

Endometrial Ablation in the Management of Abnormal Uterine Bleeding

This clinical practice guideline has been reviewed by the Clinical Practice–Gynaecology Committee and approved by the Executive and Board of the Society of Obstetricians and Gynaecologists of Canada.

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Keywords: Endometrial ablation, hysteroscopy, menorrhagia, heavy menstrual bleeding, abnormal uterine bleeding, hysterectomy.

Abstract

Background: Abnormal uterine bleeding (AUB) is the direct cause of a significant health care burden for women, their families, and society as a whole. Up to 30% of women will seek medical assistance for the problem during their reproductive years.

Objective: To provide current evidence-based guidelines on the techniques and technologies used in endometrial ablation (EA), a minimally invasive technique for the management of AUB of benign origin.

Methods: Members of the guideline committee were selected on the basis of individual expertise to represent a range of practical and academic experience in terms of both location in Canada and type of practice, as well as subspecialty expertise and general background in gynaecology. The committee reviewed all available evidence in the English medical literature, including published guidelines, and evaluated surgical and patient outcomes for the various EA techniques. Recommendations were established by consensus.

Evidence: Published literature was retrieved through searches of MEDLINE and The Cochrane Library in 2013 and 2014 using appropriate controlled vocabulary and key words (endometrial ablation, hysteroscopy, menorrhagia, heavy menstrual bleeding, AUB, hysterectomy). Results were restricted to systematic reviews, randomized control trials/controlled clinical trials, and observational studies written in English from January 2000 to November 2014. Searches were updated on a regular basis and incorporated in the guideline to December 2014.

Grey (unpublished) literature was identified through searching the websites of health technology assessment and health technology-related agencies, clinical practice guideline collections, clinical trial registries, and national and international medical specialty societies.

Values: The quality of evidence in this document was rated using the criteria described in the Report of the Canadian Task Force on Preventive Health Care (Table 1).

Results: This document reviews the evidence regarding the available techniques and technologies for EA, preoperative and postoperative care, operative set-up, anaesthesia, and practical considerations for practice.

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Table 1. Key to evidence statements and grading of recommendations, using the ranking of the Canadian Task Force on Preventive Health Care

Quality of evidence assessment*	Classification of recommendations†
I: Evidence obtained from at least one properly randomized controlled trial	A. There is good evidence to recommend the clinical preventive action
II-1: Evidence from well-designed controlled trials without randomization	B. There is fair evidence to recommend the clinical preventive action
II-2: Evidence from well-designed cohort (prospective or retrospective) or case-control studies, preferably from more than one centre or research group	C. The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making
II-3: Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category	D. There is fair evidence to recommend against the clinical preventive action
III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees	E. There is good evidence to recommend against the clinical preventive action
	L. There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision-making

*The quality of evidence reported in here has been adapted from The Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care.⁵¹

†Recommendations included in these guidelines have been adapted from the Classification of Recommendations criteria described in the Canadian Task Force on Preventive Health Care.⁵¹

Benefits, harms, and costs: Implementation of the guideline recommendations will improve the provision of EA as an effective treatment of AUB. Following these recommendations would allow the surgical procedure to be performed safely and maximize success for patients.

Conclusions: EA is a safe and effective minimally invasive option for the treatment of AUB of benign etiology.

Summary Statements

1. Endometrial ablation is a safe and effective minimally invasive surgical procedure that has become a well-established alternative to medical treatment or hysterectomy to treat abnormal uterine bleeding in select cases. (I)
2. Endometrial preparation can be used to facilitate resectoscopic endometrial ablation (EA) and can be considered for some non-resectoscopic techniques. For resectoscopic EA, preoperative endometrial thinning results in higher short-term amenorrhea rates, decreased irrigant fluid absorption, and shorter operative time than no treatment. (I)
3. Non-resectoscopic techniques are technically easier to perform than resectoscopic techniques, have shorter operative times, and

allow the use of local rather than general anaesthesia. However, both techniques have comparable patient satisfaction and reduction of heavy menstrual bleeding. (I)

4. Both resectoscopic and non-resectoscopic endometrial ablation (EA) have low complication rates. Uterine perforation, fluid overload, hematometra, and cervical lacerations are more common with resectoscopic EA; perioperative nausea/vomiting, uterine cramping, and pain are more common with non-resectoscopic EA. (I)
5. All non-resectoscopic endometrial ablation devices available in Canada have demonstrated effectiveness in decreasing menstrual flow and result in high patient satisfaction. The choice of which device to use depends primarily on surgical judgement and the availability of resources. (I)
6. The use of local anaesthetic and blocks, oral analgesia, and conscious sedation allows for the provision of non-resectoscopic EA in lower resource-intense environments including regulated non-hospital settings. (II-2)
7. Low-risk patients with satisfactory pain tolerance are good candidates to undergo endometrial ablation in settings outside the operating room or in free-standing surgical centres. (II-2)
8. Both resectoscopic and non-resectoscopic endometrial ablation are relatively safe procedures with low complication rates. The complications perforation with potential injury to contiguous structures, hemorrhage, and infection. (II-2)
9. Combined hysteroscopic sterilization and endometrial ablation can be safe and efficacious while favouring a minimally invasive approach. (II-2)

ABBREVIATIONS

AUB	abnormal uterine bleeding
CS	Caesarean section
D&C	dilatation and curettage
EA	endometrial ablation
FDA	United States Food and Drug Administration
GnRH	gonadotropin releasing hormone
HSG	hysterosalpingogram
LNG-IUS	levonorgestrel intrauterine system
NSAIDs	non-steroidal anti-inflammatories
RCT	randomized control trial

Recommendations

1. Preoperative assessment should be comprehensive to rule out any contraindication to endometrial ablation. (II-2A)
2. Patients should be counselled about the need for permanent contraception following endometrial ablation. (II-2B)
3. Recommended evaluations for abnormal uterine bleeding, including but not limited to endometrial sampling and an

assessment of the uterine cavity, are necessary components of the preoperative assessment. (II-2B)

