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**Evaluation of patients' and practitioners' satisfaction with the use of hypnosis during a thermal endovenous procedure.**

**Short title: hypnosis in endovenous procédure**

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## **Summary :**

**Introduction :** In the field of vascular surgery, hypnosis has been used in the creation of venous approaches but also as a complement to local anesthesia during more extensive vascular surgery, including the insertion of abdominal aortic aneurysm stents. The practice of thermal endovenous procedures seems to us to be conducive to hypnotic support in particular to reinforce hypnoanalgesia.

**Method:** We present a prospective and monocentric observational study at the University Hospital of Grenoble with consecutive inclusions whose objective was to evaluate the interest and the satisfaction of the patients and practitioners about the practice of hypnosis during procedures of thermal endovenous treatments.

**Results:** Among the 31 patients treated with endovenous laser, 27 accepted the hypnosis proposal, 16 had hypnosis considered as formal and 13 conversational hypnosis and 10 conversation only. Among them, 29% of patients considered that the hypnoanalgesia technique had enormously relaxed them and 19% "very relaxed"; 42% of patients considered themselves "good", 32% "very good" and 19% "extremely good" at the end of the procedure. Concerning the practitioners performing the endovenous procedure, more than half (51, 51%) considered that hypnoanalgesia relaxed the patient "moderately and/or a lot".

The results were as a whole point to a high level of satisfaction on the part of patients and practitioners with the practice of procedures with various levels of hypnosis induction. Despite many biases, this study has the merit of concluding that the patients were very satisfied with the apprehension of these gestures as well as the practitioners, and this without any additional time during the procedure.

**Keywords:** hypnosis ; endovenous laser ; anaesthesia ; anxiety ; pain ; patient experience.

## **Introduction**

In the field of vascular surgery, hypnosis has been used in the creation of venous approaches but also as a complement to local anesthesia during more extensive vascular surgery, including the insertion of abdominal aortic aneurysm stents. Thermal endovascular treatments should no longer be performed under general anesthesia but must be accompanied by tumescent anesthesia (1). A prospective randomized study assessed an audio visual distraction during endovenous thermal ablation with showed that audiovisual distraction has no influence on the visual analogue scale pain score during endovenous thermal ablation under tumescent anesthesia (2). In our current practice, no analgesic treatment is systematically offered but the gesture can still be painful. The practice of thermal endovenous procedures seems to us to be conducive to hypnotic support in particular to reinforce hypnoanalgesia. Studies to assess the effectiveness of hypnosis are more difficult to conduct in hypnosédation than in hypnoanalgesia, as if in thermal treatments where it is advisable to maintain tumescent anesthesia for reasons of effectiveness. We present a prospective observational study whose objective was to evaluate the interest and the satisfaction of the patients of the practice of hypnosis during procedures of thermal endovenous treatments.

## **Methodology**

This is a prospective and monocentric observational study at the University Hospital of Grenoble with consecutive inclusions whose objective was the evaluation of the interest and the satisfaction of patients with the practice of hypnosis during procedures of thermal endovenous treatments. Because the procedures were performed only with tumescent anesthesia and no other anesthesia, agitated patients or patients with a psychiatric history were excluded. The study took place over 7 months from 01/11/2019 to 01/07/2020.

### *Thermal endovenous procedures:*

The endovenous laser procedures were all performed in the same environment in a dedicated medical laser room in the Vascular Medicine Department at Grenoble University Hospital by 3 different operators. For each patient with an indication for endovenous laser hypnosis support was proposed during the information consultation at least 8 days before the endovenous laser procedure in the same time that the information and the presentation of the procedure details. The term used when the "hypnotic" practice was proposed was "accompagnement/relaxation, which could go as far as hypnosis". In all cases, the procedures were performed without general anesthesia and only with tumescent anesthesia according to HAS recommendations (3). The tumescent anesthesia consisted of a solution of 70 mg (14ml) of xylocaine 20 mg/100 ml (5mg/ml) diluted in 1.4% bicarbonate 500 ml.

