



## Diagnostic Hysteroscopic Procedure Evaluation in Women with Perimenopausal Bleeding

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**Article History:** Received: 26.05.2023

Revised: 28.06.2023

Accepted: 27.07.2023

### Abstract

Perimenopausal bleeding is a real clinical challenge facing gynecologists, which should indicate suspicion of endometrial malignant changes development and needs accurate evaluation of endometrium and uterine cavity.

**Keywords:** Hysteroscopic, AUB, Perimenopausal

### Introduction:

The abnormal uterine bleeding (AUB) is a major clinical problem among women in the reproductive, perimenopausal and postmenopausal age groups. The AUB in women aged 40 and older, especially in peri and post-menopausal age group requires exclusive assessment, to exclude atypical endometrial hyperplasia and carcinoma. (1).

Hysteroscopy is the process of viewing and operating in the endometrial cavity from a transcervical approach by means of illumination and some form of lens system(2).

### Hysteroscopic instrumentation

#### Hysteroscope composed of:

- 1) Telescope.
- 2) Distention media.
- 3) light source
- 4) video camera systems (3).

### Types of Telescope (hysteroscope):

- 1-Rigid hysteroscope (macro and micro hysteroscope)
- 2-Flexible hysteroscope
- 3-Minihysteroscope

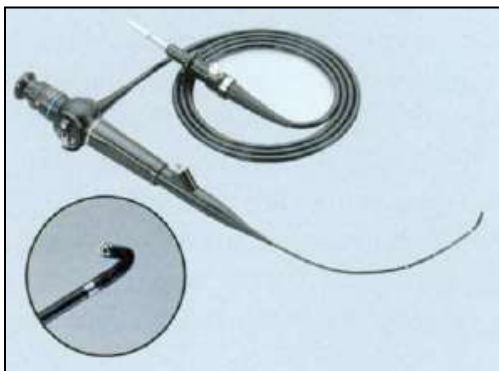
#### 1-Rigid hysteroscope

It offers the sharpest and clearest view. It is optimal for use because of its small diameter and its allowance for operative instruments. As it is available in a range of diameters, the narrow option is 3-5 mm. can be used in the office setting because they require minimal dilation of the cervix. Those scopes which are greater than 5 mm in diameter can accommodate more specific surgical instruments through separate ports. The large-caliber 8-10 mm scopes maintain optical integrity, with superior visibility due to the continuous laminar flow of media (2).

## 2-Flexible hysteroscope

The flexible hysteroscope are fiberoptic scopes that are primarily used for diagnostic purposes; however, some of the larger diameter scopes can be used for some operative procedures & was developed to overcome difficulties in viewing the corneal areas and in entering acutely anteverted and retroverted uterus **Fig (1) (2)**.

It can deflect over a range of 120-160 degrees. It decreases discomfort as it accommodates to the cervix more easily during insertion.



**Figure (1): Flexible Hysteroscope(2).**

## 3- Minihysteroscopes:

Small-caliber hysteroscopes, < 3.5 mm in outer diameter, may further simplify the use of hysteroscopy in the office setting **(4)**.

### Distention media

#### Ideal distension media(5) :

- Isotonic
- Non hemolytic
- Non toxic
- Non allergic
- Rapidly cleared
- Ample visualization

## Types of distention media(3):

Two different types of media can be used safely and effectively to distend the uterus.

- Gaseous
- Liquid Media (low-viscosity fluids; and high viscosity fluids).

### 1-Gaseous Media

Carbon dioxide (CO<sub>2</sub>) is a colorless gas that is highly soluble when mixed with blood. It can be used to safely distend the uterus when instilled with a proper insufflation apparatus. The rate of flow of CO<sub>2</sub> into the uterus should never exceed 100 mL per minute, and pressure should be adjusted below 150 mm Hg. Before CO<sub>2</sub> is infused, the hysteroscopic tubing and the hysteroscope must be purged of air. Additionally, the Trendelenburg position should be avoided**(6)**.

#### Advantage:

- The best feature in favor of CO<sub>2</sub> is its neatness.
- It does not foul instruments, it does not mess up the office or operating room, and it allows entry evaluation of the endocervical canal **(6)**

#### Disadvantage:

- When CO<sub>2</sub> flow is excessive, bubbles appear and obscure the field.
- Bleeding and CO<sub>2</sub> gas are incompatible; the gas and blood mix, producing an obscuring bubbling foam.
- CO<sub>2</sub> tends to flatten the endometrium, and this artifact can obscure pathology.
- When CO<sub>2</sub> is improperly instilled, emboli form and can produce severe derangements in cardiovascular physiology.