4. Clinicians should be vigilant for complications unique to resectoscopic endometrial ablation such as those related to fluid distention media and electrosurgical injuries. (III-A)
5. For resectoscopic endometrial ablation, a strict protocol should be followed for fluid monitoring and management to minimize the risk of complications of distension medium overload. (III-A)
6. If uterine perforation is suspected to have occurred during cervical dilatation or with the resectoscope (without electrosurgery), the procedure should be abandoned and the patient should be closely monitored for signs of intraperitoneal hemorrhage or visceral injury. If the perforation occurs with electrosurgery or if the mechanism of perforation is uncertain, abdominal exploration is warranted to obtain hemostasis and rule out visceral injury. (III-B)
7. With resectoscopic endometrial ablation, if uterine perforation has been ruled out acute hemorrhage may be managed by using intrauterine Foley balloon tamponade, injecting intracervical vasopressors, or administering rectal misoprostol. (III-B)
8. If repeat endometrial ablation (EA) is considered following non-resectoscopic or resectoscopic EA, it should be performed by a hysteroscopic surgeon with direct visualization of the cavity. Patients should be counselled about the increased risk of complications with repeat EA. (II-2A)
9. If significant intracavitary pathology is present, resectoscopic endometrial ablation combined with hysteroscopic myomectomy or polypectomy should be considered in a non-fertility sparing setting. (II-3A)

INTRODUCTION

Endometrial ablation refers to a number of minimally invasive surgical procedures designed to treat AUB, which is defined as changes in frequency of menses, duration of flow, or amount of blood loss. EA consists of targeted destruction or removal of the endothelial surface of the uterine cavity in selected women who have no desire for future fertility. The procedure was designed to treat heavy menstrual bleeding refractory to medical therapy and not caused by structural uterine pathology. It is a less invasive alternative to hysterectomy.

Although endometrial destruction through the endocervical canal dates back to 1937, this technique became more widely adopted in 1981 with laser EA, followed by rollerball and loop resection in the late 1980s. In the last 20 years, non-resectoscopic ablation techniques have become available. They use different energy sources to achieve endometrial destruction of the endometrium, including heated liquid (either free circulating or confined within a balloon), radiofrequency electricity, and tissue freezing. Currently, 6 of these systems are available in Canada. The use of microwave energy has been discontinued in Canada.

According to the Association of Obstetricians and Gynecologists of Quebec, 3646 cases of EA were performed in Quebec in 2012, more than twice those

performed in 2000. EA is now more prevalent than vaginal hysterectomy in Quebec. However, the impact of EA on hysterectomy rates remains uncertain. American statistics from 6 states show EA being used as an “additive medical technology rather than a substitute” for hysterectomy.¹ In the United Kingdom, there has been a significant reduction in hysterectomy rates over the past 20 years, explained in part by both improved medical treatment and increased use of EA techniques.^{2,3} EA improves treatment access for those women who have AUB and provides an alternative to major procedures such as hysterectomy.

In the past 10 years alone there have been more than 600 publications on the subject of EA. This guideline reviews the indications and contraindications for performing EA (Table 2) and compares resectoscopic and non-resectoscopic techniques. The document also includes discussions of operative set-up, anaesthesia, preoperative and postoperative care, and some special considerations in clinical practice. A patient information sheet has been included to help patients better understand the benefits and limitations of this procedure (Appendix).

COMPARISON OF EA TO OTHER THERAPIES

EA Versus LNG-IUS

The LNG-IUS is a simple treatment option for women with AUB and is more cost-effective than any surgical technique, including EA. In one meta-analysis of 6 randomized trials, LNG-IUS and EA had similar patient efficacy up to 2 years after treatment.⁴ A Cochrane review concluded that EA and LNG-IUS had similar patient satisfaction, although EA was associated with a greater reduction in menstrual bleeding.⁵ During the first 6 months of use, the LNG-IUS may be associated with a number of progestogenic side effects including but not limited to irregular bleeding, breast tenderness, and headache.

CLINICAL TIP

This option (LNG-IUS) should be discussed prior to any surgical option for women with AUB and a normal cavity.

EA Versus Hysterectomy

In a review of 9 prospective randomized clinical trials, hysterectomy was associated with improved control of pain and bleeding.⁶ In another study at 4 years’ follow-up 98% of women in the hysterectomy group versus 85% in the EA group were satisfied.⁷ However, hysterectomy was associated with a higher risk of adverse events, severe complications, and longer hospital stay. In a large retrospective study with 11 years’ follow-up, risk of surgery for subsequent pelvic floor repair and stress urinary incontinence associated with EA was lower than with hysterectomy.⁸ Although the direct

costs of EA are about half that of hysterectomy, it seems that the costs of the 2 procedures become equivalent at 4 years because some women with EA will need additional treatment. Age < 40 years, prior tubal ligation, and preoperative dysmenorrhea are independent predictors of EA failure and subsequent re-intervention.^{9,10}

Summary Statement

1. Endometrial ablation is a safe and effective minimally invasive surgical procedure that has become a well-established alternative to medical treatment or hysterectomy to treat abnormal uterine bleeding in select cases. (I)

Recommendation

1. Preoperative assessment should be comprehensive to rule out any contraindication to endometrial ablation. (II-2A)

PREOPERATIVE AND POSTOPERATIVE CARE

Preoperative Care

The work-up of patients with AUB and the algorithm for decision-making have been previously described.¹¹

Patients must not desire future fertility as serious maternal-fetal complications have been reported in pregnancies following EA (uterine rupture causing maternal death, limb defects, premature labour).¹² Therefore, women must be counselled that EA is not considered a sterilization method. Women must also be appropriately counselled about realistic expectations of ablation outcomes. The goal of EA is to reduce bleeding symptoms; amenorrhea, although possible, cannot be guaranteed.

