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Review article

Pain management in outpatient hysteroscopy

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ABSTRACT

We have performed a review of literature to find evidence on the effectiveness of the different methods used to decrease pain perception during office hysteroscopy and identify risk factors of a painful hysteroscopy. Our methods include a review of literature following the Meta-analysis of Observational Studies in Epidemiology (MOOSE) Guidelines for Systematic Reviews of Observational Studies; a literature search of MEDLINE, Embase, PubMed, and the Cochrane Library of Systematic Reviews; and reference search in selected papers, looking for meta-analysis and randomized controlled trials that assess pain management in office hysteroscopy and studies that identify risk factors for painful hysteroscopy. Review for appropriateness and allocation according to type of analgesic method was performed, together with evaluation for risk factors and evidence of pain reduction effects of pharmacological and nonpharmacological analgesic methods. Nonpharmacological methods, such as vaginoscopy or mini-hysteroscopes, are advisable to avoid producing pain. The only pharmacological method that has demonstrated its effectiveness in several meta-analysis and reviews is paracervical block, reducing pain during and 30 minutes after hysteroscopy. Nonsteroidal anti-inflammatory drugs (NSAIDs) seem to be useful in the postoperative period. Evidence is not clear about combination of techniques or misoprostol. Although this review is limited because of heterogeneity of the studies included, it gives a wide overview of the different methods that are available to alleviate pain in office hysteroscopy. Paracervical infiltration is the only anesthetic procedure that has proven effective for pain reduction. Other methods such as using NSAIDs, topical anesthetics, misoprostol, or nitrous oxide have to be better studied to reach conclusions on their effectiveness.

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Introduction

Outpatient hysteroscopy in the office setting is often the preferred procedure for diagnosis of intrauterine pathology and abnormal uterine bleeding, as well as for therapeutic operative treatment and transcervical sterilization. It is desirable to attempt to perform as many procedures as possible with office hysteroscopy, as long as they take place in a safe and effective fashion.

Office hysteroscopy is a diagnostic and operative technique with many advantages compared with operating room-based hysteroscopy: it does not require hospital admission, preoperative tests,

and general or regional anesthesia. Importantly, it has decreased postsurgical recovery period, global cost of the procedure, and rate of complications such as cervical tears, uterine perforation, and those due to distension media. Although it is generally well tolerated, pain, vagal syndrome, hypotension, and uneasiness are common among patients undergoing hysteroscopy.

Although a 'no-touch' approach can be achieved in a large percentage of cases without anesthesia, pain is still the main cause of office hysteroscopy failure.^{1–3} Factors related to pain experience during hysteroscopy are still not well-known. In addition, there is controversy about anesthesia and analgesia for outpatient hysteroscopy, as there is not enough high-quality evidence.

According to Nagele et al,¹ 84% of failed hysteroscopies are due to excessive discomfort. De Iaco et al.² state that 34.8% of patients who undergo anesthesia-free diagnostic hysteroscopy report severe pain. Carvalho et al³ report moderate to severe pain [measured

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by Visual Analog Scale (VAS) score of 5 or more immediately after examination] in 68.4% of patients.

An adequate knowledge of anatomy is essential to understand the physiology of pain in hysteroscopy. Anatomical structures of the female pelvis are innervated by two pathways. The fundus of the uterus is innervated by sympathetic fibers from T10 to L2 via the inferior hypogastric plexus, which enters the uterus by the uterosacral ligaments and by the infundibulopelvic ligament, forming the ovarian plexuses.⁴ The upper vagina, cervix, and lower uterine segment are innervated by parasympathetic fibers from S2 to S4, which form the Frankenhauser or uterovaginal plexus, which enters the uterus following the cardinal ligaments.^{4,5} Myometrium and endometrium are innervated by a plexus at the myometrial–endometrial interface. Only the basal third of the endometrium is innervated.⁶ Myometrial innervation can vary with disease processes such as endometriosis or adenomyosis.⁷

Considering hysteroscopic techniques, pain is mainly produced when speculum or tenaculum are placed, with cervical dilation, passage of the hysteroscope through the cervical canal, and distension of the uterus with fluid. Operative procedures that damage the endometrial walls, such as endometrial biopsy, polypectomy or myomectomy, ablation or tubal sterilization, are also painful.^{3,8,9}

Munro and Brooks⁵ suggest that due to this complex innervation, successful anesthesia requires simultaneous targeting of more than one site, including paracervical and intracervical anesthesia and topical agents in the cervical canal and endometrial cavity.

