. The average pain was 4.43 (DE: 3.10). In relation to the companions, 14.1% they presented a lack of adaptation or stress during the procedure.

Discussion & Conclusion: Clear predictive factors can be seen as determining the level of anxiety experienced by the pediatric patient, being mainly two: the age and the level of coping of the parents. Action techniques focused on the age of the patient as well as focused on the parents should be worked on in order to improve and decrease the level of anxiety experienced by the pediatric patient during these procedures.

PP03

PILOT EVALUATION OF EXTENDED PERIPHERAL INDWELL CATHETERS' (EPIC) DWELL TIME AND SUCCESS RATES IN THE NEONATAL INTENSIVE CARE SETTINGS

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Introduction: Providing safe and reliable vascular access is vital for patient safety. However, peripheral infusion therapy using short cannula devices in neonates is associated with high complication rates and reduced indwell time (failure of therapy). The extended peripheral indwelling catheter (EPIC) is effectively used with adults to address these issues but evaluations of EPICs utility in neonates is lacking. This study evaluates the utility of EPIC on indwell time in a large 112-bedded neonatal unit in Qatar.

Methods: A prospective descriptive method with a convenience sample of neonates receiving EPIC devices as part of their clinical care. Data was collected between March and August 2019 and outcomes compared with a cohort who received PIVC devices during the same period.

Results: Data from 258 EPIC insertions attempts were collected; the average number of attempts per patient was 1.3 and the success rate was 72% (186/258 attempts). The average indwell time was forty-two hours. Over the same period 4235 short peripheral devices were inserted and the success rate was 84% (4235/5138 attempts). The average indwell time was thirty-three hours.

Discussion: EPIC is a relative new concept for neonatal population. Indwell times for midline catheters in neonates reported in the literature range from 7.69 to 16.4 days in neonates. However, it is unclear as to which device some of this data relates (short central line, a long peripheral IV or something different) making broad comparison difficult. Our data support a view that in relation to indwell time EPIC is superior to short peripheral cannula.

Conclusion: In this study, EPIC provided longer indwell duration than standard short devices. However, practitioners need to become further acquitted with the specific of this technique. In addition, further larger studies to elucidate statistically significant data about EPIC's dwell time and its relationship to infusion related complications are required.

PP04

ASSESS BETTER BEFORE AND AFTER (ABBA): REDUCING SEVERITY OF PERIPHERAL IV INFILTRATION IN A NEONATAL POPULATION

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Introduction/Background: Vascular access devices (VADs) play a vital role within the Neonatal Intensive Care Unit. However, VAD use is not without risk and VAD selection is essential in optimizing infusion therapy and preventing complications. Peripheral intravenous catheters (PIVC) are predominately used in the NICU. In response to challenges faced in reducing incidence and potential harms related to PIVC use, evidence-based care bundles and preventative measures were developed and implemented.

Aim: To reduce the percentage of severity of peripheral IV related infiltration from average OMII score of 13 to 9 (40%) by end of 31st October 2019.

Method: The institution transitioned from a grading scoring system to a objective measurement system as per Cincinnati's Children's Hospital model, further, to be referred to as Objective Measurement Infiltration Injury (OMII). All staff was trained to use this novel model. At the same time an awareness campaign was rolled out with TLC (Touch, Look, Compare), Roll-up posters, Flyers and an Info-lanyard. All data are collected over 12 months.

Results: Compliance to the use of the OMII score and TLC intervention increased within 2 months to an average of 99%. The severity score reduced from an OMII of 13% to a low of 3% (benchmark 8%). Over this period, the average Central Catheter insertions increased.

Conclusion: The OMII score is suitable to quantify infiltrations. Combined with the awareness champagne the severity of infiltration decreased. Detecting PIV infiltration events in a timely manner enables staff to take appropriate actions, ensuring patent safety and reducing the potential for harm. The increased use of Central Venous Catheter insertion indicates an optimized use of VADs.

Discussion: The high compliance to use the OMII score and TLC intervention indicate user friendliness. Results showed the ability to reduce the severity infiltrations however sustainability needs to be achieved.

