LETTERS TO THE EDITOR

RISK OF ACQUIRING INFLUENZA B IN A NURSING HOME FROM A CULTURE-POSITIVE ROOMMATE

To the editor: It was recently reported that influenza A was cultured in 62 double rooms at the Wisconsin Veterans Home over six seasons. The roommate was infected in 12 (19.4%). During 3,294 resident-seasons, influenza was cultured in 208 single rooms (6.3%). Those who lived in double rooms with a culture-positive roommate had a 3.07 relative risk (95% confidence interval = 1.61–5.78) of acquiring influenza A.[1]

Identical methodology was used to analyze the 1992/1993 influenza season, in which influenza B was encountered. Case finding was based on intense prospective surveillance by research staff and has been previously described.[2] This study compared the relative risk of influenza B in residents whose roommate had a positive culture with that of those who resided in single rooms. It is possible that a second infected roommate became infected outside of the room. To control for this possibility, the number of single rooms and the number of cases in single rooms each year were determined for comparison. Influenza B was introduced to 29 double rooms. A second culture-confirmed case was noted in 10 (34%). The second cases occurred 0 to 11 days (mean 3.9 days) after the initial case. Seven of these second cases had been vaccinated (70%). Overall, 85% of residents were vaccinated. During 489 resident-seasons in single rooms, influenza was cultured in 65 rooms (13%). Those who lived in a double room with a culture-positive roommate had a relative risk of 2.6 (95% CI = 1.2–5.6) of acquiring influenza B compared to those who resided in single rooms

As expected, the data confirm a greater relative risk of acquiring influenza B in roommates of residents with influenza B than in residents who did not have roommates. The excess risk associated with having a culture-positive roommate is troublesome because it has been demonstrated that culture-confirmed influenza B was associated with an excess 30-day mortality of 3.9% over baseline mortality (1.5%/30 days) in nursing home residents.[3] A private room is optimal, but this is not possible in most nursing homes. Other interventions might include using any curtain or barrier that may exist between roommates. The roommates should be counseled to maintain hand hygiene and 3-foot separation with extra environmental hygiene provided by staff. The unaffected roommate should probably be offered chemoprophylaxis with a neuraminidase inhibitor, even if the entire unit is not placed on chemoprophylaxis.

Paul J. Drinka, MD
Peggy F. Krause, RN, CCRC
Lori J. Nest, RN
Brian M. Goodman, PhD
Wisconsin Veterans Home
King, WI

Stefan Gravenstein, MD, MPH
Eastern Virginia Medical Center
The Glennan Center for Geriatrics and Gerontology
Norfolk, VA

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ENTEROCOCCAL ENDOCARDITIS PRESENTING WITH SUDDEN RIGHT ARM WEAKNESS IN A 73-YEAR-OLD MAN

To the Editor: Infective endocarditis (IE) is increasing in the older population.[1–3] It remains a diagnostic challenge to physicians caring for elderly patients. A 73-year-old man with weakness of his right arm later diagnosed to be a complication of IE is reported.

CASE REPORT

The patient was a 73-year-old man with a known history of diabetes mellitus and hypertension. His only physical complaint before this episode of illness was micturition

difficulty despite a prostatic operation 6 months before. He experienced pain over his neck and right shoulder 1 day before admission. The next morning he could not elevate his right arm and rushed to the emergency department. He did not have any fever or constitutional symptoms. X-ray of the cervical spine and right shoulder was unremarkable. Neurological examination revealed muscle power of grade 0/5 with attempted right shoulder abduction and lateral rotation. Right elbow flexion was also of grade 0/5, and elbow extension was 4/5. Other movements in the right arm were unaffected. His C5 and C6 jerks were absent on the right side, whereas C7 jerk was preserved. Cardiovascular examination was unremarkable at presentation. Blood tests revealed an elevated erythrocyte sedimentation rate of 101 mm/h (normal <31 mm/h). Total white cell count and neutrophil counts were normal. His serum creatinine was 2.35 mg/dL (reference range 0.68–1.36 mg/dL), similar to his premorbid level; spot glucose was 302.7 mg/dL; electrolytes and liver enzymes were normal; and rheumatoid factor was weakly positive. A provisional diagnosis of brachial neuritis was made, and he was initially treated with prednisolone. Two days later, a soft early diastolic murmur was noted over the aortic valve area. The finding of an aortic regurgitation murmur raised the suspicion of infective endocarditis with septic embolism to the nerve roots. Thus, antibiotics were started and prednisolone stopped after 2 days. Later, his blood and urine cultures both yielded enterococci. The magnetic resonance image of the cervical spine confirmed the presence of right C5/C6 facet joint arthritis with soft tissue inflammation affecting the adjacent

nerve roots (Figure 1). A 6-mm vegetation, which could not be visualized using transthoracic echocardiogram (TTE), was seen attaching to the noncoronary aortic valve leaflet using transesophageal echocardiogram (TEE). His persistent lower urinary tract symptoms were traced to a bladder neck stricture, so a dilatation procedure was performed subsequently. He was treated with ampicillin and gentamicin combination therapy for 2 weeks, followed by ampicillin alone for another 4 weeks. His neurological deficit fully recovered with antibiotic treatment.

DISCUSSION

This patient shared many features commonly described for IE in older patients. He did not have any fever or constitutional symptoms before the onset of his acute shoulder pain. He did not have leucocytosis or neutrophilia in response to bacterial infection.[4,5] The organism cultured in his case pointed to a nosocomial origin for his IE, complicating the prostatic surgery he had had 6 months before. His vegetation was identified on TEE but not TTE. The prevalence of degenerative valvular changes in older people make TTE less sensitive and specific in detecting vegetations in IE.[5,6] In addition, neurological complications are more prevalent in older people with IE.[5]

This patient had enterococcal IE complicated by facet joint arthritis and radiculopathy. Although rheumatism has been reported to vary from 19% to 44% in IE, the documented infectious osteoarticular complication was not common.[7,8] *Streptococcus* bovis is usually associated with this complication but it is rare for *Enterococcus*.[8,9] A recent review identified only 14 similar patients from the literature; none had neurological complications.[10] Notably, of the 10 patients with information provided, eight were aged 60 and older.[10]

As illustrated by this patient, IE is a challenge to physicians caring for older patients. The early symptoms and signs of this patient were initially mistakenly attributed to a focal neurological disease and thus inappropriately treated. Making the correct diagnosis early is of vital importance in a treatable disease like IE. This case serves as a lesson to remind us not only of the atypical presentation of disease in old age and the need for appropriate investigations to arrive at a correct diagnosis, but also to be alert to the possibility of present illness being related to previous invasive procedures, which many elderly patients are subjected to nowadays, and thus to consider this nosocomial form of IE.

