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ORIGINAL RESEARCH

Dysmenorrhea is associated with a higher incidence of pain after diagnostic hysteroscopy or treatment

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Abstract

Purpose: The purpose of this study was to evaluate whether dysmenorrhea could predict the occurrence of pain perceived after diagnostic hysteroscopy or treatment. **Methods**: 58 women undergoing diagnostic hysteroscopy or treatment were divided into two groups: patients with dysmenorrhea (Group A) and patients without dysmenorrhea (Group B). Patients underwent routine monitoring after the administration of 7.5 μg of sufentanil by intravenous injection. Propofol infusion was initiated by using a target-controlled infusion pump with concentration initially set at 2 μg/mL in order to maintain a bispectral index monitor (BIS) of 60 to 80. Remifentanil was administered as continuous infusion at 0.05 μg/kg per minute. The total dose of propofol and remifentanil utilized during the procedure was calculated. **Results**: There were no differences in the characteristics of patients in either group. Multivariate analysis revealed that the presence of dysmenorrhea was significantly correlated with pain ($P < 0.05$) following the procedure. **Conclusion**: Dysmenorrhea is associated with a higher incidence of pain after diagnostic hysteroscopy.

Keywords

Dysmenorrhea; Diagnostic hysteroscopy; Pain

1. Introduction

Hysteroscopy is frequently used as an outpatient procedure for the treatment of intrauterine and endometrial disorders such as endometrial polyps [1]. Often patients will poorly tolerate the painful procedure, although the duration of most hysteroscopies are relatively short and the procedure is minimally invasive [2]. For this reason, alternative solutionssuch as normal saline is substituted for carbon dioxide (CO_2), a small-caliber hysteroscope is used and an analgesic or local anesthestic is administered [3–8]. However, the incidence and intensity of pain perceived after hysteroscopy or treatment remains elevated. Studies have found that menopause and pathophysiological changes of the cervix such as scarring are responsible for pain after diagnostic hysteroscopy [6–11]. However, there are no studies supporting the correlation between the pain after hysteroscopy and the history of dysmenorrhea preprocedure. Our study was conducted to evaluate whether a correlation exists between pain perceived after hysteroscopy and the previous history of dysmenorrhea.

2. Methods

2.1 General information

This study was approved by the Ethics Committee of Wenzhou Medical University (clinical trial number: ChiCTR2000036066; Registry URL: YJLCYJ-2020-051). This manuscript adheres to the applicable Equator guidelines. A total of 58 women ASA IandII aged 18 to 60 years old, 3-7 days following the last day of menstruation and were subjected to diagnostic hysteroscopy or treatment. Patients were divided into two groups: patients with dysmenorrhea (Group A) and patients without dysmenorrhea (Group B). Informed consent was obtained from all study subjects and the Institutional Review Board approval was obtained for data collection. In this study, diagnostic hysteroscopy was used to investigate abnormal uterine bleeding, endometrial thickening, infertility, fibroids, polyps, recurring miscarriage and uterine malformation. Women with a history of previous diagnostic hysteroscopy procedures were excluded from the study. Patients with an ongoing pregnancy, cervical carcinoma, pelvic inflammatory disease, excessive uterine bleeding and the need for performing an endometrial biopsy during the procedure were excluded from the study.

2.2 Anesthesia process

All patients were monitored using electrocardiography (ECG), noninvasive blood pressure cuff (NBP) and peripheral arterial blood oxygen saturation (SpO2). A non-rebreather oxygen mask was utilized. After obtaining baseline measurements, 7.5 μg of sufentanil was administered by intravenous injection followed by a propofol infusion using a target-controlled infu-

