Clinical Expert Series

Implementation of Office Hysteroscopy for the Evaluation and Treatment of Intrauterine Pathology

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Hysteroscopy provides a minimally invasive strategy to evaluate intrauterine pathology and manage conditions such as abnormal uterine bleeding, infertility, intrauterine adhesions, müllerian anomalies, and intrauterine foreign bodies. Increasing access to hysteroscopy procedures in the office has the potential to improve patient care by minimizing financial and logistical barriers, aiding in streamlined diagnosis and treatment planning, and potentially averting unnecessary operative procedures and anesthesia. Office hysteroscopy refers to procedures performed in outpatient settings where pain management involves no medications, oral non-sedating medications, local anesthetic agents, or oral or inhaled conscious sedation. We present best practices for the implementation of hysteroscopy in an office setting. These include appropriate patient selection, optimal procedural timing, cervical preparation for patients at highest risk of cervical stenosis or pain with dilation, individualized pain-management strategies, use of distension media, and video monitoring to engage patients in the procedure. We describe miniaturized equipment for use in the office setting and “no-touch” vaginoscopic approaches to limit patient discomfort. With appropriate training and experience, office hysteroscopy presents a simple and cost-effective modality for optimizing gynecologic care for our patients.

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Hysteroscopy is a minimally invasive diagnostic and surgical approach that allows for visual inspection of the endometrial cavity, cervix, and vagina by inserting an endoscope through the cervix into the uterus. Detection of intracavitary lesions is possible with high sensitivity. Hysteroscopy represents an integral tool in the evaluation and management of numerous gynecologic conditions, including abnormal uterine bleeding, infertility, intrauterine adhesions, müllerian anomalies, medically managed endometrial hyperplasia, chronic leukorrhea, and intrauterine foreign bodies, as well as endometrial assessment before and after surgery and evaluation of equivocal findings on transvaginal ultrasonography or saline infusion ultrasonography.\(^1-3\) With the adoption of the International Federation of Gynecology and Obstetrics classification system in 2011 (PALM-COEIN), hysteroscopy is integral in the appropriate characterization of abnormal uterine bleeding.\(^4\)

Many hysteroscopic procedures can be feasibly performed in the office setting rather than in the operating room, which has the potential to streamline care, reduce financial and logistical barriers, improve preoperative counseling, and avert unnecessary procedures and anesthesia exposure. Miniaturized equipment designed for use in the office allows for visualization of endometrial lesions 1 mm or greater in size with excellent patient tolerability.\(^5\) Despite data

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supporting high levels of efficacy,\textsuperscript{6,7} patient satisfaction,\textsuperscript{8,9} and cost effectiveness with this technique,\textsuperscript{10,11} only an estimated 15–25\% of gynecologists in the United States currently offer office hysteroscopy.\textsuperscript{2}

In this review, we describe appropriate candidates, equipment, and techniques for office hysteroscopy. We aim to provide clinical pearls, address myths surrounding barriers to implementation, and suggest feasible strategies for developing an office-based hysteroscopy practice that is simple and cost effective. We advocate for comprehensive residency training and continuous education for physicians in practice to increase access to office hysteroscopy broadly.

**DEFINING OFFICE HYSTEROSCOPY**

In 2021, an international working group of experts in hysteroscopy from the AAGL, the European Society for Gynaecological Endoscopy, and the Global Community of Hysteroscopy released a consensus statement outlining standardized terminology to describe multiple aspects of hysteroscopic procedures.\textsuperscript{12} The authors proposed a hierarchical nomenclature to report pain-control measures for hysteroscopy across five levels. Level 1 indicates no medications or use of oral nonprescribing medications only, level 2 involves administration of local anesthetic agents to the genital tract, level 3 describes conscious sedation (with level 3a connoting oral or inhaled medications and level 3b parenteral medications), level 4 signifies regional anesthesia, and level 5 indicates general anesthesia.\textsuperscript{12} The group further outlined consistent terminology whereby the term *office hysteroscopy* refers to procedures performed in settings where pain management up to level 3a can be safely administered. Office hysteroscopy may be used interchangeably with outpatient clinic hysteroscopy in the United States and requires that patients arrive and leave a medical facility on the same calendar day.\textsuperscript{12} Importantly, office hysteroscopy can include both diagnostic and operative procedures, which can be distinguished by whether the procedure confers direct therapeutic benefit.

In this review, we rely on the above parameters to define office hysteroscopy and focus our discussion on procedures that can be comfortably completed in clinical practices nationwide with minimal pain-control measures. We advocate for the use of diagnostic hysteroscopy to triage patients who may benefit from diagnostic or operative procedures under anesthesia. Additionally, we identify patients who may not be candidates for office-based interventions, but could benefit from brief diagnostic or therapeutic outpatient hysteroscopy procedures.