PP05

SMILE - SECURE MY INTRAVENOUS LINE EFFECTIVELY: A PILOT RANDOMIZED CONTROLLED TRIAL OF PERIPHERAL INTRAVENOUS CATHETER SECUREMENT IN PEDIATRICS

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Introduction: Failure of pediatric peripheral intravenous catheters (PIVCs) is high. Inadequate securement might be partially responsible. We aimed to evaluate the feasibility of an efficacy randomized controlled trial (RCT) of pediatric PIVC securement to prevent failure.

Methods: A 3-arm, pilot RCT in a tertiary pediatric hospital in Australia between February 2017 and May 2018. Random assignment of 330 children to receive (i) bordered polyurethane dressing + non-sterile foam, (ii) integrated securement dressing + sterile foam, or (iii) tissue adhesive + non-sterile foam. Primary outcomes were feasibility (patient acceptability; recruitment; protocol adherence; missing data; and attrition) and PIVC failure (composite measure). Secondary outcomes: local/bloodstream infection; occlusion; infiltration; dislodgement; phlebitis; dwell time; serious adverse events; and microbial sub-study of colonization of catheter tips, insertion sites, and foam.

Results: Most feasibility outcomes were confirmed; 98% of eligible patients consented, 96% received their allocated dressing and no patients were lost to follow up. Eligibility was not met; 58% of patients screened were ineligible and 11 randomized patients did not receive a PIVC. Of 319 patients receiving a PIVC (20,716 PIVC-hours), significant reduction in PIVC failure was demonstrated with integrated securement dressing, 31/107 (29%, chi-squared test, $p = 0.017$) compared to bordered polyurethane dressing, 47/105, 45%. Although not statistically significant, compared to bordered polyurethane dressing, tissue adhesive 34/107 (32%, $p = 0.052$) was associated with less PIVC failure. On Cox multi-variable regression, no securement intervention significantly reduced PIVC failure. Older age (HR 0.92; 95% confidence interval [CI] 0.88–0.96; $p = <0.01$), no infection at baseline (HR 0.51; 95% CI 0.34–0.78) and insertion by vascular access specialist (HR 0.40; 95% CI 0.26–0.64) were significantly associated with reduced failure ($p < 0.05$).

Conclusion: A large efficacy trial to test statistical differences is feasible and needed. Preliminary results suggest integrated securement dressing and tissue adhesive might reduce PIVC failure compared to bordered polyurethane dressing.

PP06

OFF LABEL USE OF PICC AS UMBILICAL ARTERIAL CATHETER: CLINICAL CASE REPORT

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Introduction: Umbilical arterial catheters (UAC) are often placed at birth in critical neonates such as those with hemodynamic instability, congenital diaphragmatic hernia (CDH), persistent pulmonary hypertension. Advantages of UAC include continuous blood pressure monitoring, accurate blood gas and frequent blood samplings. Single lumen polyurethane catheter ranging from 3.5Fr to 5 Fr designed for neonatal population are usually used for this purpose.

Method: We described the off-label use of a 3rd generation polyurethane power injectable 3 Fr single lumen peripheral inserted central catheter (PICC) as UAC in a term baby affected by CDH.

Results: Baby C.G. is born at term with an antenatal diagnosis of CDH. She was intubated in delivery room. On the admission in neonatal intensive care unit umbilical lines were placed. A 4 Fr single lumen power injectable PICC (Health PICC; Polymed) was cut at 25 cm and was placed in the umbilical artery. The catheter was safely secured at with sterile strips, semipermeable transparent membrane and a sutureless device. Blood pressure was successfully monitored achieving a good arterial pressure waveform. The catheter was removed at 96 hours of life without any side effect.

Discussion & Conclusion. This clinical case report opens new scenarios about the off-label use of power PICC in newborns. Prospective studies are needed to evaluate the safety and advantages of PICCs as umbilical catheters over the conventional old generation polyurethane neonatal catheters.

PP07

VASCULAR ACCESS AND ANESTHETIC CHALLENGES IN INFANTS AND CHILDREN WITH METABOLIC DISEASE

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Introduction: Children with metabolic diseases require often long-term vascular access for the application of enzymes, fluids or nutrition. Due to disturbed anatomy, they pose a challenge for the vein location and anesthetic airway management. The purpose of this retrospective study was to analyze data of all pediatric patients with metabolic diseases who had their vascular access devices inserted in our institution in 2017–2020 period.

