MINILAPAROTOMY FOR FEMALE STERILIZATION

An Illustrated Guide for Service Providers

ENGENDERHEALTH

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An Illustrated Guide for Service Providers

ENGENDERHEALTH
Improving Women's Health Worldwide

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Preface

Minilaparotomy and laparoscopy have transformed female sterilization into a quick, highly effective, and safe outpatient procedure that can and should be performed under local anesthesia. Since development of the minilaparotomy technique in the 1970s, the number of women sterilized has doubled. More than 210 million couples are currently protected from unintended pregnancy by female sterilization, which is currently the most widely used contraceptive method in the world and is projected to remain the most widely used method over the next quarter century.

Minilaparotomy for Female Sterilization: An Illustrated Guide for Service Providers is thus of potentially great current and future usefulness. The illustrated guide offers service providers an easy-to-use reference for learning about minilaparotomy for female sterilization. It presents a detailed description of the procedure and also illustrates the step-by-step surgical technique to follow in performing a suprapubic or subumbilical minilaparotomy under local anesthesia, with or without sedation. In addition, the guide reviews basic requirements that are essential to ensure the safety and effectiveness of any female sterilization procedure. Details related to providing female sterilization services can be found in the World Health Organization's Guide to Female Sterilization Services (WHO, 1992).

The illustrated guide is designed for four audiences:

- Experienced providers of female sterilization who want to change from other surgical techniques to the minilaparotomy technique
- Providers who have never performed female sterilization and who want to begin to provide female sterilization services using the minilaparotomy technique under local anesthesia
- Trainers, who may rely on this guide as a reference text while teaching the minilaparotomy technique

- Trainees, who may use the illustrated guide during their training and later for reference to further develop proficiency in their technique

This guide focuses on performing minilaparotomy under local anesthesia, with or without sedation. However, the surgical techniques described can be implemented using other anesthetic regimes. Similarly, the guide describes the modified Pomeroy technique for tubal occlusion, but other occlusion techniques can also be used.

Finally, as useful as this guide may prove to be, it alone is not sufficient preparation for the performance of minilaparotomy under local anesthesia. EngenderHealth strongly recommends that those interested in learning and mastering the minilaparotomy technique obtain hands-on training from a skilled provider. In addition to this guide, EngenderHealth has developed a training curriculum for minilaparotomy under local anesthesia. For more information about this curriculum or about training in minilaparotomy, contact:

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We are confident that this guide will serve as an important resource for making safe, high-quality female sterilization services more accessible and available throughout the world.

Roy Jacobstein, M.D., M.P.H.
Medical Director, EngenderHealth

Acknowledgments

EngenderHealth's work to facilitate and improve access to safe and effective female sterilization services is core to our organizational mission to improve women's reproductive health worldwide. Thus, every member of EngenderHealth's staff has contributed in some fashion to our work to advance female sterilization—and the production of this guide is no exception. In particular, experience accrued over the years by EngenderHealth's medical and program staff in the provision of quality minilaparotomy services was drawn upon during the writing, review, and revision of this guide.

Dr. Carmela Cordero and Lori Leonhardt worked on the iterative development of manuscripts and were in charge of the overall process of creating the guide. At a meeting held in India in March 2003, a number of EngenderHealth senior medical associates—Dr. Francis Floresca, Dr. Job Obwaka, Dr. Mizanur Rahman, Dr. Marcel Reyners, and Dr. Jyoti Vajpayee—reviewed the manuscript and illustrations and provided invaluable feedback. Dr. Jean Ahlborg, Dr. José Figueroa, Dr. Roy Jacobstein, John Pile, Dr. Amy E. Pollack, and Dr. Joseph Ruminjo (all of EngenderHealth) reviewed subsequent drafts of the guide and provided useful input. In addition, Dr. Pío Iván Gómez of EngenderHealth and Dr. Javier Esclava of the International Clinical Epidemiology Network (INCLEN) were key contributors to the chapter on anesthesia. Finally, a number of external experts and organizations helpfully reviewed the guide in draft, including Dr. James Shelton (USAID), Dr. Herbert Peterson (WHO), Dr. Ali Samba (Korle-Bu Teaching Hospital, Ghana), Dr. Marianne Parry (Marie Stopes International), and Dr. John Naponick (Louisiana Department of Health).

Laura Pardi Duprey created the original illustrations for this guide. All photographs included in the guide were provided by Instituto de Investigaciones y Servicios en Salud Reproductiva (INSAR). The following members of

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1 Introduction

The purpose of this guide is to provide health care providers with an easy-to-use reference for learning about minilaparotomy for female sterilization. This guide provides a detailed description of minilaparotomy and illustrates the step-by-step surgical technique for performing minilaparotomy under local anesthesia, with or without sedation. Trainees may use this guide during their training for study purposes and for later reference, to develop further proficiency in the technique. Trainers who are teaching the technique may also use this guide as a reference text.

What Is Minilaparotomy?

Minilaparotomy, generally referred to as "minilap," is an abdominal surgical approach to the fallopian tubes by means of an incision less than 5 cm in length. As a sterilization procedure for permanently occluding the fallopian tubes, minilaparotomy has been performed safely and frequently in a wide range of countries for more than 30 years.

Minilaparotomy procedures can be performed at any time, either in connection with a pregnancy (i.e., postpartum or postabortion) or at any time unrelated to a pregnancy (also known as an interval procedure). Minilaparotomy performed for interval sterilization was described first (Uchida, 1970); the postpartum minilaparotomy procedure was developed somewhat later (Osathanondh, 1974).

The procedure for accessing the fallopian tubes and the steps of the minilaparotomy approach depend upon the size of the uterus; thus, the procedure is selected based on timing relative to pregnancy (see Table 1, page 2). When the uterus is normal or close to normal in size (e.g., in interval clients or after an uncomplicated first-trimester abortion), the surgeon can approach the tubes from an incision above the pubic bone—known as a *suprapubic* procedure (Fig. 1a, page 3). Following delivery, when the uterus is

TABLE 1. Comparison of the characteristics of interval, postabortion, and postpartum minilaparotomy procedures

Characteristic	Interval	Postabortion	Postpartum
Timing	Not associated with a pregnancy	Usually immediately after an abortion	Usually within 48 hours of delivery
Uterine size	Normal	Small (close to normal) after uncomplicated first-trimester abortion	Enlarged
Surgical procedure	Suprapubic	Suprapubic	Subumbilical
Scheduling	▪ At any time that pregnancy can be ruled out ▪ Ideally, within the first two weeks of the menstrual cycle	▪ Usually within the first six hours after uterine evacuation	▪ Within 48 hours of delivery ▪ Allowing time to assess the infant's condition, many providers wait for 10 to 12 hours after delivery
Screening	▪ Standard history ▪ Physical exam ▪ Pelvic exam	▪ Standard history ▪ Physical exam to screen for abortion or postabortion events that could increase surgical risk ▪ Assessment of uterine size	▪ Standard history ▪ Physical exam to screen for antenatal or postpartum events that could increase surgical risk ▪ Assessment of uterine size
Special instruments	Uterine elevator and tubal hook	Uterine elevator and tubal hook	Tubal hook
Timing of discharge	When stable, usually two to four hours after the procedure	When stable, usually two to four hours after the procedure	No additional hospital stay required beyond routine postpartum stay

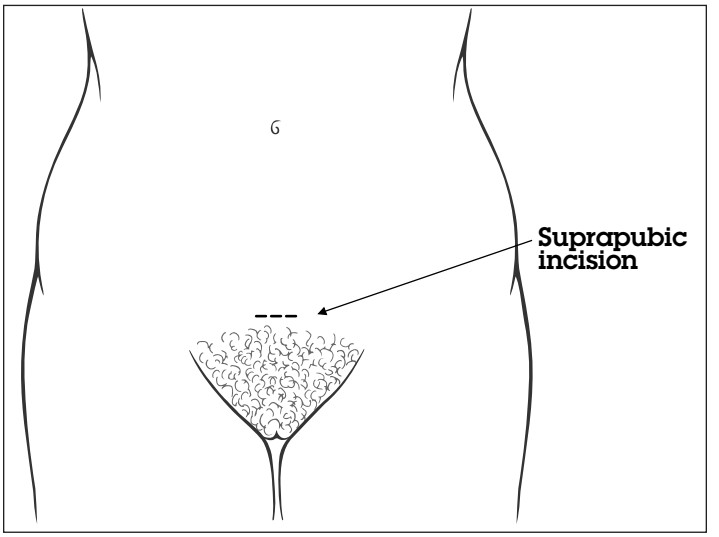
Sources: EngenderHealth, 2002; WHO, 1992; WHO, 2002.

enlarged, the uterine fundus and the tubes are high in the abdomen and can be approached by an incision under the umbilicus—known as a *subumbilical* procedure (Fig. 1b). The distinguishing feature of the suprapubic procedure is the use of a uterine elevator to elevate and rotate the fundus of the uterus toward the incision site so the tubes can be reached easily.

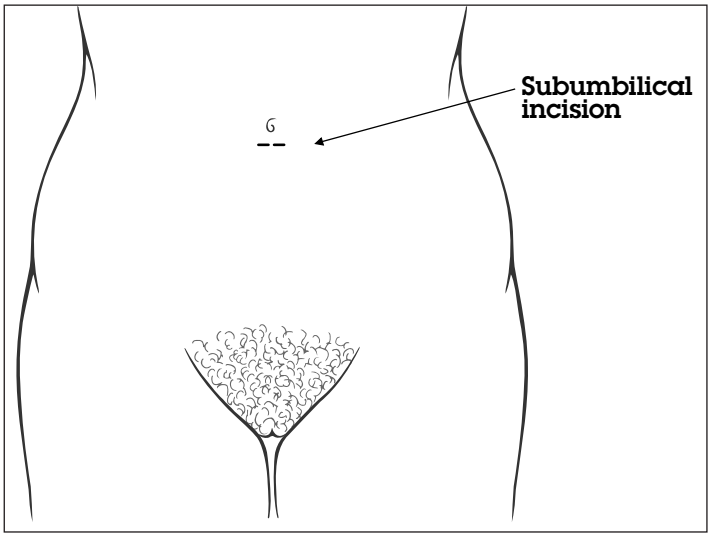
During the first 48 hours after delivery, the fallopian tubes can be reached easily via a subumbilical incision. From day 3 to day 7 postpartum, access to the tubes becomes progressively more difficult as the uterus begins to descend (involute) and lie in an area where the abdominal wall is thicker; in this situation, the

FIGURE 1. Minilaparotomy procedure incision sites

(a) Suprapubic—appropriate for interval and postabortion procedures



(b) Subumbilical—appropriate for postpartum procedures



surgery is more difficult to perform under local anesthesia. From day 8 to day 28 postpartum, minilaparotomy is not recommended: Because the uterus is descending and is not yet fully involuted, the complication risk is elevated as a result of the increased difficulty in accessing the tubes (AVSC, 1995).

Almost all occlusion methods (ligation and excision, mechanical devices, and coagulation, among others) have been used with the minilaparotomy procedure. These methods have similar efficacy and safety profiles when a surgeon skilled in the method performs them correctly (Nardin, Kulier, & Boulvain, 2003; Peterson et al., 2001). This guide describes the modified Pomeroy technique, which is the most common tubal occlusion technique used in the majority of countries. It is also the simplest to perform, since it does not require special applicators or devices.

Why Minilaparotomy?

To ensure broad access to female sterilization, the method offered at a service site should be highly effective, safe, able to be performed as an ambulatory procedure, and economical (WHO, 1992). Minilaparotomy and laparoscopy both fit these criteria and are acceptable procedures for reaching the fallopian tubes (WHO, 1992). Both are simple, are safe, and can be performed on an outpatient basis.

The anesthesia regimen for minilaparotomy and laparoscopy, as is the case for other similar elective surgeries, should be chosen according to the skill level of the staff and the capacity of the facility where the procedure is to be performed. When possible, the client's preference should also govern the anesthesia regimen chosen. EngenderHealth has found that minilaparotomy under local anesthesia, with sedation or without, is effective and safe, and recommends that this regimen be employed if the providers are skilled in following such a procedure.

Major morbidity appears to be a rare outcome for both laparoscopy and minilaparotomy. It is important to note that laparoscopy carries a greater risk than minilaparotomy of major morbidity (such as bowel or vascular injury) that may be life-threatening or may require additional surgery. However, minilaparotomy is associated with a greater risk of minor morbidity (such as uterine perforation or wound infection) (Kulier et al., 2003; WHO, 1982).

Minilaparotomy has several advantages over laparoscopy (see Table 2):

- Minilaparotomy can be offered more widely than laparoscopy because it can be performed by a broader range of providers.

TABLE 2. Comparison of minilaparotomy and laparoscopy for female sterilization

Consideration	Minilaparotomy	Laparoscopy
Surgical skills and expertise	The procedure can be performed by any health care provider with basic surgical ability and skills (after special training in the technique).	The procedure is restricted to specially trained surgeons and gynecologists.
Setting	Performing the procedure requires a health facility with basic surgical capacity.	Performing the procedure requires a health facility with comprehensive surgical capacity.
Instruments and equipment	The procedure requires a few inexpensive surgical instruments and two special ones—a tubal hook (for suprapubic and subumbilical procedures) and a uterine elevator (for suprapubic procedures).	The procedure requires delicate and expensive endoscopic equipment. (Ongoing maintenance and spare parts must be available.)
Timing	Minilaparotomy is appropriate for suprapubic and subumbilical procedures.	Laparoscopy is appropriate only for interval and first-trimester post-abortion procedures.
Postoperative pain	Postoperative abdominal pain may occur.	Postoperative abdominal pain is slight. Chest and shoulder pain may result from abdominal insufflation.
Recovery time	Recovery time is slightly longer than with laparoscopy.	Recovery time is short.

Sources: EngenderHealth, 2002; WHO, 1992; WHO, 2002.

- Minilaparotomy can be used for postpartum sterilization, while laparoscopy cannot.
- Minilaparotomy requires simple, inexpensive, and easily maintained surgical equipment.
- Minilaparotomy involves low start-up and continuing costs.
- Minilaparotomy can be offered at a variety of sites, since it does not require high-level facilities.

2 Personnel

Health care providers with a medical background and basic surgical experience can be trained to perform minilaparotomy to provide female sterilization services (although this may also depend on national policies or guidelines). Around the world, surgeons, obstetrician-gynecologists, and general practitioners have safely provided female sterilization using minilaparotomy. Where doctors cannot meet the demand for female sterilization, nurses and nurse-midwives have been trained to perform postpartum minilaparotomy. In pilot studies comparing doctors' and nurses' performance in Bangladesh and Thailand, nurses have performed procedures as safely as doctors (Chowdhury & Chowdhury, 1975; Dusitsin et al., 1980; Satyapan et al., 1983).

The Minilaparotomy Team

Minilaparotomy performed under local anesthesia requires a team effort—a group of providers working in coordination to perform a refined surgical technique while ensuring safety, efficacy, and client comfort. It is every team member's responsibility to communicate with clients and support them before, during, and after the surgery. As a group, they should make sure to implement the tasks needed to conduct surgery appropriately. To perform these tasks, the surgical team should consist of at least three people: a surgeon, a surgical assistant, and a client monitor. (In some settings, a fourth person—the circulating nurse or auxiliary nurse—could be included.)

Each member of the surgical team has very distinct responsibilities:

- The surgeon performs the surgery and is responsible for the surgical team's overall performance.
- The surgical assistant's main role is to assist the surgeon by optimizing exposure of the uterus and fallopian tubes (by handling the retractors), cutting sutures, and anticipating the surgeon's needs.

HINT: A separate scrub nurse is not required, as the surgeon and the surgical assistant can share the scrub nurse's tasks (handling sterile instruments and supplies during surgery). However, a trained scrub nurse may serve as the surgical assistant.

- The client monitor's primary responsibilities are to provide sedative or analgesic drugs, monitor the client's vital signs, and communicate with the client (reassuring her during the procedure, checking the effectiveness of the anesthesia, and observing for any early sign of complications). The client monitor needs to be appropriately trained on these tasks and must promptly alert the surgeon of any sign of complications; in some services, anesthesia-related tasks are performed by an anesthesiologist.

Frequently, the client monitor also performs the role of circulating nurse, by ensuring that needed supplies and instruments are available in the operating theater and by handling any additional supplies that the surgeon may request during the surgery. The client monitor (with the support of the surgical assistant) also is often responsible for preparing the operating theater before the client enters.

As team leader, the surgeon is ultimately responsible for supervising the steps needed for female sterilization:

- Informed decision making
- Completion of the informed consent form
- Preoperative assessment
- Correct implementation of infection prevention procedures
- Appropriate and continuous client monitoring
- Choice and appropriate management of the anesthesia regimen
- Adequate recovery monitoring
- Provision of postoperative instructions
- Confirmation that the clinic is equipped and ready to manage any emergency

Site staff other than those involved in the surgery may at times perform these necessary tasks. For example,

counseling generally is provided in the family planning clinic, and cleaning and waste disposal usually are the responsibility of aides. Ultimately, everyone involved in any aspect of the provision of female sterilization contributes to the quality and safety of female sterilization services.

3 Facilities, Equipment, Instruments, and Supplies

Facilities

Minilaparotomy can be performed at almost any facility that has surgical capacity, from a separate outpatient facility to a hospital-based facility. Sites need to take appropriate measures to ensure delivery of quality and efficient services, with attention to clients' comfort and satisfaction.

A facility needs good lighting, electricity, a supply of clean water, and the capacity to handle or quickly refer emergencies for the provision of high-quality sterilization services. In rural and remote locations, it is possible to perform minilaparotomy without a permanent source of electricity or reliable sources of running water.

- *Light:* Although the preoperative exam may be performed in natural light, a directed source of adjustable light is needed for the surgery itself. A back-up battery-operated light should be available at all times in case of power failure.
- *Electricity:* A reliable source of electricity is preferable to provide light for the procedure and for instrument processing. If the central source of electricity is not reliable, a functional generator should be available.
- *Water:* The facility should have a reliable source of clean running water. It is preferable to have clean *tap water*. If piped water is not reliable, sites may use alternative clean water supplies if necessary (e.g., cisterns) (WHO, 1992). Alternatively, water can be stored in containers, as long as the storage containers provide a clean, free-flowing source of water.*
- *Emergency capacity:* The facility must *always* have on hand all equipment, supplies, and drugs needed to stabilize a client who experiences a complication (Appendix F). The facility should also have procedures for ensuring referral to higher-level facilities for further care, if needed. This includes ensuring the availability of prompt transport to such facilities if emergencies arise.

* A bucket with an attached tap is available in many countries.

TABLE 3. Instruments for minilaparotomy for female sterilization

Standard operating instruments

1 antiseptic solution cup

1 dressing forceps, standard pattern, 5″

1 tissue forceps, delicate pattern, 5.5″

2 Kelly artery forceps, straight, 5.5″

2 mosquito forceps, delicate, curved, 5″

2 Allis intestinal forceps, delicate, 6″, 3 × 4 teeth

2 baby Babcock intestinal forceps, 7.5″

1 Foerster sponge forceps, straight, 9.5″

1 Mayo-Hegar needle holder, 7″

2 Richardson-Eastman retractors, same small size (for suprapubic procedure)

2 Army-Navy retractors, double-ended (for subumbilical procedure)

1 Metzenbaum scissors, curved, 7″

1 Mayo operating scissors, curved, 6.75″

1 surgical handle, #3, graduated in cm

Instruments for inserting the uterine elevator

1 Graves speculum, medium

1 Foerster sponge forceps, curved, 9.5″

1 Schroeder tenaculum forceps, 10″

Specialized instruments

1 Ramathobodi uterine elevator, 28 cm in length

1 Ramathobodi tubal hook

Optional instruments

1 kidney tray

Alternative instruments

1 Jackson vaginal retractor, 1.5 × 3″ (deep blade)

The following spaces are necessary (WHO, 1992):

- A reception and registration area
- A comfortable waiting area for clients
- A counseling space that allows for privacy
- An examination room for preoperative and follow-up examinations, including changing facilities for clients
- A surgical area isolated from the outside and from clinic traffic
- A space for cleaning, preparing, and sterilizing surgical instruments and linen
- Spaces for storing records, supplies, and equipment
- Arrangements for laboratory tests
- Toilet and washing facilities for clients and staff (preferably separate)
- A laundry or laundry arrangements

The overall surgical area consists of several smaller areas where the surgical activities are performed: an area where surgical personnel can change clothes, an area for surgical scrub, an area for storing prepared instruments, and the operating theater. The operating theater should

be enclosed, be clean, and possess a good ventilation system. It should also be isolated from open transit areas, with access limited to those involved in surgical activities. The operating theater should not be used as a storage room; only the items regularly used for surgical procedures should be kept there. It should also be as close as possible to the client recovery room.

Equipment, Instruments, and Supplies

The equipment, instruments, and supplies needed for performing minilaparotomy are generally available in most facilities where surgical services are offered. Appendix A lists the basic equipment, instruments, and supplies needed, and Table 3 lists the surgical instruments needed for minilaparotomy. Figure 2 shows the two specialized instruments—the uterine elevator and the tubal hook—that are needed for the minilaparotomy procedure. Figure 3 (page 14) shows the instruments needed for inserting the uterine elevator (used with the suprapubic procedure). Finally, Figure 4 (page 14) shows the instrument tray organized for the procedure.

FIGURE 2. Instruments specific to minilaparotomy procedures

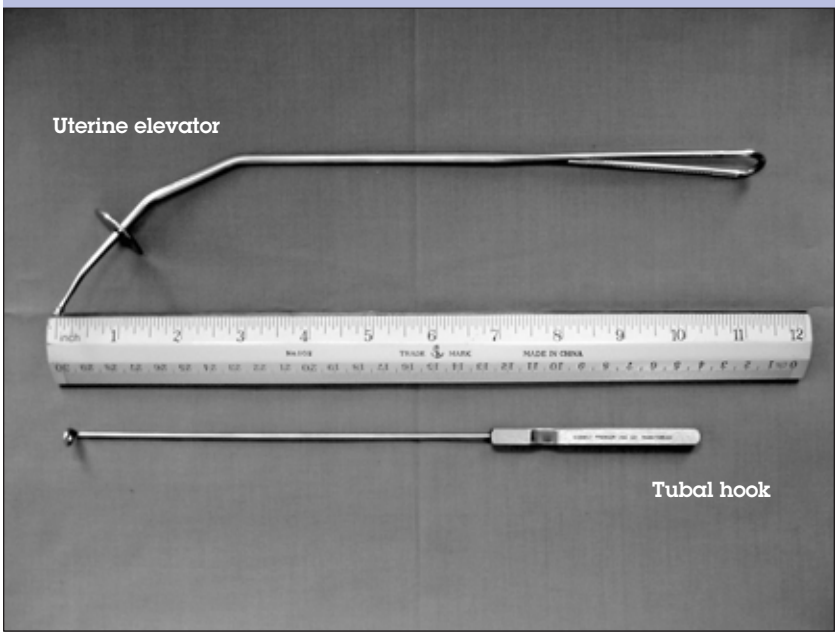


FIGURE 3. Instruments used for inserting the uterine elevator

FIGURE 4. Instrument tray used for performing minilaparotomy

4 Counseling, Preoperative Assessment, and Scheduling

Counseling the Client for Female Sterilization

Counseling is the process by which a health care provider uses empathetic, *two-way* communication to help clients explore their reproductive health needs, so they can make a voluntary, informed, and well-considered decision that is compatible with those needs. For a client making the decision about female sterilization, *counseling should be performed well in advance of the procedure,* since sterilization is a surgical procedure that is meant to be permanent.

Informed decision making is a part of the counseling process through which a client makes a well-considered, voluntary decision about contraceptive use. This decision should be reached based on options, information, and an understanding of the risks of pregnancy and sexually transmitted infections (STIs) and the levels of protection provided by different contraceptive methods, including the understanding of relevant medical facts and the potential risks involved while using contraceptives—and, more importantly in the case of female sterilization, about the procedure and its effects and about the risks and benefits associated with the surgery. This information should be tailored to individual clients, filling gaps in their knowledge, correcting any misinformation, and addressing their questions and concerns. Clients should be able to make a real choice among contraceptive options that are offered and explained. They should also receive information about female sterilization's lack of protection against STIs, including HIV, and they should be aware that dual protection may be advisable in some situations.

Informed consent, on the other hand, is the client's *written acceptance, agreement, or permission,* based on his or her own free will, to undergo a medical or surgical procedure after having made an informed decision. For female sterilization, the client gives informed consent *after* being counseled, *by signing (or by putting her thumb impression on)* a consent

form *before* the procedure is performed. (A sample informed consent form is provided in Appendix B.)

Postpartum clients should have received information and made their decision regarding female sterilization during their pregnancy. As part of clients' antenatal care (if this was received), providers should have discussed their family planning intentions, and decisions should have been made before the onset of labor. This ensures that the decision was thought out and was not made during a stressful situation. If a postpartum or post-abortion client who had not received counseling during her pregnancy requests female sterilization, efforts must be made to assess her decision and ensure that she is making a well-informed and free decision, but the procedure should not be denied without consideration.

Preoperative Assessment

The preoperative assessment should be conducted before surgery is scheduled, to screen for conditions that warrant caution, delay, or special consideration, as described in the medical screening guidelines for female sterilization developed by the World Health Organization (WHO, 2002) (see Appendix C). Generally, an interval client is assessed after her counseling session. A pregnant client who is considering female sterilization as her contraceptive option should be assessed before the surgical procedure to ensure that she is a fit for surgery.

Who is responsible for the preoperative assessment? Any health care provider trained in taking a complete medical history and in performing a complete physical exam, including a pelvic exam, can perform the preoperative assessment. This person should know the WHO Medical Eligibility Criteria for Female Sterilization (WHO, 2002) and should be qualified to recognize and appropriately identify conditions that might lead to surgical complications.

Components of the preoperative assessment. In the preoperative assessment, the provider takes a complete medical history and conducts a physical exam; in some cases, the preoperative assessment may also include performing laboratory tests. A suitable preoperative assessment will diminish the incidence of unwanted

events in the perioperative period, as well as unexpected or unscheduled hospitalizations in ambulatory surgery programs (White, 1994).

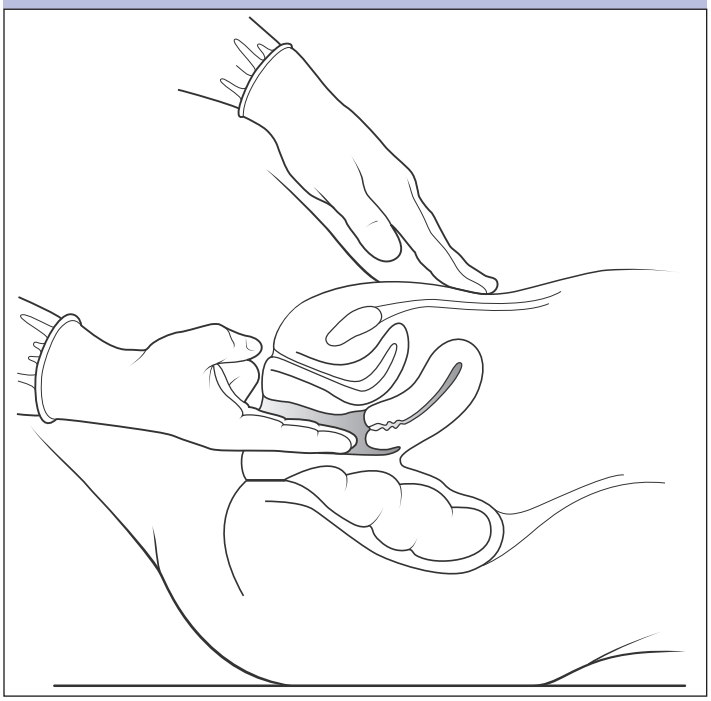
The *medical history* that is taken must be complete, whether or not questions are specifically related to the surgical procedure. The medical history includes a history of past medical conditions (related to each organ system), a reproductive health history (e.g., number of pregnancies, number of living children and their age, last pregnancy outcome and last normal menstrual period, contraceptive history, and history of STIs or HIV), and a history of any previous surgeries, anesthesia, allergies, and medications. Clients should be asked about any current illness or any symptoms that could add risk to the procedure or that could warrant a postponement.

The *physical exam* should include taking and documenting vital signs and conducting a cardiopulmonary, abdominal, and gynecological exam. In postpartum clients, an abdominal exam is important for assessing the size and relative location of the uterine fundus. For clients who will be having an interval or postabortion minilaparotomy, the physical exam should include a bimanual pelvic exam to determine the position, flexion, mobility, size, shape, and condition of the uterus (Fig. 5, page 18, and Fig. 6, page 19).

