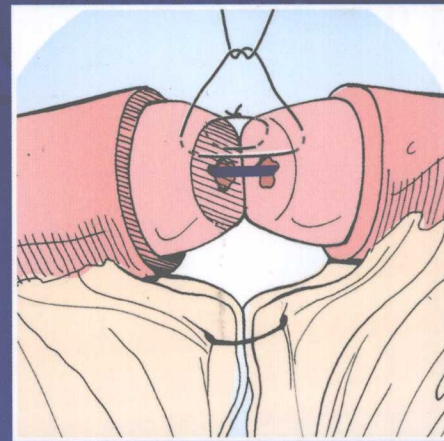
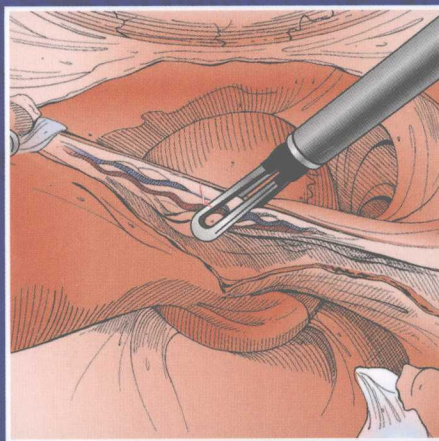
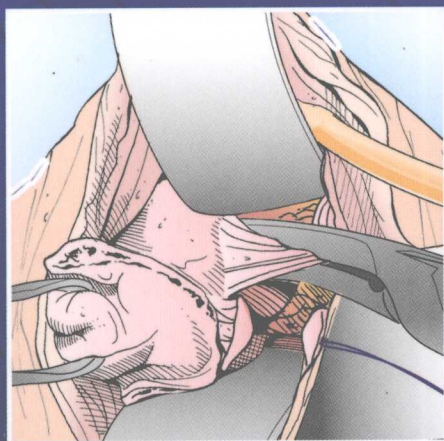


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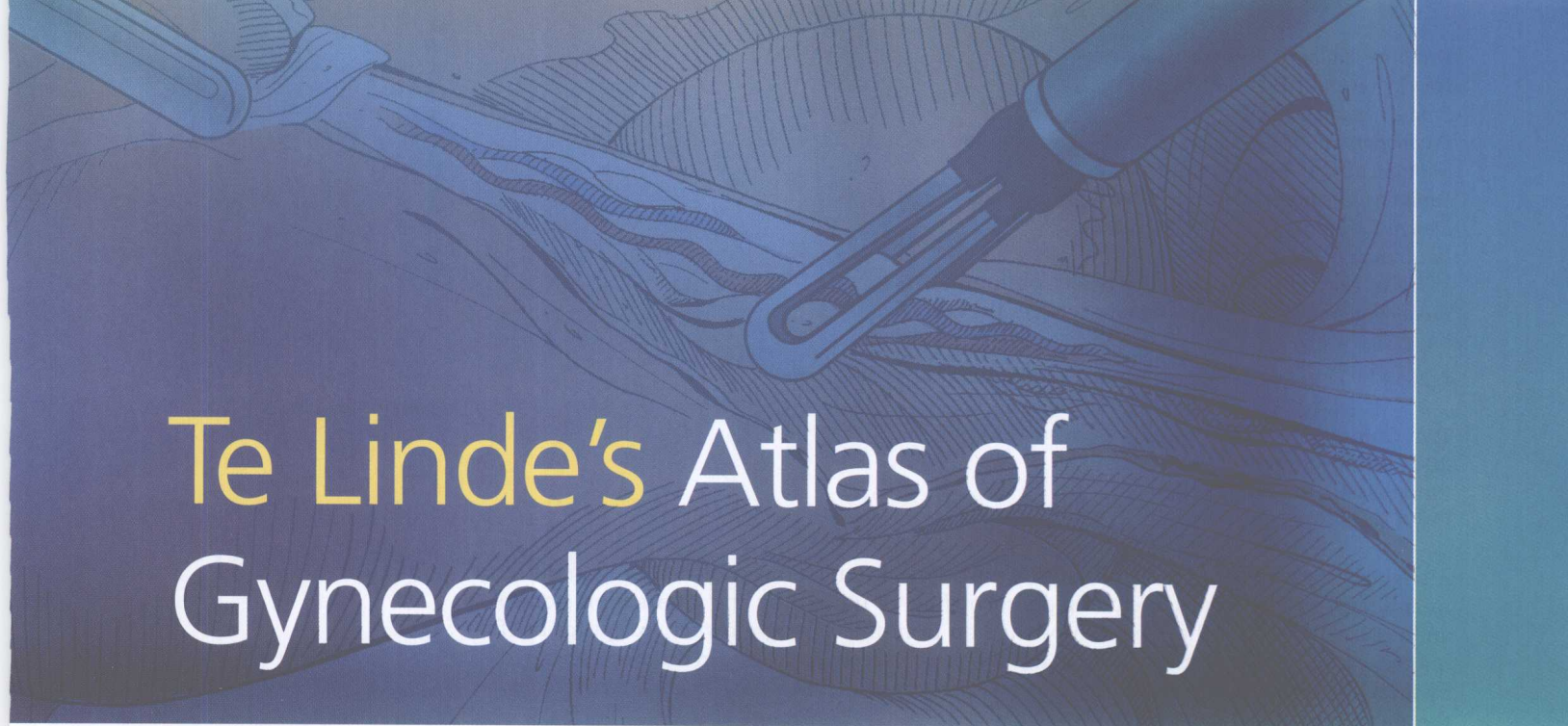


