Reference number to be mentioned by correspondence : ANAESTH-AAB-D-21-00071-R3

(Acta Anaesth. Belg., 2021, 72, 169-174)

Effect of walking to the operating room on preoperative anxiety in patients scheduled for outpatient laser therapy for venous insufficiency. A monocentric randomized study

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Abstract: *Background:* Preoperative anxiety in day surgery is associated with a higher incidence of postoperative complications such as postoperative nausea and vomiting, pain or unplanned admission.
Objectives: To evaluate the effect of walking to the operating room (OR) on anxiety in ambulatory patients undergoing minimal invasive laser therapy for venous insufficiency.
Design and setting: Randomized study in a tertiary hospital between May and November 2019.
Methods: 100 patients scheduled for ambulatory laser therapy for venous insufficiency were included. Patients were randomized to walk to the OR (study group, n=50) on even weeks or to lie in a bed to the OR (control group, n=50) on odd weeks.
Main outcome measures: Baseline anxiety was assessed using the Amsterdam Preoperative Anxiety and Information Scale (APAIS) and Numerical Rating Scale of anxiety (anxiety-NRS) from 0 to 10 when prepared for departure to OR. Preoperative anxiety-NRS assessment was performed upon arrival in the OR.
Results: Patients' characteristics were similar in both groups. Baseline anxiety-NRS was significantly lower in the study group than in the control group: 2 (1-3) vs. 4 (2-6.5) (p=.013) respectively. No difference was observed between the groups for preoperative anxiety-NRS. A significant reduction in anxiety-NRS on arrival at the OR was observed in the control group compared with the study group (p=.019).
Conclusion: Walking to the OR does not reduce anxiety in ambulatory patients undergoing minimal invasive laser therapy for venous insufficiency. But, preparing them to walk to the OR could possibly reduce baseline anxiety while waiting for surgery.

Keywords: preoperative anxiety; walking; ambulatory surgery; anxiety scale.

Introduction

As a result of the evolution of surgical and anesthetic techniques, more and more surgeries are performed in the ambulatory setting. The reduction of anxiety and the improvement of patient comfort and satisfaction are key elements of the success of the ambulatory care pathway and the early return to home and to daily and professional life.

Severe preoperative anxiety has already been described in patients undergoing superficial venous surgery. This anxiety has been associated with a higher incidence of postoperative complications and side effects such as postoperative nausea and vomiting (PONV), pain or unplanned admissions (1). However, pharmacological premedication is rarely used to reduce anxiety in the ambulatory setting for fear of possible delayed discharge, although this has never been proven (2). In contrast, nonpharmacologic tools, such as listening to music (3) or hypnosis (4), have been demonstrated to reduce preoperative anxiety in ambulatory patients. Similarly, accompanied walking of surgical patients to the operating room (OR) could reduce preoperative anxiety in a mixed surgical population (5). In addition, patients scheduled for a minor procedure are those who prefer to walk to the operating room (6).

For this reason, we proposed to introduce walking to OR instead of bed transport for ambulatory patients undergoing laser therapy for venous insufficiency with the aim of reducing their preoperative anxiety and thus improving their care pathway.

The primary objective of this study is to evaluate the effect of walking on preoperative anxiety in ambulatory patients undergoing laser

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Paper submitted on Jun 10, 2021 and accepted on Oct 01, 2021.
Conflict of interest: None

therapy for venous insufficiency. The secondary objectives are 1) to evaluate the effect of walking on postoperative anxiety, pain, nausea or vomiting, and unplanned admission; 2) to correlate the Amsterdam Preoperative Anxiety and Information Scale (APAIS) with Numerical Rating Scale of anxiety (anxiety-NRS); 3) to evaluate patient satisfaction with walking to the OR; and 4) to evaluate the effects of walking on outpatient unit organization.

Methods

Study design

This randomized controlled trial included 100 consecutive patients undergoing ambulatory laser venous surgery between May 15 and November 20, 2019 at a tertiary university hospital.