Method: A review of the hospital charts of children scheduled for implantation of the long-term venous access. Following data were extracted: demography (age, gender, weight), indication, course of the procedure (vein location, the success rate of percutaneous technique, the technique of airway management, duration), type of the device inserted, complications, and concordance with the MAGIC guidelines for VAD insertion.

Results: In total, 27 procedures in 24 children were identified. Patients were 1 month - 17 years old (median 3 y). 24 procedures were performed under general anesthesia and 3 under local anesthesia. Indications included: application of medication in 15 patients (62.5%), administration of parenteral nutrition in 6 children (25%), and application of infusion therapy in 3 patients (12.5%). 10 procedures (37%) were port implantations, 16 tunneled central venous catheter (59.3%), and one (3.7%) PICC insertion. The total success rate of percutaneous technique under the ultrasound was 96.3%, one catheter in a preterm neonate was inserted surgically. 22 catheters were inserted into the brachiocephalic vein, 4 to the internal jugular vein and one to the basilic vein. Complications included misplacement/obstruction in three and bacterial infection in four patients. MAGIC guidelines were followed in 100% of cases.

Discussion and Conclusion: The appropriate device insertion according to the guidelines, use of the ultrasound guidance in all cases and selection of the brachiocephalic vein as a first choice are the main steps in successful insertion of VAD in children.

PP08

LONG DURABILITY PERIPHERALLY INSERTED CENTRAL CATHETER IN PEDIATRIC ONCOLOGICAL PATIENTS: APPLICATION OF A GUIDELINE: FIRST EXPERIENCES IN A LATIN AMERICAN COUNTRY

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Introduction: Vascular accesses in children for treatment of oncological diseases is a challenge. Two important factors contribute to it, the size of the vessel and variation in each patient's body surface area. There are also social-financial factors involved in this. Colombia is a country with low-medium income index, the use of these type of resources in these high-cost pathologies make treatment safer and efficient. The application of a guideline exposes 17 experiences in long durability inserted central catheter in pediatric oncological patients in Colombia.

Materials & Methods: Data base of the Vascular Vessels Service between the months of January 2017 and January 2018 was checked. 17 oncological patients are found using peripherally inserted central catheter for full chemotherapy treatment. PICC placement is made with the aid of a sonogram performed by qualified personnel from vessels access team. Such team in our institution consists of one General Surgeon, the Head of Nurses and trained personnel. There is also a peripherally inserted central catheter care guide that is followed that assures completion of treatment with only one vascular access.

Results: 17 different pediatric oncological cases were treated. The rate of success was 100%. Average age was 10 (IQR 8 years). In all cases the vein accessed was the basilic vein. Only 2 patients developed complications: 2 thrombosis, and a median 65 days (IQR, 130 days) at catheter stay days.

Conclusion: When it comes to choosing PICC in pediatric oncological patients as vascular access, having a highly qualified personnel and team as well as a complete and professional guideline for application and care is key. This to achieve an adequate vascular access for oncological treatment and to prevent complications derive from intervention and the catheter itself.

PP09

CENTRAL VENOUS ACCESS DEVICES (CVADS) IN 935 PEDIATRIC ONCOLOGY PATIENTS: COMPLICATIONS AND AMICABLE SETTLEMENT

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Introduction: CVAD have a prominent role in the management of pediatric oncology patients. However, data from large pediatric cohorts receiving CVADs are scarce. Therefore, we aimed to systematically analyze existing evidence of the incidence of CVAD failure and complications across CVAD types within a large cohort and implement treatment protocols for preventing the occurrence and promptly treating the most common complications.

Methods: In this context, we analyzed 935 patients received 1326 CVADs in Dmitry Rogachev National Research Center over a period of 1 year (2018–2019), focused on CVAD-related complications, divided into groups according to the CVAD-types, as well as the long-term catheter survival rates. The incident rate (IR) per 1,000 catheter days (CD) was estimated either.

