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Diagnostic hysteroscopy

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Introduction

Although operative hysteroscopy has progressively been accepted for the treatment of intrauterine pathologies, diagnostic hysteroscopy is still not widely and routinely used. Whereas almost all urologists utilize office cystoscopy to evaluate bladder pathology, it is estimated that less than 20% of gynecologists utilize office hysteroscopy to evaluate uterine pathology.[1] Conventional hysteroscopy, defined as a procedure performed with an instrument of 5.0 mm total diameter and with CO_2 as a distention medium and in which the insertion of the hysteroscope is facilitated by the use of a speculum and a tenaculum, has not been proven to be a technique accessible for all gynecologists and applicable in a routine set-up. Recently, well-conducted scientific studies have highlighted some important elements that can explain this underutilization of hysteroscopy as a first-line diagnostic procedure both in the office and in the conventional inpatient clinic. Nagele et al[2] have proved that CO_2 induces significantly more pain than a watery solution when used as distention medium.[2] Furthermore, a watery distention medium has the advantage of cleaning the environment, leading to a better and easier visualization of the uterine cavity than with the conventional CO_2. In a prospective randomized trial (PRT) we have recently proved the importance of the instrument diameter for both patient compliance and visualization quality.[3] In the same study we also demonstrated that both the experience of the surgeon and the anatomical difficulties determined by patient's parity play a key role when a conventional hysteroscope is used. With the use of a mini-hysteroscope, however, neither surgeon's experience nor patient's parity influence the results, offering a significant improvement for patient compliance and visualization quality. Office hysteroscopy is wrongly associated to a large extent with the disadvantages of conventional hysteroscopy and unfortunately many physicians, including gynecologists who do not witness the recent technical developments, believe that office hysteroscopy is similar to conventional hysteroscopy but performed in an office setting. In addition, the benefits of incorporating hysteroscopy as a first-line diagnostic tool for the investigation of abnormal uterine bleeding (AUB)[4,5] and infertility[6–9] are still not completely assumed by the medical community, whereas the lack of expertise to perform the procedure is evident.

The office approach for diagnostic hysteroscopy

In order to propose the systematic use of diagnostic hysteroscopy and to avoid the still well-established delay in indication, it is mandatory to perform the technique in the office, ideally at the same time as transvaginal sonography (TVS). The most important challenge for the office approach is to be able to perform the procedure with an acceptable patient compliance. This should not be underestimated, since many patients still prefer the inpatient approach, believing that it will be pain-free.[10] Several alternatives have been proposed for pain reduction during conventional office diagnostic hysteroscopy, but the results are inconclusive.[11–16]

The scientific evidence gathered over the last years and the major technical improvements in the manufacturing of high-quality small-bored scopes (minihysteroscopes) have given an answer to the question of how diagnostic hysteroscopy should be implemented successfully in an office environment[2,17–21] (Table 2.1).

Instruments for office diagnostic hysteroscopy

Hysteroscope

While the diagnostic hysteroscopes used in the past had a total outer diameter of 5.0 mm, recent technical advances have allowed miniaturizing the instruments without compromising the quality of visualization. Today, two systems are suitable for performing hysteroscopy in the office:

Table 2.1 Diagnostic office hysteroscopy instrumentation

Hysteroscope:		
• 30° rod lens optic	2.0 mm	2.9 mm
• Diagnostic single-flow sheath	2.8 mm	3.7 mm
• Operative single-flow sheath	3.6 mm	4.3 mm
• Operative continuous flow sheath:	4.2 mm	5.0 mm
Additional instruments and maneuvers:		
• Vaginal speculum	Not required	
• Tenaculum	Not required	
• Cervical dilatation	Not required	
Distention medium:	Low-viscosity fluids (e.g. saline) with pressure cuff between 80 and 120 mmHg	
Analgesia/anaesthesia:	Not required	

- The mini-hysteroscope consists of a 2.0 mm 30° forward-oblique rigid telescope which fits in a single-flow examination sheath, leading to an instrument with a total outer diameter of 2.8 mm (Figure 2.1).
- The standard office hysteroscope consists of a 2.9 mm telescope assembled in a single-flow diagnostic sheath for a total instrument diameter of 3.7 mm.

Both telescopes can be inserted in a single- or double-flow operative sheet to transform purely diagnostic procedures to operative procedures. The total maximal instrument diameter increases for the 2.0 mm optic to 4.2 mm and for the 2.9 mm optic to 5.0 mm. In contrary to the diagnostic sheath the operative ones have an oval shape to reduce the instrument diameter as much as possible (Figure 2.2). The

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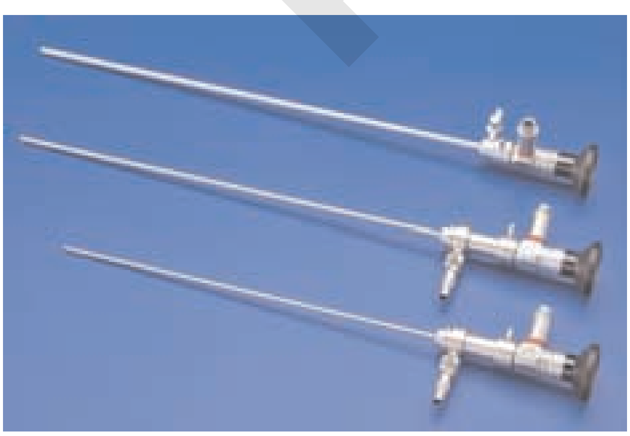

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Figure 2.1
Comparison of diagnostic hysteroscopes of different diameter.

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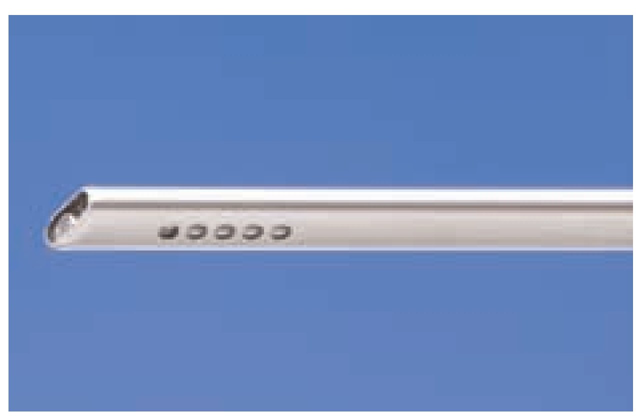

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Figure 2.2
Operative hysteroscope.

Figure 2.3
Mechanical instruments for operative hysteroscopy.

Figure 2.4
Electrical instruments for operative hysteroscopy.

