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# **Hypnosis as an effective and inexpensive option to control pain in transcatheter ablation of cardiac arrhythmias**

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## **ABSTRACT**

Supportive cares for pain relief and back discomfort during electrophysiology (EP) interventions such as arrhythmias ablation are usually needed in the EP lab, especially in long lasting procedures like atrial fibrillation ablation. Although this is usually achieved with conventional pharmacologic anaesthesia, hypnosis has recently aroused interest as a reliable tool to complement and possibly enhance conscious sedation. We collected five case of percutaneous arrhythmia ablation in which, after informed consent, hypnosis was performed by nurse anaesthetists into the cath lab. In each case at the end of the intervention the patients described complete alterations of perception or memory of the pain or of the length of the study. No anaesthetic drug was needed. Whilst waiting for more robust data we suggest hypnosis could be a reliable, inexpensive and safe tool to obtain complete pain control and comfort during arrhythmia ablation.

## **INTRODUCTION**

Hypnosis has earned in the last years growing evidence supporting its value in many invasive procedures, both in adults and children [1-4]. It creates a state of awareness and concentration, allowing to reduce stress and anxiety and inducing relaxation [5].

Basic research of pain pathways involving the nociceptive flexion reflex and positron emission tomography has also updated our knowledge on this fascinating and ancient healing tool, yielding objective data regarding the physiologic correlates of hypnosis [6,7]

Contemporary clinical investigators claim that the combination of analgesia and hypnosis is superior to conventional pharmacologic anesthesia for minor surgical cases [8], and there are no complications or side effect reported in literature. Despite some published experience in the cardiovascular field, little is known about its use during EP interventions [5,9,10]. We decided to assess the potential role of hypnosis in our EP lab: a nurse anesthetist who has received specific post-graduate formation performed it both in patients who were afraid of the ablation procedure because of previous bad experiences both in patients to whom hypnosis was proposed as an alternative to drugs. All patients signed an informed consent after complete explanation.

Hypnosis depth was assessed using Spiegel's Hypnotic Induction Profile [11], while anxiety was assessed with the State-Trait Anxiety Inventory (STAY) Form Y-1 (table 1) [12] before the procedure and with a Numeric Rating Scale (NRS) score from 0 to 10 [13] during the intervention.

### **Case 1**

She is a 63 years-old lady with history of paroxysmal atrial fibrillation (AF). Previous rhythm control strategy with flecainide had failed because of dizziness and weakness, and sotalol was

ineffective. Therefore we proposed her to receive trans catheter ablation. The anxiety measured with the STAI-Y1 questionnaire the evening before was 49. Atrial fibrillation ablation was performed through pulmonary veins disconnection with radiofrequency (RF).

In this and all the cases that follow, hypnosis was performed as an alternative to pharmacological sedation. This patient didn't like to receive anaesthesia and after hypnosis explanation preferred it. The first induction was given in the cath lab setting during the patient and lab preparation. Hypnotic susceptibility as assessed with the Spiegel's Hypnotic Induction Profile resulted of medium grade. We associated local anaesthesia before introducing sheathes and catheters, but the patients denied the lidocaine smarting sensation. Furthermore, anxiety was totally controlled with hypnosis along the whole intervention. The suggestions given throughout were related to improve self-control and relax, with post-hypnotic suggestion of pain control and fast healing. During the three hours needed to complete the ablation the patient kept a good trance level. The NRS score was 0 along all the procedure time. After the ending, we interviewed the patient who refers no pain perception and the dreaming sensation to be in an other place. No anti pain drug agents were needed neither in the next 24 hours. STAI-Y1 score was 21 at the end of the intervention.

