


Research Article

Pain Control during Outpatient Operative Hysteroscopy: What do we know nowadays?

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Abstract

Pain is the primary cause of failure of hysteroscopy. It is attributable to multiple causes, such as manipulation of the cervical canal, uterine distention due to the liquid means of distension used during the procedure, operative procedures on the endometrial mucosa, up to the release of prostaglandins following manipulation of the cervix and uterine distention. There are few studies in the literature that have compared the various methods of pain control during hysteroscopic examination; so far there is no review that defines which are the best strategies to implement. For this reason, the aim of this Review is to summarize what we know today about pain control during Outpatient Operative Hysteroscopy, and to clarify what could be the best strategies to make the hysteroscopic examination increasingly tolerable for the patients and consequently to increasingly limit entrances to the operating room.

Keywords: Outpatient Operative Hysteroscopy; Pain Control; Nitrous oxide; Paracervical block; Pericervical anesthesia

Introduction

Pain is the primary cause of failure of hysteroscopy. It can be ascribed to multiple causes, including manipulation of the cervical canal [1], uterine distention due to the liquid means of distension used during the procedure [2], operative procedures on the endometrium (as a possible cause of uterine contraction) [3], up to the release of prostaglandins following manipulation of the cervix and uterine distention [3]. There are few studies in the literature that have compared the various methods of pain control during hysteroscopic examination. Among these, Ahmad et al. [1], for example, compared the use of paracervical block and inhalation anesthesia during hysteroscopy: although both were effective in pain control, paracervical block was associated with a higher number of complications. More recently, Solano et al. [4] defined how the administration of nitrous oxide was equally effective (but with much more advantages) than paracervical block with 1% lidocaine in the control of pain during hysteroscopy performed using the Bettocchi hysteroscope [5]. As far as surgical instrumentation is concerned, to diagnose and simultaneously treat intrauterine pathology (polyps, submucosal myomas, synechiae, uterine septa) - the so-called "see and treat" approach [6]- continuous flow Miniresectors of 16 Fr caliber have recently been developed, with the aim of performing see-and-treat hysteroscopy even for large intrauterine growths. Compared to the Bettocchi hysteroscope, the Miniresector offers numerous advantages, both from a technical and economic point of view: in fact, the possibility of inserting and maintaining the electrosurgical loops inside the operating channel until the end of the operation allows the operator to avoid numerous steps through the internal uterine orifice, moreover, the surgical electrodes have an adequate angle to allow a simpler and more effective cutting action on the tissue (unlike, for example, mechanical scissors); finally,

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from an economic point of view, we remind that the surgical electrodes used in the Miniresector are multipurpose [7]. Due to its differences in caliber, but above all to fully exploit all its advantages, with the use of the Miniresector it is therefore even more fundamental to find adequate pain control methods that allow high tolerability of the hysteroscopic procedure to be performed. As regards the measurement of pain during hysteroscopy, most of the studies in the literature have used the VAS scale - Visual Analogue Scale-: among the most recent studies, Del Valle Rubido et al. [8] in 2015 report a VAS score average of 3 (on a VAS scale of 0 to 10) for nitrous oxide and of five for paracervical analgesia; Solano et al. [4] in 2021, considered a VAS from 0 to 100, instead reported an average VAS score of 34.7 ± 25.8 mm for nitrous oxide and 36.1 ± 22.9 mm for paracervical analgesia. It is essential to underline how positively pain control increases patient compliance, allowing the execution of increasingly complex interventions in an outpatient/day surgery setting with rapid discharge, thus reducing operating costs and increasing the "level of satisfaction" and adherence of patients to the method. The aim of this review is therefore to summarize what we know today about the various pain control techniques during Outpatient Operative Hysteroscopy, and to clarify what could be the best strategies to make the hysteroscopic examination increasingly tolerable for the patients and to consequence to increasingly limit entrances to the operating room.

Paracervical Vs Pericervical analgesia: What we should know

As far as topical anesthesia is concerned, it is now established that the routine instillation of a local anesthetic directly into the uterine cavity should be avoided as it is not associated with a reduction in the pain associated with outpatient hysteroscopy [9-11]. The two techniques of local anesthesia that have now proved effective in pain control during operative office hysteroscopy are paracervical block and pericervical instillation of local anesthetic. In fact, already the first data in the literature on the use of paracervical anesthesia demonstrated a significant reduction in pain with the use of the paracervical block compared to placebo or with no treatment [12]. Two more recent systematic reviews [13,14] identified six randomized controlled trials comparing paracervical injection of local anesthetics before hysteroscopy with controls (placebo or nothing). The results demonstrated a significant reduction in pain despite the heterogeneity of the studies [13]. If the use of paracervical block appears to be associated with effective pain reduction when compared with placebo or no treatment, when compared with the use of inhalational analgesia with nitrous oxide, the latter appears to be more effective and with a lower rate of side effects [1]. In fact, as reported by the most recent literature data, [4] paracervical block seems to be associated with a higher rate of side effects- abdominal pain, bleeding and pain

at the injection site of the anesthetic, dizziness, nausea and general adverse reactions vasovagal- versus nitrous oxide inhalational analgesia. All this had already been anticipated by the SEGI guidelines, drawn up by the Italian Society of Gynecological Endoscopy in 2015, which confirmed that the paracervical injection of local anesthetic, even if associated with a reduction in the pain experienced during outpatient hysteroscopy, should be taken into account consideration only in selected cases (e.g. use of hysteroscopes with a diameter greater than 5 mm) [9], since even technical and technological advances have currently minimized their potential advantage. Unlike paracervical block, which is a peripheral nerve block, pericervical block acts as an infiltrative anesthetic by stretching the tissues, causing a mechanical interruption of neural impulses [15]. In theory, this requires a less precise injection than paracervical block and appears to be easier and more reproducible between operators [16]. The application of pericervical local anesthetic is also associated with a proven reduction in pain during outpatient hysteroscopy [1]. However, since the clinical impact of this effect has not yet been fully clarified, also in this case the main guidelines recommend not performing this approach routinely [9,10].

