Office Hysteroscopy

Setting up Your Practice for Success

Anna Zelivianskaia, MD[a,*], James K. Robinson III, MD, MS[b]

KEYWORDS

• Office • Outpatient • Intrauterine adhesions • Asherman syndrome • Hysteroscopy • Abnormal uterine bleeding

KEY POINTS

- Hysteroscopy is the gold standard for the evaluation of abnormal uterine bleeding and intrauterine pathology. With advances in hysteroscope size and operative instruments, office hysteroscopy has become more practical and effective.
- Vaginoscopy is a hysteroscopic technique without a speculum or tenaculum with the greatest patient comfort and lowest pain levels.
- Many types of instruments and sterilization methods are available for the office hysteroscopy practice with unique cost-benefit factors.
- General anesthesia is not required, and minimal medication can be used for adequate pain control in office hysteroscopy, particularly with the vaginoscopy technique.
- The decreased costs of office hysteroscopy compared with the operating room setting have been demonstrated, but reimbursement challenges still exist.

Video content accompanies this article at http://www.obgyn.theclinics.com.

INTRODUCTION

Hysteroscopy is a minimally invasive method of assessing the uterine cavity and addressing pathology. The procedure was first performed in 1869 and office hysteroscopy began in the 1980s.[1] Advancements in technology allowing for smaller instruments and lower costs have allowed office hysteroscopy to become more practical.[1,2]

Hysteroscopy is the gold standard for the diagnosis of abnormal uterine bleeding.[3] Hysteroscopy with tissue sampling has lower false positives and false negative rates than endometrial biopsy, blind dilation and curettage, hysterosalpingography, or

[a] Department of Obstetrics and Gynecology, MedStar Washington Hospital Center, Georgetown University School of Medicine, 110 Irving Street, Washington, DC 20010, USA; [b] Women's and Infants' Services, Minimally Invasive Gynecologic Surgery, MedStar Washington Hospital Center, 106 Irving Street, Northwest Suite 405 South, Washington, DC 20010, USA
* Corresponding author.
E-mail addresses: Anna.S.Zelivianskaia@medstar.net (A.Z.); James.K.Robinson@medstar.net (J.K.R.)

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ultrasound techniques.[3] Ultrasound is limited in delineating endometrial thickening from other intrauterine lesions.[4] While saline infusion sonogram (SIS) can better distinguish endometrial thickening from other pathology compared with routine ultrasound, SIS is also painful and has limitations in the identification of pathology specifics.[4] For example, SIS cannot distinguish a cluster of polyps from a submucosal leiomyoma. Hysteroscopy provides a more comprehensive evaluation and misses less than 0.5% of serious pathology.[3] One study noted the sensitivity of ultrasound, SIS, and office hysteroscopy to be 56%, 81%, and 87%, respectively.[5] The specificity of these three modalities was 72%, 100%, and 100%, respectively.[5] Hysteroscopy is also superior for the identification of focal lesions causing abnormal uterine bleeding when compared with either ultrasound or endometrial biopsy.[6] Removal of endometrial polyps under direct visualization is preferable to blind curettage, which is lower in accuracy and may not remove the entire lesion.[7]

Indications and Efficacy

Indications for hysteroscopy are described in **Box 1**. There is substantial overlap in the indications for office or outpatient surgery hysteroscopy. This list is not exhaustive and other reasons may exist in individualized patient scenarios. Posttreatment follow-up is a broad indication that can apply to follow-up for various medical or surgical treatments. For example, hysteroscopy can be performed after tamoxifen use to evaluate for malignancy or after a myomectomy or septoplasty to evaluate for intrauterine adhesions.[6] Indications for removal of polyps or fibroids via operative hysteroscopy are abnormal uterine bleeding, infertility, or recurrent pregnancy loss.[7] Indications for intrauterine adhesiolysis are secondary amenorrhea, irregular menstruation, or imaging evidence of adhesions in women pursuing fertility.[7]

Hysteroscopy is a safe and effective tool for the identification and treatment of the intrauterine pathology described above. The success of hysteroscopic myomectomy, usually performed in the operating room, is dependent on the type of fibroid, but

