

Does the Temperature of the Distension Medium Affect Pain Perception in Patients undergoing Ambulatory Hysteroscopy?

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ABSTRACT

Introduction: Ambulatory Hysteroscopy (AH) has become a valuable tool for modern gynaecologists. However, its success largely depends on the patient's perception of pain. Advances such as the vaginoscopic technique and the use of smaller instruments have significantly reduced discomfort. Additionally, the use of warm saline as the distension medium is thought to further alleviate pain.

Aim: To compare the degree of pain perceived by patients undergoing office hysteroscopy using normal saline as a distension medium at room temperature with that using normal saline warmed to 37.5°C.

Materials and Methods: A prospective interventional study was conducted at the Department of Obstetrics and Gynaecology, Dr. D. Y. Patil Medical College Hospital and Research Centre, Pimpri, Pune, Maharashtra, India from August 2022 to August 2024. AH was performed on 60 patients using the vaginoscopic technique. Patients were randomly classified into two groups of 30 each. Group A used room temperature normal saline as a

distension medium, while Group B used normal saline warmed to 37.5°C. After 15 minutes of the procedure, patients from both groups were asked to rate their level of discomfort throughout the procedure on a 10-cm Visual Analogue Scale (VAS), and the pain scores were compared. The Chi-square test was utilised to determine the association between two independent categorical variables.

Results: The age of the women ranged from 34 to 53 years, with a mean age of 41.77±6.28 years. Among the 60 patients, 40 (66.67%) were premenopausal, and 20 (33.33%) were menopausal. The most common indication was Abnormal Uterine Bleeding (AUB) in 17 (28.3%) patients. Mild pain (0-3) was reported by 15 women in Group A and 24 women in Group B (p-value=0.041). Moderate pain was experienced by 10 women in Group A and 6 in Group B. Severe pain was reported by 5 patients in Group A and none in Group B.

Conclusion: The use of warm saline in AH is a simple, easy and cost-effective method for reducing pain and optimising clinical outcomes.

Keywords: Outpatient hysteroscopy, Visual analogue scale score, Warm saline

INTRODUCTION

Modern hysteroscopy has been an ideal diagnostic tool for gynaecologists to assess, diagnose and treat benign intrauterine diseases in the same setting for more than a decade. In the earlier days, hysteroscopy was performed in the operating theatre setting. However, technical innovations have relocated hysteroscopy to the office or ambulatory setting. The invention of small-diameter hysteroscopes with continuous flow features and an operating sheath that allows mechanical instruments to be introduced is primarily responsible for the rise of this futuristic technique of AH [1,2]. In 1995, Prof. Bettocchi devised a vaginoscopic approach that avoided the need for a speculum and vulsellum. The hysteroscope with its Bettocchi sheath could be easily navigated through the external os, cervical canal, and into the uterine cavity [3]. Even though office hysteroscopy has established itself as a standard treatment, patient pain and discomfort during the procedure remain the primary obstacles to its widespread usage. This can deter many gynaecologists from performing this outpatient procedure due to the pain associated with it, which may prevent a successful procedure with the patient awake [2].

To reduce pain during hysteroscopy, different techniques and approaches have been used over the past years. These include the vaginoscopic technique, small-sized instruments and the use of liquid distension mediums. The pioneering work done by Prof. Stefano Bettocchi, who is also known as the father of modern hysteroscopy, was a breakthrough innovation in decreasing pain in AH [3]. It has been postulated that the temperature of normal saline can play an important role in decreasing pain [4,5]. Hence, present

study explores the effectiveness of warm saline versus cold saline in reducing pain during AH.

MATERIALS AND METHODS

A prospective interventional study was conducted at the Department of Obstetrics and Gynaecology, Dr. D. Y. Patil Medical College Hospital and Research Centre, Pimpri, Pune, Maharashtra, India from August 2022 to August 2024. Prior clearance was obtained from the Institutional Ethics Committee (IESC/PGS/2022/127). Written informed consent was obtained from the patients, who were educated and counselled about the procedure, its process, indications, complications and prognosis.