- CO<sub>2</sub> cannot be used to flush the cavity of debris
- CO<sub>2</sub> is therefore an excellent diagnostic medium, perhaps the best. However, the liquid media are superior in most aspects for operative hysteroscopy (6)

## 2 . Fluid distention media:

### A . Low-viscosity fluids containing electrolytes:

The most commonly used electrolyte containing fluids for uterine distention are normal saline (0.9% NaCl), dextrose 5% in 50% saline solution (0.45% NaCl) and Ringer's lactate solution. They are used when operative procedures are performed with mechanical tools or laser that require no electricity (3).

### B. Low-viscosity fluids without electrolytes:

These fluids include dextrose 5% in water, glycine 1.5%, sorbitol 3%, a combination of sorbitol 2.8% and mannitol 0.5% and, finally, a mannitol 5% solution. They are required during electrosurgery with either the hysteroscope or resectoscope as electrolytes are excellent conductors (3).

#### Advantages(3):

- They can clear debris, mucus and blood clots from the operative field and continuously wash the uterine cavity.
- Permitting good visualization.
- If leakage of fluid occur, it will be immediately visible.

#### Disadvantage:

- Hyponatremia when excessive absorption occurs (3).

### C. High Viscosity fluids:

- Hyskon (32% dextran 70 in dextrose) is a colorless, viscid solution (6).

#### Advantage(6) :

- Excellent medium for both diagnostic and operative hysteroscopy
- Hyskon is a safe medium and has properties that other media do not share
- A major advantage of Hyskon is its immiscibility with blood, which permits excellent visualization, even during active bleeding, and permits the surgeon to pinpoint the site of bleeding.

#### Disadvantage:

- Dried residue tends to harden and clog hysteroscopic sheath channels. This clogging is easily prevented by immediately flushing the scope and sheath with hot water after completion of the surgery (6)
- Two types of Hyskon reactions have been reported. The rare idiosyncratic anaphylactoid reaction should be managed like any acute allergic reaction. The second reaction is caused by excessive vascular uptake of dextran, which allows a more general manifestation of its physiologic actions, including fibrinolytic action and alteration of platelet adhesiveness. (6)
- The osmotic activity of dextran is such that for each gram of Hyskon instilled into the vascular space, 20 mL of interstitial water will be pulled into the circulation. As the volume of intravascular Hyskon increases, a critical level is reached, and pulmonary edema occurs (6)

## **Distention devices:**

Intrauterine distention during hysteroscopy can be achieved using a variety of distention media. Common to all methods is the goal of using the lowest possible intrauterine pressure and medium flow rate to achieve adequate visualization of the uterine cavity. Adequate distention and visualization of the uterine cavity is usually achieved with intrauterine pressures in the range of 40–80 mmHg. As the intrauterine pressure exceeds the mean arterial pressure within the uterus, the risk of medium absorption rises (7)

A number of hysteroscopic pumps or fluid management systems are available for hysteroscopic surgery. These systems integrate a pump, usually with preset intrauterine pressure and/or fluid flow rates, and a means of determining the fluid loss or deficit. The pump may be either mechanical using a peristaltic roller, a bladder compression or centrifugal. The pumps maintain constant intrauterine pressures by varying the distention fluid flow rates (8)

The accuracy of intrauterine pressure measurements may be influenced by leakage around the instruments, resistance of the hysteroscope input or output port or stopcock, and by the amount of suction applied to the outflow port (9)

In general, flow rates are between 50 and 200 ml/min, but may be set as high as 450 ml/min to 1 liter/min with some machines. Intrauterine pressures can be set between 0 and 150 mmHg on most machines, but usually should not exceed 80

mmHg. The minimal pressure needed to provide adequate distention and visualization should be used at all times (9)

The American Association of Gynecologic Laparoscopists (AAGL) has recommended mechanical monitoring as it removes the human factor in measuring fluid deficit and allows for early warning of excessive extravasations. Accurate and continuous monitoring of fluid inflow, outflow and deficit is the most effective way to decrease the risks associated with fluid overload(3)

## **Video Equipments:**

Attaching the video camera to the telescope and performing the surgery while viewing the images on a video monitor magnifies the surgical field, dramatically improves the surgeon's comfort and allows for greater participation and interest of the operating-room staff (7).

## **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(8)

## **Monitor:**

The medical monitors found in many operating rooms (9)

## **Optical principles of the Endoscope:**

An endoscope is an optical system that enables the viewer to recognize

information from parts of an object that are not directly accessible. Basically, an endoscope consists of an optical system to carry light to illuminate the object being viewed and either the same or a different optical mechanism for conveying the image back to the eye or camera. The image may be conveyed through a series of lenses. In most modern endoscopes, the illuminating light is carried to the object by an optical fiber bundle (7)

### **Cleansing and Maintenance of Instruments:**

After use, the endoscopes, hysteroscopes and their components should be thoroughly rinsed and washed with special brushes and soaps. The ports and channels should be delicately cleaned with soft wire brushes and rinsed appropriately (3).