Box 1
Indications for hysteroscopy

- Abnormal uterine bleeding
- Cesarean scar defect (Isthmocele)
- Foreign body or intracavitary mass
  - Endometrial polyp
  - Submucosal fibroid(s)
  - Retained products of conception
  - Cystic adenomyosis
  - Imbedded IUD or IUD with a lost string
- Endometrial thickening
- Infertility
- Implantation difficulties or recurrent pregnancy loss
- Suspected or known congenital vaginal, cervical, and/or uterine Mullerian anomaly
- Suspected or known intrauterine adhesions
- Posttreatment follow-up
- Preoperative planning
- Vaginal lesions in patients that cannot tolerate a speculum examination

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overall success rates are quite high for fibroids of which greater than 50% are within the cavity. Staged resections may be required for large submucosal fibroids.[7] Success rates of hysteroscopic lysis of adhesions, performed in either the operating room or office setting, are also high and ranges from 88% to 95%.[8,9] Reformation of adhesions is possible but does not occur in most women. Prevention strategies for recurrent adhesions are outside the scope of this article.

See and Treat Approach in Office Hysteroscopy

Diagnostic hysteroscopy includes a visual assessment of the uterine cavity to note any visual pathology. Operative hysteroscopy allows for the ability to treat any observed pathology. There is significant overlap in indications for diagnostic and operative procedures and if a procedure is started with diagnostic intent, the "see and treat" approach can be used.[4] The "see and treat" approach allows a seamless transition from diagnostic to operative hysteroscopy if abnormal pathology is noted and the patient continues to tolerate the procedure.[4] Assuming proper set-up and instrumentation availability, this technique allows for the fewest number of interventions for proper patient care. Both diagnostic and operative office hysteroscopy procedures have high success rates with a meta-analysis showing the overall success of diagnostic hysteroscopy to be 96.6%.[10] A large retrospective review found successful completion of diagnostic office hysteroscopy in more than 97% of attempted cases.[11] The same study demonstrated that immediate treatment by polypectomy was possible in more than 65% of cases whereby diagnostic hysteroscopy was successful, and an endometrial polyp was identified.[11] Factors associated with successful concomitant treatment were younger age, lower BMI, and smaller polyp size.[11] A randomized control trial comparing office polypectomy to removal in the OR found one woman out of 20 randomized to the office arm was not able to complete the procedure due to cervical stenosis.[12,13] All other procedures were successful and office hysteroscopy had decreased pain and increased satisfaction.[12]

Discussion of Hysteroscopy in the Office Practice Setting

Patient selection and preparation

There are few contraindications to office hysteroscopy, which include pregnancy, active pelvic inflammatory disease, or active herpetic or human papilloma virus infections, and are the same contraindications to performing hysteroscopy in the operating room. However, selecting the appropriate patient for the procedure is important.[6] Similar to hysteroscopy in the operating room, informed consent must be obtained before the procedure. Information on the size and location of intracavitary pathology, anticipated resection time, and physician expertise should all be considered. Additional criteria for patient selection in the office are partly dependent on the need for conscious sedation or another type of anesthesia. For example, patients with comorbidities such as sleep apnea may not be good candidates for office hysteroscopy requiring conscious sedation without an anesthesia team present.[7] Additionally, patients with significant anxiety or a history of a failed office procedure may not be good candidates for this setting. In randomized trials with appropriately selected patients, office hysteroscopy was preferred when compared with the operating room.[7] Office hysteroscopy was associated with higher patient satisfaction and faster recovery time.[7]

No significant workup is required before an office hysteroscopy procedure, but a pregnancy test immediately before the procedure is necessary.[7] Office hysteroscopy should ideally be performed during the early proliferative phase of the cycle, shortly after menstruation, to achieve the best visualization of the cavity.[8] In patients where

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menstrual timing is challenging, performing the procedure after a progestin withdrawal or after 3 weeks of continuous progestational therapy is also effective. No antibiotic prophylaxis is indicated before hysteroscopy procedures.[8]

Instruments

The 5 key components of an office hysteroscopy set-up are the hysteroscope, endocamera, monitor, light source, and light cable.[14] Most of the hysteroscopes currently in use for diagnostic and/or operative procedures have continuous flow with an operating channel that allow for the insertion of instruments.[14] The development of hysteroscopes with smaller diameters have made these procedures more comfortable and more likely to be performed with little or no anesthesia, as discussed later in discussion.