Endometrial preparation can be considered preoperatively as a thin endometrium can improve visualization for the resectoscopic techniques and improve patient outcomes. A thin endometrium can be achieved by scheduling the procedure in the immediate post-menstrual phase, performing curettage prior to the procedure or administering of preoperative hormonal therapy. A systematic review suggested that preoperative endometrial thinning with GnRH agonists and danazol resulted in higher rates of amenorrhea at 12 and 24 months than placebo/no treatment.¹³ Whether or not this difference is maintained beyond 24 months is uncertain. GnRH agonists and danazol also had a beneficial effect on the intrauterine operating environment with respect to shorter operating time and reduced absorption of distention media. The disadvantages of these agents include the costs and side effects. Randomized data assessing the value of progestins in preoperative endometrial thinning prior to EA are scarce. In a study of resectoscopic EA,

Table 2. Indications and contraindications to EA

Indications

- AUB of benign origin
- EA may be considered as a primary intervention in circumstances such as intolerance to or failure of medical therapy, or patient preference
- EA may be considered for patients who refuse or are poor surgical candidates for hysterectomy

Absolute contraindications

- Pregnancy
- Desire to preserve fertility
- Known or suspected endometrial hyperplasia or cancer
- Cervical cancer
- Active pelvic infection
- Specific contraindications related to non-resectoscopic techniques*

*See "Special Considerations"

amenorrhea rates at 12-month follow-up were 39% for endometrial preparation with GnRH agonists compared with 34% for danazol, 26% for medroxyprogesterone acetate, and 18% for D&C.¹⁴

The use of endometrial preparation prior to non-resectoscopic EA will depend on the product monograph for each individual device. Meta-analysis of a few randomized trials on second-generation devices (radiofrequency ablation and balloon devices) suggest that preoperative endometrial thinning does not improve postoperative rates of amenorrhea.¹³

No RCTs have yet supported or refuted the role of antibiotic prophylaxis before EA by any technique.¹⁵

Postoperative Care

Patients can usually be discharged within 1 to 3 hours of EA depending on the type of anaesthesia used. They can resume their normal activities progressively, but are advised to abstain from sexual intercourse for one week. Pain can be managed with NSAIDs or opiates, and will usually resolve within 24 hours. Light vaginal bleeding or pinkish discharge is usual and can last up to several weeks following the procedure. Patients are counselled to seek medical care if they have fever, intense pain, or profuse vaginal bleeding.

Summary Statement

2. Endometrial preparation can be used to facilitate resectoscopic endometrial ablation (EA) and can be considered for some non-resectoscopic techniques. For resectoscopic EA, preoperative endometrial thinning results in higher short-term amenorrhea rates, decreased irrigant fluid absorption, and shorter operative time than no treatment. (I)

Recommendations

2. Patients should be counselled about the need for permanent contraception following endometrial ablation. (II-2B)
3. Recommended evaluations for abnormal uterine bleeding, including but not limited to endometrial sampling and an assessment of the uterine cavity, are necessary components of the preoperative assessment. (II-2B)

CLINICAL TIP

Required investigations prior to EA include:

- pregnancy test,
- Papanicolaou test within 2 years,
- cervical cultures if clinically appropriate,
- endometrial sampling, and
- assessment of uterine cavity for Müllerian anomalies or intracavitary pathology using transvaginal ultrasound, contrast infusion sonography, or diagnostic hysteroscopy.

(See also SOGC Clinical Practice Guideline No. 292, Abnormal Uterine Bleeding in Pre-Menopausal Women.¹¹)

Because it is often difficult to interpret residual menstrual discharge post procedure, the efficacy of the EA should be assessed no earlier than 6 to 12 weeks postoperatively.

COMPARISON OF RESECTOSCOPIC AND NON-RESECTOSCOPIC EA TECHNIQUES

The first-generation techniques introduced in the 1980s consisted of targeted endometrial destruction under direct hysteroscopic visualization. These techniques included laser ablation and electrosurgical endometrial resection or ablation. Despite their efficacy, the first-generation methods had certain disadvantages. They required a skilled hysteroscopic surgeon and an operating room environment. Their uncommon but serious complications of fluid overload and uterine perforation led to the advent of simpler, less user-dependant alternatives.

These second-generation techniques, also known as non-resectoscopic ablation, use a variety of energy sources to non-selectively destroy the endometrial lining. The advantage of these newer technologies is that they require shorter surgical time and less specialized training, and they can be performed in the outpatient setting. They also help to avert complications associated with the use of fluid distention media while achieving similar clinical outcomes.¹⁶ For these reasons non-resectoscopic procedures have become increasingly popular.¹⁷

Resectoscopic EA

Resectoscopic endometrial resection/ablation is an attempt to destroy the basal endometrial layer to prevent

further endometrial proliferation. Operative hysteroscopy, first described by Neuwirth in 1976, involved resection of submucosal myomas using a modified urological resectoscope.¹⁸ Laser ablation was described by Goldrath in 1981,¹⁹ but lost favour due to its expense and unreliability. Loop electrode and rollerball ablation using bipolar or monopolar radiofrequency electrosurgery were subsequently described by DeCherney and Polan in 1983 and Lin et al. in 1988, as reported in a previous summary of ablation techniques.²⁰

Patients are placed in supported lithotomy position and the cervix dilated to at least 10 mm. Most operative hysteroscopic systems employ a 9 mm (27 French) scope. Hysteroscopes are usually rigid, with operative hysteroscopy using 12, 15, or 30 degrees of angulation. After uterine distension is achieved, the cavity is inspected and endometrial lesions or abnormalities are mapped. Importantly, intrauterine landmarks (tubal ostia, internal cervical os, and/or the characteristic appearance of the endometrium) are identified to confirm that the cavity has been entered and ensure that the operator has not created a false passage. Focal lesions are biopsied, resected, and sent separately to the pathology laboratory.

The rollerball is used at the fundus and ostial regions with a touch technique applying no pressure. The treatment endpoint is a visual change in the endometrium to a yellow-brown honeycomb appearance indicating myometrial tissue has been reached. Tissue destruction to a depth of 4 to 6 mm will usually destroy the basal endometrial layer. The uterine walls can be ablated with the ball electrode or resected using the loop electrode, which also provides a specimen for histology. The electrode should always be visible, in contact with tissue, and moving toward the surgeon when activated. Prolonged activation of the electrode should be avoided to prevent capacitive coupling and other causes of electrosurgical injuries. The surgeon should avoid ablating beyond the cervico-uterine junction to avoid cervical stenosis.

Endometrial polyps and small submucosal fibroids can be resected using the resectoscope, but larger (> 3 cm) myoma resection requires advanced operative hysteroscopy skills. Endometrial resection may result in more fluid absorption, which is associated with longer operating times.¹⁶

Use of a fluid management system is recommended. Bipolar resectoscopic systems require the use of normal saline as a distention medium, thereby eliminating concerns about hyponatremia; however, large quantities of normal saline can still result in fluid overload complications.

Efficacy of Resectoscopic EA

Early studies reported high rates of improvement in heavy menstrual bleeding and high rates of patient satisfaction. O'Connor and Magos reported a 20% repeat surgery rate including a 9% hysterectomy rate over 5 years follow-up in a group of 525 patients undergoing endometrial resection.²¹ Martyn and Allan reported similar results with a repeat surgery rate of 19.2% including an 11.6% hysterectomy rate at 5 years of follow-up.²² The presence of fibroids and dysmenorrhea did not increase the risk of failure.

