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The impact of preoperative anxiety on pain and analgesia consumption in women undergoing vaginal hysterectomy with general anesthesia and spinal anesthesia

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ABSTRACT

Objectives: To assess the impact of preoperative anxiety on pain and analgesic consumption in patients undergoing vaginal hysterectomy (VH) with general and spinal anesthesia.

Material and methods: A total of 200 participants, including 100 undergoing vaginal hysterectomy with general anesthesia (group 1) and 100 with spinal anesthesia (group 2), were enrolled. A visual analog scale (VAS) was used for the postoperative pain intensity.

Results: The 1st hour, 6th hour, 12th hour, and 18th hour VAS scores were higher in vaginal hysterectomy with general anesthesia than in vaginal hysterectomy with spinal anesthesia.

Conclusions: Although participants undergoing VH with spinal anesthesia (preoperative state anxiety inventory score > 45) had lower pain intensity scores in the first 18 hours compared to those undergoing VH with general anesthesia, their postoperative analgesic requirements were similar.

Keywords: anxiety; general anesthesia; pain; spinal anesthesia; vaginal hysterectomy

INTRODUCTION

Today, minimal invasive surgical methods are preferred for hysterectomy, which is the most common gynecologic surgical operation performed worldwide [1, 2]. Vaginal hysterectomy (VH), one of these methods, is widely performed, especially in indications such as uterovaginal prolapse, uterine leiomyoma, and abnormal uterine bleeding [1, 3]. However, the size and accessibility of the uterus, additional gynecologic surgery, the availability of appropriate surgical equipment, and the technological infrastructure of the hospital are important in the choice of this method [1, 4].

Unfortunately, postoperative pain after surgical interventions remains an important problem despite modern anesthesia techniques and medication [5, 6]. The phenomenon of postoperative pain, which varies from person to person, is directly affected by preoperative anxiety [5]. If this preoperative anxiety can be minimized with pharmacologic and other alternative medicine methods, postoperative pain will also be reduced [5, 7]. As a result, patients with reduced postoperative pain will be able to mobilize earlier and the risk for thromboembolic events will be reduced because hypercoagulability will be reduced [6, 8].

There are contradictory results related to preoperative anxiety and postoperative pain in the literature; some studies show that preoperative anxiety increases postoperative pain and analgesic requirement [7, 9], and other studies [5, 10] claimed that there was no relationship. This study aimed to assess whether preoperative anxiety has any effect on postoperative pain and analgesic consumption in participants undergoing VH.

MATERIAL AND METHODS

Setting

The study was approved by institutional review board (reference number: 2016/10-12) and a total of 200 VHs performed were included.

Study population

The inclusion criteria were benign uterine leiomyoma, menometrorrhagia resistant to medical treatment, and uterovaginal prolapse. The exclusion criteria were as follows: having any chronic illness (*e.g.* diabetes mellitus, systemic vascular disease, cardiac and pulmonary disease), any malignant tumor, any mental disorder, mental retardation or cognitive disabilities, a chronic pain history, and drug and alcohol abuse.

Study design

A total of 200 participants (aged 45–65 years) requiring VH were divided consecutively into two groups: 100 patients underwent general anesthesia (group 1) and 100 underwent spinal anesthesia (group 2). Two senior gynecologists and two anesthetists performed all the procedures. The age, parity, indications, surgical time, pre and postoperative serum hemoglobin (Hb) levels, blood loss, hospital stay, analgesic needs, living area, and educational level, were recorded and compared.

Preoperative anxiety assessment

Three independent questionnaires [State Anxiety Inventory (SAI), Trait Anxiety Inventory (TAI) [11], and Somatosensory Amplification Scale (SASS) [12]] were completed 24 hours before surgery by each patient.

State Anxiety Inventory and TAI, which are used to measure the patient's anxiety level, consist of 20 items graded from 1 (not all) to 4 (very much). The current level of anxiety is measured using the SAI, and whether a person is generally anxious is measured using the TAI. It has been shown that both measurement scales are useful in evaluating anxiety [13, 14], and a score of > 45/80 is an indicator of high anxiety [14].

Barsky et al. [12] developed SASS and was translated into Turkish and validated by Gulec and Sayar [15]. Somatosensory amplification, which is important in clinical situations, is disproportionately correlated with somatic symptoms in significant organ pathologies [12].

Pre-surgery preparation

Patients scheduled for VH were hospitalized one day before surgery and each underwent simultaneous abdominal and transvaginal ultrasonography to determine the uterine size, along with a standard preoperative evaluation (laboratory test and premedication) required by anesthesia. A ward nurse administered cefazolin 2 g via intravenous routes for prophylaxis to all participants, a bladder catheter was placed before the surgery, and it was withdrawn by the ward nurse after 6-8 hours when the patient was mobilized. Low-molecular-weight heparin was administered for antithrombotic prophylaxis.