HINT: The mobility of a retroverted or retroflexed uterus should be carefully assessed. Although the surgeon may be able to gain access to the tubes by bending a retroverted or retroflexed uterus that is mobile, a uterus that is retroverted or retroflexed and *fixed* will not bend easily and may require a different surgical approach—e.g., a larger incision or more anesthesia (AVSC International, 1995).

The possibility of pregnancy must also be ruled out, but there is no need to perform a pregnancy test; instead, the examining provider may use the Provider Checklist for Reproductive Health Services: How to Be Reasonably Sure a Client Is Not Pregnant (Appendix D).

FIGURE 5. Bimanual pelvic examination of a normal anteverted uterus

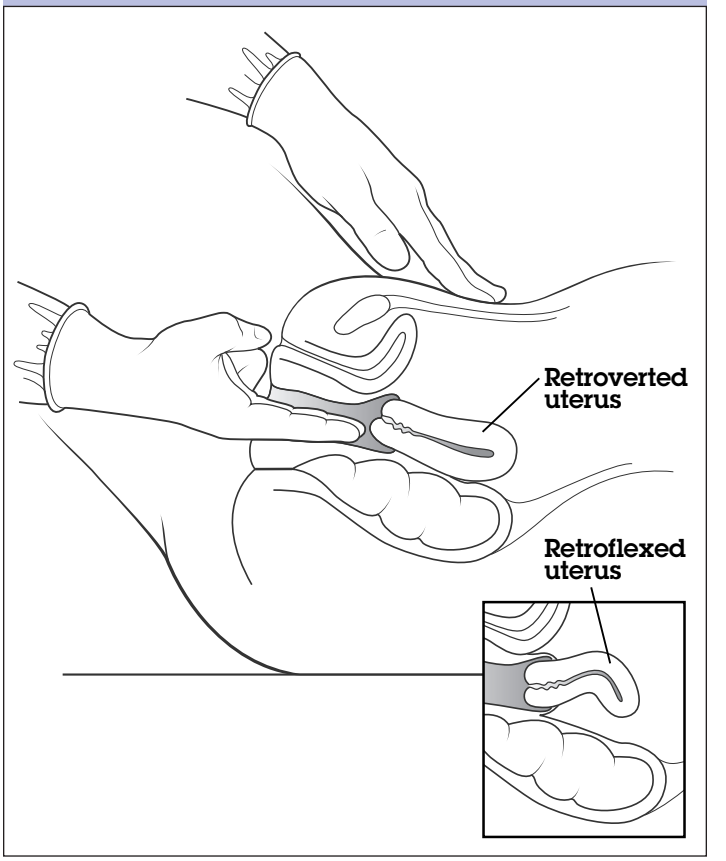


Additionally, for postpartum clients, the presence of any complicating conditions related to the delivery (e.g., potential infection, excessive blood loss during delivery or immediately postpartum, and complications associated with pregnancy-induced high blood pressure) should be assessed. The well-being of the baby should also be assured. A bimanual examination need not be performed.

For postabortion clients, the provider must be sure that there is no infection, uterine perforation, or significant blood loss. Uterine size should also be assessed, as this will influence the surgical approach selected.

Diagnostic *laboratory tests* such as hematocrit or hemoglobin are necessary only when warranted by the client's history or the results of the physical exam. In the event that either general anesthesia or regional anesthesia is being considered, laboratory tests should be performed according to respective national or international guidelines.

FIGURE 6. Bimanual pelvic examination of a retroverted or a retroflexed uterus



Medical Eligibility Criteria for Female Sterilization

There is no medical reason that would *absolutely* restrict a woman's eligibility for female sterilization. Some conditions and circumstances, which should be identified during the preoperative assessment, may indicate the need to take certain additional precautions, however. Appendix C provides screening guidelines for female sterilization. Medical conditions are classified as A (Accept), C (Caution), D (Delay), and S (Special).

The majority of clients are classified under *Accept,* and their procedure can be performed in most clinical settings. Clients identified with conditions requiring *Caution* can be scheduled in the normal setting *but with extra precautions, as required.* Clients with conditions requiring *Delay* should be scheduled when the condition is further evaluated or corrected (see Table 4, page 20, for examples). Clients identified with

TABLE 4. Conditions warranting either delay of surgery or observation of special considerations before surgery is performed

Delay	Special Consideration
Pregnancy	Postpartum uterine rupture or perforation
Postpartum	Postabortion uterine perforation
▪ Seven up to 28 days	Multiple risk factors for arterial cardiovascular disease
▪ Severe preeclampsia or eclampsia	Hypertension
▪ Prolonged rupture of membranes (24 hours or more)	▪ Systolic blood pressure >160 mm Hg or diastolic blood pressure >100 mm Hg
▪ Puerperal sepsis, or intrapartum or puerperal fever	▪ Vascular disease
▪ Severe antenatal or postpartum hemorrhage	Complicated valvular heart disease
▪ Severe trauma to the genital tract	Endometriosis
Postabortion	AIDS
▪ Postabortion sepsis or fever	Tuberculosis or known pelvic infection
▪ Severe trauma to the genital tract	Diabetes with nephropathy, retinopathy, or neuropathy
▪ Acute hematometra	Hyperthyroidism
Deep venous thrombosis or pulmonary embolism	Decompensated severe cirrhosis
▪ Current deep venous thrombosis or pulmonary embolism	Coagulation disorders
▪ Major surgery with prolonged immobilization	Chronic respiratory diseases
Current and history of ischemic heart disease	Hernia of the abdominal wall or umbilicus
Unexplained vaginal bleeding	
Malignant gestational trophoblastic disease	
Cervical, endometrial, or ovarian cancer	
Pelvic inflammatory disease (current or within the last three months)	
Current sexually transmitted infection (including purulent cervicitis)	
Current gall bladder disease	
Active viral hepatitis	
Iron deficiency anemia (Hb <7g/dL)	
Abdominal skin infection	
Acute bronchitis or pneumonia	
Gastroenteritis	
Sterilization at the same time as abdominal surgery	
▪ As an emergency (without previous counseling)	
▪ With an infectious condition	

Adapted from: WHO, 2002.

conditions requiring *Special consideration* should be scheduled in a setting that ensures appropriate handling of clients with higher risk for surgery (see Table 4). When assessing a client for female sterilization, the provider should also weigh the risks inherent in a future pregnancy against the risk for any potential conditions that would require special consideration for the surgical procedure.

Scheduling

After being counseled and receiving preoperative assessment, clients who will undergo female sterilization should be scheduled for surgery. Scheduling includes setting a time, providing alternative contraception if needed, and providing preoperative and postoperative instructions. These instructions should be given both *verbally* and *in writing.* (Most of the time, they are presented as a client brochure [see Appendix E].)

NOTE: For postpartum and postabortion clients, the time for surgery should be set according to the recommendations shown in Table 1—usually within 48 hours of delivery or within the first six hours after uterine evacuation, respectively.

Setting a time. For the interval client, female sterilization should be performed *within the first two weeks of the client's menstrual cycle.* If the provider can be sure that the woman is not pregnant (e.g., she is correctly using a reliable method of contraception or she is not sexually active), then the surgery can be scheduled for any time.

Providing temporary contraception. If a client is not within the first two weeks of her last menstrual cycle, if pregnancy cannot be ruled out, if any condition requires a delay in performing the surgery, and if she is not already using a reliable method of contraception, *the client should be offered a reliable method of contraception so she is protected from pregnancy until her surgery can be performed.*

Providing preoperative information and instructions. Preoperative information and instructions should be given both verbally and in writing. A responsible adult should accompany the client to the facility on the day of the surgery. (Sample written preoperative instructions are provided in Appendix E.)

Preoperative information and instructions are important. To inform and reassure the client, these should be given in advance, letting her know what to expect during the procedure. This is key to the success of local anesthesia and decreases the need for sedation and analgesia. Using simple terms, the counselor generally provides the following information during counseling:

- The steps of the operation
- The anesthesia regimen to be used, an explanation that some discomfort might occur, and encouragement for the client to ask questions
- The important fact that clients should not eat any solid food for at least six hours before surgery, but may take clear fluids up to two hours before surgery (Barash et al., 2001)
- The need for interval clients to bathe, clean the genital area and operative site, and remove jewelry, make-up, and nail polish on the day of the surgery
- The importance of having a responsible adult to take the client home from the facility after the procedure

In addition, information about what to expect *after* the surgery should be provided at this time, and it should include the following:

- Needed rest, wound care, and when to restart normal activities (including intercourse)
- Warning signs to be aware of, what to do in each case, and where to go in the event those complications arise
- When and where to go for the follow-up visit

Providing postoperative instructions. After surgery, the information already provided regarding postoperative care should be reiterated and reviewed. These instructions are especially important in helping women recognize warning signs and seek timely care. Clients should receive written instructions just before they leave the facility, with special attention to the following advice:

- Rest for the remainder of the day. Resume normal activities after two or three days.
- Avoid intercourse until comfortable.
- For relief of pain or discomfort, take simple analgesics at intervals of four to six hours. (Note: Name and dose should be specified.)

- Keep the wound clean and dry.
- The stitches will dissolve by themselves and do not have to be removed. (Note: This instruction must be modified if nonabsorbable suture, such as silk, is used.)
- Remember routine follow-up dates and times.
- Keep in mind where to go for urgent care in case warning signs develop, such as fever, persistent and increasing pain in the abdomen, bleeding from the incision site, or suspected pregnancy.

(Sample written postoperative instructions are provided in Appendix E.)

5 Anesthesia

Guiding Principles

In general, the aim of anesthesia is to reduce the client's anxiety and her perception of and experience of pain to allow performance of a surgical procedure. As such, it is particularly important in minilaparotomy, as this is an ambulatory procedure often performed under local anesthesia, with or without sedation.

In selecting the anesthesia regimen, providers should consider the following:

- The regimens chosen must be within the providers' technical capabilities.
- Drugs chosen should be safe, affordable, readily available, and in constant supply.
- Regimens must be comfortable for the client.
- In most cases, the type and frequency of likely complications must be manageable at the facility.
- Local protocols for anesthesia management are followed.

Because clients are usually awake during properly administered local anesthesia, the following are basic components of successful management of anesthesia for minilaparotomy procedures:

- Prior provision of information to clients on what to expect during the procedure
- Communication with, and support of, clients before, during, and after the surgery
- Gentle and precise surgical technique
- Adequate local anesthesia and, if used, appropriate sedation and analgesia

Preoperative Assessment

The preoperative assessment is usually performed before the procedure is scheduled (see Chapter 4). However, on the day of the surgery, the surgeon should confirm that the client still is a suitable candidate for the procedure to be done under local anesthesia, with or without sedation.

Types of Anesthesia

General, regional, or local anesthesia can be used for female sterilization procedures. Each of these broad categories of anesthesia has certain advantages and disadvantages, as well as risks and benefits. Selection of an anesthesia regimen will be determined by multiple factors, including the surgical approach, the skills of the surgeon, the availability of an anesthesiologist, the client's safety and comfort, the client's preference (in some instances), the availability of equipment and drugs, the site's emergency management capability, and local policies and protocols (WHO, 1992).

Although general and regional anesthesia can be used safely and effectively for minilaparotomy, the number of unexpected and life-threatening complications related to general or regional anesthesia is higher than the number associated with local anesthesia (WHO, 1992). Thus, general and regional anesthesia should be used only in settings that are properly equipped and staffed to provide such anesthesia and to handle emergencies.

General anesthesia may be indicated for a procedure that is expected to be difficult (e.g., such as when obesity, surgical scars, or other such problems are present). In instances in which a regional anesthetic regimen has already been given (e.g., a postpartum client with a continuous epidural), the surgeon should use that anesthetic regimen to perform the minilaparotomy procedure.

Local anesthesia has proven to be the most appropriate anesthesia for minilaparotomy and has allowed health institutions to provide sterilization services safely in many settings, including those with limited resources. Local anesthesia is considerably less expensive than general anesthesia, given the equipment and the level of training and of emergency management preparedness required for general anesthesia.

This guide discusses minilaparotomy with local anesthesia, with and without sedation. (Local anesthesia with sedation combines the local infiltration of anesthesia with the administration of systemic sedation and analgesics.) This technique is safe and cost-effective, and is associated with a significantly lower risk for complications than is general or regional anesthesia (WHO, 1992).

Local anesthesia:

- Facilitates access to female sterilization
- Is less risky
- Allows for faster recovery
- Promotes gentle surgery

Preparing the Client for Anesthesia

Since anxiety can contribute to acute pain, members of the surgical team should communicate with the client before, during, and after the procedure, to help her relax and feel comfortable. She should be told in simple language what to expect before each part of the procedure happens, as well as what is being done as it happens. It is *especially* important to communicate with the client during actions that can cause more discomfort, such as:

- Administering any injectable drugs
- Inserting and manipulating the uterine elevator (during suprapubic procedures)
- Administering the local anesthetic
- Opening the peritoneum
- Grasping and manipulating the fallopian tubes

Medications for Minilaparotomy under Local Anesthesia with Sedation

Preoperative interviews and explanations of anesthesia techniques diminish the level of preoperative anxiety (Egbert et al., 1963; Leigh, Walker, & Janaganathan, 1977). Providing this information in a standardized way during the counseling process and the preoperative assessment reduces the need for sedatives and other drugs (e.g., analgesics) and thus allows a procedure to be performed under local anesthesia alone or with light sedation.

Minilaparotomy can be performed under local anesthesia alone through an appropriately performed field block, while maintaining communication with the client. However, preoperative medications can be used to decrease fear and anxiety, as well as to sedate clients and increase their comfort. Preoperative medications and supplemental sedation can induce analgesia, prevent postoperative nausea and vomiting, and induce amnesia (World Federation, 1988). Depending on the drug, either oral or intramuscular administration is safer than intravenous administration, since the time to onset

is slower and the peak blood levels of the drugs are lower. Also, light sedation is preferable to heavy sedation, as the latter requires additional recovery time, closer client monitoring, and greater back-up capability.

Under light sedation, the client is fully responsive, appears awake, and is able to converse coherently but will sleep lightly if unstimulated. In contrast, under heavy sedation, it is difficult for the client to converse and she will easily fall into a deep sleep if unstimulated (WHO, 1992).

Oral medications should be given 30 to 60 minutes before the client enters the operating theater. Intramuscular (IM) and intravenous (IV) medications should be reserved for use in the operating theater, as this is the safest place for them to be administered. However, most medications used as premedication can be given outside the operating theater if the client is closely monitored.

HINT: Ideally, preoperative intravenous medication should be administered in the operating theater by a client monitor who is trained and qualified to give these medications and to monitor the client.

Preoperative medications. Atropine is used to decrease oral secretions, to prevent or to treat a slowed heartbeat (bradycardia) and to decrease the possibility of vasovagal syncope or cardiac arrest. The usual dosage is 0.6 mg, given intramuscularly or intravenously.

In ambulatory surgery, nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen or paracetamol or diclofenac can be used before the surgery begins, to help reduce uterine cramping, to decrease postsurgical pain, and to shorten recovery time (Chauvin, 2003).

Sedation. The anxiolytic, sedative, light muscle-relaxant, and amnesic effects produced in the client by sedation regimens allow surgery to be performed under local anesthesia without difficulty. Benzodiazepines (e.g., midazolam and diazepam) and some phenothiazine tranquilizers (e.g., promethazine) are used to decrease anxiety and to induce sedation. Most narcotic analgesics have sedative properties as well, but they primarily reduce pain. Table 5 shows recommended dosages for several sedatives, as well as their typical routes of administration.

TABLE 5. Drugs used for sedation and analgesia, and recommended dosages and routes

Drug	Dosing	Route
Midazolam	*Premedication:* 2.5 to 10 mg (0.05 to 0.2 mg/kg)	IM
	Conscious sedation: 0.5 to 5 mg (0.025 to 0.1 mg/kg)	IV
Diazepam	*Premedication or sedation:* 2 to 10 mg (0.05 to 0.2 mg/kg)	PO, IM, slow IV
Promethazine	*Premedication:* 12.5 to 50 mg	IV/IM (deep), PO
Fentanyl	*Premedication:* 25 to 100 μg (0.7 to 2 μg)	IV/IM
	Analgesia: 25 to 100 μg (0.7 to 2 μg)	IV/IM
Pentazocine	*Analgesia:* 30 mg	IM
Meperidine (pethidine)	*Analgesia:* 25 to 100 mg (0.5 to 2 mg/kg)	Slow IV
Nalbuphine	*Analgesia:* 5 to 10 mg (0.1 to 0.3 mg/kg)	IM/IV
Ketamine	*Sedation/analgesia:* 0.5 to 1 mg/kg 2.5 to 5 mg/kg	 IV IM/rectal
	Anesthesia induction: 1 to 2.5 mg/kg	IV

Notes: IV = intravenous; IM = intramuscular; PO = by mouth.
Adapted from: Omoigui, 1999; Barash et al., 2001.

Analgesia. Narcotic analgesics (e.g., pentazocine, fentanyl, meperidine, or nalbuphine) primarily reduce pain and are used to complement local anesthesia agents. They are administered in the operating theater. Table 5 shows recommended dosages for a variety of analgesic medications, as well as their typical routes of administration.

In some rare situations, it may be necessary to administer general anesthesia, often in the following cases:

- An extremely obese client
- An anxious, noncooperative client
- A client with a history of allergy to drugs used for local anesthesia
- A difficult case in which it is necessary to put the client to sleep

Ketamine is a rapid-acting dissociative anesthetic that has been found to be safe and effective for managing these situations; the recommended dosage is shown in Table 5. If the use of ketamine is required, a sedative

dose of diazepam should be administered if the client has *not* already received one.

Techniques for Local Anesthesia

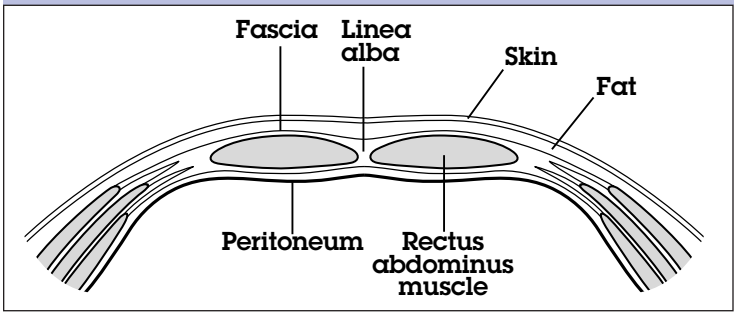
The goal of local anesthesia is to achieve an anesthetic field block that penetrates all layers of the abdominal wall, from the skin to the peritoneum. The three layers most sensitive to pain are the skin, the rectus fascia, and the peritoneum (Fig. 7). Each of these layers should be carefully infiltrated with local anesthetic. Additionally, dripping anesthetic over the fallopian tubes reinforces the effect of the anesthesia, as it decreases pain resulting from the manipulation of the tubes and also reduces postsurgical pain. There are two options for performing the anesthetic block: the fan-shape technique or the diamond-shape technique. Both techniques are described in detail on pages 33 to 37.

Lidocaine is the recommended local anesthetic, for the following reasons:

- It is widely known.
- It is available worldwide.
- It is inexpensive.
- Most providers know how to use it safely.

The recommended concentration is 1% lidocaine *without epinephrine*. There are two reasons why epinephrine (adrenaline) is not recommended: First, the vasoconstriction caused by epinephrine may mask bleeding in small blood vessels (it is best to detect and control all bleeding during surgery to prevent forma-

FIGURE 7. Cross-section of the layers of the abdominal wall



tion of hematomas); additionally, epinephrine is dangerous if accidentally injected intravascularly.

In general, *lower-concentration* preparations of lidocaine (0.5% to 1%) are preferred, since they provide the *same amount* of anesthetic in a greater volume; this facilitates infiltration of all layers of the abdominal wall and improves the anesthetic effect.

The usual dose for local infiltration is 4.5 mg/kg (2 mg/lb) of body weight. In general, *Physicians' Desk Reference* recommends that the maximum total dose not exceed 300 mg (Medical Economics, 2003). For this reason, the use of a lower concentration of anesthetic is safer and allows for a better and larger field block.

HINT: Solutions of 2% lidocaine must be diluted to 1% solution using normal saline or sterile water for injection.

The onset of action of lidocaine without epinephrine is typically three to five minutes, and the anesthetic effect lasts for up to 45 minutes. The variability of the anesthetic's effect depends on the area where it is injected: In general, absorption by muscle is greater than is absorption by skin, and in both of these two layers absorption is greater than is absorption by subcutaneous tissue. The absorption of anesthetic by the peritoneum is high; it is similar to the absorption of an IV injection.

HINT: The primary goal of local anesthesia is pain reduction through the proper administration of an anesthetic so as to obtain an appropriate field block. Sedation or administration of analgesics should *not* be used to compensate for inadequate local anesthesia. Preoperative medications can be used to increase clients' comfort and decrease their pain and anxiety.

Infiltration Techniques

Two techniques can be used to deliver local anesthesia for minilaparotomy: the fan-shape technique and the diamond-shape technique. Use of the two techniques

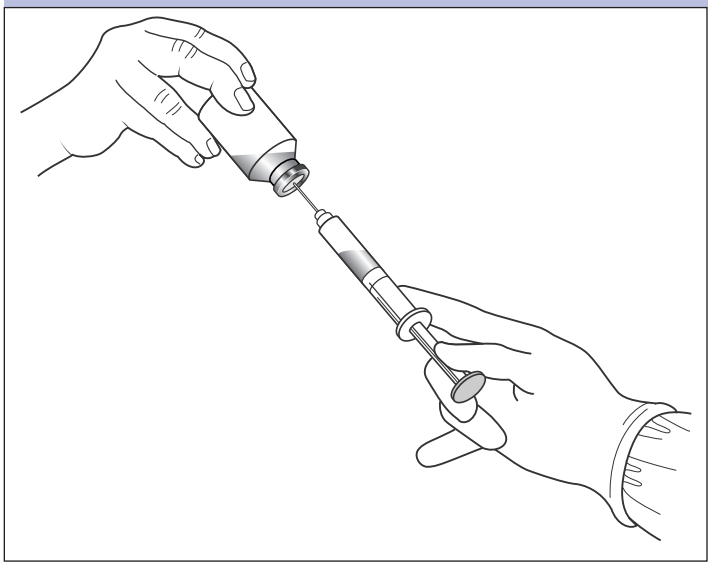
varies as a result of the training received by the surgeon. The relative efficacy of these techniques has not been compared, and both techniques are acceptable.

Using aseptic technique, draw 15 to 20 cc of 1% lidocaine without epinephrine into a 20-cc syringe. The recommended needle gauge is 21, which minimizes the time needed to draw up the anesthetic and to create a field block. The recommended needle length is 1.5 in., so the anesthesia can be applied along the entire length of the incision in one attempt.

The client monitor should clean the vial top using aseptic technique (wiping the top of the vial with a fresh cotton swab soaked with 60% to 70% alcohol and allowing it to dry). Then, the client monitor holds the vial while the surgeon or surgical assistant draws up the anesthetic solution (Fig. 8).

ALTERNATIVE: In facilities with few operating theater personnel or with many clients, the number of steps needed to provide the anesthetic solution to the surgeon may have to be reduced. In such instances, have the vial immersed in a chemical solution for high-level disinfection (e.g., in solutions containing glutaraldehyde) and then have the surgical assistant handle the vial and draw up the anesthetic.

FIGURE 8. Drawing the local anesthetic from the vial (held by the circulating nurse)



Infiltration: Fan-Shape Technique

Tell the client that her skin will now be anesthetized to reduce pain. Tell her that she may feel the initial sharp pain "prick" of the needle and a burning sensation while the anesthesia is injected.

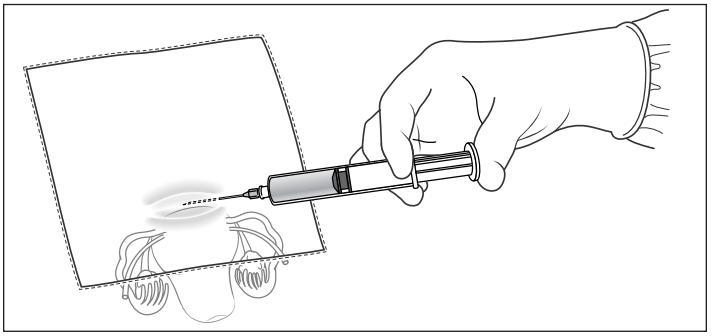
At one end of the planned incision site, introduce the needle through the skin, inserting the entire needle into the intradermal tissue and horizontally beneath the skin along the complete length of the planned incision site.

Once the needle is completely introduced, and before anesthetic is injected, gently aspirate it to ensure that the needle has not entered a blood vessel.

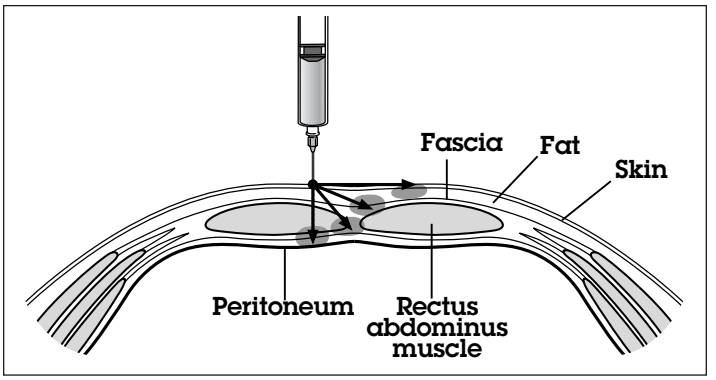
Inject the 1% lidocaine without epinephrine along the planned incision line while slowly withdrawing the needle until the tip is at the site of entry (Fig. 9a). The total injection volume should be about 3 cc.

FIGURE 9. Field block using the fan-shape technique

(a) Skin infiltration



(b) Infiltration of the different layers



PITFALL: A common pitfall is failing to administer enough anesthetic at the needle's entry point.

Repeat the preceding step at 30°, 60°, and 90° angles relative to the skin (Fig. 9b, page 33), *thus creating a fan shape.* This will ensure that all abdominal wall layers are anesthetized, down to the peritoneal layer. In each step, the local anesthetic is infiltrated along the needle track as the needle is withdrawn. The needle should be withdrawn slowly, while 2 to 3 cc lidocaine is injected in each layer.

HINT: It is not necessary to pull the needle out of the skin when reorienting the angle. Simply pull back until only the tip remains in the skin, and reintroduce the needle.

The result of using the fan-shape technique is that each layer (skin, fascia, muscles, and peritoneum) is anesthetized for the full length of the incisional area (3 to 5 cm for suprapubic procedures and 2 to 3 cm for subumbilical procedures). Achieving an appropriate field block of local anesthesia usually requires at least 10 to 12 cc of 1% lidocaine.

Wait at least two minutes for the anesthetic to take effect, and then test its effectiveness by pricking the area with a needle or a surgical dissecting forceps. If the client feels the prick, wait one to two minutes more. Test again and administer more local anesthetic, as needed (typically one-fourth of the initial dose).

HINT: Gently massaging the area being anesthetized will help spread anesthetic into the tissue (AVSC International, 1995).

Reserve the remaining lidocaine in the syringe to drip over the peritoneum, tubes, and mesosalpinx later in the procedure and to administer in the abdominal layers, as needed.

HINT: One of the most important steps in the local anesthesia regimen is to wait for the anesthetic to be absorbed and to take effect. Lidocaine without epinephrine requires at least two minutes to take effect.

Infiltration: Diamond-Shape Technique

Tell the client that her skin will now be anesthetized to reduce pain. Tell her that she may feel the initial sharp pain "prick" of the needle and a burning sensation while the anesthesia is injected.

Introduce the needle through the skin at the midline of the incision site and advance the needle into the intradermal tissue, first to one side of the planned incision site (Fig. 10a, page 36). Advance the full length of the needle (1.5 in.) without releasing any of the anesthetic. Gently aspirate it to ensure that the needle has not entered a blood vessel.

PITFALL: A common pitfall is failing to administer enough anesthetic at the needle's entry point.

Withdraw the syringe while slowly injecting 1 to 1.5 cc of 1% lidocaine without epinephrine into the tissue, until the tip of the needle is at the site of skin entry. Repeat this step three times, injecting lidocaine into the tissue horizontally toward the other side of the planned incision and then in the direction of the client's head and of the client's feet (Fig. 10b, page 36), thereby creating a *diamond shape.* A total of 4 to 6 cc should be injected into the skin layer.