### **Disinfection and sterilization:**

While most instruments can be disinfected with solutions such as glutaraldehyde (Cidex®), overnight gas sterilization is the most commonly used method to sterilize safely and maintain the instruments ready for use. However, this solution over time may damage the optics and the cement glue their parts. An autoclave can be used for all metallic parts except the telescope, plastic nipples and flexible plastic-coated instruments. The flexible hysteroscope needs cleaning, disinfection and sterilization with gas only(3).

During storage, it is important to avoid dropping, bumping or bending these delicate instruments. The telescope should be kept in

a separate container to avoid breakage. An alternative to this method of sterilization is the use of the new autoclaveable telescopes that can be sterilized quickly in standard autoclave systems(3).

### **Operating Room Set-Up:**

The operating room should be arranged to minimize clutter and maximize efficiency for the surgeon and nursing staff. Diagnostic hysteroscopy can be performed in an office procedure room or the operating room. Minimal equipment requirements, in addition to the hysteroscope, are a light source, accessory instruments and CO<sub>2</sub> insufflator or tubing for high- or low-viscosity fluids. Irrigation pump or fluid management system, camera, monitor and some means of image documentation. Arrangement of equipment should be part of the planning before procedures begin. Placement of the video camera cable, light source cable, distention-medium input and output tubing need to be considered. A clear and unobstructed view of the video monitor that does not cause the surgeon's neck to strain is essential (9).

### **Hysteroscopy using vaginoscopic approach**

The availability of light endocameras has made it possible for the physician to handle the hysteroscope without using speculum or tenaculum, as the vagina, being a cavity, can be distended by introducing a distension medium, in order to locate the cervical canal, so there is no more need to 'assist' the introduction of the scope into the cervix using the tenaculum. The anatomy can be followed by gentle movements of the

hands that will correctly drive the hysteroscope into the cervix and through the internal cervical orifice (ICO) (10).

This method, which has been defined as the 'vagoscopic approach' has definitively eliminated any patient discomfort associated with the traditional approach to the uterus. The vagina is distended using the same medium (saline solution) and at the same pressure (around 30–40 mmHg) as that used for subsequent distension of the uterine cavity. There is no need to close the vulvar labia using the fingers because the 'weight' of the liquid is enough to distend the vagina and provide correct visualization of the portio vaginalis (2).

Data on over 10000 hysteroscopic procedures performed using the above technique confirms a strong increase in patient compliance, 98.9% of patients suffered no discomfort related to the approach to the uterus and insertion of the scope into the cervix (10)

Those incidental causes of pain that complicated the procedure have thus been eliminated. Only in the presence of clinical or subclinical signs of a vaginal infection, hysteroscopy subordinated to the results of a vaginal smear. This technique has permitted complete elimination of any type of premedication, analgesia or anesthesia, making the procedure of office hysteroscopy faster and complications free (10).

### **Patient Preparation**

Patients can be scheduled for diagnostic hysteroscopy after obtaining a comprehensive patient history, performing a

physical examination, discussing choice of anesthesia, and obtaining informed consent. The patient is placed in dorsolithotomy position. A pelvic examination is performed to determine the size and position of the uterus. A weighed speculum in addition to a single toothed tenaculum is used to grasp the anterior lip of the cervix applying traction in order to straighten the uterine axes. (3).

Excessive dilatation of the cervical canal should be avoided to minimize fluid loss. The cervical canal should be dilated equivalent to the diameter of the hysteroscopic sheath used. Sounding of the uterine cavity should be avoided since it may create lacerations of the hyperplastic endometrium which may be mistaken for intrauterine pathology (3).

### **Timing of hysteroscopy:**

Hysteroscopy can be difficult to perform during the luteal phase because of the abundance of endometrial tissue. Performing hysteroscopy during the early to middle follicular phase should ensure adequate visualization of the uterine cavity. Alternatively, the endometrium can be suppressed with 2 to 4 weeks of progestin therapy, or hysteroscopy may be performed at any time in a patient taking oral contraceptives because of the dominant atrophy effect of progestin. At least 4 weeks of preoperative treatment are required for GnRH analogs such as leuprolide acetate (Depo-Lupron), because these medications are initially agonists and will actually increase estrogen output for the first 7 to 14 days before subsequent down-regulation of

the pituitary ovarian axis and subsequent endometrial atrophy (11)

## Precautions:

- The cervix should be dilated no larger than the outer diameter of the hysteroscope that will be used. Preoperative treatment with intravaginal misoprostol can soften the cervix for easier dilation and may prevent cervical lacerations.
- Hysteroscope must be guided into the endometrial cavity under direct vision(11)

The cervical canal and internal os will appear off center within the field of view when using offset-angle lenses. When the angle of the lens is oriented to look downward, the internal os will appear at the 12 o'clock position. If the telescope is inverted and the lens is pointed upward, the os will appear in the 6 o'clock position. The latter position is useful for viewing a retroverted uterus (11)

The surgeon should always maintain the camera position in a straight up-and-down orientation so that the view on the screen is kept well.