Inclusion criteria: Women with complaints of AUB, infertility, recurrent abortions, abnormal ultrasonography or hysterosalpingography findings, missed intrauterine device, women requiring targeted endometrial biopsies were included in the study.

Exclusion criteria: Women with complaints of significant bleeding, history of cardiovascular disease, acute pelvic inflammatory disease, suspicion of pregnancy, recent uterine perforation, any medical or surgical illness (e.g., hypertension, uncontrolled diabetes), unmarried females and virgins, history of treatment for anxiety or any psychiatric disorders were excluded from the study.

A total of 75 patients were referred from the outpatient department, out of which 15 were excluded for not accepting the hysteroscopic procedure without anaesthesia. The 60 patients who were enrolled for AH were asked to pick an envelope from a box containing 60 envelopes labelled "warm" and "cold" saline, and they were divided into two groups of 30 each. Group A used cold saline at room temperature (25°C) as the distension medium, while Group B used

saline warmed to 37.5°C as the distension medium. The parameters studied included demographic characteristics, indications for AH, and the VAS score.

Study Procedure

A rigid 2.9 mm scope with a 30° Hopkins type II forward oblique lens and a 4.3 mm outer sheath diameter- manufactured by Karl Storz, Tuttlingen, Germany- was used for the procedure. Normal saline was used as a distending medium, with the pressure adjusted between 60 and 100 mmHg. No premedication or cervical preparation was administered to the patient during the preoperative period.

It was ensured that the waiting time was minimal. Once everything was ready, the patient was positioned in the lithotomy position. Hysteroscopy was carried out using a vaginoscopic technique without the administration of any premedication. A hysteroscopic endomat was utilised to maintain pressure equivalent to intrauterine pressure with normal saline as the distension medium. The sheaths and the 2.9 mm Bettocchi scope were employed. When pathology was detected, it was assessed and treated appropriately depending on its type. To manage vasovagal attacks, backup anaesthesia support and emergency drugs such as injectable atropine were kept on hand.

After 15 minutes, patients from both groups were asked to rate their level of discomfort throughout the procedure on a 10-cm VAS: 0-3 cm= mild discomfort, 4-7 cm= moderate pain, and 8-10 cm= severe or unbearable pain. The scores from both groups were then compared [6].

After the treatment, the patient was monitored for 30 minutes to check for any problems or pain and was subsequently discharged.

STATISTICAL ANALYSIS

The study encompassed both continuous and categorical variables. Categorical variables were expressed as numbers (%) while age and Body Mass Index (BMI) were summarised as means and standard deviations (SD). The Chi-square test was utilised to determine the association between two independent categorical variables. A confidence level of 95% was considered for all statistical tests. Data analysis was conducted using Statistical Package for the Social Sciences (SPSS) version 20.0 and R Studio statistical software.

RESULTS

The age of the women ranged from 34 to 53 years, with a mean age of 41.77±6.28 years. The BMI of the women ranged from 24 to 31, with a mean BMI of 27.87±2.65. Among the 60 patients, 40 (66.67%) were premenopausal, and 20 (33.33%) were menopausal. Out of the 40 premenopausal patients, 8 (13.33%) were nulliparous, while 32 (53.33%) were parous.

The most common indication was AUB at 28.3%, followed by recurrent pregnancy loss (21.7%), misplaced Intrauterine Contraceptive Device (IUCD) (20%) [Table/Fig-1].

Indication	n (%)
AUB	17 (28.3)
Recurrent pregnancy loss	13 (21.7)
Misplaced Intrauterine Contraceptive Device (IUCD)	12 (20)
Infertility	10 (16.7)
Postmenopausal bleeding	8 (13.3)
Total	60 (100)

[Table/Fig-1]: Indications for Ambulatory Hysteroscopy (AH).

Mild pain (0-3) was reported by 50% of the women in Group A (cold saline) and 80% of the women in Group B (warm saline) (p=0.041). Moderate pain was experienced by 33.3% in Group A and 20% in Group B. Severe pain was reported by 16.7% in Group A, while none in Group B reported severe pain [Table/Fig-2].