**INDICATIONS FOR OFFICE HYSTEROSCOPY**

In selecting appropriate candidates for office hysteroscopy, important factors to consider include the objectives of the procedure, the patient’s pathology and individual preferences, the availability of small flexible, rigid, or disposable hysteroscopes, and physician expertise.\textsuperscript{12} Examining hysteroscopy alongside other office-based imaging modalities yields helpful information regarding spectrum of use. Compared with transvaginal ultrasonography and saline infusion ultrasonography, hysteroscopy is the most sensitive and specific imaging modality for evaluating endometrial disorders and intracavitary masses in particular.\textsuperscript{13} Saline infusion ultrasonography cannot reliably distinguish between endometrial polyps, asymmetrical endometrium with small irregularities or “endometrial moguls,” and polypoid-appearing tissue, which can be seen in cases of endometrial polyps or hyperplasia.\textsuperscript{14} In contrast, saline infusion ultrasonography visualizes the entire uterus and therefore can provide data regarding the depth of penetration or intramural component of submucous myomas, which is not obtainable with office hysteroscopy.\textsuperscript{15} Transvaginal ultrasonography alone fails to diagnose endometrial polyps or leiomyomas in one out of six patients with intracavitary lesions and a thin endometrial stripe.\textsuperscript{15} As such, transvaginal ultrasonography alone is not sufficient for imaging evaluation in patients with abnormal uterine bleeding or suspected intracavitary pathology. Saline infusion ultrasonography and office hysteroscopy can be used in a complementary fashion to evaluate equivocal lesions or those with both submucous and intramural components. Incorporating office hysteroscopy into clinic visits also provides the opportunity to diagnose and treat certain pathologies in one visit, which may be preferable for patients.

Indications and treatment opportunities for office hysteroscopy are listed in Box 1. These include use as a first-line diagnostic tool in cases of symptomatic abnormal uterine bleeding, infertility, suspected retained products of conception or foreign body and other gynecologic indications (Fig. 1 and Video 1). Hysteroscopy can help to provide clarification after abnormal imaging findings, equivocal results, or incidentally diagnosed thickened endometrium. For patients undergoing in vitro fertilization, hysteroscopy is considered the gold standard for diagnosing intrauterine pathologies, and may be especially important in cases of recurrent implantation failure or to investigate positive findings on transvaginal ultrasonogram, saline infusion ultrasonography, or hysterosalpingogram.\textsuperscript{16} Other diagnostic benefits
of hysteroscopy include thorough preoperative assessment of the vagina (vaginoscopy), cervix, and endometrial cavity to determine appropriate surgical equipment, estimate procedure length, plan for any concomitant procedures, and guide patient counseling regarding inherent procedural risks such as fluid overload. In some cases, office hysteroscopy may help to avert unnecessary procedures and thereby limit exposure to general anesthesia. Many operative procedures can also be performed in the office setting. These include visually-directed endometrial sampling, lysis of intrauterine or cervical adhesions, and removal of numerous pathologies, such as endometrial and endocervical polyps, small leiomyomas, retained products of conception and intrauterine devices.\textsuperscript{17–19}

For the past century, blind dilation and curettage (D&C) has been the mainstay of endometrial cavity evaluation. Despite the low sensitivity for detecting focal pathology, lack of confirmation that lesions are completely excised, and risk of uterine perforation without visualization, D&C remains widely used for diagnostic and therapeutic purposes. In their classic 1975 study, Drs. Stock and Kanbour established that D&C had low diagnostic accuracy and sampled less than 60% of the endometrium.\textsuperscript{20} These findings were further supported by a 2001 prospective study of 105 patients with postmenopausal bleeding and endometrial thickness 5 mm or greater on transvaginal ultrasonogram who underwent diagnostic hysteroscopy followed by blind D&C and repeat hysteroscopy.\textsuperscript{21} The authors found that 80% of patients in the study had intracavitary lesions, 98% of these demonstrated focal growth patterns, and 87% of patients with focal lesions had residual intrauterine pathology after blind D&C. Specifically, D&C missed 58% of polyps, 50% of cases of endometrial hyperplasia, 60% of cases of complex atypical hyperplasia, and 11% of endometrial cancers. Concordance between D&C diagnosis and final diagnosis was higher in patients with nonfocal lesions at 94%.\textsuperscript{21} In light of these data, the use of blind D&C alone for the diagnosis or treatment of endometrial lesions should be abandoned.\textsuperscript{22,23} Rather, direct inspection and uninterrupted visualization through hysteroscopy and visually directed curettage should be the goal.

Novel devices were developed for endometrial sampling in the office, including the Vabra aspirator and the “Pipelle du Cornier.” These constitute disposable plastic catheters with internal pistons to generate suction. They function through blind insertion into the uterine cavity to obtain a histologic biopsy specimen of the endometrium. The endometrial Pipelle was widely adopted due to higher patient acceptability compared with the Vabra aspirator, which was demonstrated in a 1988 trial.\textsuperscript{24} However, similar to blind D&C, endometrial biopsy has low sensitivity for focal lesions and does not reliably sample the entire endometrial cavity.\textsuperscript{25} A recent retrospective study involving 689 patients with abnormal or postmenopausal bleeding who underwent blind endometrial biopsy followed by hysteroscopy 25–95 days later examined the pathologies that were successfully diagnosed on preoperative biopsy. Blind endometrial biopsy detected 31% of endometrial polyps, 0% of leiomyomas, 29% of endometrial hyperplasia without atypia and 6% of endometrial hyperplasia with atypia (Lintel MK, Bradley LD, Ferrando CA. Comparing endometrial biopsy results with hysteroscopic pathology in...
women presenting with abnormal and postmenopausal uterine bleeding. Poster presented at the Society of Gynecologic Surgeons 48th Annual Scientific Meeting, March 28–30, 2022, San Antonio, Texas). Direct hysteroscopic removal is more sensitive and specific than blind endometrial sampling or D&C and is integral to the diagnosis of focal endometrial pathology.25,26