Results: Inadvertent CVAD removal 12.3% ($n = 77$) were most prevalent complications related to non-tunneled CVADs ($n = 626$), followed by CVAD occlusion related to thrombosis 4.9% ($n = 31$), catheter-related blood stream infections (BSI) 4.4% ($n = 28$) and other complications 6.3% ($n = 40$). CVAD occlusion related to thrombosis 9.9% ($n = 18$) were most prevalent related to peripherally inserted central catheters (PICCs) ($n = 181$), followed by incidences of CVAD-related occlusion non-related to thrombosis 4.9% ($n = 9$), CVAD-related thrombosis 3.3% ($n = 6$) and other causal events 7.7% ($n = 14$). Breakage/rapture 17.5% ($n = 80$) were most prevalent complications related to skin-tunneled (TCVADs) ($n = 455$), followed by TCVAD occlusion related to thrombosis 15.6% ($n = 71$), BSI 7.6% ($n = 35$) and other complications 3% ($n = 14$). BSI 9.3% ($n = 6$) were most prevalent complications related to implantable Ports (Ports), followed by CVAD occlusion related to thrombosis 4.6% ($n = 3$) and other causal events 3.1% ($n = 2$). In total 148,327 CD were recorded in 935 patients with a median of 16 CD (0–395) documented in non-tunneled, 181 CD (1–456) in PICCs, 167 CD (0–454) in TCVADs and 231 CD (32–450) in Ports. Overall, total number of BSI was low-5.5% ($n = 73$). Based on the data

obtained, treatment protocols for the most common complications were developed and introduced in routine clinical practice.

Discussion & Conclusion: Our study revealed no statistically significant differences in the frequency of the rate of complications described in the literature and our data from the large cohort. Introducing of treatment protocols for preventing the occurrence and promptly treating the most common complications related to CVADs, allowed to reduce the financial toxicity and reduce the risks of BSI, which is especially important in pediatric oncology.

PP10

PREVENTING INCIDENTS AND ACCIDENTS RELATED TO PERIPHERAL INTRAVENOUS ACCESS IN THE PEDIATRIC POPULATION

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Despite the monitoring protocols and standards of care regarding peripheral intravenous access (PIV), incidents/accidents happen in pediatric population having IV perfusions. Quality audits prove that standards of care regarding monitoring frequency and clinical assessment are known by nurses, but aren't done. Some of those incidents have direct consequences on patients, which lead to dissatisfaction of families. To increase quality and security of care, a pilot project has been done in a pediatric surgery unit. It showed that systematic documentation and education update was necessary. Those findings leaded to creation of a new systematic flow sheet and e-learning about evaluation, insertion and monitoring of peripheral vascular access. A decision algorithm has been created to guide the nurses when they insert a PIV, which contribute to set up a volunteer nurse's group who help each other and between units when insertion challenges occur. The pilot project has been realized in multidisciplinary team with a Lean methodology. The flow sheet has been implemented in 2016 and the e-learning is available since 2017. To date, more than 1100 nurses completed the e-learning. The algorithm and the vascular access team have been implemented in 2019, 45 volunteers are in the team. Data portraits shows that 50% of our PIVs are inserted in the hand, and when the inserter is a nurse, a 24G catheter is use which increase the risk of infiltration. Only 40% of the insertions succeed at the first attempt. More than 50% of our PIVs are dedicated to medication administration and are inserted without management of pain and anxiety. We addressed those issue with the e-learning and introduction of the algorithm. This poster presentation will include the decision algorithm use by nurses and the vascular access team, the impacts of the changing on data portraits, infiltration incidents and the challenges encountered.

PP11

A LONG-TERM TUNNELED FEMORAL CENTRAL VENOUS CATHETER IN CHILDREN WITH CANCER AND MEDIASTINAL MASS

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Introduction: The most of patients in our Department of Pediatric Oncology have venous port or tunneled central inserted venous catheter via right or left brachiocephalic vein, which offers large diameter of vein, even in small children under 10 kg of weight. Almost every catheter is inserted during general anesthesia. There is a part of children, where catheter insertion via superior vena cava is contraindicated due to mediastinal tumor, for example Hodgkin or non-Hodgkin lymphoma. Standardly we use for these patients in the beginning of treatment double lumen central line short-term catheter inserted via femoral vein, which is pulled out after first cycle of chemotherapy and for next cycles, depending on response, we introduce another long-term catheter via superior vena cava or patient continue treatment with peripheral access, which is not ideal. As we had a few experiences with PICC in older children, we decided to introduce 5 tunneled FICC in set of 4 patients and hold it as long-term catheter with goal to preserve it until the end of treatment.