If adequate visualization is prevented by blood and mucus, continuous flow of the distension medium should be maintained for 30 to 60 seconds to wash out blood and debris. If the field of view still appears red, the hysteroscope should be pulled back 1 to 2 cm, as it is a common mistake to insert the hysteroscope too far, and the lens may be obscured by abutting the uterine fundus (11)

- Visualization can also be compromised by inadequate distension of the uterine cavity

because of insufficient intrauterine pressure (3)

## After care

It is normal to experience light bleeding for one to two days after surgical hysteroscopy. Mild cramping or pain is common after operative hysteroscopy, but usually diminishes within eight hours. If carbon dioxide gas was used, the resulting discomfort usually subsides within 24 hours (5)

## Morbidity and mortality rates

- The rate of complications during diagnostic hysteroscopy is very low, about 0.01%. Surgical hysteroscopy is associated with a higher number of complications. Perforation of the uterus occurs in 0.8% of procedures and excess bleeding in 1.2–3.5% of cases. Death as a result of hysteroscopy occurs at a rate of 2.4 per 100,000 procedures performed. (6)

## Indications:

The principal advantage of hysteroscopy over other gynecologic diagnostic methods is that it permits observation of the entire uterine cavity. This increases the diagnostic accuracy of suspected intrauterine pathology up to 70% . Indications of hysteroscopy are summarized in the following table.

**Table (I): (3)**

<p><b>Abnormal uterine bleeding:</b></p> <p><b>A) Diagnosis:</b> Premenopausal patient. Postmenopausal patient.</p> <p><b>B) Therapy:</b> Biopsy and/or directed curettage. Polyp removal. Excision of submucous fibroid. Ablation.</p> <p><b>Foreign bodies:</b></p> <p><b>A) Diagnosis:</b> Identification. Localization.</p> <p><b>B) Therapy:</b> Removal of Intrauterine Device (IUD). Removal of suction catheter tip. Removal of ossified products of conception. Removal of laminaria.</p> <p><b>Infertility/recurrent abortions:</b></p> <p><b>A) Diagnosis:</b> Uterine synechiae. Uterine malformation. Interstitial tubal occlusion.</p> <p><b>B) Therapy:</b> Lysis of synechiae. Resection of uterine septum. Removal of interstitial tubal block. Potential intratubal insemination.</p> <p><b>Prenatal diagnosis:</b> Fetoscopy. Directed chorionic villus sampling.</p> <p><b>Contraceptive therapy:</b> Blockage of uterotubo-ostium with plugs. Destruction of uterotubal ostium.</p>
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## Complications of hysteroscopy

- The complication rate in diagnostic hysteroscopy is low and was estimated to be 0.012%(6) .
- Anaesthesia
- Positioning the patient
- The distension media
- The surgery:
  - Uterine perforation
  - Haemorrhage
- **Delayed complications:**
  - Infection
  - Uterine perforation during subsequent pregnancy
  - vaginal discharge
  - Adhesion formation: Intrauterine adhesions are common, especially after myomectomy when two fibroids are situated on opposing uterine walls. In this case, the myomectomy is better performed in stages to prevent adhesion formation(6).

### 1- Positioning The Patient(6)

Incorrect positioning of the patient may result in:

- 1.Nerve injuries
- 2.Back injuries
- 3.Damage to soft tissues
- 4.Deep venous thrombosis (DVT)

### **A . Nerve Injuries**

- Brachial plexus injury may result from incorrectly placed shoulder restraints or from leaving the patient's arm abducted on an arm board. A non-slip mattress is



preferable to restraints that compress the patient's shoulders. Injury can result from 15 minutes in a faulty position (6).

- Pressure on the peroneal nerve by lithotomy stirrups may result in paraesthesia and foot drop. The surgeon should ensure that, if lithotomy poles are used, the legs are adequately padded. Supports which hold the leg in a padded gutter are preferable(6).

## **B . Back injuries.**

- The anaesthetized patient is defenceless against traction injury to the lumbar spine. The legs should always be lifted simultaneously and kept together until they are at the appropriate height when they should be abducted gently and placed in the supports. They should never be over-abducted as this can lead to damage to the sacro-iliac joints (6).