Infiltrate the fascial layer, following the same steps as above. Repeat the same four-direction infiltration, but at a 45° angle relative to the skin (Fig. 10c, page 36). Always aspirate first.

Infiltrate the peritoneal layer by introducing the needle into the center of the planned incision site at a 90° angle to the peritoneum and injecting about 4 cc of lidocaine. Be sure to appropriately infiltrate the peritoneum (Fig. 10c).

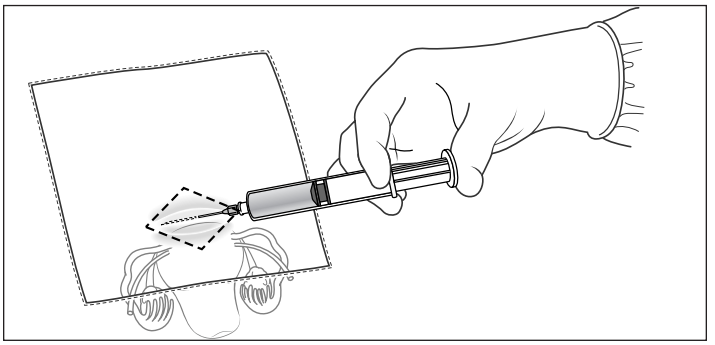
HINT: It is not necessary to pull the needle out of the skin when reorienting the angle. Simply pull back until only the tip remains in the skin, and reintroduce the needle.

Achieving an appropriate field block of local anesthesia usually requires at least 12 to 15 cc of 1% lidocaine without epinephrine.

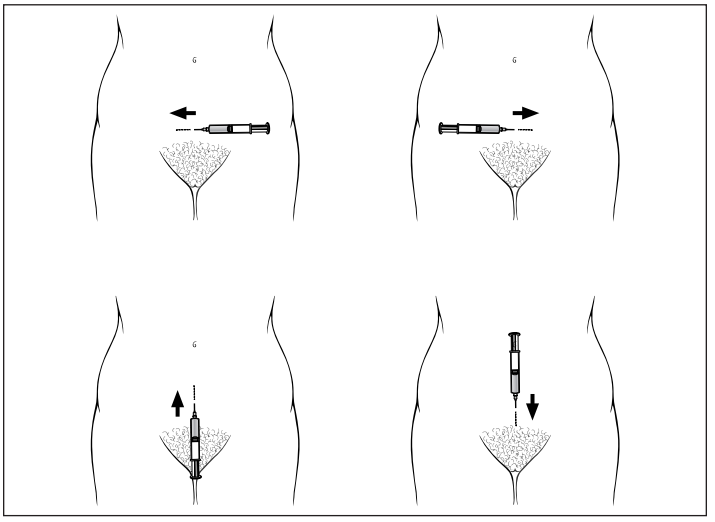
Wait at least two minutes for the anesthetic to take effect, and then test its effectiveness by pricking the

FIGURE 10. Field block using the diamond-shape technique

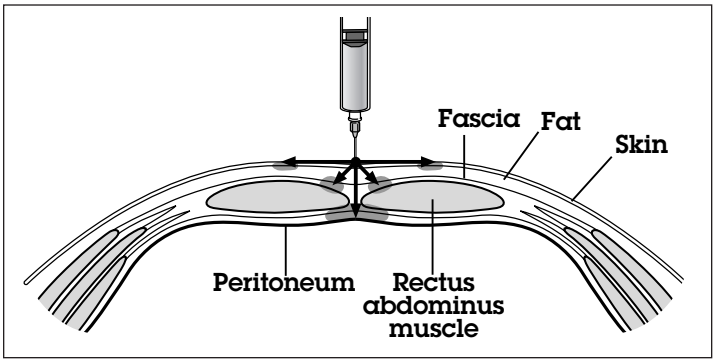
(a) Entry of the needle at the incision site



(b) Skin infiltration



(c) Infiltration of the different layers



area with a needle or a surgical dissecting forceps. If the client feels the prick, wait one to two minutes more. Test again and administer more local anesthetic, as needed (typically one-fourth of the initial dose).

HINT: Gently massaging the area being anesthetized will help spread anesthetic into the tissue (AVSC International, 1995).

Reserve the remaining lidocaine in the syringe to drip over the peritoneum, tubes, and mesosalpinx later in the procedure and to administer in the abdominal layers, as needed.

HINT: Regardless of the infiltration technique selected for a subumbilical procedure, be aware that the abdominal wall may be thin, and take care not to inject anesthetic too deeply.

Client Monitoring

As in any abdominal surgery, client monitoring is essential. It is of special importance during the use of local anesthesia, especially if sedatives and analgesics are also used, as the drugs may cause respiratory depression, cardiovascular depression, hypersensitivity reactions, or central nervous system toxicity. Monitoring enables the surgical team to detect these problems early and to respond before complications progress and become difficult to manage.

Client monitoring consists of observing and recording the client's vital signs—respiratory rate, pulse, and blood pressure. *Vital signs should be taken every five minutes*. Engaging the client in conversation distracts the client and helps reduce her anxiety. The client monitor is responsible for conducting this function.

HINT: Engaging the client in conversation is a *key* form of monitoring and an important component of local anesthesia; the ability to talk is a good sign that the client is in satisfactory condition.

6 Preoperative Preparation

Several tasks need to be taken care of, both before a client enters the operating theater and, once the client is in the operating theater, before starting the surgery. Most are related to ensuring infection prevention and making readily available everything that will be needed during the surgery.

Preparation of the Operating Theater

The operating theater should be cleaned and set up before the client enters.

- Decontamination solution (0.5% chlorine), freshly made on the day of the surgery, should be placed in containers in the operating theater.
- Appropriately processed and sterilized instrument kits should be opened and arranged on the instrument table by the surgical assistant, who should be scrubbed, gowned, and gloved.
- Supplies and drugs needed for the surgery should be readily and handily available (Appendix A).
- Equipment and drugs for emergency management should be readily and handily available (Appendix F).

Aseptic Technique

Aseptic technique refers to practices that help reduce clients' risk for procedure-related infection. Each surgical procedure must be done using aseptic technique. Because minilaparotomy is an ambulatory procedure and the client is likely to leave the facility relatively soon after the procedure, careful attention to asepsis is critical.*

Aseptic technique includes:

- Use of barriers to infection (i.e., surgical attire)
- Surgical scrub and gloving

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* More information on aseptic technique can be found in EngenderHealth's *Infection Prevention: A Reference Booklet for Health Care Providers* (EngenderHealth, 2001).

- Client preparation
- Establishment and maintenance of a sterile field
- Use of good surgical technique

Surgical attire and surgical scrub and gloving. The minilaparotomy team should wear appropriate operating theater clothing, including head cover and mask. The surgeon and surgical assistant must both perform a surgical scrub and must wear surgical gowns and surgical gloves. Abdominal procedures require either sterile or high-level disinfected gloves on surgically scrubbed hands.

Client Preparation

Proper client preparation before a surgical procedure is critical, since bacteria from a client's skin or mucous membranes can cause infection. This includes:

- Washing the operating area with soap and water. The client can do this at home (for interval clients), or the surgical team can do this in the operating theater.
- Providing the client with a surgical gown (or, if the availability of surgical gowns is limited, requesting the client to bring a clean garment, as culturally appropriate)
- Applying antiseptic solutions

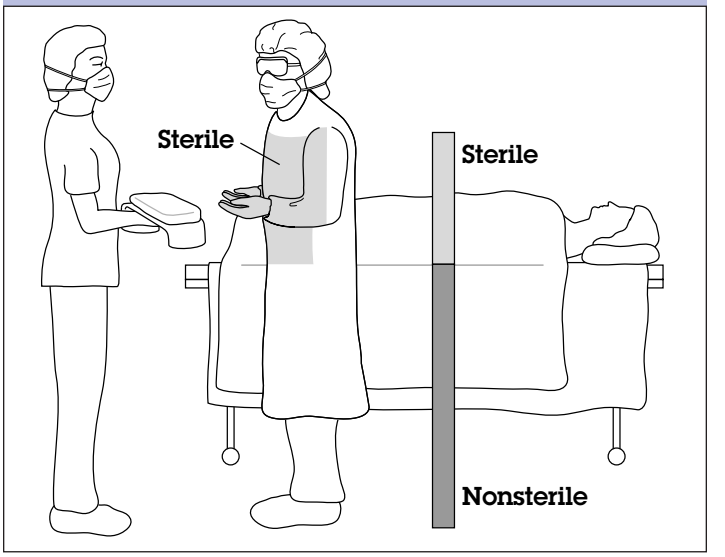
Preferred antiseptics for preparation of the skin and vagina

- Iodophors, such as povidone iodine (e.g., Betadine)
- Chlorhexidine gluconate (e.g., Hibiclens, Hibitane, or Hibiscrub)

Source: Liu et al., 1999.

Shaving the surgical site for the purpose of performing the procedure is *not* recommended, since it produces small nicks and breaks in the skin where bacteria can grow and multiply, and thus increases the risk for post-procedure infection. If hair around the surgical area is obstructing the operative area, it should be clipped while the client lies on the table (EngenderHealth, 2002).

FIGURE 11. The sterile field



Establishing and Maintaining a Sterile Field

A sterile field around the incision is established by applying antiseptic solutions to the abdominal area and by placing surgical drapes around the surgical field (EngenderHealth, 2001). The sterile field includes all sterile drapes, the front of the sterile gowns worn by the surgical team (from waist to neck, and from fingertips to elbow) (Fig. 11), and the instrument tray. Maintenance of the sterile field is the responsibility of *the entire surgical team (scrubbed and unscrubbed)* and consists of ensuring that only sterile items come into contact with the sterile field and that any contamination is immediately rectified.

Although any member of the team can perform skin preparation, draping can be performed *only* by those who are *scrubbed, gowned, and gloved.* Because draping is easier if two people participate, the surgeon and surgical assistant usually perform it together. The use of a single fenestrated drape facilitates establishment of the sterile field.

To maintain a sterile field:

- Allow only sterile items and personnel within the sterile field.
- Work only within the limits of the sterile field.

- Do not contaminate items when opening, dispensing, or transferring them.
- Consider any sterile item that has been penetrated (cut, wet, or torn) to be nonsterile.
- Never set up a sterile field near a door or an open window.
- When in doubt as to whether an item is still sterile, consider it to be contaminated.

Operating in the Era of HIV

The following are recommendations for preventing transmission of HIV infection and for decreasing risks for surgeons and operating theater staff (Rayburn & Schwartz, 1996):

- Use two gloves or thicker gloves
- Use a clear plastic face shield
- Use scissors instead of a scalpel, whenever possible
- Transfer sharp instruments by placing them in a tray or basin, or by handing them properly (inversed needle and scalpel) to the assistant
- Use retractors and instruments, not hands or fingers
- Reposition the needle with surgical forceps
- Provide counterpressure with an instrument, not with your hands or fingers
- Cut off the needle from the suture before tying knots
- Put the needle in the needle holder without touching it

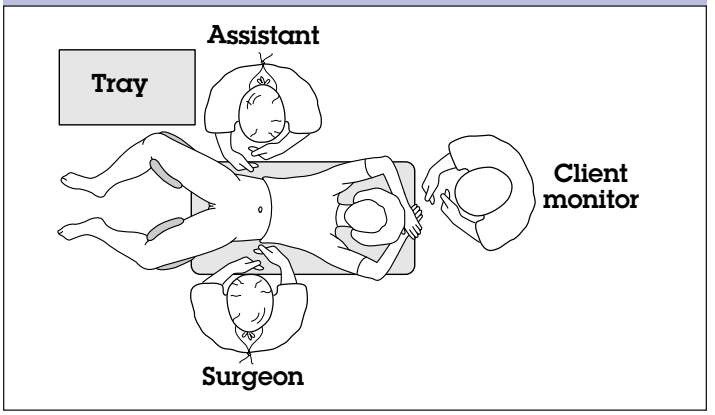
Good Surgical Technique

Meticulous attention to bleeding and gentle handling of tissue during surgery can help reduce the risk of infection. Postprocedure infections are most likely to occur when tissues have been damaged through rough handling or excessive manipulation during surgery or when there is excessive bleeding.

Positioning of the Team

It has been observed that to facilitate the surgery, a right-handed surgeon should stand on the left side of the client, which allows for easier manipulation of the uterine elevator in the suprapubic procedure and easier access to the tube (Fig. 12). Conversely, a left-handed surgeon should stand on the right side of the client.

FIGURE 12. Positioning of the surgical team



7 Surgical Approach to the Tubes: Suprapubic Minilaparotomy

This chapter covers the evaluation and preparation of a client undergoing a suprapubic minilaparotomy procedure. It also includes the steps for inserting the uterine elevator, entering the abdomen, and delivering the tubes. (Occluding the tubes and closing the abdomen are described in Chapters 9 and 10.) The descriptions that follow include all of the major steps of the procedure, most of which are performed by the surgeon, with support from the surgical assistant.

The suprapubic procedure is appropriate for clients at any time in their menstrual cycle. This procedure is also appropriate for most postabortion clients and for clients who are 28 or more days postpartum (i.e., once the uterus is fully involuted). The suprapubic incision is made 2 to 3 cm above the symphysis pubis. The transverse incision is widely used and is the one described here.

Evaluation of the Client

Although the preoperative assessment has already been conducted, be sure to perform the following steps before surgery:

- Review the client's medical history and physical exam results from the medical record.
- Verify the client's informed decision and consent by asking if she still wants the procedure and why she wants it.
- Check the client's vital signs.
- Confirm by history and by reexamination the absence of pregnancy, infection, or any other conditions that could require delaying the procedure.

HINT: If a client is being assessed for the first time, evaluation (including a pelvic exam) should be done before the client enters the

operating theater. If the surgeon finds a condition that warrants additional caution, this needs to be discussed with the client, as the surgery should be rescheduled to a later date, after the condition is addressed and rectified. In such situations, temporary contraceptive methods should be provided, if needed.

Client Preparation Just before Entering the Operating Theater

After the client has been evaluated and the decision has been made to proceed with surgery, prepare the client before she enters the operating theater, as follows:

- Verify that the client understands the most important steps of the procedure (e.g., what local anesthesia means, what she might feel at various times, and that she may be asked to "assist" during the procedure by taking a deep breath).
- Provide a surgical gown for the client and give her a private place in which to change. A client's modesty should be preserved, so if a surgical gown is not likely to be available for the client, she should be told to bring a clean garment (as culturally appropriate), which will help her preserve some modesty and also will help keep her warm.
- Ask the client to empty her bladder.

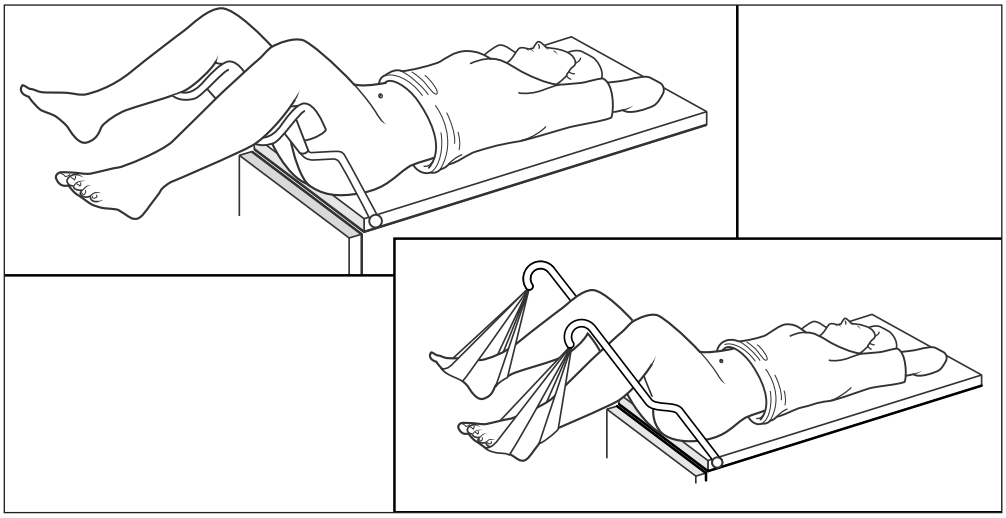
PITFALL: A full bladder increases the risk of injury during abdominal entry; therefore, immediately before the procedure, the client's bladder should be emptied. The safest, most effective way to ensure an empty bladder is to ask the client to urinate immediately before she enters the operating theater. Routine use of the Foley or Nelaton catheter should be discouraged, since it may raise the risk of infection (Liu et al., 1999). A catheter should be used only if, once the client is on the operating table, palpation or visualization suggests that the bladder is full.

Positioning the Client

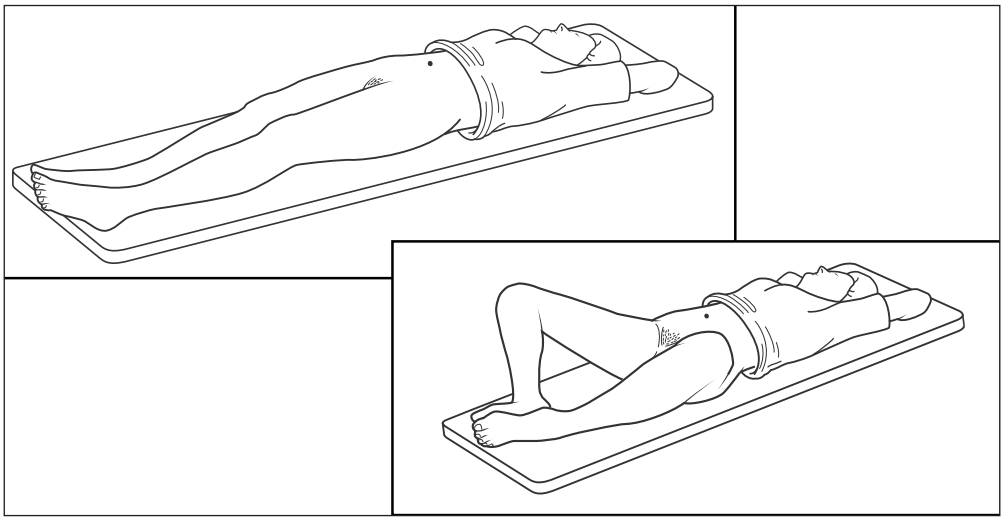
Escort the client into the operating theater and help her onto the surgical table. Positioning the client for a suprapubic procedure should involve considerations of both client comfort and ease of access to the surgical area. Since access to the fallopian tubes is facilitated through the use of the uterine elevator, the most common positions used are the dorsal lithotomy position (Fig. 13a) and the dorsal supine position (Fig. 13b). (The inset to Fig. 13a shows a common alternative for leg support in the dorsal lithotomy position.)

FIGURE 13. Positioning the client for suprapubic minilaparotomy

(a) Dorsal lithotomy position



(b) Dorsal supine position



ALTERNATIVE: Although most surgeons report that the dorsal lithotomy position allows for better control of the uterine elevator, some surgeons consider the dorsal supine position to be more comfortable for the client. In such a case, the client's legs should be put into the frog-leg position when the uterine elevator is inserted (shown in the inset to Fig. 13b). Once the uterine elevator is inserted, the client's legs should be put into the supine position.

Inserting the Uterine Elevator

The uterine elevator (Figure 2, top) helps the surgeon manipulate the uterus and gain easier access to the fallopian tubes, by bringing the uterine cornual portion of the tubes to the incision site so that each tube can be directly visualized and grasped. (This will produce less discomfort for the client than will blindly grasping the tubes.) Use of the uterine elevator also permits the incision to be small.

HINT: For trainees who have not previously performed minilaparotomy, the uterine elevator allows easier access to the fallopian tubes. Guided practice is needed for the trainee to gain the skills and confidence needed to use it.

The surgeon should insert the uterine elevator. If the surgeon has not performed a pelvic exam, he or she should do so before inserting the uterine elevator, as knowing the size, shape, and direction of the uterus will help decrease the chances of uterine perforation or of difficulty in manipulating the uterine elevator. The surgeon should insert the uterine elevator prior to preparing the client's abdomen.

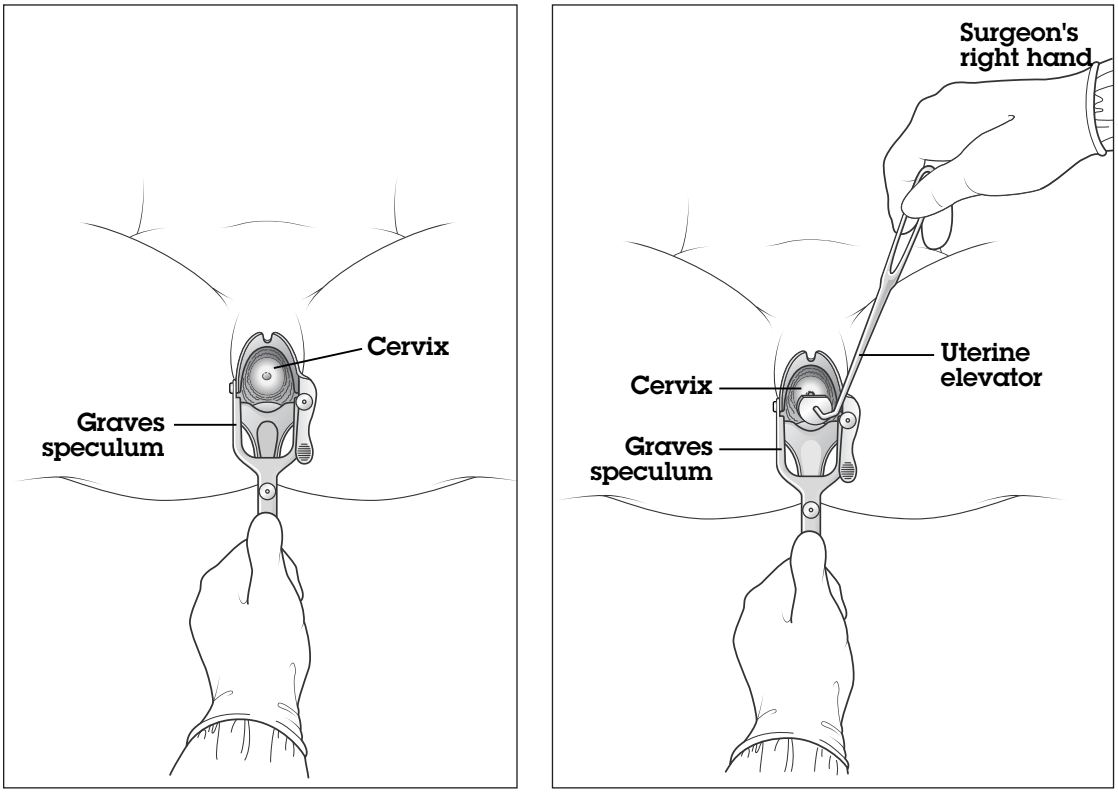
HINT: When performing a pelvic exam before the uterine elevator is inserted, the surgeon must take extra care to maintain the sterility of the gowns and the sleeves; at all times, the sterility of the intrauterine portion of the uterine elevator must be ensured.

The uterine elevator may be inserted in various ways, depending on the positioning of the client on the surgical table, the positioning of her legs, and the instruments used to open the vagina and gain access to the cervix. The use of any one of these variations

FIGURE 14. Inserting the uterine elevator

(a) Using a Graves speculum to visualize the cervix

(b) Passing the uterine elevator into the cervix without letting it touch the vaginal walls



relates to the equipment and instruments available and to the surgeon's preference, which in turn relates to his or her training and the influence of regional medical culture.

The *most widely used technique* for inserting the uterine elevator is as follows: Position the client comfortably on the surgical table in the dorsal lithotomy position. Insert the Graves vaginal speculum into the vagina to expose the cervix. Use both screws to open the two blades of the Graves speculum, to ensure optimal visualization of the cervix and to help prevent the vaginal walls from coming into contact with the intrauterine portion of the uterine elevator (Fig. 14a).

NOTE: The dorsal lithotomy position provides more room for inserting the Graves speculum. When using the dorsal supine position, the surgeon may have to place the client's legs in the frog-leg position and insert the Graves speculum upside down.

Using a sterile forceps to hold an antiseptic-soaked cotton ball or gauze sponge, generously swab the cervix and vagina with antiseptic solution (such as iodophor-based Betadine).

Without touching the vaginal walls, pass the uterine elevator through the vagina and into the cervix, up to the cervical guard (Fig. 14b). Be sure to maintain the sterility of the intrauterine portion of the elevator. Remove the speculum, taking care to keep the uterine elevator in place with one hand so it does not slip out.

Place a sterile drape on top of the handle of the uterine elevator so it can be manipulated during abdominal surgery without becoming contaminated.

ALTERNATIVE: With the client in the dorsal lithotomy position, insert a Jackson vaginal retractor to help make the cervix visible. With an antiseptic-soaked cotton ball or gauze sponge, generously swab the cervix and vagina with antiseptic solution (such as iodophor-based Betadine). Holding a cervical tenaculum horizontally, grasp the anterior lip of the cervix (Fig. 15a). (The cervical tenaculum will aid in the insertion of the uterine elevator by keeping the uterus stationary.) Ask the surgical assistant to hold the cervical tenaculum and insert the uterine elevator carefully, without touching the vaginal walls (Fig. 15b). Remove the tenaculum and remove carefully the Jackson vaginal retractor, leaving the uterine elevator in place (Fig. 15c).

Preparing the Client's Abdominal Area

Use an appropriate antiseptic solution to saturate a sterile swab (a cotton ball or gauze sponge) on a sterile sponge forceps.