PATIENT SELECTION AND COUNSELING

Comprehensive patient counseling and expectation setting are crucial for successful office hysteroscopy. Counseling should include a description of the intervention, including expected degree of discomfort and procedure length, as well as therapeutic goals. We recommend selecting procedures with an anticipated short duration to be performed in the office setting. Patient-level factors to consider include parity, previous experiences surrounding pelvic examinations, comorbid medical conditions, mobility limitations, history of chronic pain or sexual abuse, and known cervical stenosis or previous cervical procedures. Shared decision-making with the patient should be used to determine the plan for anesthesia, as detailed below.

There are few absolute contraindications to office hysteroscopy. These include active reproductive tract infection such as pelvic inflammatory disease or active or prodromal herpes infection.5,27 Pregnancy can be reliably excluded for most patients with a urine pregnancy test performed at the start of the office visit. Scheduling the procedure during the follicular phase of the patient’s cycle shortly after cessation of menses (see below) is also helpful. Pelvic inflammatory disease is diagnosed clinically, with characteristic signs and symptoms that include subacute onset of abdominal pain, mucopurulent cervical discharge, cervical erythema, and tenderness on bimanual examination.28 If active genital tract infection is suspected at the time of examination, hysteroscopy should be deferred due to risk of intraabdominal dissemination of infection through the uterine tubes.

Conversely, although dissemination of malignant cells has been proposed in cases of uterine malignancy, undergoing hysteroscopy is not associated with positive peritoneal cytology in early-stage

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Box 1. Office Hysteroscopy Indications and Treatment Options

AUB
- Prepubertal vaginal bleeding
- Evaluation of AUB among reproductive-aged patients
- Evaluation of postmenopausal bleeding
- Evaluation of endocervix
- Evaluation of recurrent bleeding after endometrial ablation
- Detection of adenomyosis gland openings in endometrium (localized adenomyosis)
- Evaluation of nondiagnostic biopsies or prior blind dilation and curettage
- Endometrial polypectomy
- Removal of small submucous myomas
- Targeted endometrial biopsies
- Evaluation of the uterine cavity after uterine perforation

Leukorrhea
- Evaluation for chronic endometritis
- Postprocedure follow-up, including endometrial ablation and radiofrequency ablation (transcervical or laparoscopic)
- Uterine artery embolization
- Foreign body, including sutures and malpositioned IUD

Abnormal or equivocal findings on imaging
- Suboptimal visualization with transvaginal ultrasonography or saline infusion ultrasonography
- Incidental thickened endometrium, including patients on tamoxifen
- Evaluation of abnormal hysterosalpingogram
- Visually directed endometrial sampling

Secondary amenorrhea
- Evaluation for intrauterine adhesions
- Lysis of adhesions

Complications of pregnancy
- Retained products of conception
- Evaluation of cesarean delivery scar defect or isthmocele
- Persistent bleeding after termination of pregnancy

Unexplained infertility
- Screening before assisted reproductive technologies
- Evaluation for recurrent pregnancy loss
- Evaluation of suspected müllerian anomalies
- Uterine septum resection or metroplasty
- Tubal polyps or synechiae

Foreign body evaluation
- Detection of incomplete or broken IUD arms
- Bone fragments from incomplete pregnancy termination
- Migrated cervical cerclage
- Broken laminaria tents
- Removal of retained IUD
- Evaluation of malpositioned hysteroscopic inserts
- Pediatric and adult vaginoscopy

Preoperative planning
- Complete assessment of lesions and pathology

Conservative management of endometrial hyperplasia
- Follow-up-directed endometrial biopsies

Postoperative or postprocedure follow-up

Screening for intrauterine adhesions
- Evaluation for recurrent lesions
- Confirmation of completed procedure

AUB, abnormal uterine bleeding; IUD, intrauterine device.
endometrial cancer and does not affect prognosis. A 2021 meta-analysis investigating the use of hysteroscopy in the diagnosis of suspected endometrial cancer found that maintaining an intrauterine distension pressure less than 80 mm Hg is highly unlikely to result in positive peritoneal cytology. In fact, a 2021 retrospective cohort study involving patients with leiomyosarcoma showed that hysteroscopy was associated with improved preoperative detection of malignancy and greater likelihood of undergoing optimal surgical management.

PROCEDURE TIMING AND ENDOMETRIAL PREPARATION

To maximize visualization and ease of the procedure, office hysteroscopy should be scheduled shortly after menstruation for reproductive-aged women with regular menstrual cycles. This corresponds with the early proliferative phase of the uterus when the endometrial lining is thinnest. In contrast, the presence of secretory endometrium during the luteal phase of the menstrual cycle may mimic endometrial polyps or obscure intrauterine pathology, including International Federation of Gynecology and Obstetrics type 1 and 2 submucous leiomyomas. Individuals receiving continuous hormonal contraception, menopausal hormonal therapy, or progestin therapy (including intrauterine devices) do not regularly cycle and should therefore have a thin endometrial lining secondary to a progestin-dominant hormonal environment. These patients can have their procedures scheduled at any time.

