Original Article

Effect of Visualisation of Instrument Sets on Pain Experienced During Hysterosalpingography

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ABSTRACT

Objectives: Tubal factor infertility accounts for 30%–40% of all cases of female infertility. Hysterosalpingography (HSG) is used to screen for tubal occlusion. Pain felt during HSG might negatively affect patient cooperation, thereby limiting the use of HSG.This study aimed to evaluate the effect of visualization of instrument sets used in HSG on the pain perceived.
Patients and Methods: This is a prospective study included infertile women scheduled for HSG. The patients were randomised into 2 groups; group (I) women underwent HSG after education and counseling using visualisation of HSG instrument sets and group (II) women underwent HSG after receiving the usual care (verbal explanation of the procedure).
Results: The study included 56 patients in group (I) and 50 patients in group (II).Patients who received counseling before HSG aided by visualization of the instrument sets used experienced less pain than patients who received usual care. The VAS score means were 1.1±0.5 in group (I) and 6.8±1.45 in group (II) (p=0.001). In group (I) a significant decrease in pain scores was reported after HSG compared to anticipated pain before the procedure (p=<0.001).
Conclusion: Visualization of instrument sets used in HSG potentially reduces pain perception and positively affects patients' compliance.

Key Words: Counseling, hysterosalpingography, infertility, instruments, pain.

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INTRODUCTION

Infertility is failure to achieve pregnancy after 1 year or more of regular unprotected sexual intercourse[1]. Tubal factor infertility accounts for 30%–40% of all cases of female infertility[2,3]. The National Institute for Health and Care Excellence (NICE) guidelines recommend hysterosalpingography (HSG) to screen for tubal occlusion[4].

Pain is a major disadvantage of HSG. Moderate to severe pain was reported after HSG in 85% of cases[5]. Maximum pain was felt with dye instillation, and pain decreased within 5–10 minutes. After HSG, patients describe their experience as uncomfortable[6]. Pain felt during HSG is relevant, as it might negatively affect patient cooperation, thereby limiting the use of HSG as a diagnostic tool in infertility work-up[7].

The release of local prostaglandins due to cervical traction, uterine cavity stretching, and peritoneal irritation by the contrast agent initiates uterine cramps and consequently causes pain. Pharmacological and technical strategies for improving the pain experience have been presented in previous studies, such as the use of paracervical or intrauterine lidocaine[8,9,10], different analgesics[11,12], a metal cannula versus balloon catheter[13], and water-based compared to oil-based contrast media[14].

In addition to the anatomical and physical factors mentioned above, anxiety caused by uncertainty and unfamiliarity during invasive gynecological procedures plays a role in pain perception. Anxiety activates the adrenergic system, where epinephrine release produces hyperalgesia[5].

Anxiety and stress experienced by patients waiting for HSG were significantly higher than those of women awaiting mammography or abdominal ultrasonography[15]. This is related to the level of invasiveness before and during the examination[16]. Increased anticipated pain is associated with increased perceived pain with intrauterine device (IUD) insertion and HSG[5,17].

Non-pharmacological methods, such as guided imagery, music therapy, hypnosis, and distraction can improve pain experience during painful procedures[18,19]. Education and counseling have been found to be effective in reducing anxiety and pain reduction[5]. Proper counseling and education before HSG could enhance patient comfort

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and prepare patients psychologically. This consequently improves the patients' experience and reduces pain perception when undergoing HSG[20].

This study aimed to evaluate the effect of visualization of instrument sets used in HSG in decreasing pain perceived during HSG. In this study, we postulate that this approach can normalize patients' expectations, improve their satisfaction, and positively affect their compliance when HSG is performed.

PATIENTS AND METHODS

This prospective study was conducted in the obstetrics and gynecology departments of Galaa Military Hospital (Cairo, Egypt) and Al-Khafji National Hospital (Al-Khafji, Saudi Arabia) from March 2017 to November 2020. Infertile patients scheduled for HSG as part of the infertility work-up were included in the study. Informed consent was obtained from all women before enrollment in the study.The study was approved by the local ethics committees and was performed in accordance with the Declaration of Helsinki.

At the initial visit, demographic characteristics and medical and reproductive histories were recorded. General, abdominal, and pelvic examinations were also performed. Baseline transvaginal ultrasound (TVS), hormonal profile (Day-2: follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin, and thyroid stimulating hormone (TSH)), and semen analysis results were recorded.

The HSG was performed within day-5 to day-10 of the menstrual cycle, and participants were allocated into groups (I) and (II) using computer-generated random numbers. The patients in group (I) underwent HSG after education and counseling, aided by visualization of the HSG instrument sets. The patients in group (II) underwent HSG after receiving the usual care (defining the purpose of HSG, its benefits, and verbal explanation of the procedure). Counseling and HSG were performed by a gynecologist managing the infertility condition in all patients to avoid interpersonal bias.