A meta-analysis of 21 randomized trials comparing different resectoscopic techniques of endometrial destruction showed no difference in rates of amenorrhea and subsequent hysterectomy.¹⁶ First-generation techniques showed improvement in bleeding in 72.5% to 79.5% at 1-year follow-up and high patient satisfaction rates.

Advantages and Disadvantages of Resectoscopic EA

Compared with the non-resectoscopic techniques, the resectoscopic EA offers certain advantages. It allows for accurate assessment of uterine pathology with directed biopsies, documentation with photography, and concurrent treatment of intracavitary pathology. It can also be used in patients who have had previous EA or transmyometrial surgery. However, resectoscopic EA is a skill-dependent procedure that requires an operative room environment and has a higher complication rate than non-resectoscopic methods.

Distending Media for Resectoscopic EA

Distending media provide uterine distension and irrigate blood and tissue fragments from the surgical field. A non-electrolyte solution is required for monopolar resectoscopic surgery, but normal saline can be used with bipolar systems. The following are common distending media:

Conductive solutions (electrolytic/crystalloids)

- Normal saline (290 mOsm/L): isotonic/isonatremic

Non-conductive (non-ionic, non-electrolytic)

- mannitol (275 mOsm/L): isotonic/hyponatremic, induces diuresis
- glycine 1.5% (200 mOsm/L): hypotonic/hyponatremic; acidic with a pH of 6.1
- sorbitol 3.3% (165 mOsm/L): hypotonic/hyponatremic
- cystosol (mannitol 0.54% and sorbitol 2.7%): isotonic/hyponatremic

Osmotically active particles must be added to hypotonic solutions to prevent complications from fluid absorption. Although absorption of isotonic fluids may also lower

serum sodium, it is less likely to cause cerebral edema than the absorption of hypotonic media.

Fluid absorption increases significantly when intrauterine pressure exceeds mean arterial pressure. For every 100 mL of non-electrolyte solution absorbed, serum sodium falls by 1 meq. Electronic fluid management systems provide an accurate measurement of fluid deficits and can safeguard against complications of excess absorption. Excess absorption of isotonic solutions may be less dangerous than absorption of hypotonic solutions because there is a smaller chance of cerebral edema. Excessive fluid absorption may be prevented by pre-treatment of the endometrium,¹⁴ intracervical injection of pressor agents (vasopressin, epinephrine) and the use of distension pressure less than that of the patient's mean arterial pressure. Electronic fluid monitoring systems, which allow regulation of the flow rate, infusion pressure, outflow suction, and fluid deficit may be more accurate in calculating fluid deficits than traditional gravity infusion systems and manual estimation of fluid deficit.

Non-resectoscopic EA

Currently various energy sources are used in 6 non-resectoscopic EA devices approved by Health Canada: bipolar radiofrequency ablation (NovaSure), cryotherapy (Her Option),²³ heated fluid freely circulated in the uterine cavity (Hydro ThermAblator), and fluid contained in a balloon (Thermachoice, Thermablate EAS, and Cavaterm). Specifications of each of these devices are compared in Table 3. Future technologies such as the Aurora ablation system (radiofrequency energy and heated Argon gas forming plasma energy) have promising preliminary results.²⁴

In the absence of large differences in effectiveness and with low complication rates for each of the devices, the choice of which to use depends primarily on the following practical issues and patient factors:

- availability of scientific evidence
- cost effectiveness
- surgeon preference
- ease of use in outpatient/clinic setting
- requirement of endometrial preparation
- uterine cavity characteristics (size, cavitory pathology)

CLINICAL TIP

- For safety and appropriate intracavitary device placement, pre- and post-procedural diagnostic hysteroscopy or intraprocedural ultrasound guidance may be considered.
- The balloon technologies involve coagulation of the endometrium that eventually leads to fibrosis. The maximum effect of this process is seen at 6 months post procedure rather than the 2 to 4 weeks seen with other technologies.

Table 3. Comparison of non-resectoscopic endometrial ablation devices

	Mechanism of action	Device size (mm)	Treatment time (min)	Advantages	Disadvantages	Procedural points
Novasure	Bipolar radiofrequency	7.2	1 to 2	Rapid treatment time No endometrial preparation required High amenorrhea and satisfactions	Cavity limitations (mostly suitable for normal cavities) Cost of disposable equipment Seating the device requires practice	After cervical dilatation to Hegar 8 (25 fr), the device is inserted against the fundus then slightly retracted. It is deployed after proper seating. Pending a CO ₂ perforation detection check, negative pressure is applied and power is delivered until 50 Ohms of tissue impedance is reached. Blood/steam from the cavity is removed during the procedure.
Her Option	Cryo-ablation at -90°C	5.5	10 to 18	Minimal anaesthesia Minimal or no cervical dilatation Able to treat larger cavities	Long treatment time Variability of outcome data ²³ Requires ultrasound guidance and hormonal endometrial preparation	After cervical dilatation to Hegar 5–5½ (15 fr), a disposable 4.5mm cryoprobe is used to form an elliptical freezing zone starting at both cornua. Concurrent trans-abdominal ultrasound allows visualization of the freezing process. Frequently additional applications are necessary to treat the lower uterine body.
Hydro-Therm-Ablator	Saline at 90°C circulated freely	7.8	3 to heat fluid, 10 to treat	Direct visualization of treatment effect Able to treat irregular cavities (fibroids) Short learning curve	Requires hormonal endometrial preparation Safety: fluid leaks may cause burns Long treatment time	After cervical dilatation, a disposable sheath that adapts to a 2.7–3.0 mm hysteroscope is inserted. The fluid is heated to target temperature for 3 min followed by a 10 min treatment time under direct visualization. Loss of more than 10 mL of fluid (through the cervix or the Fallopian tubes) will shut the system off automatically.
Hot liquid-filled silicone balloon devices						
Therma-choice III	5% dextrose at 87°C	5.5	8	Short learning curve Long-term safety and effectiveness data	Cramping from balloon distention Long treatment time	The cervix is dilated, the cavity is measured, and the pear-shaped balloon catheter is inserted. Automated treatment maintains a pressure of 180 to 185 mmHg. Safety features monitor and prevent excess temperature and pressure. Endometrial preparation (hormonal/mechanical) is optional.
Thermaplate EAS	Glycerine at 173°C	6	2.2	Short learning curve Rapid treatment time	RCT results not yet available	Fluid takes 8 min to heat <i>prior</i> to catheter insertion. During the treatment, the balloon undergoes serial of pressurizations (200 mmHg) and depressurizations. Fluid pressure is monitored by transducers that react to contractions or relaxations of the uterus. Endometrial preparation (hormonal/mechanical) is optional.
Cavaterm	1.5% Glycine at 75°C to 80°C	8	10	Simple to use Adjustable balloon length	Cramping Long treatment time	During the treatment, the fluid is maintained at approximately 200 mmHg. A safety mechanism will stop the procedure if it exceeds 250 mmHg. Endometrial preparation (hormonal/mechanical) is optional.