For patients with irregular cycles, timing is crucial as the topography of the endometrium can be variable. To increase successful visualization and diagnostic accuracy, a short course of combined hormonal contraceptives or progestin therapy can be considered for 10–14 days, followed by a withdrawal menses, and immediate procedure scheduling after bleeding subsides, as this will produce a thin endometrium. This may be especially beneficial for operative procedures such as polypectomy to promote complete specimen extraction. Pharmacologic endometrial preparation has also been associated with decreased procedure time and improved patient and physician satisfaction during operative hysteroscopy. We discourage the use of hormonal pretreatment for diagnostic hysteroscopy alone as this may alter endometrial histology and provide misleading results. Overall, data related to pharmacologic endometrial

Fig. 1. Selected findings and pathologies visible on office hysteroscopy, including atrophic endometrium (A), endometrial polyps (B), vascular submucous myoma (C), and intrauterine adhesions (D).

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preparation are limited to small studies with varying treatment protocols, and an optimal regimen has yet to be determined.

**CERVICAL PREPARATION**

Given that almost half of complications related to hysteroscopy are associated with difficulties with dilation, preoperative pharmacologic cervical softening or ripening may be considered for patients at highest risk of cervical stenosis. These include postmenopausal patients, those with a history of cervical stenosis, previous cesarean delivery or cervical surgery, and patients undergoing procedures with larger hysteroscopic devices 5 mm in diameter or greater. Cervical preparation may decrease periprocedural discomfort and increase the likelihood of successful completion of the procedure.1

There is not one agreed-on, evidence-based regimen for optimal cervical preparation. The use of misoprostol, a prostaglandin E1 analogue, has been extensively studied in preoperative cervical ripening, with formulations ranging from 200 to 800 micrograms administered orally or vaginally three to 24 hours before the procedure.5,37–42 Benefits of misoprostol include improved ease of cervical entry, decreased procedure length, and reduced intraoperative and postoperative pain scores.1,38,39 The most common side effects include mild abdominal pain, vaginal bleeding, nausea, diarrhea, and increased body temperature,37,43 though these are usually well-tolerated in our experience. For office hysteroscopy, administration of misoprostol 200–400 micrograms at least 12 hours before the procedure appears to produce clinically-significant results.44 Although certain studies demonstrate improved results and fewer side effects after vaginal administration,40 both vaginal and oral routes appear to be effective for cervical preparation.41

A 2015 Cochrane review integrating data from 19 randomized controlled trials of 1,870 patients compared the use of misoprostol, dinoprostone (prostaglandin E2), and osmotic dilators with no treatment or placebo before operative hysteroscopy among premenopausal and postmenopausal women.37 The authors concluded that misoprostol was more effective than dinoprostone, no treatment, or placebo, as measured by the proportion of patients requiring mechanical cervical dilation at the time of the procedure. Similarly, those who received misoprostol experienced the lowest rates of intraoperative complications.37

Studies restricted to postmenopausal patients have yielded conflicting results regarding the efficacy of misoprostol use for cervical softening. Although certain groups have demonstrated decreased peri-procedural pain and need for mechanical dilation,45,46 others reveal no benefit in misoprostol administration among postmenopausal patients.37,48 Of note, the highest quality systematic review and meta-analysis published on this topic does not distinguish between the efficacy of cervical preparation by menopausal status.37 In addition, the application of vaginal estradiol 25 micrograms daily for 14 days before the procedure along with a one-time dose of preoperative vaginal misoprostol 400–1,000 micrograms appears to have superior cervical ripening effect than misoprostol alone for postmenopausal patients.49,50 A 2-week course of vaginal estrogen can be considered for postmenopausal women undergoing operative office hysteroscopy, though the time investment is likely not worthwhile for those undergoing diagnostic procedures with smaller hysteroscopes.

Evening primrose oil is another pharmacologic treatment option for cervical preparation that is inexpensive and well-tolerated. Published studies have examined the use of two to six 500 mg capsules placed vaginally 2–6 hours before hysteroscopy.51–53 A 2021 randomized controlled trial specifically demonstrated efficacy in postmenopausal patients.52 Evening primrose oil can be purchased over-the-counter and may present an alternative or adjunct to misoprostol in locations where misoprostol is not readily available.

Vaginal osmotic dilators (laminaria) have also been shown to be effective for cervical preparation before hysteroscopy. The same 2015 Cochrane review concluded that patients who underwent placement of laminaria one or two days preoperatively were less likely to require intraoperative mechanical cervical dilation than those who received misoprostol.37 This finding was replicated in a subsequent 2016 randomized controlled trial comparing laminaria placement to misoprostol administration and intraoperative mechanical dilation.54 However, patients who received laminaria had significantly higher pain scores in the interval between application and hysteroscopy.54 In addition, laminaria placement requires a separate office visit before the procedure, which may not be logistically feasible for patients. Benefits of misoprostol over laminaria include reduced cost, ease of administration, and patient acceptability.55

Lastly, intracervical dilute vasopressin has been associated with reduced force needed at the time of mechanical dilation for operative hysteroscopy.56 We urge caution with this technique in the office given the potential for rare and serious cardiovascular side effects secondary to intravascular vasopressin.
Furthermore, office procedures tend to involve smaller equipment and decreased relative complexity compared with hysteroscopies performed in the operating room, thereby limiting the advantages of reduced blood loss and fluid absorption conferred by vasoconstrictors.