In group (I), education and counseling sessions began by defining the purpose of HSG and its benefits in infertility treatment. To normalize women's expectations and alleviate unfamiliarity, the steps of the procedure were explained using instruments. Their potential painfulness is as follows: first, the smooth edges of the Cusco speculum and the actual size, insertion, and application of the lubricating gel were demonstrated. The patient was allowed to visualize the non-traumatic serrations of the vulsellum that were used to grasp the cervix. Regarding Rubin's cannula, patient was shown that only the small fenestrated end of the cannula (the tip) will be inserted in the cervical canal and not the whole uterine cavity. Lastly, the patient was reassured by the colorless and water-like characteristics of the dye to be injected.

After counseling both groups, HSG was performed. In the dorsolithotomy position, a Cusco's speculum was applied, and the vagina was cleansed with an antiseptic solution (povidone–iodine). The cervix was fixed with vulsellum, and Rubin's cannula was applied through which 10 ml of water-soluble contrast medium (Echovist) at room temperature was injected. Radiographic images of the uterus and fallopian tubes were obtained before and after the dye injection. The patients were not premedicated with anti-inflammatory drugs, analgesics, or local anesthetics. Prophylactic doxycycline (100 mg orally twice daily) was prescribed.

Before HSG, patients in both groups were asked to state their expected pain severity using a visual analog scale (VAS). Five minutes after the procedure, the severity of perceived pain was evaluated using VAS. Pain severity was presented as a point marked by the patient along a continuous line from 0 to 10 (0 = no pain to 10 = excruciating pain). The VAS score was determined by the distance measured in centimeters (to the nearest 0.1 cm) of the marked point from the 0 edge.

Statistical analyses were performed using SPSS software (version 21.0; IBM Corp, Armonk, NY, USA). Numerical parametric variables are described as means and standard deviations. Categorical variables were described as numbers and percentages. An independent t-test was used to compare quantitative variables. Differences between two independent groups were analyzed using paired Student's t-test. For parametric data (SD < 50% mean), the significance level was set at 0.05.

RESULTS

A total of 120 women were randomly allocated to groups (I) and (II), with 60 patients in each study arm. The HSG was not performed in 14 patients due to vaginismus, leakage of dye from the cervix, or cervical stenosis. Thus, the study was completed with 106 women (56 in group (I) and 50 in group (II).

No significant differences in age, body mass index (BMI), or type of infertility between the two study groups were seen (Table 1). The mean age of participants in group (I) was 28.6 ± 6.4 years and 29 ± 7 years in group (II). The BMI with an average of 23.8 ± 3.6 kg/m^2 and 23.7 ± 3.5 kg/m^2 was for group (I) and (II), respectively. Thirty-two patients had primary infertility in group (I) compared to 31 patients in group (II). There were 24 patients with secondary infertility in group (I) and 19 patients in group (II).

Table 1: The demographic characteristics of the two study groups

	Group (I) (n=56)	Group (II) (n=50)	*P value*
Age (years)	28.6±6.4	29±7	0.371
BMI (Kg/m^2)	23.8±3.6	23.7±3.5	0.947
Primary infertility	32 (57.2%)	31(62%)	0.322
Secondary infertility	24(42.8%)	19(38%)	0.346

Data are presented as mean ± standard deviation or numbers (n) and percentages (%)

Before HSG, there was no significant difference in the pain expected by patients in group (I) and (II) (6.7 ± 1.47 versus 6.8 ± 1.48 respectively, p = 0.661). However, patients who received counseling aided by visualization of the instrument sets experienced less pain than patients who received usual care. The mean of VAS score in group (I) was 1.1 ± 0.5 and group (II) was 6.8 ± 1.45 with p = 0.001 (Table 2).

Table 2: VAS scores before and after HSG in the 2 study arms

VAS	Group (I) (n=56)	Group (II) (n=50)	T [a]	*P - value*
Before HSG (expected pain)	6.7±1.47	6.8±1.48	-0.259	0.661
After HSG (actual pain)	1.1±0.5	6.8±1.45	-29.187	0.001
T [b]	- 29.1	- 2.17	-	-
P - value	<0.001	0.17	-	-

a Independent t-test
b paired t-test

The expected pain scores before HSG and the actual pain scores after HSG in each study group were compared. There was no significant difference between the expected and actual pain in group (II) (p = 0.17). When counseling was aided by visualization of instrument sets, a statistically significant decrease in actual pain scores was recorded compared to the expected pain scores before the procedure ($p < 0.001$) (Table 2).