## **C . Damage to soft tissues.**

It is the responsibility of the surgeon to ensure that there is no injury from moving parts of the table to the patient's soft tissues or hands. The surgeon should also ensure that no part of the patient is in contact with metal parts of the table because these can act as return plates for electrical energy and burns can occur at the point of contact (3)

## **2 Distention medium hazards:**

Complications specifically related to distention media were reported to have occurred in less than 4% of cases in a retrospective survey (3).

### **Carbon dioxide**

Embolism is the most feared complication from the use of CO<sub>2</sub> as a

distention medium. CO<sub>2</sub> produces very few systemic cardiovascular problems unless the flow rates were higher than those recommended for hysteroscopy and were maintained for longer periods of time. Thus, when CO<sub>2</sub> is the chosen distending medium, the margin of safety is quite wide(12).

### **Low-viscosity liquid complications:**

- Low-viscosity fluids, such as sorbitol, glycine, mannitol, dextrose in water, etc. may result in significant hyponatremia and fluid overload when retained in the patient because they are sodium-free. Retention of these fluids mainly occurs from intravasation resulting from opening into large venous sinuses during the operative procedure or from lacerations or false passages produced during a difficult dilatation of the cervix. It is mandatory to monitor intake and output of these liquids during and after each procedure, with the immediate assessment of serum electrolytes if a discrepancy of 1000 ml or more occurs in the healthy patient, or 750 ml in the older patient and/or in those with a history of cardiovascular compromise(6).

### **Gas and Air Emboli:**

In recent years, significant attention has been given to the issues of air and gas embolism. While largely unrecognized until the mid 1990s as a problem in hysteroscopic surgery. Several different mechanisms exist whereby air or gas embolism may occur during surgical procedures. The process of entry into the endometrial cavity may be difficult with creation of false passages,

endomyometrial trauma or laceration, perforation, etc. Wide cervical dilatation in and of itself presents an opportunity for room air to enter these areas, and the placement of patients into the Trendelenburg position, with the head lower than the uterus, sets up a gradient to promote air emboli. The use of electrocautery during operative hysteroscopy may also be associated with gas production and gas emboli (3).

- Air absorption into the venous vascular tree is much more problematic than CO<sub>2</sub>. Room air is composed largely of nitrogen which is much less soluble in blood than CO<sub>2</sub>. Once air has entered the circulation and entered the right heart there is decreased blood outflow, with increased pulmonary pressure and decreased cardiac output. This results in hypotension, hypoxia, tachypnea and ultimately cardiac arrest if untreated. Other clinical findings include a sudden fall in end-tidal CO<sub>2</sub>, dysrhythmias or a precordial millwheel murmur (6).

Immediately on diagnosis, the surgical procedure should be stopped, any open channels should be occluded (i.e. cervix and vagina), and the patient placed in the left lateral decubitus position with slight Trendelenburg (**Durant maneuver**). Depending on the degree of physiological changes, the patient may require 100% oxygenation, use of pressors, increasing vascular volume and pulmonary artery catheter placement(13).

### Keys for prevention of this potentially catastrophic complication include(14):

- (1) Avoid Trendelenburg position;
- (2) Perform cervical dilatation and entry with care
- (3) Purge all lines prior to hysteroscopy
- (4) Do not leave a dilated cervix open to the air
- (5) Recognize the physiological changes associated with embolism, some of which may be confused with fluid overload

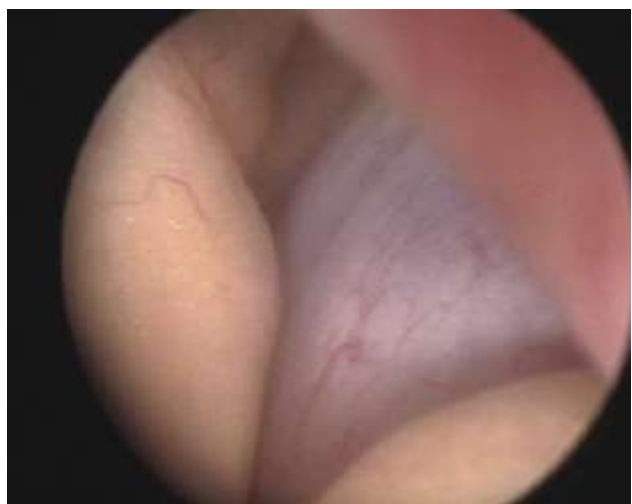
### Prevention of complications(6):

- Be familiar with the properties of the media that is used
- Monitor fluid balance
- Keep low intra uterine pressure (< 70 mmHg)
- Avoid closing the outflow valve
- Decrease the surgery time
- Avoid Trendelenburg position