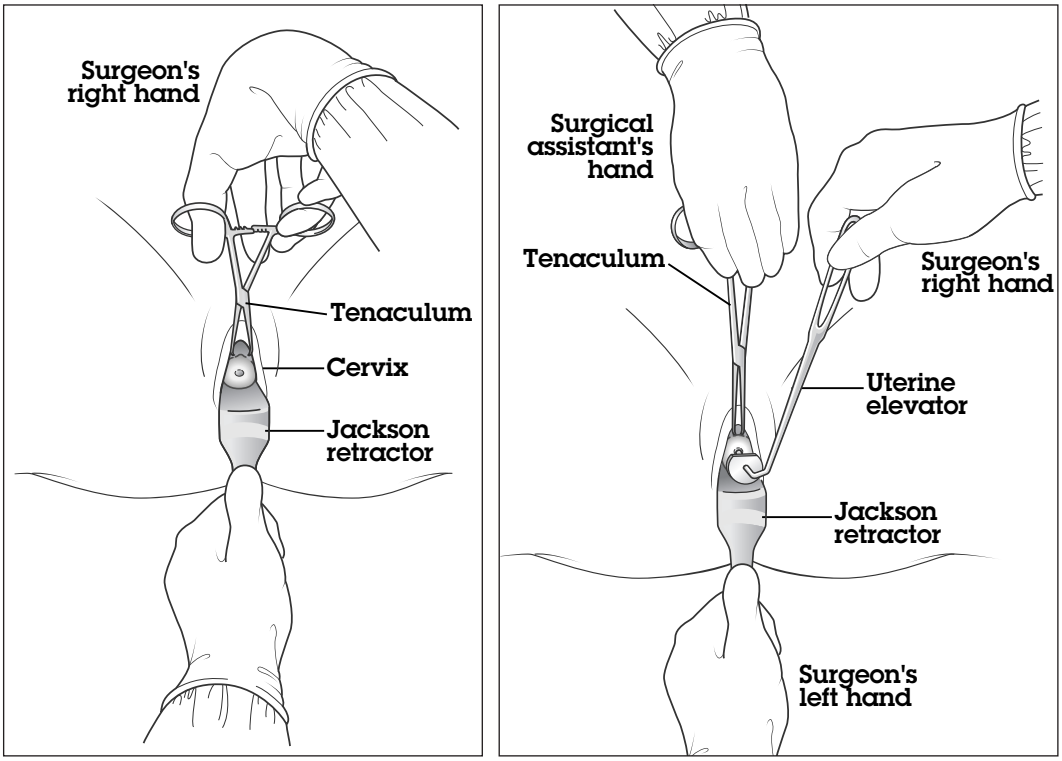
Using the soaked swab on a sponge forceps, wipe the skin, first with strokes at the site of the planned incision line and then with circular motions around the incision line, moving progressively out to the periphery (Fig. 16, page 52). Make progressively larger concentric circles from the planned incision line outward, but *do not bring the used swab back over a cleaned area.*

Upon reaching the periphery of the prepared skin, discard the swab in a waste receptacle. Swabbing should be repeated at least twice. *For suprapubic procedures, skin preparation should include the upper part of the pubis and thighs.*

FIGURE 15. An alternative method for inserting the uterine elevator using a Jackson vaginal retractor

(a) Grasping the anterior lip of the cervix

(b) Inserting the uterine elevator without letting it touch the vaginal walls



(c) Removing the Jackson vaginal retractor, holding the uterine elevator in place

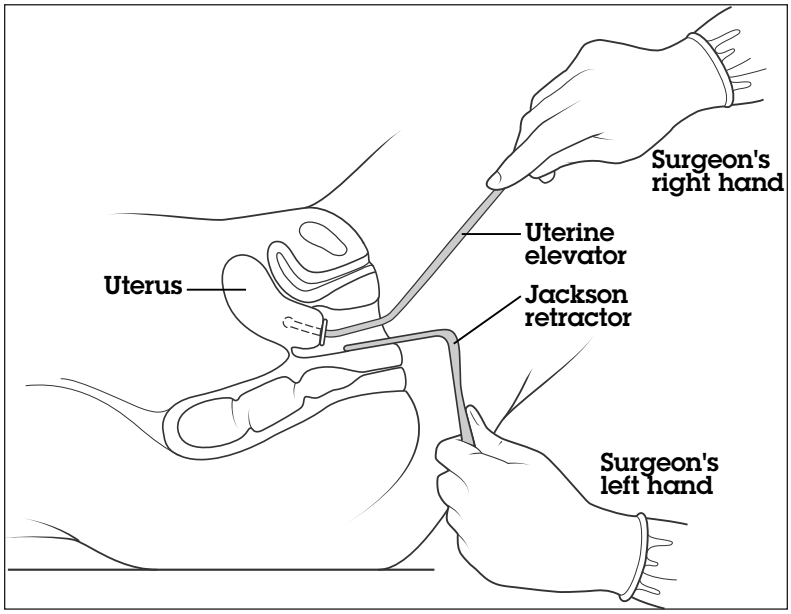
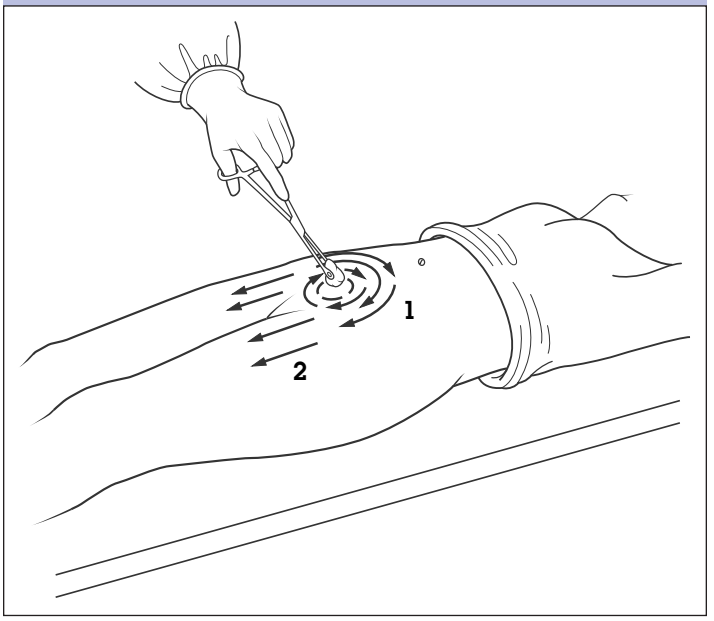
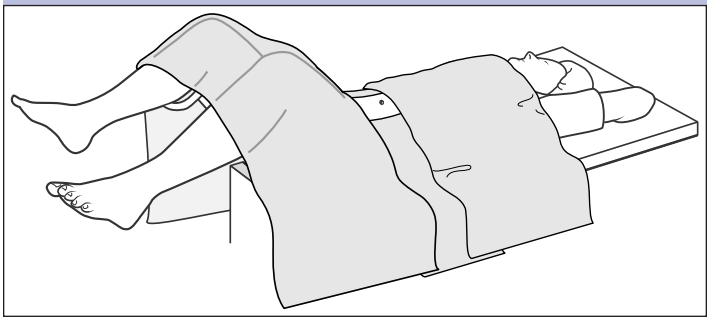


FIGURE 16. Preparing the client's abdominal area before a suprapubic mini-laparotomy



After allowing the antiseptic to dry, create a sterile field by placing sterile drape sheets (either four drapes or one fenestrated drape) around the immediate operative site. If four drapes are used, place the drapes above (to the head of the client), below (to the legs of the client), and on both sides of the operative area, and secure them in place with towel clips, as needed (Fig. 17). Once the sheets are in position, when placed at right angles they will form a sterile window.

FIGURE 17. Draping the client



At this moment, the client monitor should administer any additional pain medication (e.g., diazepam and meperidine), according to the regimen selected.

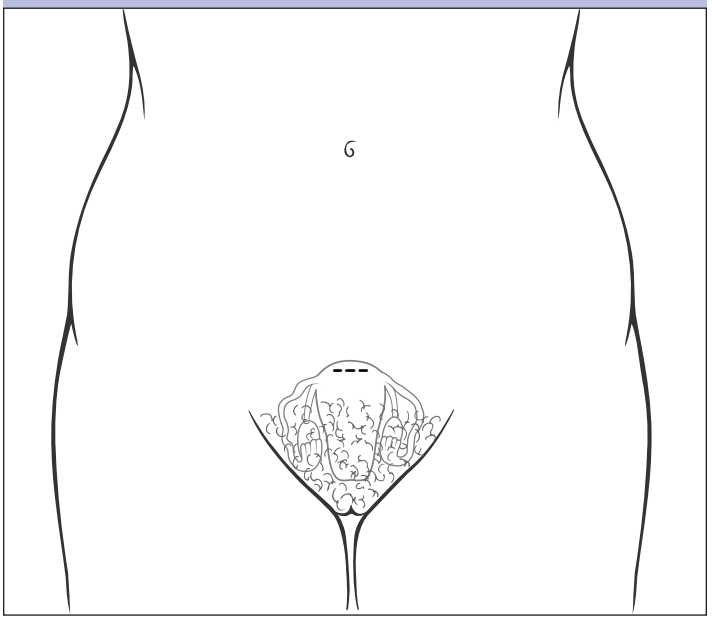
Selecting the Incision Site

Regardless of the infiltration technique used, before beginning infiltration the surgeon must select the appropriate incision site. This will ensure that the abdomen is opened in the most optimal area anatomically, one that will facilitate access to the tubes.

The best area for the suprapubic incision is 2 to 3 cm (or 1 in.) above the border of the pubis (Fig. 18). In this area, an anatomical fold at the union of the pubis and the abdominal wall is generally thinner, which facilitates the opening of the abdomen.

ALTERNATIVE: To select the incision site, lower the handle of the uterine elevator to raise the uterine fundus against the abdominal wall. The bulge appearing by sight or by palpation on the abdominal wall indicates the height of the fundus; the area to anesthetize (and thus where to make the incision) will be 1 to 2 cm below the height of the palpated fundus.

FIGURE 18. The suprapubic minilaparotomy: Incision site



PITFALL: The fundus may change position, depending on the force and direction of the pressure applied to the uterine elevator. For this reason, the uterus may seem higher than it actually is; the resulting higher-than-appropriate incision could in turn complicate access to the tubes. Further, the location of the fundus may not be obvious if the abdominal area is fatty.

Entering the Abdomen

Infiltrate the abdominal wall, following the local anesthesia infiltration technique selected (Chapter 5, pages 33 and 35). To open and enter the abdomen, the surgeon and the surgical assistant work together.

The main responsibilities of the surgeon are to:

- Incise and dissect the abdominal walls
- Access and identify the tubes
- Provide direction to the assistant on how to help

The main responsibilities of the surgical assistant are to:

- Expose the abdominal wall layers
- Hold the retractors parallel to the client's abdomen once all layers are opened
- Move the retractors as needed, to maintain the incision opening
- Actively follow the surgery and help as needed

Before incising, check for effective anesthesia block in the selected incision site by pinching the skin with a dissecting forceps.

Pull the skin taut to make an incision approximately 2 to 3 cm long, centered, above the pubic symphysis. Using a scalpel blade, **open an incision only through the epidermis** 2 to 3 cm in length (to a maximum of 5 cm) (Fig. 19). The subcutaneous tissue should not be included in the opening of the incision, as it should be dissected bluntly later.

HINT: The transverse incision is most commonly used because:

- **It heals more rapidly.**
- **It is associated with less pain during the healing process.**
- **Incidence of opening of the wound is lower.**
- **The scar that forms is less visible.**

NOTE: A vertical incision is indicated when there is an existing midline scar.

Using a Kelly forceps or the small blade of the Richardson-Eastman retractor (always working in the midline), **bluntly dissect the subcutaneous fat.** Do so gently and precisely, to minimize tissue trauma and bleeding. Control bleeding in any vessels, as needed. Dissect subcutaneous tissue until the anterior rectus fascia is visualized and exposed.

PITFALL: Use of sharp dissection increases the risk for more bleeding. Thus, sharp dissection should be avoided.

Incise the fascia transversely, using a scalpel at the center of the incision; incise the full thickness of the fascia until the rectus muscle can be seen on both

FIGURE 19. Entering the abdomen: Opening the skin

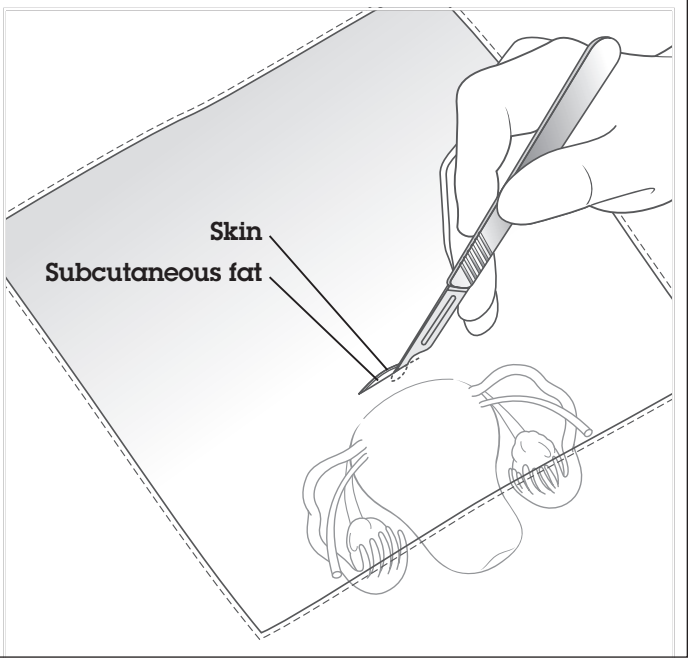
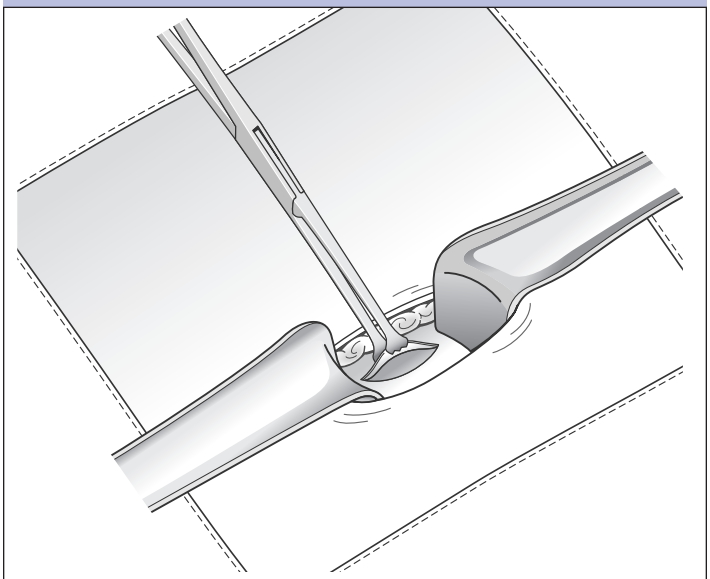
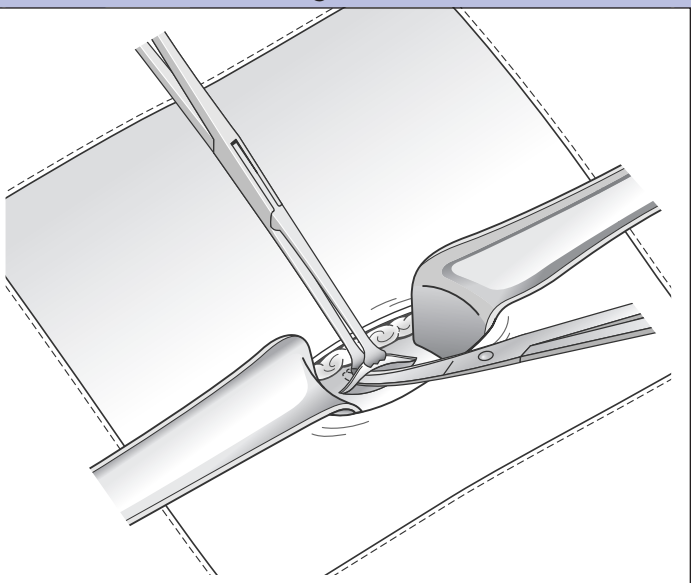


FIGURE 20. Entering the abdomen: Grasping the fascia



Note: While two Allis forceps are needed here, only one is shown in the figure, for clarity.

FIGURE 21. Entering the abdomen: Dissecting the fascia



Note: While two Allis forceps are needed here, only one is shown in the figure, for clarity.

sides of the midline. With the Allis forceps, grasp the fascia in the midline of the incision at the inferior and superior portion (Fig. 20). If necessary, free the underlying muscles from the fascia by bluntly dissecting it or by using a Mayo scissors (Fig. 21). Extend the fascial opening on both sides so that it is slightly larger than or about the same length as the skin incision. Have the surgical assistant place the retractors under the fascia and adjust them to expose the linea alba (the midline raphe of the rectus muscle) (Fig. 22). Retractors should be pulled horizontally to keep the incision open. At this time, one of the Allis forceps can be removed.

NOTE: If the incision is too low, you may first see the pyramidal muscle after opening the fascia. If so, you can separate the pyramidal muscle by dissecting it from the upper top where it adheres to the fascia (see Fig. 22, inset).

FIGURE 22. Entering the abdomen: Visualizing the muscle layers

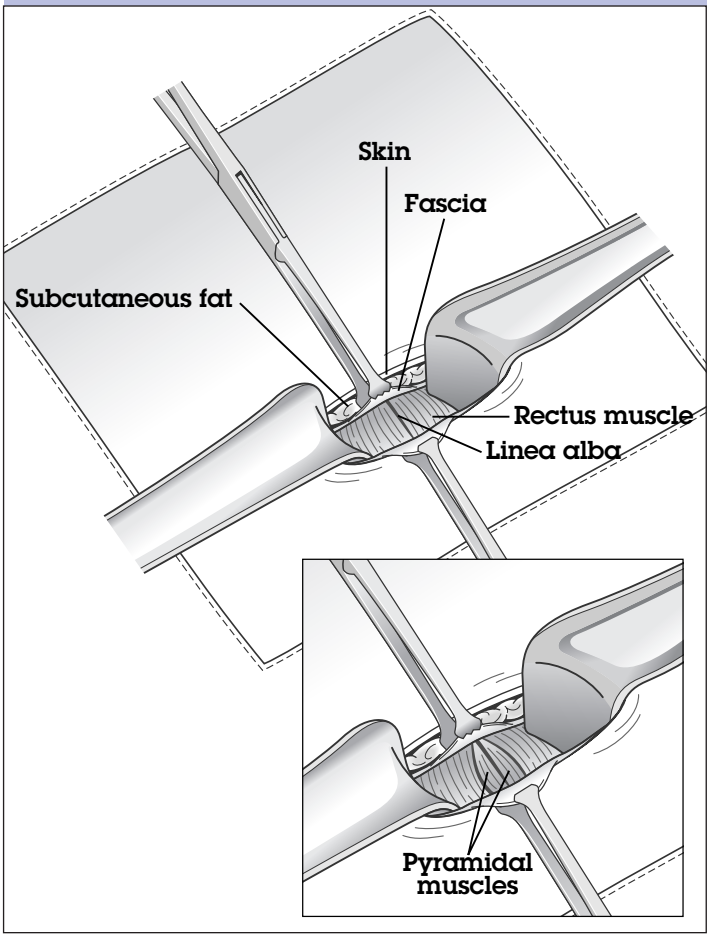
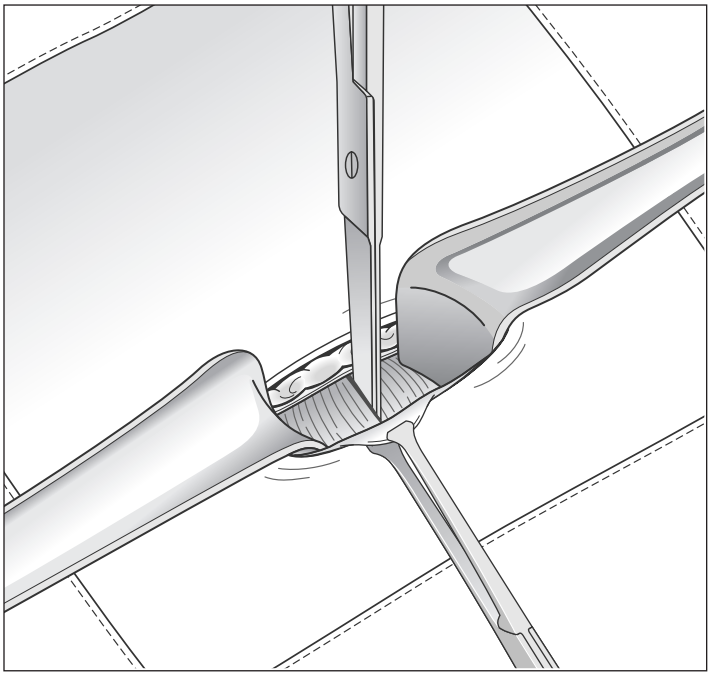


FIGURE 23. Entering the abdomen: Opening the rectus muscles

(a) Separating the rectus muscles



(b) Opening the scissors to separate the muscles

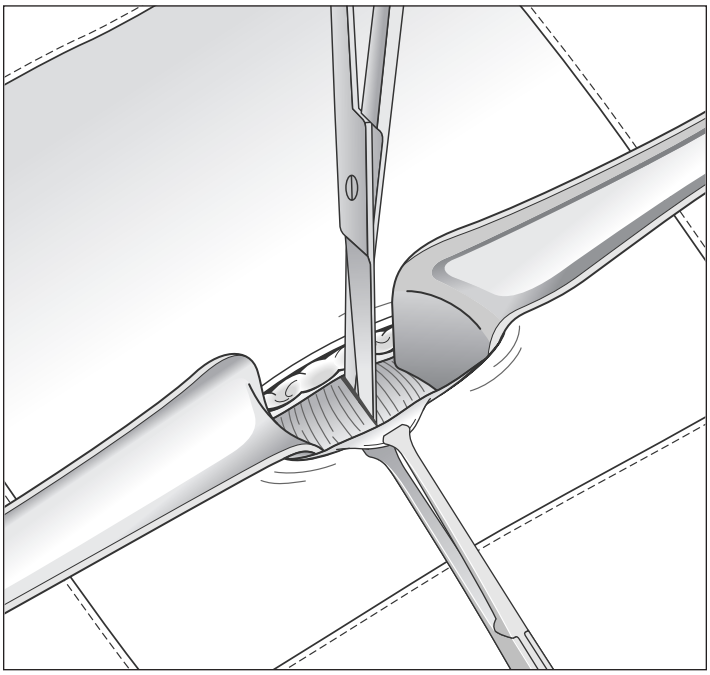
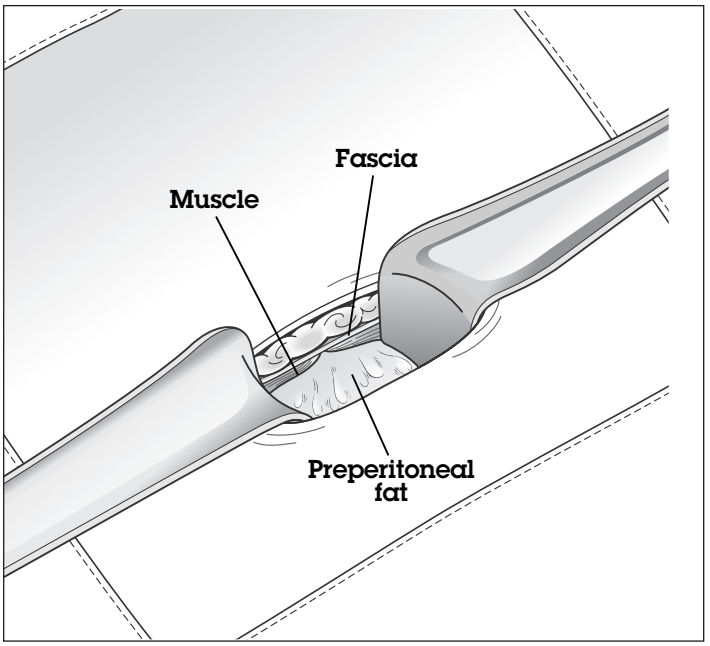


FIGURE 23. Entering the abdomen: Opening the rectus muscles (cont'd.)

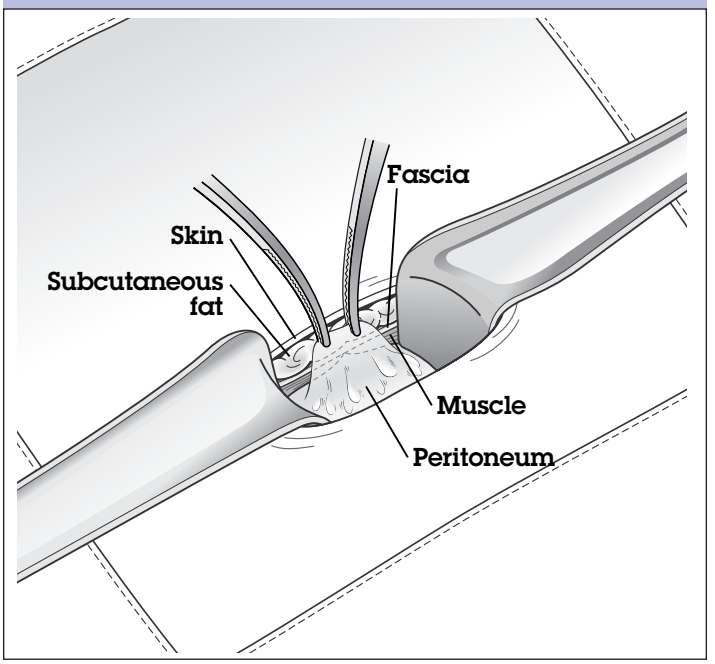
(c) Repositioning the retractors to expose the preperitoneal fat



Bluntly separate the rectus muscles vertically at the linea alba, entering through the linea alba with a closed scissors or a hemostat (Fig. 23a). Once through the linea alba, open the scissors to enlarge the opening (Fig. 23b). After the rectus muscles are separated, have the surgical assistant reposition the retractors further into the incision, to separate the rectus muscles even more and expose the preperitoneal fat (Fig. 23c).

Entry into the abdominal cavity is safer when the operating table is placed in the Trendelenburg position (with the head of the table tilted downward). This position shifts the bowels out of the operative site, thus minimizing the risk of injury. (The Trendelenburg position should be 20° or less, to avoid reducing the client's lung volume and compromising her respiratory ability.) Ideally, to minimize the amount of time the client spends in this position, a member of the surgical team (usually the client monitor) should place the client in this position just before incising the peritoneum, and should return her to the horizontal position as soon as tubal occlusion is completed.

FIGURE 24. Entering the abdomen: Grasping the peritoneum



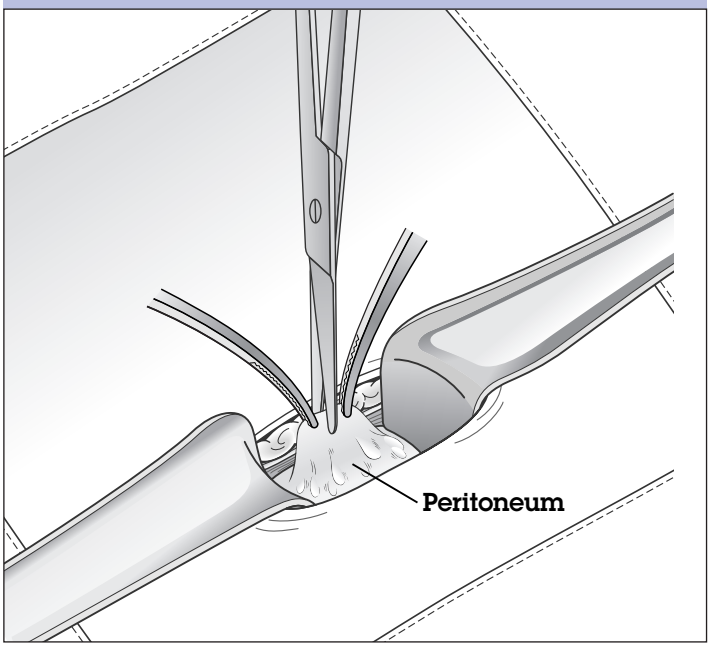
Bluntly dissect the preperitoneal fat as needed to expose the peritoneum.

PITFALL: In some clients, particularly in those who are obese, the preperitoneal fat is abundant. This can cause difficulties during the process of opening the peritoneum. It is advisable to dissect slowly, without making unnecessary cuts, and to identify the peritoneum before cutting.

HINT: You may want to use retractors for a blunt dissection of the preperitoneal fat. You may separate the peritoneum from the underlying bowels by pulling the retractors horizontally upwards. Additionally, make sure to stay in the midline as tissue is lifted and carefully dissected.

To incise the peritoneum, elevate the peritoneum by grasping it at two points with hemostats (Fig. 24). To prevent injury to underlying structures, avoid using toothed instruments. Once the peritoneum has been

FIGURE 25. Entering the abdomen: Opening the peritoneum



elevated, to protect the underlying viscera and structures from injury, check that the bowels, bladder, or omentum have not been grasped inadvertently. Once that has been ascertained, make a small opening in the peritoneum with a scissors or hemostat (Fig. 25).

HINTS FOR OPENING THE PERITONEUM SAFELY:

- **To avoid grasping the bowels along with the peritoneum, ask the client to take a deep breath before you grasp the peritoneum. (This results in the bowels being moved out of the surgical area.) Before incising it, look at or feel a fold of the grasped tissue, to confirm that it is the translucent peritoneum and that abdominal contents are not adhering to it.**
- **If you are experiencing any difficulties, it may be preferable to incise superiorly (away from the pubic bone) to avoid the bladder. Take care to avoid the bowels or bladder whenever the peritoneum is incised. Stay directly under the incision at the midline.**

- **Since the peritoneum has nerve endings, minimize pulling and tugging so as to prevent pain and vasovagal reactions (e.g., nausea, vomiting, and fainting).**

Once the peritoneum is open and entry into the abdominal cavity is confirmed, the surgical assistant should gently reposition the retractors inside the abdomen to maximally expose pelvic structures. The best position for the retractors is in the same direction as the incision—transversely.

From this point until the completion of tubal occlusion, the surgical assistant must keep the incision open with retractors and must adjust the retractors according to the surgeon's needs.

HINT: The surgical assistant must keep the retractors horizontal (i.e., parallel to the abdomen) and must simultaneously pull them up. This ensures better visibility of the abdominal cavity and minimizes the possibility of trauma to the interior abdominal wall.

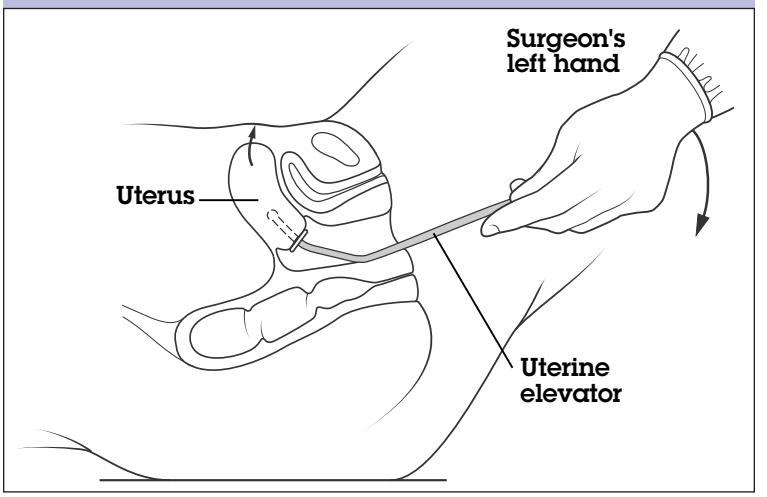
Accessing and Delivering the Fallopian Tubes

Accessing and delivering the fallopian tubes requires manipulation of the uterus and the fallopian tubes. The uterine elevator is the key instrument for moving the uterus and consequently for positioning the fallopian tubes near the incision area, which allows the surgeon to access them. The process of manipulating the uterine elevator with one hand and accessing and delivering the tubes with the other requires coordination.