Anesthesia protocol

Anesthesia type selection was performed by the anesthesiologist and was terminated when the target number for each group was reached. An intravenous line was opened, preferably in the left arm, and 500 mL of Ringer's lactate solution was given as a liquid bolus and the patient's vital signs were monitored before the surgery.

After the surgery was completed, the patients were taken to the postoperative care unit to monitor their vital signs and were transferred to the ward within 1 hour.

Surgical procedure for VH

Vaginal hysterectomy was performed in the Trendelenburg position. After disinfection and sterile closure, the portio cervix was held using by two forceps. An annular incision was performed in the cervix, the bladder was separated, and the vezico-uterinum spatium was opened. Then, both the ligg. Sacrouterinae and Cardinale were grasped, cut, and ligated, and then the parametria were separated. The annexes were ligated separately. The uterus was removed, and finally,the peritoneum was closed.

Assessment of pain perception and analgesic needs

A VAS was used to assess pain perception. The patients marked their pain on the VAS (0 = no pain and 10 = worst pain).

Statistical analysis

All the variables were analyzed using the SPSS 15.0 software (Statistical Package for the Social Sciences, SPSS Inc., Chicago, IL, USA). Kolmogorov-Smirnov tests were used to determine normal or non-normal distribution for the continuous variables. Independent samples t-tests or Mann-Whitney U test were used for continuous variables. Mean ± standard deviation (SD) was preferred for normally distributed variables, and those not distributed normally were presented as median and 25th and 75th ranges. Evaluation of the effect of VAS scores on the rates of patients undergoing VH was performed using logistic regression analysis. The categorical data was assessed by Chi-square test or Fisher's exact test was used for. A p-value of 0.05 was accepted as statistical significance.

A minimum of 100 participants was necessary to show a 10% difference at $\alpha = 0.05$ and $\beta = 0.20$ [16] (Research Sample Size Calculation Program). This difference of 10% was predicted both from a pilot study and from our clinical trials.

RESULTS

A total of 200 participants were categorized as general anesthesia (n=100) and spinal anesthesia (n = 100) (Fig. 1).

Table 1 summarizes the sociodemographic characteristics of the study participants. Age, body mass index (BMI), parity, indications, surgical time, pre and postoperative serum

Hb levels, blood loss, hospital stay, analgesic needs, levels of serum urea, alanine transaminase (ALT), aspartate aminotransferase (AST), and cholinesterase, living area, and educational level were comparable ($p > 0.05$).

Table 2 lists anxiety scores, pain intensity measurements, analgesic consumptions, and VAS scores of the study participants. Although significant differences were obtained in the postoperative pain levels between the groups at the 1st hour, 6th hour, 12th hour, and 18th hour, there was no differences in the 24th-hour measurements ($p > 0.05$).

Table 3 describes analgesic consumption and pain intensity based on SAI Index scores of the participants. The VAS scores at the 1st hour, 6th hour, 12th hour, and 18th hour were difference between the groups with SAI scores ≥ 45, but no difference was seen in the 24th-hour scores.

No difference was noted between the groups in surgical procedures performed concomitantly with VHs (oopherectomy 86.0% vs 81.0%, $p = 0.446$; anterior colporaphy 67.0% vs 72.0%, $p = 0.539$, posterior colporaphy 69.0% vs 63.0%, $p = 0.456$, paravaginal repair 7.0% vs 11.0%, $p = 0.522$, vaginal vault suspansion 29.0% vs 24.0%, $p = 0.522$, and anal sphincteroplasty 7.0% vs 4.0%, $p = 0.537$).

DISCUSSION

The pain severity scores in participants undergoing VH with general anesthesia were higher in the first 18 hours postoperatively compared to those undergoing VH with spinal anesthesia. It has been shown that preoperative anxiety scores before cesarean section are associated with higher postoperative pain severity and intensity in patients who delivered by cesarean section under general anesthesia compared with patients who delivered with spinal anesthesia, especially in the first 12 hours [6].

Although abdominal hysterectomy (AH) has been a widely used gynecologic surgery for many years, nowadays, VH, which has a shorter surgical time and is more cost-effective, is preferred especially in the presence of a small uterus, a history of vaginal delivery, and the absence of any adnexal pathology [2]. Therefore, the type of anesthesia used in postoperative pain management is important in increasing VH procedures.Although there is no clear consensus in the literature on the type of anesthesia that should be administered to patients who will undergo VH surgery, spinal anesthesia provides many advantages such as the continuation of spontaneous breathing during surgery, the patient’s awakening, and the preservation of protective reflexes such as coughing, as well as early mobilization, minimal lung complications, the continuation of analgesia, and a short hospital stay in the postoperative days [6].