**PAIN-MANAGEMENT STRATEGIES**

Pain experienced during hysteroscopy may arise from one or multiple inciting events, which include speculum placement, tenaculum application, mechanical cervical dilation, hysteroscope insertion through the cervix, endometrial cavity distension, and disruption of the endometrium.\(^1\) Individualized counseling and decision-making surrounding pain-management options is crucial to a successful office hysteroscopy program. By definition, office hysteroscopy precludes the use of parenteral, regional, or general anesthesia.\(^1\) Options for treatment of pain in the office setting include no medication, oral nonsedating medications, administration of local (intra- cervical and paracervical) anesthetic agents, and conscious sedation with oral or inhaled therapies. Although there is extensive literature surrounding methods to reduce pain during office hysteroscopy, no single regimen has been associated with superior outcomes.\(^1\)

Pain and cervical stenosis are the primary reasons cited for failed or incomplete office hysteroscopy procedures.\(^2,58\) Individuals with severe dysmenorrhea, in particular, have an elevated risk of experiencing periprocedural pain.\(^59\) We suggest implementing baseline comfort measures for all patients, with special attention paid to those with chronic pain conditions. These can include warmed instruments, heating pads, music, guided visualization, transcutaneous electrical nerve stimulation (TENS), and allowing space for a support person at the visit if desired.\(^60,61\) We recommend practicing trauma-informed care, which incorporates practices to respect and aid trauma survivors in engaging with gynecologic care.\(^62\) These universal trauma precautions should include patient-centered communication and ensuring that patients have choices and control over how and when to undergo gynecologic examinations.\(^62,63\)

Numerous studies have investigated the use of local anesthetic applied to the genital tract at the time of office hysteroscopy. A 2017 Cochrane review concluded that patients who received local anesthetics instead of placebo appeared to have decreased mean pain scores.\(^64\) However, the authors believed this was unlikely to be clinically significant and judged the data as low- to-moderate quality.\(^64\) Since that time, a systematic review and meta-analysis of 37 randomized controlled trials was published in 2020 and found that local anesthesia was associated with pain reduction irrespective of the site of application (ie, topical, transcervical, intracervical, or paracervical) or the type of local anesthetic used (lido- caine, bupivacaine, prilocaine or mepivacaine).\(^65\)

Adverse effects linked to local anesthetic administration can include discomfort at the site of tenaculum placement or injection. **Local anesthetic systemic toxicity** refers to rare central nervous system or cardiac effects that are most often associated with inadvertent intravascular injection or administration above the maximum recommended dose. The addition of dilute epinephrine to local anesthetic solution reduces systemic absorption and can be considered based on the clinical scenario.\(^66\)

With the advent of vaginoscopic techniques and miniaturized instruments that limit the need for cervical instrumentation, it is critical to understand the effects of systemic analgesia for office hysteroscopy. A 2020 systematic review and meta-analysis sought to investigate pain medications and techniques excluding genital tract instrumentation.\(^67\) This study incorporated data from 16 randomized controlled trials and found that nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, antispasmodics, and TENS were all associated with statistically significant reductions in pain compared with control groups. However, only NSAIDs and TENS showed no increased rates of adverse events.\(^67\) A 2019 network meta-analysis that examined pain during endometrial sampling after office hysteroscopy found that naproxen, specifically, was associated with the greatest reduction in pain.\(^68\)

Other interventions included tramadol, the antispasmodic drotaverine hydrochloride, and lidocaine (spray and paracervical application); diclofenac was the only other NSAID included in the analysis.\(^68\)

Other considerations include use of the smallest instruments possible. A 2021 systematic review of 10 randomized controlled trials revealed that smaller and mechanical devices such as hysteroscopic tissue-retrieval systems and scissors are associated with improved pain control compared with larger or electrosurgical hysteroscopic instruments.\(^69\) In particular, hysteroscopes less than 5 mm in diameter appear to cause the least discomfort and maintain high diagnostic sensitivity.\(^70–72\) A randomized controlled trial of 362 postmenopausal patients showed that use of a 3.5-mm hysteroscope was associated with reduced pain compared with a 5-mm hysteroscope coupled with paracervical injection of local anesthetic.\(^70\) Diagnostic hysteroscopy performed with a narrow-caliber hysteroscope may not require adjuvant pain control for all patients. However, a 2016 systematic review found that 17% of women experienced moderate or severe pain with the use of hysteroscopes up to
3.7 mm in diameter, defined as pain score 5 out of 10 or higher on a visual analog scale.\textsuperscript{73} For operative procedures that require larger instruments, we recommend performing shared decision-making with the patient to individualize pain management based on the patient’s preferences.