Bun Sheng, MSc, FHKAM(Medicine)
Tak Kwan Kong, FHKAM(Medicine), FRCP
Department of Medicine and Geriatrics
Lik Fai Cheng, MBChB, FRCR
Department of Diagnostic Radiology
Princess Margaret Hospital
Hong Kong

Figure 1. A: SE T1WI axial scan at the level of C5/6 facet joint showed cortical disruption at right C5/6 facet joint, associated with increased adjacent soft tissue (arrow). B: GE T2WI axial scan at the same level as (A) showed increased signal over the right C5/6 facet joint. C and D: Postgadolinium SPGR axial (C) and sagittal (D) scan showed abnormal soft tissue enhancement adjacent to the right C5/6 facet joint, which also extended into the intervertebral foramen.

provided the magnetic resonance images and described the radiological findings.

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SPONTANEOUS FRACTURES OF LONG BONES ASSOCIATED WITH JOINT CONTRACTURES IN BEDRIDDEN ELDERLY INPATIENTS: CLINICAL FEATURES AND OUTCOME

To the Editor: Reports on the occurrence of fractures without any apparent external force in completely bedridden elderly patients under care are limited. One study[1] described six individuals with "spontaneous fractures of long bones" in nursing home patients. Another elderly nonweight-bearing woman with "transfer" and "turning" fracture was also reported.[2] A survey of 11 nursing homes identified 16 subjects with "minimal trauma fractures."[3] Fifty-five "spontaneous long-bone insufficiency fractures" in 53 extremely elderly residents in long-term nursing homes, including 38 bedridden subjects, were recently described.[4]

An observational study was conducted in a hospital and long-term care facility with 1,993 beds for older people (male/female ratio approximately 3/10; mean age 79 for men, 85 for women), from 1998 to 2004 in Japan. Reports of accidents and possible abuse in the hospital were constructed from daily observations of nursing staff. Numbers of bedridden patients and those with joint contracture(s) were approximately 500 and 250, respectively, in the hospital during the study period. Spontaneous fractures were defined as fractures occurring in long bones in bedridden older people, without any apparent external force or abuse, during daily care procedures.

Clinical features of spontaneous fractures, as cited in Table 1, and the outcome up to 1 year after fracture(s) were reviewed from the medical records.

Eighteen bedridden inpatients (one man and 17 women, mean age ± standard deviation 88 ± 9) with spontaneous fractures were identified (Table 1). Their mean period of being bedridden was 7 ± 6 years. Their nutritional state just before they sustained fractures was poor, as evaluated using serum albumin level. Spontaneous fractures affected the femur in 12 cases (8 supracondylar fractures, 2 intertrochanteric fractures, 1 shaft fracture, and 1 neck fracture), the humerus in five cases (2 neck fractures, 2 shaft fractures, and 1 supracondylar fracture), and the proximal phalanx in one case. All spontaneous fractures occurred near joint contractures at proximal or distal sites of extremity bones. Ten patients had previously suffered long-bone fractures during nonbedridden periods, and in six of these 10 cases, spontaneous fractures reoccurred in the same bone. Four of five fractures in hemiplegic patients occurred on the paralytic side. Although one patient died due to worsening of pneumonia 1 month after fracture, 17 of 18 subjects were successfully treated with bandage procedures and showed recovery within approximately 2 months after fracture.

One of the characteristic features of spontaneous fractures in bedridden older people in this study was that one-third of the subjects had had previous fractures of the same bone where the spontaneous fractures occurred. More than half of the patients also had a history of fractures of long bones of traumatic or nontraumatic origin, indicating that elderly subjects with previous long-bone fractures during nonbedridden periods are prone to reoccurrence of long-bone fractures, especially in the healed bone, even after the start of their bedridden status.

As additional evidence of absorbing interest in this investigation, joint contractures adjacent to the fractures were found in all individuals. There were no cases of spontaneous fractures in the population of bedridden elderly without joint contractures during the survey. Joint contractures might be one of the risk factors leading to fractures. Of the 18 bedridden patients with fractures, joint contractures were observed at the proximal site in 17, at the distal site in 16, and at the proximal or distal sites of the fractured bones in all 18 subjects. A marked decrease in bone mass and bone quality due to multiple risk factors, including immobilization, disease, and malnutrition, should also be considered to be a fundamental factor in fracture.[3,4]

It has been reported that bone mineral density (BMD) decreased more rapidly on the paretic side than the nonparetic side,[5] and hemiplegic patients showed more-severe joint contractures on the paretic side than the nonparetic side in this study. The fractures seemed to occur at weakest point of the bone, near the contracted articulation. Joint contractures of an extremity fix the limb to the torso so that the contracted joint acts like a supporting point of leverage and any minimal external force or torque maneuver during passive transfer or lifting on the distal part of a long bone might easily make a bone with low BMD reach its fracture threshold. A subtle external force such as changing a diaper, washing, or putting the patient in an ambulatory or sitting position might produce a deforming force strong enough to make the bone reach its fracture threshold.