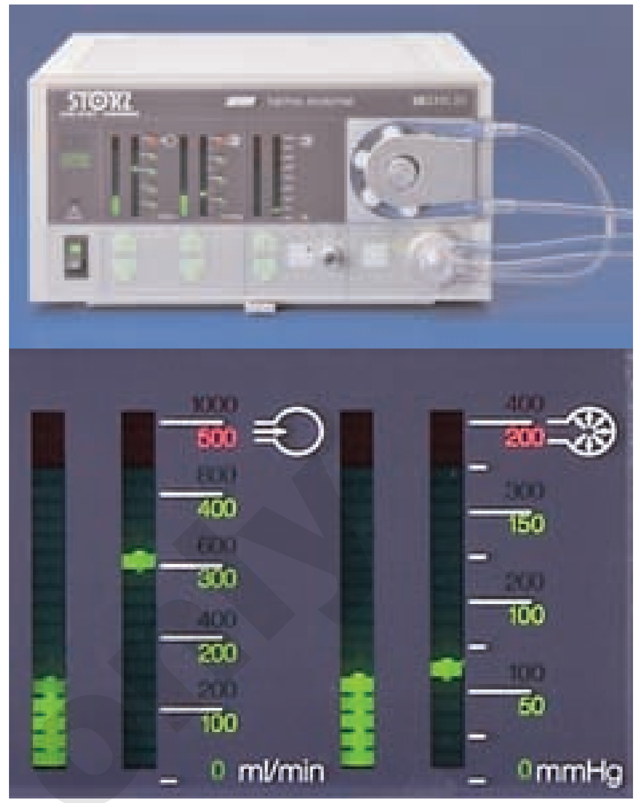

Figure 2.5
Electronic suction/irrigation pump.

operative channel has an access for 5 Fr instruments, either mechanical (e.g. crocodile grasping forceps, spoon and punch biopsy forceps, sharp and blunt scissors, Figure 2.3) or electrical (e.g. bipolar needle, bipolar coagulation probe, Figure 2.4). This allows performing operative procedures in the office, such as visual guided biopsy, removal of small polyps, myomas or lost intrauterine devices (IUDs), and lysis of simple adhesions. The same instrumentation is used to perform the treatment of Asherman syndrome and the correction of congenital anomalies, but in those cases some form of pain relief is necessary.

Distention media

Since a good distention of the uterine cavity is required for performing hysteroscopy, the distention medium and the system to deliver it under certain pressure and flow must be considered. For diagnostic hysteroscopy, either low-viscosity fluids with electrolytes (e.g. saline, Ringer's lactate, 5% glucose) or CO_2 can be used. To control pressure and flow, a simple gravity fall system, a pressure cuff, or an electronic suction/irrigation pump (Figure 2.5) can be used.

As a result of the differences in refraction index, fluid and gaseous distention media lead to different optical conditions. CO_2 is the most common gaseous distention medium used for hysteroscopy. The advantages of this natural gas are the good optical quality and, as a dry medium, its facility for use in an office environment. However, it must be supplied through a special pressure/flow-controlled unit to eliminate the danger of gas embolism,[22] it is limited to diagnostic procedures, and the current scientific evidence indicates that CO_2 is more painful and irritating than a fluid distention medium.[2] Mainly for the last reason, it is rapidly being replaced by fluid distention medium and is no longer used in many centers. The advantages of fluids lie in their simplicity, better patient compliance, and the excellent visualization capacity due to the rinsing and the hydroflotation (i.e. lesions floating in the watery low-pressure environment) effects. There is no blind phase at entering the cavity and no irritation of the peritoneum when the fluid enters through the fallopian tubes into the abdominal cavity.

For outpatient diagnostic hysteroscopy, an ionic, isotonic solution such as Ringer's lactate with a pressure cuff system is preferred owing to its cost-effectiveness and comfortable handling. The pressure cuff is mostly preset at a pressure between 80 and 120 mmHg, bearing in mind that the aim is to use the lowest-needed pressure to distend the uterine cavity correctly.

Light source

In 1960 Karl Storz discovered that it was possible to transmit light with fiberoptic light cables. This discovery marked the birth of cold light endoscopy. From a light source outside the body, light is transmitted via a fiberoptic light cable through an endoscope to the examination site. Only specific and particularly powerful halogen or xenon light sources are used in today's cold light projectors.

Video camera

The use of a video camera is essential for diagnostic hysteroscopic procedures. It is very instructive when the patient and the nursing personnel can see the diagnostic process on the screen and it is indispensable for correct documentation of the findings. Also, for the surgeon, the use of a camera facilitates the performance of the examination in a comfortable position.

Documentation system

The digital documentation systems AIDA (Advanced Image and Data Archiving) provide convenient image, video and audio data archiving of the procedure for academic and legal purposes.

Special office all in one solution, the TELE PACK system

TELE PACK is a comprehensive, multifunctional and compact documentation terminal that can be used as a compact system in the doctor's office, or as a secondary system in the operating room (Figure 2.6). It consists of the following components:

- *Input unit:* inbuilt, high-quality membrane keyboard and text generator for entering patient data.
- *Documentation:* flexible, all-purpose PCMCIA memory card for recording still images; easy transfer of data to AIDA and PC.
- *Camera control unit*
- *Illumination:* HiLux high-performance light source.
- *Image display:* foldaway LCD color monitor

Figure 2.6
The TELE PACK system.

Technique

The use of mini-hysteroscopes and saline as a distention medium still allows approaching the uterus either with the classic technique, in which a speculum is used to visualize the portio and the external cervical os, or with the vaginoscopical approach, which we advocate. Because a speculum impairs the liberal scope movement, frequently leading to the necessity of using a tenaculum, we have adapted the vagino-cervico-hysteroscopy technique since the early 1990s. The examination is started with a TVS to evaluate uterus characteristics. A vaginal disinfection with a non-irritating watery disinfection solution is performed without placing a speculum. The tip of the mini-hysteroscope is positioned in the vaginal introit, slightly separating the labia with the fingers. The vagina is distended with the same medium used for the uterine cavity. In contrary to the distention of the uterine cavity, the distention of the vagina does not provoke pain, even if the technique is not correctly performed. This approach requires a good knowledge of the physics and instrumentation as well as dexterity on the part of the operator (i.e. the correlation between what is seen on the screen and the actual position of the 30° fore-oblique scope). The scope is driven to the posterior fornix to readily visualize the portio, and slowly backwards to identify the external cervical os (Figure 2.7a). When this is visible, the scope is introduced into the cervical canal (Figure 2.7b) and, after achieving its distention, the scope is carefully moved forward to the internal cervical os (Figure 2.7c) and then to the uterine cavity with the least-possible trauma. The uterine cavity is systematically explored by