Comparing the Efficacy of Non-resectoscopic Devices

Patient satisfaction and re-intervention rates may be more clinically meaningful than absolute amenorrhea rates in comparing outcomes of procedures using non-resectoscopic devices. All of these devices work well and lead to high levels of patient satisfaction, as demonstrated by the FDA's pivotal trials that showed satisfaction rates of 86% to 99% at 1 year.²⁵

Direct comparisons of non-resectoscopic devices are scarce, and differences between trials with respect to outcome measures, preoperative endometrial preparation, practice settings, and follow-up times make it challenging to compare outcomes accurately. NovaSure radiofrequency ablation has been the most studied in randomized trials comparing it with Hydro ThermAblator and the hot liquid balloons Thermachoice and Cavaterm.

NovaSure versus Hydro ThermAblator

At 12 months' follow-up, NovaSure had significantly higher rates of patient satisfaction (87% vs. 68%) and amenorrhea (47% vs 24%) than Hydro ThermAblator.²⁶ This benefit persisted at 5 years, with NovaSure having significantly higher satisfaction rates (81% vs. 48%), higher amenorrhea rates (55% vs. 37%), and fewer surgical re-interventions (15% vs. 35%).²⁷

NovaSure versus Thermachoice

At the 5-year follow-up, both groups had similar improvements in health-related quality of life measures and no significant differences in amenorrhea rates (48% vs. 32%) and surgical re-interventions (10% vs. 13%).²⁸

NovaSure versus Cavaterm

In a small randomized trial of 57 patients at 1-year follow-up, there was no difference in patient satisfaction (92% vs. 83%) or re-intervention rates between groups. Amenorrhea rates, however, were significantly higher with NovaSure (42% vs. 12%).²⁹

A network meta-analysis reported that bipolar radio frequency EA resulted in higher rates of amenorrhea than thermal balloon at 12 months.³⁰ This has also been confirmed by other systematic reviews.³¹ However, there was no difference between techniques in patient satisfaction or number of women still experiencing heavy bleeding.

EFFECTIVENESS OF RESECTOSCOPIC VERSUS NON-RESECTOSCOPIC TECHNIQUES

Primary outcome measures when evaluating EA procedures include rates of amenorrhea, patient satisfaction, and surgical re-intervention. A Cochrane Database review

compared resectoscopic and non-resectoscopic techniques and reported similar amenorrhea rates at 1 year (37% vs. 28%) and at 2 to 5 years (53% vs. 48%).¹⁶ Because women who suffer from menorrhagia are likely to be satisfied with either hypomenorrhea or normal menses, satisfaction rates for both types of ablations are high.³² In the Cochrane meta-analysis, satisfaction rates were also comparable at 1 year (91% vs. 88%) and at 2 to 5 years (93% vs. 87%).¹⁶ In an updated analysis of 25 RCTs with over 4000 patients, the rates of amenorrhea and patient satisfaction were not significantly different, even up to 10 years after surgery.³³ The surgical re-intervention rate (repeat ablation and/or hysterectomy) for AUB has been reported to be similar between techniques (21% vs. 25% at 2 to 5 years).¹⁶ However, analysis of studies with longer follow-up shows that non-resectoscopic EA has a lower re-intervention rate (RR 0.6, 95% CI 0.38 to 0.96) than resectoscopic EA.³³

Although clinical outcomes between techniques were comparable, non-resectoscopic procedures required shorter surgical time, were more likely to be performed under local anaesthesia, and resulted in patients' quicker return to normal activity.^{32,33} The overall perioperative complication rate was low with both techniques (< 2.5% each), but the non-resectoscopic procedures had a lower incidence of uterine perforation, fluid overload, hematometra and cervical laceration.^{32,33} These advantages were offset by increased nausea/vomiting and uterine cramping in the perioperative period.³³ A higher incidence of equipment failure of second-generation devices was reported in earlier trials, but this is becoming less of a concern with updated models.

Summary Statements

3. Non-resectoscopic techniques are technically easier to perform than resectoscopic techniques, have shorter operative times, and allow the use of local rather than general anaesthesia. However, both techniques have comparable patient satisfaction and reduction of heavy menstrual bleeding. (I)
4. Both resectoscopic and non-resectoscopic endometrial ablation (EA) have low complication rates. Uterine perforation, fluid overload, hematometra, and cervical lacerations are more common with resectoscopic EA; perioperative nausea/vomiting, uterine cramping, and pain are more common with non-resectoscopic EA. (I)
5. All non-resectoscopic endometrial ablation devices available in Canada have demonstrated effectiveness in decreasing menstrual flow and result in high patient satisfaction. The choice of which device to use depends primarily on surgical judgement and the availability of resources. (I)

ANAESTHESIA AND OPERATIVE SET-UP

Resectoscopic ablation is frequently performed under general or regional anaesthesia in the operating room. However, in the appropriate setting, it can also be safely and effectively performed using a local paracervical block with intravenous sedation.

Local, regional, or general anaesthesia can be used for non-resectoscopic EA. A main advantage of non-resectoscopic procedures is that they may be conducted under local anaesthesia in a lower resource-intense environment than the operating room. Performing such procedures in the operating room rather than through a hysteroscopic procedure in another setting adds significant instrumentation costs but no value to the patient.