Shoshi Takamoto, MD
Shuichi Saeki, MD
Yasuaki Yabumoto, MD
Hideki Masaki, MD
Toshio Onishi, MD
Department of Internal Medicine
Hanwa Daiichi Senboku Hospital
Osaka, Japan

Table 1. Clinical Characteristics of Patients with Spontaneous Fractures of Long Bones

No.	Age	Sex	Bedridden Period (Years)	Main Cause of Bedridden State	Serum Albumin Level (g/L)	Complications	Date of Spontaneous Fracture	Location of Fracture	Episode that Might Have Caused Fracture	History of Fracture of Same Bone	History of Other Long-Bone Fracture	Side of Hemiplegia if Present	Joint Contractures Adjacent to Fractured Bone	Treatment of Fracture	Outcome
1	91	Female	7	Cerebral infarction	29	Aspiration pneumonia, pressure ulcers	27-Oct-98	Shaft of right humerus	Unknown	—	Right hip fracture by falling	Right	Shoulder and elbow	Splint bandage	Died 1 month later from aspiration pneumonia
2	91	Female	2	Multiple cerebral lacunar infarction	33	Pressure ulcers	4-Apr-99	Supracondylar area of left femur	Unknown	—	—	—	Hip and knee	Plaster bandage	Recovered (died 9.5 months later from aspiration pneumonia)
3	91	Female	4	Multiple cerebral lacunar infarction	33	—	25-May-99	Supracondylar area of right femur	"Crack" heard during changing diaper	Left hip fracture by falling	—	—	Hip and knee	Plaster bandage	Recovered
4	100	Female	3	Hip fracture	33	—	31-May-99	Supracondylar area of right femur	Unknown	—	Left hip fracture by falling	—	Hip and knee	Plaster bandage	Recovered (died 3 months later from gastrointestinal bleeding)
5	86	Female	20	Multiple cerebral lacunar infarction	24	Aspiration pneumonia	3-Apr-00	Supracondylar area of left femur	Unknown	—	Left hip fracture by falling	—	Hip and knee	Plaster bandage	Recovered (died 9 months later from aspiration pneumonia)
6	93	Female	3	Senile dementia	27	—	3-Dec-00	Supracondylar area of right femur	Unknown (knee joint found to be swollen and skin reddish when nurse was applying ointment)	Right hip fracture by falling	—	—	Hip and knee	Plaster bandage	Recovered
7	82	Female	5	Intracerebral hemorrhage	31	Aspiration pneumonia	1-Jun-01	1) Shaft of right humerus 2) Shaft of right humerus	Unknown	Fracture of right humerus by falling	—	Right	Shoulder and elbow	Splint bandage	Recovered (died 5 months later from aspiration pneumonia)
8	63	Male	17	Intracerebral hemorrhage	39	—	8-Aug-01	Supracondylar area of left femur	Unknown	—	Left hip fracture by falling	Right	Knee	Plaster bandage	Recovered
9	85	Female	10	Multiple cerebral lacunar infarction	34	Aspiration pneumonia	8-Sep-01	Intertrochanteric area of right femur	Unknown	Fracture of right humerus by falling	—	—	Hip and knee	Splint bandage	Recovered
10	89	Female	5.5	Multiple cerebral lacunar infarction	30	—	15-Nov-01	Neck of left humerus	Unknown	—	—	Left	Shoulder	Splint bandage	Recovered
11	96	Female	3.7	Cerebral infarction	25	—	18-Jan-02	Supracondylar area of left femur	Unknown	Left hip fracture by falling	—	—	Hip and knee	Plaster bandage	Recovered
12	82	Female	22	Multiple cerebral lacunar infarction	35	—	30-Apr-02	Supracondylar area of right femur	Unknown	—	—	Right	Shoulder and elbow	Adhesive plaster bandage	Recovered
13	94	Female	12	Multiple cerebral lacunar infarction	36	Urinary tract infection	9-May-02	Neck of right humerus	Unknown (rigid contracted joint found to be floppy when changing diaper)	—	—	—	Shoulder and elbow	Splint bandage	Recovered
14	73	Female	2	Parkinson disease	33	Urinary tract infection, pressure ulcers	6-Sep-03	Shaft of right femur	Fracture might have occurred while lifting right leg during treatment of a decubitus ulcer	—	—	—	Hip and knee	Open reduction and internal fixation	Recovered
15	90	Female	4	Senile dementia	37	—	22-Dec-03	Supracondylar area of left femur	Unknown	Left hip fracture by falling	—	—	Hip and knee	Plaster bandage	Recovered
16	89	Female	4	Senile dementia	32	—	30-Dec-03	Proximal phalanx of left second finger	Unknown	—	Right hip fracture by falling	—	Fingers and wrist	Adhesive plaster bandage	Recovered
17	98	Female	2	Multiple cerebral lacunar infarction	32	—	14-Jan-04	Intertrochanteric area of right femur	Unknown	—	—	—	Hip and knee	Traction only	Recovered
18	90	Female	6	Multiple cerebral lacunar infarction	34	—	16-Jul-04	Neck of left femur	Unknown	—	—	—	Hip and knee	Plaster bandage	Recovered

Shigeto Morimoto, MD
Masayuki Matsumoto, MD
Department of Geriatric Medicine
Takashi Takahashi, MD
Tsugiyasu Kanda, MD
Department of General Medicine
Kanazawa Medical University
Ishikawa, Japan

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QUANTITATIVE GAIT ANALYSIS TO DETECT GAIT DISORDERS IN GERIATRIC PATIENTS WITH DEPRESSION

To the Editor: Gait disorders and depressive symptoms are both highly prevalent in elderly people and can have diverse and severe consequences as an increased risk of falls and loss of independence.[1,2] Striking in the clinical observation of depressed geriatric patients is their slowness of movements and, during performance of a dual task, their increased gait and balance problems. The shared etiological role of cerebral white matter lesions may explain the co-occurrence of mood and gait disorders.[3] Only three studies have investigated quantitative aspects of gait in patients with depression and found a slower gait velocity and shorter step length,[4–6] but their population was young (mean age 44), they used methods of moderate quality, and they did not investigate gait variability, which is strongly associated with increased fall frequency.[7] It was hypothesized that noninvasive quantitative gait analysis could be used in depressed geriatric patients to detect and monitor decreased gait velocity and step length, increased double support time, and an increase in their variability.