Method: Tunneled femoral inserted central catheter (FICC).

Results: We implemented 5 FICCs in 4 children with mediastinal tumor where insertion via superior vena cava was contraindicated. In one case catheter was pulled out spontaneously. In one case we had remove nonfunctional catheter due to intraluminal thrombosis. Three catheters are well working.

Discussion & Conclusion: Femoral catheters have significantly higher risk of thrombosis than those inserted via superior vena cava. However, for some groups of patients, this approach remains the only way of central venous access. We believe that even despite higher risk of thrombotic complications in femoral inserted catheters, this approach, when correctly performed, could be favorable in term of reduction in need of general anesthesia, good enough for treatment and at the same time be comfortable for the patient.

PP12

EXTRAVASATION IN NEONATES, OCCURRENCE, TREATMENT AND PROTOCOL ADHERENCE

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Introduction: Neonates admitted to a neonatal intensive care unit (NICU) rely highly on intravenous (IV) therapy. One of the preferred devices for this therapy are peripheral intravenous cannulas. However, extravasation is a repeated problem in the NICU, despite the use of guidelines and protocols 1. In addition, there is scarce data regarding extravasation in this vulnerable population. Therefore, we aimed to quantify the incidence, grading and treatment of extravasation during 2019.

Method: We conducted a prospective observational study with a mixed method design, during one year in a level III NICU. Registration of extravasation, grading (I mild- IV worst, table 1) and treatment (table 2) was conducted. According to protocol the IV was hourly checked on signs of extravasation. In addition, bedside observation and interviews regarding adherence to the protocol were performed. Descriptive analyses were used.

Results: In total 163 cases of extravasation in peripheral IV's occurred during 2019. Of these, 15 were assessed grade I, 102 grade II, 31 grade III and 7 grade IV. In 8 neonates the degree was not determined. In the event of grade 3 or 4 injury the medical team was notified immediately. The majority of extravasation was caused by total parental nutrition (TPN), 7 cases were caused by administration of anti-biotics and 5 cases were caused by transfusions. Photos of injuries, for education and to discuss treatment to reach consensus, were made in 51 neonates. Adherences to the protocol to check all IV's hourly was often not performed because of workload.

Conclusion: Based on the results of the present study, strategies to identify and prevent extravasation in neonates are required. Protocol adherence is difficult when workload is high. Advanced training of all members of VA teams and ongoing monitoring of VA devices are recommended in order to decrease the occurrence of extravasation.

PP13

EXPERIENCES OF INTRODUCING A DEDICATED NEONATAL NURSE-LED VASCULAR ACCESS TEAM IN QATAR

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Recent infusion therapy standards highlight the potential benefits for patient safety and effective infusion therapy from creating a dedicated vascular access and infusion therapy team. Neonatal patients are a unique population, one that presents considerable challenges for establishing and maintaining vascular access. In the Neonatal Intensive Care Unit (NICU) of the Women's Wellness and Research Center (WWRC) in Qatar, a specialized neonatal vascular access nurse team, the Clinical Advanced Practice (CAP) Team consisting of nurses with additional education, training and proven competence was created to address the complex needs of neonates around vascular access and infusion therapy. The CAP nurses were established in late 2018 and consists of 32 nurses. Member's duties and responsibilities includes assessing vascular access needs, deciding on appropriate vascular access using an algorithm jointly developed with physicians, inserting peripheral intravenous catheters (PIVC), managing intravenous (IV) complications and undertaking audit of vascular access-related data. In 2019 in the NICU, 10,467 PIVCs were inserted by the team in 3,918 babies. The overall success rate of insertions was 82%. First attempt success rate was 60% with an average of 1.45 attempt per insertion. This is an improvement in the past performances when all NICU nurses can insert a PIVC. IV complication rate was 45% which included infiltration/extravasation and infection, compared to 67% in a published international study. Having a dedicated vascular access nursing team in the NICU is highly recommended as it ensures the delivery of a safe and effective infusion therapy in neonates. In WWRC-NICU, evidence-based practice changes can be more readily implemented and vascular access practices are standardized as the CAP team is small and highly motivated group. There is an evident reduced risk of vascular access-related complications and there is a reduction in painful procedures done on neonates due to unsuccessful PIV attempts.

