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Hysteroscopy & Distending Media

history

- Derived from the Greek words hystera (uterus) and skopeo (“to view”), hysteroscopy is visual examination of the cervix and uterus with an endoscope. Pantaleoni performed the first hysteroscopy in 1869 when he used a tube with an external light source to diagnose a polypoid uterine growth in a 60-year-old woman with postmenopausal bleeding.
- Over the past 150 years, advances in optics, instrumentation, and distension media have resulted in new hysteroscopic techniques for diagnosis and treatment of intrauterine cavity disorders.

How to get skills?

- Traditional methods of acquiring endoscopic skills have focused on course attendance, preceptorship, and practice. From the late 1990s to the present, hysteroscopic simulation systems have emerged to facilitate development of hand-eye coordination and procedural orientation. Several computer-based models with advanced interactive graphics provide sophisticated models for learners to excise myomas, ablate endometrium, and pass cannulas into tubal ostia.

The most basic skill

- However, simulation does not provide experience with the most basic skill the hysteroscopist must obtain: the safe insertion of the scope into the uterine cavity followed by satisfactory distension of the cavity. This must be learned in vivo; without this skill set, hysteroscopy cannot be safely and successfully performed.

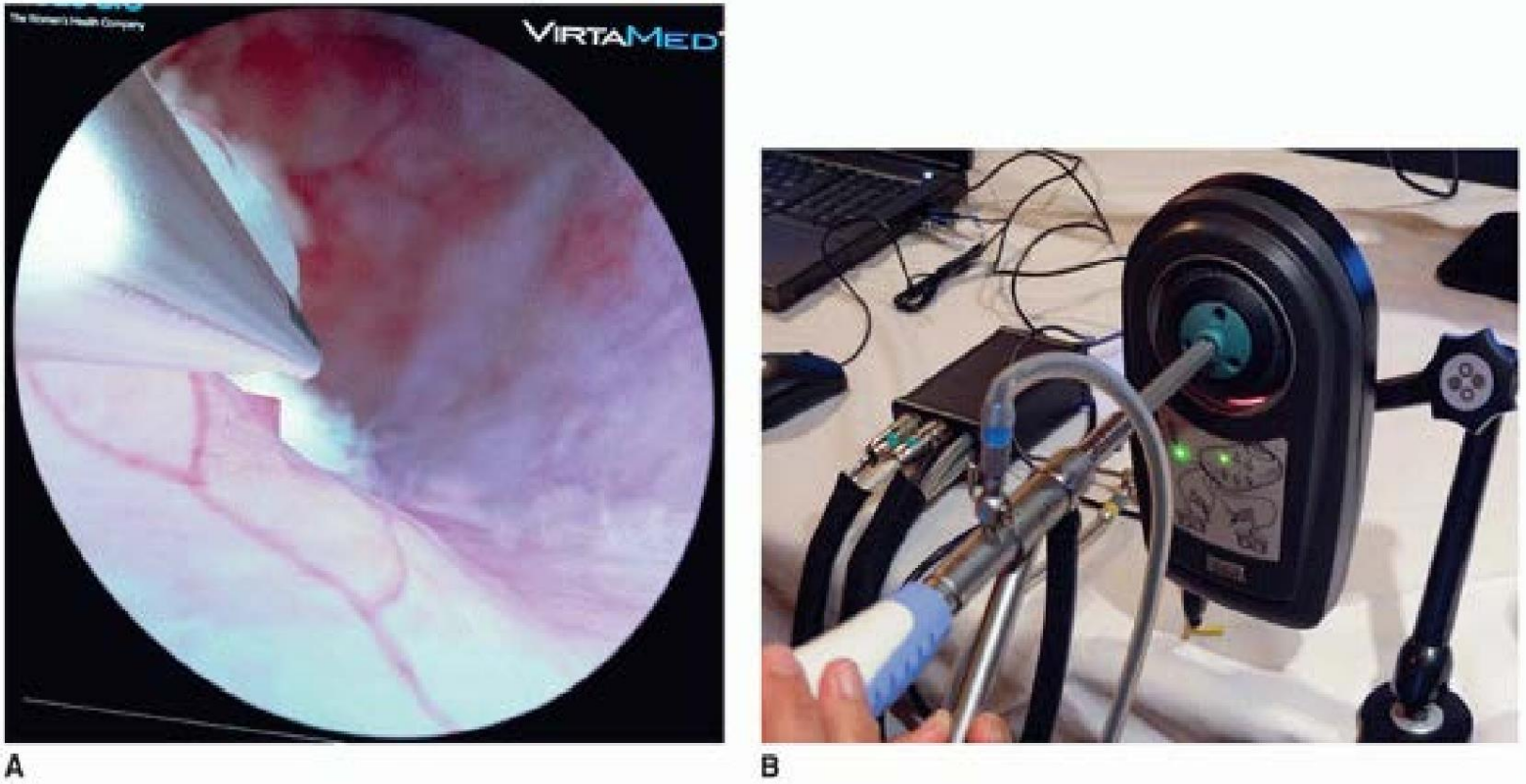


FIGURE 13.1 A: Computerized simulation permits the gynecologist to interact by manipulating a hysteroscopic morcellator and resecting a virtual submucosal myoma or polyp. **B:** The simulator uses equipment that is manipulated in a fashion similar to actual hysteroscopes. (**A:** Reprinted with permission from Baggish MS, Valle RF, Guedj H. ***Hysteroscopy: visual perspectives of uterine anatomy, physiology and pathology***, 3rd ed. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2007.

Different types of diagnostic hysteroscope

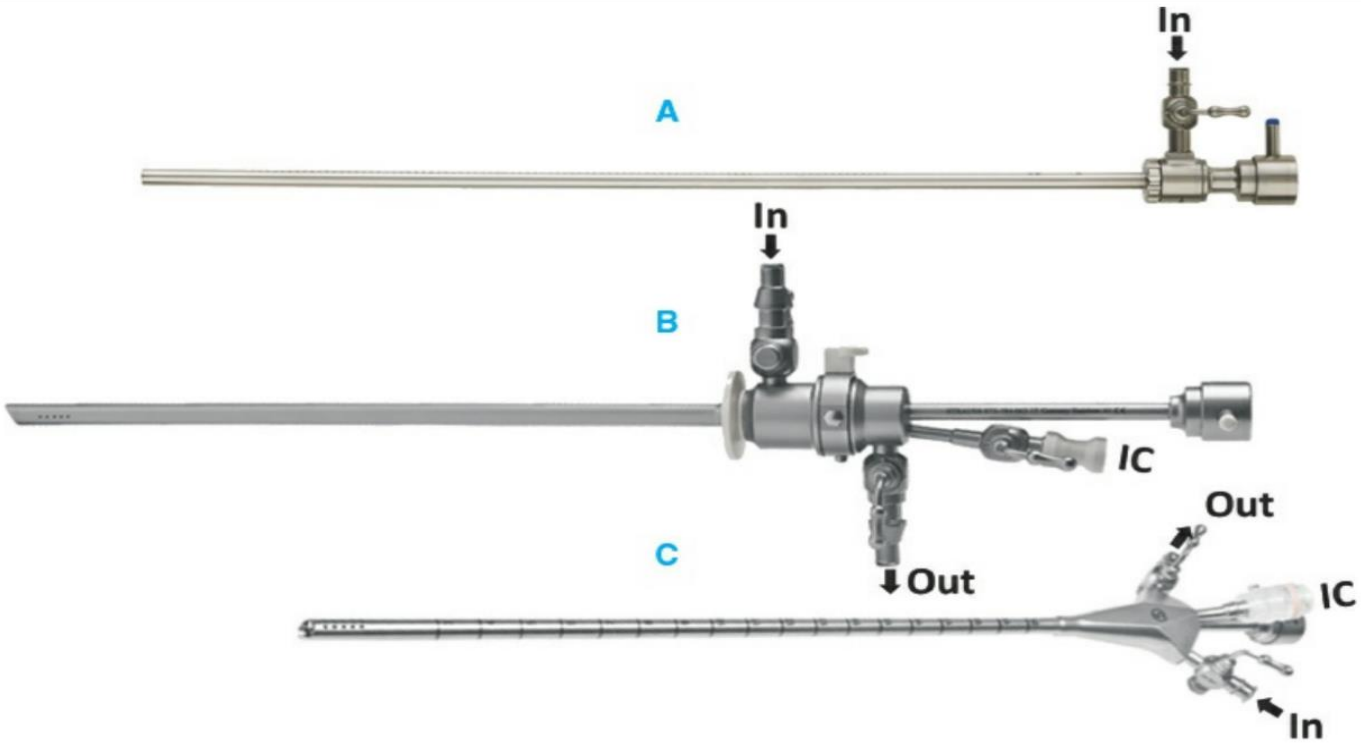
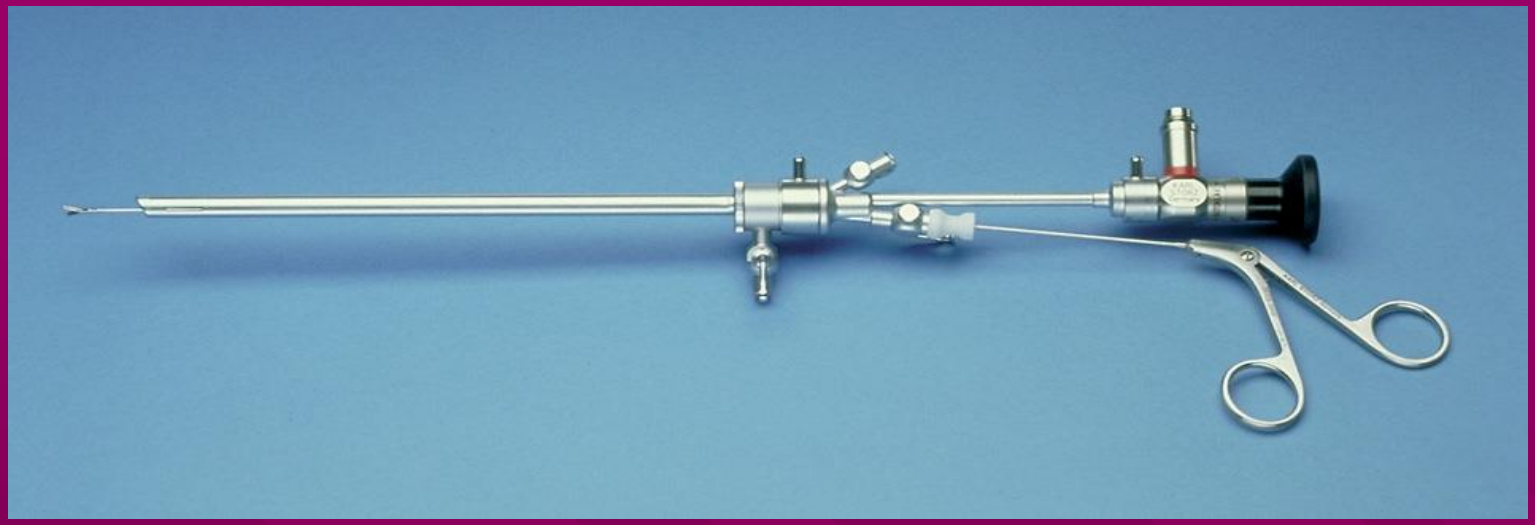