**EQUIPMENT FOR OFFICE PRACTICE**

There are two primary hysteroscope models available for use in office practice: flexible and rigid hysteroscopes (Fig. 2). Flexible hysteroscopes most often use a zero-degree viewing angle, in which the image aligns with the sheath of the endoscope. The physician controls a mobile tip that can be deflected upward or downward to navigate the cervix and uterus and provide a panoramic view of the endometrial cavity. Flexible hysteroscopes are typically less than four mm in outer diameter. There is a variety of reusable flexible hysteroscopes that typically have longer working lengths and may be more suitable for patients with obesity. In contrast, rigid hysteroscopes generally contain 12-degree or 30-degree viewing angles, which facilitate visualization of operative instruments and tubal ostia. The outer diameter of the sheath most often ranges from 3 mm to 10 mm. In 2001, a randomized controlled trial was undertaken to compare flexible and rigid instruments 3.6–3.7 mm in diameter in the office setting. This study showed that although rigid hysteroscopes were associated with greater patient discomfort, they demonstrated improved hysteroscopic view and diagnostic accuracy.\textsuperscript{74}

Most operative hysteroscopes contain a rigid sheath and an operative channel. This allows for passage of various instruments such as scissors, graspers, and mechanical morcellators or tissue shavers. Mechanical tissue-retrieval systems are single-use and use reciprocating blades to excise tissue, which is collected through the instrument. Electrosurgical instruments may also be used in the office, though these generally require a larger-diameter hysteroscope.

Disposable, digital hysteroscopes are also available as an alternative to reusable instrumentation for office practice. These incorporate a single-use cannula with an image projected onto a hand-held viewing device.
screen. Certain models contain an operative channel that can allow for visually directed biopsy, polypectomy, or foreign body removal.

When possible, we recommend use of a video-monitoring system that allows patients and other personnel to view the procedure as desired. For all reusable equipment, physicians and staff should be careful to follow the manufacturer’s recommendations to ensure sterilization.

**SPECULUM-ASSISTED AND VAGINOSCOPIC APPROACHES**

In their 2021 international consensus document, experts from the AAGL, the European Society for Gynaecological Endoscopy, and the Global Community of Hysteroscopy characterized approach of hysteroscopic procedure as either speculum-assisted or vaginoscopic. 12 Speculum-assisted hysteroscopy represents the traditional approach, which involves inserting a speculum into the vagina to visualize the cervix and grasping it with a tenaculum (Fig. 2A). The tenaculum allows the physician to straighten the axis of the uterus and maintain traction on the cervix during instrumentation. With the advent of smaller and flexible hysteroscopic equipment, many physicians have moved away from using a tenaculum during speculum-assisted hysteroscopy. In contrast, vaginoscopy obviates the need for conventional instrumentation by distending the vagina with fluid and inserting the hysteroscope into the posterior vaginal fornix before visualizing the cervix and passing the hysteroscope into the uterus (Fig. 2B). Vaginoscopy is also deemed the “no touch” technique and can be performed with rigid or flexible hysteroscopic equipment.2

Compared with speculum-assisted hysteroscopy, vaginoscopy is associated with decreased pain and similar rates of procedural success during office hysteroscopy. A 2010 systematic review of six randomized controlled trials of 2,851 premenopausal and postmenopausal patients undergoing diagnostic office hysteroscopy showed that those who received vaginoscopy had significantly lower periprocedural visual analog scale pain scores.75 There were no differences between groups in terms of proportion of failed office hysteroscopies.75 An updated review by the same research group was conducted in 2020 given increased adoption of vaginoscopy and new literature on the topic.76 Pain reduction was again noted with vaginoscopy compared with speculum-assisted hysteroscopy, with no differences in patient or physician acceptability or patient satisfaction. Failed procedures using one approach were successfully completed with the other approach in 75% of cases identified.76

There are multiple well-described techniques for troubleshooting during vaginoscopic procedures. These include direct application of suprapubic pressure or relying on full bladder distension to limit uterine anteflexion. The vaginal opening can be occluded with manual compression of the labia majora or use of a balloon catheter.1,77 Vaginoscopy may be particularly suited to adolescents and individuals with a narrow vaginal introitus.77

**VISUALIZATION AND FLUID MANAGEMENT**

Using distending media is critical for optimal visualization and prevention of complications during hysteroscopy. Distension of the endometrial canal is accomplished with either carbon dioxide (CO2) gas or fluid media, which are generally classified by viscosity and electrolyte composition.1 Carbon dioxide should be used only for diagnostic procedures with a low-pressure hysteroscopic insufflator. These low-flow gas systems can adjust insufflation from 0 to 100 mL/minute and pressure from 0 to 150 mm Hg. In comparison, laparoscopic CO2 insufflators use flow rates of 1 L/minute or more. Operative hysteroscopy with CO2 distending media poses an unacceptably high risk of gas embolism due to the use of higher intrauterine pressures, longer procedures, and increased likelihood of blood vessel disruption and systemic absorption of CO2.78,79

High-viscosity, hyperosmolar fluids such as dextran are no longer widely used due to elevated risks of volume overload and anaphylaxis compared with low-viscosity solutions and high rates of equipment damage.78 Electrolyte-containing, low-viscosity solutions such as normal saline or Ringer’s lactate are isotonic to human serum. These are preferred over electrolyte-poor solutions such as glycine, sorbitol, or mannitol due to decreased risks of hyponatremia in cases of excess fluid absorption. In select cases that involve monopolar electrosurgery, however, electrolyte-poor fluids are required because electrolyte-rich media prevent desired tissue effects through current dispersal.78 Electrolyte-rich fluids should be used during operative hysteroscopy involving mechanical or bipolar electro-surgical instruments.

