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Pain relief in hysteroscopy

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Pain is a major barrier to successful outpatient hysteroscopy. Multiple factors can cause pain during the procedure including patient factors such as cervical stenosis and anxiety and procedural factors such as hysteroscope diameter and operative procedures. Pain relief strategies tailored to needs for Hong Kong women may enhance patient satisfaction and the success rate of outpatient hysteroscopic procedures.

Keywords: Hysteroscopy; Pain, procedural

Introduction

Outpatient hysteroscopy is a safe and well-accepted procedure for diagnostic and therapeutic purposes in ambulatory gynaecology care[1,2]. It is indicated for abnormal uterine bleeding, suspected uterine pathology, and subfertility. It enables visualisation of the uterine cavity and is more accurate than pelvic ultrasound in assessing the endometrial cavity[1-4]. It has a high diagnostic accuracy for endometrial cancer and is not associated with worse prognosis in early-stage endometrial cancer[5]. Performing hysteroscopic procedures in an outpatient setting reduces the need for operative theatres and hence healthcare costs[6-8]. This may translate to more efficient use of operative theatre sessions for other major gynaecological surgeries. Patients may also avoid the risk and morbidities associated with general anaesthesia.

Endometrial polyps are one of the most common pathologies diagnosed on hysteroscopy. In >80% of such cases, resection is feasible in an outpatient setting[9]. The risk of atypical lesion or malignancy of endometrial polyps in postmenopausal women ranges from 2% to 5%; the risk is higher in symptomatic cases[10,11]. The 'see-and-treat' approach in outpatient hysteroscopy facilitates early diagnosis and treatment of premalignancies and malignancies. This also reduces the need for patients to re-attend the hospital on another occasion. Moreover, patients need not suffer from symptoms arising from the uterine pathology (such as abnormal bleeding and recurrent anaemia secondary to submucosal fibroids) while awaiting the therapeutic procedure. Nonetheless, not all patients are suitable for outpatient procedures. Patient selection, patient counselling and expectation management, procedure time, type of uterine pathology, cervical priming, use of instruments, and surgical skills are important determinants.

Pain is a major factor that affects the success of outpatient operative hysteroscopic procedures and is a major component of patient satisfaction[12,13]. Pain may arise from genital tract instrumentation (use of a speculum or tenaculum, insertion of a hysteroscope, cervical dilatation), uterine cavity medium, and the operative procedure. Pain can be exacerbated by the patient's anxiety and vary in different types of procedures. Although patient acceptability for outpatient operative hysteroscopy is high, the pain score for operative hysteroscopy is higher than for diagnostic hysteroscopy[14,15]. In a study of >500 women with outpatient hysteroscopy under local anaesthesia, those with operative hysteroscopy had higher mean maximum pain scores than those with diagnostic hysteroscopy[16]. In a study of >5000 patients in the United Kingdom, the mean pain score was significantly higher during hysteroscopic myomectomy and endometrial ablation than during diagnostic hysteroscopy[17].

Although the Cochrane Database Systematic Review in 2017 concluded that there is limited evidence of the clinical difference in safety or effectiveness when comparing different types of pain relief methods or no treatment for hysteroscopy[18], it does not specifically address operative hysteroscopy, in which the procedure is longer and potentially needs cervical manipulation. Therefore, measures to reduce pain remain important in the context of outpatient operative hysteroscopy.

Reducing anxiety levels

Outpatient hysteroscopy is associated with pre-procedural anxiety, which affects pain during hysteroscopy. Higher anxiety levels are associated with a higher level of intraprocedural pain and thus an increased likelihood to

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need analgesics[19-21]. High levels of anxiety related to pain are a predictor for patients preferring future procedure to be performed under general anesthesia[22]. Longer duration of the procedure is associated with higher pain scores and anxiety levels[23]. Longer pre-procedural waiting time is positively correlated with pain during the procedure[24]. Special attention should be paid to patients with a history of dysmenorrhea, adenomyosis, chronic pain condition, or anxiety, as they may experience higher levels of pain.

General measures to reduce anxiety such as patient counselling, reduction of the waiting time and procedure time, and the use of a comfortable examination chair should be offered. Adequate surgeon experience plays a key role in this aspect. A 'vocal-local approach' during the procedure can reduce pain[25,26]. If the patient agrees, the surgeon and/or healthcare staff may explain to the patient what is happening and what the findings are, with a monitor showing the hysteroscopy view in real-time. Direct involvement of the patient provides emotional support to the patient and can reduce anxiety and pain.