Pinto et al. [10] stipulated that preoperative anxiety did not affect postoperative pain and analgesic consumption in their study, which included 185 patients who underwent AH for benign indications. On the contrary, another study [7] reported that preoperative anxiety scores were directly positively related to analgesic consumption after AH in which 60 patients were evaluated. Additionally, it has been claimed that preoperative anxiety increases analgesic consumption in the acute periodand is associated with pain even at 4 months postoperatively.

Kain et al. [5] found that although preoperative trait anxiety had no direct effect on postoperative pain in patients who underwent AH surgery, state anxiety was a direct positive predictor. Similarly, Aouad et al. [7] reported that only preoperative state anxiety affected postoperative pain band analgesic consumption in AH, whereas trait anxiety had no such effect.On the other hand, Carvalho et al. [17] claimed that there was no correlation between anxiety scores and postoperative pain scores in hysterectomy surgery. It has been observed that psychosocial education and support before hysterectomy reduces preoperative anxiety and therefore this condition reduces postoperative pain severity and intensity [9].

Abdominal hysterectomy performed with a Pfannenstiel's incision in the abdomen may result in higher postoperative pain scores than VH [5, 7, 18]. Especially in open abdominal surgeries, the prolongation of surgical time causes extended pain stimulation and this causes an increase in postoperative pain scores [19]. Postoperative pain scores are lower in VH because it has a shorter surgical time and is less invasive than AH. Unfortunately, we did not compare the severity and intensity of preoperative anxiety and postoperative pain between AH and VH in our study.

The conflicting results between preoperative anxiety and postoperative pain severity and intensity in the literature may be due to the inhomogeneity of the groups in the studies, differences in surgical procedures, non-standardized anesthesia methods, different anesthetic agents, non-standardized pain scale scales, and insufficient sample sizes [5, 7, 10]. The possible confounding factors such as age, BMI, parity, surgical time, and educational level were similar. Additionally, VH was performed by specialist physicians experienced in surgical interventions and anesthesia procedures.

In experimental pain models, it has been observed that invasive procedures such as intravenous catheter insertion before surgery increase the amount and duration of postoperative analgesic consumption [20, 21]. This situation was not evaluated in our study.

Control of postoperative pain is very important, especially in the first 24 hours after surgical interventions, because postoperative pain is more intense and analgesic consumption is at a maximum level in this period [6, 22]. If pain control cannot be achieved within this period, the first mobilization period of the patient will be later in the postoperative period, which will increase the susceptibility to thromboembolic events and will also create a risk factor for chronic pelvic pain [7, 8].

There are no data about postoperative pain severity and intensity, and also analgesic requirements after VH procedures. Generally, the data in the literature belong to cesarean section and AH procedures as mentioned above. To our knowledge, our study is the first in this topic.

The limitation was the use of a subjective method instead of an objective method in the assessment of anxiety and pain intensity.

CONCLUSIONS

In conclusion, although participants undergoing VH with spinal anesthesia (Preoperative SAI score > 45) had lower pain intensity scores in the first 18 hours compared to those undergoing VH with general anesthesia, their postoperative analgesic requirements were similar. Preoperative anxiety should be alleviated with psychiatric support to reduce the severity and intensity of postoperative pain. Further randomized controlled studies with larger participant numbers are necessary to support our findings.

Article information and declarations

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Conflict of interest

The authors declared that they have no conflict of interest.

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Table 1. Sociodemographic characteristics of the study participants.