   Therefore, an observational study was performed in patients consecutively admitted to an acute geriatric ward of an academic hospital or an acute ward of old age psychiatry of a psychiatric hospital. Patients were included when they could walk 10 meters and understand simple instructions and if they and their care givers had given informed consent. The collected descriptive data about the participants included age, sex, the cumulative illness rating scale in geriatrics (CIRS-G), a cognition test (Mini-Mental State Examination, MMSE), functioning in daily life (Barthel Index), number of drugs, and use of antidepressants and walking aids. Two groups of patients were compared two different ways: with or without depression and with or without mild to moderate depressive symptoms. A psychiatrist or geriatrician made the diagnosis of depression based on *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) criteria.[8] For mild to moderate depressive symptoms, a cutoff score of 18 on the Montgomery Asberg Depression Rating Scale (MADRS)[9] was used at the time of the measurements (depressed: MADRS score ≥ 18; not depressed: MADRS score < 18). The quantitative gait variables (gait velocity, step length, cadence, and percentage of double support phase) were measured using the Gaitrite (CIR Systems, Inc., Havertown, PA), an electronic walkway.[10] To measure these gait variables, the patients walked twice at comfortable speed over the Gaitrite and twice while counting backward from 45 as dual task. The independent sample *t* test was used to compare gait variables between the two groups and the coefficient of variation for calculation of gait variability. In addition, the Pearson correlation coefficient was used to estimate the correlation between MADRS score and gait velocity and step length.

   Twenty-eight patients with a mean age $\pm$ standard deviation of 78.4 ± 7.2 participated; 21 were women. Thirteen patients were diagnosed with depression (mean MADRS score 16.3). The distribution of covariables did not differ significantly between the two groups. In summary, mean scores for the whole group were CIRS-G, 9.8; MMSE, 22.6; and Barthel, 15.5. Patients used 6.7 drugs on average. Eight patients used an antidepressant, and nine patients used a walking aid during the measurements.

   Significant differences were not found in gait variables or their variability between the group with and without a depression (DSM-IV criteria). Geriatric patients who were depressed according to their MADRS score had a significantly shorter step length and greater double support time and a trend toward lower gait velocity. (Table 1). These results were independent of the use of antidepressants. When going from normal walking to walking while counting backward, the increase in variability of gait velocity (15%) and double support phase (16%) was larger in geriatric patients who were depressed (MADRS score ≥ 18) than in those who were not (MADRS score < 18) (increases of 2% and 3%, respectively) but not statistically significant. There was no significant correlation between MADRS score and gait velocity and step length.

   This study partially confirmed the hypothesis that depression decreases gait velocity and step length, increases double support phase, and increases gait variability during dual tasks in geriatric patients. An explanation for the absence of significant differences in gait when using the

Table 1. Gait Variables of Geriatric Patients with and without Depression as Defined Using the Montgomery Asberg Depression Rating Scale (MADRS)*

Gait Variable	Depressed[†]	Not Depressed[‡]	P-value
	Mean ± Standard Deviation		
Gait velocity, cm/s	54.5 ± 25.3	71.4 ± 18.8	.14
Step length, cm	33.3 ± 11.0	45.3 ± 10.5	.04
Cadence, steps/min	95.0 ± 17.1	95.1 ± 12.1	.99
Double support phase (% of gait cycle)	44.1 ± 13.0	31.6 ± 8.2	.049

Note: Results are mean of two walking trials.
*Range 0–60.
[†]MADRS score ≥18.
[‡]MADRS score <18.
SD = standard deviation.

DSM-IV criteria for depression might be that the depression of participating patients was already in remission. Their mean MADRS score of 16.3, below the cutoff score for depression, strengthens this theory. Power was limited because of large standard deviations in gait variables and small groups. In the future, research with larger groups is needed, together with the incorporation of mobility and balance scales and outcomes such as fall frequency and functioning in daily life, to detect, monitor, and prevent increased fall risk and decreased mobility in geriatric patients with depression.

Marianne B. van Iersel, MD
Aleid Haitsma, MD
Marcel G. M. Olde Rikkert, MD, PhD
Department of Geriatrics
Nijmegen Medical Center
Radboud University
Nijmegen, the Netherlands

Carolien E. M. Benraad, MD
Maria MacKenzie Center for Old Age Psychiatry
Nijmegen, the Netherlands

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ACUTE ISCHEMIC STROKE IN ELDERLY PATIENTS TREATED IN HOSPITAL AT HOME: A COST MINIMIZATION ANALYSIS

To the Editor: Hospital at Home may be advantageous in the care of acutely ill older persons, but its economic value is unclear.[1–3]

In 1996, the Geriatric Home Hospitalization Service (GHHS) at S. Giovanni Battista Hospital in Torino, Italy, initiated a Hospital at Home program to treat first acute ischemic stroke. This model and its clinical outcomes have been described previously.[4] In brief, 120 older patients admitted to the ED of the hospital with first acute uncomplicated ischemic stroke were randomized to home treatment by the GHHS or to the general medical ward (GMW).

There was no difference in neurological outcomes between the two interventions, although GHHS patients had better depressive scores and lower rates of admission to nursing home than GMW patients. GHHS patients had a significantly longer length of stay than GMW patients ($38.1 ± 28.6$ vs $22.2 ± 11.5$ days, $t = 3.995$, $P < .001$). The GHHS intervention includes acute and rehabilitation care, whereas hospital care usually includes only treatment of the acute phase of the disease and the early steps of a rehabilitation program, which is often followed by a further period of care in rehabilitation facilities.

The aim of this letter is to compare the costs of GHHS for the treatment of first ischemic stroke with the costs of GMW care.

METHODS

Costs for the original/acute episode were calculated, comparing only the direct health costs of GHHS interventions with those of GMW care.

The costs were calculated in euro and converted to U.S. dollars using an exchange rate of 1 euro = $1.30.

The 62% of daily GHHS costs was represented by costs for geriatricians, nurses, physiotherapy, speech therapists, occupational therapy, psychologists, dietitians, and social workers, calculated according to the amount of time spent with patients and including a cost for noncontact time. The

remaining 38% included costs for drugs, diagnostic procedures, medications, and nonstaff costs. Daily GHHS cost per patient did not include costs for food, laundry, heating, or lighting, which patients paid.

Data on hospital costs were collected from the official hospital medical cost charts, including direct medical costs for beds, staff, examinations, medications, rehabilitation, and miscellaneous expenses.

Cost of management for each patient in the emergency department was $293.8, on average, and it was the same for all patients in both settings, because it was derived from an evaluation made before randomization.

RESULTS

In the GMW, the mean length of hospital stay was 22.2 days, whereas in the GHHS, it was 38.1 days. The mean total cost was $6,413.5 for each patient treated at home and $6,504.8 for patients treated in the hospital. On a cost per patient per day basis, GHHS costs were $163.0 ± 20.5, compared with $275.6 ± 27.7 for GMW patients ($P < .001$).