### Traumatic complications of hysteroscopy:

Traumatic complications of diagnostic hysteroscopy have been well documented. Hysteroscopic surgery, however, also involves some degree of blind manipulation. Dilating the cervix to accommodate wide-caliber operating instruments may cause cervical laceration and/or uterine perforation, with or without hemorrhage. The incidence of these complications has been estimated as 1–9%. (15)

Cervical laceration is diagnosed only if cervical bleeding occurs. Preoperative use of gonadotropin-releasing hormone (GnRH) analogs might render the cervix more resistant to dilatation. Uterine perforation is suspected if the depth of passage of the sound or the dilator is greater than the apparent size of the uterus. Very rapid flow of liquid or very low distension pressure with CO<sub>2</sub> at the time of insertion of the hysteroscope should raise this suspicion. Diagnosis is sometimes made by visualization of the bowel (Fig.2). Any hemorrhage before initiation of the surgical procedure is highly suggestive of traumatic damage (6)



**Figure.(2): Visualization of the bowel through a uterine perforation. (6)**

Cervical lacerations are of little consequence, although sutures are occasionally required to prevent or stop cervical bleeding. Uterine perforation does not usually need surgical repair. If perforation is diagnosed before the surgical procedure, surgery must be delayed and the patient observed for 24 hours. If perforation

is diagnosed intra-operatively or after the surgical procedure, diagnostic laparoscopy is recommended to ensure that no thermal damage has been caused to adherent or adjacent structures, and that there is no unsuspected laceration of the large blood vessels(16).

### **Prevention:**

To prevent such complications, careful placement of the tenaculum and gentle dilatation of the cervix are recommended. The hysteroscope must always be advanced under visual control, adapting the instrument axis to the direction of the cervical canal and the position of the uterus(17).

### **Hemorrhagic Complications of Hysteroscopy:**

- Intraoperative bleeding, other than that due to cervical laceration or uterine perforation, is usually the result of inadvertent or intentional trauma to the uterine wall. The reported rate of bleeding requiring surgery or uterine tamponade ranges from 0 to 22.4%. (6)
- Hemorrhage can occur from false passages, with or without perforation, created either during dilatation or upon insertion of the hysteroscope. Bleeding can also occur after operative procedures, especially when the penetration of healthy myometrium is too deep. This can arise after using scissors or thermal energy (laser, resectoscope). (6)

## Diagnosis:

- Heavy and continuous vaginal bleeding during or after surgery must be investigated, to determine whether it is intrauterine or cervical bleeding. Management should be effected according to the origin of the hemorrhage (6)

## Management:

- Intraoperatively, rapid bleeding can be controlled by coagulation, using either the tip of the laser fiber or the electrical loop. However, uncontrolled intraoperative or postoperative bleeding may sometimes require intrauterine tamponade. A Foley catheter is introduced into the uterine cavity and the balloon is inflated with 15 ml of liquid. After approximately 3 hours, half of the liquid is removed; if no bleeding recurs over the next hour, the catheter is removed and the patient is usually discharged (6)

## Prevention:

- Recommendations for avoiding trauma are that the entire surgical procedure must be carried out under strict visualization of the dissection plane. The use of intracervical vasopressin has been shown to reduce the risk of bleeding (6)

But this drug must be used with consideration of its systemic effects. Preoperative medical therapy (GnRH agonists, danazol, progestins) has also been reported to decrease postoperative bleeding. Such therapy reduces the thickness and vascularity of the endometrium and shrinks myomas, and thus may be helpful in preventing this type of complication (3)

## Late Complications:

### 1 Infection

When infection occurs, it is usually following longer operative procedures, especially with repeated insertion and removal of the hysteroscope through the cervical canal. (3)

### Treatment

- Endometritis, is usually treated with oral antibiotics and rarely requires hospitalization(6).

### Prevention

- To prevent it from occurring, the use of prophylactic antibiotics is recommended when long procedures are contemplated, as well as for all patients being treated for infertility (6).

### 2 Uterine perforation during subsequent pregnancy:

Operative hysteroscopy has an important role in the correction of Müllerian anomalies such as uterine septa, and in the improvement of fertility in the case of uterine synechiae or uterine hypoplasia in women exposed to diethylstilbestrol. In women undergoing hysteroscopic metroplasty, the uterus is weakened, and several cases of uterine rupture during subsequent pregnancy have been described. Some uterine ruptures even occurred after perforation during diagnostic hysteroscopy(3).

### 3 Vaginal Discharge

Vaginal discharge is common after any ablative procedure and is usually self limiting (3)

## Contraindications of Hysteroscopy

Some contraindications are absolute in that hysteroscopy should never be performed when these contraindications are present. Others are relative, and indicate that the technique must be modified and patients individually selected for this approach (18).

### Absolute contraindications are(6):

- Pelvic inflammatory disease
- Profuse uterine bleeding.