In addition to local anaesthesia by paracervical block, oral or intravenous conscious sedation may be used depending on patient pain tolerance and surgeon preference. NSAIDs can be administered preoperatively and are moderately effective in diminishing uterine contractions during and after the procedure.³⁴

Procedure Room Versus Operating Room Setting

In the United States non-resectoscopic EA is frequently an office-based procedure, and provider payment processes promote these less resource-intense environments.³⁵ Currently no mechanisms in the Canadian health care system compensate providers for non-resectoscopic EA in such a setting. EA performed in a hospital-based procedure room or a free-standing surgical centre rather than an operating room offers the advantages of a patient-centred environment, easier scheduling, and reduced costs per case. Appropriate low-risk patient selection and a satisfactory pain management strategy are critical in this environment. Procedure rooms must have appropriate emergency equipment available and all personnel must be trained in appropriate adverse event protocols. A systematic review comparing non-resectoscopic EA performed in the outpatient setting to resectoscopic EA in the operating room, showed varying amounts of cost-savings.³¹ In the Canadian setting, an estimated savings of \$562 per patient receiving EA has been attributed to the introduction of balloon devices in the outpatient setting.³¹

Summary Statements

6. The use of local anaesthetic and blocks, oral analgesia, and conscious sedation allows for the provision of non-resectoscopic EA in lower resource-intense environments including regulated non-hospital settings. (II-2)
7. Low-risk patients with satisfactory pain tolerance are good candidates to undergo endometrial ablation in settings outside the operating room or free-standing surgical centres. (II-2)

COMPLICATIONS OF ENDOMETRIAL ABLATION

The most common adverse events following EA are pelvic pain, cramping, and nausea/vomiting. These will generally resolve within 12 to 24 hours of the procedure. Other problems that can develop post-procedure are hematometrium, pyometrium, or endometritis. More severe complications are rare with both techniques of EA, but can include injury to contiguous pelvic structures such as pelvic blood vessels, the bowel, and urinary tract anatomic components. Procedural complications such as severe pain, bleeding, uterine perforation, and infection may require emergent surgical management.¹⁶

The FDA has a reporting system for non-resectoscopic ablation complications, and bowel injury is the most common complication reported to its Manufacturer and User Facility Device (MAUDE) database.³⁶ Other major complications reported more infrequently are urinary tract injuries, immediate hysterectomy, gas embolism, necrotizing fasciitis, and death. The incidence of such complications is unavailable from such databases as the denominator (total number of cases) is not known. However, the majority of these adverse events were associated with non-compliance with the manufacturers' instructions for use. To mitigate the risk of injury with non-resectoscopic procedures, surgeons may consider post-dilatation hysteroscopy or concurrent ultrasound surveillance during the procedure.

Serious Complications of EA

Uterine perforation has been reported in 0.3% of non-resectoscopic EA procedures and 1.3% of resectoscopic ablations or resections.¹⁶ If uterine perforation is suspected to have occurred during cervical dilatation or with the resectoscope (without electrosurgery), the procedure should be abandoned and the patient should be closely monitored for signs of intraperitoneal hemorrhage or visceral injury. If the perforation occurs while using electrosurgery or if the mechanism of perforation is uncertain, abdominal exploration is warranted to obtain hemostasis and rule out visceral injury.

Perioperative hemorrhage has been reported in 1.2% of women undergoing non-resectoscopic ablation and 3.0% of those undergoing resectoscopic ablation.¹⁶

Hematometra have been reported in 0.9% of women undergoing non-resectoscopic ablation and in 2.4 of those undergoing in resectoscopic ablation.¹⁶ Although intrauterine scarring is an expected result of EA, hematometra will occur when areas of the endometrium are adherent and there is endometrial bleeding behind the occlusion. Hematometra and cervical stenosis may be

managed by cervical dilation, hysteroscopic adhesiolysis and drainage, or hormonal endometrial suppression. For persistent pain despite minimally invasive treatment, hysterectomy may be indicated.

Postablation tubal sterilization syndrome has been reported to occur at a rate as high as 10%.³⁷ Some women who have undergone tubal ligation prior to EA experience cyclic or intermittent pelvic pain. The proposed etiology is bleeding from active endometrium trapped in the uterine cornua. This can be managed laparoscopically by excision of the tubal stumps or hysterectomy.

Pelvic infections and fever occur in the immediate postoperative period in approximately 1% of women who have undergone EA.¹⁶ In a meta-analysis, the incidence of infectious complications included endometritis (1.4 to 2.0%), myometritis (0 to 0.9%), pelvic inflammatory disease (1.1%), and pelvic abscess (0 to 1.1%).¹⁶

Long-term recurrent AUB after EA may be caused by endometrial proliferation, adenomyosis, or (rarely) pre-malignant or malignant condition of the uterus. Investigation should include an endometrial biopsy if more than 1 year has passed since the procedure. Because dense intrauterine synechiae sometimes follow EA, endometrial biopsy, even D&C, may often be impossible.³⁸ Transvaginal ultrasound can also be used to exclude abnormal proliferation of the endometrium. When adequate sampling of the endometrium cannot be obtained and AUB persists, with ultrasonic evidence of a thickened endometrium, hysterectomy is generally indicated for both curative and diagnostic purposes.³⁸

CLINICAL TIP

- For resectoscopic EA, if uterine perforation has been ruled out, acute hemorrhage may be managed with intrauterine Foley balloon tamponade, intracervical vasopressors injection, or rectal misoprostol administration.
- Hematometra should be suspected in a patient with a history of an EA who presents with amenorrhea and cyclic pain, even remote from the procedure.³⁹ This can be diagnosed by transvaginal ultrasound and prevented by ensuring complete ablation of the uterine fundus, cornua, and tubal ostia while avoiding ablation of the cervix or cervico-uterine junction.
- Tips for administering paracervical block⁴⁰:
 - Infiltration of the cervix carries the risks of intravascular injection and toxicity of the local anaesthetic. These risks can be minimized by infiltrating slowly, using lower concentrations of local anaesthetic, frequently aspirating, and monitoring for symptoms of intravasation (tinnitus, blurring of vision, peri-oral/facial numbness). If the local anaesthetic contains epinephrine, patients may experience palpitations, tachycardia, or feelings of anxiety. Basic resuscitative equipment should be available.
 - Allow the block to take effect by waiting 10 to 15 minutes prior to proceeding with cervical dilatation.

Complications Specific to Resectoscopic EA

Resectoscopic EA has potential complications specific to this surgical modality. Careful fluid management is critical to the safe use of hysteroscopic EA. In addition, surgeons must possess a comprehensive understanding of potential electrosurgical injuries during hysteroscopic EA.