FIGURE 26-46 Hysteroscopic sheaths. A: A simple "diagnostic" sheath, with only one inflow channel (*In*), but no outflow and no instrument channel. **B:** A continuous flow system with two separate sheaths connected together. One sheath is responsible for inflow (*In*) and one for outflow (*Out*), a circumstance that does much to maintain a clear field, particularly if there is blood or debris. There is a separate instrument channel (*IC*). **C:** A single piece continuous flow sheath with integrated inflow and outflow channel, and an instrument channel (*IC*).




1. Endoscope 30° 内窥镜 Φ2.9×302mm
2. Inner Sheath 内鞘
3. Outer Sheath 外鞘 16.5 Fr × 200mm
Hysteroscopy Set
宫腔操作镜

Flexible office hysteroscope

Flexible hysteroscopes are 3.2 to 3.5 mm in diameter with a tip that deflects over a range of 90 to 120 degrees, not requiring cervical dilation.

For operative hysteroscopy, a single-flow rigid hysteroscope with a 4- to 5-mm outer sheath can be used in the office with semirigid instruments such as scissors, graspers, and biopsy forceps.

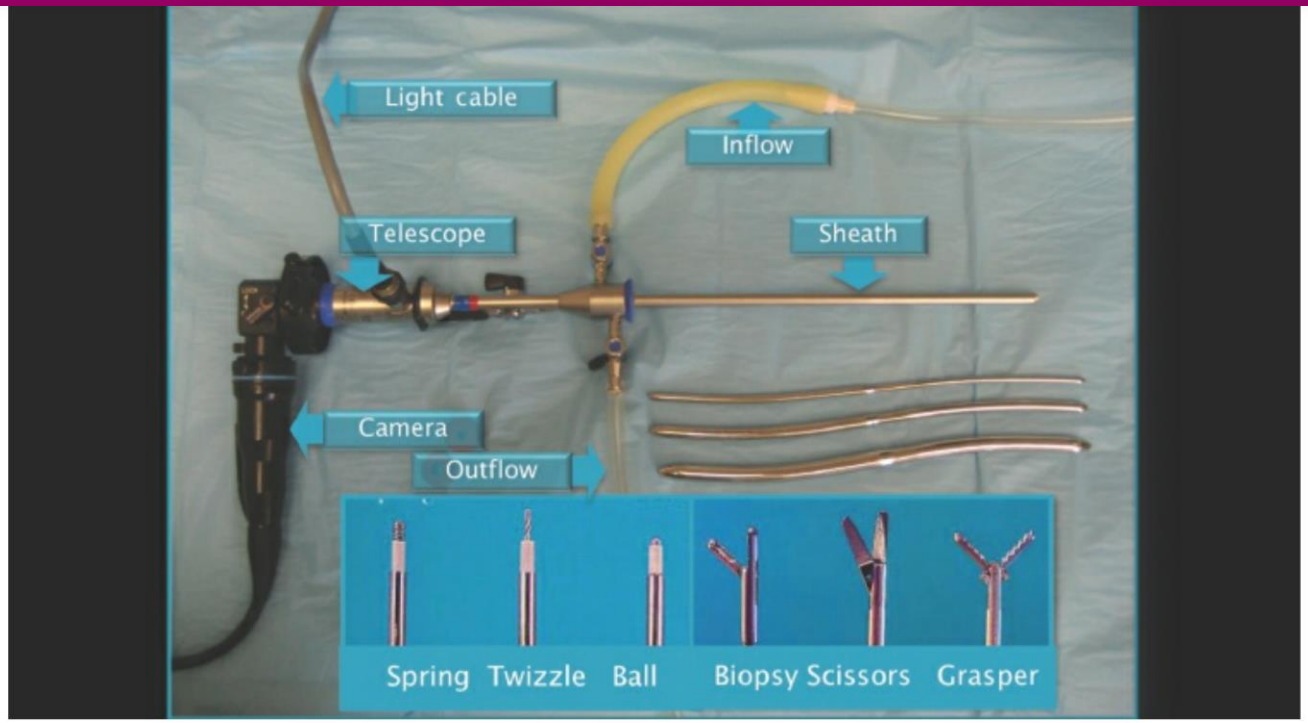


FIGURE 26-44 Office hysteroscopy instruments. An assembled continuous flow operating hysteroscope with a 5.5-mm diameter external sheath is shown connected to inflow and outflow tubing and an attached medical video camera and light cable. In the *lower right inset* are three 5-Fr instruments that can be passed through the operating channel into the endometrial cavity. From **left** to **right** these are biopsy forceps, semi-rigid scissors, and grasping forceps. In the *left inset* are bipolar RF instruments. From **left** to **right** these include a "spring tip" for tissue vaporization; a "twizzle tip" for tissue transection; and a "ball tip" for vessel coagulation.

Equipment setup

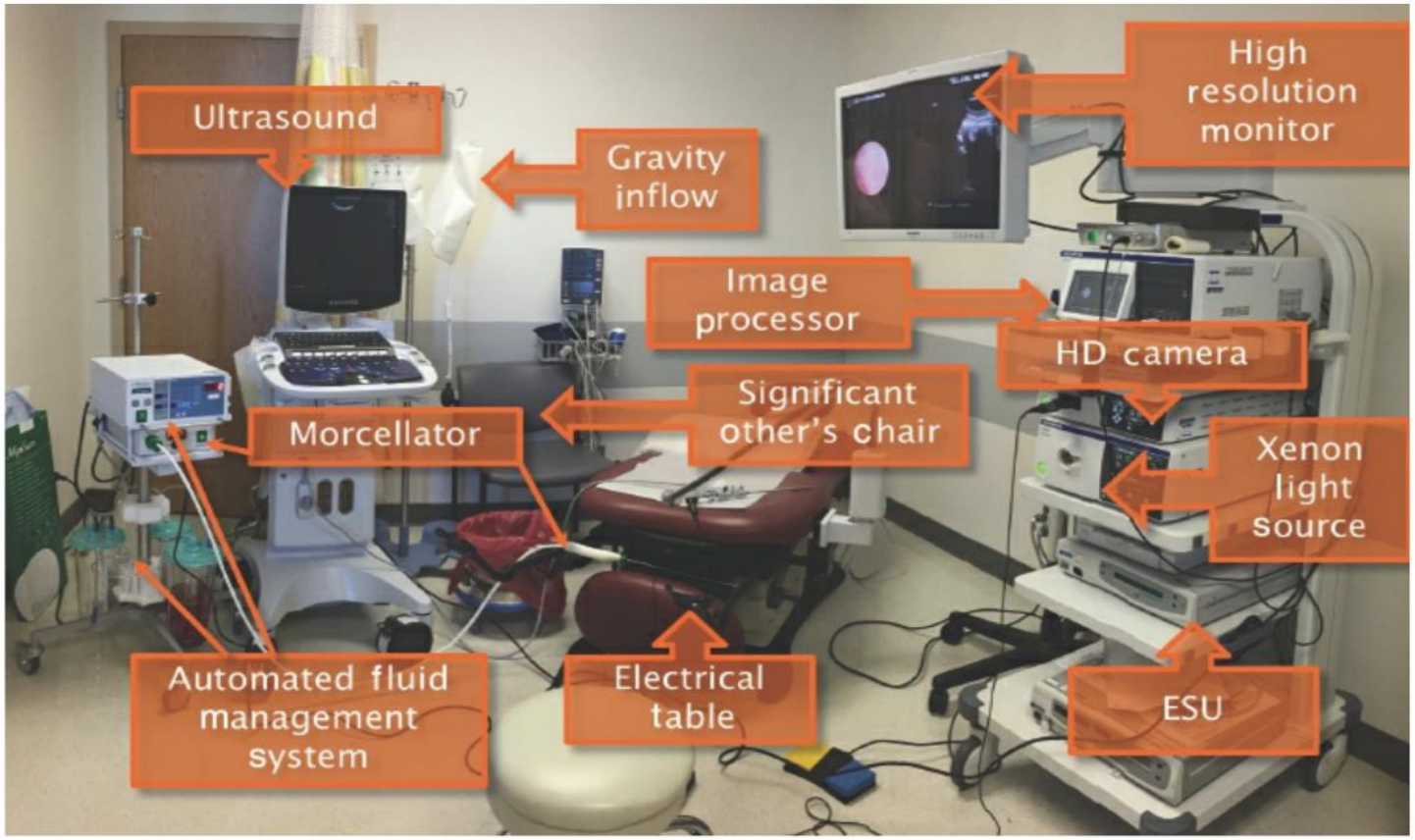
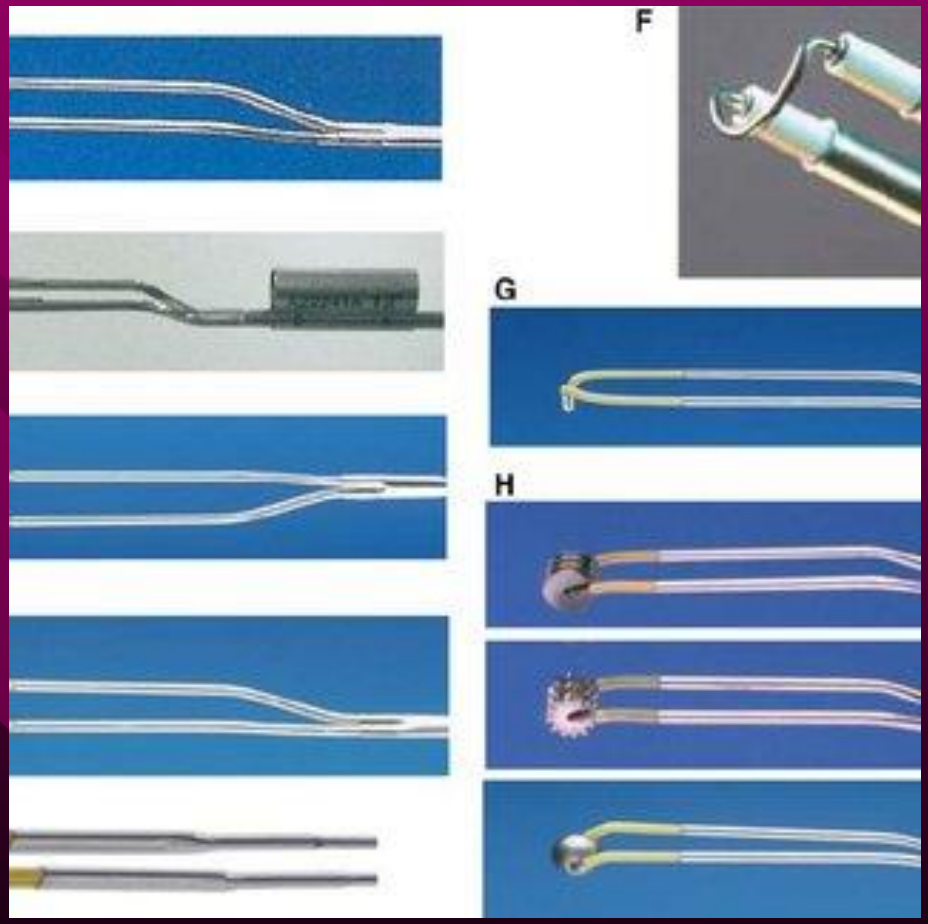