Cervical preparation

Cervical stenosis can be present in up to 30% of hysteroscopy cases and is a major reason of failed outpatient hysteroscopy[12]. Cervical dilatation may increase the risk of uterine perforation and the need for cervical manipulation with dilators and tenaculum and hence the pain and discomfort. Examples of pharmacological preparation for cervical ripening include misoprostol, prostaglandin, and osmotic dilators. There is insufficient evidence to support routine use of misoprostol in outpatient hysteroscopy[1,2]. Misoprostol is associated with abdominal pain, fever, and vaginal bleeding, but these adverse effects are usually mild. Misoprostol is associated with a reduction of procedure duration and the need for cervical dilatation. The Cochrane Database Systematic Review in 2015 concluded that misoprostol is more effective in reducing the need for cervical dilatation and intraoperative complications than dinoprostone and osmotic dilators in a cohort of women in which 80% required mechanical cervical dilatation without cervical preparation[27].

Although the use of miniature scopes reduces the need for a larger diameter of the cervical os, misoprostol may still be useful for outpatient operative hysteroscopy where instruments of a larger size diameter are used, compared with diagnostic hysteroscopy. The American College of Obstetricians and Gynecologists (ACOG) guideline recommends the use of misoprostol for those with a higher risk of cervical stenosis and those undergoing operative hysteroscopy[1]. These may include nulliparous women, those with previous caesarean delivery, and those with a history of cervical stenosis or surgery. For postmenopausal women undergoing outpatient hysteroscopy, misoprostol plus 25 μg of vaginal oestrogen 14 days before the procedure is more effective than misoprostol alone in pain reduction[1,27]. There is no consensus on the optimal regimen for misoprostol. Various oral or vaginal regimens of misoprostol of 200 to 1000 μg administered up to 24 hours before the procedure have been reported[28-30]. In a randomised controlled trial of 120 nulliparous women, misoprostol administered 12 hours before outpatient hysteroscopy is more effective than misoprostol administered 3 hours before hysteroscopy[29]. Oral, sublingual, and vaginal regimens are all effective, although the vaginal regimen results in fewer side effects[30]. The vaginal regimen is usually self-administered and thus its effectiveness depends on whether the patient has administered the medication correctly. The route of administration should be discussed with the patient, as some women may not accept self-administration. Osmotic dilator is effective for cervical preparation but requires a separate visit for its application[31].

Uterine distension media

The distension medium pressure correlates with the level of pain experienced during hysteroscopy[32], but the use of lower intra-uterine pressure should be balanced with adequate visualisation of the uterine cavity. Lower intra-uterine pressure is associated with reduced intra-procedural pain and post-procedural pain[33,34]. In a systematic review in 2021, normal saline significantly reduces post-procedural pain but not intraprocedural pain, compared with carbon dioxide[33]. The Cochrane Database Systematic Review in 2021 concluded that normal saline results in fewer adverse events such as shoulder-tip pain and vasovagal reaction. Vaginoscopy is also easier with a fluid distension medium[35]. The use of warm saline (rather than room temperature saline) is a common practice, despite lacking evidence of pain reduction in outpatient hysteroscopy. Most studies show no difference in pain between warm saline and room temperature saline[33,36,37].

Music

Music has been widely used as a non-pharmacological method to reduce patient anxiety and perioperative pain and to increase patient satisfaction in surgery[38-40], labour[41,42], and endoscopy[43]. Music has been shown to reduce anxiety and enhance performance of surgeons during surgery[44]. In the context of outpatient hysteroscopy, there is a potential reduction of the duration

of the procedure. Music may distract the patient from the noise of operative instruments. Although music has been shown to be effective in reducing anxiety and pain scores[45,46], evidence of music as a stand-alone pain-relief strategy is lacking. Given its easy availability and non-invasive nature, music can be used as an adjunct to other pain-relief methods.

Transcutaneous electrical nerve stimulation

Transcutaneous electrical nerve stimulation is widely used for acute and chronic pain conditions[47]. It is non-invasive, safe, easy to use, and well-tolerated. It is used during labour[48,49] and for symptomatic relief of primary dysmenorrhea[50,51]. A randomised, double-blinded, placebo-controlled trial of 138 women in 2017 has shown that transcutaneous electrical nerve stimulation has been associated with reduced pain and increased patient satisfaction in hysteroscopy[52].