Considering the length of stay, it is important to highlight that all patients discharged from GHHS had completed their rehabilitation program at home, whereas 50% of GMW patients continued their rehabilitation program in rehabilitation facilities after hospital discharge, with an average daily cost of $162.5 for a period of approximately 24.2 ± 7.6 days.

CONCLUSION

Hospital at Home treatment for first acute ischemic stroke is cost effective when compared with usual hospital care. Each patient-day of at-home care cost is about half of the cost of a day in a traditional hospital setting, and total costs for GHHS, including the rehabilitation component, were comparable with usual hospital costs that include only a part of the rehabilitative costs.

The specific elements responsible for lower costs of GHHS, indirect costs of care, or out-of-pocket costs that may have been incurred by families of GHHS patients were not evaluated.

Nicoletta Aimonino Ricauda, MD
Vittoria Tibaldi, MD
Renata Marinello, MD
Mario Bo, MD
Gianluca Isaia, MD
Carla Scarafiotti, MD
Mario Molaschi, MD
Department of Medical and Surgical Disciplines
Geriatric Section
University of Torino
Torino, Italy

ACKNOWLEDGMENT

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REHOSPITALIZATION AND TRANSFERS TO NURSING FACILITIES IN ELDERLY PATIENTS AFTER HIP FRACTURE SURGERY

To the Editor: In their article recently published in the *Journal of the American Geriatrics Society*,[1] Boockvar et al. found that absence of dementia, in-hospital delirium, new impairment at hospital discharge, hospital discharge other than home, and not living at home alone before fracture independently predicted relocation at 6 months after hip fracture surgery.

We want to contribute to this topic with data on a population of elderly patients who underwent rehabilitation training after hip fracture. Between January 2001 and December 2003, 106 patients were discharged alive from our Rehabilitation and Aged Care Unit after rehabilitation for hip fracture surgery. At 12 months, the number of hospital readmissions (for medical or surgical causes), nursing home (NH) transfers, and deaths was investigated using patient or surrogate interviews. Fourteen patients had died and thus were excluded from further analyses; 11 resided in NHs, and 81 lived at home. Of subjects living at home, 17 underwent at least one rehospitalization during the follow-up period and four underwent two or more (mean number of rehospitalizations = 1.21 ± 0.5). Patients alive were therefore divided into two groups according to whether they had been rehospitalized or transferred to a nursing facility. Table 1 shows that the patients who were rehospitalized or transferred to nursing facilities at 12 months were significantly more impaired before fracture according to the Barthel Index (BI), had a lower functional recovery at discharge (assessed using the Montebello factor score for BI (Table 1),[2] and had a higher delirium prevalence on admission to the Rehabilitation and Aged Care Unit. Furthermore, although not significant in the univariate analysis, the postoperative albumin level was lower in this group, as much as the prevalence of those living alone before fracture and of those treated with endoprosthesis. In a multiple regression analysis, after controlling for all variables, not living alone at home before fracture (β = 0.25, SE = 0.10, $P = .01$), low functional recovery at discharge (BI relative functional gain, β = 0.005, SE = 0.002, $P = .02$), and delirium on admission (β = 0.32, SE = 0.12, $P = .01$) were the factors significantly and independently associated with rehospitalization or NH transfer at 12 months.

Table 1. Patient Characteristics at 12 Months (Home Versus Rehospitalization and Nursing Home Placement) by Relocation in a Population of 92 Elderly Subjects Discharged from a Rehabilitation and Aged Care Unit After Hip Fracture Surgery

Variable	At Home (n = 60)	Institutionalized in Nursing Home or Rehospitalized (n = 32)	P-value
Demographic			
Age, mean ± SD	81.8 ± 8.4	83.2 ± 7.1	.42
Female, n (%)	55 (91.7)	31 (96.9)	.31
Living alone at home before fracture, n (%)	43 (71.7)	17 (53.1)	.06
Cognitive and functional status			
Mini-Mental State Examination score, mean ± SD (range 0–30)	21.0 ± 6.6	20.2 ± 6.2	.60
Delirium on admission, n (%)	16 (26.7)	16 (50.0)	.02
Barthel Index before fracture, mean ± SD (range 0–100)	90.9 ± 13.5	79.9 ± 19.6	.002
Barthel Index on admission, mean ± SD (range 0–100)	34.2 ± 16.1	27.6 ± 15.5	.06
Somatic status, mean ± SD			
Postoperative albumin serum level (gr/dL)	2.8 ± 0.3	2.6 ± 0.3	.07
Charlson Comorbidity Index	2.2 ± 1.7	2.1 ± 1.6	.70
Drugs on admission	4.9 ± 2.1	5.4 ± 2.0	.22
Type of intervention-related			
Endoprosthesis	27 (45.8)	9 (28.1)	.07
Internal fixation	32 (54.2)	23 (71.9)	
Outcome at discharge			
Barthel Index relative functional gain, mean ± SD (%)*	71.2 ± 25.2	51.9 ± 32.6	.002
Discharge at home after rehabilitation, n (%)	59 (98.3)	30 (93.8)	.27

*(Barthel Index before fracture − Barthel Index on admission)/(Barthel Index at discharge − Barthel Index on admission)×100.
SD = standard deviation.

Hip fracture is a condition that is typically associated with a poor clinical outcome within the brief period after hip fracture, including adverse clinical events[3] and fragmentation of care.[4] In this framework, identifying clusters of patients with a greater risk of negative events, such as rehospitalization or transfer to nursing facilities, might be useful in planning interventions and coordinating care. These data suggest that frail subjects (those not living alone at home before fracture, developing delirium on admission, and not recovering their prefracture functional status) may be possible targets of intervention. As correctly emphasized by Boockvar et al. in their article, relocation to different sites of care typically occurs at a time of change in patient needs and at a time of patient vulnerability.[1] Healthcare system efforts should therefore be directed to prevent rehospitalizations and NH transfers to improve the overall outcomes of high-risk elderly patients with hip fracture. This goal may be reached with a mix of clinical interventions (e.g., prevention of delirium in orthopedic wards) and of long-term surveillance (e.g., programs of at-home follow-ups).