FIGURE 26-43 Office hysteroscopy setup. Hysteroscopic procedures are facilitated with an electric examination table designed to adjust the patient's position. Distension media may be positioned on an IV pole, but wide, cystoscopy tubing allows maintenance of higher intrauterine pressures suitable for viewing and performing simple procedures such as polypectomy or transcervical sterilization. A light source is necessary and a camera desirable. The camera is attached to the monitor and may be connected to a printer and/or video recorder. The camera head is attached to a flexible hysteroscope.

Surgical resectoscope

Operative resectoscope

Resectoscopic electrodes



Light Generators

- The quality and power of light delivered to the telescope are determined by three factors:
- Wattage, Light generator, and Connecting fiberoptic light cable.
- Three general types of light generators are available:
- Tungsten, Metal halide, and Xenon.
- A xenon light generator provides the best illumination for video techniques, although less expensive light sources may be satisfactory when coupled to newer cameras, which are highly light sensitive.
- The cable must be intact to convey the optimal light from the generator to the telescope. Broken fibers can be easily identified by viewing the stretched-out cable against a dark background and looking for light emitting through the sides of the cable

Adequate illumination of the endometrial cavity is essential. Because it runs from a standard 110- or 220-volt wall outlet, the light source requires no special electrical connections. For most cameras and endoscopes, the element must have at least 150 watts of power for direct viewing and preferably 250 watts or more for video and operative procedures

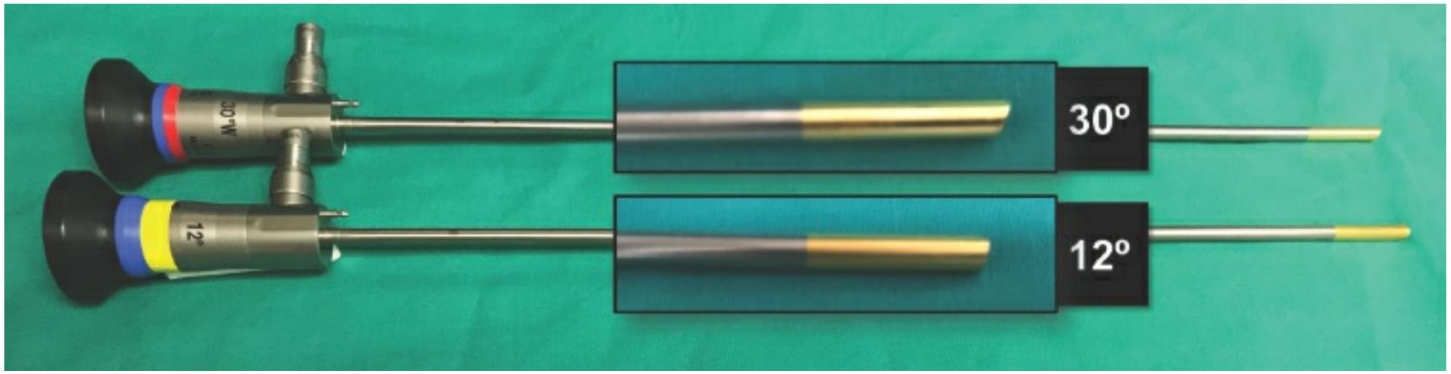


FIGURE 26-49 Rigid hysteroscopes. Demonstrated are a 12-degree (**bottom**) and a 30-degree (**top**) foreoblique variety.

Viewing angle

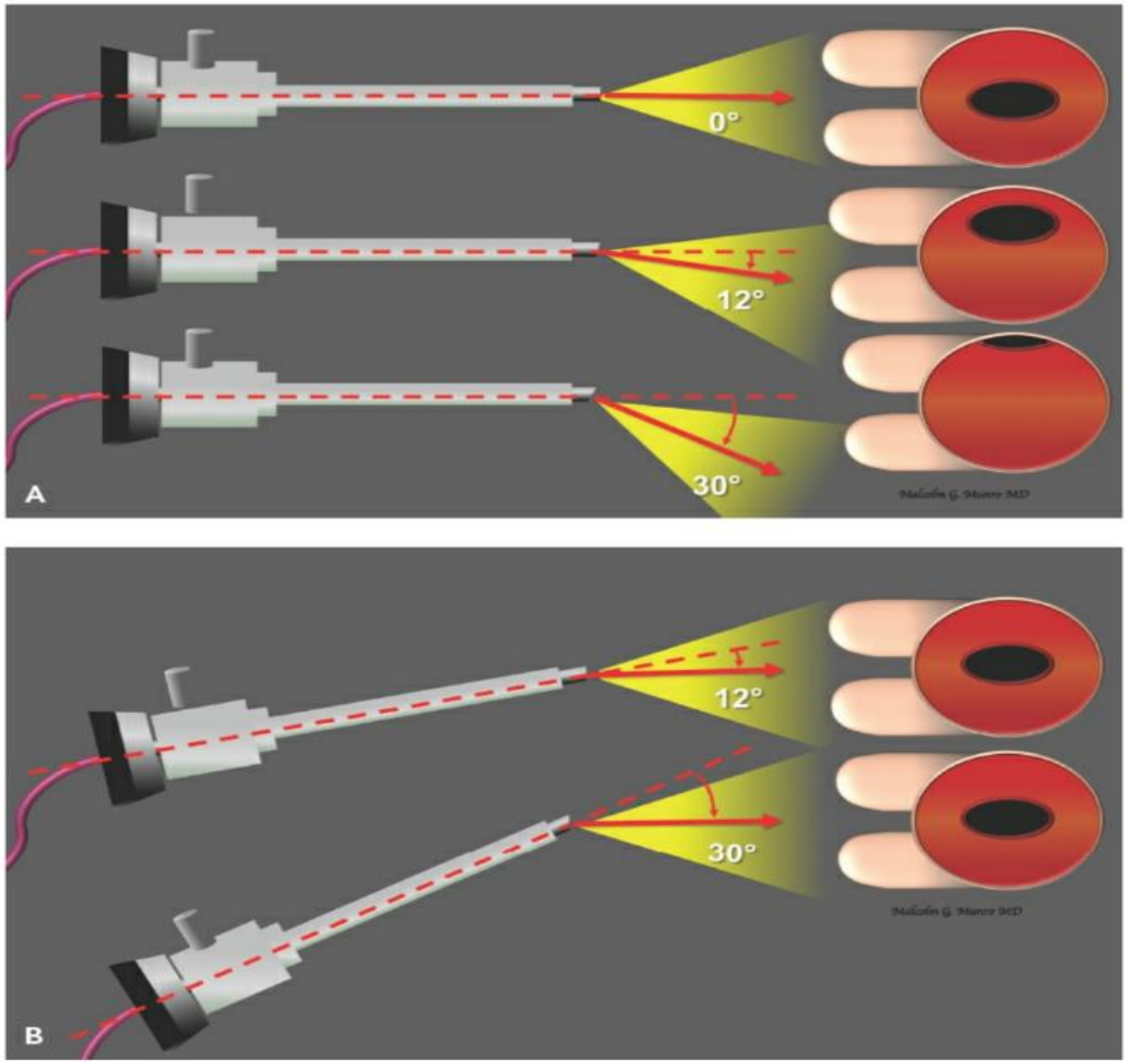


FIGURE 26-50 **Rigid endoscope optics. A:** When the 0 degrees hysteroscope is inserted into the cervix the cervical canal is generally central (**top**) and the direction of insertion is aligned with the viewing angle. When a 12-degree lens is inserted with the axis of the endoscope aligned with that of the cervix, the canal will be seen to be anterior (**middle**), a circumstance that becomes more extreme with a 30-degree viewing angle to the point that only the cervical sidewall is seen (**bottom**). **B.** Adjusting the viewing angle to see the