<table>
<tr><th colspan="2"></th><th>Group 1
(n = 100)</th><th>Group 2
(n = 100)</th><th>p value</th></tr>
<tr><td colspan="2">Age [years]</td><td>56.32 ± 7.20</td><td>57.44 ± 6.28</td><td>0.174</td></tr>
<tr><td colspan="2">BMI [kg/m^{2]}</td><td>25.63 ± 2.29</td><td>25.94 ± 2.51</td><td>0.308</td></tr>
<tr><td colspan="2">Parity</td><td>3.0 (2.0–4.0)</td><td>3.0 (2.0–3.0)</td><td>0.374</td></tr>
<tr><td rowspan="3">Indications [(%]</td><td>Meno-metroragia resistant to medical treatment</td><td>55</td><td>49%</td><td rowspan="3">0.548</td></tr>
<tr><td>Cronic pelvic pain</td><td>8</td><td>12%</td></tr>
<tr><td>Uterovaginal prolapse</td><td>37</td><td>39%</td></tr>
<tr><td colspan="2">Duration of operation [min]</td><td>73.40 ± 10.16</td><td>71.36 ± 11.02</td><td>0.189</td></tr>
<tr><td colspan="2">Hb (preoperative) [gr/L]</td><td>11.79 ± 1.86</td><td>12.04 ± 1.76</td><td>0.346</td></tr>
<tr><td colspan="2">Hb (postoperative) [gr/L]</td><td>10.29 ± 1.82</td><td>10.54 ± 1.76</td><td>0.315</td></tr>
<tr><td colspan="2">Blood loss [mL]</td><td>232.68 ± 83.09</td><td>216.61 ± 58.27</td><td>0.115</td></tr>
</table>

Length of hospital stay [days]	2.69 ± 0.77	2.52 ± 0.69	0.103
Analgesic needs [days]	3.88 ± 1.11	3.63 ± 1.07	0.106
Living area [%]			0.369
Village	11	17	
Town	14	10	
City	75	73	
Educational level [%]			0.176
Primary school	55	54	
Secondary school	22	32	
University	23	14	

BMI — body mass index; Hb — hemoglobin

Table 2. Anxiety scores, pain intensity measurements, analgesic consumptions, and visual analog scale (VAS) scores of the study participants

	Group 1 (n = 100)	**Group 2 (n = 100)**	**Odds ratio**	**95% confidence interval**	**p value**
MSAI score	40.03 ± 8.82	38.57 ± 9.14	–	–	0.253
MTAI score	43.97 ± 7.11	42.89 ± 7.21	–	–	0.149
SAS score	31.47 ± 6.77	29.96 ± 7.03	–	–	0.125
The dosage of diclofenac consumption [mg]	108.76 ± 51.54	117.74 ± 44.29	–	–	0.186
The dosage of pethidine consumption [mg]	23.01 ± 15.12	20.51 ± 15.61	–	–	0.619
SAI score ≥ 45 [%]	33	31	–	–	0.416
VAS					
1. hour	4.12 ± 1.80	3.16 ± 1.94	0.766	0.658–0.895	< 0.001*
6. hour	3.78 ± 1.96	2.82 ± 1.54	0.707	0.592–0.844	< 0.001*
12. hour	3.58 ± 2.05	2.54 ± 1.65	0.736	0.628–0.862	< 0.001*
18. hour	3.02 ± 1.56	2.47 ± 1.59	0.798	0.662–0.962	0.015*
24. hour	2.19 ± 1.07	2.32 ± 1.43	1.191	0.933–1.521	0.361
MSAI score	40.03 ± 8.82	38.57 ± 9.14	–	–	0.252

*Statistically significant; MSAI — Mean State Anxiety Inventory; MTAI — Mean Trait Anxiety Inventory; SAS — Somato-sensory amplification Scale; SAI — State Anxiety Inventory

Table 3. Analgesic consumption and pain intensity of the participants with and without State Anxiety Index scores of ≥ 45

	SAI Score < 45			**SAI Score ≥ 45**		
	General Anesthesia (Group 1) (n = 68)	**Spinal Anesthesia (Group 2) (n = 70)**	**p value**	**General Anesthesia (Group 1) (n = 32)**	**Spinal Anesthesia (Group 2) (n = 30)**	**p value**
The dosage of diclofenac consumption [mg]	118.02 ± 43.58	110.37 ± 43.72	0.304	117.18 ± 46.42	105.01 ± 67.07	0.408
The dosage of pethidine consumption [mg]	22.15 ± 16.75	16.92 ± 11.88	0.375	28.14 ± 12.02	25.01 ± 11.47	0.743
VAS						
1. hour	4.02 ± 1.81	3.63 ± 2.15	0.162	4.37 ± 1.81	3.05 ± 2.14	< 0.001*
6. hour	3.65 ± 2.02	3.18 ± 1.46	0.102	4.14 ± 1.78	2.79 ± 1.37	< 0.001*
12. hour	3.61 ± 2.04	3.06 ± 1.86	0.217	3.58 ± 2.08	2.48 ± 1.82	< 0.001*
18. hour	3.02 ± 1.47	2.83 ± 1.38	0.358	2.96 ± 1.72	2.02 ± 1.03	< 0.001*
24. hour	2.32 ± 1.89	2.07 ± 1.06	0.413	2.16 ± 1.94	1.88 ± 0.94	0.218

*Statistically significant; SAI — State Anxiety Inventory; VAS — Visual analog scale