Robotic-Assisted Simple Prostatectomy: An Overview

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KEYWORDS

• Robotic surgery • Simple prostatectomy • Minimally invasive • Benign prostatic hyperplasia

KEY POINTS

- Simple prostatectomy performed by any approach declined in the last 15 years.
- In 2012, 5% of all simple prostatectomies were performed laparoscopically in the US.
- Few large series limited to robotic prostatectomies have been published, with limited data on retreatment rates.
- However, existing data suggest that robotic prostatectomy is associated with equivalent functional outcomes, a significant reduction in transfusion rates, decreased hospital length of stay, and no difference in hospital charges compare to the open approach.

INTRODUCTION

Despite widespread use of medical therapy, the global incidence and prevalence of benign prostatic hyperplasia (BPH) and lower urinary tract symptoms have increased in the past 2 decades. At least 6.5 million men in the Unites States and 1.1 billion men globally suffer from BPH.[1–4]

Factors likely driving these trends include an aging population and an increased prevalence of metabolic disorders such as diabetes, obesity, and the metabolic syndrome, all of which are associated with increased risks of BPH and lower urinary tract symptoms.[5–8] As a result, the incidence of BPH-associated adverse medical events has persisted and, in the case of urinary retention, possibly increased.[1,9,10]

Indications for BPH surgical therapy focus primarily on adverse medical events and include urinary retention, renal failure secondary to BPH, urinary infections, bladder calculi, hematuria, and failure of—or inability to tolerate—medications.[11–13] Thus, even in an era of BPH medical therapy, the need for BPH surgery persists.

In patients requiring surgery, EAU and AUA Guidelines recommend consideration of open simple prostatectomy (OSP) for the surgical treatment of patients with large volume (>80 mL) glands (www.EAU.org, www.AUA.org). Refined from transcapsular and transvesical techniques described by Freyer[14] and Millin,[15] OSP substantially improves International Prostate Symptoms Score, urinary flow rate, quality of life, and postvoid residual volumes.

However, OSP has also been associated with relatively high rates of perioperative transfusion, prolonged hospital duration of stay, reoperation, and urinary infections.[16–18] An analysis of the US Nationwide Inpatient Sample (NIS), for example, observed a transfusion prevalence of 21% among more than 6000 OSP procedures performed in the United States from 2008 to 2010.[19] In multiple single institution series, perioperative transfusion rates ranged from 3.3% to 36.8%, and perioperative mortality was as high as 2.1%. Other adverse events include clot retention, bladder neck contracture, wound infection, and myocardial infarction.[20]

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Robotic-assisted laparoscopic simple prostatectomy (RASP), first described by Sotelo and colleagues[21] in 2008, potentially improves perioperative outcomes for simple prostatectomy, and its use has been increasing. Two recent studies of the NIS examined trends in the use of simple prostatectomy.[19,22] From 1998 to 2012, there was an overall decrease in the number of simple prostatectomies performed, but a modest increase in the proportion of minimally invasive simple prostatectomies (up to 5% of all surgeries by 2012), although neither study could differentiate laparoscopic from robotic techniques.

Herein, we describe a technique for transvesical robotic-assisted prostatectomy and review published evidence of RASP outcomes.

SURGICAL TECHNIQUE

We describe a technique for suprapubic, transperitoneal RASP which emulates classic anatomic principles of suprapubic OSP.[21] Other investigators have described retropubic and preperitoneal approaches for RASP. There is no evidence in the literature to suggest that any one of these techniques is superior to the others.[23–25]

Preoperative Evaluation and Preparation

Judicious screening for prostate cancer should be considered per evidence-based recommendations (www.nccn.org). Although prostate adenocarcinoma has been reported in up to 10% of series of simple prostatectomy,[26] the clinical significance of this observation in the modern era is unclear.

Per evidence-based guidelines, transrectal ultrasonography, cystoscopy, and urodynamics may be considered, and may be helpful in establishing the need for simple prostatectomy. Documentation of prostate volume, intravesical protrusion of median lobe, diverticuli, and calculi may be noted. Standard considerations for the preoperative evaluation of a patient undergoing laparoscopy may be made. Bowel preparation is unnecessary.

Patient Setup

The patient is placed in the supine Trendelenburg position with the legs spread, identical to the positioning for a robotic-assisted radical prostatectomy, with a Foley catheter in the bladder and 5 or 6 ports placed across the lower abdomen: typically a camera port, three 8-mm arm ports, and a 12-mm assistant port (Fig. 1). The robot is docked in the standard fashion.

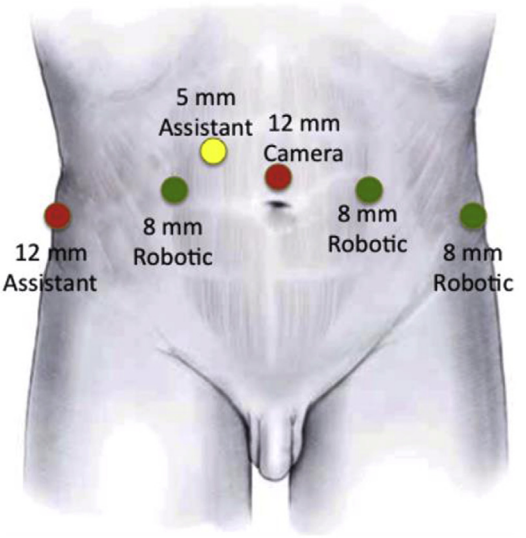

Fig. 1. Typical port placement. (*From* Patel M, Hemal A. Robot-assisted laparoscopic simple anatomic prostatectomy. Urol Clin North Am 2014;41:487; with permission.)

Prostate Exposure

In an initial approach identical to robotic-assisted radical prostatectomy, an incision is made in the anterior abdominal wall and the space of Retzius is accessed in the standard transperitoneal fashion. The medial and the median umbilical ligaments are transected and the bladder is released from the anterior abdominal wall. A transverse or vertical incision is made in the anterior bladder 2 to 3 cm proximal to the junction of the prostate and the bladder. The bladder lumen is entered, exposing the prostate adenoma.

Alternatively, the bladder is filled with normal saline to mark its boundaries and incised vertically on the posterior wall to enter the lumen. To provide fixed exposure of the bladder neck and prostate adenoma, the cystotomy incision is secured open with four 2-0 Vicryl sutures, 2 each placed at the anterior and posterior apices of the incision. The anterior and posterior sutures are secured in place to the anterior and lateral abdominal wall, respectively, with hemolock clips. The incision is lengthened as needed to afford additional exposure. Retraction sutures can be placed at the lateral margins of the cystotomy and affixed to the abdominal wall to facilitate exposure.[27]

Development of the Posterior Plane

To provide exposure of the posterior plane, the median lobe is placed on anterior traction by grasping it with the Prograsp forceps attached to the third arm of the robot. To minimize tissue