Indications of diagnostic hyteroscopy

- 1. Unexplained abnormal uterine bleeding (AUB):
  - Premenopausal
  - Postmenopausal
- 2. Selected infertility cases
  - Abnormal hysterography or TVUS
  - Unexplained infertility
  - Routine assessment prior to ET
  - “Second look” evaluation following selected uterine surgery cases
- 3. Recurrent pregnancy loss (RPL)

Hysteroscopic examination is superior to HSG in the evaluation of the endometrial cavity.

Access to Uterine Cavity

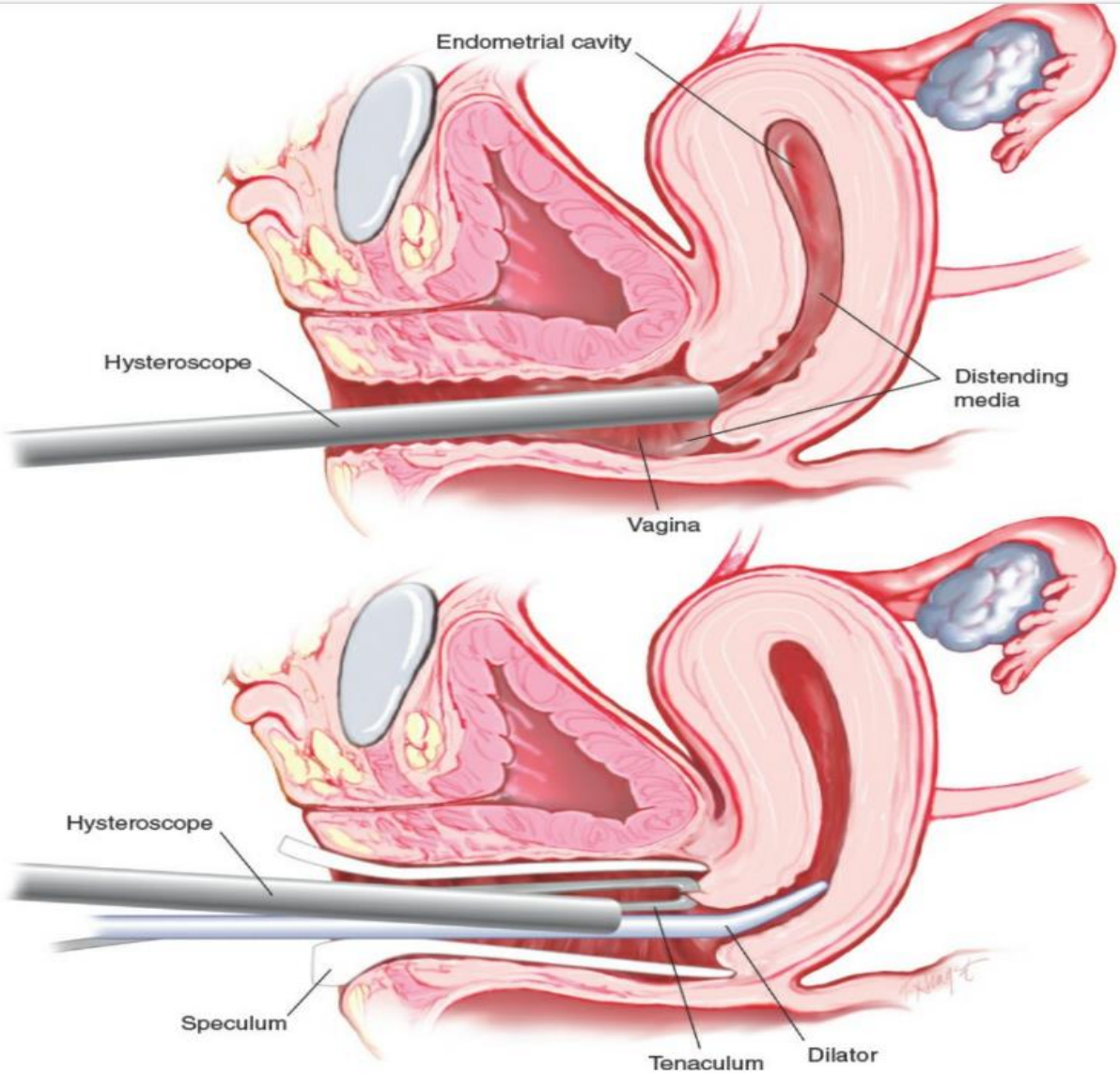


FIGURE 26-45 Hysteroscopic access. In many instances, the hysteroscopic system can be passed into the vagina (vaginoscopic access, *top panel*), the external os visualized endoscopically, and then advanced into the endometrial cavity without a tenaculum or cervical dilation. The more traditional approach of tenaculum and cervical dilation is necessary if the cervical canal is stenotic or substantially narrower than the outside diameter of the hysteroscopic system.

Cervical dilation

- **Prostaglandin E1** (misoprostol) administered **400 µg orally or 200–400 µg vaginally**, approximately **3 to 24 hours before** the procedure facilitates cervical dilation.
- This may have more utility for **postmenopausal** women who **require estrogenization**, with a vaginal preparation, administered daily **for 2 weeks before the procedure** .
- **Intraoperatively** administered intracervical **vasopressin (0.05 U/mL, 4 cc at 4 and 8 o'clock)** substantially reduces the force required for cervical dilation.
-

Cervical dilation

- Inserting a laminaria “tent,” in the cervix **3 to 8 hours before** the procedure. If laminaria are left in place too long (e.g., longer than 24 hours), the cervix may overdilate
- Regardless of the circumstance, the cervix should be dilated **as atraumatically as possible**. It is best to avoid using a uterine sound because it can traumatize the canal or the endometrium, causing unnecessary bleeding and uterine perforation.
- The best approach may be to use the **hysteroscope, not a dilator or sound**, to explore the cervical canal, a circumstance that facilitates visually guided entry into the uterine cavity.

Safe use of vasopressin

Care should be taken to avoid **intravascular injection**

The maximal safe dose of vasopressin is not well established.

Cardiovascular complications following have been reported in isolated cases with total vasopressin doses ranging from 5 to 11 units.

An upper limit of a cumulative total vasopressin dose per procedure of 4 to 6 units has been proposed.

In our practice, we dilute **20 units of vasopressin in 100 ml of saline; 4 to 6 units of vasopressin equals 20 to 30 mL of this solution (cystectomy/ (0.1–1unit/ml).**

1-2 units of vasopressin in 100 ml of saline for cervical ripening (0.05 U/ml).

The half-life of intramuscular vasopressin is 10 to 20 minutes and the duration of action is **two to eight hours.**

Anesthesia (local)

- **Paracervical block**: Instill about 3 mL of 0.5% to 1% lidocaine into the anterior lip of the cervix to allow attachment of a tenaculum to allow manipulation of the exocervix.
- While the exact location and depth of the injection varies with providers and studies, the uterosacral ligament location (about 4-mm deep at approximately at the 4- and 8- o'clock positions **as one looks at the cervix**) is successful.
- The injection of **lidocaine 1%, 10 to 15** mL, directly into the cervix produces adequate anesthesia. (Te Linde 's)

Anesthesia (local)

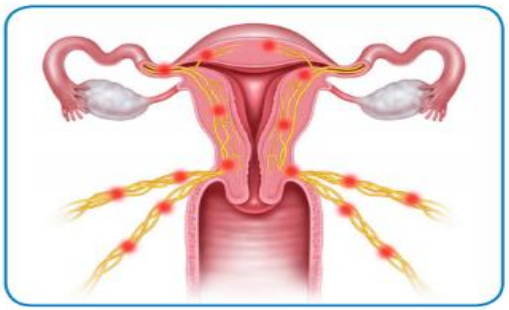
- **Intracervical block** : where the anesthetic agent is injected evenly around the circumference of the cervix, attempting to reach the level of the internal os. The efficacy of this approach is unclear.
- **Additional topical anesthesia** may be applied to the cervical canal or to the endometrium, or both, using anesthetic spray, gel, or cream: instillation of **5 mL of 2% mepivacaine** into the endometrial cavity with a syringe or the application of similar amounts of 2% lidocaine gel.

Why use a paracervical block in the office setting?