NOTE: Before performing the procedure, the surgeon should use pelvic teaching models to practice controlling and manipulating the uterine elevator.

HINT: It is good practice to make a habit of always accessing the tubes in the same order—for example, by always taking the right tube first and then the left, or vice versa. This helps prevent the accidental failure to occlude one tube.

FIGURE 26. Elevating the uterus



If the table has not previously been **placed in the Trendelenburg position** (20° or less), the client monitor should do so now.

Clear a path to see the uterus and tubes. Visualization of the uterus and tubes may be obscured by the omentum or bowels. If this is the case, ask the client to take a deep breath **while you push the bowels gently out of the way with the baby Babcock forceps and manipulate the uterus** with the uterine elevator, as described in the following steps.

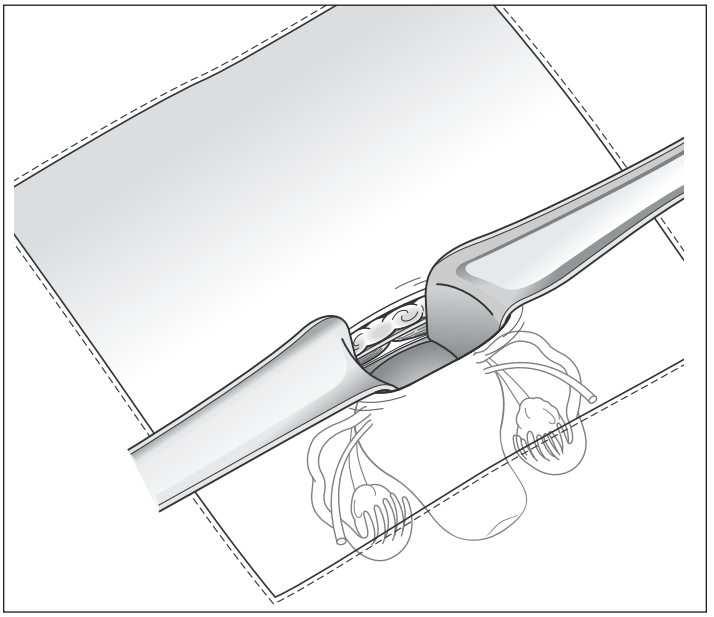
Gently press the handle of the uterine elevator downward (in the direction of the floor) with one hand (Fig. 26); this will **bring the uterine fundus upward** toward the incision site and closer to the abdominal wall (Fig. 27a, page 64).

PITFALL: Pushing the handle upward (in the direction of the client's head) can push the uterus above the incision.

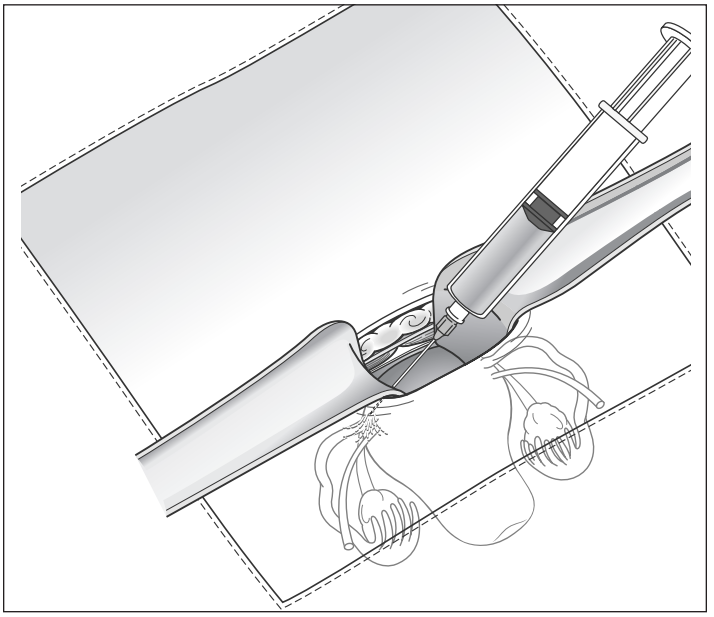
PITFALL: In certain situations, the client may be unable to assist the surgeon by taking a deep breath because she is nervous, scared, or in pain. In these cases, the surgeon *must* remain calm, should not manipulate the uterus or any other abdominal structures, and should wait for the client to relax and try again. If the client is

FIGURE 27. Viewing the fundus and anesthetizing the fallopian tubes

(a) Viewing the uterine fundus through the incision



(b) Dripping lidocaine over the tubes



still unable to do so, the table can be placed further in the Trendelenburg position. (As the angle increases, there is a risk that the client may glide; in these cases, the client should have shoulder supports.) If at this point the client remains unable to assist, provide sedation (or additional sedation).

Since the fallopian tubes have a peritoneal layer that contains nerve endings, clients often feel pain when their fallopian tubes are grasped. To prevent pain, **spray 1 to 2 cc of 1% lidocaine without epinephrine** on each fallopian tube through the incision, which the surgical assistant is holding open with retractors (Fig. 27b). Then wait 30 to 60 seconds for the anesthetic to take effect.

While directly viewing the uterine fundus, gently rotate the handle of the uterine elevator in the opposite direction of the tube being accessed, to position the tube at the incision site (Fig. 28). As a result of this maneuver, the tube should become visible and can then be grasped.

FIGURE 28. Accessing the tubes: Rotating the uterus to position the tube at the incision site

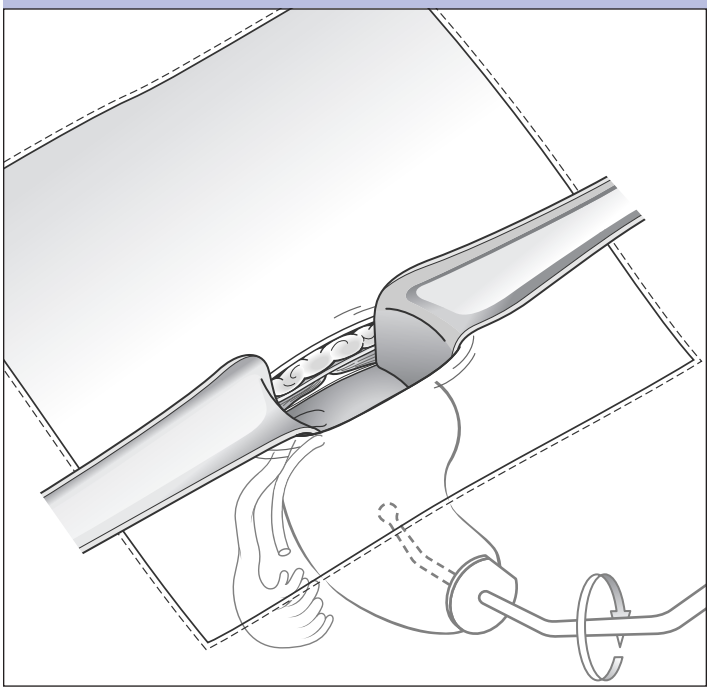
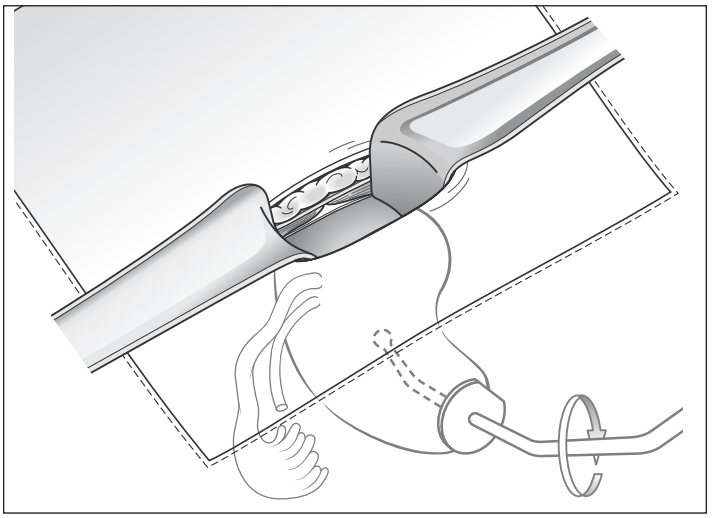
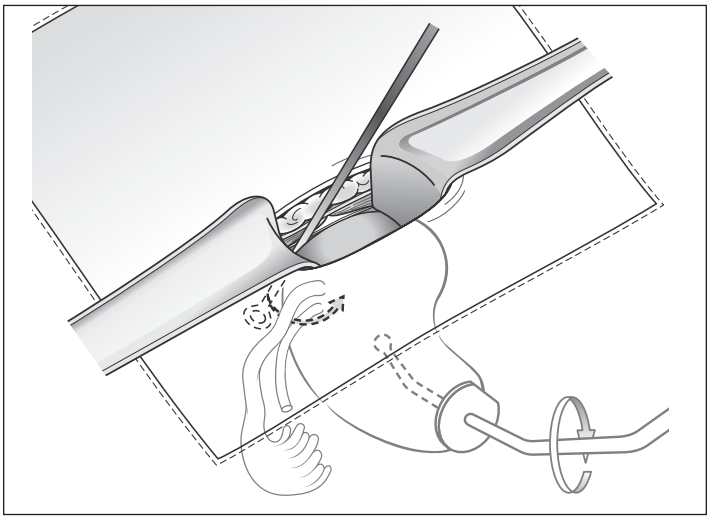


FIGURE 29. Using the tubal hook: Bringing the tube to the incision

(a) The tube cannot be visualized



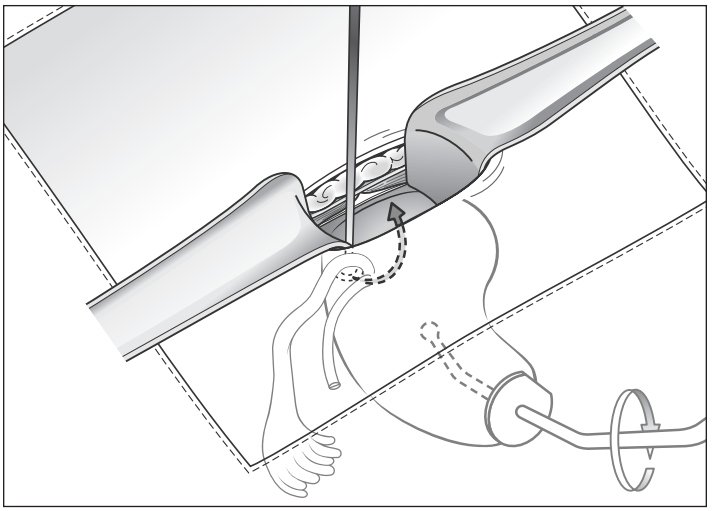
(b) The tubal hook is inserted behind the fundus and is swept around one side of the uterus



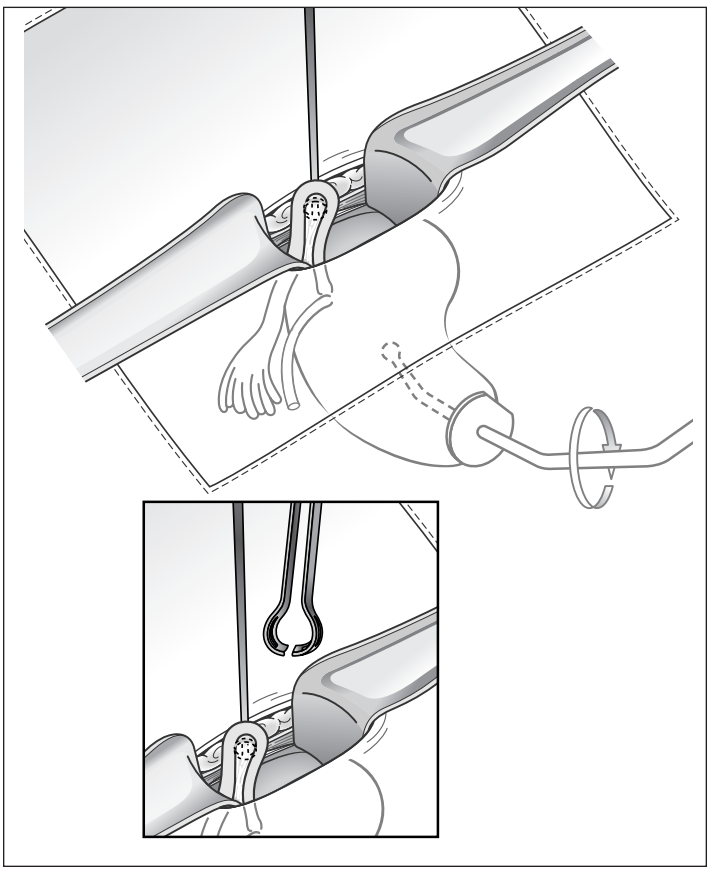
ALTERNATIVE: If the tube still cannot be visualized (Fig. 29a), use the **tubal hook** to gently bring it to the incision site. With the hand that is not on the uterine elevator, gently slide the tubal hook behind the fundus and sweep the hook around one side of the uterus toward the anterior wall (Fig. 29b) and then pull the tubal hook horizontally and out through the incision (Fig. 29c). This maneuver should hook the tube and sweep it forward (Fig. 29d). The assistant will need to hold the uterine elevator for you to grasp the tube with the baby Babcock forceps (Fig. 29d, inset).

FIGURE 29. Using the tubal hook: Bringing the tube to the incision (cont'd.)

(c) The tubal hook is pulled horizontally and out through the incision



(d) The fallopian tube is brought to the incision



Once you visualize the tube, with your free hand use a baby Babcock forceps to grasp the tube atraumatically, all the while keeping the uterine elevator in place with the other hand (Fig. 30).

Release the uterine elevator, while continuing to hold the tube with the baby Babcock forceps (Fig. 31a). **Confirm the identity of the tube** by pulling it out further (Fig. 31b), following it to the fimbriated end (using the baby Babcock forceps with one hand and a delicate dissecting forceps with the other), and pulling the tube out gently until the fimbria can be seen (Fig. 31c, page 70).

NOTE: Neglecting this important step may lead to ligation of other structures (such as the round ligament) instead of the fallopian tube, which will result in failure of the procedure.

PITFALL: If the fimbria is not visible because of adhesions, to confirm the identity of the tube the surgeon must attempt to follow the tube as far as possible and observe carefully the anatomical relations of the appendages (e.g., the round ligament, the ovarian ligament, and the ovary). When a section of the tube is removed, the surgeon should identify the lumen, to be sure that the tube—not the round ligament—has been ligated.

FIGURE 30. Grasping the tube with a baby Babcock forceps

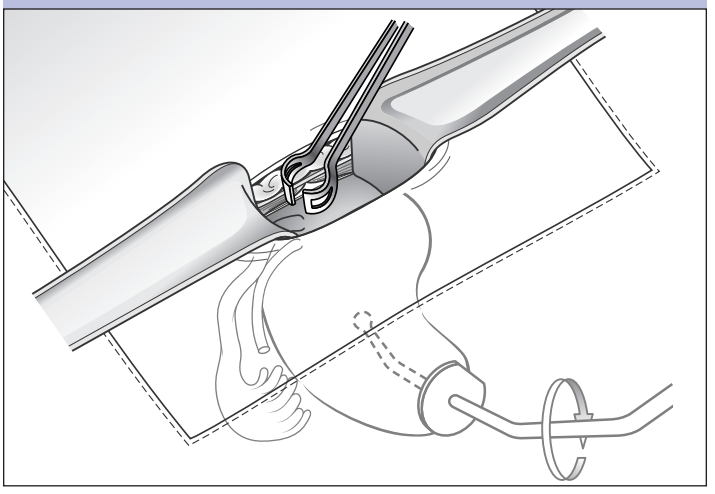
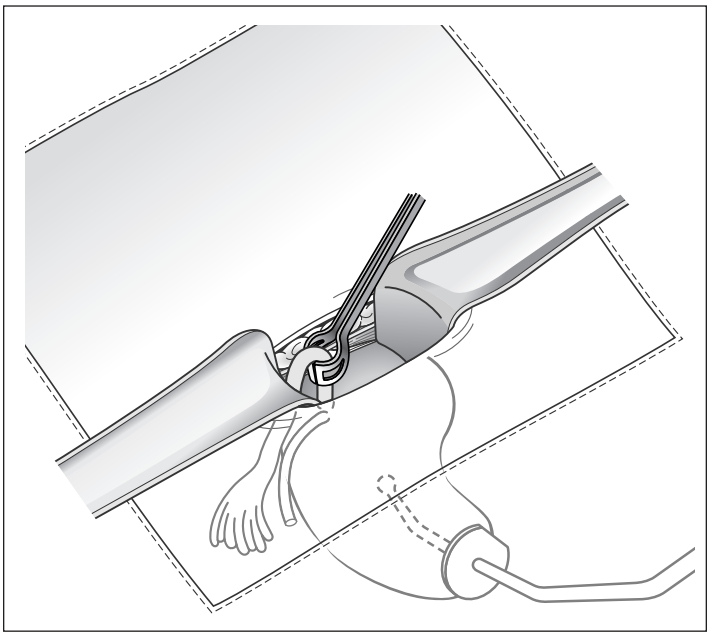


FIGURE 31. Confirming the identity of the tube

(a) Holding the tube while releasing the uterine elevator



(b) Pulling the tube further out of the incision

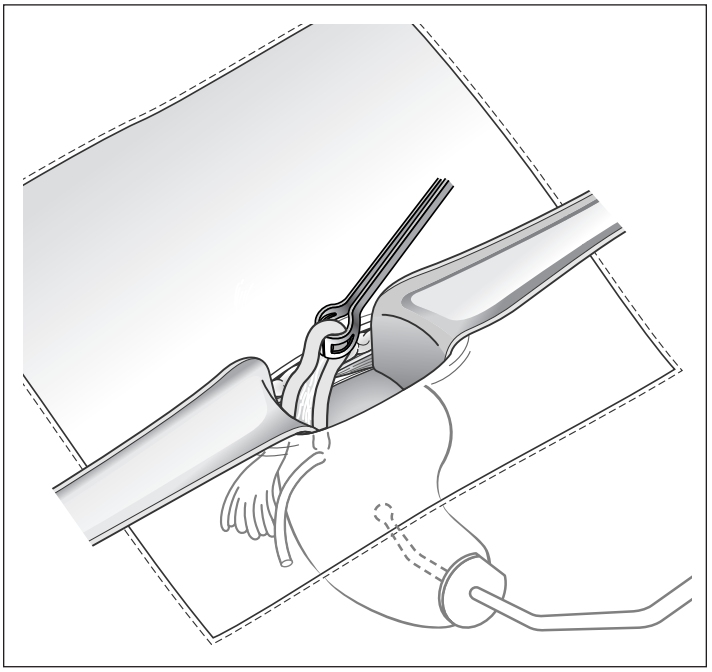
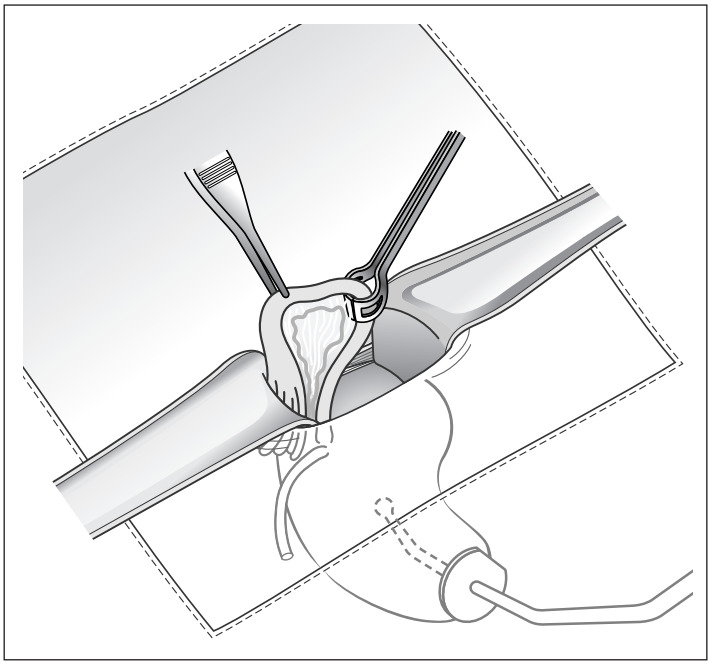


FIGURE 31. Confirming the identity of the tube (cont'd.)

(c) Visualizing the fimbrial end of the tube



At this point, you are ready to ligate the tube, as is described in Chapter 9. After the tube is ligated on one side, repeat the above steps (pages 62 to 70) on the other side to ligate the other tube.

8 Surgical Approach to the Tubes: Subumbilical Minilaparotomy

This chapter covers the evaluation and preparation of a client undergoing a subumbilical minilaparotomy procedure. It also includes the steps for entering the abdomen and delivering the tubes. (Occluding the tubes and closing the abdomen are described in Chapters 9 and 10.) The descriptions that follow include all of the major steps of the procedure, most of which are performed by the surgeon, with support from the surgical assistant.

Subumbilical minilaparotomy is used for postpartum clients; a transverse incision is usually made at the lower border of the umbilicus. The transverse incision is preferable to a vertical incision because it is easier to perform and results in a better healing process. *The uterine elevator is not used in the subumbilical procedure.*

Evaluation of the Client

Ideally, a postpartum client requesting female sterilization should have been counseled and assessed before arriving at the facility for delivery. Even so, additional counseling and an assessment of her continuing interest in and suitability for sterilization should again be performed before the client is transferred from the maternity ward to the surgical area for sterilization.

An important step is to determine the condition of the infant. In some cases, if the infant's health is unstable, the client may want to postpone the sterilization procedure, since her desire for permanent contraception may change if the infant dies or suffers from some health problem.

Additionally, confirm that the client has not consumed solid foods for six hours and fluids for two hours before surgery.

At this point, the surgeon must:

- Review the client's medical history and physical exam results from the medical record. It is important to know if the client experienced any complications during delivery that might increase the risk for complications during the sterilization procedure and that might require delaying the surgery.
- Verify the client's informed decision and consent by asking if she still wants the procedure and why she wants it.
- Perform a physical examination, if the record does not provide complete information about the client's postpartum condition.

NOTE: For postpartum clients who have not been counseled but have clearly made a prior decision to undergo permanent sterilization, informed consent should be obtained before the surgery.

Client Preparation Just before Entering the Operating Theater

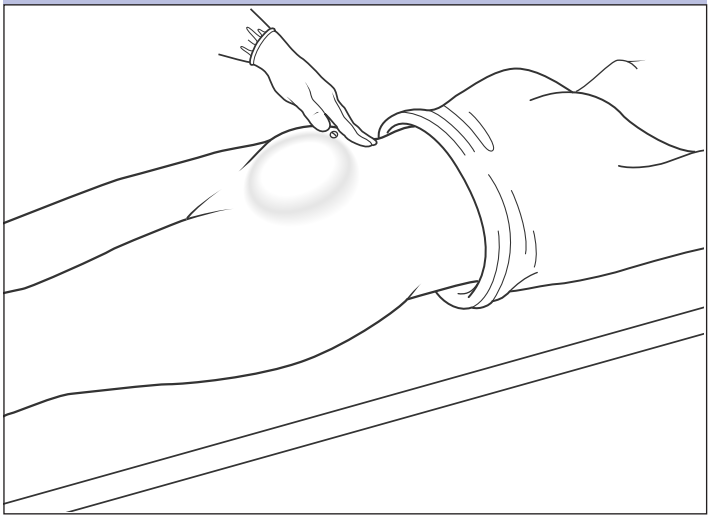
After the client has been evaluated and the decision has been made to proceed with surgery, prepare the client before she enters the operating theater, as follows:

- Verify that the client understands the most important steps of the procedure (e.g., what local anesthesia means, what she might feel at various times during the procedure, and that she may be asked to "assist" during the procedure by taking a deep breath).
- Provide a surgical gown for the client and give her a private place in which to change. A client's modesty should be preserved, so if a surgical gown is likely not available for the client, she should retain her robe, which will preserve some modesty and also will help keep her warm.
- Ask the client to empty her bladder.

Positioning the Client

Position the client for surgery in the dorsal supine position (Fig. 13a or 13b, page 47). The height of the uterine postpartum fundus should be assessed to confirm that it is close to the umbilicus (Fig. 32).

FIGURE 32. Positioning the client for subumbilical minilaparotomy: Assessing the height of the uterine fundus



Preparing the Client's Abdominal Area

Using an antiseptic-soaked swab on a sponge forceps, clean the umbilicus and throw away the swab. Take a second swab, and, starting from the subumbilical area, move progressively out from the umbilicus in circular motion (Fig. 33, page 74). Swab at least a 12-cm circumference progressively in this manner; *do not bring the used swab back over a cleaned area.* Repeat the preceding steps with a new soaked swab.

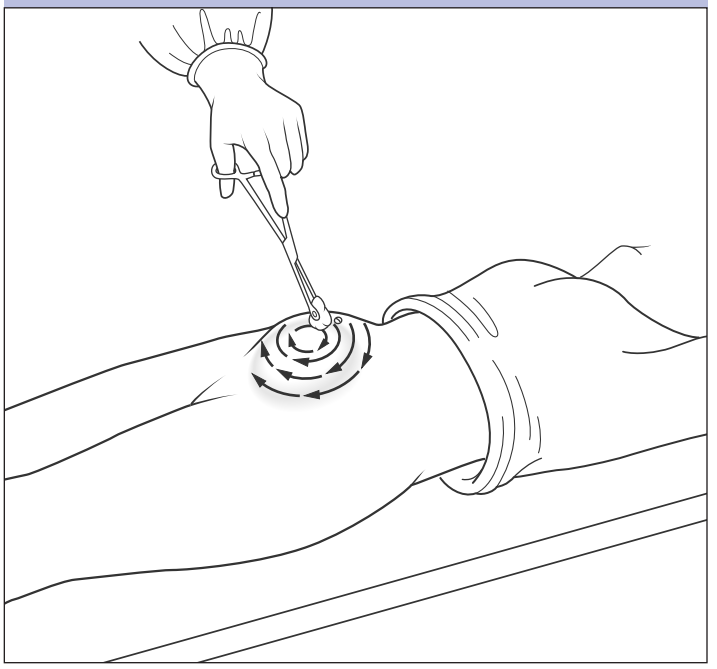
After allowing the antiseptic to dry, create a sterile field by placing sterile drape sheets (either four drapes or one fenestrated drape) around the immediate operative site. If four drapes are used, place the drapes above (to the head of the client), below (to the legs of the client), and on both sides of the operative area, and secure them in place with towel clips, as needed (Fig. 17, page 52). Once the sheets are in position, when placed at right angles they will form a sterile window.

At this moment, the client monitor should administer any additional pain medication (e.g., diazepam and meperidine), according to the regimen selected.

Selecting the Incision Site

The best area for the subumbilical incision is just beneath the umbilicus, as during the immediate postpartum period the umbilicus is not deep and lies on top of the enlarged postpartum uterine fundus. Additionally, the abdominal wall in this area is thin and flexible.

FIGURE 33. Preparing the client's abdominal area before a subumbilical mini-laparotomy



Entering the Abdomen

Infiltrate the abdominal wall, following the local anesthesia infiltration technique selected (Chapter 5, pages 33 and 35). To open and enter the abdomen, the surgeon and the surgical assistant work together.

The main responsibilities of the surgeon are to:

- Incise and dissect the abdominal wall
- Access and identify the tubes
- Provide direction to the assistant on how to help

The main responsibilities of the surgical assistant are to:

- Expose the abdominal wall layers
- Hold the retractors parallel to the client's abdomen once all layers are opened
- Move the retractors as needed, to maintain the incision opening
- Actively follow the surgery and help as needed

Before incising, check for effective anesthesia block in the selected incision site by pinching the skin with a dissecting forceps.

Make a skin incision approximately 1.5 to 3 cm long, and **open it only through the epidermis** (Fig. 34).