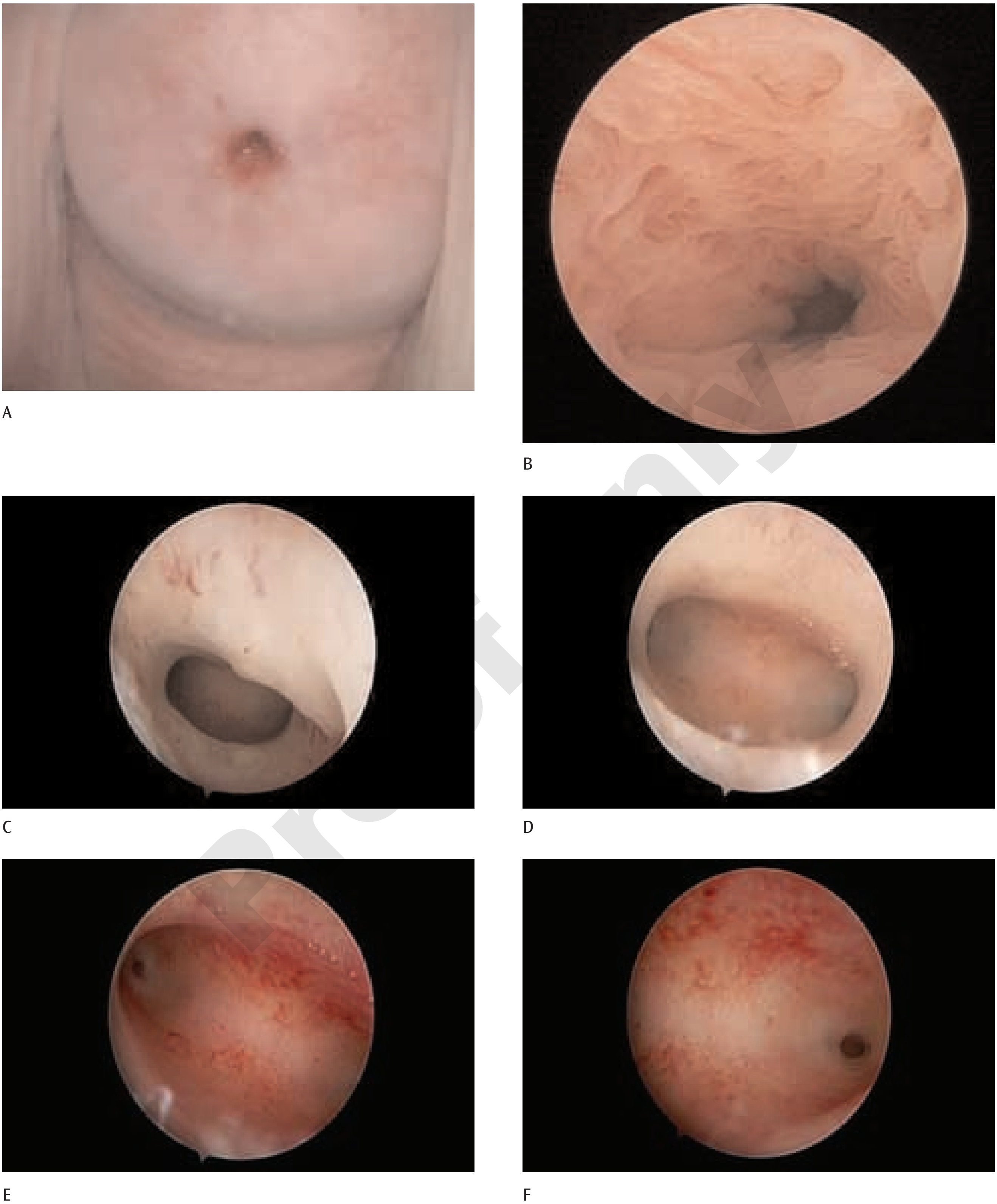

Figure 2.7
Hysteroscopy with the vaginoscopical approach. Visualization of the external cervical os (a), cervical canal (b) with internal cervical os (c), uterine cavity overview (d), right tubal ostium (e), and left tubal ostium (f).

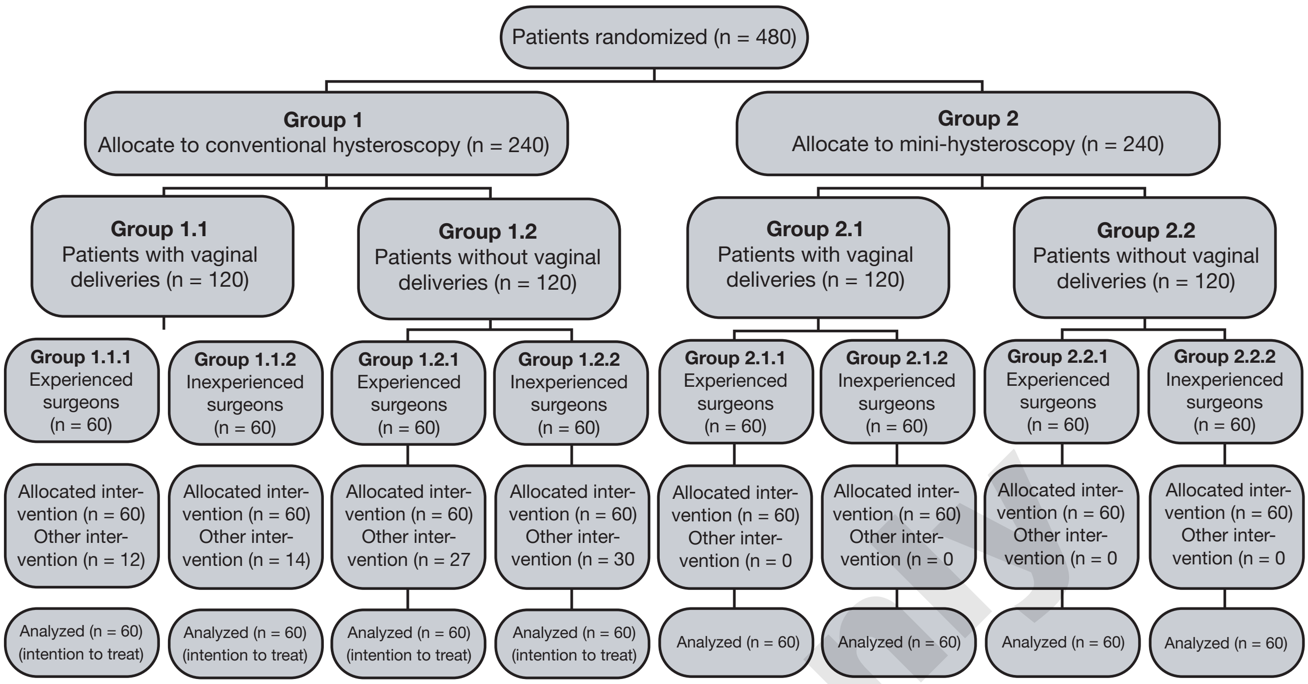

Figure 2.8
Prospective multicentric randomized controlled trial to evaluate factors influencing the success rate of office diagnostic hysteroscopy. Trial Profile. (Reproduced with permission from Campo et al.[3])

rotating the 30° fore-oblique scope and, after identification of the anatomical landmarks (i.e. the tubal ostia), any anomaly in the fundus, the laterals, anterior, or posterior uterine walls (Figure 2.7d) or in the right (Figure 2.7e) and left (Figure 2.7f) tubal ostium can be detected. At this stage it is crucially important to avoid lateral movements as much as possible to reduce patient discomfort to a minimum. Immediately after the hysteroscopy, a second TVS is performed, taking advantage of the intracavitary fluid for a contrast image of the uterus.