Systemic analgesia

The joint guideline by the Royal College of Obstetricians and Gynaecologists (RCOG) and the British Society for Gynaecological Endoscopy (BSGE) on the best practice of outpatient hysteroscopy recommends the use of non-steroidal anti-inflammatory drugs around 1 hour before outpatient hysteroscopy[2]. In a systematic review of 22 studies and a meta-analysis of 16 studies, pre-procedural administration of anti-inflammatory drugs plus transcutaneous electrical nerve stimulation result in significant reduction in pain during outpatient hysteroscopy with no increase in adverse events, compared with controls[53]. Tramadol is effective in reducing pain but is associated with opioid adverse effects such as dizziness and vomiting[54,55]. Anti-spasmodic is associated with reduced pain but is also associated with more adverse effects[53].

Local analgesia

In a systematic review and meta-analysis in 2020, local analgesia results in a reduction in intraprocedural pain regardless of type or route of administration, although studies included in the analysis are heterogeneous and thus the role of local anaesthesia warrants further research[56]. Local anaesthesia given via the transcervical route has been shown to significantly reduce vagal effects during hysteroscopy. Both short-acting and long-acting anaesthetic agents are effective in reducing pain. Using the vaginoscopic approach (with minimal genital tract instrumentation) as the first-line approach requires further research[56]. Nonetheless, miniature operative hysteroscopes and instruments are still of a larger diameter than those for diagnostic hysteroscopy, local anaesthesia still has a role in outpatient operative hysteroscopy.

Local anaesthesia may be given topically, para-cervically, or intra-cervically. Topical anaesthesia such as lidocaine/prilocaine cream has been reported to reduce pain during endometrial biopsy and intrauterine device insertion.[57,58] It is easy to use and has low incidence of serious adverse effects and can be self-administered by patients. Lidocaine spray has been reported to reduce pain related to tenaculum use[59]. However, evidence on the effectiveness of these topical medications in pain control in hysteroscopy is limited. Topical anaesthesia requires time to work and its effectiveness wanes within a short time.

Intracervical injection of local anaesthesia can be administered at the 12 o'clock position of the cervix for pain relief, whereas paracervical anaesthesia administered into the vaginal mucosa at the cervicovaginal junction at the 3, 5, 7, and 9 o'clock positions is effective in cervical procedures and hysteroscopy[2,56]. Procedure should be started around 7 minutes after administration of local analgesia, during which the clinician may prepare the equipment for the procedure. Local anaesthesia is associated with pain during injection and takes time to work.

The use of intrauterine fundal anaesthesia for outpatient endometrial ablation and manual vacuum aspiration has been reported[60-65]. Anaesthesia is injected under direct visualisation by hysteroscopy into the myometrium medial to each tubal ostia. The rationale of uterine fundal anaesthesia is that the uterine fundus and the cervix differ in nerve innervation[66]. The uterine fundus sensory is primarily supplied from T10 to L1, whereas the sensory for the lower part of the uterus and cervix is through S2 to S4. Therefore, local paracervical anaesthesia may not be adequate for uterine interventions that involve the uterine fundus. Intrauterine fundal anaesthesia is safe and non-inferior to paracervical anaesthesia alone, but there is limited evidence of its use as a sole local anaesthesia.

Multimodal analgesia is commonly used for perioperative pain management[67], but there is limited evidence of this approach for outpatient hysteroscopy. In a study of a multimodal anaesthetic approach for both diagnostic and operative hysteroscopies that involve topical application of lidocaine gel on the speculum, use of intracervical and paracervical blocks, and application of lidocaine gel to the cervical canal, pain associated with application of anaesthesia was not higher than pain associated with operative procedures[16]. Serious adverse

effects of local anaesthesia for hysteroscopy are uncommon; vasovagal adverse effects include nausea, vomiting, dizziness, sweating, bradycardia, and hypotension[56]. The risk of serious adverse events can be reduced by using a standardised administration and dosage of local anaesthesia.

Vaginoscopic approach

Vaginoscopic approach to outpatient hysteroscopy is considered the standard approach by the RCOG[2], the ACOG[1], and the American Association of Gynecologic Laparoscopists[68], as it is associated with less pain, reduced incidence of vasovagal reaction, reduced procedural time, with similar efficacy[69,70]. Vaginoscopy enables a larger range of movement to facilitate procedures for an acutely anteverted or retroverted uterus. Cervical stenosis is the main reason for failure of vaginoscopy, and pain is the most common reason for failure of hysteroscopy[12]. Techniques of the vaginoscopic approach involve insertion of the hysteroscope to the posterior fornix of the vagina to enable gradual identification of external cervical os, which can guide the insertion of hysteroscopy into the endocervical canal[71]. Leakage of uterine distension media can be reduced by occluding the introitus manually or by balloon catheter. Suprapubic pressure and bladder filling may be applied to reduce anteflexion to facilitate the uterus to be in a more axial position. Similarly, digital pressure from the rectum can reduce retroflexion.