Using a Kelly forceps or Army-Navy retractors, **bluntly dissect the subcutaneous fat.** Do so gently and precisely, to minimize tissue trauma and bleeding. Control bleeding in any vessel, as needed. Dissect subcutaneous tissue until the fascia is visualized and exposed with retractors (Fig. 35, page 76).

PITFALL: Among postpartum women, the abdominal wall in the subumbilical area is very thin. Therefore, dissection must be performed *cautiously,* to avoid injury to underlying structures.

FIGURE 34. The subumbilical minilaparotomy: Incision site

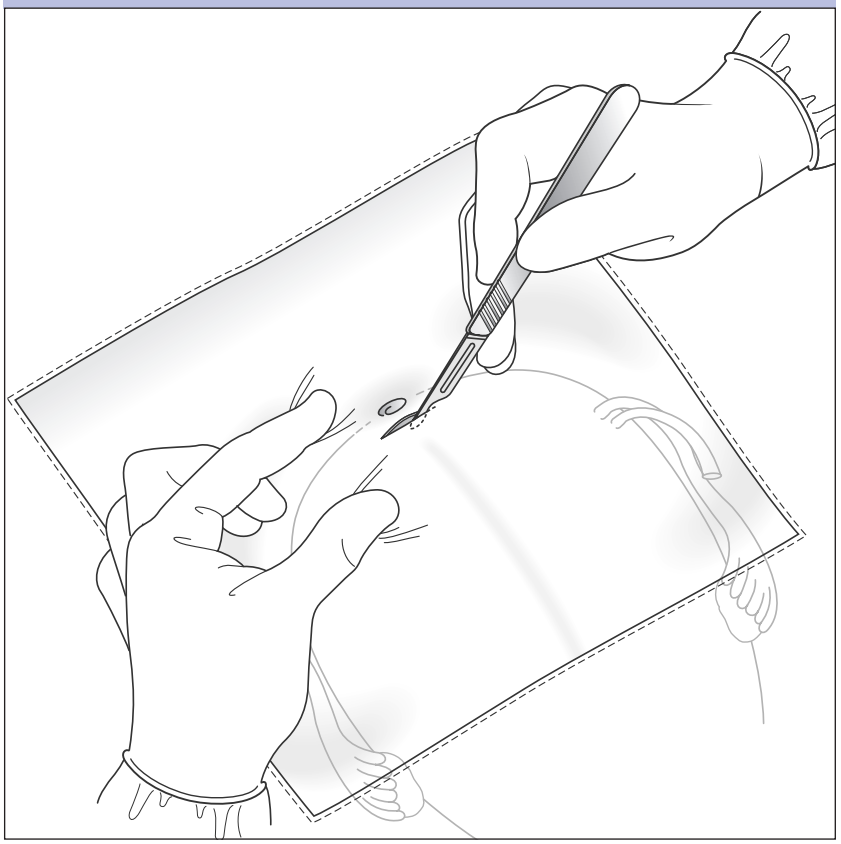


FIGURE 35. Entering the abdomen: Visualizing the fascia

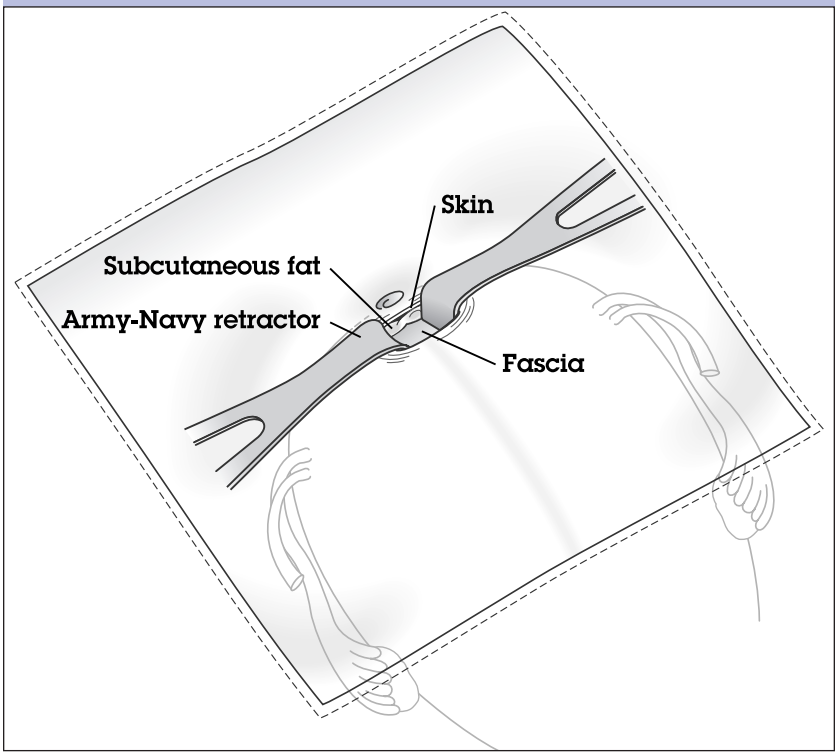


FIGURE 36. Anterior view of the layers of the abdominal wall

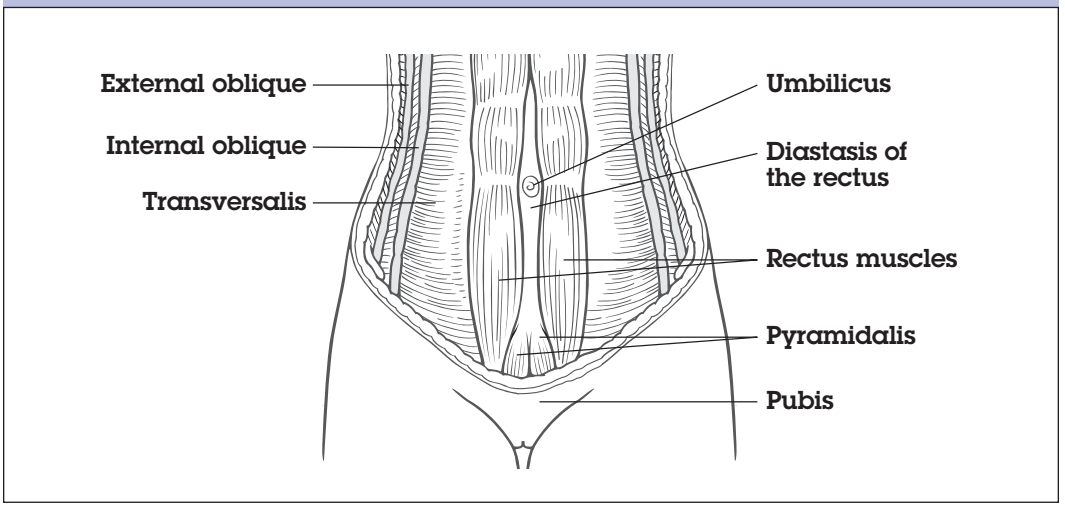
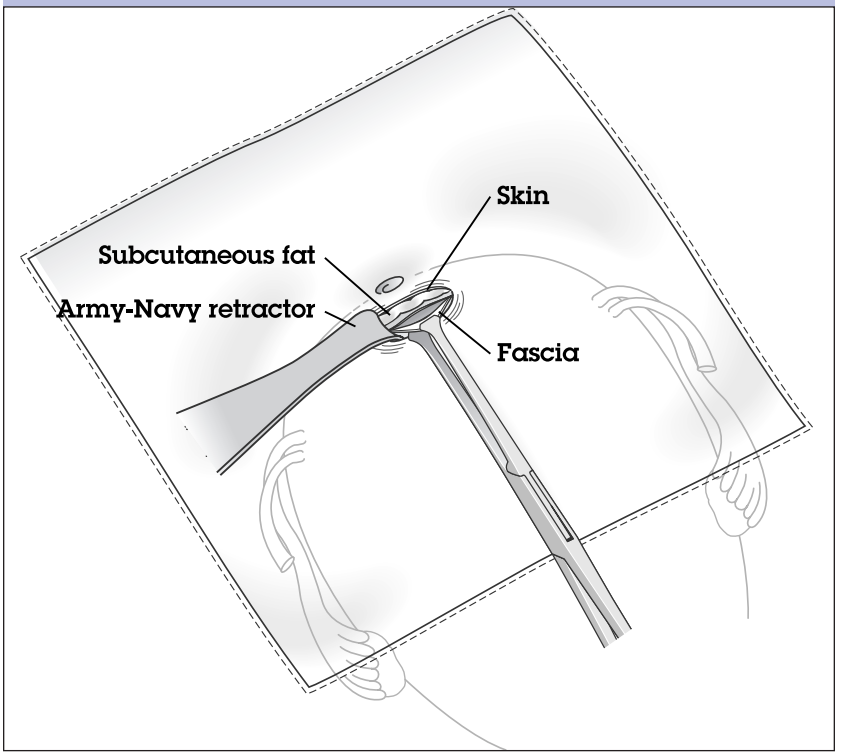


FIGURE 37. Entering the abdomen: Opening the fascia



HINT: Due to the diastasis of the rectus, there is no intervening rectus muscle under the umbilicus (Fig. 36); in postpartum clients, the fascia and peritoneum usually adhere, making them one layer. Therefore, layer-by-layer dissection usually is unnecessary, since the surgeon generally enters the abdomen immediately after incising the fascia.

To incise the fascia, place the table in a slight Trendelenburg position (20° or less), then grasp and elevate the fascia with Allis forceps in the midline of the incision at the inferior and superior portion. Using scissors, incise the fascia transversely. Extend the fascial opening slightly beyond the skin incision on both sides (Fig. 37). If you are already in the abdominal cavity, proceed to access the tubes.

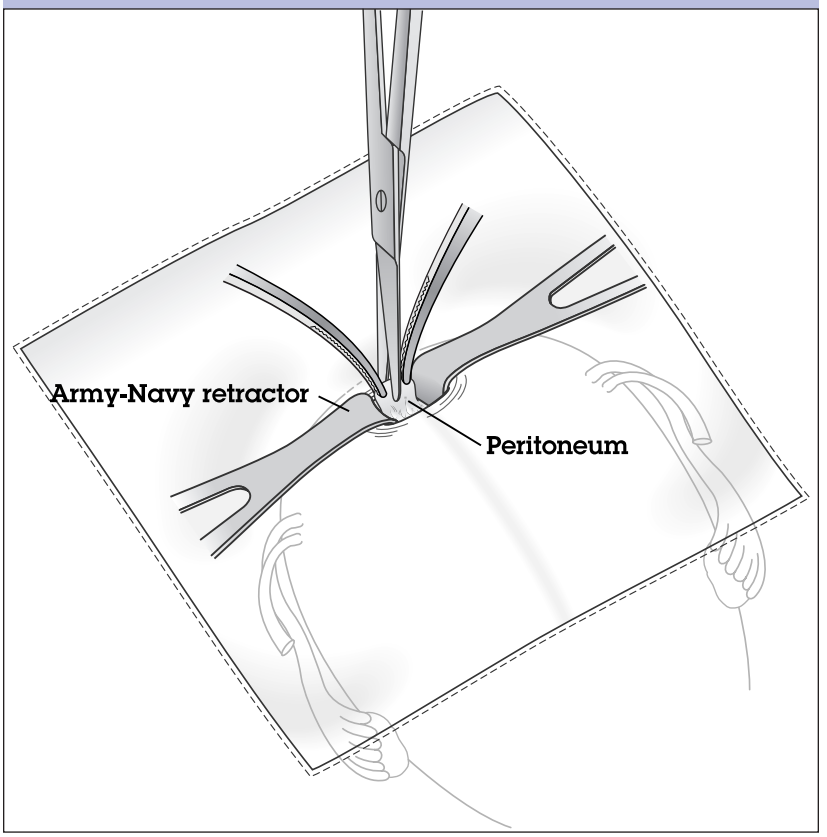
Incise the peritoneum. If the previous step did not provide entry into the abdomen, identify and elevate the peritoneum by grasping it at two points with hemo-

stats. To prevent injury to underlying structures, avoid using toothed instruments. Once the peritoneum has been elevated, to protect the underlying viscera and structures from injury, check that the bowel, bladder, or omentum has not been grasped inadvertently. Once that has been ascertained, make a small opening in the peritoneum with a scissors or hemostat (Fig. 38).

HINT: To avoid grasping the bowels along with the peritoneum, be sure to ask the client to take a deep breath before you grasp the peritoneum. Before incising it, look at or feel a fold of the grasped tissue, to confirm that it is the translucent peritoneum and that abdominal contents are not adhering to it.

Once entry into the abdominal cavity is confirmed, the surgical assistant should gently place the retractors

FIGURE 38. Entering the abdomen: Opening the peritoneum



inside the abdomen to maximally expose the uterus and tubes (Fig. 39).

PITFALL: In some clients, particularly in those who are obese, the preperitoneal fat is abundant. This can cause difficulties during the process of opening the peritoneum. It is advisable to dissect slowly, without making unnecessary cuts, and to identify the peritoneum before cutting.

From this point until the completion of tubal occlusion, the surgical assistant must keep the incision open with retractors and must adjust the retractors according to the surgeon's needs.

Accessing and Delivering the Fallopian Tubes

One of the advantages of subumbilical access to the fallopian tubes is that the skin is pliable; this allows the surgical assistant to move the incision to the sides so the tubes can be accessed in the area in which they

FIGURE 39. Using the retractors to expose the uterus and tubes

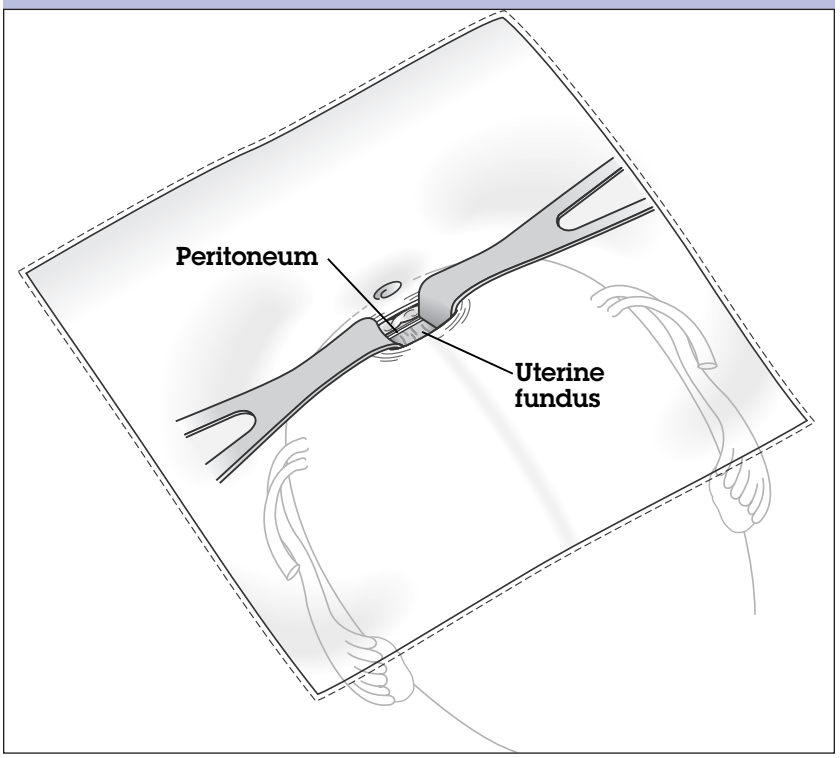
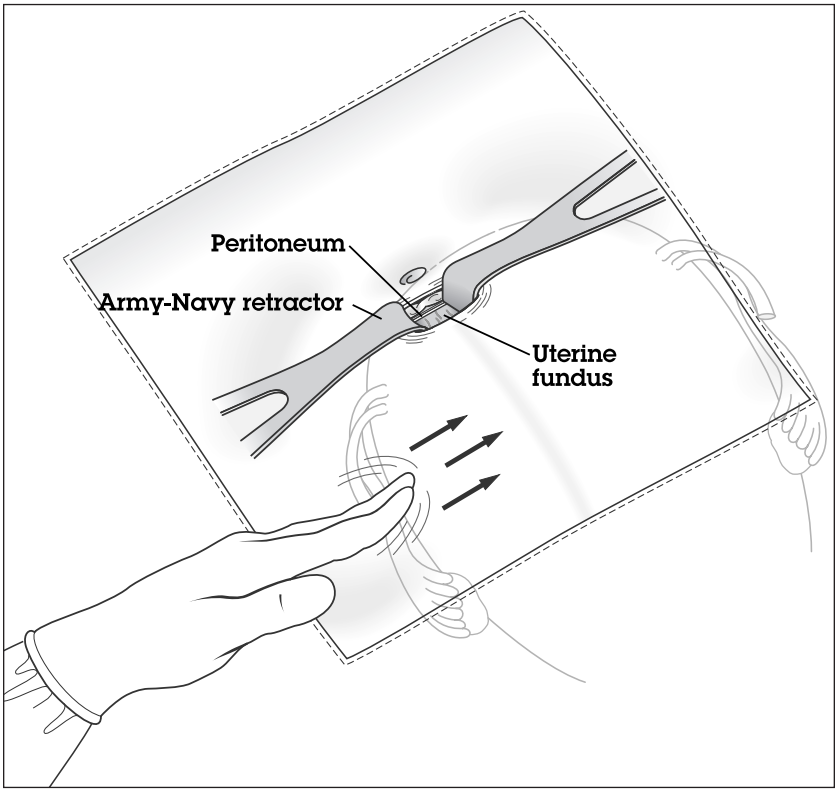
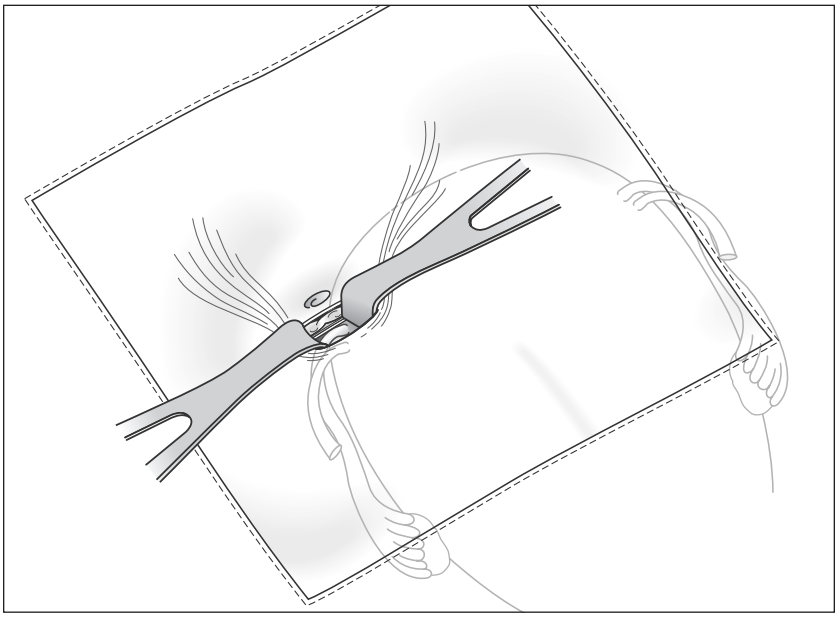


FIGURE 40. Accessing the tubes

(a) Pushing the uterus toward the opposite side of the tube being accessed



(b) Moving the incision to be above the tube being accessed



are located anatomically. Also, the uterus can be manipulated from the outside, allowing the cornua to be moved to the incision and thus making access to the tubes easy.

Clear a path to see the uterus and tubes. Visualization of the uterus and tubes may be obscured by the omentum or bowels. If this is the case, ask the client to take a deep breath **while you push the bowels gently out of the way** using the retractors.

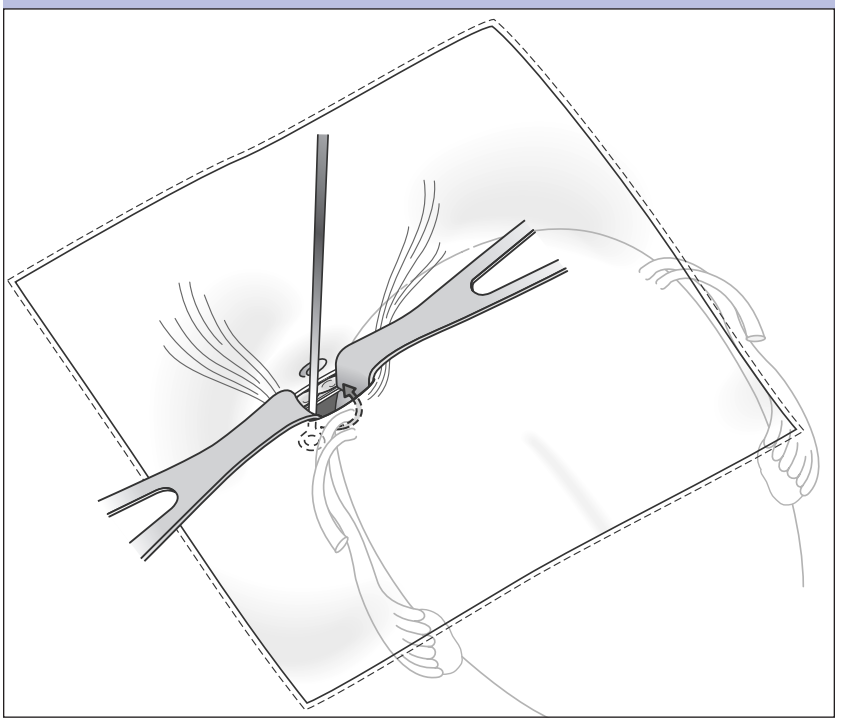
PITFALL: In certain situations, the client may be unable to assist the surgeon by taking a deep breath because she is nervous, scared, or in pain. In these cases, the surgeon *must* remain calm and should wait for the client to relax and try again. If she remains unable to assist, provide sedation (or additional sedation).

Using manual, external pressure on the abdomen, gently push the uterus toward the opposite side of the tube being accessed (Fig. 40a), while the surgical assistant positions the incision over the fallopian tube by gently moving and pressing down the side of the uterus both retractors simultaneously and thus moving the incision to the cornual area (Fig. 40b). This will allow you to visualize the tube and grasp it.

ALTERNATIVE: If the tube cannot be visualized, use the tubal hook to gently bring it to the incision site. With the uterus pushed laterally and the incision placed as close to the cornua as possible, gently slide the tubal hook behind the fundus and sweep the hook around one side of the uterus toward the anterior, lower part of the uterus, and then pull the tubal hook horizontally and out through the incision. This maneuver should hook the tube and sweep it forward to the incision (Fig. 41, page 82).

HINT: Since the peritoneum has nerve endings, minimize pulling and tugging so as to prevent pain and vasovagal reactions (e.g., nausea, vomiting, and fainting).

FIGURE 41. Using the tubal hook: Bringing the tube into view



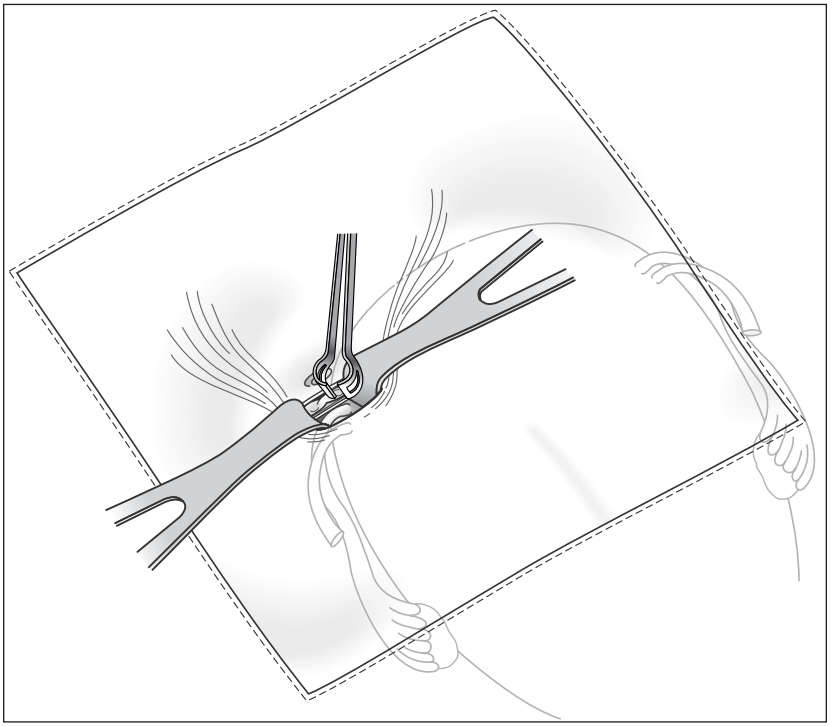
Once the tube has been visualized, grasp it atraumatically with a baby Babcock forceps (Fig. 42a). **Confirm the identity of the tube** by following it to the fimbriated end (using the baby Babcock forceps with one hand and a delicate dissecting forceps with the other) (Fig. 42b) and pulling the tube out gently until the fimbria can be seen (Fig. 42c, page 84).

NOTE: Neglecting this important step may lead to ligation of other structures (such as the round ligament) instead of the fallopian tube, which will result in failure of the procedure.

At this point, you are ready to ligate the tube, as is described in Chapter 9. After the tube is ligated on one side, repeat the above steps (pages 79 to 82) on the other side to ligate the other tube.

FIGURE 42. Grasping and identifying the tube

(a) Grasping the tube with a baby Babcock forceps



(b) Moving the tube to the opening

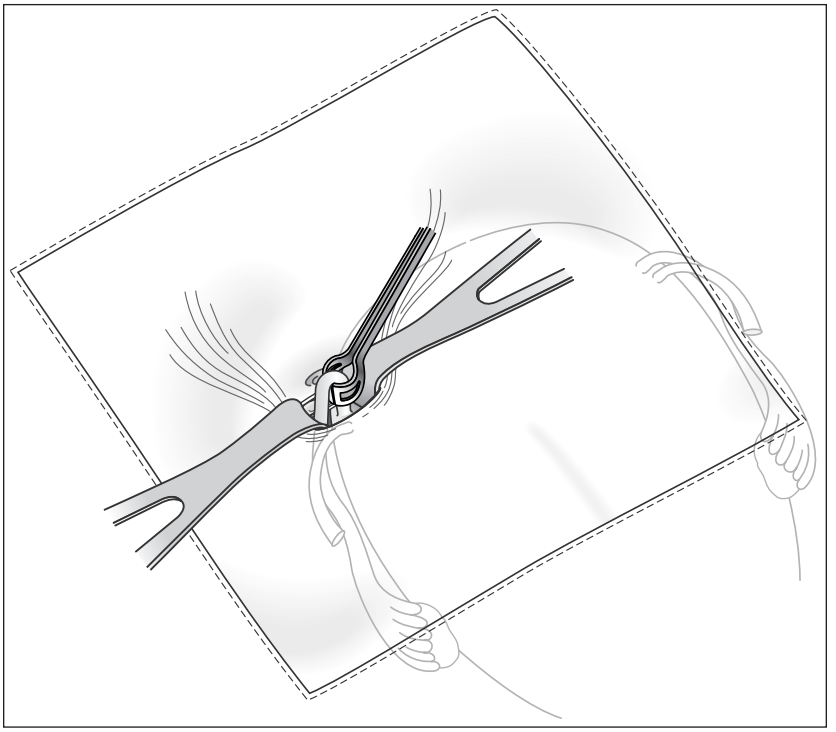
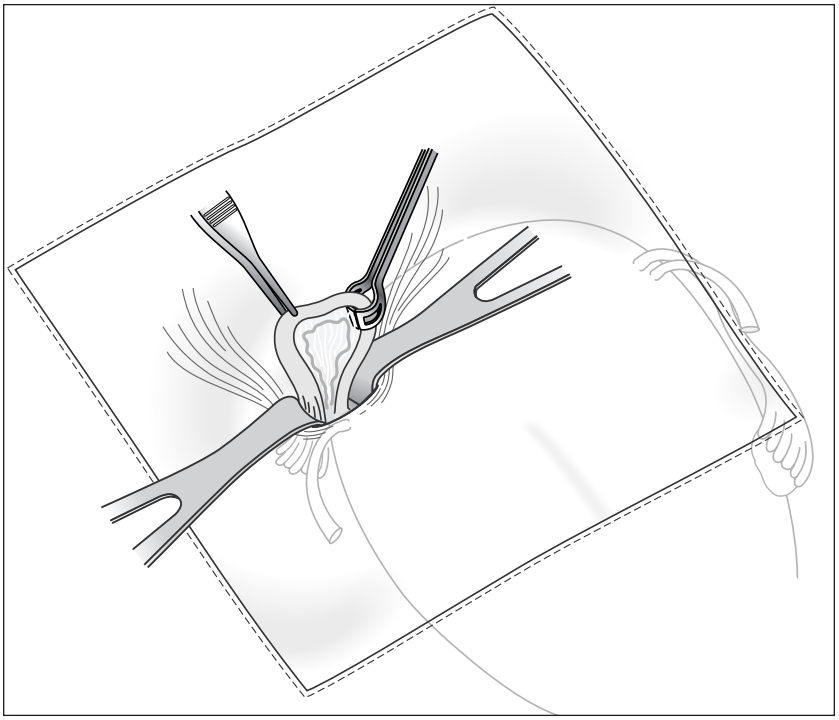


FIGURE 42. Grasping and identifying the tube (cont'd.)