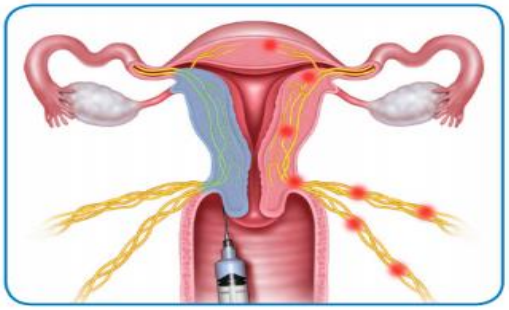
Paracervical and fundal block are local anesthetic techniques that can improve patient comfort for minor procedures in the office setting. They can be used for a variety of different office procedures, including the NovaSure endometrial ablation procedure, cervical biopsies, endometrial biopsies, and LEEP procedures. A paracervical block is the introduction of an anesthetic at the base of the uterus, near the cervix and the uterosacral ligaments, which blocks the pain fibers leaving the uterus.

A fundal block is the introduction of an anesthetic into the myometrium of the uterine fundus. This type of block can be used in combination with a paracervical block to further minimize patient pain.

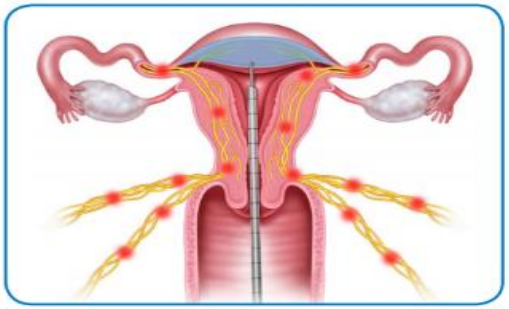
There are several protocols that describe the type of anesthetic agents to use and the locations to inject them. Understanding the blood supply and innervation of the uterus and cervix can help in planning where to safely inject the medications to achieve the best result.



The sensation for pain for the patient is mainly due to impulses passing by sensory pathways down the lateral and posterior portions of the cervix, into the area of the uterosacral ligaments.



Paracervical block involves injecting anesthetic medication into the uterine region to block the impulses leaving the uterus.



Fundal block involves injecting anesthetic medication into the fundus to block the impulses in the upper part of the uterus.

Anesthesia

- Many operative procedures can be performed with these techniques combined, if deemed necessary, with the **oral or intravenous use of anxiolytics or analgesics**.
- An important component of the optimal use of local anesthesia is to **allow sufficient time between injection or application** of the agents and the commencement of the procedure.
- While injectable local anesthetic agents such as lidocaine and mepivacaine may have an onset of **action of 2 to 3 minutes, it may take up to 15 to 20** minutes to obtain a maximal effect.
- If local anesthesia is not deemed appropriate, **regional or general anesthesia** may be used.

DISTENDING MEDIA

The uterine cavity is a potential space , so to achieve a panoramic view within the uterus the walls must be forcibly separated

The minimum pressure required to distend the cavity is 40 mm Hg

During operative hysteroscopy the walls of the uterus must be held more widely apart, so the required pressure is 70 mm Hg

Media delivery systems

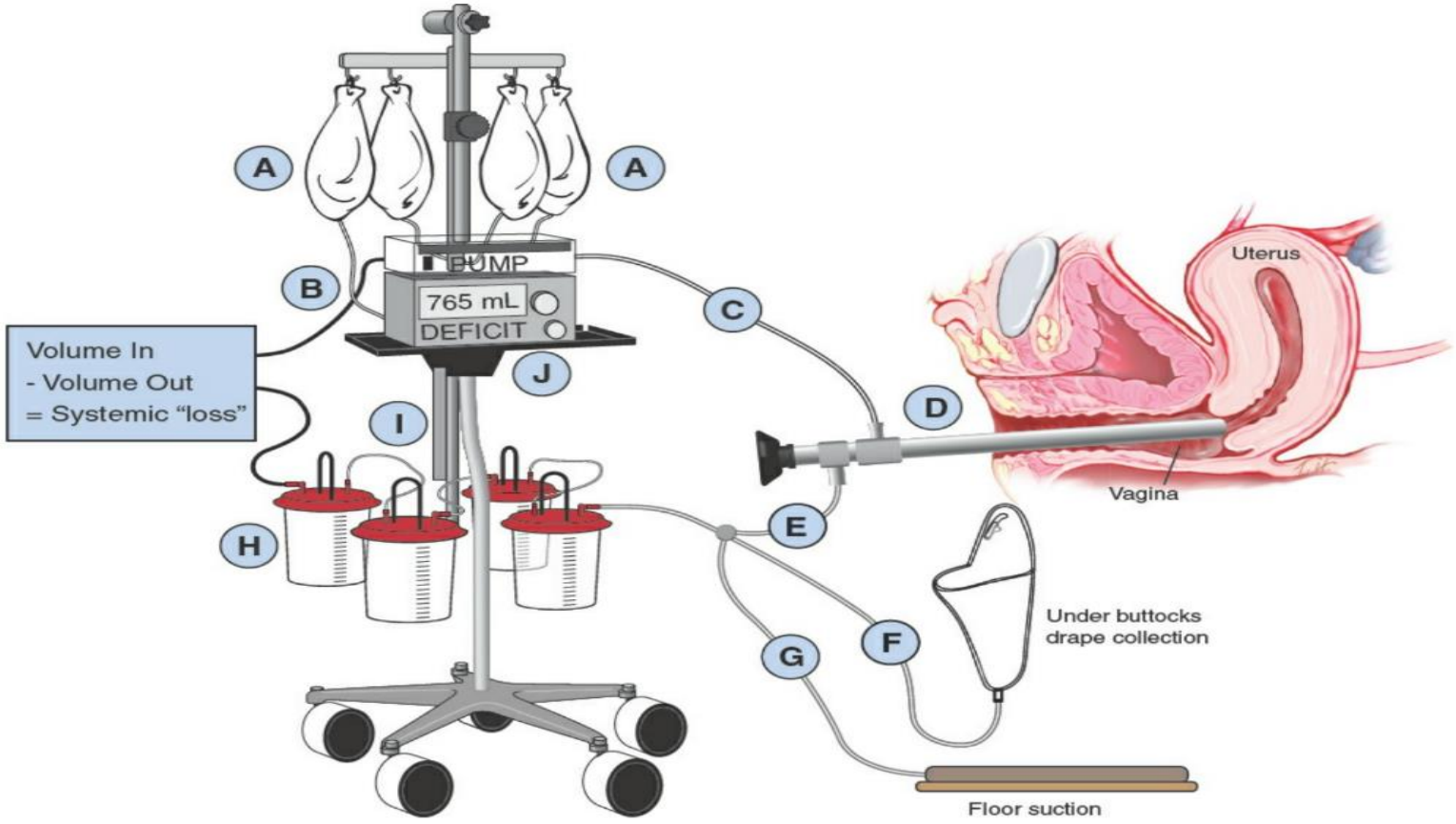


FIGURE 26-47 Fluid management system. Hysteroscopic fluid management systems combine a pump that delivers fluid to the endometrial cavity with a system for calculating the amount of fluid that is absorbed systemically—the deficit. The bags of fluid are hung (*A*) and connected to the pump (*B*) that delivers the media via tubing (*C*) to the inflow channel of the hysteroscopic system (*D*). Then, the fluid is either systemically absorbed through blood vessels or the peritoneal cavity via fallopian tubes, or collected from the outflow channel of the hysteroscope (*E*), the underbuttocks drape (*F*) and, if available, floor suction (*G*), into containers at the base of the system (*H*).The collected fluid is weighed by an electronic scale (*I*) and the microprocessor system converts this weight to volume that, when subtracted from the measured infused volume by the microprocessor, allows the "deficit" to be displayed on the screen in mL (*J*).

MEDIA

-LIQUID:

A-low viscosity:

With electrolytes

Without electrolytes

B-high viscosity

-GASEOUS: Carbon Dioxide(CO_2)

Carbon Dioxide (CO_2): a colorless gas, is popular for office diagnostic hysteroscopy.

CO2

The rate of flow should never exceed 100 mL/ minute. Pressure should be below 150 mm of Hg.

Advantages:

-Co2 is easy to get,
-Does not wet surgeons cloths as fluid does
-Does not foul instruments
-Does not mess up the office or operating room

So is an excellent **diagnostic** medium

Disadvantages:

-CO_2 and blood mix ,producing an obscuring bubbling foam

-Tends to flatten the endometrium and obscure pathology

-Cannot be used to flush the cavity of debris.

-It is associated with higher procedure-related pain, (shoulder pain).

-A major disadvantage of CO_2 is that it cannot be used for operative hysteroscopy due to risk of CO_2 embolism.

Caution:

A-Hysteroscopic insufflator is a special instrument for using Co_2 as distending media

B-Trendelenburg position should be avoided

LIQUID MEDIA High viscosity

Hyskon(32% dextran 70 in dextrose): Dextran 70 a hyperosmolar medium is a colorless viscid solution.

Is an excellent medium for both diagnostic and operative hysteroscopy.

Hyskon can be used universally with electrosurgical devices and conventional equipment.

Due to osmotic activity of dextran ,100 mL of Hyskon will expand the plasma volume by 640mL

-The upper limits for Hyskon infused during a single case is 500 mL

-Adv: Immiscibility with blood , permits excellent visualization during active bleeding

-Disadv: Dried residue harden and clog hysteroscopic sheath. Is prevented by immediately flushing the scope and sheath with hot water.

Complication:

-Anaphylactoid reaction

-Bleeding diathesis
A-Alteration of platelet adhesiveness
B-Interference with von willebrand factor

-Pulmonary edema due to vascular overload and heart failure

Low Viscosity Fluid With Electrolytes:

Low Viscosity fluids must be continuously flushed through the uterine cavity if a clear view is to be obtained.

The most frequently used are Normal Saline.

They are appropriate when bipolar electrode, and mechanical devices are used.

The safest distending media is 0.9% sodium chloride (normal saline) due to its osmolarity and sodium content.