Giuseppe Bellelli, MD
Elena Lucchi, PsyD
Rehabilitation and Aged Care Unit
"Ancelle della Carità" Hospital
Cremona, Italy
Geriatric Research Group
Brescia, Italy

Francesca Magnifico, PsyD
Geriatric Research Group
Brescia, Italy
Marco Trabucchi, MD
Geriatric Research Group
Brescia, Italy
Tor Vergata University
Rome, Italy

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STAFF TRAINING AND USE OF SPECIFIC PROTOCOLS FOR DELIRIUM MANAGEMENT

To the Editor: In their article recently published in the *Journal of the American Geriatrics Society,*[1] Naughton et al. found that a staff educational program and the use of specific protocols were associated with better delirium management during hospital stay and positive outcomes at 4 and 9 months after discharge. We want to contribute to this topic, referring to our experience in detecting delirium in the last 2 years in our Rehabilitation and Aged Care Unit. Similar to the experience of Naughton et al., at the end of the 2003, we identified delirium as a prominent problem. Review of all charts of patients admitted to the Rehabilitation and Aged Care Unit from January to December 2003 revealed that there were often discrepancies between nurses' and physicians' reports. Nurses tended to report delirium only when it was hyperactive and physicians only on the basis of their clinical examination but not taking into the account the nurse reports. From January to April 2004, an educational training directed to physicians, nurses, and physiotherapists was performed and a more comprehensive geriatric assessment introduced in clinical practice, including the Richmond Agitation and Sedation Scale (RASS),[2] the Confusion Assessment Method (CAM),[3] and the Memorial Delirium Assessment Scale.[4] For all patients, the nursing staff administered the RASS three times daily from admission to discharge to monitor the status of patients' alertness, whereas physicians administered the CAM upon admission and every day when a variation in RASS score was noted. Physicians administered the Memorial Delirium Assessment Scale when the CAM was positive to confirm the diagnosis of delirium and to measure its severity. Table 1 shows that, although the typology and clinical characteristics of the patients were similar in the two periods, the frequency of the observed delirium was significantly higher in the second group (23%). Similar to Naughton et al., we observed less medication use in 2004 than in 2003 in patients with delirium. Although not statistically significant, and various other factors might be considered in the etiology of delirium,[5] the mean number ± standard deviation of prescribed drugs from admission to discharge decreased by 0.3 ± 2.6 in 2003 and by 1.2 ± 2.0 in 2004, indicating a greater attention of physicians to the high number of drugs as a risk factor for delirium. Taken together, these data suggest that the educational training and the adoption of more sensible diagnostic instruments increase the sensitivity to detect delirium in rehabilitation setting as has been demonstrated in a university-affiliated hospital.[1] The introduction of a common and complementary assessment to the physicians and the nursing staff may be the key point in promoting diagnostic accuracy in patients at risk. The prompt recognition of delirium may also favor quicker clinical interventions. Focusing the staff on delirium

Table 1. Characteristics of 956 Patients Consecutively Admitted from January 2003 to October 2004 in a Rehabilitation and Aged Care Unit, Stratified by Year

Characteristic	January–December 2003 (n = 482)	January–October 2004 (n = 474)	*P*-value
Demographic			
Age, mean ± SD	79.0 ± 7.3	79.0 ± 6.9	.99
Female, n (%)	359 (74.5)	347 (73.2)	.55
Cognitive and functional status, mean ± SD			
Mini-Mental State Examination score (range 0–30)	22.4 ± 6.2	22.9 ± 6.1	.17
Geriatric Depression Scale (range 0–15)	6.0 ± 3.5	6.1 ± 3.6	.81
Barthel Index on admission (range 0–100)	54.2 ± 27.9	53.0 ± 27.6	.52
Barthel Index on discharge (range 0–100)	72.6 ± 25.9	71.5 ± 26.4	.53
Somatic status, mean ± SD			
Serum albumin levels (gr/dL)	3.2 ± 0.5	3.1 ± 0.9	.98
Charlson Index	3.0 ± 2.3	3.3 ± 2.4	.09
Drugs on admission	5.3 ± 2.3	5.4 ± 2.4	.55
Type of patient, n (%)			
Postsurgical*	131 (27.2)	117 (24.7)	.21
Nonsurgical†	351 (72.8)	357 (75.3)	
Delirium, prevalence§	74 (15.4)	95 (20.0)	.03
On admission, n (%) (prevalent)		78 (16.4)	
During hospital stay, n (%) (incident)		17 (3.6)	
Difference in drugs from admission to discharge, mean ± SD	− 0.3 ± 2.6	− 1.2 ± 3.0	.09

*Patients who underwent surgery for orthopedic (hip and knee), abdominal, neurological, or heart (coronary artery and valve) disease.
†Patients who underwent rehabilitation for gait disorders (arthritis, parkinsonisms, miscellaneous), chronic obstructive pulmonary disease, peripheral vascular disease.
§Distinction between prevalent and incident delirium was performed since January 2004.
SD = standard deviation.

detection and management in addition to a traditional geriatric assessment might become a routine procedure in rehabilitation units for elderly subjects.

Salvatore Speciale
Giuseppe Bellelli
Rehabilitation and Aged Care Unit
"Ancelle della Carità" Hospital
Cremona, Italy
Geriatric Research Group
Brescia, Italy

Marco Trabucchi
Geriatric Research Group
Brescia, Italy
Tor Vergata University
Rome, Italy

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ASSOCIATION BETWEEN RISPERIDONE TREATMENT AND CEREBROVASCULAR ADVERSE EVENTS IN ELDERLY PATIENTS WITH DEMENTIA

To the Editor: We have read with interest the review of treatment of elderly patients with antipsychotics drug published in the *Journal of the American Geriatrics Society.*[1,2] One of the neuroleptic drugs most commonly used to treat some of the behavioral and psychological symptoms of dementia is risperidone.[3–5] A potential association has been suggested between treatment with risperidone and increased incidence of cerebrovascular adverse events (CVAEs) such as stroke and transient ischemic attack (TIA),[6] although such association was not supported by other studies.[3,7]

Three hundred twenty consecutive patients with dementia aged 65 and older from six centers were evaluated to assess the possibility of an association between use of risperidone and an increased risk of CVAEs.