The importance of the instrument diameter and other factors in office diagnostic hysteroscopy

The advantages of the use of mini-hysteroscopes have been reported in many studies enrolling mostly patients with AUB and with previous vaginal deliveries.[19–21,23]

In an attempt to evaluate the effect of this (endoscope diameter) and other factors upon the success rate of diagnostic office hysteroscopy in a more general population we have recently conducted a PRT including 480 patients.[3] Together with instrument diameter (conventional hysteroscopy: 4.0 mm optic with 5.0 mm sheath or mini-hysteroscopy: 2.7 mm optic with 3.5 mm sheath), patient parity (with or without vaginal deliveries) and surgeon's experience (with or without experience in office hysteroscopy) were also evaluated (Figure 2.8). The following variables were assessed: pain (10 cm visual analogue scale: 0, none; 10, intolerable), quality of visualization of the uterine cavity (0, none' 1, insufficient; 2, sufficient; 3, excellent), and complication rate. From these variables, the success rate was calculated (pain <4, visualization ≥ 2 and no complications). Mini-hysteroscopy compared with conventional hysteroscopy was associated with less pain and better visualization, probably due to the less-traumatic passage through the cervical canal and the internal cervical os. The differences in visualization scores were only related to the quality of visualization of the uterine cavity rather than the quality of image itself, since it is obvious that the 4.0 mm optic provides a better image than the 2.7 mm optic. Although no differences in complication rates could be detected, probably due to the overall very low values, the success rates were higher with mini-hysteroscopy. In a multifactorial analysis, pain (Figure 2.9), visualization (Figure 2.10), and success rate (Figure 2.11) were highly influenced by instrument diameter and patient parity and only slightly influenced by the surgeon's experience. A better performance was observed with the use of mini-hysteroscopy, in patients with vaginal deliveries and in procedures performed by experienced surgeons.[3] The

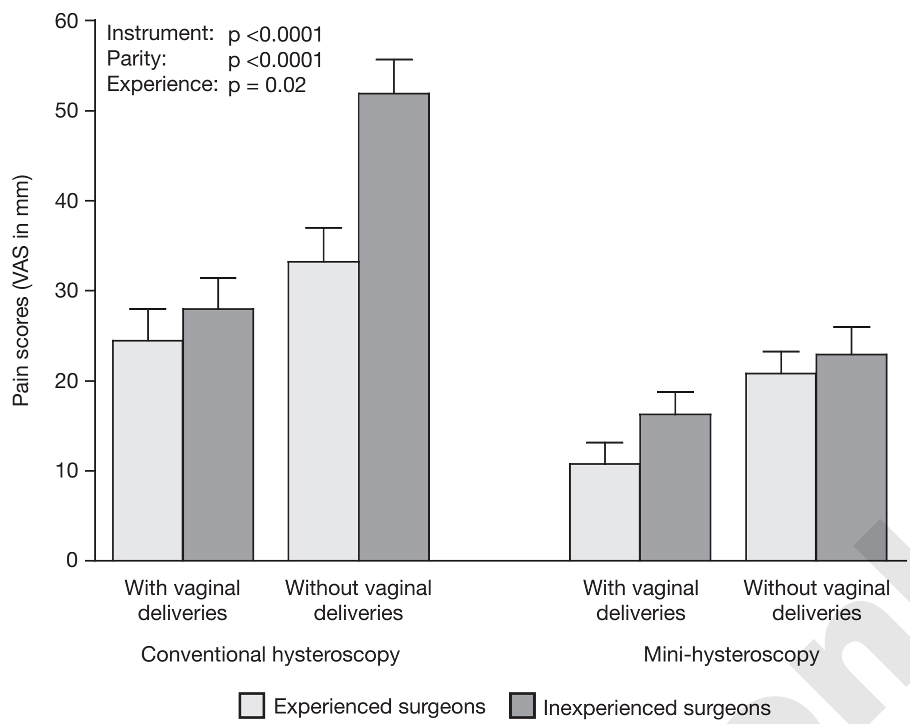

Figure 2.9
Effect of instrument diameter, patient parity, and surgeon experience upon the pain experienced by the patients during office diagnostic hysteroscopy. Pain was scored using a 10 cm visual analogue scale (0, none; 10, intolerable). The procedures were performed either with conventional instruments or with mini-instruments in patients with or without vaginal deliveries for experienced or inexperienced surgeons. Means ± SE, together with significances of a three-way analysis (proc GLM), are indicated. (Reproduced with permission from Campo et al.[3])

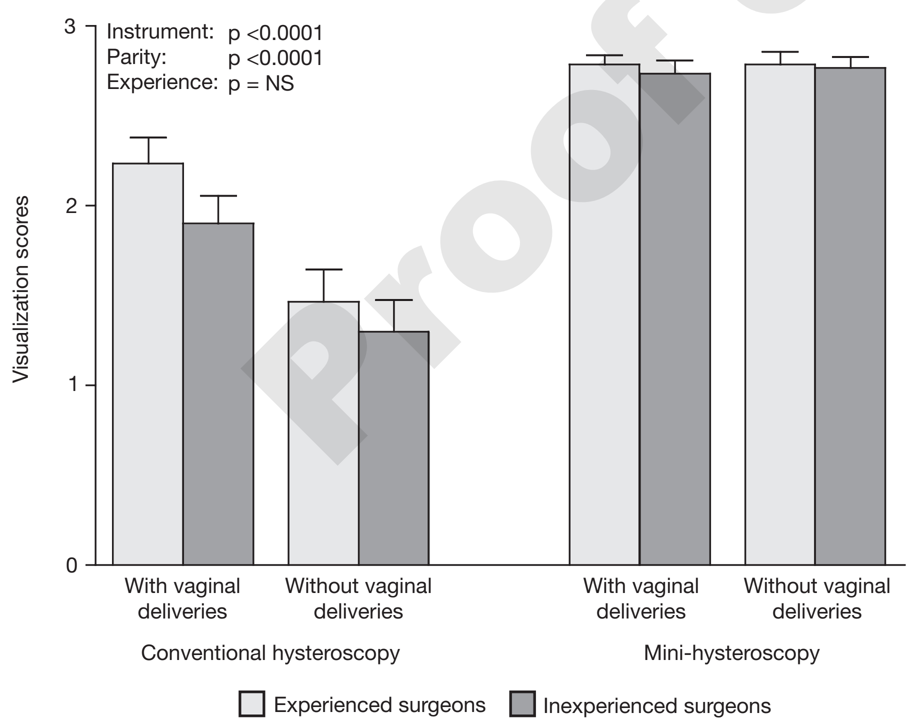

Figure 2.10
Effect of instrument diameter, patient parity, and surgeon experience upon the quality of visualization of the uterine cavity during office diagnostic hysteroscopy. Visualization was scored using a grading system (0, none; 1, insufficient; 2, sufficient; 3, excellent). The procedures were performed either with conventional instruments or with mini-instruments in patients with or without vaginal deliveries for experienced or inexperienced surgeons. Means ± SE, together with significances of a three-way analysis (proc GLM), are indicated. (Reproduced with permission from Campo et al.[3])

effects of patient parity and surgeon's experience were even more significant when conventional hysteroscopy was performed. This was not surprising, since in those patients and in those surgeons an easier access to the uterine cavity and less-traumatic maneuvers, respectively, can be expected. Interestingly, both patient parity and surgeon's experience were no longer important when mini-hysteroscopy was performed, indicating that a small-diameter endoscope can counteract the difficulties determined by the anatomy and by the operator.[3]