Saline is an efficient conductor of electrons and cannot create enough current density so is not suitable for monopolar electrosurgery

Adv:

-Greater margin in fluid intravasation

-Easy to obtain

-Low cost

Caution:

Whenever fluid deficit is more than 2.5 L , the procedure should be discontinued and scheduled for completion at a later date

low viscosity (Without electrolytes):

Accountancy of fluid input and output is mandatory in any hysteroscopic procedure.

The low-viscosity fluids most often used are glycine l.5% ,sorbitol 3%, and mannitol 5 %

Glycin (1.5%) and sorbitol (3%)are hypoosmolar. (Glycin,200mOsm/L and sorbitol 178mOsm/L)

Manitol is nearly isoosmolar, with osmolarity of 285mOsm/L and is an osmotic diuretic

Adv:

-Low cost

-Compatibility for use with monopolar electrosurgical devices.

Disadv:

Vascular absorption and the creation of an acute hyponatremic, hypoosmolar state.

In the operating room, media infusion and collection should take place in a closed system to allow accurate measurement of the absorbed Volume.

Alarm

When the fluid deficit **equal to or greater than 750** mL, the surgeon should assess serum sodium in the **operating room and 4 hours later.**

The brain cells respond by **pumping cation** out to diminish the positive infusion of water into the brain. Unfortunately, this **cation-pumping mechanism is decreased in women**, likely due to progesterone, and women are therefore at greater risk for developing **lifethreatening** cerebral edema during a hypo-osmolar state as well as Nausea and vertigo at the initiation of process.

Specific characteristic

- An additional unique risk of glycine is that it can be metabolized to ammonia and **cause neurologic damage** (leading to encephalopathy and, rarely, death).
- Mannitol (5%) may be used with electrosurgical devices and is approximately iso-osmolar. Mannitol has an osmolality of 285 mOsm and is an osmotic diuretic. however, mannitol is less likely to cause hyponatremia due to its **diuretic characteristics.**

Managements

- Hyponatraemia should be treated with administration of diuretics and hypertonic saline solution combined with monitoring of serum electrolyte levels until normality has been restored.
- Encephalopathy requires haemodialysis to be performed.
- The lowest intrauterine pressure necessary for adequate distention should be used to complete the operation, if possible at a level that is below the mean arterial pressure. A good range **is 70 to 80 mm Hg**, which can be achieved with a specially designed pump or by maintaining the meniscus of the infusion bag **1 m above** the level of the patient's uterus.

BOX 13.1 STEPS IN THE PROCEDURE

Diagnostic Hysteroscopy

- Lithotomy position, bimanual examination: uterus anteverted or retroverted.
- Empty the bladder; drape the perineum into sterile fluid.
- Position fluid collection bag under buttocks.
- Verify correct hysteroscopic equipment and distension media.
- The cervix is visualized with bivalve speculum or Sims retractor.
- Tenaculum is applied to the anterior lip of the cervix.
- Dilation of cervix, if required (dilatation not required for diagnostic scope); do not overdilate.
- Place hysteroscope in the external os, with distension media flowing; insert under direct visualization; countertraction is applied using the tenaculum.
- Inspect the endocervical canal during entry of hysteroscope.
- Once inside the uterine cavity, remove the speculum or Sims retractor with hysteroscope in place.
- Verify/orient position by identifying tubal ostia.
- Inspection should include the cervical canal, panoramic view of the cavity, bilateral tubal ostia, and anterior and posterior uterine walls.

BOX 13.2 STEPS IN THE PROCEDURE

Operative Hysteroscopy

- Follow initial steps for diagnostic hysteroscopy.
- If visualization is cloudy, open outflow valve to clear, and then reclose; leave slightly open for fluid circulation if necessary.
- Constantly monitor fluid deficit: Halt procedure at a deficit of 750 mL (nonelectrolyte) or 2,500 mL (electrolyte) depending on distension.

Myomectomy

- ***Resectoscope:*** 90 degrees loop released with continuous-wave (cutting) electrocautery at 80 to 100 W; progressively shave myoma with occasional removal of fibroid fragments; loop is always pulled toward hysteroscope when cutting.
- ***Morcellator:*** handpiece placed through operative channel with distal tip adjacent to fibroid edge. Activate cutting action with foot pedal as handpiece remains stationary.

Polypectomy

- Insert hysteroscopic scissors and cut polyp at the base.
- Insert hysteroscopic forceps to grasp polyp and excise.
- Alternative methods: resectoscope or morcellator (similar to myomectomy).

Septum Excision

- Identify both uterine chambers and bilateral tubal ostia.
- Using hysteroscopic scissors or other cutting device, divide the septum at midportion.
- Take care when approaching the fundus to avoid perforation or bleeding.

Lysis of Adhesions

- Perform a thorough diagnostic hysteroscopy to identify landmarks.
- Using scissors or other cutting device, cut filmy and central adhesions first.
- Cut marginal and dense adhesions last, always cutting from below and moving upward.
- Maintain hysteroscope in midchannel relative to uterine walls.

Electromechanical morcelator (Bigatti Shaver)

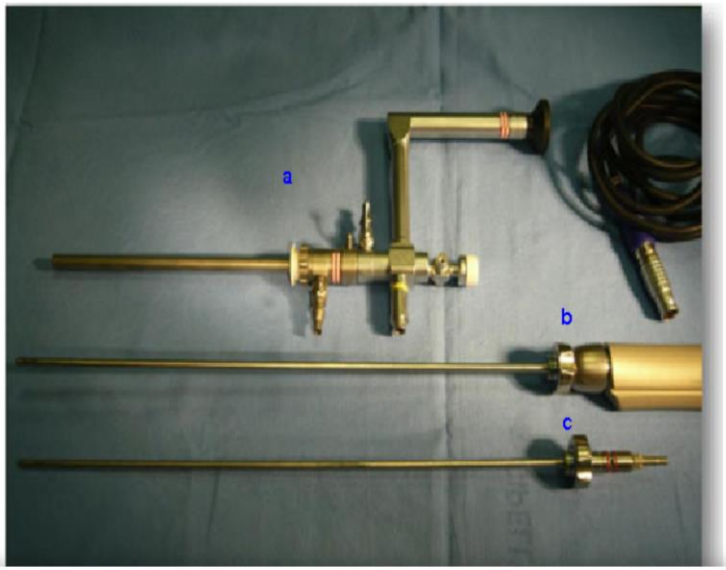


Fig. 1 Integrated Bigatti Shaver (IBS). a 90 angulated 6 optics (Karl Storz GmbH of Tuttlingen) with a double flow sheath and an extra channel for the insertion of a bRigid shaving system, c reusable blade