Patients were included in the group on neuroleptic treatment when they had taken a neuroleptic drug for at least 15 consecutive days, because it was a usual practice for patients included to take the neuroleptic as required in a flexible regimen. The main variable recorded was the occurrence of any type of CVAE during follow-up treatment since dementia was diagnosed.

Two hundred fourteen women (67%) and 106 men were included. Mean age ± standard deviation was 81.1 ± 6.8. Mean time since diagnosis of dementia was 31.1 ± 24.0 months. Mean values in Reisberg's Global Deterioration Scale were 5.3 ± 1.1. One hundred sixty-six patients (52%) were receiving treatment for hypertension, 69 (22%) for diabetes mellitus, and 43 (13%) for dyslipidemia. One hundred thirty-one patients (41%) were taking antiaggregant therapy, and 15 (5%) were taking oral anticoagulation therapy. A prior CVAE was found in 77 (24%) patients, of whom 75% were on antiaggregant therapy and 6% on anticoagulant therapy. Thirty-seven patients (12%) had atrial fibrillation, which was being treated with oral anticoagulants in 11 patients.

One hundred ninety-one patients (60%) had received treatment with neuroleptic drugs: 168 risperidone (53%), 10 haloperidol, six levomepromazine, four olanzapine, two quetiapine, and one thioridazine. The daily dose of risperidone ranged from 0.5 mg to 3 mg, and the mean time since the start of risperidone was 10.1 ± 12.0 months.

Six patients experienced a new stroke during follow-up (mean 20 months): three of them in the risperidone group and three in the other group (two patients not taking neuroleptics and one on thioridazine); there were no significant differences ($P = 1.0$). Four patients experienced a TIA during follow-up (mean 18.4 months): one in the risperidone group and three in the other group (two not taking neuroleptics and one taking levomepromazine) ($P = .34$). Overall, 10 patients experienced some CVAE during follow-up (mean 19 months): four in the risperidone group and six in the other group (four not taking neuroleptics and one each on thioridazine and levomepromazine) ($P = .52$). When data were analyzed depending on whether patients had taken neuroleptic treatment, no significant differences were found in stroke (4 vs 2; $P = .90$) or TIA (2 vs 2; $P = .90$), nor were they found when both events were analyzed together (6 vs 4; $P = .90$). Table 1 shows the characteristics of patients with a new CVAE.

Data on a potential increase in the number of CVAEs in elderly patients with dementia taking risperidone come from an analysis of four placebo-controlled trials showing CVAEs in 4% of patients in the risperidone group, compared with 2% in the placebo group, although there were no mortality differences.[6] The studies were not designed to test the hypothesis as to whether risperidone increased the risk of stroke. Moreover, in a recent study[7] involving 1,130 cases and 3,658 controls, no association was found between risperidone and an increased risk of CVAEs.

In an attempt to find an explanation for this possible association, a potential increase in orthostatic hypotension has been suggested, despite the fact that no postural changes in blood pressure have been noted in patients treated with risperidone.[3,5] A further possibility would be an increased risk of thromboembolic disease, but neither risperidone nor its active metabolite caused changes in

Table 1. Main Characteristics of the 10 Patients with Dementia Who Had Cerebrovascular Adverse Events

Characteristic	Patient									
	1	2	3	4	5	6	7	8	8	10
Type of cerebrovascular adverse event	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke	TIA	TIA	TIA	TIA
Type of dementia	VaD	VaD	Mixed	AD	Mixed	AD	VaD	VaD	Mixed	AD
Sex	Male	Female	Male	Female	Male	Male	Male	Female	Male	Female
Age	82	91	96	89	82	71	92	83	76	85
Prior stroke	Yes	Yes	No	No	No	No	Yes	Yes	No	No
Arterial hypertension	Yes	No	Yes	No	No	No	Yes	Yes	Yes	No
Diabetes mellitus	Yes	No	No	No	Yes	No	Yes	No	No	No
Dyslipidemia	No	No	No	No	No	No	No	No	No	No
Atrial fibrillation	Yes	No	No	No	No	No	No	No	No	No
Neuroleptic	No	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes
Risperidone	No	No	Yes	Yes	No	Yes	No	No	No	Yes
Thioridazine	No	Yes	No	No	No	No	No	No	No	No
Levomepromazine	No	No	No	No	No	No	No	No	Yes	No

TIA = transient ischemic attack; AD = Alzheimer's disease; VaD = vascular dementia.

platelet shape or aggregation in in vitro studies.[8–10] Other highly unlikely causes would be that an increased sedation resulted in a certain dehydration or that a possible increase in prolactin secretion triggered an accelerated atherosclerosis.

When assessing the limitations of our study, it should be taken into account that any possible stroke that had caused the death of the patient was not included, although no mortality differences were reported in previous studies.[6] It is also possible, although unlikely, that the patients or main caregivers did not report some TIAs.

Although the limitations imposed by a retrospective study using flexible doses and a small sample size should not be disregarded, our conclusion is that there is no association between the use of risperidone and an increased incidence of CVAEs.

Francesc Formiga, MD
GIECAM Working Group
Geriatric Unit
Internal Medicine Service
Hospital Universitari de Bellvitge
L'Hospitalet de Llobregat
Barcelona, Spain

Isabel Fort, MD
Psychogeriatric Unit
Center Sociosanitari el Carme, Badalona
Barcelona, Spain

Juan Manel Pérez-Castejón, MD
GIECAM Working Group
Clínica Barceloneta
Barcelona, Spain

Domingo Ruiz, MD
GIECAM Working Group
Geriatric Unit
Internal Medicine

Hospital de Sant Pau
Barcelona, Spain

Enric Duaso, MD
GIECAM Working Group
Geriatric Unit
Internal Medicine
Hospital Mútua de Terrassa, Terrassa
Barcelona, Spain

Sebastia Riu, MD
Psychogeriatric Unit
Llars Mundet
Barcelona, Spain

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CLOSE ASSOCIATION BETWEEN GERIATRIC FUNCTIONAL ABILITY AND ECONOMIC STATUS IN DEVELOPING AND DEVELOPED COUNTRIES

To the Editor: Economic status influences human health, especially maternal and infant, throughout the world. The association between health status and subjective economical satisfaction in West Papua has been reported,[1] but there has been no international community-based comparative study on the association between geriatric function and economic status. This study showed the association between quantitative scores in basic and advanced activities of daily living (ADLs) in older people and economic status in two developing countries, Vietnam and Indonesia, and a developed one, Japan.