## **Case 2**

She is a 69 years old lady with hypertension, thalassemic trait and a history of suspected Osler's syndrome, for which she was contraindicated to assumption of antiplatelet and anticoagulant therapy. She suffered of paroxysmal atrial fibrillation with some episodes of typical atrial flutter previously unsuccessfully treated with propafenone, flecainide and sotalol; amiodarone was started but then interrupted after some months because of hyperthyroidism. A first atrial fibrillation ablation was performed in 2013 with RF pulmonary veins disconnection and a line on the Cavo-tricuspid isthmus. In that occasion the patients had experienced pain and

discomfort even though anaesthesiology support. When approaching the new attempt of atrial fibrillation ablation we decided to perform hypnosis because of patient's high level of anxiety: she was afraid to not be able to go throughout a new intervention: she was worried about pain and position discomfort, and the STAI-Y1 questionnaire performed 60. When attempted the first induction, Spiegel's Hypnotic Induction Profile revealed a high susceptibility: after this first experiment patient enjoyed hypnotic state and agreed to try it either during the TOE either in the cath lab setting. The perfect control of the dreaming state made possible to not perform at all any kind of local anaesthesia neither for vascular access. During the ablation continuous suggestion of peace, analgesia and wellness kept the patient perfectly still throughout the four hour long intervention. The self-assessed NRS score was 0 throughout the ablation. When she was awakened she denied any memory of the procedure, barely believing it had really happened. STAI-Y1 score at the end was 27. No painkiller or sedative drugs were needed along the hospital stay.

### **Case 3**

He is a 47 years old man with history of hypertension and atrial fibrillation which in two episodes needed electric DC shock to be interrupted because amiodarone iv failed in restoring sinus rhythm. Despite antiarrhythmic therapy with flecainide the patient continued to feel palpitations in the event of paroxysmal episodes of atrial fibrillation and was therefore scheduled for atrial fibrillation ablation performed through percutaneous pulmonary veins disconnection using a cryo-energy balloon. Hypnosis was offered as an alternative to drugs-based anaesthesia to a naïve patient, who accepted this different treatment. The STAI-Y1 questionnaire filled the day before the intervention resulted 57 for him. In this patient again hypnosis was performed in the theatre setting, but despite a medium-high level reached in controlling the pain we decided to give him local anaesthetic before needle and sheathes

introduction. No painkiller or sedative drugs were needed, and after the end of a three-hour ablation the awakened patient referred a complete dissociate state throughout all the intervention, with lively perception of being home with his own sons. He denied pain or other symptoms, and NRS score was 0, while STAI-Y1 score after the procedure was 28.

#### **Case 4**

He is a 15 years old patient with a history of Asperger syndrome and primitive pulmonary hypertension, for which he underwent lung transplantation at the age of 13. Echocardiography displayed a severely dilated and hypertrophic right ventricle with moderate tricuspidal regurgitation, D-shaped left ventricle with normal ejection fraction and dilated right atria with right-to-left atrial shunt through a patent foramen ovale. He was symptomatic for atrio-ventricular re-entrant tachycardia (AVNRT) from the age of 12 and many drugs were useless for prophylaxis. He developed long QT with amiodarone, while propranolol, sotalol, nadolol, flecainide, verapamil and digoxin were ineffective. A previous attempt of percutaneous ablation of his arrhythmia aborted due to panic attack. Because of frequent relapses highly symptomatic we decided to use hypnosis to support a new ablation endeavour, relying of previous experience in successful hypnosis during bronchoscopy. We decided for a non-verbal approach for induction, adding wellness suggestion and self control. That permitted a good control of stillness. Local anaesthetic in the groin was the only drug we needed. Because of the special psychological setting, hypnotic session had started in the patient's room and lasted over the end of the ablation in order to keep the patient still and safe also in the hours after the procedure. Unfortunately, due to the psychological characteristics of this patient, he filled no questionnaire. But in this case we think that hypnosis has been an irreplaceable tool, given the severe comorbidity of the patients, which could increase side effects of any sedative drug.



## **Case 5**

She is a 62 years old lady with history of both persistent atrial fibrillation and atrial flutter which were treated in vain with several anti-arrhythmic drugs (flecainide, propafenone, amiodarone and disopiramide). In her history she had already received four different radiofrequency ablation procedures for atrial fibrillation, including pulmonary veins disconnection, linear lesion on the Cavo-tricuspid isthmus and inside the left atrium and in the coronary sinus. Because of the relapse of the atrial atypical flutter we decided to perform another endocavitary study, which revealed critical isthmus in the poster inferior mitral annulus, where we applied RF that interrupted the arrhythmia.