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Te Linde's Atlas of Gynecologic Surgery

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To Cindy, Ashlee, Jonathon, and Mallory—for their unwavering love and support.

Ricardo Azziz

To my family—Michelle, Jackson, Chloe, and Haley—for your love, patience,
inspiration, and support.

Robert E. Bristow

To the women who have brought meaning and joy to my life, including
my patients, my colleagues, my mother, Peggy, daughters, Victoria and Adreanna,
and most importantly, my wife, Valerie.

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Gynecology has always been a surgical specialty, yet the breadth and complexity of gynecologic surgery continues to expand. The complex three-dimensional nature of pelvic anatomy and distinctive opportunity for multiple surgical approaches challenge the surgeon who is seeking to master the full breadth of the specialty. Add novel techniques and technologies of recent years, and the challenge grows. Faced with this challenge, both the gynecologist-in-training and those already in practice can benefit from readily accessible visual tools that assist them in achieving mastery of their field. This is the goal of *Te Linde's Atlas of Gynecologic Surgery*.

Achieving quality and patient-centered care requires a surgeon to be flexible in utilizing the surgical technique and approach that will best meet the patient's needs. Of course, no surgical technique should be offered until there is adequate evidence of both safety and efficacy, as a patient cannot make an informed choice in the absence of such data. All of the techniques described in this text have ample evidence of safety and efficacy, although this evidence is not

presented. The reader is referred to the seminal text *Te Linde's Operative Gynecology*, which this atlas complements, for a more extensive discussion of the development, considerations, pros and cons, and risks and benefits of these procedures.

Instead, in this atlas we have aimed to provide a clear and detailed description of the steps involved in performing the procedures. To assist the readers in their comprehension, the prose is accompanied by meticulously accurate drawings. These illustrations are rendered in an accessible style with color to maximize the surgeons' understanding. Many chapters also have narrated videos to provide further context for the reader.

Whether this text is used to complement the descriptions and discussions presented in *Te Linde's Operative Gynecology*, or used as an initial introduction to a new surgical technique, or as a method to prepare prior to carrying out a procedure not commonly performed, we hope that this surgical atlas will become an invaluable tool for all surgeons treating women.

ACKNOWLEDGMENTS

No project of this kind can be solely attributed to the authors, or even the practitioners who kindly contributed to its writing. Rather, these feats are the result of the efforts of many. And this text is no different.