DISCUSSION

Pain felt during HSG is relevant, as it might limit the use of HSG as a diagnostic tool in infertility work-up. Education and counseling using visualization of instrument sets used in HSG might help normalize women's expectations and decrease the pain perceived during HSG.

In this study, patients who received counseling before HSG aided by visualization of the instrument sets used (group (I)) experienced less pain than patients who received usual care (group (II)). The mean VAS scores in groups (I) and (II) were 1.1 ± 0.5 and 6.8 ± 1.45, respectively (p = 0.001). Additionally, this approach resulted in a significant decrease in actual pain scores after HSG (1.1 ± 0.5) compared to the expected pain scores before the procedure (6.7 ± 1.47) ($p \leq 0.001$). To the best of our knowledge, this approach and its effects have not been examined previously.

Few studies have shown that counseling and education are effective in reducing pain during invasive procedures in female patients. Studies presented by Balci et al.[21] and Walsh et al.[22] reported that patient education effectively reduced pain in patients undergoing amniocentesis and colposcopy, respectively.

One study showed that education and counseling prior to HSG causes a decline in the mean scores of pains experienced compared to the control group where routine care was given (3.04 ± 2.38 and 6.40 ± 2.29, respectively[20]. In contrast, another study showed that education and counseling alone could not be sufficient to control pain levels. The study reported no reduction in pain scores in the intervention group who received education and counseling compared with the control group who received usual care[23].

In this study, education and counseling before HSG resulted in a reduction in pain perception. Moreover, the pain scores were lower than those reported by Guvenc et al.[20]. This could be attributed to the addition of instrument sets visualization during counselling. Visualization of the instrument sets might have helped normalize the patients' expectations. Thus, this could potentiate the effect of counseling on pain perception.

This study had some limitations. First, the pre-procedure assessment did not evaluate anxiety and pain using scores as the Beck Anxiety Inventory or State-Trait Anxiety Inventory, instead VAS was used to report the patient's expected pain. Marking in one-pattern forms may be easier and less stressful for patients. Second, the data presented are patient dependent, which may affect the reliability of the responses. Third, other factors that may cause pain during HSG were not fully evaluated in this study. Moreover, counseling and HSG were performed by a gynecologist managing the infertility condition of all the patients according to the regulations of the study locations. This status might also relieve patients' anxiety and reduce pain during HSG, which needs to be evaluated in future studies. Finally, more publications with larger sample sizes are needed to synergize its results.

CONCLUSION

Education and counseling aided by visualization of instrument sets used in HSG potentially reduces pain perception. This approach can normalize patients' expectations, improve their satisfaction, and positively affect their compliance when HSG is performed.

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CONFLICT OF INTERESTS

There are no conflicts of interest.

REFERENCES

1. World Health Organization (WHO): Sexual and reproductive health, Infertility definitions and terminology. WHO. 2014. Available from : https :// www.who.int/reproductive health/topics/infertility/ definitions/en/.

2. Kodaman PH , Arici A, Seli E. Evidence-based diagnosis and management of tubal factor infertility. Curr. Opin. Obstet. Gynecol.2004;16(3):221–229. doi: 10.1097/00001703-200406000-00004.

3. Steinkeler JA, Woodfield CA, Lazarus E , Hillstrom M. Female infertility: a systematic approach to radiologic imaging and diagnosis. Radiographics.2009;29(5):1353–1370.doi: 10.1148/ rg.295095047.

4. National Institute for Health and Care Excellence (NICE). Fertility assessment and treatment for people with fertility problems .London, UK: National Collaborating Centre for Women's and Children's Health .2013. Available from https ://www.nice.org. uk/guidance/cg156.

5. Tokmak A, Kokanali MK, Guzel AI, Taşdemir Ü, Akselim B et al. The effect of preprocedure anxiety levels on postprocedure pain scores in women undergoing hysterosalpingography. J Chin Med Assoc.2015;78(8): 481–485. doi: 10.1016/j. jcma.2015.01.010.

6. Hindocha A, Beere L, O'Flynn H ,Watson A , Ahmad G et al. Pain relief in hysterosalpingography. Cochrane Database Syst Rev. 2015 Sep 20;(9):CD006106. doi: 10.1002/14651858.CD006106.pub3.

7. Szymusik I, Grzechocinska B, Marianowski P, Kaczyński, B, Wielgoś M et al. Factors influencing the severity of pain during hysterosalpingography .Int J Gynaecol Obstet. 2015 May;129(2):118-22. doi: 10.1016/j.ijgo.2014.11.015.