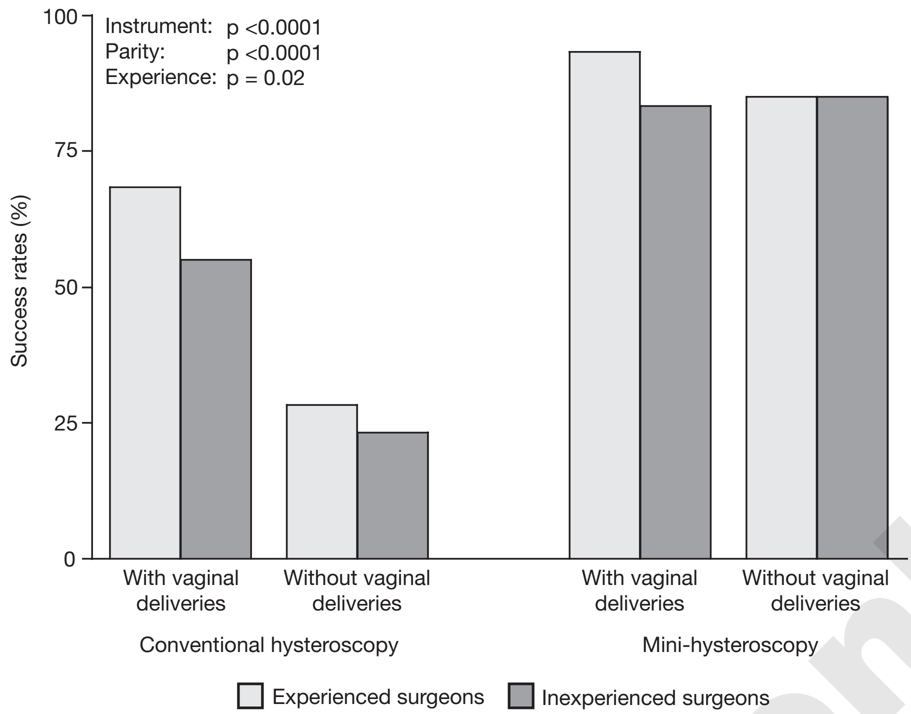

Figure 2.11
Effect of instrument diameter, patient parity, and surgeon experience upon the success rate of office diagnostic hysteroscopy. The procedures were considered successful when pain scores were <4, visualization scores were >1, and when no complication occurred. The procedures were performed either with conventional instruments or with mini-instruments in patients with or without vaginal deliveries for experienced or inexperienced surgeons. Frequencies, together with significances of a three-way analysis (proc logistic), are indicated. (Reproduced with permission from Campo et al.[3])

Indications for diagnostic hysteroscopy

The significant technical improvements in the field of hysteroscopy, including the use of mini-hysteroscopes, saline as distention medium, and the atraumatic insertion of the instruments, have allowed the performance of the procedure in the office and therefore broadened the indications for diagnostic hysteroscopy (Table 2.2). Indeed, office diagnostic hysteroscopy can be indicated today in any situation in which a major or minor intrauterine anomaly is suspected or necessary to rule out, including asymptomatic patients and for purpose of endometrial surveillance during drug treatment.

Table 2.2 Indications for office diagnostic hysteroscopy

- Abnormal uterine bleeding
- Infertility
- Abnormal findings at other diagnostic tests (e.g. ultrasound, hysterosalpingography, magnetic resonance imaging, blind biopsy)
- Repetitive pregnancy wastage
- Suspicious of uterine congenital anomalies
- Suspicious of intrauterine adhesions
- Misplaced foreign bodies (e.g. IUD)
- Follow-up of medical (e.g. tamoxifen) or surgical treatment
- Embryo evaluation (embryoscopy)

As with conventional hysteroscopy, the main indication for office diagnostic hysteroscopy remains the evaluation of AUB, including the suspicions of endometrial polyps, submucous myomas, and endometrial hyperplasia. Office diagnostic hysteroscopy is also indicated for the evaluation of the cervical and uterine factors in patients with infertility and especially in those who are scheduled to enter an in vitro fertilization (IVF) program. The time for this indication is the subject of continuous debate, since some clinics advocate systematic diagnostic hysteroscopy before IVF, whereas others delay the indication after several IVF failures. Other indications include repetitive pregnancy wastage, suspected intrauterine adhesions or uterine congenital anomalies, misplaced intrauterine foreign bodies (e.g. IUDs), reported abnormal findings at ultrasound, hysterosalpingography, magnetic resonance image or blind biopsy, and follow-up of certain treatments with intrauterine repercussions (e.g. tamoxifen or intrauterine surgery).

Furthermore, the already-mentioned simplification of the technique and the consistent data published over the recent permits us to propose office hysteroscopy as a first-line diagnostic tool for the investigation of AUB[4,5] and infertility.[6–9]

Controversial aspects and contraindications for hysteroscopy

Since the current technique of diagnostic hysteroscopy has decreased in trauma and manipulation, it is an intervention remarkably free of complications. There are no absolute contraindications, but still controversial questions are the dissemination of cells (e.g. germs, endometrium or cancer cells) into the abdominal cavity. In most cases during diagnostic hysteroscopy, distention medium floats through the fallopian tubes into the abdomen. This raises the question as to whether in case of inflammation of the vagina and/or the uterus ascending infections can occur thereafter or if endometriosis or peritoneal metastasis, in case of an endometrial carcinoma, can be promoted.

- An ascending genital infection after a diagnostic hysteroscopy is extremely rare and is not known in a series of several thousand hysteroscopies. Yet in cases of known vaginal or uterine infection the indication for a diagnostic hysteroscopy should be considered carefully and primarily the basic illness should be treated before a hysteroscopy is performed.
- As to the question of a potential furthering of an endometriosis, there are no available data with respect to diagnostic hysteroscopy. It can, however, be assumed that an inclination towards forming of an endometriosis follows different rules, especially as it is known that many women show retrograde blood and endometrium secretion during menstruation, but that only in a certain number of cases an endometriosis develops (autoimmune deficiency phenomenon?).
- Data about diagnostic hysteroscopy and spreading of tumor cells in cases of endometrial carcinoma are very limited. Several small studies did observe an increase of positive peritoneal cytology after fluid hysteroscopy. It is not known if this has any impact on the further course of the disease. To evaluate the influence of a diagnostic fluid hysteroscopy on the evolution of an endometrial carcinoma we only have available data of a comparable exam called the hysterosalpingography. Whereas this examination deliberately aims to transport the dye over the tubes into the abdominal cavity it is reassuring that the available data do not indicate any negative effect of performing this diagnostic procedure on the course of the disease. A still more important and as yet unanswered question is the possible effect of a dilatation and curettage (D&C) on the spread of carcinoma cells.

Active uterine bleeding, an absolute contraindication in the past, has become today only a relative contraindication since the use of continuous-flow hysteroscopy permits evacuation of blood and lavage of the uterine cavity, allowing visualization. Only profuse uterine bleeding remains as a real contraindication despite continuous-flow washing of the cavity.

Early pregnancy is not an absolute contraindication for hysteroscopy performed with the atraumatic technique described above (i.e. mini-hysteroscopes, saline distention medium, and vaginoscopical approach). Indeed, adverse effects have not so far been reported for hysteroscopy performed accidentally in early pregnancy. Furthermore, in case of intrauterine pregnancy with an IUD, it is recommended to remove the device because of the risk of abortions or septic complications. If the thread of the IUD is not visible, which often occurs because of growth of the uterus in pregnancy, it is advisable to extract it by either hysteroscopy or ultrasonic guidance.

As with any other diagnostic method, uncooperative or unstable patients, inappropriate training of the operator and lack of proper instrumentation also contraindicates the performance of the technique.