Firstly, we should acknowledge the work of our colleagues who contributed to text, including Dr. Roxana Geoffrion, Dr. Melinda Henne, Dr. Darren Lazare, Dr. Jonathon Solnik, and Dr. Frank Tu. We are also indebted to Jennifer Smith, whose considerable artistic skill allowed us to illustrate that which is hard to see with the naked eye. And to Chris Merillo, at Bio-media Communications, for ensuring excellent videos and voice-overs to complement the text and Jennifer's drawings.

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Fourthly, we all recognize that our expertise as surgeons arises from the patient and dedicated efforts of our many surgical mentors and teachers, including Drs. John A. Rock, Alfred E. Bent, W. Allen Addison, Rick Bump, and Rick Montz. And no less, we are eternally grateful for the trust of those many patients who allowed us to care for them, providing us with a rich experience that we now share with the reader, as our patients are truly the drive, passion, and purpose behind this text.

And we rightfully should recognize the unwavering support and encouragement of our families, without whose care and support during the production of this text its reality would have been an impossibility.

Finally, we would like to acknowledge you, the reader, for caring enough about your patients to expand your understanding and hone your skills, and for being willing to lead in the surgical care of women, now and in the future.

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Chapter 2 Total Abdominal Hysterectomy

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Chapter 3 Total Vaginal Hysterectomy

Roxana Geoffrion

Chapter 4 Total Laparoscopic Hysterectomy

Robert E. Bristow

Chapter 5 Laparoscopic Supracervical Hysterectomy

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SECTION I

Gynecology

Uterine Ablation Techniques

Frank Tu

INTRODUCTION

There is a long history of attempts to deliver energy to the endometrial lining in order to reduce abnormal menstrual bleeding—dating back to as early as the 1890s. More recently, hysteroscopic resection or hysteroscopic ablation has proven to be of significant value in ensuring the destruction of the endometrium and amelioration of menorrhagia and related symptoms. However, due to concerns about serious complications from fluid overload with conventional hysteroscopic endometrial resection for abnormal uterine bleeding, several global endometrial ablation (GEA) devices were introduced around the beginning of the new millennium. These GEA techniques use radiofrequency, thermal energy, or microwave energy to destroy the endometrium, in order to reduce the amount of cyclical bleeding or, in some cases, even achieve complete amenorrhea.

GEA is indicated for the treatment of dysfunctional uterine bleeding. This can include comorbid leiomyoma for certain devices, but typically a hysteroscopic myomectomy might be a better treatment for a known submucosal leiomyoma. There are several contraindications to consider; these include ongoing pregnancy or desire for future pregnancy, cancer or premalignant change, untreated pelvic inflammatory disease, hydrosalpinx, history of classical cesarean section, or transmural myomectomy. A woman with a cesarean section scar measuring less than 8 to 10 mm on ultrasound should be considered a relative contraindication for GEA or might consider having the procedure done under ultrasound guidance to minimize the risk of

perforation. Women with intra-uterine devices (IUDs) in place and, for selected procedures, the presence of intramural leiomyomas and endometrial polyps may benefit from additional pre-ablation procedures.

Benefits of GEA have been supported by multiple head-to-head comparative trials against traditional transcervical endometrial resection, with patient satisfaction ranging from 89% to 98% and amenorrhea rates ranging from 14% to 55%. Patient satisfaction is generally quite high with all the procedures, although it is important to note that one survey has suggested that women are willing to tolerate up to a 50% failure rate with conservative management strategies in order to avoid hysterectomy. Despite the high overall satisfaction with virtually all devices, bipolar ablation has been shown in two head-to-head trials to deliver superior objective results compared to thermal balloon and hydrothermablation, respectively. This may be in part due to differences in how patients are pretreated for these procedures.

