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Review article

Tips and tricks in office hysteroscopy

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ABSTRACT

Office hysteroscopy is a minimally invasive procedure that has been shown to be highly accurate in diagnosing abnormalities of the endometrial cavity and the endocervical canal. It allows the direct visualizing of uterine pathology without the need for general anesthesia and the use of an operating room, generating cost savings and greater compliance among patients. The advent of small-diameter hysteroscopes, the use of saline solution as a distension media, as well as the vaginoscopic technique have widely contributed to the diffusion of this technique worldwide, and currently it can be considered the gold standard for the examination of the uterine cavity. The improved technology has also enabled surgeons to perform many operative procedures in an ambulatory setting without significant patient discomfort. With the development of miniaturized operative hysteroscopes and mechanical/electrified instruments, many surgical interventions on the uterine cavity can be actually performed safely and effectively in the office-based setting, introducing the concept of "see and treat hysteroscopy." This review provides several tips and tricks to maximize the chance of success of an office hysteroscopy, either diagnostic or operative.

Introduction

Technical and technological advances are continuously revolutionizing our everyday life, at times forcing us to race ahead just to keep up with the times. This is nowhere more true than in the field of surgery, which in recent decades has been all but reborn through modern technologies, leading to results that are both thrilling and astonishing, even in the eyes of the most skeptical.

Referring to gynecology, the most significant reflection of this frenetic and burgeoning progress is without doubt that seen in gynecologic endoscopy, and particularly in the field of hysteroscopy.

Hysteroscopy (from the Greek terms *hysteros* meaning uterus and *scopy* meaning to look) can be considered a real Copernican revolution of modern gynecology, because whereas laparoscopy simply modified the access to the abdominal cavity, hysteroscopy by contrast "enlightened" for the first time a cramped and dark space, which was never directly explored until the mid-19th century.

Hysteroscopy, in its early days, was considered the "Cinderella" subspecialty of gynecologic endoscopy, a modality that was both laborious and difficult to master because of its considerable technical challenges and deficiencies in terms of instrumentation. Indeed, it was rarely used in routine clinical practice, which has relied almost exclusively on "dilatation and curettage" (D&C) for the purposes of diagnosis and treatment of intrauterine pathologies.

Although some scientific societies and authors continue to emphasize the diagnostic and therapeutic role of D&C,[1–8] a large number of papers have extensively shown throughout the years the significant limits of this technique: (1) need for in-patient admission and general or locoregional anesthesia; (2) high risk of complications (i.e., perforation, adhesions, infections); (3) poor diagnostic accuracy.[3,4,9] Indeed, many studies have shown that D&C is characterized by a high number of focal lesions missed and consequently by an extremely high number of false negative uterine cavities.[10] Furthermore, D&C has no therapeutic role, with most endometrial disorders still present in the uterus after it is performed and with a high recurrence rate of bleeding symptoms.[9]

Over the past 40 years, the higher diagnostic accuracy related to the possibility of direct endoscopic vision of the distended uterine

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cavity together with continuous and rapid advances in technologies and techniques, have opened up new horizons for hysteroscopic modalities, which today are considered the gold standard of diagnostic and therapeutic options in the management of intrauterine pathologies, and, more recently, of those seen in the cervix and vagina.[11–13]

During the 1970–1980s, hysteroscopy was routinely performed using the so-called "traditional technique." This approach involved the use of a speculum and cervical forceps while viewing and examining the cervix under distension using CO_2 as the preferred gaseous medium. Owing to the large diameter of the hysteroscope, preparatory cervical dilatation was mandatory, using local or general anesthesia, followed by hospitalization during recovery (inpatient hysteroscopy).[14]

In the early 1990s, advances in technology and techniques made hysteroscopy less painful and invasive. While gaining an increasingly widespread acceptance in clinical practice, the method helped to reduce the number of procedures performed in the operating room. At the same time, the number of ambulatory procedures (office hysteroscopy) was seen to rise, which may also be attributed to the fact that office hysteroscopy has the inherent benefit of obviating the need for anesthesia and dilatation of the cervical canal.[15–17]

In subsequent years, numerous studies have indicated that office hysteroscopy has definite advantages in comparison with the blind techniques (D&C, Vabra, curette) and a diagnostic accuracy comparable to that of hysteroscopy in the operating room. In addition, the method provides added advantages, in that the risks associated with anesthesia are reduced, it generates cost savings, and has a greater compliance rate among patients.[9,18,19]

Currently, office hysteroscopy can be considered, in every respect, the gold standard for the examination of the uterine cavity, overcoming, in fact, the significant limitations of D&C and other blind techniques.