To avoid pain, the less possible harm has to be done during hysteroscopy. This includes performing a ‘no-touch’ approach (direct entry with vaginoscopy and hydrodistension of the cervix for dilation, while avoiding the use of speculum and tenaculum) and the use of small caliber instruments. Moreover, normal saline has been shown to be more comfortable and safer than carbon dioxide and glycine as distension medium.¹⁰ Although it is thought that warming the distension fluid to physiological temperature (37.5°C) decreases perceived pain, it has not been proven.¹¹ Sagiv et al performed a randomized controlled study of 126 patients comparing vaginoscopy without anesthesia to hysteroscopy with speculum and tenaculum placement and paracervical block. The mean VAS scores were 3.8 and 5.3 in the vaginoscopic and traditional groups, respectively.¹²

In addition, a smaller outer diameter of the hysteroscope decreases pain perceived by the patients. Technological improvements have enabled minimization of the caliber of hysteroscopes (minihysteroscopes ≤ 3.5 mm) and instruments. Reduction in outer diameter by 1 mm or 2 mm as well as reduction in total hysteroscope size reduces the section of area of the instrument by 50–75%. The passage of the minihysteroscope through the cervical canal is consequently smoother, causing less pain. Flexible hysteroscopes have also been developed, making it easier to follow the canal pathway.¹³

However, this ‘no-touch’ technique is not always feasible, and even when it is possible, it is still sometimes painful. For this reason, identification of risk factors for a painful procedure has to be done.

The objective of this review of literature is to identify the factors that influence pain perceived by patients undergoing hysteroscopy and study the different anesthetic and analgesic methods that are used in office hysteroscopy to get the clearer possible view of the ideal method for pain control according to the available evidence.

Materials and methods

A comprehensive literature search has been conducted by a team of medical investigators (including gynecologists, a

pharmacologist, and epidemiologist) to identify studies published in English that evaluate pain during outpatient hysteroscopy and analgesic and anesthetic methods for pain management in outpatient hysteroscopy. The study population includes women undergoing office hysteroscopy. Searched databases include MEDLINE, Embase, PubMed, and the Cochrane Library of Systematic Reviews. We used a combination of the following keywords: “hysteroscopy”, “office hysteroscopy”, “pain”, “VAS”, “anesthetics”, “vagoscopy”, “analgesics”, “NSAIDs”, “local anesthesia”, and “paracervical block”. We searched for meta-analysis and randomized controlled studies mainly from 2000 to 2015, but other types of relevant studies and reviews have also been included, when no or only a few randomized trials were found. Reference sections of the selected papers were also searched for relevant studies to ensure a wide high-quality review.

Of the 49 initially selected papers, 16 were excluded after reading the abstract and methods because pain outcomes were not reported or operating-room procedures were included. No unpublished studies were included. No authors were contacted during the selection.

Database search and careful selection threw three meta-analyses, six reviews, 17 randomized clinical trials, one controlled trial without randomization, two cohort studies, and four observational studies from 2000 to 2015 that were suitable for this review. Some of the papers that were included are not specific to office hysteroscopic procedures,^{9,14} but have been selected because they provide useful information. All the papers assess pain management during office hysteroscopy; however, there is heterogeneity regarding their approach on this subject. Possible confounding factors are the fact that the included studies have different designs, making it difficult to compare and contrast them, and that they include different analgesic methods, and comparisons with placebo, control group, or other methods, thus making analysis even more difficult. Stratification or regression on possible predictors of study results, as well as sensitivity testing could therefore not be performed (Tables 1 and 2). Quality assessment of the trials that have been reviewed is presented in Table 3.

Results and Discussion

Several studies have been performed to establish risk and protective factors for suffering pain during hysteroscopy. de Freitas Fonseca et al.¹⁵ observed 558 patients who underwent outpatient hysteroscopy without anesthesia with vaginoscopic approach, looking for predictors of unacceptable pain. Carta et al.¹⁶ did the same with 284 women attending their clinic. Factors most associated with pain are severe dysmenorrhea and dyspareunia,¹⁵ menopause, nulliparity, and chronic pelvic pain.^{3,16}

Anxiety, although it is difficult to assess, also has a role in pain perception.^{16,17} Methods for controlling anxiety have been proposed to reduce pain perception. Reducing waiting time has a statistically significant positive correlation, even if weak, with pain perception during hysteroscopy ($r = 0.45$; $p < 0.01$). However, anxiety *per se*, measured by values of anxiety state (State-Trait Anxiety Inventory scales), was not significantly correlated with pain.¹⁶ A randomized trial using music to reduce anxiety during hysteroscopy has proven that it decreases anxiety and pain perceived during the procedure [VAS score 4.83 (no music group) vs. 2.95 (music group); $p < 0.001$]. It also reduces systolic blood pressure and heart rate and, according to Angioli et al.,¹⁷ distracts the patient from anxiety—provoking thoughts and makes them focus in more pleasant stimuli.

Procedure-related risk factors for pain during hysteroscopy are the use of 5 mm or wider hysteroscopes, speculum, tenaculum, cervical dilators, carbon dioxide for uterine distension, resection of

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