The study population consisted of community-dwelling elderly subjects; 165 aged 60 and older in Doan Hung, Vietnam (mean age 71.4, men/women 67/98); 216 aged 60 and older in West Java, Indonesia (mean age 72.5, men/women 89/127); and 1,037 aged 65 and older in Kyoto, Japan (mean age 74.7, men/women 475/562). Seven basic ADL items were assessed (walking, ascending and descending stairs, feeding, dressing, toileting, bathing, grooming). Each basic ADL item was evaluated along four levels; the total basic ADL score ranged from 0 to 21.[2] A good basic ADL score was defined as a score of 20 or 21. For assessment of advanced ADLs, the Tokyo Metropolitan Institute of Gerontology (TMIG) index was applied to all subjects.[3] The TMIG consists of a 13-item index with three sublevels of competence: instrumental self-maintenance, intellectual activities, and social role. A good advanced ADL score was defined as a total score of 10 to 13 on the TMIG.

For evaluation of objective economic status, different methods were used in the three countries. In Japan, the amount of individual monthly income (mean 161,000 yen/month) was assessed. Older Japanese were then divided into three groups according to monthly income: low (the lower 20th percentile, < 50,000 yen), moderate (50,000–250,000 yen), and high (the upper 20th percentile, > 250,000 yen). Local authorities classified economic household status in Vietnam into three groups using the ABC method (a method of wealth ranking by knowledgeable local authorities as a participatory rural appraisal) as a ranking system: low, moderate, and high, according to their possessions (e.g., house style, area of field, domestic animals).[4] Economic status in West Java was classified by prosperous family types from the Census survey of the Indonesian govern-

ment. They were divided into three groups, low (preprosperous family in the Census survey), moderate (prosperous family − 1), and high (prosperous family − 2 and more). There was no statistical difference in average basic ADL score between the three countries; 19.8 ± 3.3 in Kyoto, 20.1 ± 2.4 in West Java, and 20.2 ± 1.3 in Doan. The average advanced ADL score was significantly highest (11.0 ± 3.2) in Japan, middle (9.4 ± 3.7) in Vietnam, and lowest (6.9 ± 3.2) in Indonesia ($P < .001$, Fisher protected least significant difference, analysis of variance (ANOVA)). The odds ratio for good basic ADLs for those with moderate economic status after adjustment for the effect of age and sex was 1.1 to 3.1; for those with high economic status, it was 4.1 to 6.4, compared with those with low economic status using logistic regression analysis. The odds ratio for good advanced ADLs in the moderate economic group was 2.5 to 8.5; for the high economic group it was 8.1 to 20.0, compared with the low economic group after adjustment for age and sex. Good basic and advanced ADLs of community-dwelling older people were closely associated with their economic status in all countries, notwithstanding the different ways of evaluating economic status (Figure 1).

Estimated gross domestic product (GDP) per capita in Japan, Indonesia, and Vietnam in 2003 was $28,200, $3,200, and $2,500, respectively.[5] Although there was no
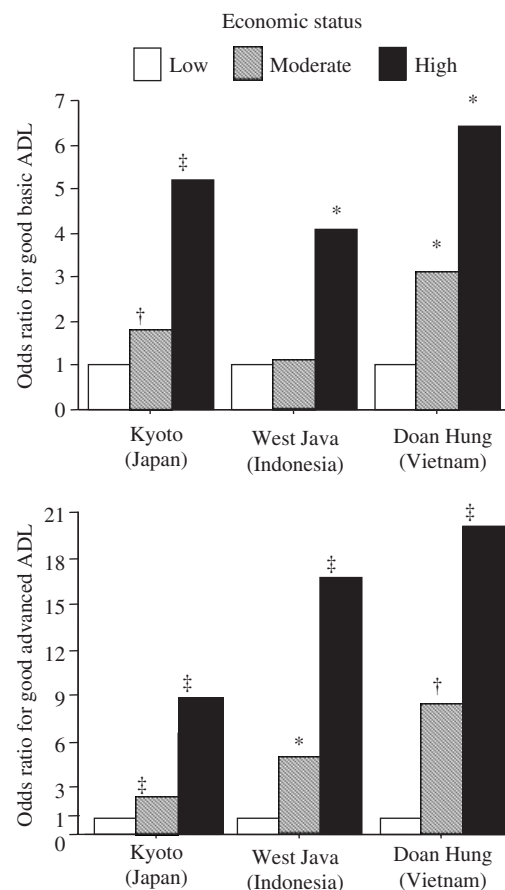
Figure 1. Comparisons of three countries of odds ratios for good basic and advanced activities of daily living (ADLs) according to economic status in community-dwelling older people.
$P < $ *.05, †.01, ‡.001 using logistic regression analysis after adjustment for age and sex (reference group: low economic status).

difference in average scores in basic ADLs between the three countries, advanced ADL scores were highest in Japan, followed by Vietnam and then Indonesia. Infrastructural development, educational levels, and development of a social network may influence advanced ADLs assessing instrumental, intellectual, and social activities. Although infrastructure and educational levels might be associated with per capita GDP, the social role of older people might be strongly associated with their traditional social network. Social role scores were higher in Doan Hung (3.5 ± 0.9) than in West Java (3.1 ± 1.2) or Kyoto (3.1 ± 1.2) $(P = .001,$ ANOVA), indicating that social networks in Doan Hung were the strongest of the three areas.

In conclusion, a significant association between economic status and good basic and advanced ADLs in community-dwelling older people is a universal phenomenon—one that was revealed in the three countries surveyed, indicating that geriatric functional ability is closely associated with economic status not only in developing countries, but also in developed countries.

Kiyohito Okumiya, MD, PhD
Research Institute for Humanity and Nature
Taizo Wada, MD, PhD
Masayuki Ishine, MD
Department of Field Medicine
Graduate School of Medicine
Teiji Sakagami, MD
Department of Psychiatry
Graduate School of Medicine
Kosuke Mizuno, PhD

Terry Arther Rambo, PhD
Kozo Matsubayashi, MD, PhD
Center for Southeast Asian Studies
Kyoto University
Kyoto, Japan

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