Nitrous Oxide

Nitrous oxide is a colorless, odorless, and non-explosive gas. At room temperature, it remains below its critical temperature, which is why it is kept in a liquid state. When liberated at atmospheric pressure it becomes an inert gas and is then eliminated unchanged through the airways during respiration. It takes about 20 seconds to pass from the pulmonary circulation to the central nervous system and 3-5 minutes to reach the peak [17]. It has no serious gastrointestinal side effects and does not alter the coagulation parameters [8]. More and more favorable literature data have recently come out regarding nitrous oxide; in fact, the equimolar gas mixture of 50% nitrous oxide and oxygen has been shown to be effective and safe for pain control due to its analgesic, anxiolytic and amnesic properties. In fact, this mixture produces a safe, short-acting analgesic effect as it does not depress the cough reflex and respiration [8]. The first study evaluating the efficacy of nitrous oxide versus other options (including paracervical block) for pain control in hysteroscopic polypectomy was published by the group of Del Valle Rubido et al. and has shown promising results [8]. More recently, Solano Calvo et al. [4] demonstrated that regardless of outpatient hysteroscopic procedures, nitrous oxide was as effective as paracervical block with 1% lidocaine for pain control. Both interventions were more effective than the option without analgesics [1,4]. The results also suggest a better safety profile for nitrous oxide than the other groups. Notably, vasovagal events were reported more in the paracervical block and no analgesic arm than in the nitrous oxide arm [4]. Therefore, from the literature available

nowadays, it emerges that inhaled nitrous oxide has shown analgesic efficacy equivalent to that shown by paracervical and pericervical block with lidocaine, for all the outpatient hysteroscopic procedures evaluated. However, nitrous oxide is much easier to administer, and has therefore been shown to have a better safety profile and, overall, been associated with higher patient satisfaction. It is necessary to highlight the clinical relevance of such a finding: in fact, when outpatient hysteroscopy cannot be completed successfully, the procedure must be performed under general anesthesia in an operating room, which requires longer recovery time, greater discomfort, and higher cost. Therefore, avoiding such a situation could represent an important cost saving for the healthcare system [18], as well as giving better patient satisfaction.

Other methods

Conscious Sedation: Although conscious sedation is used extensively in office endoscopic procedures especially of the gastrointestinal system, it is less commonly employed in office hysteroscopy. Indeed, sedative drugs administered orally, intravenously, transmucosally, or inhaled have the ability to depress the central nervous system and the potential to impair respiration, circulation, or both. For this reason, the major guidelines [9-11] underline how conscious sedation should not be used routinely in outpatient hysteroscopic procedures as it is not associated with clear advantages in pain control and in the degree of woman satisfaction when compared with other techniques of local anesthesia.

Oral analgesics: As far as the use of oral analgesics is concerned, there are data in the literature on the use of opiates, in particular tramadol administered about an hour before hysteroscopy [19,20]: the results showed that women treated with tramadol had a significant reduction pain than those who had intracervical anesthesia and those not treated. Other studies have evaluated the efficacy of sublingual buprenorphine, 40 minutes before hysteroscopy, compared to the placebo group: in this case there was no significant reduction in pain overall [21]. As for the adverse effects; with tramadol no differences in the incidence of nausea, vomiting or bradycardia were reported [20]. In contrast, in the buprenorphine study there was a high incidence of adverse effects in the treated group and no adverse effects in the control group [21]. In the systematic review by Ahmad et al. [1], of good methodological quality, one of the studies also examined diclofenac [21]. Although diclofenac is the most effective of the over-the-counter analgesics (OTCA), it also appears to be the least safe and the one with the highest rate of adverse effects; for this reason the most recent literature data [22], which have compared diclofenac and the other OTCAs in pain control, recommend ibuprofen, as it is always effective but with a much lower rate of side effects and a better

safety profile. As regards the timing of analgesia before the procedure, there are no studies that give precise and clarifying results. To be effective, these drugs should be administered in advance of hysteroscopy. The ideal time varies according to the drug used (half-life, rate of absorption) and the route of administration; the major guidelines in the literature define how in general non-opioid drugs, such as 1g of paracetamol or 400mg of ibuprofen, should be taken one hour before the scheduled appointment [9-11]. For this reason it is preferable to advise women to take them first, rather than administering them in the hospital.

Conclusions

As previously described, good pain control considerably increases the patient's compliance with the hysteroscopic procedure, allowing the execution of increasingly complex operations on an outpatient basis with rapid discharge, increasingly reducing admissions to the operating room and thus health care costs and, more generally, increasing the "level of satisfaction" and the adherence of the patients to the method. From the literature present to date we can define how inhalation anesthesia with the use of nitrous oxide is a simple, effective, economical, non-invasive method and with high patient compliance due to its low rate of side effects. As far as local analgesia is concerned, although paracervical and pericervical anesthesia have shown similar efficacy rates, the paracervical block presents a more complex infiltration technique which is less reproducible between operator and operator, and above all it seems to be associated with a higher rate of side effects compared to pericervical analgesia.

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