8. Costello M, Horrowitz S, Steigrad S , Saif N, Bennett M et al. Transcervical intrauterine topical local anesthetic at hysterosalpingography: a prospective, randomized, double blind,placebo-controlled trial. Fertil Steril. 2002;78(5):1116–1122. doi: 10.1016/ s0015-0282(02)03362-9.

9. Frishman GN, Spencer PK, Weitzen S ,Plosker S, Shafi F et al.The use of intrauterine lidocaine to minimize pain during hysterosalpingography: a randomized trial. Obstet Gynecol . 2004;103(6):1261–1266. doi: 10.1097/01.AOG.0000127370.66704.f5.

10. Hacivelioglu S, Gencer M, Cakir A, Kosar S, Koc E et al. Can the addition of a paracervical block to systemic or local analgesics improve the pain perceived by the patient during hysterosalpingography?. J Obstet Gynaecol . 2014 Jan;34(1):48-53. doi: 10.3109/01443615.2013.828025.

11. Karasahin E, Alanbay I, Keskin U , Gezginc K, Baser I et al. Lidocaine 10% spray reduces pain during hysterosalpingography: A randomized controlled trial. J Obstet Gynaecol Res . 2009 Apr;35(2):354-8. doi: 10.1111/j.1447-0756.2008.00938.x.

12. Unlu B, Yilmazer M, Koken G , Arioz, D, Unlu E et al .Comparison of four different pain relief methods during hysterosalpingography: A randomized controlled study. Pain Res Manag .2015;20(2):107–111. doi: 10.1155/2015/306248.

13. Kiykac A, Dilbaz S, Zengin T , Kilic S , Cakir L et al. Evaluation of pain during hysterosalpingography with the use of balloon catheter vs metal cannula. J Obstet Gynaecol. 2015;35(2):193–198. doi: 10.3109/01443615.2014.948400.

14. Lindequist S, Justesen P, Larsen C, Rasmussen F. Diagnostic quality and complications of hysterosalpingography:Oil -versus water- soluble contrast media– a randomized prospective study. Radiology.1991;179(1):69–74. doi: 10.1148/ radiology.179.1.1848715.

15. Eimers J , Omtzigt A , Vogelzang E, van Ommen R, Habbema J et al. Physical complaints and emotional stress related to routine diagnostic procedures of the fertility investigation. J Psychosom Obstet Gynaecol. 1997;18(1):31–35. doi: 10.3109/01674829709085566.

16. Weller A, Hener T. Invasiveness of medical procedures and state anxiety in women. Behav Med. 1993;19:60e5. doi:10.1080/08964289.1993.9937566.

17. Hunter T, Sonalkar S, Schreiber C, Lisa K , Mary D et al. Anticipated Pain During Intrauterine Device Insertion . J Pediatr Adolesc Gynecol . 2020;33(1):27-32. doi: 10.1016/j.jpag.2019.09.007

18. Kulkarni S, Johnson P, Keatles S and Kasthuri R.. Music during interventional radiological procedures, effect on sedation, pain and anxiety: a randomised controlled trial. Br. J. Radiol.. 2012;85:1059–1063. doi: 10.1259/bjr/71897605.

19. Wentworth L, Briese L , Timimi F. Massage therapy reduces tension, anxiety and pain in patients awaiting invasive cardiovascular procedures. Prog Cardiovasc Nurs. 2009;24(4):155–161. doi:10.1111/j.1751-7117.2009.00054.x.

20. Gulten Guvenc , Burcin Bektas Pardes , Mehmet Ferdi Kinci and Kazım Emre Karasahin. Effect of education and counselling on reducing pain and anxiety in women undergoing hysterosalpingography: A randomised controlled trial. J Clin Nurs. 2020; 29:1653–1661. doi:10.1111/jocn.15166.

21. Balci, O., Acar, A., Mahmoud, A. S. and Colakoglu, M. C.. Effect of pre-amniocentesis counseling on maternal pain and anxiety. J Obstet Gynaecol Res.. 2011;37(12):1828–1832. doi: 10.1111/j.1447-0756.2011.01621.x.

22. Walsh J, Curtis R , Mylotte M. Anxiety levels in women attending a colposcopy clinic: a randomised trial of an educational intervention using video colposcopy. Patient Educ Couns. 2004;55(2):247-51. doi:10.1016/j.pec.2003.09.012.

23. Alfredo La Fianza, Carolina Dellafiore, Daniele Travaini, Davide Broglia, Francesca Gambini et al. Effectiveness of a Single Education and Counseling Intervention in Reducing Anxiety in Women Undergoing Hysterosalpingography: A Randomized Controlled Trial. Scientific World Journal.2014;16:598293.doi: 10.1155/2014/598293.