(c) Pulling the tube out and visualizing the fimbria



9 Occluding the Fallopian Tubes

Since the introduction of female sterilization, numerous methods of tubal occlusion have been employed, including ligature, ligature and excision, occlusion via various mechanical devices (such as silastic rings and clips), and different techniques using electrocoagulation. The selection of the occlusion technique used is related to the surgical procedure selected. Ligature and excision of the tube is generally the occlusion method selected to be used with minilaparotomy.

For occluding the tubes, this guide describes and recommends using the modified Pomeroy technique, which is an effective and safe technique, is easy to learn, and requires only suture material. In contrast, other occlusion methods require devices, device applicators, or special equipment. This tubal occlusion technique follows the same steps for suprapubic and subumbilical minilaparotomy.

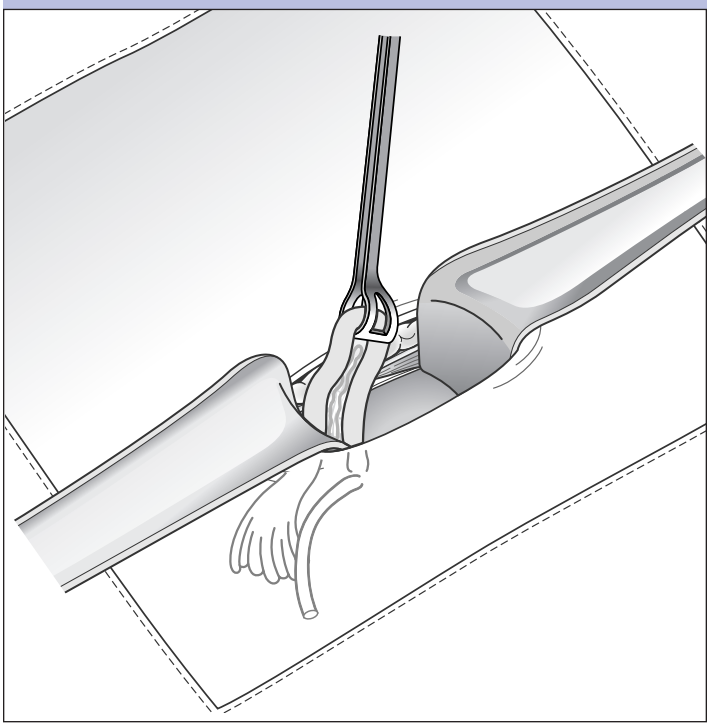
The modified Pomeroy technique is the most commonly used method for occluding the fallopian tubes. The basic concept of the technique is: *Tie a knot onto a loop of an avascular area of the tube, minimize tissue destruction, excise a portion of the tube, and use absorbable suture.*

HINT: Rapidly absorbable suture (chromic or plain catgut) is recommended, to allow the two cut ends of the tube to withdraw quickly from each other. This reduces the risk of failure as a result of spontaneous recanalization.

Modified Pomeroy Technique

With a baby Babcock forceps, grasp and elevate at least a 2-cm loop of fallopian tube at its midsection (the isthmic portion), approximately 2 to 3 cm from the

FIGURE 43. Holding the tubal loop with the baby Babcock forceps



cornual portion of the tube. Position the baby Babcock forceps over an avascular portion of the mesosalpinx. Keeping the forceps in a vertical position, hold the tubal loop (Fig. 43).

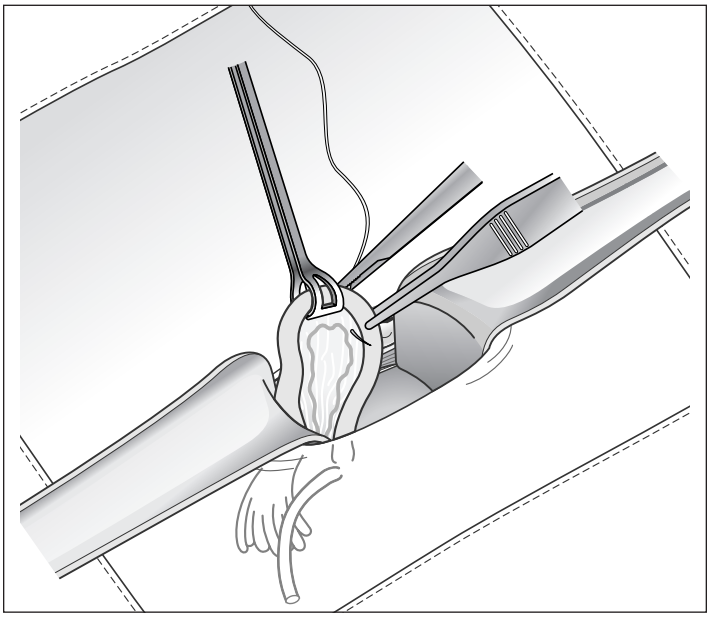
HINT: It is important that the tubal loop is large enough so that at least 1 cm of the tube can be excised but enough of the margin of the tube remains that it does not slip out of the suture.

Transfixing the suture. Using a surgical dissecting forceps, hold the tube by its distal side and pass a needle with absorbable suture Number 0 through the avascular section of the mesosalpinx, taking care to avoid blood vessels (Fig. 44a).

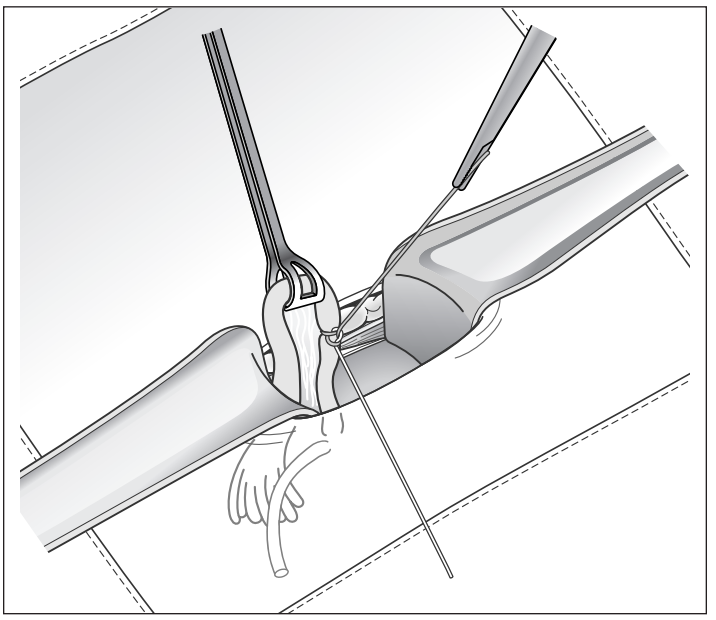
Place an **anchor tie** around the proximal side of the loop of fallopian tube. Be sure to use a square knot (Fig. 44b). Tie the same suture on **the other side of the looped tube,** using a square knot (Fig. 44c, page 88).

FIGURE 44. Steps in the modified Pomeroy technique

(a) Transfixing the suture



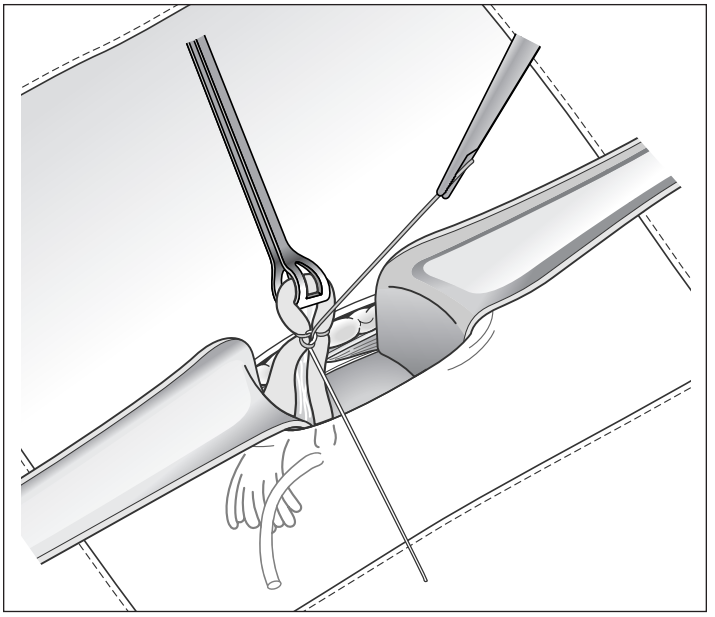
(b) Tying a square knot around the proximal side



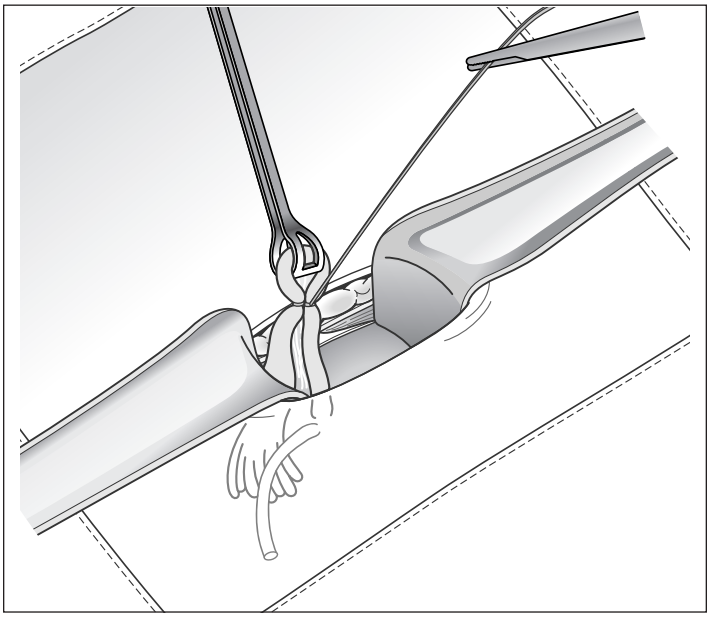
PITFALL: Do not place ligatures near the fimbrial portion of the tube, since this increases the potential for recanalization and failure.

FIGURE 44. Steps in the modified Pomeroy technique (cont'd.)

(c) Tying the distal side



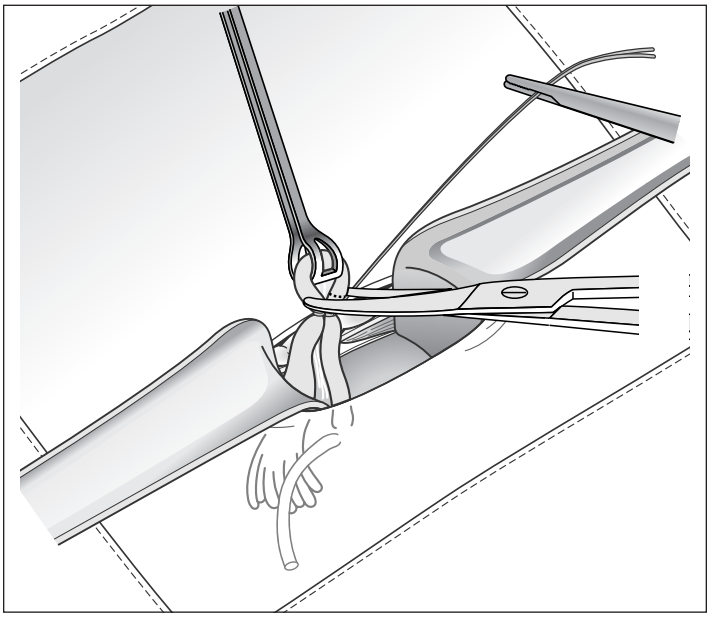
(d) Tying off the loop of the fallopian tube



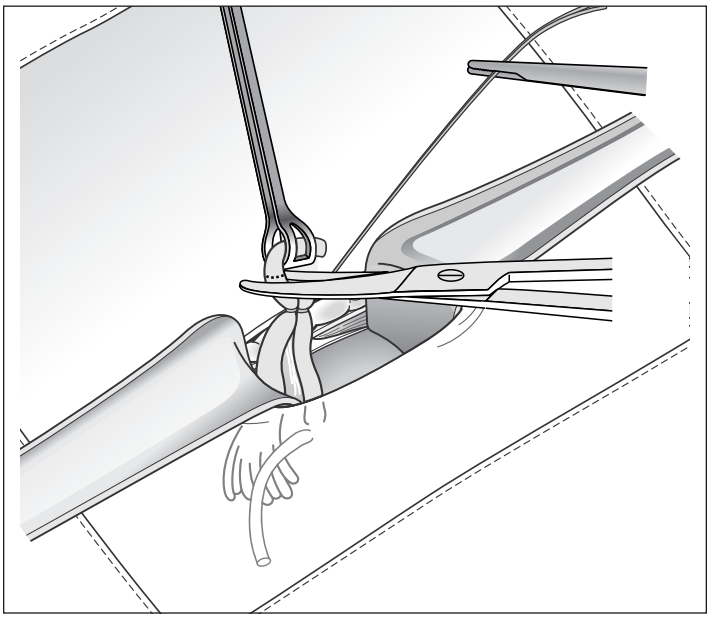
Cutting the tube. After tying the loop of the fallopian tube (Fig. 44d), use a hemostat to hold the suture knot. While holding the knot, cut off 1 cm of the loop of fallopian tube above the knot, using the Metzenbaum

FIGURE 45. Cutting the tube

(a) Cutting the proximal side of the tube

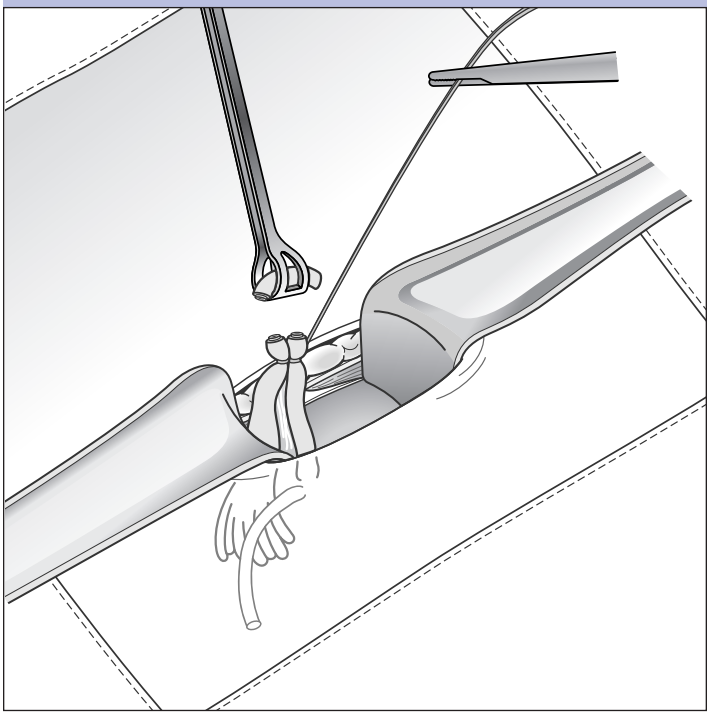


(b) Cutting the distal side of the tube



scissors, leaving at least a 0.5-cm tubal stump above the knot. Cut the proximal side first (Fig. 45a) and then the distal side (Fig. 45b). Examine the stump for bleeding (Fig. 46, page 90).

FIGURE 46. Checking the stump for bleeding



HINT: Because some blood vessels of the mesosalpinx are caught in the ligature, hemostasis must be assured before the tube is released and returned to the abdominal cavity. Be sure to hold the tube but not to pull it, as the pressure exerted could hide the bleeding.

Cutting the suture. After examining the cut tubal stump to ensure that hemostasis has been achieved, cut the suture above the knot and allow the tube to return into the abdomen by releasing the hemostat.

At this point, access and deliver the second fallopian tube, as was described in the previous section, and occlude it.

After both fallopian tubes have been occluded and returned to the abdomen, have the client monitor or the circulating nurse return the table to its initial horizontal position (if the Trendelenburg position was used).

10 Closing the Abdomen

Before closing the abdomen, visually explore the surgical area to exclude the possibility of any injury or bleeding. Two layers of the abdomen must be closed: the fascia and the skin. *Peritoneal closure is not necessary,* as data have shown that the peritoneum heals by itself in 24 to 48 hours, without adhesions (Janschek et al., 2003).

While grasping both sides of the fascia, starting at one end of the incision, close the fascia using a continuous (running stitches) suture with absorbable suture Number 0 (Fig. 47). Two or three stitches may be needed, depending on the length of the incision and the extent of superficial bleeding or the need to control bleeding. Observe for bleeding.

FIGURE 47. Closing the fascia

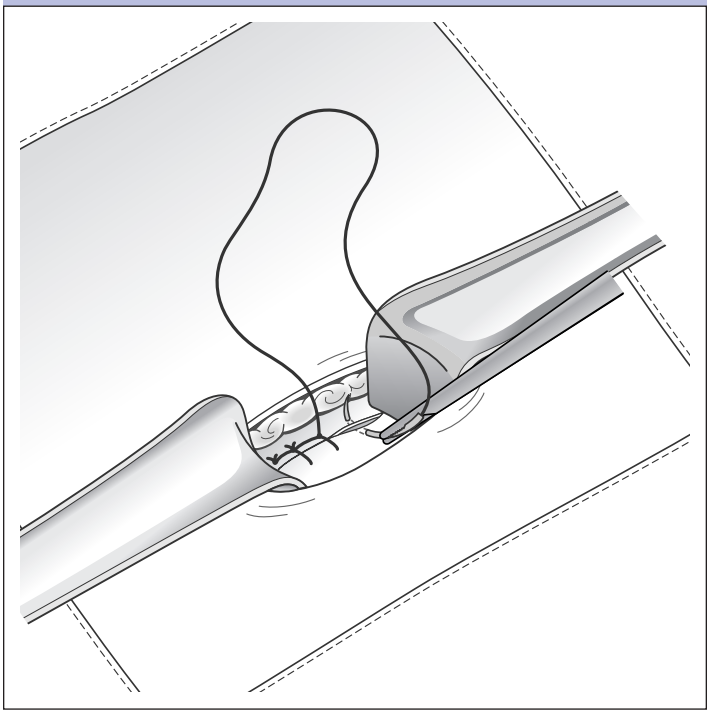
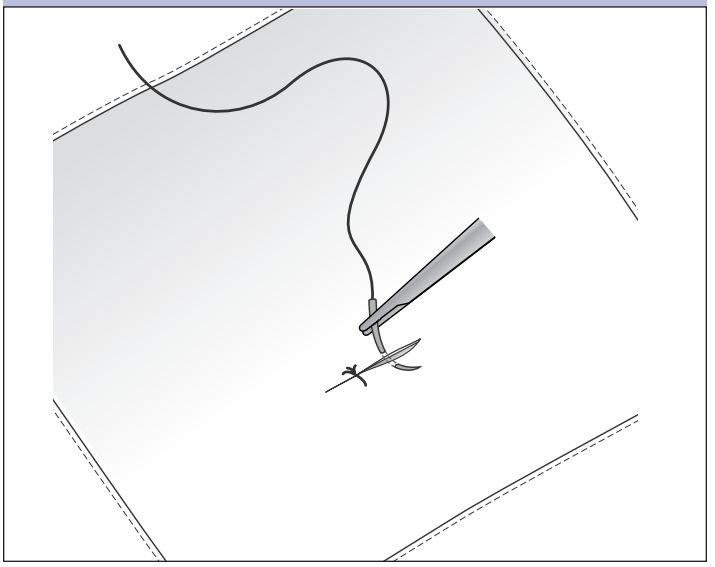


FIGURE 48. Closing the skin

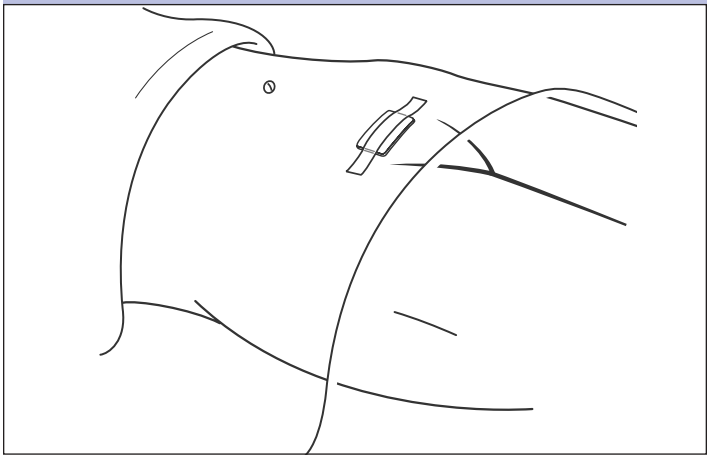


Close the skin with interrupted stitches, using either absorbable or nonabsorbable suture Number 0 (Fig. 48). The skin can be closed with stitches about 1 cm apart, depending on the need to control bleeding.

PITFALL: If nonabsorbable suture is used to close the skin, make sure that the client has access to a facility where the suture can be removed.

Finally, dress the closed incision (Fig. 49) before removing gloves, gowns, and drapes.

FIGURE 49. Dressing the wound



11 Postprocedure Tasks and Client Recovery

Client-Related Tasks That Take Place in the Operating Theater

Once the closed incision is dressed, the surgical team should perform the following steps: First, they should make sure that the client is feeling well and is calm. Next, they should remove the client's abdominal drapes. Finally, they should remove the uterine elevator (if this was a suprapubic procedure).

Help the client off the table and escort her to the recovery room, where she must be monitored regularly until she is discharged.

ALTERNATIVE: If the client was sedated, she should be transported to the recovery room on a stretcher or in a wheelchair.

Infection Prevention Tasks in the Operating Theater

Remove all sharps (needles and scalpels) from the surgical tray. Place *disposable* sharps in puncture-proof containers to be incinerated or buried. Place used instruments in a 0.5% chlorine solution for 10 minutes for decontamination. Dispose of waste materials in accordance with standard infection prevention procedures. Wipe any potentially contaminated surfaces with a 0.5% chlorine solution.

Before removing their gloves, all team members should briefly dip their gloved hands in a 0.5% chlorine solution. After removing gloves, team members must wash their hands thoroughly. Reusable gloves should be immersed in a 0.5% chlorine solution for 10 minutes and then processed following standard infection prevention procedures.

Client Recovery Tasks

The tasks described below are performed by a nurse or other staff member who is trained and designated to monitor clients in the recovery room, initiate emergency management should a complication arise, and discharge the clients.

Client monitoring consists of observing and recording the client's vital signs (respiratory rate, pulse, and blood pressure), checking her general conditions and comfort, and observing her surgical drape to promptly identify any bleeding. The client should be monitored every 15 minutes for at least the first hour after surgery. If the client is not awake, monitoring should continue every 15 minutes until she is fully awake. Clients should be monitored for at least two hours before discharge.

HINT: Engaging the client in conversation is a form of monitoring; the ability to talk and follow simple instructions is a good sign that the client is recovering appropriately.

If possible, or available, give the client sweetened liquids (i.e., tea or juice) to raise her blood sugar level, as she may have fasted for several hours prior to surgery.

The client may be discharged when she is able to retain oral fluids, urinate, converse, dress herself, and walk around. This usually occurs within two hours; however, if a sedative has been used, this time frame will vary, according to the type of sedative used and dosage given.

After sedation has worn off and before discharge, a trained staff member should repeat the postoperative instructions to the client or designated accompanying person. A written copy of the postoperative instructions should also be provided. (See Appendix E for sample instructions.)

Discharge

Before being discharged, the client should be instructed to return for routine follow-up within one week, and to return at any time if warning signs arise. Staff should discuss the nature of those warning signs with the client and with the person accompanying the client from the facility, and should verify their understanding of this information. The client should have received this information in advance; at this time, it should be reiterated, and the person in charge of the client's discharge should make sure that she understands it.

Oral analgesics can be prescribed or given, to be taken during the first two days following the procedure. There is no need to prescribe antibiotics.

12 Emergency Prevention and Management

***P**reventing the occurrence of complications is the first and most important measure to follow*. It is for this reason that appropriate assessment of the client's physical condition is so critical, as is the need to follow updated and sound service-provision protocols. These include not only guidelines for service implementation, but also guidelines for emergency preparedness and management.

Facilities that provide minilaparotomy services must be able to manage minor complications on-site and must have the capability to transfer clients for management of serious complications. For more serious complications that the site cannot manage, the client should be stabilized and promptly referred. In short, *emergency management preparedness is a vital and absolutely necessary component of minilaparotomy for female sterilization services*. This includes:

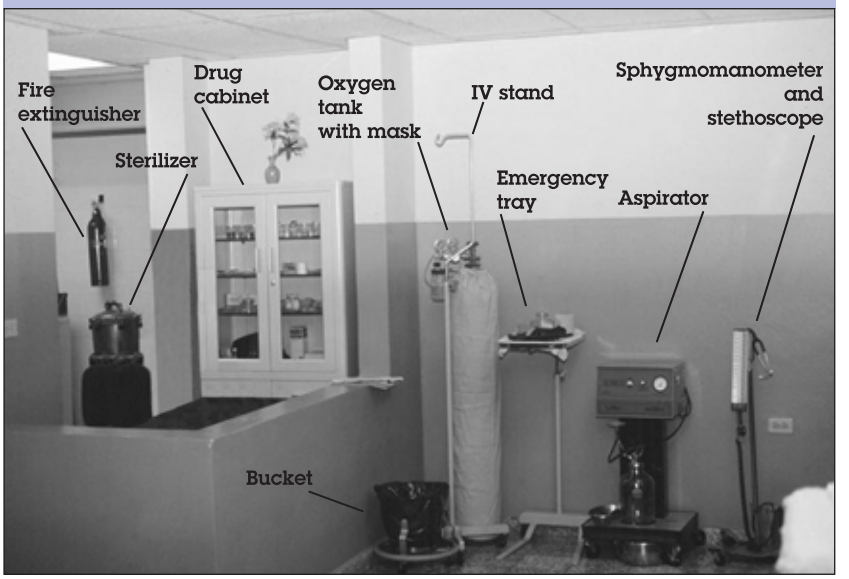
- *The ability to recognize and manage early warning signs and complications.* All who provide direct client care and all operating theater personnel should be able to recognize cardiorespiratory distress and resuscitate the client. For clinic personnel to have these skills, they need specialized training, followed by periodic skills refreshment (which can be accomplished through drills and role plays).
- *Client monitoring for early recognition of complications.* Client monitoring must be routine and complete (as outlined on pages 37 and 94, because such monitoring facilitates the early recognition of complications, through early observation of changes in the client's vital signs and responsiveness.
- *Availability of functional equipment, adequate supplies, and appropriate drugs.* Regardless of the type of anesthesia used, emergency drugs and equipment for treating a sedative overdose or any other reactions (e.g., vasovagal reaction, or fainting) *must* be available. These need to be near at hand

both in the surgical area (Fig. 50) and in the recovery area (Fig. 51) (see Appendix F). Also, staff must have been appropriately trained to manage such complications.

- *Transfer capability and a back-up referral facility.* After stabilization, for complications that need fur-

FIGURE 50. The emergency trolley

FIGURE 51. Appropriate emergency equipment for the recovery room



ther treatment, staff must be prepared to be able to transfer a client to a facility capable of managing serious complications. For this purpose, the service facility where the original procedure took place should ensure that it has the capability, procedures, and arrangements (such as transport and a nearby back-up referral facility to which clients can be transferred for prompt and definitive care of complications, as needed). Providers and other appropriate staff at the facility must be familiar with these procedures, referral linkages, and transport arrangements, and must ensure that transport is provided in a timely manner.

NOTE: For more information about emergency preparedness and management, see EngenderHealth's *Emergency Management for the Operating and Recovery Rooms* (AVSC International, 2000).

Appendix A

Minilaparotomy Equipment, Instruments, and Supplies

Equipment

Adjustable operating table

Step stool

Operating light (fixed, or portable with stand)

Instrument tray on a Mayo table

Auxiliary table

IV stand

Waste bucket

Plastic bucket (for instrument decontamination)

Sphygmomanometer (one in each area—operating theater, recovery, etc.)