The particular attractiveness of GEA over endometrial resection is also evident in the number of cases that increasingly are done in the office or under local anesthetic. That being said, there is still a selective role for endometrial resection in the hands of experienced hysteroscopic surgeons, particularly in patients desiring conservative therapy after failure of initial GEA. Patients do need to be counseled about risks, including the rare risk in women with a prior history of tubal ligation of “postablation tubal pain syndrome,” central hematometra, endometritis with rare reports of sepsis, uterine perforation, and injury to adjacent pelvic

organs. Minor side effects include temporary abdominal cramping in around 10% to 15% of patients treated and a few weeks of vaginal discharge in most patients.

Effective means of contraception are needed if permanent sterilization has not already been assured, as future gestational complications such as uterine dehiscence, intrauterine growth restriction, and preterm delivery have been described in unexpected pregnancies following GEA. Unfortunately, GEA in a subset of women impairs cancer screening due to obliteration of the endometrial cavity, which can obscure the abnormal bleeding that is a hallmark of endometrial cancer.

PREOPERATIVE CONSIDERATIONS

The initial workup of menorrhagia should follow generally accepted clinical practice and includes: (a) excluding pregnancy, (b) completing a pelvic exam and pelvic ultrasonography, (c) obtaining confirmation of a recent negative PAP smear, (d) performing an endometrial biopsy to rule out cervical or endometrial malignancy and pre-malignant changes to the uterus, and (e) potentially performing a hysteroscopy to confirm the appropriateness of the size of the uterus and the absence of intracavitary lesions that might limit the effectiveness of GEA techniques. All methods, except for the Novasure® bipolar electrode array, recommend

performing the procedure during the early follicular phase or following a month of hormonal (e.g., progestogen) pretreatment to thin the endometrial lining. Although many patients are comfortable having this done in the ambulatory setting using one of several available analgesic strategies, the clinician must select the best setting based on the examination and his/her assessment of the patient's tolerance level (**Box 1.1**).

To address the issue of a submucosal leiomyoma, or to prevent future pregnancies, some clinicians perform concomitant procedures such as hysteroscopic myomectomy, or tubal sterilization, or IUD placement at the same time as GEA. The Her Option® cryoablation system and MEA® have indications for intracavitary leiomyoma up to 2 and 3 cm, respectively. Published postmarketing experience from Kaiser Permanente suggests that the use of office-based Hydrothermablator® (HTA) can still be effective in the presence of either Type 0 or Type I myomas, although the reported failure rate of 23% at a mean follow-up of ~2.5 years post-procedure was markedly higher than their 3.7% failure rate in myoma-free patients. Similar efficacy has been reported for off-label use of Thermachoice® and Novasure®. There is concern that an immediate prior myomectomy may weaken the uterine tissue and increase the risk of perforation or iatrogenic injury to abdominal organs. Placement of the tubal sterilization implant Essure® must be done after Novasure® ablation due to

BOX

1.1

Suggestions for in-office analgesic protocols for GEA procedures

Consider using a combination of the following agents to achieve multimodal pain management. Many practices use all of these in conjunction to achieve optimal comfort. Patient selection is crucial.

1. Anti-inflammatory: administer 600 to 800 mg of oral ibuprofen every 6 hours beginning in evening prior to procedure, followed by in-office intramuscular injection of ketorolac 30 mg (at least 6 hours after previous NSAID dose)
2. Muscle relaxant/anxiolytic: oral diazepam 2 to 5 mg 60 minutes prior to procedure
3. Cervical ripening agent: misoprostol 200 µg at bedtime night prior to procedure—not recommended if doing HTA in office due to concern for spill
4. Opioid analgesic: 5 to 10 mg of oral hydrocodone or oxycodone, or belladonna and opium rectal suppositories 16.2/30 or 16.2/60, 60 minutes prior to procedure
5. In-office paracervical block with local anesthetic: must wait 5 to 10 minutes to achieve effect
6. Patients should consider arranging for transportation to and from procedure if any sedative agents are administered in the perioperative period

the metal content of the implants. While an IUD can be placed after GEA, it may be difficult to remove subsequently due to the resulting fibrosis.