No specific analgesic or anxiolytic drug treatment was proposed to the patient. No local anesthesia ointment on the injection sites of the tumescent anesthesia was associated with the procedure. Only at the patient's insistence, a 25 mg tablet of hydroxyzine hydrochloride could be administered before the procedure. The Meopa gas, an equimolar gas of oxygen nitrous oxide (composed of a mixture of 50% oxygen and 50% nitrous oxide) gas was systematically available in the operating room and was never offered spontaneously to the patient. The procedure took place in a dedicated room where the patient was partially undressed, keeping his underwear and clothes on the upper half of his body. A vertically positioned draped field separated the upper half of the patient from the lower half and defined a space for the patient to talk with the nurse who remained positioned at the head of the patient.

### *Hypnosis procedure:*

The nurse trained in hypnosis in charge of assisting the practitioner in the thermal gesture and accompanying the patient during the procedure had a short interview with the patient on the

day of the procedure when he entered the dedicated room (4). During this interview, she re-explained him that the procedure takes place in 3 parts (introduction of the endovenous laser fiber up to 2 cm before the saphenofemoral junction, tumescence and finally heating by the laser fiber). During the first and second parts, the doctor has less need to communicate with the patient and it is during these first two times that the nurse proposes to the patient a hypnotic practice in order to make the intervention as pleasant as possible. The nurse collects at this time the patient's themes of interest.

Therapeutic hypnosis was proposed to the patient by explaining that it is not a procedure to manipulate the patient or to take over his or her consciousness but only a hypnosis that he or she already knows in another form. A hypnotic state corresponds to a modulation of consciousness to enter into a psychological functioning involving both the circuits of attention and the circuits of relaxation (5). Concrete examples were given to explain a hypnotic state such as the loss of attention when driving in a routine landscape where the notion of time is disturbed and generally accelerated or other examples such as the loss of attention when listening to a speaker who is too long where the mind starts to go elsewhere. Depending on the patient's propensity, we can distinguish 2 types of hypnosis: formal hypnosis and conversational hypnosis (CH) which are two ways of approaching a trance experience (5). The first called "formal" by working on breathing or by fixing their mind and vision on something like a point on the surrounding sterile field in order to focus their mind and then divert it from the operative context with hypnotic suggestions. Whenever possible, the nurse repeated the terms and suggestions gathered during the initial interview with the patient. If the patient had not suggested a theme of preference, the nurse proposed vague suggestions where the patient could recognize himself or hook his mind in order to facilitate his entry into hypnosis. This formal hypnosis requires the patient's agreement and participation in a

procedure with a clear-cut induction procedure and a formal procedure for increasing suggestibility (5).

The second one is the “conversational hypnosis » (CH) , also known as the “conversational approach” and is a variant of hypnotic suggestion. CH is operationally defined by two concomitant, observable variables: the intentional use of verbal suggestion designed to elicit automatic, dissociated, or subconscious responding the universal hallmark of hypnosis and an increase in trance behavior without the subject having been subjected to a formal induction ritual (5). In conversational hypnosis, the induction of the modified state of consciousness is "spun", that is to say not very obvious, progressive and seemingly unframed. CH used paradox, metaphors, analogies, indirect and permissive suggestions, and teaching stories to modify behaviors (5). It was generally done by default when the patient seems not very receptive, in case of refusal of the patient, or if the patient came out of a first phase of "formal hypnosis" (sometimes when the patient came out of formal hypnosis when the pain was too important). This form of therapeutic hypnosis focused on conversation or communication where the practitioner (in this case the nurse) subtly mobilizes and modifies the patient's unconscious or behavior without the patient being aware of it but with the patient's acceptance. By making the patient talk or by asking questions, the patient is involved in the conversation and is obliged to answer or explain something. His attention is thus diverted from the painful act and focused on the conversation. If the patient refuses to be treated by hypnosis, the nurse simply converses with the patient with the same objective as "conversational hypnosis".

At the end of the therapeutic procedure with or without hypnosis, depending on the patient's wishes and receptivity, evaluation questionnaires were handed out and completed by the patient and the doctor who performed the procedure respectively. These questionnaires aimed to evaluate the satisfaction of both parties involved. The Numerical Rating Scale for pain was

from 0 to 10 and a satisfaction rating was given by the patient and the practitioner from 0 to 10.

### **Results :**

Thirty-one patients were included, including 14 men and 17 women with an average age of 59 years and 39 treated legs. Of the 31 patients, there was a possibility of changing techniques during the same endovenous procedure: 27 accepted the hypnosis proposal, 16 had hypnosis considered formal and 13 conversational hypnosis and 10 a "simple conversation". Of the additional medications, only one patient had the Meopa gas and 2 patients had been premedicated with hydroxyzine hydrochloride.