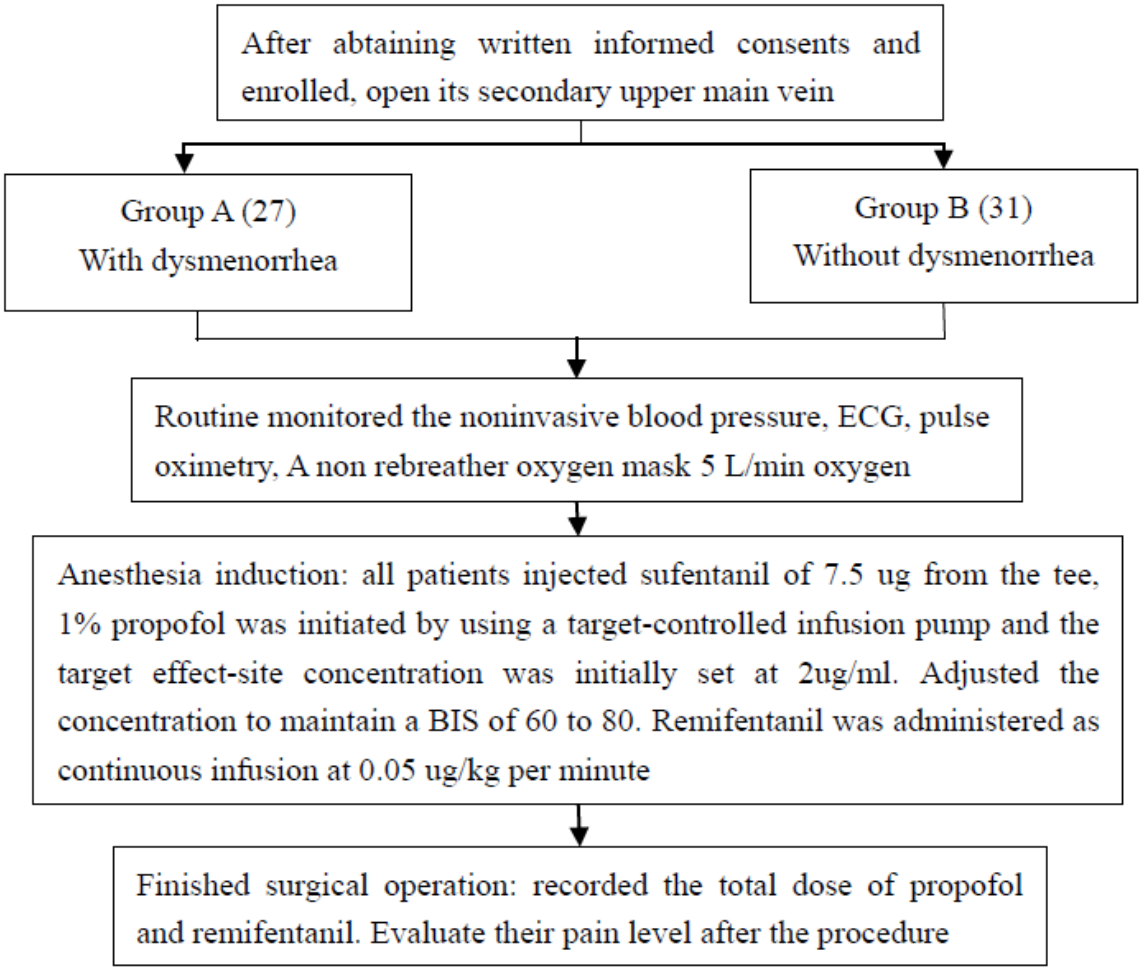

FIGURE 1. Study flow diagram.

sion pump (Master TCI, Fresenius Vial SA, Berzins, France). The target effect-site concentration was initially set at 2 μg/mL. Degrees of sedation were evaluated by using a bispectral index monitor (BIS XP, A-2000, Aspect Medical Systems, Newton, MA). The target concentration of propofol was increased by 0.5 μg/mL if the BIS went above 80 and decreased by 0.5 μg/mL when the BIS decreased below 60 to maintain a BIS of 60 to 80. Concurrently remifentanil was administered as a continuous infusion at 0.05 μg/kg per minute. The infusion rate was increased if signs of insufficient analgesia (facial grimace, movement, a sudden increase in heart rate [HR] or BP, complaint of discomfort or pain) were present or decreased with signs of excessive analgesia (respiratory depression, hypotension, or bradycardia) (Fig. 1).

Adverse hemodynamic events were present when the systolic BP (SBP) was higher than 150 mmHg (hypertension), less than 90 mmHg (hypotension), HR greater than 110 bpm (tachycardia), HR less than 45 bpm (bradycardia); respiratory depression with a SpO2 of 90% or lower for more than 30 seconds or a respiratory rate (RR) less than 8 breaths/min for more than one minute. These adverse events were treated by titration of the propofol and opioid infusion and if necessary ephedrine, atropine, or assisted ventilation with jaw thrust.

2.3 Curative effect observation and recovery

After all the hysteroscopic procedures were completed, the anesthesiologist calculated the total dose of propofol and remifentanil utilized. When patients were transferred to post-anesthesia care unit (PACU), a PACU nurse evaluated the patient by using a modified Aldrete scoring system. The criterion used for patient discharge was the achievement of a modified Aldrete score of 9.

2.4 Numerical rating scale

Fifteen minutes after the procedure, a PACU nurse, who was unaware of the amount of opioid given to each patient, assisted patients to evaluate their pain level by using a numerical rating scale (VAS: 0 = none, 10 = most severe, 1-3 mild pain, 4-6 moderate pain, 7-10 severe pain) [12].

2.5 Statistical analysis

Continuous values were expressed by mean ± SD and compared using Student's *t*-test. Categorical values were described by count and proportions and compared by the $\chi 2$ test. All calculations were carried out with SPSS with the statistical significance level at 0.05. Multivariate logistic was utilized used to evaluate the relationship between dysmenorrhea and

TABLE 1. Demographic characteristics of the two groups.