Hysteroscopes can be either reusable or disposable (**Table 1**). Within these categories, hysteroscopes can be further divided into the following: flexible, hysterofiberscopes, and rigid rod lens. Hystero-fiberscopes are rarely used because they are costly, not durable, and difficult to sterilize.[14] We will limit our discussion to flexible and rigid hysteroscopes.

Reusable or disposable semirigid instruments that are commonly used for operative office hysteroscopy include scissors, grasping or biopsy forceps, tenacula, and polyp snares. Scissors are useful for lysing intrauterine adhesions and undermining various pathologies, such as polyps, small submucosal fibroids, or retained products of conception. Biopsy forceps are intended for tissue sampling. Pathology extraction is often facilitated by the utilization of grasping forceps, tenaculum, or snare.

5 French (Fr) monopolar and bipolar wire tip electrodes can also be used in the office but require the use of a radiofrequency generator, appropriate distention media, and a formal fluid management system to accurately follow fluid deficit. More recently, a 5 mm bipolar office-resectoscope was developed which allows the use of 15 Fr loop, wire, and coagulation tips (Karl Storz) for true resectoscopic surgery often without cervical dilation. Similarly, multiple small gauge tissue morcellators are also on the market that can be used without cervical dilation in selected patients (see **Table 1**).

Distention media

There are several types of distention media used for hysteroscopy, including high viscosity fluid, low viscosity fluid, and gas. High viscosity media has the advantage of not mixing with blood, which facilitates the evaluation of the uterine cavity in the presence of bleeding.[15] The most commonly used high-viscosity fluid for uterine distention is a hyperosmolar solution of 32% dextran 70 in 10% glucose.[15] However, the high osmolality of this fluid can lead to cardiovascular issues and pulmonary edema at relatively low volumes.[15] Due to the risk of adverse events and the tendency of dextran 70 to caramelize on instruments if not immediately cleaned, it is not a media commonly used for hysteroscopy.[15]

The most used media for distention in office hysteroscopy is saline, a low viscosity electrolyte-rich solution. This is a relatively safe solution that is used with bipolar energy and does not cause electrolyte imbalance but can cause fluid overload and pulmonary edema if absorbed in very large quantities.[15] This risk is extremely low with short office procedures. Lactated ringer's is presumed to have the same qualities but has not been specifically tested in the office hysteroscopy setting.[15] Electrolyte-poor solution, such as 1.5% glycine, 5% mannitol, or 3% sorbitol, is required if monopolar energy is used. The use of monopolar energy is less common in office hysteroscopy than bipolar energy. These electrolyte-poor solutions are also low viscosity

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Table 1
Disposable office hysteroscopy equipment

Product	Disposable	Diagnostic	Operative	OD (mm)	Instruments	One Time Cost	Per Use Cost	Notes
Myosure Manual	Partial	X	X	3.7–6	Manual Tissue Removal Device	Scope $9655	Device $550	Tissue Removal Device is disposable
Benesta Hysteroscope	Partial	X	X	5.8	Disposable tissue Removal Device with 15 mm cutting window	Scope $3753		
Lina OperaScope	Yes	x	x	4.2	Biopsy forceps, Rat tooth, scissors, Lasso (10 and 16 mm), Angled Lasso (10 and 16 mm)	N/A	$258	Operative instruments range $49–149
EndoSee Advance	Partial	x	x	4.3	Biopsy forceps, scissors, Alligator grasper, Spoon	$2995 for reusable Scope bundle	$175	Single use semi flexible cannula. Reusable handpiece and monitor
Luminelle 360	Partial	x	x	3.7–5.7	Dilating rotosheath	$3000 for reusable Scope; $4500 for reusable Scope bundle	$99–150	Reusable scope, Single use dilating rotosheath
Aveta System	Yes	x	x	4.6	Aveta Auto Morcellator	N/A	Opal scope $150 Coral Scope $250 Auto resector $450	Suction within the handle, tissue container attached, auto morcellation with 7 mm cutting window

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and provide excellent visualization but can affect the systemic sodium balance if absorbed in large quantities.[15] Excessive fluid absorption will lead to hyponatremia, which can cause cerebral edema and other neurologic issues.[15]

Carbon dioxide (CO_2) is another option used historically because it is generally well-tolerated and does not distort the view of the uterine cavity.[14] However, CO_2 can lead to uterine spasm, subdiaphragmatic irritation, or embolism in rare cases. Recent literature suggests that electrolyte-rich fluid is the preferred distention media, especially during operative procedures, as the continuous inflow and outflow can clear blood, clots, and debris.[3,14] Saline has lower costs compared with CO_2 and allows for the use of bipolar instruments.