The study was approved by the Comité d'Ethique Hospitalo-facultaire de Liège (N°B707201940182, Chairperson: Prof. Vincent Seutin) and followed CONSORT 2010 guidelines (7). Written informed consent was obtained from all voluntary participants on the day of surgery.

Patients' selection

Our inclusion criteria were ambulatory minimal invasive laser therapy for venous insufficiency under general or spinal anesthesia. Exclusion criteria were inpatient surgery, invasive surgery, local anesthesia, need for anxiolytic premedication, use of a walking aid, non-French speaking patient, and patient refusal.

Transfer to the operating room

According to the randomization, patients went to the OR lying in a bed during even weeks (control group) or walking during odd weeks (study group).

Patients in the control group were dressed in an operating gown. Their prostheses such as dentures, hearing aids or eyeglasses were removed just before leaving the outpatient unit. Two nurses from the outpatient unit maneuvered the bed. Patients in the study group were dressed in an operating gown *plus* a robe and slippers for the transfer to the OR. To ensure their safety during the transfer, they kept their dentures, hearing aids, and glasses on until they entered the OR. The patient was accompanied by one nurse from the outpatient unit. If necessary, a chair was available at the entrance of the OR in case of waiting time. The patient's bed was secondarily sent to the OR by a care assistant from the outpatient unit.

Anxiety assessment

The baseline anxiety assessment was performed in the outpatient unit when patient had received explanations for the transfer and was ready to leave for the OR, but still had dentures, hearing aids and glasses. The assessment of preoperative anxiety using the NRS was performed by the anesthesiologist immediately before entry into the OR. Finally, postoperative anxiety was assessed using the NRS after surgery upon return to the room by the same nurse.

Pain assessment

Pain was assessed using an NRS of 0 to 10 on arrival in the recovery room, on arrival in the outpatient unit after surgery, on discharge from the hospital and on the first postoperative day. Analgesic consumption in the recovery room and in the outpatient unit was recorded.

Nausea and vomiting assessment

Nausea and vomiting (none, mild, moderate or severe) were assessed in the recovery room and in the outpatient unit. Antiemetics used in recovery room and in outpatient unit were quantified.

Observation intervals

Length of stay in the recovery room, time to achieve a Post Anesthetic Discharge Scoring System (PADSS) > 9 in the outpatient unit (9), length of hospital stay, as well as time from call to the OR to arrival in the OR, time to get to the OR, and time waiting outside the OR were collected.

Patient satisfaction

Patient satisfaction with the clinical pathway, the mode of transfer to the OR, and the manner of dressing (blouse, slippers, etc.) was evaluated by the nurse in charge of the patient with an NRS between 0 and 10.

Other variables

Demographic characteristics including gender, age, weight, height, American Society of Anesthesiologists (ASA) score, type of anesthesia, and rate and cause of unplanned admissions were also collected.

Sample size

On the basis of the previous data, we calculated that a sample size of 80 patients was necessary to detect a 3-point reduction in the APAIS-score with an alpha of .05 and a power of .9. We decided to include 100 patients to compensate for a possible loss of data.

Statistical analysis

We performed the statistical analysis with JMP version 14.0 (SAS Institute Inc.). For the analysis, patients were divided into 2 groups: a control group and a study group according to the mode of transfer used to reach the OR. The results were expressed as proportions (percentage), mean ± standard deviation, or median value (interquartile range). After a Shapiro-Wilk normality test, parametric data between groups were compared using the unpaired Student's *t*-test and nonparametric data by the Mann-Whitney Rank Sum test. Categorical data were compared using the chi-squared test or Fisher exact test using 2-sided probability. Paired data were compared using the paired Student's *t*-test. A multivariate logistic regression model (backward stepwise model) was used to determine independent risk factors for higher levels of baseline anxiety-NRS, keeping in the equation those variables that were found to be relevant ($p < .05$) in the univariate analysis. A p-value of less than .05 was considered significant.