Safe hysteroscopic surgery requires careful fluid management to avoid excessive intravasation of hysteroscopic distension media. Adherence to a strict protocol of fluid monitoring and management criteria will minimize the risk of complications of distension medium overload such as cardiovascular compromise and pulmonary edema, electrolyte abnormalities, and encephalopathy. Table 4 provides an approach to prudent management of hysteroscopic distention fluid issues.

Electrosurgical injuries with monopolar operative hysteroscopy can occur due to capacitive coupling and defective insulation and result in cervical, vaginal, or perineal burns. There is an increased risk of this occurring when the tip of the resectoscope is in the cervical canal, when the cervix is over-dilated, or when there are electrode insulation defects. There is a greater degree of capacitive coupling injury with higher voltage outputs, which may occur with use of coagulation mode, long uninterrupted periods of electrode activation, and non-contact with tissue.⁴¹ Risks of capacitive coupling can be reduced by preventing cervical over-dilatation, using the lower voltage “cut” current, avoiding prolonged and uninterrupted activation, checking for insulation defects, ensuring contact with tissue during activation, and using a weighted speculum during the procedure to disperse any stray currents.

Summary Statement

8. Both resectoscopic and non-resectoscopic endometrial ablation are relatively safe procedures with low complication rates. The complications perforation with potential injury to contiguous structures, hemorrhage, and infection. (II-2)

Recommendations

4. Clinicians should be vigilant for complications unique to resectoscopic endometrial ablation such as those related to fluid distention media and electrosurgical injuries. (III-A)
5. For resectoscopic endometrial ablation, a strict protocol should be followed for fluid monitoring and management to minimize the risk of complications of distension medium overload. (III-A)
6. If uterine perforation is suspected to have occurred during cervical dilatation or with the resectoscope

Table 4. Management of hysteroscopic distention fluid losses**Measurement of Intake and Output (I&O) During Hysteroscopy**

- a. I&O should be measured accurately, ideally by an electronic fluid management system, for all operative hysteroscopy procedures.
- b. I&O values for all distention media should be monitored and fluid deficits reported to the surgeon and anaesthesiologist.
- c. The circulating nurse should seek assistance, and additional staff if required, to monitor fluid I&O.
- d. Final I&O values or fluid deficit should be recorded on the operative record.
- e. Final I&O values should be reported to the surgeon and anaesthesiologist at the end of the procedure.

Excess Fluid Deficit for Non-conductive Solutions

At a fluid deficit of 500 cc:

- Ensure anaesthesiologist and surgeon are aware of the deficit in return of uterine distension fluid.

At a fluid deficit of 1000 cc:

- The procedure should be completed as expeditiously as possible.
- Consider placing Foley catheter in bladder for accurate monitoring of urine output.
- Consider fluid restriction and IV to keep vein open.
- Consider IV diuretic (e.g. furosemide) administration.

At a fluid deficit of 1500 cc:

- The procedure should be discontinued immediately.
- Serum electrolyte values should be obtained and abnormalities managed appropriately.
- Observe patient for signs of fluid overload and encephalopathy, changes in level of consciousness, seizure activity, pulmonary edema, and tachypnea.
- Admit patient for observation and management of complications.
- If normal saline is used as the distending medium, consider completing and terminating the procedure at volumes of 2000 cc and 2500 cc, respectively.

(without electrosurgery), the procedure should be abandoned and the patient should be closely monitored for signs of intraperitoneal hemorrhage or visceral injury. If the perforation occurs with electrosurgery or if the mechanism of perforation is uncertain, abdominal exploration is warranted to obtain hemostasis and rule out visceral injury. (III-B)

7. With resectoscopic endometrial ablation, if uterine perforation has been ruled out acute hemorrhage may be managed by using intrauterine Foley balloon tamponade, injecting intracervical vasopressors, or administering rectal misoprostol. (III-B)

SPECIAL CONSIDERATIONS**Repeat Ablation**

Irrespective of technique, EA has a success rate of 73% to 85%. Therefore, EA failures raise the issue of repeat ablation or hysterectomy. The decision for repeat ablation versus another approach will depend on the surgeon's skill and the patient's consent, appropriately informed about possible complications. If the initial EA was deemed a failure because it did not reduce menstrual flow and if the symptoms are highly suggestive of adenomyosis, definitive management should be considered.

If repeat EA is considered, a hysteroscopic approach using the resectoscope is recommended. With the possible exception of the HydroThermAblator,⁴⁰ a non-resectoscopic blind procedure is generally contraindicated in this clinical scenario, as is a global EA technique under hysteroscopic visualization. Complication rates of repeat EA are statistically higher than primary procedures. The risks of perforation, higher fluid absorption, and bleeding have been reported to be in the order of 9.3% to 11% compared with 2.05% for primary ablation.⁴² Repeat ablation should therefore be performed by skilled surgeons with experience in hysteroscopic surgery. When repeat procedures are performed in patients with the appropriate indications, success rates of avoiding hysterectomy have been reported to be about 55% to 60%.⁴³

Concomitant Hysteroscopic (Essure) Tubal Sterilization

Hysteroscopic sterilization has rapidly replaced laparoscopic sterilization in the United States but has not yet been widely accepted in Canada. Essure is highly successful, with a reported 5-year effectiveness of 99.8% and most failures related to deviations from protocol.⁴⁴ Over the last few years there have been multiple reports on the concomitant use of Essure and different ablation techniques, most

often non-resectoscopic procedures such as NovaSure, Thermachoice, Thermablate, HydroThermAblator.⁴⁵ In most cases, both procedures were reported to be successful for the ablation and placement of the implants at rate of 83% to 89%. The NovaSure requires placement of implants after the procedure, while balloon thermal transfer and circulating saline could be performed before or after hysteroscopic tubal sterilization.

Problems with combined Essure placement arise from the FDA's mandatory requirement of confirming postoperative tubal occlusion by HSG at 3 months. Obliteration of the uterine cavity following EA may make confirmation of tubal occlusions by HSG difficult. However, in other countries including Canada, HSG is not mandatory following hysteroscopic sterilization and many articles advocate using three-dimensional US and X-ray to confirm bilateral placement and the non-migration of the tubal inserts.⁴⁶

Previous Caesarean Section

The literature regarding EA in patients with previous CS consists primarily of small retrospective cohorts studies. For resectoscopic EA, there are generally no restrictions following previous CS. However, caution should be exercised over the CS scar as myometrial thinning may predispose it to perforation or thermal injury. For a patient with previous transmural myomectomy, obtaining adequate visualization of the cavity using a pressure pump should allow for safe treatment.