Distention media can be delivered using atmospheric pressure, a "squeeze bag" pressure system, or an electronically controlled fluid management system.[14] We use a pressure bag set-up (**Fig. 1**). This type of setup is more economical than a complete fluid management system but does not allow the exact measurement of how much fluid the patient has absorbed. Fluid can leave the uterus by the outflow channel, leakage from the cervix or fallopian tubes, or extravasation.[16] The primary mechanism of systemic fluid absorption during hysteroscopy is through extravasation via venous sinuses in the endometrium and myometrium.[15] While the inability to precisely measure fluid inflow and outflow is a limitation, absorption of clinically relevant volumes of fluid distention media is a rare occurrence in office hysteroscopy whereby mechanical or radiofrequency resectoscopic procedures are not being used. Additionally, one can conservatively limit fluid intake by using a 1L fluid bag for the procedure. When more advanced resectoscopic techniques are used, a formal fluid management system is a necessity.

Sterilization or high-level disinfection

Sterilization refers to the destruction of all microbial life, while high-level disinfection uses an enzymatic agent to destroy all recognized pathogenic microbes but not necessarily all types of microorganisms such as bacterial endospores that might be present on inanimate objects.

Gas sterilization using either ethylene oxide gas or vaporized hydrogen peroxide gas plasma (STERRAD) are the techniques most compatible with reusable rigid and flexible hysteroscopes. Gas sterilization can be performed at a well-equipped clinic location or at an off-site facility using a medical equipment transport service. High-level

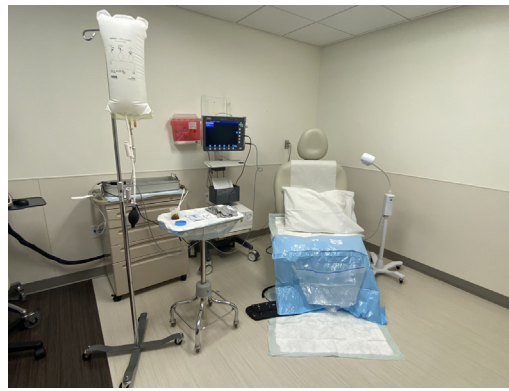

Fig. 1. Example of office hysteroscopy room setup. A pressure bag system and drape to catch fluid are used.

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disinfection, using an enzymatic solution, can be performed in most office settings without a significant financial investment. Several considerations should be considered before committing to a preferred processing solution.

Before processing reusable instruments, the hysteroscope must be taken apart and any soiled areas wiped down. Then the hysteroscope should be cleaned with hot water and the lumen flushed with distilled water. Lenses should be buffed immediately after use. Alternatively, water and a detergent cleaning solution can be used in this precleaning step.[17] The hysteroscope can then be processed using the approved technique according to manufacturer instructions. This is usually accomplished with either autoclave, the highest level of sterilization, or high-level disinfecting enzymatic solution. The latter is more cost-effective but may not comply with specific institutional requirements.

If using an enzymatic solution, it should be diluted according to label instructions and the hysteroscope soaked for 5 to 15 minutes.[17–19] Several kinds of enzymatic solutions are on the market, including Steris Prolystica and Cidex OPA solutions.[19,20] The device and components should then be scrubbed and rinsed under hot water, followed by a rinse with purified water.[18] If gas sterilization is used, the scrub and rinse steps should be completed first.[18] Alternatively, rigid hysteroscopes and instruments can be sterilized in the autoclave at 134°C.[17] After sterilization or high-level disinfection is complete, the instruments must be packaged carefully to maintain sterility.[17]

Vaginoscopy versus traditional hysteroscopy technique

For any type of hysteroscopy, the patient should be positioned in the dorsal lithotomy position, taking care to avoid unnecessary pressure that may cause nerve injury. It is helpful to perform a bimanual examination before the procedure to assess the position of the uterus. Patients are usually most comfortable if asked to void before the procedure. The hysteroscope needs to be set up, the camera white-balanced and focused, and the inflow tract primed (see **Fig. 1**; **Figs. 2–4**).