Complications of hysteroscopy

The possible complications of diagnostic hysteroscopy have been significantly reduced because of the smaller instrumentation and the less-traumatic technique. Nonetheless, even with these small instruments, complications such as uterine perforation, vasovagal reaction, laceration, and bleeding can occur. Campo reported 7 perforations in 4204 diagnostic hysteroscopies (0.16%).[24] No further problems occurred in these cases. Uterine perforation mostly occurs during introduction of the hysteroscope at the back of the uterus at the cervico-uterine junction. Conservative treatment is recommended and only in case of signs of inner bleeding in the following hours should diagnostic laparoscopy be performed. In a PRT involving 480 patients evaluating differences between conventional hysteroscopes (5.0 mm) and mini-hysteroscopes (3.5 mm), we found an overall very low complication rate (12/480, 2.5%), all of them being vasovagal reactions, whereas uterine perforation, cervical lacerations, or bleeding were not reported.[3] Interestingly, most of these complications were observed with the conventional hysteroscope (8/240, 3.3%) rather than with the mini-hysteroscope (4/240, 1.66%).

Findings at diagnostic hysteroscopy

All hysteroscopic findings are recorded in a standardized pre-design form. A complete visualization of cervical canal, uterine cavity, and tubal ostia and absence of any anatomical alterations is required to categorize the examination as normal. It is considered abnormal when any major or minor abnormalities, regardless of their clinical significance, are detected. If for any reason (i.e. patient tolerance, technical or anatomical problems) no or insufficient visu-

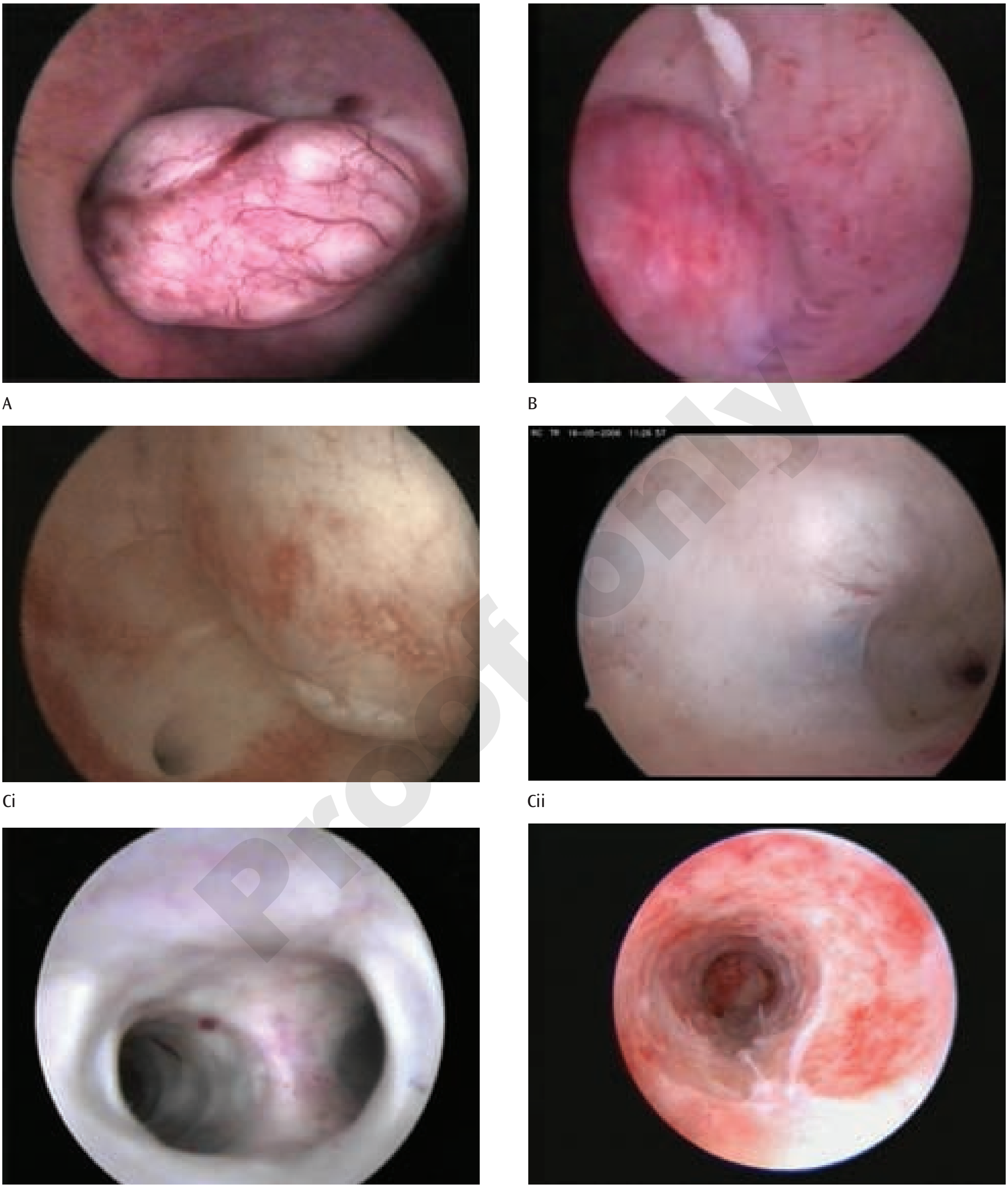

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Figure 2.12
Major uterine abnormalities. Myoma with different degree of cavity involvement: (a) type 0, pedunculated; (b) type 1, intramural part but >50% in cavity; (c) type 2, major intramural part <50% in cavity. Congenital anomalies: (d) hysteroscopic image of a uterine septum; (e) hysteroscopic image by T-shaped uterus. Intrauterine adhesion and total obliteration of the cavity

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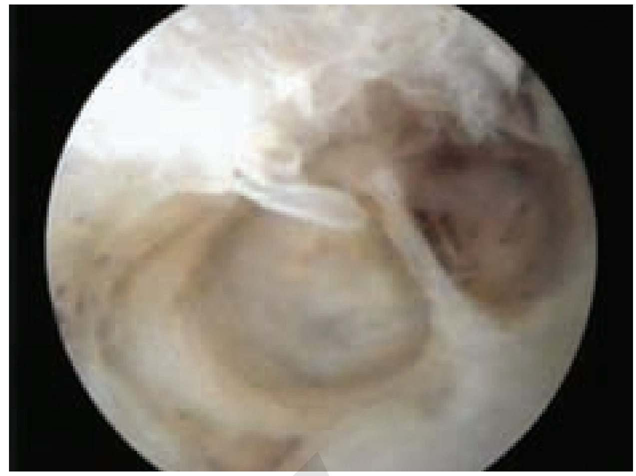

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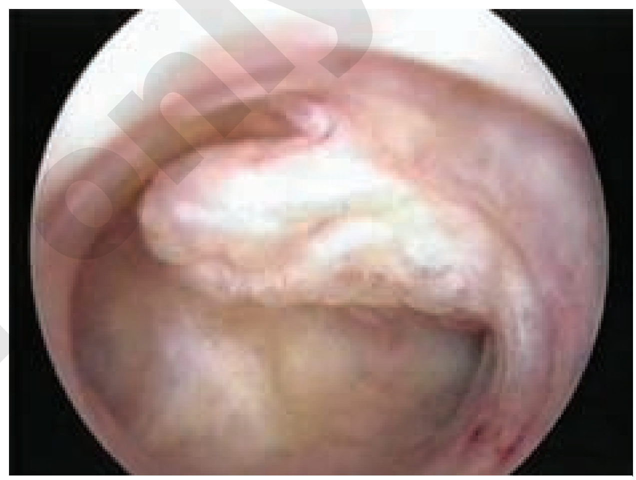