Normal saline is the recommended distending media for office hysteroscopy given its safety profile. Although no studies have specifically examined Ringer’s lactate in office hysteroscopy, it shares properties of being isotonic and electrolyte-rich, and likely has similar risk profiles.78 A recent systematic review was performed to investigate the characteristics of distension
media associated with the lowest pain scores during office hysteroscopy.\textsuperscript{60} The authors identified 17 randomized controlled trials comparing distension media based on fluid type (normal saline vs CO\textsubscript{2}), pressure (normal saline at low vs high pressures), and temperature. They found that postprocedural pain was not affected by media type or temperature but appeared to be lowest with lower distension pressures.\textsuperscript{80}

As such, we recommend using normal saline for distension media at the lowest pressure that allows for appropriate visualization during office hysteroscopy. A maximum fluid deficit of 2,500 mL (calculated as fluid input–fluid output) is suggested for hysteroscopy using isotonic, low-viscosity solutions such as normal saline. This recommendation is based on expert consensus and aims to limit the risk of complications such as fluid overload, pulmonary edema, and heart failure.\textsuperscript{1,78} It is important to systematically monitor for excess fluid deficit in the office setting. This can be accomplished by setting a predetermined fluid input maximum (ie, using a 1,000 mL fluid bag or a series of premeasured syringes), using a manual system that monitors all potential sources of fluid return, or relying on an automated fluid management system. We recommend avoiding intravenous fluid administration during office hysteroscopy as this can exacerbate the risk of fluid overload.

Varying the pressure of fluid media during office hysteroscopy is an important strategy to aid in visualization. On initial entry into the uterus with the endoscope, the entire cavity should be examined, with care taken to identify and characterize the endometrium and endocervix, tubal ostia, and any intracavitary or submucosal pathology. We recommend also examining the cavity under decreased distension pressure to reduce the risk of false-negative findings attributable to lesion distortion or flattening (Appendices 1 and 2, available online at http://links.lww.com/AOG/C815). At other times, visualization may be distorted secondary to bleeding or lesions limiting endometrial distensibility. Increasing fluid pressure can be a useful technique in these situations for improving hemostasis and identification of pathology.

**CHALLENGES AND COMPLICATIONS**

Hysteroscopy is an extremely safe procedure, with complication rates of less than 0.3% reported in the largest studies.\textsuperscript{35,81} Overall, more complicated procedures are associated with higher risk of adverse events, as evidenced by more frequent complications occurring during operative rather than diagnostic procedures (0.95% vs 0.13%).\textsuperscript{35} In studies limited to office hysteroscopy, the most frequent complications listed include excessive pain, vasovagal reactions, and nausea or vomiting.\textsuperscript{82} These overlap with the most common adverse events that occur after other office-based procedures in which uterine access is obtained, such as placement of an intrauterine device or endometrial biopsy. As such, most gynecologists are well-versed in first-line management strategies. We review selected best practice strategies for troubleshooting and increasing patient safety.

Vasovagal reactions represent parasympathetic activation and may present with a combination of vital sign changes (bradycardia and hypotension) and symptoms such as dizziness, diaphoresis, nausea, vomiting, or loss of consciousness. Young age is a risk factor and well-recognized triggers include emotional distress, pain, warm environment, and hypovolemia.\textsuperscript{83} The frequency of vasovagal reactions during office hysteroscopy appears to be reduced with the use of a flexible rather than rigid hysteroscope and normal saline instead of CO\textsubscript{2} for distension.\textsuperscript{84,85} Management includes stopping the procedure immediately, monitoring vital signs, and initiating supportive care measures. These include repositioning in supine position with legs elevated (Trendelenburg), encouraging deep breathing, and using ammonia or other aromatic spirits. Although most vasovagal reactions will resolve with these interventions, intravenous fluids and atropine can be administered for persistent symptoms.\textsuperscript{1,83}

Half of hysteroscopic complications in all settings are associated with entry into the uterine cavity.\textsuperscript{35} During office hysteroscopy, challenging cervical dilation is likely to end in a failed procedure. Other possible outcomes include creation of a false passage or uterine perforation. Risk factors for perforation include extremes of uterine positioning (antversion or retroversion), anatomic distortion from pathology, need for mechanical cervical dilation and previous surgeries or adhesions.\textsuperscript{1} Some of these risks can be reduced with appropriate cervical preparation, appropriate patient positioning low on the table, placement of a tenaculum to straighten the axis of the uterus, the use of intraoperative ultrasound guidance, and hydrodistension through the hysteroscope during entry. In particular, the myometrium overlying the uterine cornua can be as thin as 4 mm, and special care should be taken when excising pathology at this location.\textsuperscript{66} Signs of uterine perforation include sudden loss of cavity distention, increased fluid deficit, and brisk bleeding. If perforation by an operative or electrosurgical instrument is suspected, injury to adjacent blood vessels and organs can occur. The patient should be transferred to a facility where the patient can be...
observed and laparoscopy or laparotomy can be performed expeditiously if indicated.