Before the procedure, 42% of patients considered themselves "moderately worried" and 39% "not at all worried." To the question "Did the hypno-sedation technique relax you?", 29% of the patients considered that the hypnoanalgesia technique had relaxed them "very much" and 19% "a lot". 42% of the patients considered themselves "good", 33% "very good" and 19% "extremely good" at the end of the procedure. The visual analog pain scale at the end of the procedure was 2.03. Regarding overall management, 74% of patients would recommend the endovenous procedure to a loved one, 71% would want the procedure again in this form, and 65% would recommend the hypnoanalgesia technique to a loved one. The average overall satisfaction score for the procedure was 8.8/10 and the satisfaction score for the hypnoanalgesia technique was 8.7/10.

Concerning the practitioners performing the endovenous procedure, 61% of them were "not at all worried" and 16% "moderately worried" before the procedure. More than twelve percent of practitioners reported being "extremely well" at the end of the procedure, 29% "very well" and 29,3% "well." More than half (52%) considered that hypnoanalgesia relaxed the patient "moderately and/or very much". Less than 10% of the practitioners considered that they were



limited in their actions because of the patient's pain or tension. The patient's pain estimated by the practitioner was on average 3.3/10 with the Numerical Rating Scale for pain. The average global satisfaction score on the course of the procedure by the practitioner was 8.3/10.

## **Discussion**

The results to a high level of satisfaction with the practice of the procedures with various levels of hypnosis induction. Only in 3 cases an additional analgesic treatment was associated with tumescent anesthesia and hypnosis.

The practice of hypnosis lends itself to light and sometimes heavier interventions which can limit the acts of anesthesia. The hypnosis technique has emerged in particular in the field of endocrine cervical surgery such as thyroidectomies or cervical explorations in hyperparathyroidism (6). In the field of vascular surgery, hypnosis has been used in the creation of venous approaches (7-9) or in heavier surgeries up to the insertion of fenestrated abdominal aortic aneurysm stents associated with local anesthesia (10,11).

In the context of venous insufficiency treatment, thermal endovenous procedures must no longer be performed under general anesthesia (1,3), but a tumescent anesthesia is mandatory. This peri-venous anesthetic technique under ultrasound guidance has several objectives: the essential objective of protecting peri-venous tissues from tissue destruction by laser or radiofrequency (thermal destruction at temperatures of up to 100°C), the objective of providing anesthesia and making the procedure less painful when heated, and finally, the objective of optimizing the effectiveness of the procedure by obtaining a thermal fiber plating against the endovenous wall to be treated without any intermediate medium (notably blood). It is not advisable to reason when performing a tumescent anaesthesia as if one wanted to "spare the anaesthetic product" since tumescent anaesthesia contributes to the safety and efficiency of the procedure beyond the analgesic character. Thermal endovenous procedures,

like all painful procedures, can be accompanied by hypnosis. We have not found any publication on the subject in the literature, including the latest Cochrane review which does not detail the presence or absence of hypnotic practice during the procedures (12). Audiovisual distraction has no influence on the visual analogue scale pain score during endovenous thermal ablation under tumescent anesthesia in a prospective randomized study with 50 patients (2).

The difficulty lies in the evaluation in clinical research of the interest of hypnosis, particularly in terms of effectiveness or added value in relation to the dedicated personnel and time. It has not been possible to evaluate the benefit of hypnosis in terms of sparing other analgesics, as with other interventional procedures, because the use of analgesics is not only not systematic, but in the vast majority of interventions, no analgesic is necessary. In our study, hypnosis is positioned here as a means of hypnoanalgesia and not hypnosedation. Some studies have shown the effectiveness of hypnosis in hypnosedation by evaluating the consumption of analgesics, which was not possible here (13).