Results

During the study period, 127 patients were admitted to the outpatient unit for venous insufficiency surgery. Of these 127 patients, 14 patients required invasive surgery, 10 patients were operated on under local anesthesia, and 1 patient no longer met the criteria for ambulatory surgery (no escort on the day). The remaining 102 patients met the inclusion criteria. They all agreed to participate and were randomized. The data collection sheets of 2 of these patients, included in the control group, were misplaced. Finally, 100 patients were included in the statistical analysis, 50 in the study group and 50 in the control group.

Demographic data

There was no statistical difference for age, weight, height, sex ratio, ASA score or type of anesthesia between the 2 groups (Table 1).

Anxiety Assessment

Baseline total APAIS (p=.266) and baseline anxiety APAIS (p=.219) were similar in the study and control groups. Baseline anxiety-NRS was significantly lower in the study group compared to the control group (p=.013) (Table 2). A significant positive correlation was observed between baseline anxiety-NRS and baseline total APAIS (R=0.69, p<.0001) as well as between baseline anxiety-NRS and baseline anxiety APAIS (R=0.72; p<.0001). There was no difference for the preoperative anxiety-NRS between the two groups (p=.807). The reduction of anxiety between baseline and preoperative anxiety-NRS was significantly different between the two groups (p=.019). The mean difference for anxiety-NRS was -0.55 ± 0.25 (95% CI -0.04 to -1.07) for the control group and 0.41 ± 0.25 (95% CI 0.98 to -0.08) for patients in the study group. There was no difference for postoperative anxiety-NRS between the two groups (p=.214).

A significant difference in baseline anxiety-NRS was also observed according to the type of anesthesia, 2 (0-4) for spinal anesthesia vs 3(2-6,5) for general anesthesia (p=.023).

Table 1.

Demographic data

	***Control* group N=50**	***Study* group N=50**	**p-value**
Age, years	55 (± 11)	53 (± 15)	.408
Weight, Kg	76 [59.75-83.25]	65 [57-82.25]	.627
Height, cm	171 (± 11)	171 (± 9)	.894
Sex ratio F/M	38 (76)/12(24)	35(70)/15(30)	.499
ASA score I/II/III	12 (24)/37 (74)/1(2)	12 (24)/36 (72)/2 (4)	.827
General anesthesia/ spinal anesthesia	29 (58)/21(42)	35 (70)/15 (30)	.211

Data are presented as mean (± standard deviation), median [interquartile 25-75], numbers (%). Abbreviation: ASA: American Society of Anesthesia.

Table 2.

Anxiety assessment

	***Control* group N=50**	***Study* group N=50**	**p-value**
Baseline total APAIS (6 to 30)	12 [8-17.5]	11.5 [15-7]	.266
Baseline anxiety-APAIS (4 to 20)	6.5 [5-12]	6 [4.75-9]	.219
Baseline anxiety-NRS (0 to 10)	4 [2-6.5]	2 [1-3]	.013[a]
Preoperative anxiety-NRS (0 to 10)	3 [1-5.5]	2 [1-5]	.807
Difference between baseline and preoperative anxiety-NRS	0 [-2-0]	0 [0-1]	.019[a]
Post-operative anxiety-NRS (0 to 10)	0 [0-2]	1 [0-2]	.214

Data are expressed as median [interquartile 25-75]. [a] p<.05 significant. Abbreviations: APAIS: Amsterdam Preoperative Anxiety and Information Scale. NRS: Numerical Rating Scale.

Table 3.