	Group A	Group B	*P*
Patients (n)	27	31	
Age (yrs)	36.17 ± 8.44	34.79 ± 8.41	0.48
Weight (kg)	56.16 ± 7.69	54.68 ± 7.59	0.39
Height (cm)	158.24 ± 5.14	159.23± 5.00	0.39
BMI	22.43 ± 2.72	21.59 ± 2.81	0.19
Time of operation	12.88 ± 5.85	12.41 ± 5.48	0.71
Propofol (mg)	190.24 ± 48.65	184.25 ± 57.45	0.64
Remifentanil (ug)	53.84 ± 25.68	57.77 ± 27.66	0.53

Values are means ± SD.

TABLE 2. Comparison of different operation methods in two groups.

	Uterine polyp removal	Uterine adhesion lysis	Hysteroscopy
Group A (n = 27)	12	4	11
Group B (n = 31)	13	7	11

Compared different operation methods in two groups, $P > 0.05$.

the incidence of pain.

3. Results

3.1 Characteristic between patients with or without dysmenorrhea

As shown in Table 1, there was no statistical significance in age, weight, height, length of the procedure and the total amount of propofol and remifentanil given. The operating methods used in the two groups were not statistically significant, $P = 0.75$ (Table 2).

3.2 Incidence of pain after operation between patients with or without dysmenorrhea

The incidence of pain after the procedure in patients with dysmenorrhea was higher than that of patients without dysmenorrhea (77.8% vs. 45.2%, $P = 0.011$) (Table 3). A comparison of pain severity in two groups was significant ($P = 0.038$) (Table 4). Multiple logistic regression analysis revealed that dysmenorrhea was an independent predictor of pain in patients with diagnostic hysteroscopy after adjusting for age, BMI, length of operation and doses of propofol and sufentanil (OR: 3.28, 95% CI = 1.14-9.42, $P = 0.027$).

TABLE 3. Comparison of incidence of pain after operation in two groups.

	Group A (n = 27)	Group B (n = 31)
NRS = 0	6	17
NRS > 0	21	14

Compared the incidence of pain after operation in two groups, $P < 0.05$.

TABLE 4. Comparison of pain severity after operation in two groups.

NRS	Group A (n = 27)	Group B (n = 31)
0	6	17
1-3	11	10
4-6	8	4
7-10	2	0

Compared the pain severity after operation in two groups, $P < 0.05$.

4. Discussion

The results from the present study demonstrate that pain perceived after hysteroscopy or treatment is more common in patients with dysmenorrhea with the relative percentage being around 80%. NRS score in patients with dysmenorrhea after hysteroscopy or treatment is significantly higher than in those patients with no dysmenorrhea. Our results indicated that dysmenorrhea increased the intensity of pain perceived after the hysteroscopy.

Hysteroscopy or treatment is a frequently performed outpatient procedure that is minimally invasive and is considered to be the gold standard for the treatment of intrauterine pathology. It has been demonstrated to cause pain, discomfort and anxiety. Utilization of anesthetic approaches, such as the paracervical block, intracervical block and transcervical block have been attempted to mitigate these issues [13, 14]. However, various adverse effects of an anesthetic block have mitigated their use during many hysteroscopic procedures.

Remifentanil is an esterase-metabolized opioid analgesic widely used in the perioperative period because of its ultra-short half-life (three min) [15] which tends to make it better suited for painful medical procedures [18]. In addition, remifentanil produces the desired analgesic result instantly

during anesthesia and decreases respiratory depression postoperatively, irrespective of the duration of the infusion. Remifentanil was shown to have a greater analgesic effect than recommended doses of alfentanil during breast biopsy under monitored anesthesia [16]. In that study, the rapidity of postoperative recovery was not significantly different between the two groups. The study of monitored anesthesia care has shown that remifentanil infusion at 0.05 μg/kg per minute provided adequate analgesia (reference). In our study, we chose this infusion mode (0.05 μg/kg per minute) [19] and found that total doses of remifentanil was not significantly differente between the 2 groups. Although remifentanil was believed to be associated with increased postoperative pain intensity and more analgesic requirements, we did not observe this phenomenon in our study. Pain perceived after diagnostic hysteroscopy has been studied in numerous clinical investigations. A study from de Carvalho Schettini found that after multivariate analysis, menopause, nulliparity and the positioning of the speculum are all factors responsible for eliciting pain during diagnostic hysteroscopy [17]. In the present study, we focused on the characteristics of dysmenorrhea as the cause of pain. We found that dysmenorrhea significantly increased the intensity and frequency of pain after diagnostic hysteroscopy. The underlying mechanism of why dysmenorrhea contributes to the pain intensity was not investigated in this study.

In summary, this study demonstrates that dysmenorrhea may predict the intensity and incidence of pain after diagnostic hysteroscopy or treatment.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethics Committee of Wenzhou Medical University (clinical trial number: ChiCTR2000036066; Registry URL: YJLCYJ-2020-051).

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CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

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