Postoperative infection is rare after office hysteroscopy, with a rate of 0.06% reported in a 2019 prospective study of more than 42,000 patients. In this study, the authors noted that patients who developed postoperative tubo-ovarian abscesses had evidence of distal tubal occlusion and hypothesized that this may represent a risk factor for infection. Given the low rate of infection, limited evidence of benefit, and potential for adverse events, prophylactic antibiotics are not routinely indicated at the time of hysteroscopy.

**POSTPROCEDURE FOLLOW-UP**

Patients can achieve fast return to normal activities after office hysteroscopy. We recommend pelvic rest for 48–72 hours after the procedure to limit the risk for postprocedure bleeding or infection. Patients are able to return to work and activities the next day. Regarding clinical follow-up, all pathology findings should be reviewed to determine whether additional treatment steps are needed and this must be communicated with the patient in a timely and confidential manner.

**STRATEGIES FOR IMPLEMENTATION AND COST EFFECTIVENESS**

Office hysteroscopy is an essential tool that gynecologists should offer widely to optimize patient care. A summary of best practices for integration of hysteroscopy into office practice are listed in Appendix 3, available online at http://links.lww.com/AOG/C815. These include the use of consistent approaches to the following components of the procedure: cervical preparation for patients at high risk of cervical stenosis or pain with dilation, individualized pain-management strategies, use of distension media, and video monitoring to engage patients in the procedure. Providing standardized patient education materials beforehand can also aid in expectation setting. We recommend training a consistent team, including front desk staff and clinical assistants. Similarly, electronic medical record procedure templates can aid in ease of documentation for physicians and staff. Taken together, these strategies can limit wait times and enhance patients’ experiences with the procedure.

Cost and reimbursement are important considerations for the implementation and sustainability of an office hysteroscopy practice. Compared with procedures performed in the operating room, office hysteroscopy is associated with reduced hospital overhead, staffing, and anesthesia costs. Physician reimbursement for the procedure is determined by relative value units, which are assigned according to the resource-based relative value scale used by the Centers for Medicare & Medicaid Services and most other insurance providers. Relative value units are allocated by procedure and calculated to incorporate physician work, practice expenses, and malpractice insurance costs. Practice expenses are valued higher for hysteroscopy procedures performed in the office rather than the operating room, to account for the costs of maintaining an outpatient practice. This in turn may be associated with comparatively increased physician reimbursement for office hysteroscopy depending on the relevant practice model. In many cases, the above payment structure allows for sustainable and cost-effective practice models that incorporate office hysteroscopy.

Training and education are also essential components of maintaining and increasing access to office hysteroscopy broadly. We advocate for the integration of office hysteroscopy techniques into residency training. Once in practice, continuous education through simulation and apprenticeship models can aid individuals and the clinical team in staying up to date on new techniques. This can involve simulation sessions at regional and national conferences, partnership with industry representatives, and dedicated surgical courses or fellowship training as desired by the individual.

**FUTURE APPLICATIONS**

Potential applications for office hysteroscopy continue to evolve with the emergence of new technologies and evidence. Novel approaches include the use of a hysteroscopic collection device to obtain cytologic sampling of the distal fallopian tubes to screen for ovarian cancer. The feasibility of this technique was demonstrated in a 2020 pilot study, which showed a 68% yield from visualized tubal ostia and high concordance with surgical pathology. Other proposed techniques for hysteroscopy include primary management of missed abortion, embryo inspection in cases of fetal anomalies, post-abortal endometrial evaluation after missed abortion, and tubal patency assessment in cases of difficult cannulation. Further research is needed to investigate and establish the utility of these techniques.

**CONCLUSION**

Hysteroscopy has been available since 1869, when Pantaleoni first visualized a likely endometrial polyp in a woman with postmenopausal bleeding. However, more than a century later, despite adequate office reimbursement and myriad publications detailing its safety and superiority over blind sampling of the
endometrium, gynecologists have not fervently embraced office hysteroscopy. With the advent of miniaturized flexible, rigid, and disposable hysteroscopes, visualization of the endometrial cavity, cervix, and proximal tubal ostia can be rapidly available for all gynecologists in the office setting.

As gynecologists, our hysteroscope is our stethoscope for evaluating intrauterine health. We advocate for universal education of obstetrics and gynecology trainees in the safe and effective use of office hysteroscopy. For those who have completed training, there are many ways to adopt and embrace hysteroscopy, including apprenticeships, participation in hands-on simulation, and attending regional and national conferences. Office hysteroscopy is a fundamental domain of the modern gynecologist, and we urge physicians to advocate for their patients and institutions in championing its use.

REFERENCES


512 Orlando and Bradley Office Hysteroscopy Implementation OBSTETRICS & GYNECOLOGY

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