PP14

PREVENTION OF OCCLUSION OF CENTRAL LINES FOR CHILDREN WITH CANCER: THE POETIC PROJECT

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Introduction: Central venous access devices (CVAD) are vital medical devices to support the treatment of pediatric cancer, however device occlusion is common, which disrupts treatment. The aim of this study was to improve the identification and management of CVAD occlusions in children with cancer, as well as to identify the demographic and clinical risk factors and device characteristics associated with increased risk for CVAD occlusion.

Methods: A pre- post- implementation study was conducted at a metropolitan pediatric oncology facility in Australia, using the Theoretical Domains Framework. Patients with a CVAD for anti-cancer therapy were prospectively followed for occlusive events pre- and post- the implementation of clinical resources, to support the identification and management of CVAD occlusive events. The study interventions were developed and implemented in partnership with key interdisciplinary stakeholders (see Figure 1 and 2). CVAD occlusion and management data were collected and compared pre- and post- implementation. Risk factors for CVAD occlusion were described by mixed-effects poisson regression, and incident rate ratios (IRR).

Results: A total of 133 CVADs were inserted into 131 patients for a total of 6,784 catheter days. The incidence of CVAD-related occlusion pre-implementation was 59.7 (95% CI 51.4–69.0, per 1,000 catheter days); compared to 31.6 [95% CI 26.4–37.6]; $p < 0.01$) post-implementation of clinical resources. In multivariate models, other than post-implementation phases (IRR 0.51 [95% CI 0.32–0.81]), only neutropenia significantly increased the risk of CVAD occlusion (IRR 2.14 [95% CI 1.15–3.97]).

Conclusion: CVAD occlusions in pediatric oncology are common. This study demonstrates implementation of a co-developed clinical resource can have a significant positive effect on clinical practice (appropriate occlusion management strategies) and associated patient outcomes (decreased CVAD occlusion incidence). Further studies to innovate and improve practice in this area are warranted and should focus on improving the quality of evidence to prevent and manage CVAD occlusion.

PP15

EVALUATION OF A SUTURELESS SECUREMENT DEVICE (SECURACATH) FOR PICCS COMPARED WITH SUTURES AT A TERTIARY PEDIATRIC CENTER

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Introduction Current options for PICC securement include adhesive devices (such as StatLock and Grip-Lok), adhesive-strips and sutures (stitches). Adhesive devices require weekly changes and are currently not available at our institution. Experience with these in children is that the PICC is often at high risk of accidental removal during dressing changes. Sutures are often used to mitigate this risk and are the standard method for securement in our institution. Method We performed a service evaluation comparing a sutureless securement device (SecurAcath) to sutures in a tertiary pediatric center. The evaluation was performed in 10 patients having PICCs secured using sutures, versus 10 patients having PICCs secured with a SecurAcath device. The patients had PICCs with an intended dwell time of over two weeks. The outcomes measured were displacement, migration, infection, skin damage, pain at site, ease of dressing change, ease of removal and completion of treatment. Results The evaluation was carried out over a period of five months with patients ranging from 5 weeks to 17 years of age. In the SecurAcath group there were no recorded displacements or migrations whilst in the suture group, two patients suffered line migration, one of whom did not complete treatment as a consequence of the migration. Three other patients did not complete treatment for other reasons, including line occlusion or breakage. There were no cases of skin damage or significant pain at the site of securement in both groups.

Discussion and Conclusion: We have evaluated the case for adopting SecurAcath in our institution for securing PICCs. We found SecurAcath

easy to insert, well tolerated and associated with a low incidence of catheter-related complications with less displacement compared to sutures.

PP16

REDUCTION OF BACTEREMIA AND CENTRAL LINE ASSOCIATED COMPLICATION RATE AT THE PEDIATRIC HEMATO-ONCOLOGY AND BONE MARROW TRANSPLANT DEPARTMENT (PHOBMTD) OF SHEBA MEDICAL CENTER

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Background: Patients hospitalized at the Pediatric Hemato-Oncology and Bone Marrow Transplant Department of Sheba Medical Center are immunocompromised due to an extensive exposure to chemotherapy treatments and broad-spectrum antibiotics. Of the 805 patients who were admitted to the department during the year of 2017, 22% developed bacteremia, which led to central line associated bloodstream infection. The aim of this study was to reduce hospitalization days due to central line associated bloodstream infections and other complications by implementing a preventative measure and early intervention in the immunocompromised patients admitted to the department.

