4. Generation of Working Space: Extraperitoneal Approaches

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A. Indications

Extraperitoneal endoscopic surgery (EES) was first described by Bartel in 1969. Wickham and Miller described the use of carbon dioxide (CO₂) and videoscopic control in 1993. Gaur introduced balloons for retroperitoneal dissection in 1993, and Hirsch and coworkers described the use of a trocar mounted balloon for extraperitoneal dissection in 1994. There are both advantages and disadvantages to this approach (Table 4.1).

Procedures in which EES has been utilized include the following:
1. Totally extraperitoneal (TEP) inguinal herniorrhaphy (see Chapter 40)
2. Retroperitoneal endoscopically assisted spine surgery
3. Renal surgery
4. Adrenalectomy (see Chapter 39.2)
5. Varicocele ligation
6. Pelvic lymph node dissection (see Chapter 38)
7. Bladder suspension
8. Aortoiliac surgery
9. Lumbar sympathectomy

B. Anatomic Considerations

Knowledge of anatomic landmarks is essential to orientation in the extraperitoneal space. The retroperitoneum can be divided into three spaces:
1. The retropubic space (space of Retzius) is the space between the pubic bone and the bladder. This space is obliterated by prior retroperitoneal urologic surgery such as retropubic prostatectomy.
2. The space of Bogros is lateral and cephalad to the space of Retzius.
3. The lumbar retroperitoneal space is the posterior continuation of the space of Bogros bounded by the vena cava and aorta medially, the psoas dorsally, the colon ventrally, and transversalis fascia laterally. This space contains the kidney, adrenal, ureter, and Gerota’s fascia.
Table 4.1. Advantages and disadvantages of extraperitoneal endoscopic surgery.

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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<td>- Decreased risk of bowel injury</td>
<td>- Small working space</td>
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<td>- Decreased problems with bowel retraction</td>
<td>- Orientation can be confusing</td>
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<td>- Less postoperative ileus</td>
<td>- Inadvertent entry into peritoneum causes loss of working space</td>
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<td>- Closure of peritoneum not required when mesh implanted retroperitoneally</td>
<td>- Retractors often needed to displace peritoneal sac</td>
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<td>- Less adverse hemodynamic effects from retroperitoneal insufflation</td>
<td>- Prior extraperitoneal dissection is a contraindication to this approach</td>
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C. Access to the Extraperitoneal Space

There are three basic ways to gain access to the extraperitoneal space.

1. The **open approach**
   a. Make a 2-cm incision overlying the space to be developed.
   b. Bluntly dissect down to the preperitoneal space and develop this space.
   c. Place a Hasson cannula or a structural balloon trocar (U.S. Surgical, Norwalk, CT).
   d. Continue dissection with laparoscope or balloon dissector (see dissection, below).

2. Use of a **lens-tipped trocar**
   a. Make a 12-mm skin incision over the desired location.
   b. Place a 0-degree laparoscope into a lens-tipped trocar.
   c. Use this to penetrate the layers of the abdominal wall under direct vision.
   d. Once the correct plane is achieved, place a Hasson cannula or structural balloon trocar and continue dissection (see Section D).

3. **Dulocq technique**
   a. Insert a Veress needle suprapubically through the fascial layers into the preperitoneal position. The needle will traverse two palpable points of resistance (the anterior rectus sheath and transversalis fascia).
   b. Insufflate 1L of CO₂.
   c. Make a skin incision lateral to the midline.
   d. Insert a 10-mm trocar, directed caudad, until the gas-filled space is entered.
   e. Place the laparoscope into the trocar and use it to dissect the space while insufflating CO₂.
   f. The major disadvantage is that this procedure is relatively “blind” and risks visceral and vascular injury as well as