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Challenges in total laparoscopic hysterectomy: Severe adhesions

Success is likely if you are 1) proactive and 2) meticulous about abdominal entry, and if you manage adhesions strategically. Two experts offer tips and techniques.

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Do the authors' techniques and pearls for TLH increase your confidence?

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CASE

Probable adhesions. Is laparoscopy practical?

A 54-year-old woman complains of perimenopausal bleeding that has not been controlled by hormone therapy, as well as increasing pelvic pain that has caused her to miss work. She wants you to perform hysterectomy to end these problems once and for all.

Aside from these complaints, her history is unremarkable except for a laparotomy at 13 years for a ruptured appendix. Her Pap smear, endometrial biopsy, and pelvic sonogram are negative.

Is she a candidate for laparoscopic hysterectomy?

A patient such as this one, who has a history of laparotomy, is likely to have extensive intra-abdominal adhesions. This pathology increases the risk of bowel injury during surgery—whether it is performed via laparotomy or laparoscopy.

The ability to simplify laparoscopic hysterectomy in a woman who has extensive adhesions requires an understanding of the ways in which adhesions form—in order to lyse them skillfully and avoid creating further adhesions. It also requires special techniques to enter the abdomen, identify the site of attachment, separate adhered structures, and conclude the hysterectomy. Attention to the type of energy that is used also is important.

In this article, we describe these techniques and considerations.

In Part 1 of this article, immediately preceding, we discussed techniques that facilitate laparoscopic hysterectomy in a woman who has a large uterus.

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TABLE 7 causes of intra-abdominal adhesions

Instrument-traumatized tissue
Poor hemostasis
Devitalized tissue
Intraperitoneal infection
Ischemic tissue due to sutures
Foreign body reaction (carbon particles, suture)
Electrical tissue injury

Source: Ling FW, et al²

Don't overlook preoperative discussion, preparation

The patient needs to understand the risks and benefits of laparoscopic hysterectomy, particularly when extensive adhesions are likely, as well as the fact that it may be necessary to convert the procedure to laparotomy if the laparoscopic approach proves too difficult. She also needs to understand that conversion to laparotomy does not represent a failure of the procedure but an aim for greater safety.

Because bowel injury is a real risk when the patient has extensive adhesions, mechanical bowel preparation is important. Choose the regimen preferred by the colorectal surgeon likely to be consulted if intraoperative injury occurs.

The operating room (OR) and anesthesia staffs also need to be prepared, and the patient should be positioned for optimal access in the OR. These and other preoperative steps are described in Part 1 of this article (page 46) and remain the same for the patient who has extensive intra-abdominal adhesions.

How adhesions form

When the peritoneum is injured, a fibrinous exudate develops, causing adjacent tissues to stick together. Normal peritoneum immediately initiates a process to break down this exudate, but traumatized peritoneum has limited ability to do so. As a result, a permanent

adhesion can form in as few as 5 to 8 days.^{1,2}

Pelvic inflammatory disease and **intra-peritoneal blood** associated with distant endometriosis implants are well known causes of abdominal adhesions; others are listed in the **TABLE**.

The challenge of safe entry

During laparotomy, adhesions can make it difficult to enter the abdomen. The same is true—but more so—for laparoscopic entry. The distortion caused by adhesions can lead to inadvertent injury to blood vessels, bowel, and bladder even in the best surgical hands. An attempt to lyse adhesions laparoscopically often prolongs the surgical procedure and increases the risk of visceral injury, bleeding, and fistula.¹

In more than 80% of patients experiencing injury during major abdominal surgery, the injury is associated with omental adhesions to the previous abdominal wall incision, and more than 50% have intestine included in the adhesion complex.¹

One study involving 918 patients who underwent laparoscopy found that 54.9% had umbilical adhesions of sufficient size to interfere with umbilical port placement.³ More important, 16% of this study group had only a single midline umbilical incision for laparoscopy before the adhesions were discovered.

The utility of Palmer's point

Although multiple techniques have been described to minimize entry-related injury, no technique has completely eliminated the risk of inadvertent bowel or major large-vessel injury.³ In 1974, Palmer described an abdominal entry point for the Veress needle and small trocar for women who have a history of abdominal surgery.⁴ Many surgeons now consider “Palmer's point,” in the left upper quadrant, as the safest peritoneal entry site.

Technique. After emptying the stomach of its contents using suction, insert the Veress needle into the peritoneal cavity at a point midway between the midclavicular line and the anterior axillary line, 3 cm below the cos-



Ultrasonic energy involves minimal thermal spread, minimal carbon particle formation, and a cavitation effect similar to what occurs with hydrodissection

tal margin (FIGURE). Advance it slowly until you hear three pops, signifying entry into the peritoneal cavity. Only minimal insertion is needed; insufflation pressure of less than 10 mm Hg indicates intraperitoneal placement of the needle tip.⁵

Once pneumoperitoneum pressure of 20 mm Hg is established, insert a 5-mm trocar perpendicular to the abdominal wall, 3 cm below the ribs, midway between the midclavicular line and the anterior axillary line.³ (There is a risk of colon injury at the splenic flexure if the entry point is further lateral.)

Inspect the abdominal cavity with the laparoscope from this access port to determine the best placement of remaining trocars under direct vision; lyse adhesions, if necessary, to perform the procedure.

Success depends on careful lysis and minimal tissue injury

Adhesions in the abdomen may involve:

- omentum to peritoneum
- omentum to pelvic structures
- intestine to peritoneum
- intestine to pelvic structures.

Adhesions may be filmy and thin or dense and thick, avascular or vascular. They can be minimal, or a veritable curtain that prevents adequate visualization of the primary surgical site. When they are present, they must be managed successfully if the primary procedure is to be accomplished laparoscopically.