VAS score	Medium used		Total	p-value
	Group A (cold saline) n (%)	Group B (warm saline) n (%)		
Mild (0-3)	15 (50)	24 (80)	39	0.041*
Moderate (4-7)	10 (33.3)	6 (20)	16	
Severe (8-10)	5 (16.7)	0	5	
	30 (100)	30 (100)	60	

[Table/Fig-2]: Visual Analogue Scale (VAS) Score.

*Chi-square test was used

DISCUSSION

The AH is a boon for gynaecologists of this generation. However, a successful AH is dependent on the patient's perception of pain. The use of warm saline as a distension medium has been assumed to reduce pain. Present study investigated the effectiveness of this simple intervention in reducing pain during AH. Present study observed a higher number of parous women (53.33%) compared to menopausal women (33.33%). Similar to present study findings, a study conducted by Telang M et al., included 82.6% parous women and 17.3% menopausal women [7]. The study by Török P and Major T included 70 cases, with 57% parous, 42% nulligravida, and 28% menopausal women [8]. Evangelista A et al., included 64 cases, with 75% parous and 25% menopausal women, which correlated well with present study [9].

In present study, AUB was the most common indication, seen in 28.3% of patients. Telang M et al., conducted a study of 3,000 cases (diagnostic and operative) with indications that included AUB, postmenopausal bleeding and infertility [7]. A study conducted by Zayed SM et al., evaluated 254 women, with the most common indication for referral being infertility (53.15%), followed by 19% with AUB [10].

In a recent randomised controlled trial conducted by Gulucu S and Cakmak B involving 100 perimenopausal women experiencing AUB who were undergoing diagnostic office hysteroscopy, the study compared room temperature (25°C) versus body temperature (37°C) normal saline as a distension medium [4]. In comparison to the unheated fluid group, they found that employing warm distension fluid significantly lowered pain levels during the procedure. This study correlates with present study findings, where women in group B (warm saline) reported lower pain scores compared to group A (cold saline).

Nair VG et al., similar to present study, discovered that the warm saline group experienced a significant reduction in VAS pain scores during and after operative office hysteroscopy compared to the room temperature saline group [5]. Furthermore, they validated present study results by indicating a noteworthy enhancement in patient satisfaction within the heated saline cohort.

When normal saline is used as a distension medium, the temperature of the liquid may influence the perception of pain. At lower temperatures, the endometrium may provoke pain due to increased uterine contractility [2]. However, present study has shown that using saline warmed to 37.5°C reduces pain perception. This could be due to warm fluid causing less uterine contractility, promoting relaxation of the uterine muscles, and increasing blood flow. Therefore, the use of warm saline during AH without anaesthesia or analgesia reduces pain, making the procedure more tolerable and allowing the patient to return to her routine much quicker.

However, the use of miniature instruments, the vaginoscopic technique, and the surgeon's expertise are protective factors against pain during hysteroscopy. These maneuvers and techniques reduce pain during AH and improve patient satisfaction and compliance. The correlation between pain and poor execution of the procedure cannot be underestimated. As noted by Gambadauro P and Magos A, the techniques for pain reduction during hysteroscopy require

reduced invasiveness and a refined approach rather than relying on “metal” instruments in the vagina [11]. As a result, AH should be adopted and taught to practicing gynaecologists.

However, further trials and studies involving a larger population are required to prove the effectiveness of warm saline over room-temperature saline in AH. Accredited training to perform hysteroscopy in awake patients is essential. Therefore, this is a tool for the modern gynaecologist that requires the 3Ts: Technique, Technology and Training.

Limitation(s)

The smaller sample size was the main limitation of the study. The relationship or association of the VAS score with parity, menopausal status and the presence of cervical pathology was not established.

CONCLUSION(S)

The use of warm saline in AH is a simple method that, along with vaginoscopic techniques and the use of small-calibre instruments, helps reduce pain and optimise clinical outcomes. With appropriate surgical expertise and the implementation of these methods to minimise pain, AH becomes an effective tool for gynaecologists in the diagnosis and treatment of intrauterine pathologies.

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