With the traditional technique, a speculum is first inserted. The cervix is visualized and grasped anteriorly with a single-tooth tenaculum or allis clamp.[1] The cervix is then dilated, if necessary, to the diameter of the hysteroscope being used and the hysteroscope is then inserted.[1] At the same time, counter traction is applied with the tenaculum to straighten the uterus.[1]

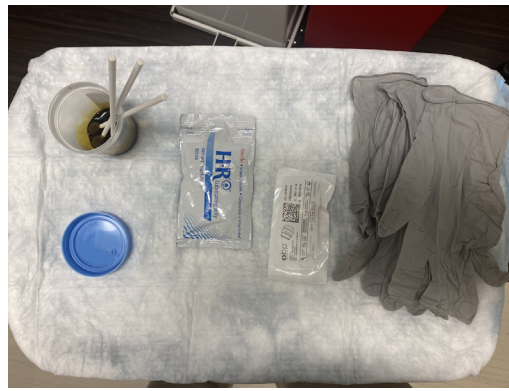

Fig. 2. Preparatory table for hysteroscopy procedure includes betadine solution, lubricant, and gloves.

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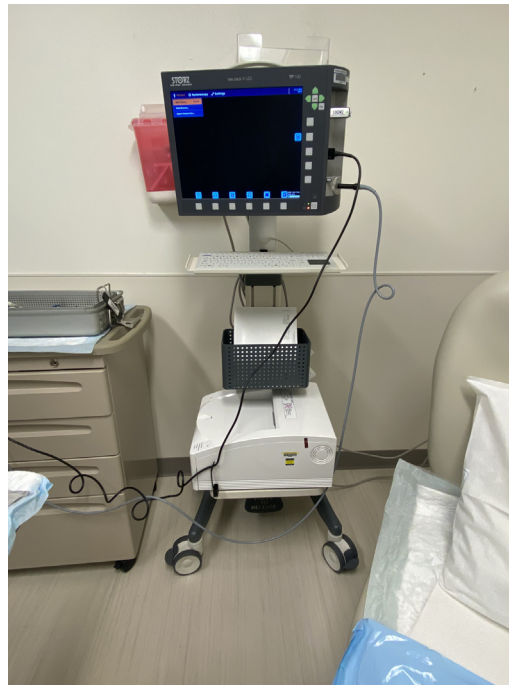

Fig. 3. Video monitor, light source, and printer.

With the vaginoscopic entry or no-touch technique, the need for the traditional instruments used for entry, such as a speculum or cervical tenaculum, is avoided. The provider begins vaginoscopy by introducing the hysteroscope with distention fluid flowing into the vagina (**Fig. 4**). The posterior fornix is easily identified, and the scope is advanced upwards to identify the external os. Once the cervix is located, the hysteroscope is carefully inserted and passed through the internal os into the uterine cavity under direct visualization. Distention media is flowing throughout these steps to expand the cervical canal and cavity.[1–7] If entry is challenging, the uterus can be brought to a more axial position by applying pressure above the pubic symphysis or

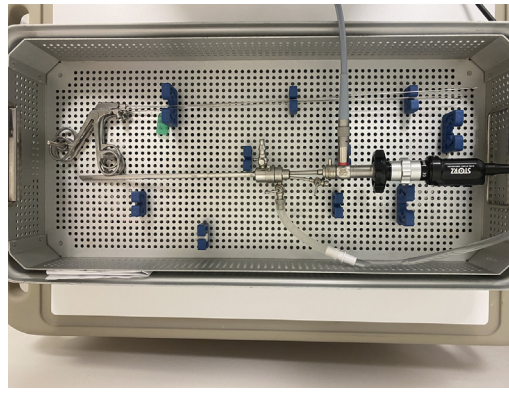

Fig. 4. Sterile rigid hysteroscope and reusable instruments.