### Relative contraindications are(6):

- Desired pregnancy
- Cervical malignancy
- Menstruation
- Known adenocarcinoma of the endometrium
- Cervical stenosis
- Recent uterine perforation
- Operator inexperience

### 1 Pelvic inflammatory disease:

Because of the danger of causing extended ascending infection and peritonitis. Pelvic inflammatory disease is an absolute contraindication because of the potential of spreading infection, through either the bloodstream or lymphatic routes systemically, or Fallopian tubes into the peritoneal cavity. Infection must be ruled out in patients presenting with symptoms or a history of recent pelvic infection by appropriate cervical cultures before hysteroscopy to prevent exacerbation of an existing infection, and by applying meticulous attention to technique to avoid introduction of new infection to the endometrial cavity. (18)

### 2 Menstruation:

Hysteroscopy should be avoided during menstruation, because of a theoretical risk of dissemination of endometriosis and mainly because the view is usually unsatisfactory. Moderate uterine bleeding does not prevent adequate visualization of the endometrial cavity. (18)

### 3 Cervical malignancy:

In the presence of known cervical malignancy, manipulation of the area should be avoided to prevent possible spread& the information derived may not contribute to the plan of treatment. Nonetheless, under meticulous and controlled protocols, the endocervical canal can be evaluated with a small-caliber endoscope to assess the extent of an adenocarcinoma of the cervix. (16)

### 4 Adenocarcinoma of endometrium:

Hysteroscopy is used in the evaluation of patients with abnormal uterine bleeding. Occasionally, abnormal focal areas of endometrium are found and confirmed to be carcinomas. However, in a patient with known carcinoma of the endometrium, at that stage, a carcinoma is likely to be extensive and adding hysteroscopy may not change the plan of treatment. If it is necessary to determine involvement of the cervix, hysteroscopy may be used to evaluate the extent of the adenocarcinoma and confirm involvement of the cervical canal. However, following the new FIGO (International Federation of Gynecologist and Obstetricians) Guidelines for surgical staging, this evaluation has become unnecessary. (3)

## **Pain Control In Outpatient Hysteroscopy:**

Distension of the uterine cavity causes discomfort and pain. The lower the distension pressure in the uterus, the less the discomfort: a minimum of 30 mmHg is needed to separate the uterine walls. In the outpatient setting the pressure should be kept to this minimum. A prospective, randomized controlled trial (RCT) comparing carbon dioxide and normal saline for uterine distension in outpatient hysteroscopy found significantly less abdominal pain and less shoulder tip pain with saline (18)

Irrespective of the distension medium used, pelvic discomfort is worse in nulliparous women than in multiparous women (19).

The size of the hysteroscope and sheath has an impact on pain and success rates. Diameters of <3.5 mm are well tolerated in the outpatient setting. The addition of endometrial biopsy to hysteroscopy increases pain. Proper counselling before the procedure and talking to the patient during the procedure can improve tolerability (19).

## **Anaesthetic techniques for outpatient hysteroscopic procedures**

It is important to remember that the majority of outpatient diagnostic hysteroscopies do not need any anaesthesia or analgesia; this is required only if there is a need to overcome cervical stenosis, i.e. to dilate the cervix or during some outpatient operative hysteroscopic procedures. Polyps can be removed, or fibroids treated, with

minimal pain using bipolar energy, snares or mechanical instruments without the need to dilate the cervix (18)

The available anaesthetic techniques for outpatient hysteroscopic procedures include topical lidocaine, intrauterine lidocaine or the paracervical block (18)

## **Analgesia for hysteroscopy:**

Analgesia, in the form of paracetamol or a non-steroidal anti-inflammatory, can be used for ambulatory hysteroscopic operations. 100 mg of diclofenac sodium suppository 1 hour before the procedure has demonstrated high efficacy. This is particularly popular in ambulatory settings because of the simplicity of administration and low incidence of side-effects (19).

## **Technique of diagnostic hysteroscopy**

### **1- Timing of examination:**

- A diagnostic hysteroscopic examination is best performed without medical preparation of the endometrium. except for menses, hysteroscopy may be performed at any time during the menstrual cycle. However, visualisation is best within 2 or 3 days after cessation of menstrual flow (6)

### **2- Preoperative consent issues:**

- Thorough preoperative explanation and counseling, including detailed explanation or the pathophysiology of the underlying gynaecological condition, treatment options available and their risks and benefits, are essential to ensure a successful operative experience for the patient as well as the surgeon. This is