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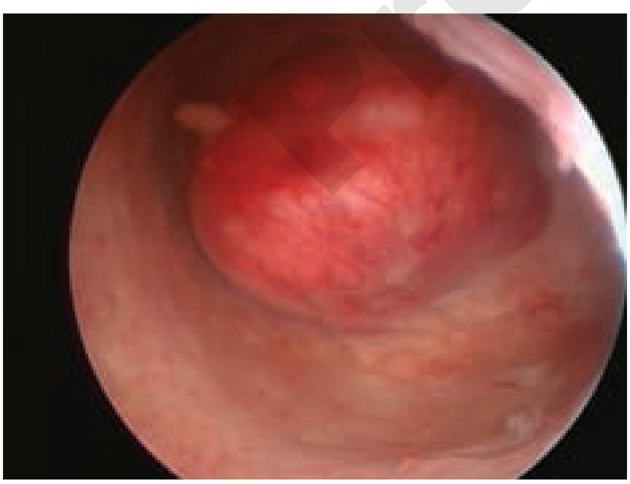

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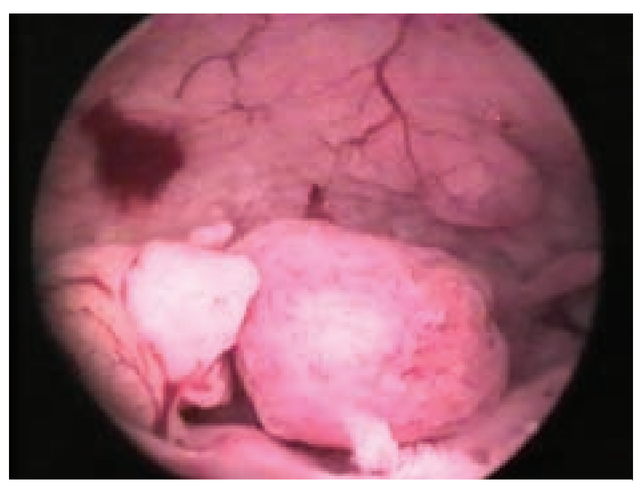

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(f) and (g). Different types of polyps: (h) functional polyp; (i) sessile polyp; (j) myoma-like polyp. Adenocarcinoma: (k).

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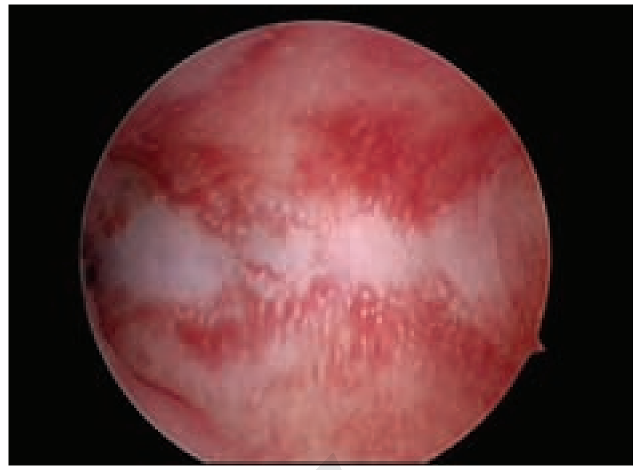

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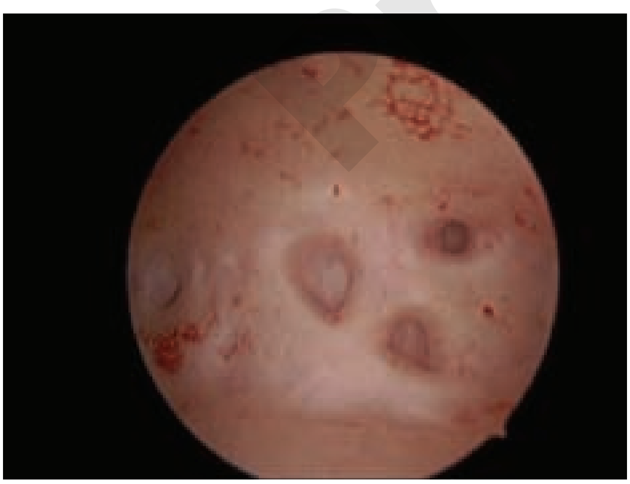

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Figure 2.13
Hysteroscopic image of subtle lesions. (a) Hyperemic endometrium with intrauterine device. (b) Strawberry like pattern. (c) Diffuse polyposis. (d) Necrotic tissue (decidua). (e) Fundal endometrial defect (adenomyosis). (f) Moderate elevation, cystic lesion with a dark blue color originated from fluid blood in the lesion.

alization is obtained, it is stated that the examination failed to achieve a diagnosis.

- *Major abnormalities* are arbitrarily defined as those that structurally change the normal hysteroscopic anatomy (e.g. cervical stenosis, submucous myoma, polyps, congenital malformations, adhesions, necrotic tissue, tubal os stenosis, foreign bodies (Figure 2.12).
- *Minor abnormalities* or subtle lesions indicate changes of the appearance without deformation of the normal anatomy, where the pathologic significance is not always proven but where the hysteroscopic picture is different from the normal situation. These subtle or incipient lesions are described according to their hysteroscopic appearance and not to their supposed clinical significance (e.g. diffuse polyposis, hypervascularization, strawberry pattern, moderate/marked localized/generalized mucosal elevation (Figure 2.13).

In a recently published PRT we found that in the total population ($n = 480$) the findings were normal in 55% of the cases and abnormal in 41% of the cases, whereas no diagnosis could be obtained in 4% of the cases.[3] Interestingly, normal and abnormal findings were not equally distributed in patients with infertility or AUB. Indeed, in the infertility population ($n = 219$), the findings were normal in 67% of the cases and abnormal in 29% of the cases, whereas no diagnosis could be obtained in 4% of the cases. In the AUB population ($n = 230$), however, the findings were normal in only 46% of the cases and abnormal in 51% of the cases, whereas no diagnosis could be obtained in 3% of the cases. Furthermore, the specific findings were significantly different in both groups of patients (Figure 2.14, unpublished data).