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anterior pressure digitally through the rectum.[7] Full bladder distention will also reduce uterine anteflexion. Multiple studies have shown there is no difference in failed procedures when comparing vaginoscopy to the traditional hysteroscopic technique.[7] Vaginoscopy leads to significantly decreased pain, as described further in the next section.[16] (Video 1).

In patients with a nulliparous or stenotic cervix, placement of a speculum for the dilation of the external cervical os followed by removal of the speculum before the placement of the hysteroscope is often sufficient to allow the utilization of the better tolerated vaginoscopic technique.

Pain management

The office hysteroscopy experience begins with entry into the examination room and mitigation of patient anxiety is a vital component. Efficient room setup and calming techniques, such as music or dim lighting, can alleviate patient anxiety and reduce the perception of pain.[21] Constant communication during the procedure leads to a more positive perception of the procedure during office hysteroscopy and may lower anxiety levels.[22]

There are multiple studies describing office hysteroscopy performed without analgesia, even with the use of bipolar electrocautery.[11,23] Sensory innervation is largely absent in endometrium, polyps, adhesions, and myomas. In one large study, the mean pain score during office hysteroscopy was 3.57 out of 10.[6] The mean pain levels with no-touch vaginoscopy are significantly lower compared with the traditional technique utilizing a speculum and cervical stabilizing instruments.[25] Smaller hysteroscopes, less than 5 mm, are also associated with decreased pain. One randomized control trial showed lower pain levels with a 3.5 mm hysteroscope compared with either a 5 mm hysteroscope or a 5 mm hysteroscope with paracervical block.[24] Factors associated with higher levels of perceived pain include cervical stenosis, postmenopausal status, anxiety, and chronic pelvic pain.[24]

Premedication with nonsteroidal anti-inflammatory drugs (NSAIDs) or opioids, such as tramadol or oxycodone, can also reduce discomfort. Administration of 800 mg ibuprofen 2 hours before the procedure has been shown to decrease patient discomfort.[1] A meta-analysis of studies comparing NSAID use to control groups showed a statistically significant decrease in reported pain levels during and after office hysteroscopy.[25] Opioid use 40 to 60 minutes before the procedure was also associated with decreased pain scores during and after office hysteroscopy compared with control groups.[25] Two studies reported a decrease in procedural pain with oral antispasmodic use 1 hour before the procedure compared with a control.[25] However, there was a statistically significant increase in adverse events with use of either opioids or antispasmodics.[25] One large study compared transcutaneous electrical nerve stimulation (TENS) against a control group for office hysteroscopy and showed a statistically significant pain reduction and no increase in adverse events.[25] Virtual reality headsets with a calming meditation application were subjectively well received by patients but did not show a significant decrease in objectively rated pain during office hysteroscopy with a vaginoscopic approach.[26]

Warming the saline distention media or adding ropivacaine or levobupivacaine can lower discomfort during the procedure. Paracervical block has been shown to decrease pain with tenaculum placement and cervical dilation,[7,11] but if vaginoscopy is used without the need for cervical dilation paracervical block is not helpful for pain management and increases the risk of a vasovagal reaction.

There is currently insufficient evidence to recommend routine cervical ripening. The use of vaginal misoprostol before the procedure can reduce pain during access in

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select women.[7] Misoprostol is a prostaglandin E1 analog and various dosages of misoprostol have been studied. A dose of 200 to 400mcg intravaginally is the most common dose if cervical ripening is desired.[7] Its use must be balanced with adverse effects of the medication, including abdominal cramping, increased body temperature, and vaginal bleeding.[7] One meta-analysis examining the effects of misoprostol showed that cervical dilation, cervical lacerations, and creation of false passage were significantly reduced after vaginal misoprostol administration.[27] These positive effects were not seen with oral or sublingual misoprostol administration.[27] In a subgroup analysis of diagnostic hysteroscopy, there was a lower need for cervical dilation, but it was not statistically significant.[27] If a need for cervical dilation is expected, it may be reasonable to pretreat with vaginal misoprostol to improve patient comfort and lower complications.