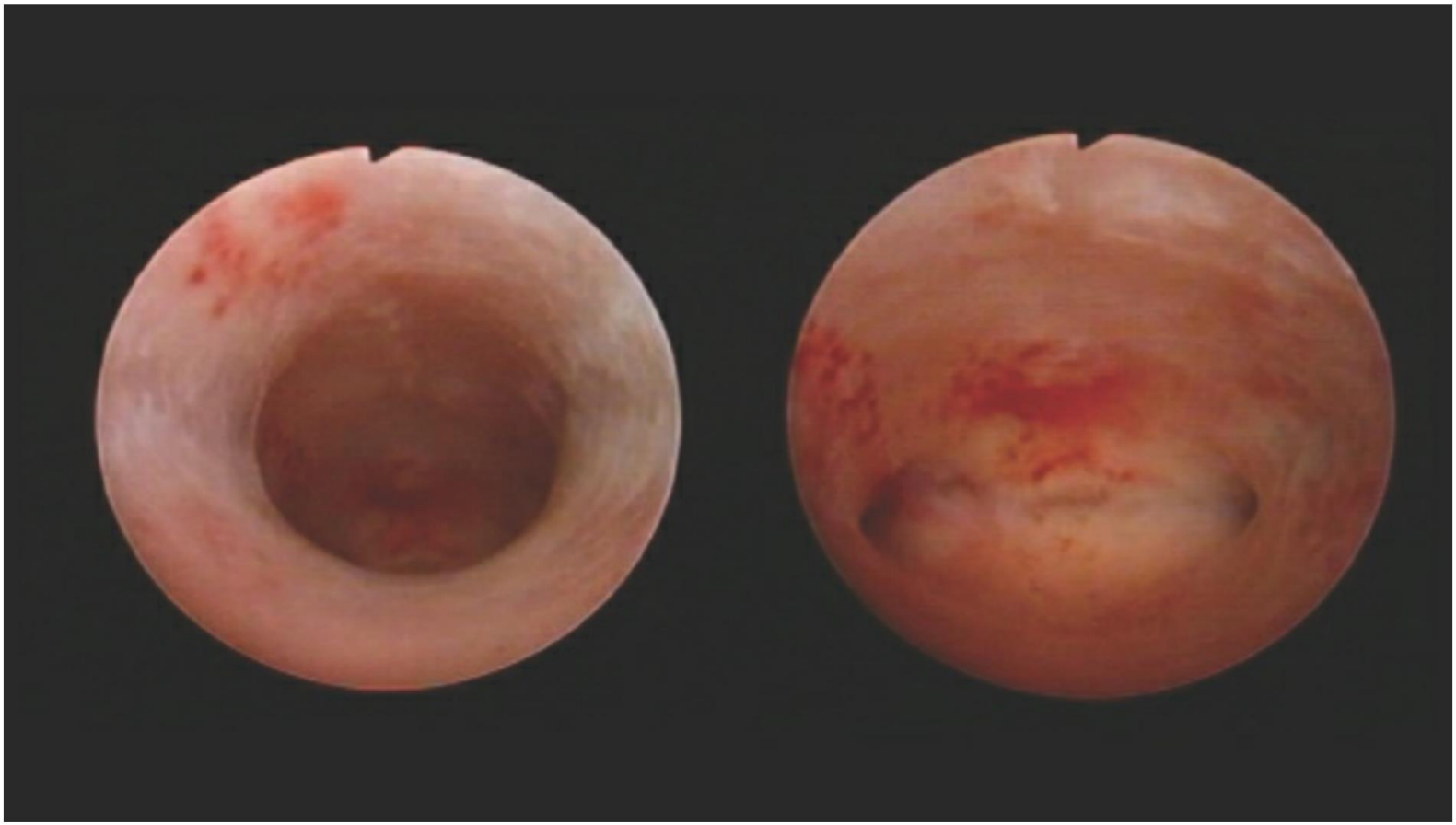
Published in Gynecological Surgery 2013

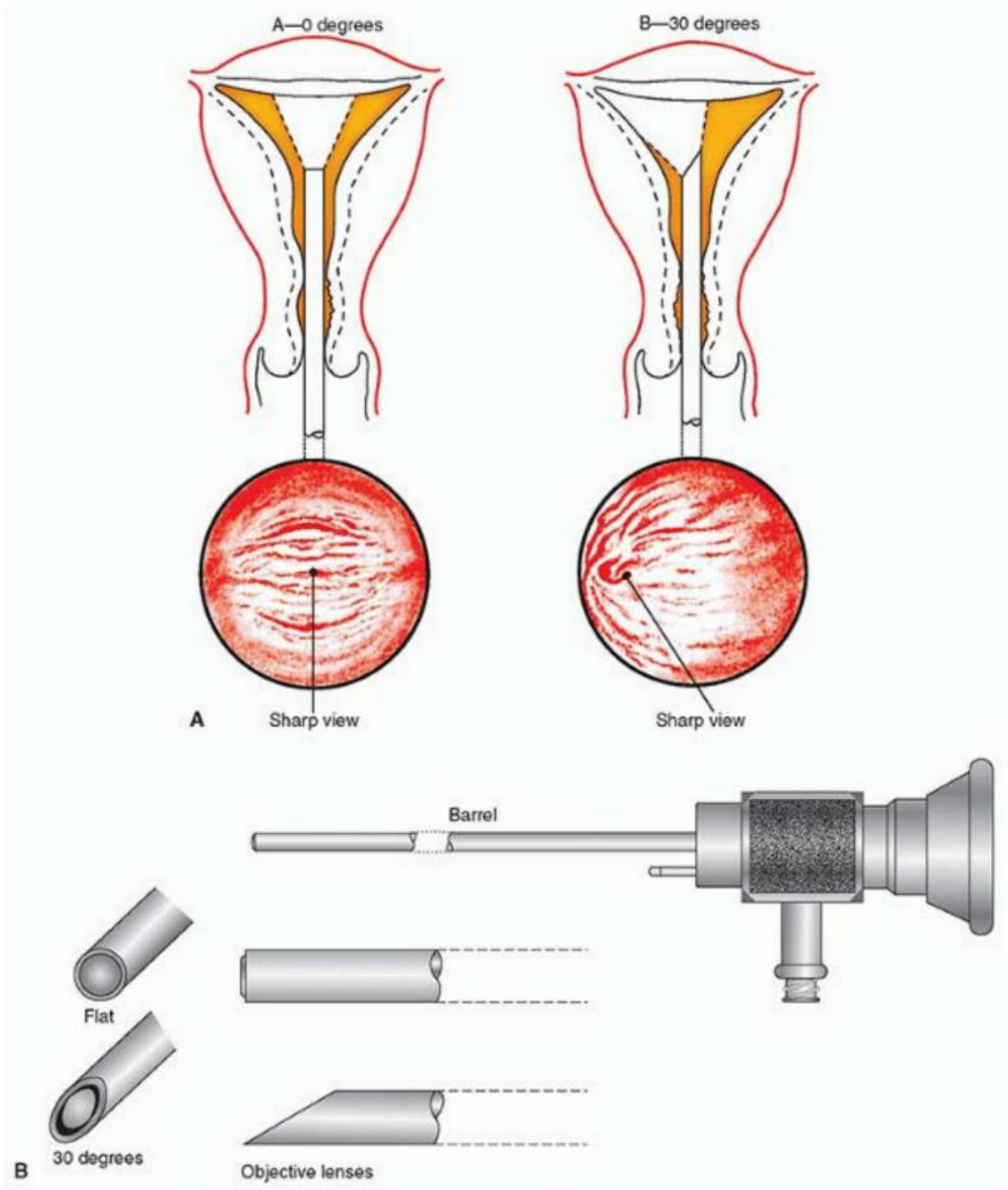
Hysteroscopic myomectomy with the IBS® Integrated Bigatti Shaver versus conventional bipolar resectoscope: a retrospective comparative study

G. Bigatti, S. Franchetti, M. Rosales, A. Baglioni, S. Bianchi

FIGURE 26-53 Electromechanical morcellator. These systems have their own proprietary hysteroscope system with an offset eyepiece (**right**) to allow for one of the rigid hollow probes (**bottom**) to be inserted. The probe is connected to a motor drive (**center**) that is activated by depressing a footpedal (**upper left**) that activates both an oscillating blade and suction. The blade transects the tissue, and the suction transports it to a collecting sac in the fluid management system.

Diagnostic hysteroscopy




A—0 degrees
B—30 degrees
Sharp view
Sharp view
A
Barrel
Flat
30 degrees
Objective lenses
B

380

Septate uterus

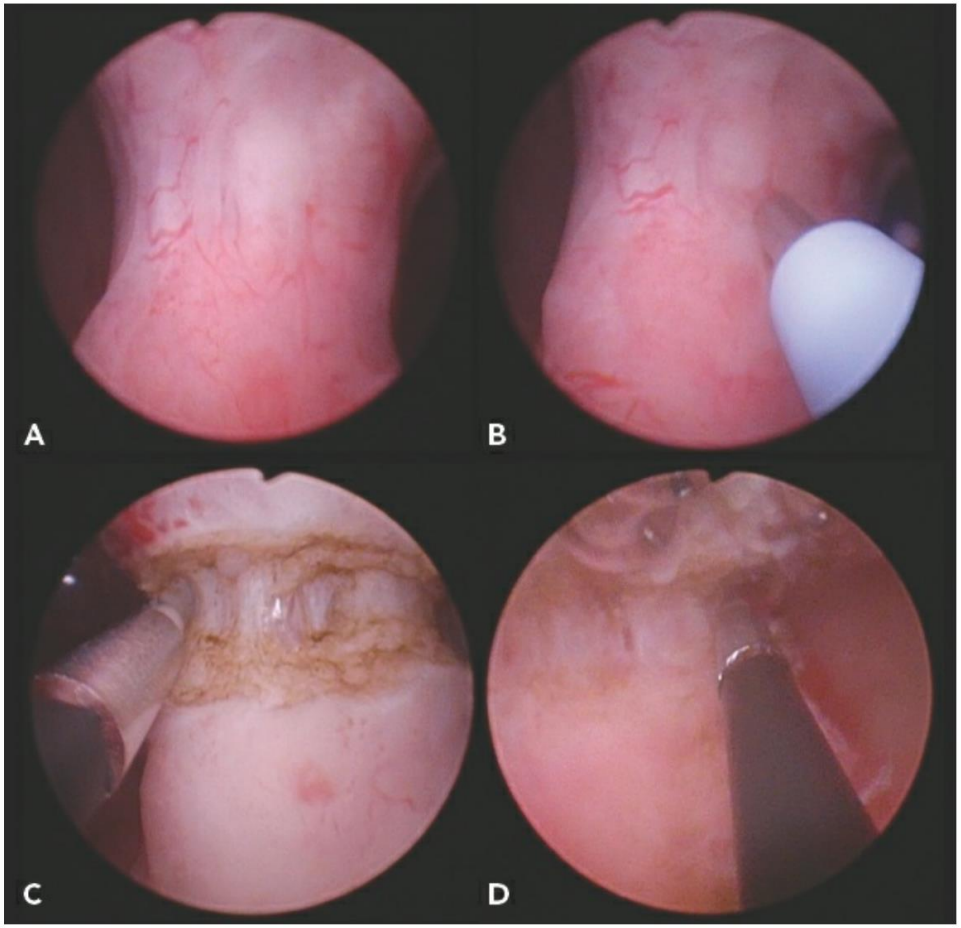
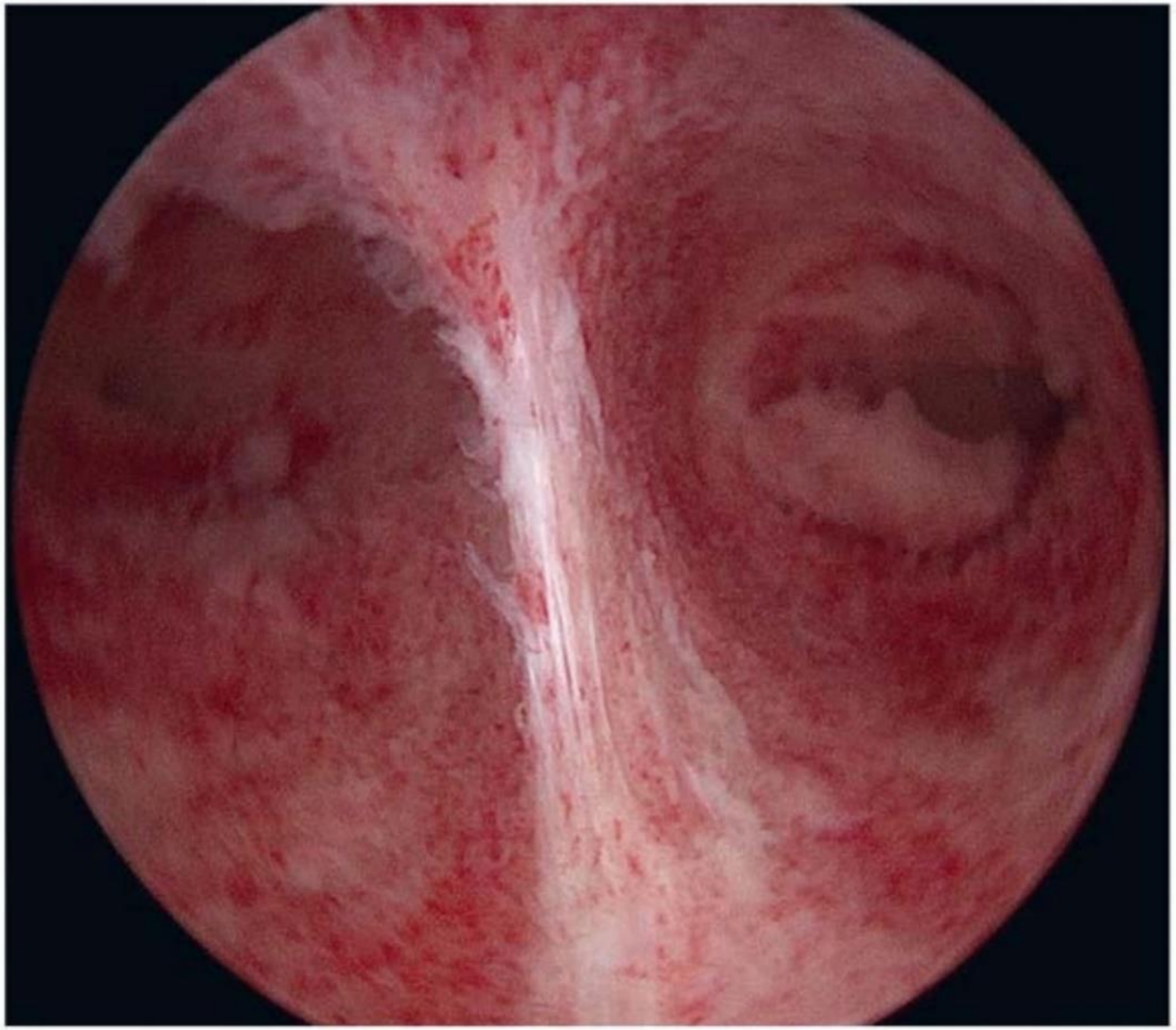


