13
Robotic Radical Prostatectomy: A Step-by-Step Approach

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Radical retropubic prostatectomy is one of the most difficult operations in the field of urology. After the procedure was introduced by Millin in 1947, this technique was adopted by others and modified, but never gained widespread popularity because of the significant complications of bleeding, incontinence, and impotence. Although anatomic discoveries by Walsh improved the surgeon’s ability to remove all tumor and have substantially improved other outcomes. Open radical prostatectomy still remains a procedure with significant morbidity.

Laparoscopic techniques in other surgical fields heralded an era of minimally invasive surgery with promise of early recuperation and reduced morbidity. Although laparoscopic radical prostatectomy was first described in 1992, the procedure took too long and offered little advantage over conventional retropubic radical prostatectomy. It was only after the pioneering work of Guillonneau and Vallancien, and Abbou and colleagues that there was a resurgence of interest in the procedure. Nonetheless, the consensus among American urologists remained that the procedure was exceedingly difficult to master and offered little benefit to the patient.

In November 2000, Guy Vallancien performed the first robot-assisted radical prostatectomy using the da Vinci® robotic system (Intuitive Surgical Inc., Sunnyvale, CA) at our institution. The procedure was implemented to the routine surgical care of patients with localized prostate cancer in March 2001. As of this writing, we have performed over 2100 cases. Our technique has continually evolved. This evolution is driven by our increasing experience, better instrumentation, newer insights into the prostatic anatomy, and a quest for better functional results.


Our initial technique of robot-assisted prostatectomy was based firmly on the scientific foundations of the Montsouris technique of laparoscopic prostatectomy. However, there were important differences between the techniques of robot-assisted and conventional laparoscopic radical prostatectomy. Our modifications were necessitated by the need for separate console and patientside surgeons and subtle considerations for avoiding conflict between the da Vinci® and patientside surgeon’s ports. The ergonomics of the movements of the surgeon’s fingers had to adapt to the limitations of the robotic instruments and take advantage of their versatility.

13.2. Steps of the Robotic Prostatectomy

A list of instruments used in robotic prostatectomy is listed in Table 13.1.
13.2.1. Development of the Extraperitoneal Space

13.2.1.1. Robotic Instruments

- Right arm: Monopolar Hook Cautery (90 W)
- Left arm: Bipolar Maryland Forceps (25 W)
- Telescope: 30° directed upwards

13.2.1.2. Procedure

The peritoneal cavity is inspected using the 30° upward-looking lens (Figure 13.1). A transverse peritoneal incision is made extending from the left to the right medial umbilical ligament. The incision is extended in an inverted U to the level of the vasa on either side. The extraperitoneal space is developed after transecting the medial and median umbilical ligaments.

Both assistants provide traction/countertraction to facilitate the dissection. This dissection allows the bladder, prostate, and bowel to drop posterior and the remainder of the operation to be performed extraperitoneally. At the end of this step, prostate covered with periprostatic fascia and bladder covered with a layer of fat is seen.

13.2.2. Exposure of Prostatic Apex and Control of Dorsal Venous Complex

13.2.2.1. Objective

The levator fascia near its junction with the lateral prostatic fascia in incised to expose the levator muscle fibers. This frees the lateral attachment of the lateral prostatic fascia and provides space for the dorsal venous stitch.

13.2.2.2. Procedure

13.2.2.2.1. Robotic Instrument Change

- Telescope: 0°

The 0° lens with fine scaling is used for this part of dissection. The levator fascia often has a weak area, through which the levator fibers can be exposed. This fascia is incised using the da Vinci® hook. Dissection is carried inferiorly until the urethra with the surrounding puboperinealis muscle is exposed (Figure 13.2) and superiorly until the prostatovesical junction is identified by the presence of a subtle tongue of retroperitoneal fat (Figure 13.3).

**TABLE 13.1.** Instruments used for Robotic Prostatectomy.

<table>
<thead>
<tr>
<th>Console surgeon</th>
<th>Assistants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monopolar hook cautery</td>
<td>Microfrance laparoscopic graspers</td>
</tr>
<tr>
<td>Bipolar graspers and suction</td>
<td>ACMI suction irrigator with long suction</td>
</tr>
<tr>
<td>Roundtip robotic scissors</td>
<td>Cannula</td>
</tr>
<tr>
<td>Robotic needle drivers</td>
<td>Laparoscopic scissors</td>
</tr>
<tr>
<td>Long tip grasper</td>
<td>Laparoscopic needle drivers</td>
</tr>
<tr>
<td></td>
<td>Endocatch bag</td>
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<td></td>
<td>Laparoscopic Weck Clip applicators</td>
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</tbody>
</table>

**FIGURE 13.1.** Development of the extraperitoneal space. The yellow line marks the site of the peritoneal incision, < is the left median umbilical ligament, and > if the right median umbilical ligament.

**FIGURE 13.2.** Inferior extent of dissection of the endopelvic fascia. Abbreviations: U, urethra; PPL, left puboprostatic ligament; P, prostate.