The vaginoscopic approach may be feasible when miniature operative hysteroscopes, such as resectoscopes and shavers, are used. However, it may not be practical for nulliparous or postmenopausal women, as operative instruments are still larger in diameter than diagnostic instruments. Evidence for the role of vaginoscopy in reducing pain during operative hysteroscopy is limited.

Miniaturised instruments

Miniaturised instruments may facilitate vaginoscopy and minimise pain. Hysteroscopic tissue removal systems enable simultaneous tissue removal and retrieval without applying electric energy to the endometrium, thereby reducing the need for reinsertion of instrument and thus reducing pain[72].

A systematic review of randomised controlled trials in 2021 has shown that medical technologies such as scissors and morcellators are associated with less pain experienced by patients than an electrical device[73].

Hysteroscopic electrosurgery has the advantage of controlling bleeding during operative procedures[74], but it may not be feasible to remove polyps and fibroids in one go (owing to the miniaturised instrument) and require further instrumentation for specimen retrieval. Hysteroscopic morcellators have the additional benefit of removing pathology specimens simultaneously with resection. This reduces the frequency of insertion and removal of instruments from the genital tract as well as the operation time. Intrauterine morcellators have been shown to have better outcomes in terms of shorter operation time and reduced risk of fluid deficit, compared with standard surgical procedures[75-77].

Quality and safety

Pre-procedure counselling and involvement of patients in making decisions on outpatient hysteroscopy are essential. In 2013, the National Health Service in the United Kingdom launched a campaign against inadequate pain relief during hysteroscopy for discussion by the Parliament[78]. In a study in 2020, disconnection between clinician- and patient-reporting resulted in negative correlation of patient self-rated pain with clinical estimates of pain[79]. Thus, patient-reported outcomes should be included when reviewing outpatient hysteroscopic services. An example of a pain relief protocol is shown in the Appendix.

The RCOG/BSGE joint guideline recommends auditable standards, which include items such as adverse events, failure rates, need for cervical dilatation, and patient satisfaction[2]. A national outpatient hysteroscopy service patient-centred survey in United Kingdom was conducted in 2019 to assess women's perspectives of their experience of outpatient hysteroscopy and to benchmark outpatient hysteroscopy practices[17]. This survey can help to identify problems in services and facilitate quality improvement initiatives in addressing service gaps.

Conclusion

Outpatient diagnostic and operative hysteroscopy is safe and effective. Major barriers to the success of outpatient hysteroscopic procedures are patient anxiety and pain. Thus, patient-reported outcomes should be considered. Although there is no standardised regimen for pain relief in outpatient hysteroscopy, pain-relief protocols comprising non-pharmacological and pharmacological options should be in place to minimise pain and anxiety, especially for operative procedures. Shared decision-making is essential when considering hysteroscopy as an outpatient or inpatient procedure.

Contributors

The author designed the study, acquired the data, analysed the data, drafted the manuscript, and critically revised the manuscript for important intellectual content. The author had full access to the data, contributed to the study, approved the final version for publication, and takes responsibility for its accuracy and integrity.

Conflicts of interest

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Data availability

All data generated or analysed during the present study are available from the corresponding author on reasonable request.

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Appendix.
Pain relief strategies

Before procedure
Patient counselling
Informed consent (including see-and-treat approach)
Manage expectations (duration of procedure, information sheet)
Answer any questions/concerns
Reduce waiting time in clinic
Pharmacological methods
Non-steroidal anti-inflammatory drugs (1 hour before procedure)
Use of vaginal misoprostol for those at higher risk of cervical stenosis
Use of oestrogen cream for postmenopausal women with a history of cervical stenosis
During procedure
Non-pharmacological pain-relief methods
Music
Transcutaneous electrical nerve stimulation
Techniques
Vaginoscopic approach as standard technique
Use hysteroscope of 12° to 30° optic angle
Avoid cervical dilatation
Avoid use of tenaculum on cervix
Use lowest pressure to distend the uterine cavity to obtain visualisation
Use warm normal saline as distension medium
Use of miniature equipment including scissors, resectoscope, and morcellator
Minimise procedure duration
Pharmacological strategies after discussion with patient
Topical anaesthesia
Intra-cervical block
Paracervical block
Multimodal anaesthesia
After procedure
Post-procedure analgesics