Methods: Information regarding catheter presence and catheter days was retrieved from computerized data and nurses' documentation. Data collection of pre intervention was from 01.07.2018 - 30.09.2018. Data collection of post intervention was from 01.07.2019 to 30.09.2019. The interventions included staff simulation for of proper central line care including aseptic blood draws and blood cultures. The primary intervention was the implementation of 3M Curos Caps on all needless connectors replacing the "scrub the hub" practice.

Results: 98% compliance rate was achieved within three weeks of implementing the use of the 3M CurosTM caps. Bacteremia decreased by 40% compared with the previous year (2018). Culture contaminations decreased by 17%, and present on admission (POA) bacteremia decreased by 35%.

Conclusion: The positive clinical results, team satisfaction, and high compliance rate (over 98%), influenced the decision to implement the same standard of central line care in the outpatient hemato-oncology clinic and hospice unit of the department. The results reported are preliminary results and further research is required to establish the advantages (reduced hospitalization days) of the intervention.

PP17

EVALUATION OF THE IMPACT OF A CENTRAL LINE BUNDLE ON CANDIDA RELATED CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTIONS IN A PEDIATRIC TERTIARY HEALTH CENTER FOR THROUGHOUT 12 YEARS OF PERIOD

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Background: Candida species are among the most common microorganisms causing central line-associated bloodstream infections. In this cross-sectional study, we evaluated the clinical impact of bundle applications for prevention of central line-associated bloodstream infections due to the Candida species in three different clinical settings including pediatric intensive care units, neonatal intensive care unit and pediatric hematology-oncology wards.

Methods: This study included patients with central venous catheters, including three different central vascular access device types; non-tunneled central venous catheters, umbilical veins and porta catheters. The study periods are divided into pre-bundle and bundle periods and include 5.5 to 12 years for different clinical settings. Episodes of candidemia related CLABSI were identified through the records of the Clinical Microbiology Laboratory.

Results: There were 200 and 124 Candida associated central line-associated bloodstream infections in the pre-bundle and bundle period prospectively. During the study period, a total of 324 candida associated CLABSI were observed. For 2019 to 2020, there was only six Candida related CLABSI in the total of clinical settings. The ward specific Candida associated CLABSI rates were 13.6/1000 in PICU, 4.0/1000 in NICU, 4.8/1000 Cl days in pediatric hematology-oncology department in the pre-bundle period and decreased to 6.0/1000 in PICU, 1.9/1000 in NICU and 2.6/1000 Cl days in pediatric hematology oncology unit. The decrease was statistically significant in the PICU and pediatric hematology-oncology department ($p < 0.001$, $p < 0.001$), but not significant in the NICU ($p = 0.07$).

Conclusion: This study showed that suggested that the central line bundles significantly reduced CLABSI with candida species. For the hospitals with a high incidence of Candida related CLABSI's, central line bundles are an excellent scientific solution.

PP18

DO PEDIATRIC RESIDENTS TAKE BLOOD CULTURE WITH THE APPROPRIATE TECHNIQUE? THE FIRST STEP TO DECREASE BLOOD CULTURE CONTAMINATION RATES: DETERMINING THE CURRENT SITUATION

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Introduction: Blood culture is essential because it is the first step to obtain a definitive diagnosis in a patient presumed to have sepsis. A positive blood culture prevents the use of inappropriate antibiotics by enabling targeted therapy against the specific organism in question. As a result of false-positive blood culture; misdiagnosis, long-term antibiotic treatment, prolonged length of hospital stay, increased risk of hospital infections can occur. The study aimed to evaluate whether pediatric residents working in our hospital took blood culture with appropriate techniques.

Material-Method: A checklist was prepared for the steps to be followed while taking blood culture. The checklist prepared based on international guidelines. The pediatric residents took a culture of blood from a model arm; meanwhile, they were observed by the pediatric infectious diseases assistant. No intervention was made to the pediatric residents during the observation.