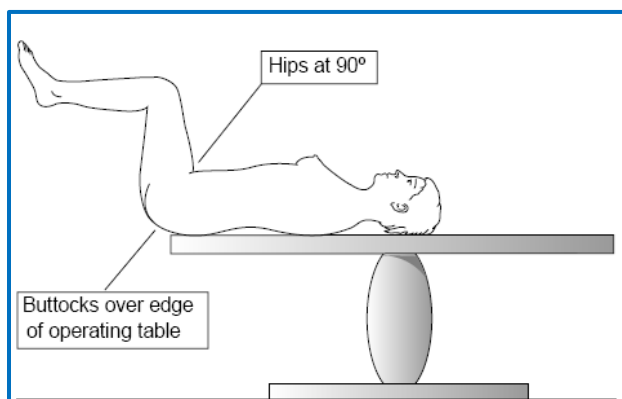
best started during the outpatient consultation when the decision for hysteroscopy is taken and followed by giving an information leaflet with a helpline where any further doubts can be clarified(6)

### 3- Anaesthesia (5):

- **Without anaesthesia:** In outpatient procedures, using an optic with a small diameter .
- **Local anaesthesia:** Paracervical block in postmenopausal patient or when cervical dilation is necessary.
- **General anaesthesia:** Should be performed in operative hysteroscopy, when cervical dilatation is required or associated with laparoscopy .

### 4- Positioning:

Hysteroscopy can be performed on a general operating table in the lithotomy position **Fig (3)**.



**Figure.(3) Patient position for hysteroscopy.(6)**

### 5- Procedures:

- A pelvic examination is performed in order to determine the size and direction of the uterus. The vulva and vagina are cleansed with antiseptic solution and the anterior lip

of the cervix is grasped with a vulsellum forceps (6)

### Introduction of the hysteroscope:

- Insertion of the hysteroscope through the cervical canal should be performed under direct vision and in the first instance without cervical dilatation or the passage of a sound. This allows examination of the cervical canal and inspection of undamaged endometrium (6)

The cervical canal is readily identified as a narrow passage of the same diameter. The operator should follow the microcavities created by the distending medium until the black hole of the internal Os is seen. The instrument can in this manner, be kept in the centre of the canal and introduced into the uterine cavity without damaging the cervical mucosa. which is the usual source of bleeding (6)

- It should be noted that most hysteroscopes have a fore-oblique lens angled at about 30°. To introduce a telescope in the cervical canal, the opening at the end of the canal must be located in the lower half of the view. If it is located in the centre of the view, the telescope will dig into the posterior wall of the cervix when advanced (6)

### Panoramic examination:

- Once the telescope is introduced in the cavity, examination should start: systematically. First, we obtain a panoramic view of the cavity, followed by examination of the fundus, anterior, posterior and lateral wall of the uterus ending by visualization of the utero-tubal junction (6)

## 6- Postoperative:

- The majority of the recovery process after a diagnostic hysteroscopy relates to the anaesthetic used. A small amount of vaginal bleeding is not unusual following hysteroscopy and the patient should be warned about this. Occasionally, cramping period-like pains are experienced which should settle within 48 hours and respond to paracetamol or an NSAID such as mefenamic acid. Persistent pain and bleeding may suggest a complication such as endometritis and the patient should seek medical help. The provision of a post-procedure information leaflet is a good practice (6)

## Hysteroscopy and perimenopausal bleeding

Abnormal uterine bleeding, suspected endometrial polyps, and/or endometrial thickness are a source of concern, particularly among perimenopausal and postmenopausal women, and may require evaluation by means of ultrasonography or hysteroscopy. Depending on the overall risk, management and final diagnosis may require a tissue sample (20).

Although blinded procedures, such as dilatation and curettage (D&C) and Pipelle endometrial sampling, have been reported to be relatively accurate, easy to perform, and well-tolerated by patients, (21) they may have substantial false-negative rates, especially in detecting focal pathology (22).

Hysteroscopy enables the operator to take biopsies under vision directly from suspected areas. This procedure may require cervical dilatation under anesthesia, (23, 24).

Which may be problematic in older patients with medical illnesses. Advancement in technique and instruments have made it possible to combine diagnostic and operative hysteroscopy in an outpatient setting without anesthesia (the “see-and-treat” technique), making this procedure more accessible as a first line diagnostic tool. (25)

The diagnostic accuracy of hysteroscopy performed under general anesthesia is well-established, However, the reported accuracy of outpatient hysteroscopy varies, possibly as a result of the miniaturized instrumentation used limited visualization. (26)

It has not been determined whether outpatient hysteroscopy has a similar correlation of visual findings to biopsy results as conventional hysteroscopy (27)

In the context of endometrial malignancy, histological features determined by preoperative endometrial biopsy may have a key significance for future clinical decisions and surgical management (28).

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## Diagnostic Hysteroscopic Procedure Evaluation in Women with Perimenopausal Bleeding

*Section A -Research paper*

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