FIGURE 26-36 Transection of a uterine septum (rAFS Class 5A). The leading edge of the septum is seen close to the internal os (**A**). Additional anesthesia is injected via a 5-Fr needle passed through the 5-Fr channel in the operating sheath (**B**). A bipolar radiofrequency (RF) needle is used to start the transection (**C**) that is nearly complete in **D**. This procedure was done completely under local anesthesia in an office environment.



Myomatose uterus

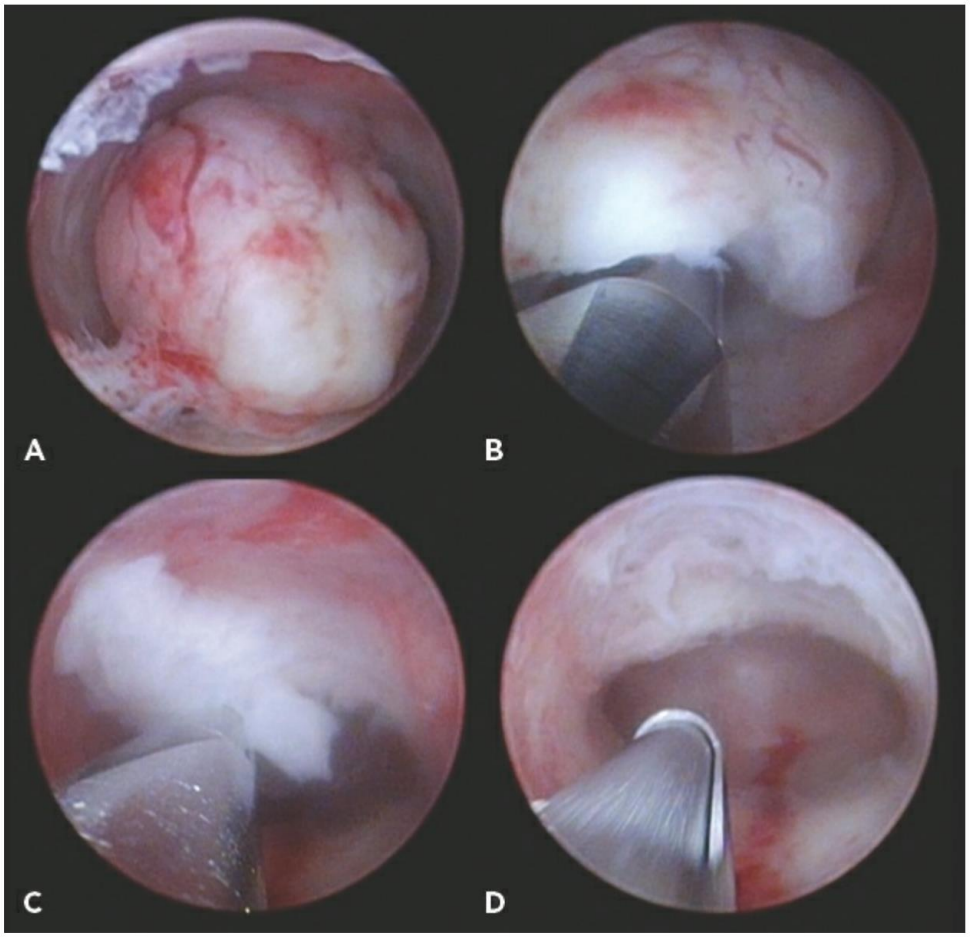


FIGURE 26-39 Myomectomy—FIGO type 0 leiomyoma. A: Note that the leiomyoma is entirely intracavitary and attached to the endometrium/myometrium by a narrow stalk. An electromechanical morcellator (Myosure®, Hologic Inc Marlborough, MA, USA) has been introduced and a portion of the tumor has been removed (**B**); it is almost totally gone in **C. D:** The tumor has been totally removed from the anterior wall.

Submucous myoma

Detailed view of the superficial vessels

Contraindications for hysteroscopy

- Active pelvic infection,
- Pyometra,
- Intrauterine pregnancy,
- Cervical or uterine cancer.
- Medical comorbidities (eg, coronary heart disease, bleeding diathesis) are also potential contraindications to hysteroscopic surgery

Complications

- The risks of operative hysteroscopy are related to one of five aspects of the procedure performed:
- (a) anesthesia;
- (b) distention media;
- (c) perforation;
- (d) bleeding; and
- (e) the use of energy

Anesthesia complications

- maximum recommended doses (lidocaine, 4 mg/kg; mepivacaine, 3 mg/kg).
- The use of a dilute vasoconstrictor such as epinephrine 1/200,000 reduces the amount of systemic absorption of the agent, virtually doubling the maximum dose that can be used and facilitates the onset of action of local anesthetic agents.
- Complications of intravascular injection or anesthetic overdose include
  - allergy,
  - neurologic effects, and
  - impaired myocardial conduction.

Management of anesthesia complications

- Allergy is characterized by the typical symptoms of agitation, palpitations, pruritus, coughing, shortness of breath, urticaria, bronchospasm, shock, and convulsions. Treatment measures include administration of oxygen, isotonic intravenous fluids, intramuscular or subcutaneous adrenaline, and intravenous prednisolone and aminophylline.
- Cardiac effects related to impaired myocardial conduction include bradycardia, cardiac arrest, shock, and convulsions. Emergency treatment measures include the administration of oxygen, intravenous atropine (0.5 mg), intravenous adrenaline, and the initiation of appropriate cardiac resuscitation.
- The most common central nervous system manifestations are paresthesia of the tongue, drowsiness, tremor, and convulsions. Options for therapy include intravenous diazepam and respiratory support.

Uterine perforation

- Perforation may occur during dilation of the cervix, positioning of the hysteroscope, or because of the intrauterine procedure itself.
- With complete perforation, the endometrial cavity typically does not distend, and the visual field is generally lost.
- When perforation occurs during dilation of the cervix, the procedure must be terminated, but, because of the blunt nature of the dilators, usually there are no other injuries.
- If the uterus is perforated by the activated tip of a laser, electrode, or an activated electromechanical tissue removal device, there is a risk for bleeding or injury to the adjacent viscera.
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Management of perforation

- Therefore, the operation must be stopped, and laparoscopy or laparotomy should be performed.
- Injury to the uterus is relatively easy to detect with a laparoscope.
- However, mechanical or thermal injury to the bowel, ureter, or bladder is more difficult to the extent that laparoscopy is frequently inadequate to make a complete evaluation.
- If the patient's condition is managed expectantly, she should be advised of the situation and asked to report any symptoms of bleeding or visceral trauma such as fever, increasing pain, nausea, and vomiting.

Bleeding as a hysteroscopy complication

- The risk of bleeding may be reduced by the preoperative injection of diluted vasopressin into the cervical stroma.
- The risk of injury to the branches of the uterine artery can be lowered by limiting the depth of resection in the lateral endometrial cavity near the uterine isthmus, where ablative techniques should be considered.
- When bleeding is encountered during resectoscopic procedures, the ball electrode can be used to desiccate the vessel electrosurgically. Intractable bleeding may respond to the injection of diluted vasopressin or to the inflation of a 30-mL Foley catheter balloon or similar device in the endometrial cavity

Management of anemia

- In planning operations that involve deep resection, anemic patients should be treated medically, if possible, with agents such as ulipristal acetate or a GnRH agonist, if necessary, while oral or intravenous iron is used to replenish iron stores.
- An alternative approach, perhaps suitable for nonanemic patients is obtaining and storing autologous blood before surgery.

The End