Results: A total of 70 assistants were observed. It was observed that 27.1% of the pediatric residents provided proper hand hygiene and 60% of them wore sterile gloves. While cleaning the skin, 55.7% of the pediatric residents used sterile gauze and 44.3% used cotton. While baticon was preferred by 80% of pediatric residents as the skin antiseptic, alcohol was preferred 20% rate as the skin antiseptic. A total of 22.9% of the pediatric residents wiped the skin with alcohol or baticon and waited for a suitable time before taken a blood culture. However, 77.1% of pediatric residents did not wait for the antiseptic to dry out. Only 17.1% of the pediatric residents took blood in the volume appropriate for the patient's body weight, 75% did not take into account the patient's body weight.

Conclusion: It was observed that pediatric residents working in our hospital had low compliance with the standards while taking blood culture.

It is thought that training on correct blood culture can be beneficial in reducing blood culture contamination rates.

PP19

EXPERIENCE IN THE USE OF CENTRAL VASCULAR ACCESS SYSTEMS IN PEDIATRIC ONCOLOGICAL PRACTICE

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Introduction: Insertions of central venous catheters (further – CVCs) results in mechanical complications (further – MCs) in around 20% of cases. Monitoring of the causes of complications in pediatric oncology practice is very significant, as it enables to minimize their frequency and further improve the insertion protocols.

Method: 1327 CVCs were inserted to the patients in the age group from 1 month to 18 years old in 2018. During this period we have been constantly analyzing the MCs arising in the process of CVCs' insertion. Therefore, all patients were divided into groups according to the type of CVC inserted.

Results: The article presents statistic information regarding the complications arising from insertions of CVCs of different types. For instance, in the group where non-tunneled catheters were used (overall – 626 cases) the total number of MCs was 20.3%, i.e. in 127 cases. The most common cause of complications in this group was repeated puncture: 79.5%, in 101 cases. Guide wire migration to the jugular vein happened in 8.7% of cases, guide wire migration to the contralateral subclavian vein occurred in 5.5% of cases, puncture of the contralateral subclavian artery without clinically significant bleeding was a complication in 1.6% of cases. In 2 cases (1.6%) pneumomediastinum developed and in 1 case pneumothorax (0.8%) took place. Having analysed the statistics data, it was noticed that repeated puncture was the most common complication during the installation of all types of CVCs. Guide wire migration was found to be another frequently occurred complication happening while insertion of non-tunneled catheters and Picc-line catheters.

Discussion & Conclusion The obtained statistics data led to the improvement of protocols and allowed to reduce the number of mechanical complications.

PP20

AN INVESTIGATION OF THE USE OF INFRARED VISUALIZATION TECHNOLOGY TO ENHANCE PREREGISTRATION STUDENT NURSES FOR VENIPUNCTURE AND CANNULATION AT A HIGHER INSTITUTE OF EDUCATION IN LONDON, UNITED KINGDOM

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Introduction: Infrared Visualization technology is the norm in some London Acute Hospital settings for invasive procedures such as Venipuncture and Cannulation. Ford (2018) discusses how the Nursing and Midwifery Council (2019) has launched standards to shape the next generation of nurses by using a more modern and innovative approach to the way universities and their practice partners train nurses. As a lecturer I have observed in the last few years that students' nurses are now demanding variety in the lesson. The use of Visualization technology such as thein Higher Institute of Education is vital in the nursing curriculum to enhance student engagement and advancement in their knowledge and skills in Venipuncture and Cannulation.

Method: The third-year pre-registration nursing students have a full day session which equates to 6 hours that involves theory and practice of venipuncture and cannulation: The activities are • The students in pairs are asked to visualize only, look for veins in the Anterior Cubital Fossa, lower part of hands and the dorsal area without touching. The aim of the activity is for the students to identify how easy or difficult it is seeing veins • The students are then taught how to palpitate veins and to apply tourniquet. At this point the students use the Infrared Visualization Technology. The students are asked to complete an evaluation form regarding the venipuncture and cannulation session.

Results: The use of Infrared Visualization Technology is an integral part to student learning and raise the awareness that this technology is available in Trusts across the United Kingdom which is evident in the written feedback from the students.

Discussion: With technical advancement this will allow health care professionals and our nursing students in the United Kingdom to advance the ease of this skill with evidenced based technique and devices to improve vein visibility.