SURGICAL TECHNIQUE

1. GEA techniques: Patients are placed in slight Trendelenburg position in stirrups and the perineum prepped and draped in the usual fashion. Typically, some sort of IV sedation is given or else office protocols for preoperative pain control are used. The bladder is emptied with a catheter if appropriate. Preoperative antibiotics are usually unnecessary, although patients should be counseled that endometritis can occur rarely after these procedures. A paracervical block is given at 4 and 8 o'clock if indicated and uterus is sounded to confirm appropriateness for each given device. A speculum is placed and the cervix grasped with a tenaculum.

a. Her Option® (Cooper Surgical): The only cryoprobe therapy approach among the five methods reviewed achieves biological effect on the endometrium by cooling the 3.5-cm tip

of an intrauterine probe to -80°C during two freeze cycles of 4 and 6 minutes each, to treat each side of the uterine cavity (**Figure 1.1**). The procedure is done under ultrasound guidance and usually does not require preoperative cervical dilation as the probe measures 5.5 mm in diameter (and 22 cm in length). Women with uterine cavity lengths between 4 and 10 cm (by sounding) and a uterine volume of 300 ml or less are considered appropriate candidates for treatment with this device.

The active probe is connected to a gas compressor. On activation, a hermetically sealed gas mixture flows into the distal tip of the probe, which permits cooling and heating of the probe. The disposable probe is first tested in the air and confirmed to be able to reach -50°C in a test freeze. Air is first cleared from the probe channel with a small volume (1–2 ml) of saline and the probe is then inserted under ultrasound guidance toward the right or left fundus. A saline-filled 30-ml syringe is attached to the injection port on the probe, and 5 to 10 ml injected into the cavity to optimize contact of

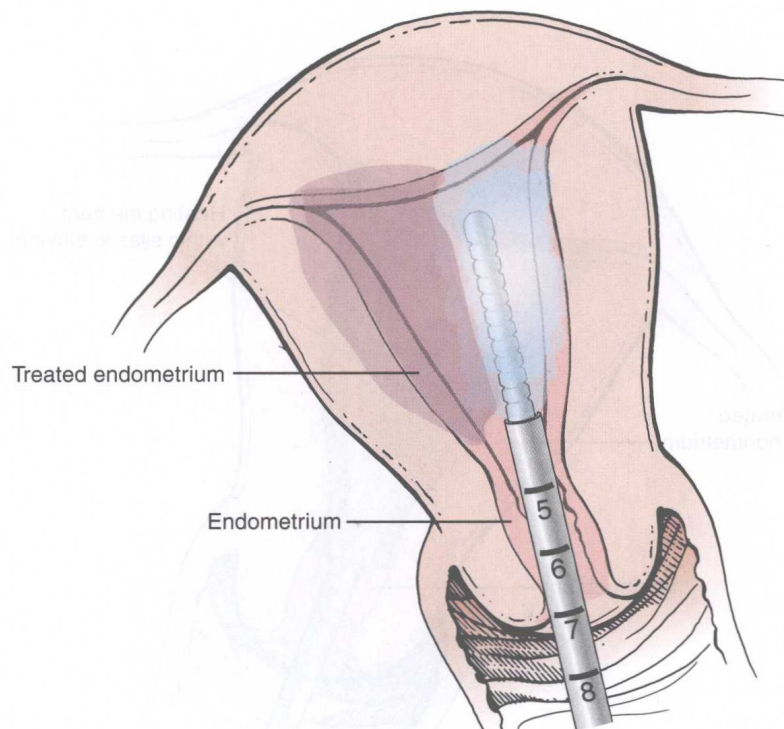


FIGURE 1.1 Her Option® (Cooper Surgical): The only cryoprobe therapy approach to endometrial ablation, it achieves its biological effect on the endometrium by cooling the 3.5-cm tip of an intrauterine probe to -80°C during two freeze cycles of 4 and 6 minutes each, treating each side of the uterine cavity. The procedure is done under ultrasound guidance.