Robot-Assisted Laparoscopic Simple Anatomic Prostatectomy

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KEYWORDS

• Robotic • Laparoscopy • Simple prostatectomy • Benign prostatic hypertrophy
• Bladder outlet obstruction • Lower urinary tract symptoms

KEY POINTS

- This article demonstrates multiple surgical approaches for robot-assisted simple prostatectomy (RALSP) in patients suffering from lower urinary tract symptoms from large prostatic adenomas.
- RALSP is a technically feasible and viable treatment option that also allows management of other pathologies concomitantly.
- RALSP with complete urethrovesical reconstruction is a minimally invasive technique for a large prostatic adenoma that provides excellent outcomes.
- RALSP can also be performed with other modified techniques as described.
- Larger studies with longer follow-up are needed to assess the long-term results of this procedure on alleviation of voiding symptoms.

INTRODUCTION

Management options for men with symptomatic benign prostatic hyperplasia have increased over the past few decades. For most men with small glands and lower urinary tract symptoms, the standard therapy includes alpha blockers as a first-line treatment. In previous studies of 1-year duration or less, combination with a 5-alpha reductase inhibitor proved equal to alpha-blocker therapy in efficacy and safety, but superior to 5-alpha reducatase inhibitor (ARI) therapy alone. However, the Medical Therapy of Prostate Symptoms (MTOPS) study[1] demonstrated that in the long term, among men with larger prostates, combination therapy is superior to either alpha-blocker or 5-ARI therapy in preventing progression and improving symptoms.

According to the American Urological Association (AUA) guidelines, surgery is recommended for patients who have renal insufficiency secondary to benign prostatic hyperplasia (BPH), who have recurrent urinary tract infections (UTIs), bladder stones or gross hematuria due to BPH, and those who have lower urinary tract symptoms (LUTS) refractory to other therapies. Minimally invasive interventions are the standard therapy for this group of patients.

Technology is rapidly improving, and the use of various endoscopic techniques along with lasers has gained popularity because of the lower morbidity and mortality compared with the traditional gold standard of transurethral resection of the prostate (TURP).[2] Other approved technologies for treatment of outlet obstruction include visual laser ablation of the prostate (VLAP), transurethral needle ablation of the prostate (TUNA), transurethral electrovaporization of the prostate (TUEVP), microwave ablation of the prostate, Greenlight photovaprorization of the prostate using a KTP laser, and holmium enucleation of the prostate. The AUA guidelines state that in men with larger prostates who would likely require

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a staged procedure, open prostatectomy is an appropriate and effective treatment alternative for men with moderate-to-severe LUTS who are significantly bothered by their symptoms.

Open simple prostatectomy is recommended by the European Association of Urology guidelines for men with large glands (>80–100 mL). Although the guidelines last updated in 2010 did not give a formal recommendation to minimally invasive approaches to simple prostatectomy, techniques been developed and are now commonly being performed to help men suffering from significant lower urinary tract symptoms who would otherwise undergo a difficult transurethral procedure.

The first laparoscopic simple prostatectomy was performed in 2006,[3] and numerous subsequent series have demonstrated function outcomes similar to the open technique.[4,5] Although these series demonstrated the equivalence of performing simple prostatectomy using a minimally invasive approach, this technique is difficult to master and disseminate. The authors first started developing a technique of robot-assisted laparoscopic simple prostatectomy (RALSP) in 2009 at Wake Forest based on experience of the senior author, who has previously performed laparoscopic and robot-assisted simple prostatectomy.[6,7]

The use of robotics overcomes the limitations of pure laparoscopy by providing stereoscopic 3-dimensional vision, wristed instruments with 7° of freedom, and tremor control. Robotic assistance helps in quicker skills acquisition, and the learning curve for RALSP is actually steeper than for laparoscopic simple prostatectomy, as learning is longer and shallower with the latter. This article describes multiple techniques for RALSP in a step-by-step manner presents the authors' results.

Indications for RALSP include

1. Large prostate over 75 to 100 g
2. Acute urinary retention
3. Bladder outlet obstruction recalcitrant to medical therapy
4. Bladder outlet obstruction with diverticulum
5. Recurrent hematuria due to BPH
6. Upper tract changes
7. Bladder calculi

METHODS AND PATIENTS

Twenty consecutive cases of RALSP for BPH-related LUTS were performed by a single surgeon. Some of these procedures were performed as a live demonstration for educational purposes.

Initial workup included a complete history and physical examination, International Prostrate Symptom Score (IPSS) (if applicable, ie, not with an indwelling Foley urethral catheter for urinary retention), office uroflowmetry, urine analysis, urine culture, serum electrolytes including creatinine, prostate-specific antigen, and axial imaging (**Fig. 1**). All patients who were younger than 70 with an elevated prostrate-specific antigen (PSA) test underwent transrectal ultrasound-guided prostate biopsy to exclude prostate cancer prior to surgery before their referral to the authors. All patients had failed medical therapy prior to intervention. Patients were counseled regarding treatment options including continuing medical therapy, prostatectomy (both open and minimally invasive), TURP, laser prostatectomy, and photovaporization of the prostate. After appropriate workup and counseling, informed consent was obtained.

Multiple techniques can be employed to perform RALSP. Each approach recapitulated the open technique with few modifications.

Technique I—RALSP Transperitoneal Anatomic Approach

The step-by-step video of this technique can be seen on the *Urologic Clinics of North America* Web site.

Positioning

The patient is placed in the dorsal lithotomy position with all pressure points padded. The patient

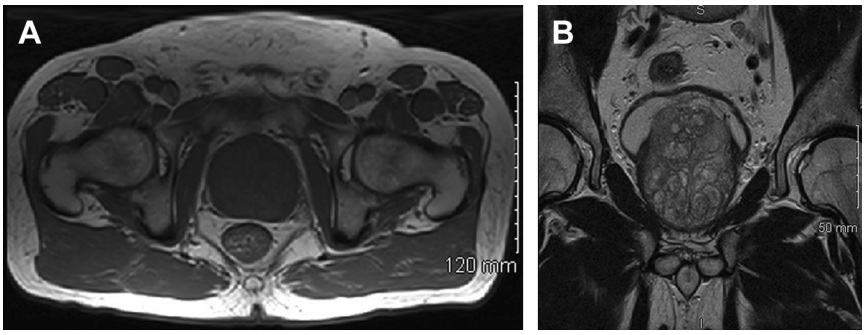

Fig. 1. (*A*) Magnetic resonance imaging (MRI) axial images of large prostatic adenoma. (*B*) MRI coronal images demonstrating significant intravesical prostatic protrusion of prostatic adenoma.