However, several tips and tricks are needed to maximize the chance of success of an office hysteroscopy, either diagnostic or operative.

Comfortable setting

Office hysteroscopy should be conducted outside of the formal operating theater setting in an appropriately sized, equipped, and staffed treatment room with adjoining, private changing facilities and toilet. As the patient is aware of everything that is going on, it is advisable to organize a relaxed setting, using a protected space with a comfortable seat (Fig. 1) and, if possible, create a family environment.[20,21]

The nurse should set up the room where the procedure takes place in order to ensure that all the necessary equipment and instruments are in proper working conditions and readily available.

It has been speculated that women who are anxious while undergoing a hysteroscopy usually experience more discomfort during the procedure. Therefore, if the doctor or a nurse is able to develop a plan of care that will help minimize the patient's anxiety, a more positive outcome and increased patient satisfaction can be expected.

During the procedure, the nurse or a resident should provide emotional support to the patient ("vocal local") and in order to further reduce the patient's anxiety the physician may also get the patient more involved into the procedure by inviting her to look at

Fig. 1. Setup of ambulatory hysteroscopy at the Department of Obstetrics and Gynecology of University "Federico II" of Naples: an ergonomic, electronically activated examination chair may facilitate in putting the patient in the proper position for the hysteroscopy, even in women with limited mobility at the knee.

the additional monitor and explaining the view or any abnormalities found.

Miniaturized rigid and flexible hysteroscopes

The standard rigid hysteroscopes used for decades had a diameter > 5 mm and so required cervical dilatation and local or general anesthesia.

The recent trend of reducing the size and diameter of hysteroscopes has largely contributed to the performance of hysteroscopy as an ambulatory procedure. In fact, the miniaturization of the instruments effectively reduces the difficulties both for the operator and for the patient, allowing even less skilled gynecologists to perform office hysteroscopy.[22] Moreover, it has been demonstrated that a smaller hysteroscope size make its introduction easier and less painful compared with conventional ones.[23,24]

Within the past few years, flexible hysteroscopes with a smaller diameter have demonstrated several advantages over the standard rigid ones in several studies.[25,26] Above all, they are less invasive thanks to the fact that there is no need for cervical dilatation, and thus less painful. However, their use is hampered by (1) higher costs for purchase and maintenance of the equipment; (2) increased effort for cleaning, disinfection, and sterilization; (3) a reduced image size on the monitor screen compared with full-size standard hysteroscopy; (4) greater frailty; and (5) greater difficulty in their use.

Oval profile rigid hysteroscopes

The uterine flexion angle makes the internal uterine ostium (IUO), which is usually circular, of oval profile, with a transverse main axis and a diameter of ~ 4–5 mm. The use of hysteroscopes featuring an oval profile and a total diameter between 4 mm and 5 mm is more strictly correlated to the endoscopic appearance of the cervical canal.

In fact, with a simple rotation of the scope on the endocamera by 90°, the operator can adequately align the longitudinal main axis of the scope with the transverse axis of the IUO.[27] Thus, it allows for an easy and less painful entrance of the hysteroscope into the uterine cavity.

Saline solution as a distension medium

CO_2 and normal saline are the most commonly used distension medium for office hysteroscopy. Although CO_2 is generally well tolerated, uterine distension with normal saline is preferred in office hysteroscopy, as it has been shown to be more comfortable for the patient, to be more cost-effective, and to provide a superior hysteroscopic view in case of intrauterine bleeding.[28,29] Furthermore, the vaginoscopic approach is much easier a with water distension medium.[28,30]

Liquid distension is normally used together with an electronically controlled irrigation and suction device, with the aim of obtaining a constant average uterine distension < 70 mmHg. In this way, a clear intrauterine view during the overall procedure is obtained. The risk of passage of the distension media into the abdomen is also reduced, thereby making the procedure safer.

Vaginoscopy

In 1997, Bettocchi et al[15] developed the “vaginoscopic approach” or “no-touch technique” for the atramautic insertion of the hysteroscope into the external uterine orifice, without the aid of the speculum or the tenaculum, introducing the scope directly into the vaginal canal. This method reduces patient discomfort and allows the performance of endoscopic examination even in virgo patients or in women who have severe vaginal atrophy or stenosis.[16,31,32]

To ensure a good vaginoscopic approach, the endoscopist starts to place the hysteroscope into the lower vagina and, with the introduction of the distension medium at a pressure of 30–40 mmHg (the same pressure used for the distension of the uterine cavity), progressively distend the vaginal cavity, without causing pain. The scope is driven to the posterior fornix until the operator can readily visualize the portio and then slowly backward to identify the external uterine ostium (EUO).