For the available non-resectoscopic technologies, no restriction on the minimum myometrial thickness has been mentioned. However, caution is recommended with patients who have had more than 2 CS. Non-resectoscopic EA is contraindicated in patients with previous classical Caesarean section or transmural myomectomies. Five-year data on satisfaction, treatment failure, and operative complications of non-resectoscopic EA in patients with previous CS are similar to those in patients without previous CS.⁴⁷

Intracavitary Pathology and Non-Resectoscopic EA

Intracavitary fibroids and polyps were excluded from the original randomized controlled trials evaluating non-resectoscopic EA techniques. These procedures were originally designed to treat normal uterine cavities. Subsequently, various attempts have been made to examine the utility of these technologies in distorted cavities with submucosal fibroids. The HydroThermAblator, which relies on freely circulating heated fluid under direct visualization, may be suited to treat distorted cavities as it does not rely on the fixed shape of a mesh or balloon. A prospective study of patients with type 0 or type 1 submucosal fibroids

< 4 cm reported an amenorrhea rate of 39% with the HydroThermAblator treatment. However, amenorrhea rates were significantly higher for patients with normal cavities (62% at 30 months' follow-up).⁴⁸ Rates of re-intervention were also significantly higher in patients with distorted cavities.⁴⁸ Women with types 1 and 2 submucosal fibroids < 3 cm who were followed prospectively following treatment with NovaSure had amenorrhea rates of 69% at 1 year.⁴⁹ Thermachoice also demonstrated a decrease in menstrual flow in 4 women with submucosal myomas < 3 cm.⁵⁰

Despite encouraging results showing that non-resectoscopic EA may be beneficial in treating AUB in women with small (< 3 cm) submucosal fibroids, further research is still required. Where possible, hysteroscopic myomectomy/polypectomy combined with resectoscopic EA should be used to treat women with symptomatic intracavitary pathology.

Summary Statement

9. Combined hysteroscopic sterilization and endometrial ablation can be safe and efficacious while favouring a minimally invasive approach. (II-2)

Recommendations

8. If repeat endometrial ablation (EA) is considered following non-resectoscopic or resectoscopic EA, it should be performed by a hysteroscopic surgeon with direct visualization of the cavity. Patients should be counselled about the increased risk of complications with repeat EA. (II-2A)
9. If significant intracavitary pathology is present, resectoscopic endometrial ablation combined with hysteroscopic myomectomy or polypectomy should be considered in a non-fertility sparing setting. (II-3A)

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APPENDIX

ENDOMETRIAL ABLATION PATIENT INFORMATION SHEET

Endometrial ablation is an alternative surgical procedure for heavy menstrual bleeding. It attempts to destroy or remove the endometrium—the lining of your uterus. This can replace hysterectomy in many cases.

This is a day surgery procedure. The technique varies depending on the method used to destroy the endometrium.

Most EA procedures can be done in an outpatient surgical centre while others must be performed in an operating room. Factors such as the size of your uterus, presence of fibroid tumours, and experience of the surgeon will help determine which endometrial ablation method is best for you.

While medications are typically recommended as first line treatment for heavy menstrual bleeding, endometrial ablation may be an option if medications don't help or you decline to try them.

Endometrial ablation is **not recommended** for women who:

- wish to become pregnant in the future,
- have cancer of the uterus,
- have large fibroid tumours in the uterus, and/or
- have had recent pelvic infection.

Endometrial ablation risks may include:

- perforation of the uterine wall,
- damage to nearby organs, and/or
- pain, bleeding, or infection.

Future pregnancy

Many women stop having periods after endometrial ablation, but pregnancy is still possible in some women. Most of these pregnancies will have an abnormal outcome. Women who wish to become pregnant in the future should not consider endometrial ablation.

Some women may choose to undergo a sterilization procedure at the time of endometrial ablation or consider other forms of reliable contraception to prevent pregnancy. Concomitant laparoscopic tubal ligation would usually require general anaesthetic.

Preparation for surgery

- **Check for abnormal endometrial cells.** Your doctor may take a small sample of the lining of your uterus using a small endometrial biopsy instrument. This is done in the office before surgery.
- **Thin your endometrium.** Endometrial ablation is often performed more successfully when the uterine lining is thin. This can be accomplished with preoperative medications or by undergoing a D and C (dilation and curettage) on the day of surgery.
- **Discuss method of anaesthesia.** Most procedures can be performed with conscious sedation and local anaesthetic block. In some instances general anaesthesia is required.

The procedure

Endometrial ablation can be performed in your doctor's office, but some types of endometrial ablation are performed in a hospital operating room, especially if you will need general anaesthesia.

The cervix is dilated to allow for the passage of the instruments used in endometrial ablation. Endometrial ablation procedures vary by the method used to destroy your endometrium.

- **Electrosurgery.** This method uses a small hysteroscope to view the uterine cavity during the procedure. An electrode is used to resect or destroy the lining of the uterus.
- **Free-flowing hot fluid.** Saline fluid heated to 80°C to 90°C is circulated within the uterus for about 10 minutes.
- **Heated balloon.** A balloon device is inserted through your cervix and then inflated with fluid heated to 87°C for about 2 to 10 minutes.
- **Bipolar radiofrequency.** This uses a bipolar wire mesh electrode that contacts the uterine cavity. The instrument transmits high frequency electrical energy that vaporizes the endometrial tissue in about 90 seconds.

After the procedure

After endometrial ablation, you may experience:

- **Cramps.** You may have menstrual-like cramps for a few days.
- **Vaginal discharge.** A watery discharge, mixed with blood, may occur for a few weeks. The discharge is typically heaviest for the first few days after the procedure.
- **Frequent urination.** You may need to pass urine more often during the first 24 hours after endometrial ablation.

Avoid intercourse for one week after surgery.

All endometrial ablation techniques show similar improvement in bleeding pattern. It may take a few months to see the final results of surgery, but endometrial ablation causes marked reduction in menstrual blood loss in over 80% of patients. Most women will have lighter periods or spotting, and some will stop having periods entirely.

You should continue to use contraception.