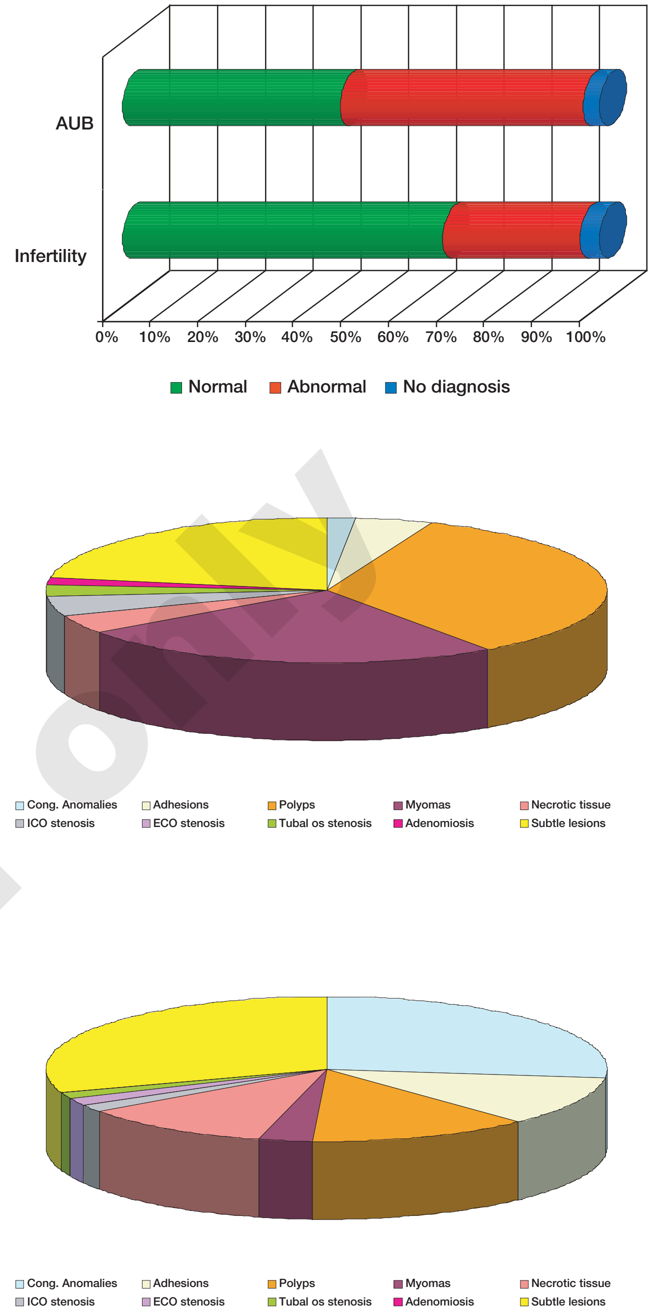

Figure 2.14
Hysteroscopic findings in patients with abnormal uterine bleeding (AUB) or infertility (unpublished data). (a) Distribution of normal and abnormal findings. (b) Abnormal findings in AUB patients. (c) Abnormal findings in infertility patients.

Feasibility of diagnostic hysteroscopy

In the same PRT we found that the success rate, measured in terms of patient pain, visualization quality, and complication rate (see above), of diagnostic hysteroscopy was 65% (313/480). After discriminating by instrument diameter, however, this success rate rises to 87% (208/240) in the mini-hysteroscopy group and decreases to 44% (105/240) in the conventional hysteroscopy group ($p < 0.0001$). The mini-hysteroscopy was feasible for all assigned patients and, although the system included 3.5 mm and 2.4 mm scopes, the latter was necessary to use in five cases only (2%). For ethical reasons and to be able to obtain a diagnosis, the conventional 5.0 mm hysteroscope had to be changed to a mini-hysteroscope in 83 cases (35%; in 70 cases to a 3.5 mm scope and in 13 cases to a 2.4 mm scope), but patients remained in the assigned group for statistical analysis (intention-to-treat). Since the smallest fiberoptic 2.4 mm hysteroscope was very seldom required, the data indicate that the rod lenses, 3.5 mm hysteroscope, combining the advantages of good optical quality and small diameter, is suitable for most cases.[3]

Conclusions

From the very first attempts at hysteroscopic diagnosis and treatment, starting with the examination by Commander Pantaleoni in 1869,[5] it was obvious that the inspection of the uterine cavity was not a simple technique. Problems related to light transmission, with bleeding from trauma of the very fragile endometrium and with the inability to distend properly the virtual uterine cavity surrounded by a thick muscular wall, slowed the development of hysteroscopy. Physicians convinced of the value of the technique had to focus on improving technical aspects and reducing instrument-related problems. Without ignoring the tremendous efforts made by pioneers of this technique, we have to acknowledge the fact that it was only in the last decennia that gynecologists, scientists, and engineers joined forces to develop instruments, as well as electronic and optical devices, that permit the diagnosis and treatment of intrauterine pathology through endoscopy, using a safe, atraumatic, and minimally invasive technique.

A major topic that has dominated this entire period of hysteroscopic research has been the improvement of safety measures during intrauterine procedures. Indeed, one of the major barriers to general acceptance of diagnostic hysteroscopy was caused by some lethal complications due to the use of inadequate CO_2 insufflation equipment. Based on experimental findings of the influence of CO_2 on the cardiopulmonary system, purpose-designed CO_2 hysteroflators that allow safe gas administration have been developed. Nowadays, however, distention medium for diagnostic hysteroscopy has changed in favor of low-viscosity fluids (e.g. saline, Ringer's lactate) and the equipment required consists only of a pressure cuff, so that both risks and costs are very low. Together with the selection of the right distention medium, the miniaturization of the instruments plays a key role in intrauterine endoscopic procedures in an outpatient basis. The use of small instruments with outstanding optical features allows us to apply the atraumatic insertion technique in which the scope is introduced under visual control through the cervical canal, which is dilated only by the distention medium, into the uterine cavity, making it possible to obtain a perfect view of the endocervix and uterine cavity without any additional manipulation.

Diagnostic hysteroscopy, in combination with clinical examination and TVS, is a promising first-line diagnostic procedure in the gynecologic office to differentiate normal from abnormal situations. The endoscopic approach has, compared with the blind intrauterine manipulations such as D&C, the major advantage of permitting direct visualization of the pathology and selective treatment. For both major indications of hysteroscopy (i.e. AUB and infertility) this seems extremely important. For AUB patients, diagnostic and operative hysteroscopy offers an efficient organ-preserving technique. For infertile patients, diagnostic and operative hysteroscopy offers the possibility of preserving maximal chances for normal implantation and development of the pregnancy. Since the number of patients with infertility is constantly growing and the mean age of the infertile couples is increasing, the probability of intrauterine pathology is also growing. The scientific evidence on the success rate of office hysteroscopy and the reported incidence of intrauterine pathology after several IVF failures combined with the high cost of an IVF procedure makes it unacceptable not to implement diagnostic hysteroscopy in the routine exploration of the infertile patient.

In spite of the significant technical improvements, office hysteroscopy is still very poorly spread. Also, the recent scientific validation of the different parameters responsible for a simple, safe, and well-tolerated procedure has not led to a broad response. The most probable reason for the hesitation to implement office hysteroscopy is the lack of teaching at the majority of the universities during the residency in OB&GYN. In addition to the lack of teaching, the need to purchase endoscopic equipment often represents an important cost, which is not correctly reimbursed by most social security systems.

In summary, there is scientific evidence that the correct instrument selection, the atraumatic insertion technique, and the use of a watery distention medium are essential for successful office hysteroscopy. The miniaturization of the instruments opens the office procedure to inexperienced surgeons and makes it possible to offer this diagnostic procedure to the vast majority of the patients. Today, there is no clinical or scientifically acceptable reason for not implementing mini-hysteroscopy in daily practice as a first-line office diagnostic procedure in patients with infertility or AUB.

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