Economic challenges

Successful office hysteroscopy procedures have lower costs compared with similar procedures performed in the operating room due to lower anesthesia and facility costs. Additionally, from the patient perspective, women appreciate decreased procedure costs, faster recovery, and less time off work with less associated lost income.[6,24] However, several economic challenges to wider adoption of office hysteroscopy exist, including total costs and reimbursement in the office setting.

There is convincing evidence that if hysteroscopy can be accomplished in the office it is more cost-effective than performing the same procedure in the operating room. One study compared average costs of office hysteroscopy procedure with local anesthetic to OR hysteroscopy with either general anesthesia or local anesthetic and found considerable cost savings.[28] The cost for the office procedure was $482 compared with $716 and $1482 for OR hysteroscopy with local anesthetic and general anesthesia, respectively.[28] Decreased staff costs were the primary factor for cost savings.[28] A meta-analysis of office hysteroscopy compared with OR hysteroscopy also showed significantly decreased costs for the office procedures.[29] Specifically, the OR hysteroscopy cost range was $268 to 3144 and the office procedure cost range was $97 to 1258.[29]

In the last several years, the cost-effectiveness of office procedures has been recognized and reimbursement has increased, but this has not been universal for all types of office hysteroscopy. The relative value units (RVUs) associated with physician services are determined by the Medicare Resource-Based Relative Value Scale. Based on this system, certain office procedures are valued at a much higher relative value than others. For example, since 2017, a hysteroscopic polypectomy earns 6.71 RVUs in a facility but 38.51 RVUs if performed in the office.[9] This translates to an additional monetary reimbursement of approximately $1100.[9] It is important to know whether an office practice charges a facility fee as this may decrease reimbursement even if the procedure is not performed in the OR. Other types of hysteroscopies do not have a set amount of RVUs for the office setting and thus do not have the same significant monetary difference in reimbursement. For hysteroscopic lysis of intrauterine adhesions and hysteroscopic myomectomies, there is less than a $10 difference for a procedure performed in the office compared with a facility.[9] There is a moderate difference in reimbursement for diagnostic hysteroscopy in the office, which earns an additional 3.2 RVUs translating to an additional $115 in reimbursement amount per procedure.[9]

The decision to invest in reusable equipment as compared with disposable equipment must take many factors into consideration. Disposable instruments are convenient and do not require a significant capital investment or sterilization.

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Unfortunately, the cost of the disposables also cuts into reimbursement fees significantly. A busy office hysteroscopy practice can typically recoup capital investments for reusable instruments after approximately 50 office procedures.[10] Service agreements can also be purchased with all the major equipment suppliers as insurance against breakage, repair, and replacement which can be valuable. In general, it makes economic sense to use disposable equipment in a low-volume setting and reusable equipment in a high-volume setting. Given the wide range of indications for office hysteroscopy, most busy gynecology practices will be able to build a high-volume program without much difficulty. **Table 1** highlights some important cost considerations.

SUMMARY

Office hysteroscopy is a safe and effective method for the diagnosis and treatment of a wide range of intrauterine pathology. Unfortunately, it is underutilized, and this review aims to describe the building blocks of a successful practice. Office hysteroscopy is well-tolerated with minimal premedication, but proper patient selection and preparation are important. Additionally, using the vaginoscopy technique is better tolerated by patients with similar success rates. Recent improvements in procedural work RVUs incentivize the adoption of the technology. While economic and sterilization challenges exist, there are numerous options available that make the incorporation of office hysteroscopy in most busy gynecology practices both viable and profitable.

CLINICS CARE POINTS

- Office hysteroscopy is a safe and effective method for the diagnosis and treatment of various intrauterine pathologies, including abnormal uterine bleeding and infertility.
- Proper patient selection and preparation is crucial, but preprocedure workup is minimal and requires a pregnancy test.
- Many types of hysteroscope types exist and can be classified as either reusable or disposable.
- Office hysteroscopy can be accomplished with little to no anesthesia and the vaginoscopy technique leads to lower pain levels compared with traditional hysteroscopy.
- A successful and cost-effective office practice can be built with a thorough knowledge of reimbursement structures, equipment types, and sterilization methods available.

DISCLOSURE

The authors have nothing to disclose.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.ogc.2022.02.011.

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