Stethoscope (one in each area—operating theater, recovery, etc.)

Medicine cabinet

Stretcher with wheels and sides, or a wheelchair

Comprehensive Instrument List

1 antiseptic solution cup

1 dressing forceps, standard pattern, 5″

1 tissue forceps, delicate pattern, 5.5″

2 Kelly artery forceps, straight, 5.5″

2 mosquito forceps, delicate, curved, 5″

2 Allis intestinal forceps, delicate, 6″, 3 × 4 teeth

2 baby Babcock intestinal forceps, 7.5″

1 Schroeder tenaculum forceps, 10″

1 Foerster sponge forceps, straight, 9.5″

1 Foerster sponge forceps, curved, 9.5″

1 Mayo-Hegar needle holder, 7″

2 Richardson-Eastman retractors, same small size (for suprapubic procedure)

2 Army-Navy retractors, double-ended (for subumbilical procedure)

1 Metzenbaum scissors, curved, 7″

1 Mayo operating scissors, curved, 6.75″

1 surgical handle, #3, graduated in cm

1 Graves speculum, medium

Specialized Instruments

1 Ramathobodi uterine elevator, 28 cm in length

1 Ramathobodi tubal hook

Optional Instruments

1 kidney tray

Alternative Instruments

1 Jackson vaginal retractor, 1.5 × 3″ (deep blade)

Supplies

Hypodermic syringes, 10–20 cc

Hypodermic needles

Scalpel blades

Absorbable suture (if possible, on an atraumatic needle)

Nonabsorbable suture (if possible, on an atraumatic needle)

Suture needles

Gauze sponges or cotton swabs

Surgical adhesive tape

IV solutions (normal saline or 5% dextrose in water)

Infusion sets with large-caliber needles or catheters (14–16 gauge) and tubing

Urethral catheter

Linen tape

Exam gloves

Sterile or high-level decontaminated gloves

Protective eyewear

Lubricant for nasopharyngeal intubation

Appendix B

Informed Consent Form for Sterilization Clients

I, _____ , the undersigned, request that a sterilization via
(client's name)

_____ be performed on my person.
(specify the procedure)

I make this request of my own free will, without having been forced, pressured, or given any special inducement. I understand the following:

1. There are temporary methods of contraception available to my partner and me.
2. The procedure to be performed on me is a surgical procedure, the details of which have been explained to me.
3. This surgical procedure involves risks, in addition to benefits, both of which have been explained to me.
4. The procedure should be considered permanent. However, no surgical procedure can be guaranteed to work 100% on all people. There is a small failure rate. If the procedure is successful, I will be unable to have any more children.
5. This surgical procedure will not protect me and my partner from sexually transmitted infections (STIs), including HIV (the virus that causes AIDS).
6. I can decide against the procedure at any time before the operation is performed (and no medical, health, or other benefits or services will be withheld from me as a result).

_____ _____
Signature or mark of the client Date

_____ _____
Signature of attending physician or delegated assistant Date

If the client cannot read, a witness of the client's choosing, of the same sex and speaking the same language, must sign the following declaration:

I, the undersigned, attest to the fact that the client has affixed his/her thumbprint or mark in my presence.

_____ _____
Signature or mark of witness Date

Appendix C

Adapted from

World Health Organization (WHO) Screening Guidelines for Female Sterilization

Surgical Sterilization Procedures

Considering the irreversibility or permanence of sterilization procedures, special care must be taken to ensure that the client has made a voluntary informed choice to have the procedure. Particular attention must be given in the case of young people, nulliparous women, and male partners who have not yet been fathers, and in clients with mental health problems, including depressive conditions. All women should be counseled about the permanence of sterilization and the availability of alternative, long-term, highly effective methods; this is of extra concern for young people. The national laws and existing norms for the delivery of sterilization procedures must be considered in the decision-making process.

There is no medical condition that would absolutely restrict a person's eligibility for sterilization. Some conditions and circumstances indicate that certain precautions should be taken.

The classification of conditions into the different categories is based on an in-depth review of the epidemiological and clinical evidence relevant to medical eligibility. The programmatic implications of these updated medical criteria are still to be addressed, taking into account the various levels of service delivery. However, for the particular case of sterilization procedures, the following category definitions were developed.

Definitions

A **Accept:** There is no medical reason to deny sterilization to a person with this condition.

C **Caution:** The procedure is normally conducted in a routine setting, but with extra preparation and precautions.

D **Delay:** The procedure is delayed until the condition is evaluated and/or corrected. Alternative temporary methods of contraception should be provided.

S **Special:** The procedure should be undertaken in a setting with an experienced surgeon and staff, equipment needed to provide general anesthesia, and other back-up medical support. For these conditions, the capacity to decide on the most appropriate procedure and anesthesia regimen is also needed. Alternative temporary methods of contraception should be provided, if referral is required or if there is otherwise any delay.

Sterilization does not protect against sexually transmitted infections (STIs) or HIV; if there is risk for STIs or HIV (including during the postpartum period), the correct and consistent use of condoms is recommended, either alone or with another contraceptive method. Male latex condoms are proven to protect against STIs and HIV.

Female Sterilization

Condition	Category	New Evidence/Comments
Personal Characteristics and Reproductive History		
Pregnancy	D	
Young age	C	**New evidence:** Studies show that up to 20% of women sterilized at a young age later regret this decision, and that young age is the strongest predictor of regret that can be identified before sterilization (Hardy et al., 1996; Hillis et al., 1999). **Comments:** All women should be counseled about the permanence of sterilization and the availability of alternative, long-term, highly effective methods. This is of extra concern for young women.
Parity		
(a) Nulliparous (b) Parous	A A	**Comments:** Counseling requires special care to ensure that an informed choice is being made.
Breastfeeding	A	**Comments:** There is no impact on lactation if local anesthesia is used and separation of mother and child is minimized.
Postpartum		
(a) <7 days	A	**Comments:** Sterilization can be safely performed immediately postpartum.
7 up to 28 days	D	**Comments:** There is an increased risk for complications when the uterus has not fully involuted.
≥28 days	A	
(b) Preeclampsia/eclampsia		
(i) Mild preeclampsia	A	
(ii) Severe preeclampsia/ eclampsia	D	**Comments:** There are increased anesthesia-related risks.
(c) Prolonged rupture of membranes (≥24 hours)	D	**Comments:** There are increased risks of postoperative infection.
(d) Puerperal sepsis, intrapartum or puerperal fever	D	**Comments:** This may indicate systemic or local infection; there is an increased risk for postoperative infection.
(e) Severe antenatal or postpartum hemorrhage	D	**Comments:** The client may be anemic and unable to tolerate further blood loss (see section below).

Female Sterilization *(continued)*

Condition	Category	New Evidence/Comments
(f) Severe trauma to the genital tract: cervical or vaginal tear at time of delivery	D	**Comments:** There may have been significant blood loss and anemia. The procedure may be very painful.
(g) Uterine rupture or perforation	S	**Comments:** There may have been significant blood loss or damage to abdominal contents, which may increase the infection risk. If exploratory surgery or laparoscopy is conducted and the client is stable, repair of the problem and tubal sterilization may be performed concurrently if no additional risk is involved.
Postabortion		
(a) Uncomplicated	A	
(b) Postabortal sepsis or fever	D	**Comments:** This condition may substantially increase the poststerilization infection risk.
(c) Severe postabortal hemorrhage	D	**Comments:** The client may be anemic and unable to tolerate further blood loss.
(d) Severe trauma to the genital tract: cervical or vaginal tear at time of abortion	D	**Comments:** The client may be anemic and unable to tolerate further blood loss. The procedure may be more painful.
(e) Uterine perforation	S	**Comments:** There may have been significant blood loss or damage to abdominal contents, which may increase the infection risk. If exploratory surgery or laparoscopy is conducted and the client is stable, repair of the problem and tubal sterilization may be performed concurrently if no additional risk is involved.
(f) Acute hematometra	D	**Comments:** The client may be anemic and unable to tolerate further blood loss.
Past Ectopic Pregnancy	A	
Smoking		
(a) Age <35 years	A	
(b) Age ≥35 years		
(i) <15 cigarettes/day	A	
(ii) ≥15 cigarettes/day	A	
Obesity ≥30 kg/m^2 body mass index (BMI)	C	**Comments:** The procedure may be more difficult. There is an increased risk for wound infection and disruption. The condition may require general anesthesia and may limit respiratory function.
Cardiovascular Disease		
Multiple risk factors for arterial cardiovascular disease (such as older age, smoking, diabetes, and hypertension)	S	**Comments:** The client may be at high risk for complications associated with anesthesia and surgery.

Female Sterilization *(continued)*

Condition	Category	New Evidence/Comments
Hypertension		
(a) History of hypertension, where blood pressure *cannot* be evaluated (including hypertension during pregnancy)	C	**Comments:** ▪ Blood pressure should be controlled before surgery. ▪ There are increased anesthesia-related risks and an increased risk for cardiac arrhythmia. Blood pressure may be very labile and difficult to control in the early postpartum period. Appropriate monitoring of blood pressure intraoperatively is necessary.
(b) Adequately controlled hypertension, where blood pressure *can* be evaluated	C	
(c) Elevated blood pressure levels (properly taken measurements)		
(i) Systolic 140 to 159 mm Hg or diastolic 90 to 99 mm Hg	C	
(ii) Systolic ≥160 mm Hg or diastolic ≥100 mm Hg	S	
(d) Vascular disease	S	
History of high blood pressure during pregnancy (where current blood pressure is measurable and normal)	A	
Deep venous thrombosis (DVT)/ pulmonary embolism (PE)		
(a) History of DVT/PE	A	**Comments:** To reduce the risk for DVT/PE, early ambulation is recommended.
(b) Current DVT/PE	D	
(c) Family history of DVT/PE (first-degree relatives)	A	
(d) Major surgery		
(i) With prolonged immobilization	D	
(ii) Without prolonged immobilization	A	
(e) Minor surgery without immobilization	A	
Superficial venous thrombosis		
(a) Varicose veins	A	
(b) Superficial thrombophlebitis	A	
Current and history of ischemic heart disease		
(a) Current ischemic heart disease	D	**Comments:** The client is at high risk for complications associated with anesthesia and surgery.
(b) History of ischemic heart disease	C	

Female Sterilization *(continued)*

Condition	Category	New Evidence/Comments
Stroke (history of cerebrovascular accident)	C	
Known hyperlipidemias	A	**Comments:** Routine screening is not appropriate because of the rarity of the conditions and the high cost of screening. Some types of hyperlipidemias are risk factors for vascular disease. The category should be assessed according to the type and its severity.
Valvular heart disease		
(a) Uncomplicated	C	**Comments:** The client requires prophylactic antibiotics.
(b) Complicated (pulmonary hypertension, atrial fibrillation, history of subacute bacterial endocarditis)	S	**Comments:** The client is at high risk for complications associated with anesthesia and surgery. If she has unstable atrial fibrillation or current subacute bacterial endocarditis, the procedure should be delayed.
Neurological Conditions		
Headaches		
(a) Nonmigrainous (mild or severe)	A	
(b) Migraine		
(i) Without focal neurologic symptoms		
Age <35	A	
Age ≥35	A	
(ii) With focal neurologic symptoms (at any age)	A	
Epilepsy	C	
Reproductive Tract Infections and Disorders		
Vaginal bleeding patterns		
(a) Irregular pattern *without* heavy bleeding	A	
(b) Heavy or prolonged bleeding (includes regular and irregular patterns)	A	
Unexplained vaginal bleeding (suspicious for serious condition)		**Comments:** The condition must be evaluated before the procedure is performed.
Before evaluation	D	
Endometriosis	S	
Benign ovarian tumors (including cysts)	A	
Severe dysmenorrhea	A	

Female Sterilization *(continued)*

Condition	Category	New Evidence/Comments
Trophoblast disease		
(a) Benign gestational trophoblastic disease	A	
(b) Malignant gestational trophoblastic disease	D	
Cervical ectropion	A	
Cervical intraepithelial neoplasia	A	
Cervical cancer (awaiting treatment)	D	**Comments:** In general, the treatment renders a woman sterile.
Breast disease		
(a) Undiagnosed mass	A	
(b) Benign breast disease	A	
(c) Family history of cancer	A	
(d) Cancer		
(i) Current	C	
(ii) Past, and no evidence of current disease for five years	A	
Endometrial cancer	D	**Comments:** In general, the treatment renders a woman sterile.
Ovarian cancer	D	**Comments:** In general, the treatment renders a woman sterile.
Uterine fibroids		
(a) Without distortion of the uterine cavity	C	**Comments:** Depending on the size and location of the fibroids, it might be difficult to localize the tubes and mobilize the uterus.
(b) With distortion of the uterine cavity	C	
Pelvic inflammatory disease (PID)		
(a) Past PID (assuming no current risk factors for STIs)		**Comments:** A careful pelvic examination must be performed to rule out recurrent or persistent infection and to determine the mobility of the uterus.
(i) With subsequent pregnancy	A	
(ii) Without subsequent pregnancy	C	
(b) PID (current or within the last three months)	D	**Comments:** PID can lead to an increased risk for poststerilization infection or adhesions.
STIs		
(a) Current (including purulent cervicitis)	D	**Comments:** ▪ There is an increased risk for postoperative infection. ▪ If no symptoms persist following treatment, sterilization may be performed.

Female Sterilization *(continued)*

Condition	Category	New Evidence/Comments
(b) Within the last three months	A	
(c) Vaginitis without purulent cervicitis	A	
(d) Increased risk for STIs	A	
HIV/AIDS		
High risk for HIV	A	**Comments:** No routine screening is needed. Appropriate infection prevention procedures, including universal precautions, must be carefully observed with all surgical procedures. The use of condoms is recommended following sterilization.
HIV-positive	A	
AIDS	S	**Comments:** If the client is currently suffering an AIDS-related illness, the procedure should be delayed.
Other Infections		
Schistosomiasis		
(a) Uncomplicated	A	
(b) Fibrosis of liver	C	**Comments:** Liver function may need to be evaluated.
Tuberculosis		
(a) Nonpelvic	A	
(b) Known pelvic	S	
Malaria	A	
Endocrine Conditions		
Diabetes		
(a) History of gestational disease	A	**Comments:** If blood glucose is not well controlled, referral to a higher-level facility is recommended.
(b) Nonvascular disease:		**Comments:**
(i) Non–insulin-dependent	C	▪ If blood glucose is not well controlled, referral to a higher-level facility is recommended.
(ii) Insulin-dependent	C	
(c) Nephropathy/retinopathy/ neuropathy	S	▪ There is a possible decrease in healing and an increased risk for wound infection. Use of prophylactic antibiotics is recommended.
(d) Other vascular disease or diabetes of >20 years' duration	S	▪ There is a risk for hypoglycemia or ketoacidosis.
Thyroid		
(a) Simple goiter	A	
(b) Hyperthyroid	S	**Comments:** The woman is at high risk for complications associated with anesthesia and surgery.
(c) Hypothyroid	C	

Female Sterilization *(continued)*

Condition	Category	New Evidence/Comments
Gastrointestinal Conditions		
Gall-bladder disease		
(a) Symptomatic		
(i) Treated by cholecystectomy	A	
(ii) Medically treated	A	
(iii) Current	D	
(b) Asymptomatic	A	
History of cholestasis		
(a) Pregnancy-related	A	
(b) Past oral contraceptive–related	A	
Viral hepatitis		
(a) Active	D	**Comments:** The client is at high risk for complications associated with anesthesia and surgery. Appropriate infection prevention procedures, including universal precautions, must be carefully observed.
(b) Carrier	A	
Cirrhosis		
(a) Mild (compensated)	C	**Comments:** Liver function and clotting might be altered. Liver function should be evaluated.
(b) Severe (decompensated)	S	
Liver tumors		
(a) Benign (adenoma)	C	**Comments:** Liver function and clotting might be altered. Liver function should be evaluated.
(b) Malignant (hepatoma)	C	
Anemias		
Thalassemia	C	
Sickle-cell disease	C	**Comments:** There is an increased risk for pulmonary, cardiac, or neurologic complications and possible increased risk for wound infection.
Iron deficiency anemia		
(a) Hb <7 g/dL	D	**Comments:** The underlying disease should be identified. Both preoperative hemoglobin level and operative blood loss are important factors in women with anemia. If peripheral perfusion is inadequate, this may decrease wound healing.
(b) Hb ≥7 to <10 g/dL	C	
Conditions Relevant Only for Female Surgical Sterilization		
Local infection		
Abdominal skin infection	D	**Comments:** There is an increased risk for postoperative infection.

Female Sterilization *(continued)*

Condition	Category	New Evidence/Comments
Coagulation disorders	S	**Comments:** Women with coagulation disorders are at increased risk for hematologic complications of surgery.
Respiratory diseases		
(a) Acute (bronchitis, pneumonia)	D	**Comments:** The procedure should be delayed until the condition is corrected. There are increases in anesthesia-related and other perioperative risks.
(b) Chronic		**Comments:** For laparoscopy, the client may experience acute exacerbation of symptoms induced by the raising of the diaphragm by pneumoperitoneum, the Trendelenburg position, and a decrease in venous return from gaseous compression of the large vessels.
(i) Asthma	S	
(ii) Bronchitis	S	
(iii) Emphysema	S	
(iv) Lung infection	S	
Systemic infection or gastroenteritis	D	**Comments:** There are increased risks of postoperative infection, complications from dehydration, and anesthesia-related complications.
Fixed uterus due to previous surgery or infection	S	**Comments:** Decreased mobility of the uterus and bowels may make closed laparoscopy and minilaparotomy difficult and increase the risk for complications.
Abdominal wall or umbilical hernia	S	**Comments:** Hernia repair and tubal sterilization should be performed concurrently, if possible.
Diaphragmatic hernia	C	**Comments:** For laparoscopy, the client may experience acute exacerbation of symptoms induced by the raising of the diaphragm by pneumoperitoneum, the Trendelenburg position, and a decrease in venous return from gaseous compression of the large vessels.
Kidney disease	C	**Comments:** Blood clotting may be impaired. There may be an increased risk for infection and hypovolemic shock. May cause baseline anemia, electrolyte disturbances, peripheral neuropathy, and abnormalities in drug metabolism and excretion.
Severe nutritional deficiencies	C	**Comments:** There may be an increased risk for wound infection and delayed healing.
Sterilization concurrent with abdominal surgery		
(a) Elective	C	
(b) Emergency (without previous counseling)	D	
(c) Infectious condition	D	
Sterilization concurrent with cesarean section	A	**Comments:** Concurrent sterilization does not increase risk for complications in a surgically stable client.

Appendix D

Provider Checklist for Reproductive Health Services: How to Be Reasonably Sure a Client Is Not Pregnant

If the client answers YES to any question,
proceed to the first box directly below the YES column.

No		Yes
	1. Did you have a baby less than six months ago, and are you fully or nearly fully breastfeeding *and* have had no menstrual period since then?	
	2. Have you abstained from sexual intercourse since your last menstrual period?	
	3. Have you had a baby in the past four weeks?	
	4. Did your last menstrual period start within the past seven days?	
	5. Have you had a miscarriage or abortion in the past seven days?	
	6. Have you been using a reliable contraceptive method consistently and correctly?	

The client answered **NO** to *all* of the questions.	The client answered **YES** to at least one question.
Pregnancy cannot be ruled out.	The client is free of signs or symptoms of pregnancy.
The client should await menses or use a pregnancy test.	Provide the client with the desired method.

Explanation of Checklist to Rule Out Pregnancy

Goal of the Checklist Tool

Family planning providers should always rule out pregnancy before providing hormonal methods, intrauterine devices (IUDs), or female sterilization. However, pregnancy tests may not be available at all clinics or affordable for all clients. In

such cases, this checklist serves as an easy-to-use tool for providers to help non-menstruating clients safely initiate their method of choice. The checklist is based on criteria for ruling out pregnancy recognized by the World Health Organization (WHO) (TG/CWG, 1997). Tests of the checklist's effectiveness in family planning clinics showed that the tool was more than 99% effective at ruling out pregnancy (Stanback, 1999).

Using the Checklist

The checklist is used to rule out pregnancy if no pregnancy tests are available. The provider simply asks the client each of the six questions (or includes them in history-taking). If the client answers "yes" to *any* one question, and has no signs or symptoms of pregnancy, then she can safely be provided with her method of choice. It is very important that the provider trust what the client says. For example, if the client says her menstrual period started within the past seven days, the provider should accept the client's word.

Pregnancy cannot always be ruled out. In these cases, the woman may go for a pregnancy test elsewhere, or may use a temporary barrier method while awaiting her menstrual period. If a client using the pill chooses to wait for her menstrual period, she should be given the option of carrying home a cycle of pills to initiate when her menstrual period returns.

Adapting the Checklist

Some programs may choose to adapt the checklist to their own unique situations. For example, since a provider does not need to continue asking questions once a client answers "yes," a program can reorder the checklist questions to reflect locally common reasons that exclude pregnancy. However, programs should take care to ensure that the meaning of the original questions remains unchanged when adapting or translating the checklist.

Note: Checklist and explanation are adapted from Family Health International, 2002.

Appendix E

Sample Preoperative and Postoperative Instructions to Clients (Oral and Written)

What You Should Know about Your Sterilization Operation

This leaflet contains important information that you need to know. It tells you how to prepare for your sterilization operation and how to take care of yourself afterwards.

Remember, sterilization is a surgical procedure. It is meant to be permanent. After sterilization, you will no longer be able to get pregnant. If you have any questions or doubts, talk to the clinic staff. We are here to help you.

Before going to the clinic:

1. Do not eat any solid food for at least six hours before surgery, but you may drink clear fluids up to two hours before the operation. You will be able to eat and drink after the operation.
2. Have a bath. Carefully wash your belly button, belly, and genital area using soap.
3. Wear clean, loose clothing.
4. Arrange for a family member or friend to come to the clinic to help you home after the operation.

When you return home:

1. Rest for one or two days at home. You will probably be able to resume most of your normal activities within three to five days. Avoid heavy work or lifting for one week. This will help the wound heal.
2. Do not let the bandage get wet for one to two days.
3. Take the medicine provided by the clinic.
4. You may have sex as soon as it is comfortable for you. This is usually about one week after the operation.
5. Avoid pulling, scratching, or irritating the wound.
6. It is important for you to know what is normal following your surgery. There will probably be some pain and swelling around the wound. This is normal and should not worry you.
7. Return to the clinic or notify the doctor or health worker if you have any of the following, or if you notice any unusual body changes:
   - Fever within one week of the operation
   - A pain in your belly that does not go away or that becomes worse

- Bleeding or pus coming from the wound
- Signs that you may be pregnant—a missed period, stomach pains, or dark or spotty bleeding between periods (Watch for these signs at any time after the operation. They may mean that the operation has failed and that you may be pregnant.)

For any of these problems, you should telephone or go to the following location for medical care without delay:

_____

_____

_____

(add appropriate address)

Telephone number: _____

Adapted from: WHO, 1992.

Appendix F

Emergency Management Equipment and Drugs

Basic Equipment

Demand resuscitator *or* manual resuscitator (Ambu-bag)

Face mask

Oxygen tank with pressure-reducing valve, flow-meter tubing, oxygen nipple, and tubing

Suction machine with tubing and traps

Nonflexible (size 18 Fr) catheters

Flexible suction catheter

Oral airways (sizes 90 mm and 100 mm)

Nasopharyngeal airways (sizes 28 and 30)

Tourniquet

Foley bladder catheter (size 16 or 18) and drainage bag

Blood pressure apparatus

Stethoscope

Torch (flashlight)

Emesis basin

Blanket

Additional Equipment *(if personnel trained in the use of such equipment are available)*

Laryngoscope, with spare bulb and spare battery

Endotracheal tubes

Electrocardiogram (ECG) machine with leads

Defibrillator

Emergency Management Drugs

Adrenaline

Aminophylline

Diphenhydramine

Dopamine

Flumazenil

Hydrocortisone

Intravenous solutions (normal saline and 5% dextrose in water)

Naloxone

Physostigmine

Sodium bicarbonate

References

AVSC International. 1995. *Minilaparotomy under local anaesthesia: A curriculum for doctors and nurses.* New York.

AVSC International. 2000. *Emergency management for the operating and recovery rooms.* New York.

Barash, P. G., et al. 2001. *Handbook of clinical anesthesia,* 4th ed. Philadelphia: Lippincott, Williams, and Wilkins.

Chauvin, M. 2003. State of the art of pain treatment following ambulatory surgery. *European Journal of Anaesthesiology* 20(S28):3–6.

Chowdhury, S., and Chowdhury, Z. 1975. Tubectomy by paraprofessional surgeons in rural Bangladesh. *Lancet* 2(7935):567–569.

Dusitsin, N., et al. 1980. Post-partum tubal ligation by nurse-midwives and doctors in Thailand. *Lancet* 1(8169):638–639.

Egbert, L. D., et al. 1963. The value of the preoperative visit by an anesthetist: A study of doctor-patient rapport. *Journal of the American Medical Association* 185:553–555.

EngenderHealth. 2001. *Infection prevention: A reference booklet for health care providers.* New York.

EngenderHealth. 2002. *Contraceptive sterilization: Global issues and trends*. New York.

Family Health International. 2002. *Provider checklists for reproductive health services.* Research Triangle Park, NC. Available at: htpp://www.fhi.org/en/RH/Pubs/servdelivery/checklists/pregnancy/index.htm.

Hardy, E., et al. 1996. Risk factors for tubal sterilization regret, detectable before surgery. *Contraception* 54(3):159–162.

Hillis, S. D., et al. 1999. Poststerilization regret: findings from the United States Collaborative Review of Sterilization. *Obstetrics and Gynecology* 93(6): 889–895.

Janschek, C., et al. 2003. A study of non-closure of the peritoneum at vaginal hysterectomy. *Archives of Gynecology and Obstetrics* 267(4):213–216.

Kulier, R., et al. 2003. Minilaparotomy and endoscopic techniques for tubal sterilisation (Cochrane Review). In: *The Cochrane Library,* Issue 2. Oxford: Update Software.

Leigh, J. M., Walker, J., and Janaganathan, P. 1977. Effect of preoperative anesthetic visit on anxiety. *British Medical Journal* 2:987–989.

Liu, S. K., et al. 1999. Urinary catheter in laparoscopic cholecystectomy: Is it necessary? *Surgical Laparoscopy, Endoscopy & Percutaneous Techniques* 9(3):184–186.

Medical Economics. 2003. *Physicians' Desk Reference,* 57th ed. Montvale, NJ.

Nardin, J. M., Kulier, R., and Boulvain, M. 2003. Techniques for the interruption of tubal patency for female sterilisation (Cochrane Review). In: *The Cochrane Library*, Issue 1. Oxford: Update Software.

Omoigui, S. 1999. *Sota Omoigui's anesthesia drugs handbook,* 3rd ed. Malden, MA: Blackwell Science.

Osathanondh, V. 1974. Suprapubic mini-laparotomy, uterine elevation technique: Simple, inexpensive and outpatient procedure for interval female sterilization. *Contraception* 10(3):251–262.

Peterson, H. B., et al. 2001. Pregnancy after tubal sterilization with silicone rubber band and spring clip application. *Obstetrics and Gynecology* 97(2):205–210.

Rayburn, W. F., and Schwartz, W. J. 3rd. 1996. Refinements in performing a cesarean delivery. *Obstetrical and Gynecological Survey* 51(7):445–451.

Satyapan, S., et. al. 1983. Postpartum tubal ligation by nurse-midwives in Thailand: A field trial. *Studies in Family Planning* 14(4):115–118.

Stanback, J., et al. 1999. Checklist for ruling out pregnancy among family planning clients in primary care. *Lancet* 14(9178):566.

Technical Guidance/Competence Working Group (TG/CWG). 1997. *Recommendations for updating selected practices in contraceptive use: Volume II.* Washington, DC: U.S. Agency for International Development.

Uchida, H. 1970. Uchida abdominal sterilization applied postpartum. International Journal of Gynecology and Obstetrics 8(Pt. 2):116.

White, P. F. 1994. Anesthesia for ambulatory surgery. *International Anesthesiology Clinics* Vol. 32, No. 3.

World Federation of Health Agencies for the Advancement of Voluntary Surgical Contraception. 1988. *Safe and voluntary surgical contraception: Guidelines for service programs.* New York: AVSC International.

World Health Organization (WHO). 1992. *Female sterilization: A guide to the provision of services.* Geneva.

WHO. 2002. *Improving access to quality care in family planning: Medical eligibility criteria for contraceptive use,* 2nd ed. Geneva.