Postoperative data

	***Control* group N=50**	***Study* group N=50**	**p-value**
Pain and treatment			
Pain score in the recovery room, NRS (0 to 10)	0 [0-0]	0 [0-0]	.135
Pain score in the outpatient unit, NRS (0 to 10)	1 [0-2]	0 [0-2]	.391
Pain score at discharge, NRS (0 to 10)	0 [0-1]	0 [0-2]	.215
Pain score at day 1, NRS (0 to 10)	1 [0-2.75]	1 [0-2]	.533
Acetaminophen use in OR	36 (72)	40 (80)	.348
Acetaminophen use in the recovery room	5 (10)	5 (10)	1.0
Acetaminophen use in the outpatient unit	6 (12)	7 (14)	.766
Tramadol use in OR	1 (2)	13 (26)	.0002[a]
Tramadol use in the recovery room	5 (10)	2 (4)	.233
Tramadol use in the outpatient unit	0 (0)	1 (2)	.237
NSAID use in OR	34 (68)	36 (72)	.662
NSAID use in the outpatient unit	2 (4)	3 (6)	.645
Dexamethasone in OR	24 (48)	33 (66)	.068
Nausea and Vomiting			
Patients with nausea in the recovery room	2 (4)	6 (12)	.117
Patients with nausea in the outpatient unit	1 (2)	5 (10)	.087
Patients with vomiting during the hospitalization	0 (0)	2 (4)	.149
Length of stay			
Length of recovery room stay, minutes	49 [37-60]	43.5 [34.75-60.5]	.469
Time to achieve a PADSS > 9, minutes	104 [60-153]	99 [66.25-142.25]	.785
Length of hospital stay, minutes	460.5 [425.75-495]	470 [433-543.5]	.336
Hospital admission			
Unplanned admission	0 (0)	1 (2)	.315

Data are expressed as median [interquartile 25-75] or number (%). [a] p<.05 significant. Abbreviation: NRS: Numerical Rating Scale; NSAID: Non-steroidal anti-inflammatory drug; PADSS: post-anesthetic discharge scoring system.

Multivariate analysis confirmed that being in a bed (p=.007) and having a general anesthesia (p=.009) were independent risk factors for a higher baseline anxiety-NRS.

Pain Assessment

Pain scores were not significantly different between the 2 groups at any time points. The use of acetaminophen, NSAIDs or dexamethasone was similar in the 2 groups. A significant difference was observed in the number of patients receiving tramadol in the OR (one patient in the control group vs 13 patients in the study group, p=.0002) (Table 3).

A weak positive correlation (r=0.28) between the pain score in the outpatient unit and the baseline

anxiety-NRS was observed (p=.007). A weak positive correlation was also observed between pain score at discharge and preoperative anxiety-NRS (r=0.34, p=.001) or postoperative anxiety-NRS (r=0.43, p<.0001). Finally, a weak positive correlation was observed between postoperative pain on day 1 and baseline anxiety-NRS (r=0.22, p=.023). Using multivariate analysis, postoperative anxiety-NRS was found to be the only predictive factor of pain at discharge (p=.0002).

Nausea and Vomiting assessment

The incidence of nausea or vomiting was similar between the two groups in the recovery room (p=.117) and in the outpatient unit (p=.087). Tramadol was associated with an increased risk of nausea in the outpatient unit (RR 5.93 (CI 95% 1.32 to 26.48), p=.011).

Observation intervals

The length of stay in the recovery room, length of stay until discharge from the outpatient unit, and length of hospital stay were similar in the 2 groups.

The time to prepare the patient for surgery by the nurse was 13 minutes (10-20) for the control group and 15.5 minutes (15-25) for the study group (p=.025). Transfer time from the outpatient unit to the OR was significantly shorter in the study group with 120 seconds (120-255) compared to 240 seconds (120-300) in the control group (p=.046). Waiting time in front of the OR was significantly shorter in the study group (0 second (0-60)) than in the control group (180 seconds (60-540)) (p < .0001).

Unplanned admission

One patient was admitted overnight because of persistent bleeding in the study group. There was no difference in the rate of unplanned admission rate between the groups (p=.315).

Patient satisfaction

Satisfaction with mode of transfer was 10 (8-10) for the control group and 8 (8-10) for the study group (p=.024). Dress satisfaction was 8 (8-10) for the control group and 8 (8-10) for the study group (p=.826). Overall satisfaction with the hospital stay was 9 (8-10) and 9 (8-9) (p=.014) for the control and study groups, respectively.