To pass the EUO, the operator should consider the fore–oblique view of 12–30° of all modern hysteroscopes: what is identified in the middle of the screen is, in reality, located 30° or 12° lower (depending on the scope). Therefore, the required image (i.e., the EUO or the cervical canal) should appear in the lower half of the screen and not in its center.[31,33,34]

After passing the EUO, the scope is introduced into the cervical canal and is carefully moved forward to the IUO in the uterine cavity. The main trick to reduce the possible trauma during this phase is to maintain the scope located in the middle of the canal, avoiding stimulation of the muscle fibers.

The vaginoscopic approach does not take a longer time than the conventional approach and offers a detailed endoscopic evaluation of the vaginal walls, fornices, and esocervix.[31]

Tricks for overpassing cervical stenosis

Pain experienced throughout the procedure as well as various anatomical obstacles that challenge the access to the uterine cavity represent the main limiting factors to the widespread use of office hysteroscopy. Among the most relevant anatomical obstacles are “cervical stenoses”, usually defined as cervical scarring of a variable degree, and comprising both subjective impression of narrowing and the completely obliterated EUO or IUO.

Currently, a wide set of 5F mechanical instruments may be used to overcome stenosis of the cervical channel in the office-based setting.[35] No sensitive nerve terminals or blood vessels have been demonstrated in the fibrous tissue. Therefore, in the case of moderate stenosis, semirigid 5F mechanical instruments (Karl Storz, Tuttlingen, Germany) may be inserted in the operating channel of the modern rigid hysteroscopes and used to obtain the resection of fibrous tissue responsible for the stenosis without causing any pain or bleeding.

Once the fibrous tissue has been identified, the fibrous ring may be cut at two or three points using sharp scissors (Fig. 2A). Alternatively, it may be stretched by grasping forceps inserted within it with the jaws closed and then gently opened (Fig. 2B).

The main advantage of this technique lies in the prompt identification of false passages. Indeed, a sudden increase of patient's pain, bleeding, or the visualization of red tissue are warning signs of creating a false passage into the cervical myometrium.

The main disadvantage of this technique has been recognized in the fragility of the instruments used, which are prone to break and damage during the lysis of strong fibrous adhesions. By contrast, bipolar electrodes are significantly being used more in the case of stenosis of EUO alone or in combination with stenosis of IUO. Stenosis involving the EUO is generally more severe than the others, and very often it can be difficult even to identify a punctiform access to the uterine cavity. This precludes the use of mechanical instruments, allowing only the possibility to insert a needle-like bipolar electrode in order to cut the fibrotic ring.

Severe stenosis of the EUO may be resolved by creating three or four radial incisions, at approximately the 3 o'clock, 6 o'clock, 9 o'clock, and 12 o'clock positions, by means of the bipolar electrode (Fig. 2C).

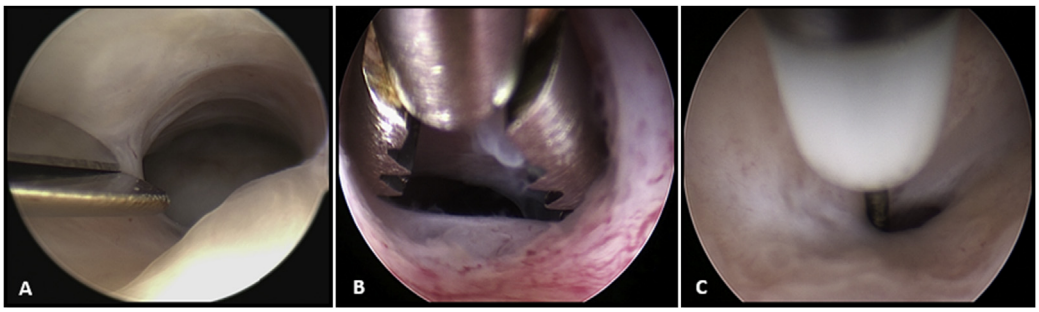

Fig. 2. 5F instruments such as (A) scissors, (B) grasping forceps, and (C) bipolar electrodes may be used to overcome even severe cervical stenosis.

Office operative hysteroscopy

With the ongoing developments in the field of hysteroscopy during the past 15 years, hysteroscopic surgery is becoming safer and less invasive for the patient. Improved technology has enabled surgeons to perform many operative procedures in an ambulatory setting without significant patient discomfort and with potentially significant cost savings.[13,35]

Office operative hysteroscopy (see and treat hysteroscopy) reduces the distinction between a diagnostic and an operative procedure, shifting the focus in health care away from inpatient diagnosis and treatment. The development of smaller-diameter hysteroscopes with continuous-flow system features and working channels, through which operative instruments can be introduced, has made it possible to treat some uterine and cervical diseases without the traditional need for cervical dilation or general anesthesia.