Successful management requires techniques to maximize adhesiolysis and minimize new adhesions or tissue injury:

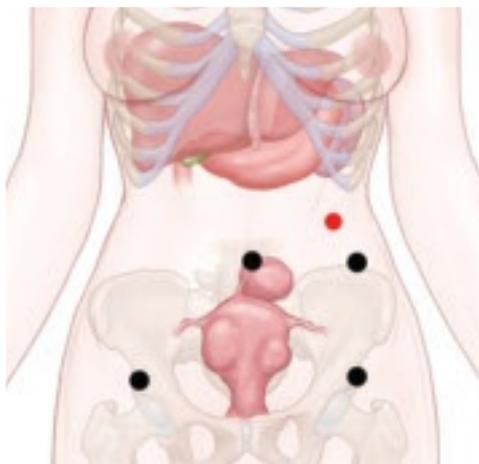
- **Use traction and countertraction** to define the line of attachment; this is essential to separate two tissues bound by adhesions.

- **Use atraumatic graspers** to reduce the risk of tissue laceration.

- **Avoid sharp dissection with scissors.** Although this is the traditional method of lysis, it is often associated with bleeding that stains and obscures the line of dissection.

- **Choose tools wisely.** Electrosurgery and lasers use obliterative coagulation, working at temperatures of 150°C to 400°C to burn tissue. Blood and tissue are desiccated and

FIGURE Enter the abdomen at Palmer's point



This entry site (red dot) lies midway between the midclavicular line and the anterior axillary line, 3 cm below the costal margin. The other port sites (black dots) are described in **Figure 2**, page 52.

ILLUSTRATION BY ROB FLEWELL FOR OBG MANAGEMENT

oxidized, forming an eschar that covers and seals the bleeding area. Rebleeding during electrosurgery may occur when the instrument sticks to tissue and disrupts the eschar. In addition, monopolar instruments may cause undetected remote thermal injury, causing late complications.⁶ Both monopolar and bipolar techniques can also leave carbon particles during the oxidation process that become foci for future adhesions.⁷

- **Consider ultrasonic energy.** Unlike electrosurgery, ultrasonic energy is mechanical and works at much lower temperatures (50°C to 100°C), controlling bleeding by coaptive coagulation. The ultrasonic blade, vibrating at 55,500 Hz, disrupts and denatures protein to form a coagulum that seals small coapted vessels. When the effect is prolonged, secondary heat seals larger vessels. Ultrasonic energy involves minimal thermal spread, minimal carbon particle formation, and a cavitation effect similar to hydrodissection that helps expose the adhesive line. It creates minimal smoke, improving visibility. Because ultrasonic energy operates at a lower temperature, less char and necrotic



In more than 80% of patients who are injured during major abdominal surgery, the injury is associated with omental adhesions to the previous abdominal incision



tissue—important causes of adhesions—occur than with bipolar or monopolar electrical energy.⁷

Although different energy sources interact with human tissue using different mechanisms, clinical outcomes appear to be much the same and depend more on the skill of the individual surgeon than on the power source used. Data on this topic are limited.

Thawing the frozen pelvis

Many patients have adhesions that involve omentum or intestine that can be managed using simple laparoscopic techniques, but some have organs that are fixed in the pelvis by adhesions. In these cases, traction and countertraction techniques can be tedious and may cause inadvertent injury to critical structures or excessive bleeding that necessitates conversion to laparotomy.

A better way to approach the obliterated, or “frozen,” pelvis is to open the retroperitoneal space and identify critical structures:

- **Enter the retroperitoneal space** at the pelvic brim in an area free of adhesions. Identify the ureter and follow it to the bladder. This can be accomplished using hydrodissection techniques or cavitation techniques with ultrasonic energy.
- **Skeletonize, coagulate, and cut the vessels** once you reach the cardinal ligament and identify the ascending uterine blood supply.
- **Dissect the structures of the obliterated cul de sac** using standard techniques.
- **Use sharp dissection for adhesiolysis.** Laparoscopic blunt dissection of adhesions can lead to serosal tears and inadvertent enterotomy. Sharp dissection or mechanical energy devices are preferred to divide the tissue along the line of demarcation—but

remember that monopolar and bipolar devices can cause remote thermal damage that goes undetected at the time of use.

When dissection becomes unproductive in one area, switch to another; dissection planes frequently open and demonstrate the relationships between pelvic structures and loops of bowel.⁸

Occasionally, the visceral peritoneum of the bowel is breached during adhesiolysis. If the mucosa and muscularis remain intact, denuded serosa need not be repaired. Surgical repair is necessary if mucosa is exposed, or perforation may occur.

Because most ObGyn residency programs offer limited training in management of bowel injuries, intraoperative consultation with a general surgeon may be indicated if more than a simple repair is required.⁸

CASE RESOLVED

You perform total laparoscopic hysterectomy and find multiple adhesions in the right lower quadrant, adjacent to the area of trocar insertion. Small intestine is adherent to the right lateral pelvic wall; sigmoid colon is adherent to the left pelvic wall; and the anterior fundus is adherent to the bladder peritoneal reflection, with the adhesions extending on either side to include the round ligaments.

You begin adhesiolysis in the right lower quadrant to optimize trocar movement. You transect the round ligaments in the mid-position, with dissection extended retroperitoneally on either side to the midline of the lower uterine segment; this opens access to the ascending branch of the uterine vessels. You dissect the intestine free of either pelvic sidewall along the line of demarcation.

Total blood loss is less than 25 mL. The patient is discharged 6 hours after surgery. 🟢

FAST TRACK

If the visceral peritoneum or bowel is breached during adhesiolysis, and mucosa is exposed, surgical repair is necessary

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