Discussion

The salient result of our study is that ambulatory patients undergoing minimal invasive laser therapy for venous insufficiency who are willing to walk to the OR have a lower baseline anxiety-NRS than patients willing to be transfer in a bed during the preoperative wait in their room. However, walking to the OR did not reduce preoperative anxiety-NRS on arrival at the OR compared with lying in a bed. In addition, patients walking to the OR were less satisfied with the transfer mode than those in a bed.

In designing this study, we hypothesized that walking to the OR as a patient-centered approach might have a beneficial effect on anxiety by reducing preoperative anxiety when patients arrive in the theater. This has not been confirmed, and this result is quite surprising. This can probably be explained either by the low level of baseline anxiety in our cohort associated with the timing of the baseline anxiety assessment, i.e., after receiving explanations from the nurse. The low level of baseline anxiety is consistent with recommendations not to perform ambulatory surgery in patients for whom an excessive level of preoperative anxiety is anticipated (10) The benefits of the nurse's explanation of the process should not be underestimated either. Indeed, fear of the unknown shows the strongest correlation with anxiety measures (11). Especially since the preparation was longer in the study group and, we observed a statistical difference in baseline anxiety after patient preparation. In this way, we cannot exclude that the actual level of baseline anxiety, i.e., on arrival in the outpatient unit, was not higher that measured as a baseline after patient preparation and explanations in the study group. This is a limitation to this study.

Our results also confirm the relationship between higher preoperative (12, 13) or postoperative anxiety and pain scores after surgery. It also confirms the relationship between higher anxiety levels and general anesthesia in ambulatory surgery (14). General anesthesia is the preferred technique in anxious patient. Previous observations suggest that patients who are unable to cope with the additional challenges of being awake during surgery request general anesthesia and that the fear of the regional block will not work and needle phobia are additional causes of anxiety that prevent patients from choosing regional anesthesia (15).

We also found a positive correlation between anxiety-NRS and APAIS score. Previous studies have demonstrated a significant correlation between the Visual Analogue Scale (VAS) of anxiety and

the State-Trait Anxiety Inventory (STAI) (11) and, between VAS of anxiety and APAIS (16). To our knowledge, no study used an NRS and demonstrated a correlation with a validated score such as the APAIS (17). In our opinion, the major advantage of the NRS is its ease of use, perhaps even easier than the VAS. Indeed, the latter requires adequate vision for the patient, which may be impossible when the visual aids have been removed to come to the OR.

Satisfaction with the mode of transfer was lower for patients walking to the OR. This may be because this unusual mode of transfer was not part of the patient's expectations Indeed, meeting the patient's expectations is a factor of satisfaction (18).

Finally, the organizational benefits are small. Little nursing time was freed up. However, it can be used for other tasks on the unit. The flow of patients in the OR corridors is smoother with fewer patients waiting which can improve the ergonomics of work in the OR.

Our study has several limitations. In addition to the potential biases already mentioned, we can also note that the study was not blinded. The assessment of anxiety was done by the nurse and the anesthesiologist in charge of the patient, which may induce an inter-observer bias. Although it is not significant, general anesthesia was more frequent in the study group. Because of the correlation between general anesthesia and level of anxiety, it may influence our results. The non-standardization of anesthetic management may also introduce a bias. For example, a difference in the use of tramadol was observed between the groups. This use is correlated with a higher incidence of postoperative nausea. Finally, interference with patient expectations, such as differences in clothing or prosthesis wearing between the groups, could also be a limitation

Conclusions

Walking to the OR does not reduce anxiety in ambulatory patients undergoing minimal invasive laser therapy for venous insufficiency. But preparing them to walk to the OR could possibly reduce baseline anxiety while waiting for the procedure. Further studies considering the highlighted limitations are needed to confirm these results.

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