Use of specially designed hysteroscopic 5F mechanical instruments (e.g., scissors, biopsy cup, graspers, and corkscrews) has long been the only way to perform operative procedures in an ambulatory setting.[35] However, although grasping forceps and scissors are excellent for treating adhesions, cervical polyps, and endometrial polyps smaller than or the same size as the IUO, larger endometrial polyps, or thick lesions (e.g., submucous fibroids) were difficult to treat successfully using such miniature, fragile instruments and without cervical dilation.

An important technologic advance occurred in 1997 with the introduction of a versatile bipolar electrosurgery system dedicated to hysteroscopy, the Gynecare VersaPoint (Ethicon, Inc., Somerville, NJ, USA), which represents a key point in the history of office operative hysteroscopy. With the use of 5F bipolar electrodes, the number of pathologic conditions treated using office operative hysteroscopy has increased tremendously, reducing the use of the resectoscope and the operating room to a smaller number of cases.[36]

More recently, a new generation of electrical generators, allowing the use of bipolar energy on miniaturized electrodes, has been presented (Autocon 400 II; Karl Storz Endoscopy, Tuttlingen, Germany). The main advantage of these instruments is that they are reusable, thereby reducing the costs of office operative procedures. The application of this electrode and the technique used to perform the procedures is the same as those described for the Versapoint system.

The feasibility of ambulatory uterine surgery is not just dependent on recent technological advances in instrumentation such as miniaturization of equipment, but also the favorable anatomical characteristics of the uterus itself.[37] The sensitive innervations of the uterus originate in the myometrium and extend to the outer serosal surface, whereas the endometrium and any fibrotic tissue within the cavity are not sensitive. Thus, procedures can be carried out without the use of analgesia or anesthesia.[35]

However, a careful operative technique is of paramount importance, in particular, avoiding inadvertent deep penetration of the superficial myometrium when resecting lesions such as polyps, maintaining the lowest possible distension pressures, and expediting procedures through efficient surgical techniques.

Thanks to the continuous and incessant developments realized in the past years, whose main objectives are to increase the technical feasibility of these procedures and minimize the patients' discomfort, to date hysteroscopy has played a central role in the mini-invasive gynecological surgeries performed worldwide. However, modern office hysteroscopy was the invention that has revolutionized the approach to common uterine diseases, offering an easy, safe, and cheap method to perform the operative procedures, which are sometimes complex, in an ambulatory setting. In fact, the see and treat hysteroscopy is a “philosophy” that can be embraced by every gynecologist who has the will. The indispensable conditions to maximize the possibilities of success, thereby reducing the risks, are the availability of adequate environment and instrumentation, and a specific hysteroscopic training in an authorized center that would allow trainees to acquire the fundamental theoretical and technical notions (Fig. 3).

Fig. 3. Experience has shown that office operative hysteroscopy is not a difficult technique and that the learning curve may be further reduced by supervised training and proper knowledge of techniques and instruments. A new generation of hysteroscopists, who are familiar with modern hysteroscopes and able to simultaneously use the scope and 5F instruments, is on the rise particularly in Europe.

However, the number of gynecologists who choose to treat their patients in an ambulatory setting, rather than in a hospital environment, is still unexpectedly low. This low level of acceptance of "office practice" could be attributable to the conviction—both on the part of the gynecologist and that of the patient—that the ambulatory hysteroscopic procedure, performed without anesthesia, may be very painful. The costs of replacing traditional equipment are also to be considered.

Certainly, numerous advancements have been made in order to minimize discomfort and pain related to outpatient procedures, especially the reduction in the diameter of hysteroscopes and the spread of the vaginoscopic approach. Therefore, the range of treatment options available today in the office setting has been greatly enriched, along with the possibility of resolving many cervical and vaginal pathologies or performing complex procedures such as tubal sterilization and metroplasty, which are traditionally performed in the operating room under general anesthesia.

In conclusion, apart from removing the need for local and general anesthesia, office operative hysteroscopy has other undeniable advantages over resectoscopic surgery, such as quicker recovery time and lower costs of operating room usage.

Conclusion

Based on these considerations, the office approach should be the first option to consider when diagnosing and treating the most common uterine, cervical, and vaginal pathologies, reserving traditional resectoscopic surgeries exclusively for few challenging cases (i.e., endometrial ablation) or for certain pathologies (myomas > 1.5cm, broad-base septa, large-size polyps). In this context, traditional surgery and office surgery should now be considered complementary to each other, which should give clinicians better options when choosing the most appropriate treatment strategy to approach each case.

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