Because of the strong will of the patient to be completely anesthetized we propose to her hypnosis as an alternative to drugs (i.e. remifentanyl), explaining to her the higher risks of complications in completely anesthetized patients. The first induction was given to manage TOE and Spiegel's Hypnotic Induction Profile revealed a high susceptibility to hypnosis; the evening before ablation's day STAI-Y1 questionnaire revealed a 77 score. During the ablation we didn't need to give her any kind of drug before, during or after. This is even more amazing because the procedure took six hours. In the course of hypnosis she received suggestion of quietness and tranquillity, with NRS score referred being 0. At the end she commented on a dissociated dreaming state with different dreams in different place following each other with a strong memory of that and without any experience related to the cath lab. STAI-Y1 score immediately after the procedure was 34.

## **DISCUSSION**

Despite the lack of large and randomized studies enrolling enough patients to test the hypothesis that hypnosis could be a real benefit for patient, evidence of beneficial data from

small studies are clear and related to increasing patient satisfaction, reducing drug need and hospital stay [5,9,10,14]. As cited above, previous meta-analysis (3,4-15) on the effectiveness of adjunctive hypnosis with surgical patients suggests that hypnosis does really improve patient related outcome. However, the data must be interpreted with caution because of the great variability in techniques and definitions among the reports entering into these analyses. This is why we decide to try to objectively assess anxiety and hypnosis depth through validated and objective scales [12,13]. In our first-hand experience, hypnosis not only performed as a valuable tool to improve patient comfort but also allowed to avoid use of drugs in the delicate setting of arrhythmia ablation. This is particularly useful, since avoiding anaesthetics might be important to reduce drug-related side effects. Furthermore, a better control of pain, fears and stress can help to act through the neuro-vegetative system balance, a well-known actor in the arrhythmia induction and also component of the Coumel's triangle [16]. Indeed, despite it may be difficult to clearly assess the effect of hypnotic state on the neuro-vegetative system, we experience that stability of heart rate and blood pressure can be achieved throughout all the procedural time and also in normally painful moment such as the ablation ones.

If hypnosis provides clinical benefit it also has a not secondary aspect: it is nearly unexpensive. [17], provided that hypnosis-trained staff is actually working inside the hospital. Relying on the substrate of the emotional support and empathy with the patient, hypnosis may therefore candidate as a real tool of care that cardiologists (as well as education manager) should have in mind in routine clinical practice, to offer a valuable option either to the patients either to the health service itself. Nevertheless, more robust data from bigger studies with more patients are needed.

TABLE 1. Example form of the State-Trait Anxiety Score (STAI-Y) questionnaire. Each form is accompanied by instruction for the patient.

Here you will find a number of statements that people have used to describe themselves. Please reading each sentence and put a cross over the number that better describe how do you feel in this very moment. There are not correct or wrong answers. Do not spend too much time on any one statement but give the answers which describes your presents feelings best.					
1= Not at all    2= Somewhat    3= Moderately so    4= Very much so					
1	I am calm	1	2	3	4
2	I feel secure	1	2	3	4
3	I am tense	1	2	3	4
4	I feel strained	1	2	3	4
5	I feel at ease	1	2	3	4
6	I am upset	1	2	3	4
7	I am presently worrying over possible misfortunes	1	2	3	4
8	I feel satisfied	1	2	3	4
9	I feel frightened	1	2	3	4
10	I feel comfortable	1	2	3	4
11	I feel self-confident	1	2	3	4
12	I feel nervous	1	2	3	4
13	I am jittery	1	2	3	4
14	I feel indecisive	1	2	3	4
15	I am relaxed	1	2	3	4
16	I feel content	1	2	3	4
17	I am worried	1	2	3	4

18	I feel confused	1	2	3	4
19	I feel steady	1	2	3	4
20	I feel pleasant	1	2	3	4

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