The duration of thermal endovenous interventions is not modified in the framework of our procedures systematically associated with a proposal to the patient of a hypnotic accompaniment. The duration of the procedures was not specifically recorded during the evaluation but the proposal and integration of the practice of hypnosis does not modify the duration of the procedures. The Vascular Medicine nurses trained in the installation and accompaniment of patients treated with endovenous laser in a dedicated room have specific training with a University Diploma in hypnosis, a skill used for other painful treatments such as the debridement of chronic wounds or echo-guided sclerosis of venous malformations. They begin the actual induction of hypnosis at the moment when the practitioner begins the local anesthesia with the puncture of the vein to be treated, at the moment when they can be fully available to the patient. The evaluation of the practice of hypnosis in our practice thus

lies especially in the added value for the patient and the practitioner in the realization of this gesture. In spite of all the biases of an open observational study (even if with consecutive inclusions), the results of this study go in the direction of a satisfaction of the two evaluated parts. Other biases could be evoked in this evaluation and could be the progression of experience of the practitioners over time during the study. In fact, the levels of hypnotic inductions were very variable according to the patients with a difficulty at times to distinguish the times of "conversational hypnosis" from "simple conversation". Studies are underway to better understand the differences in sensorimotor integration between patients and to better define the definition of hypnotizability recently revised by the American Psychological Association (14). Differences in sensorimotor integration were found between patients with high and low hypnotizability scores in the ordinary state of consciousness and in the absence of suggestion. It is hypothesized that these differences are related to cerebellar features and that the cerebellum may also be involved in the cognitive aspects of hypnotisability (14,15).

Hypnotic suggestibility is a trait-like, individual difference variable reflecting the general tendency to respond to hypnosis and hypnotic suggestions (16). Three groups of people can be distinguished: the first one with higher suggestibility and with the strongest response to hypnotic analgesia, the second some with a medium suggestibility (with significant relief from hypnosis) and the third with a low hypnotic suggestibility range. Some studies suggest that even these last group of patients may benefit from imaginative analgesia suggestions. The first two groups correspond to 55% of the population. The main conclusion suggested by Leonard S Milling is that high or medium hypnotic suggestibility is not necessary for successful hypnotic pain intervention (16). People who score in the medium range of hypnotic suggestibility are also likely to achieve substantial pain reduction by hypnosis. In some studies, individuals in the low suggestibility range who received imaginative suggestions for

analgesia achieved as much relief as people in the high suggestibility range who were treated with hypnosis (17,18).

#### Conclusion:

Overall, all the consequences of this hypnotic support in our department were positive and have been perpetuated. In some cases, the language barrier or the refusal of the patient did not really allow the hypnotic support, even by a simple conversation. In these configurations, no alternative analgesic treatment was systematically proposed. The team's perspectives could be, especially for this type of patients, to equip themselves with helmets or hypnosis masks which allow to divert the attention without the necessity of a contact with the nurse. This type of equipment has not been chosen as a first intention and will have to be evaluated, in particular because the complete "disconnection" between the patient and the nurse or the practitioner is generally not desirable during the heating part by the laser fiber and in addition more cost expensive. The practice of hypnosis, even conversational hypnosis, appears in this respect to be more reassuring than a hypnosis mask or helmet in order to maintain communication between the patient and the human environment, in particular so that the patient feels free to communicate with the practitioner to alert him/her of pain during heating. The appearance of pain should cause the quality of the tumescent anesthesia to be rechecked and patient safety should take precedence over absolute patient comfort.

Despite many biases, this study has the merit of concluding that the patients were very satisfied with the apprehension of these gestures as well as the practitioners, and this without any additional time during the procedure. Some randomized studies have shown the benefit of hypnosis in reducing the pain of certain procedures (19). Additional studies are of course necessary to better understand the different groups of patients according to their level of Hypnotic and imaginative suggestibility for pain reduction and to improve our practice.

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- **Human and animal rights**

The authors declare that the work described has not involved experimentation on humans or animals.

- **Informed consent and patient details**

The authors declare that this report does not contain any personal information that could lead to the identification of the patient(s).

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The authors declare that they have no known competing financial or personal relationships that could be viewed as influencing the work reported in this paper.

- **Declaration of Competing Interest**

The authors declare that they have no conflicts of interest.

- **CRediT authorship contribution statement**

N. Loseto: Conceptualization, Formal analysis, Investigation, Validation of the final draft.

N. Zenati: Investigation, Validation of the final draft.

C. Seinturier: Investigation, Methodology, Validation of the final draft,

Visualization.

S. Blaise: Conceptualization, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing– original draft.

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