

# Laparoscopic and Robotic-assisted Simple Prostatectomy

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## ABSTRACT

Laparoscopic and robotic-assisted techniques are now established in the surgical treatment of prostate cancer. The use of these new technologies in the area of benign prostatic disease is surprisingly recent. Where endoscopic resection is precluded because of large volume gland enlargement, open prostatectomy is still a preferred method. Holmium laser enucleation and transurethral electroresection-enucleation are other modalities that are in use in selected centers. This review is to evaluate the current position of laparoscopic and robot-assisted simple prostatectomy, explore advantages and disadvantages and assess the impact of these technologies in the future management of benign prostatic hyperplasia.

**Keywords:** Benign prostatic hyperplasia, Prostatectomy, Laparoscopy, Robot assisted.

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## INTRODUCTION

Benign prostatic hyperplasia (BPH) is estimated to afflict 60% of 60-year-old and 90% of 90-year-old men. In spite of advances in medical therapy using  $\alpha$ 1 blockers and 5 $\alpha$  reductase inhibitors (5 ARI) up to 10% of these men will require surgical relief of bladder outlet obstruction (BOO) caused by the enlarged gland. With advancing age and prolonged medical therapy there is likely to be a significant number of patients with larger glands requiring enucleation rather than transurethral resection. Similarly, comorbidities are on the increase and the invasiveness of open surgery combined with blood loss and the metabolic response to trauma, traditional open prostatectomy is giving way to less invasive methods via the transurethral route, such as holmium laser enucleation (HOLEP) and electroresection and enucleation (TUERP). Recent applications of laparoscopic and robotic-assisted techniques to replicate open prostatectomy have aroused considerable interest.

## OBJECTIVE

The objective of this review article is to assess safety and outcome between laparoscopic and robotic-assisted simple prostatectomy for BPH and compare these with the more established open and transurethral prostatectomy (including HOLEP and TUERP).

The main parameters assessed were the feasibility and ease with which the procedure could be performed and the

advantages and disadvantages when compared with the other methods in use.

This involved the review of related articles to epidemiology of BPH, open prostatectomy, HOLEP, TUERP as well as laparoscopic and robot-assisted simple prostatectomy, with the aim of realizing the objectives of the study. This was achieved using internet search engines and then reviewing the relevant articles through the Royal Australasian College of Surgeons (RACS) library, eMedicine and Uptodate from the Queensland Health website and from resources at World Laparoscopy Hospital. The original articles were obtained from the RACS library in the majority of cases.

## REVIEW OF ARTICLE

Epidemiological studies of BPH are fraught with difficulty because of controversy over diagnostic criteria. Nevertheless BPH is a growing public health concern.<sup>1,2</sup>

Open prostatectomy remains the 'gold standard' in terms of symptom relief but the associated morbidity and complication rates are high.<sup>3,4</sup>

Transurethral resection of prostate (TURP) is ideal for moderate-sized glands. Attempts to reduce associated morbidity include saline TURP and laser techniques with resection and nucleation. Holmium enucleation is an established technique and newer lasers, such as thulium are yet to show any marked advantages.<sup>5</sup>

Transurethral enucleation and resection using saline as irrigant and bipolar energy (TUERP, TUEB) is a novel technique for removal of the larger gland.<sup>6</sup> Both this and HOLEP require mechanical morcellation of the gland prior to removal.

Porpiglia<sup>7</sup> in 2006 reported laparoscopic Millin's prostatectomy and Desai et al<sup>8</sup> followed with robot-assisted single port transvesical prostatectomy. A large review of 450 cases was reported from Turkey in 2010.<sup>9</sup>

## TECHNIQUES AND RESULTS

Laparoscopic simple prostatectomy is performed through an extraperitoneal or transvesical approach. A subumbilical 2 to 2.5 cm incision permits the insertion of a SILS or multiport and the preperitoneal space developed by balloon or insufflation and dissection. The prostate is approached either through the bladder or by a capsular incision as in Millin's technique. The remainder of the operation follows closely the steps of open prostatectomy. Hemostasis is

achieved by direct electrocoagulation, trigonization and closure of the incision done with continuous sutures. The specimen cut into strips and removed through the port site. Operative time has varied between 108 minutes to 6 hours and there have been documented injuries to the adjacent bowel. Finger assistance has been described both through the rectum and through the port site.<sup>10</sup>

The reported robotic technique has been done with a single port inserted directly into the bladder.

The procedures have been uniformly considered feasible, safe and relatively complication free. A stated advantage is the significantly lower blood loss.

## DISCUSSION

With ageing populations worldwide resulting from increasing longevity, BPH requiring surgical intervention is becoming a significant public health challenge. It is estimated that the incidence of BPH is as high as 38 per 1,000 man-years at age 75 to 79, rising exponentially from 3 per 1,000 man-years at age 45 to 49 years. Associated comorbidities and treatment thereof especially with antiplatelet and anticoagulant drugs add to perioperative morbidity and mortality thereby limiting the surgical options especially that of open prostatectomy, which already has higher complication rates.

HOLEP and TUERP have been developed to safely perform enucleation even in patients on anticoagulant therapy. These are not universally available and the learning curve is steep so that the procedures are limited to few centres where enthusiasts have gained the requisite skills.

The advent of laparoscopy and robotics is, therefore, an area that has tremendous potential. Most modern surgeons are being trained in laparoscopic techniques and many urology residents are acquiring skills with the da Vinci robot. Instrumentation is now ergonomically designed, the only limiting factor being the high associated costs.<sup>11</sup>

## CONCLUSION

It is obvious that the new technologies are here to stay and will make inroads into the traditional management of all manner of surgically correctible conditions.

It remains to be seen whether the potential benefits are translated into practical applications. More studies will be needed to define the place of laparoscopy and robotics in the surgical treatment of BPH.

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