Retzius-sparing robotic radical prostatectomy

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Traditional approach to the prostate during radical prostatectomy (RP) when performed by open, laparoscopic, or robotic means has been from its anterior aspect first and has involved suture ligation and division of the dorsal vein complex (DVC), division of the puboprostatic ligaments, and incision of the endopelvic fascia on either side of the prostate. These steps are necessary to liberate the prostate from its surrounding attachments, even though concern has always existed about the likely association between disruption of these structures and postprostatectomy incontinence (PPI). Although perineal prostatectomy leaves these structures intact, it has failed to become widely accepted because of the small incidence of postoperative fecal incontinence and the difficulty in performing a pelvic lymphadenectomy (PLND) when this is indicated.

Retzius-sparing robot-assisted radical prostatectomy (RS-RARP) was first described by Galfano et al.\(^1\) It represents the continuation in an anterior direction of the posterior approach to the vasa and seminal vesicles through a posterior peritoneectomy, first described as a part of initial step of laparoscopic RP by Guillonneau and Vallencien in 2000.\(^2\) The challenges of this approach include a small workspace, no lateral aiming point when dissecting the lateral pedicles of the prostate, an inability to look into the bladder after bladder neck division to verify the position of the ureteric orifices, and an inverted relationship between the bladder and prostate during dissection and reconstruction.

A PubMed search of the English language using the term “Retzius-sparing radical prostatectomy” was conducted before writing this review of the technique. The important role played by the structures anterior to the apex of the prostate in stabilizing the external urinary sphincter has been revealed by the significantly better early urinary continence noted in published series of RS-RARP, which includes small randomized controlled trials done by Menon and coworkers and Asimakopoulos and colleagues (Table 1).\(^3–8\) The results show that initial continence is approximately three times better than that after anterior approach (AA) RP. Based on the fact that of the various consequences of RP that negatively impact a patient’s quality of life,\(^9\) postprostatectomy SUI (PPSUI) has the greatest single influence.\(^10\) This is of considerable importance to patients and is likely to reduce the appeal of nonsurgical options for treating operable prostate cancer.

At least theoretically, preservation of the arteries within the DVC, as well as the accessory pudendal arteries found in 30% of men, might also lead to better postoperative potency, and the author has started to see a trend that supports this, although longer follow-up supported by patient-reported outcome questionnaires is needed to clarify this observation. The author also feels that being forced to begin the neurovascular bundle (NVB) preservation (or indeed, excision, if that is the aim) posterior to the prostate by freeing it in the infravesical or interfascial plane before dividing the lateral pedicles, as one is during RS-RARP, results in a lower risk of inadvertent NVB injury, especially to the proximal NVB, and better postoperative potency.

A further advantage of RS-RARP includes a shorter operating time through the omission of several steps done during AA-RARP: mobilization of the bladder, defatting the prostate, incision of the endopelvic fascia, ligation and division of the DVC, and anatomical reconstruction such as insertion of a Rocco suture. In addition, recent analysis of the author’s first 320 cases (Table 2) showed similar operating time for prostates <70 g and >70 g (179 min and 177 min; P ≤ 0.001), a similar transfusion rate (3 units and 1 unit; P = 0.94), a similar postoperation hospital stay (1.9 nights and 1.8 nights; P = 1.00), similar Clavien 1, 2, and 3 complications (8, 3, 7 patients and 5, 1, 2 patients; P = 0.98, 0.94, and 0.76, respectively), and similar positive surgical margin (PSM) rates for pT2/pT3 disease (18.7%/38.8% and 11.8%/29.4%; P = 0.98/0.13).

Maintaining the relationship between the bladder and the anterior abdominal wall allows the safe use of a suprapubic catheter after RS-RARP, which two studies have shown is more comfortable for RP patients than a urethral catheter.\(^11,12\) It also allows the trial of voiding (TOV) to be done at home and for a failed TOV to be managed more easily. Furthermore, the author has found a significant reduction (to 1/25) in patients with a symptomatic urinary tract infection (UTI) after RP when an SPC was used.

For surgeons using intraoperative frozen section (the neuroSAFE technique), the RS approach allows easier secondary resection of potentially involved NVBs as when the bladder is lifted up after the vesicourethral anastomosis has been completed, the two NVBs are directly visible in RS cases, in contrast with the anterior approach in which medial retraction of the bladder is needed to expose them, potentially placing tension on the anastomosis.

To date, dissemination of RS-RARP has not matched the interest in this technique because first it is difficult to do laparoscopically with straight laparoscopic instruments (the author has attempted eight cases and has successfully completed four of these entirely laparoscopically) and second even in more affluent healthcare environments where robotic surgery is financially viable the lack of landmarks, cramped workspace, and...
proximity of the ureters are reasons enough to put off even experienced RP surgeons, as is a lack of suitable mentors. However, in high-volume centers, RS-RARP is as easily taught as AA-RARP, and in the author’s department, three surgeons including two fellows use this technique.

Case selection when starting one’s initial experience of RS-RARP is sensible to safeguard patients and minimize the inevitable initial increase in operating time. The ideal case would be a slim patient with no prior abdominal or pelvic surgery and a 40 ml prostate with localized prostate cancer. As experience grows, larger prostates and heavier patients, previously-operated cancers, and those with T3 disease can be attempted and those with T3 disease can be attempted by suitably-experienced surgeons, knowing that conversion to an anterior approach is a straightforward option to salvage a difficult RS-RARP case. RS-RARP is a preferable approach anatomically after laparoscopic TEP mesh hernia repair, as all of the surgery can be done under the mesh without the need to disturb it, as well as after renal transplantation for similar reasons. Based on the results obtained thus far, the author also feels that RS-RARP is particularly advantageous in patients who might otherwise be expected to have poorer PPI: men aged >70 years, the obese, nonnerve-sparing cases, and patients having salvage surgery.

**POTENTIAL DISADVANTAGES OF RS-RARP**

The three studies that have compared RS and AA-RARP noted higher PSM rates following RS, but these have not reached statistical significance and patient numbers (n = 40–60) were too small to allow definitive conclusions to be drawn. In the author’s first 160 RS-RARP cases, the location of PSMs was statistically similar (P ≤ 0.05) in all locations, but there was a trend toward a higher apical and radial PSM in RS-RARP cases, which was thought to be due to more aggressive preservation of urethral stump length and nerve preservation robotically, compared to 1000 AA laparoscopic RP controls (Figure 1). Large anterior tumors remain an oncological challenge for RS-RARP and might be better performed by AA-RARP, although the author is currently investigating a modification of the RS approach in which the plane of dissection is taken anterior to the DVC as soon as the anterior bladder neck is divided, leaving this structure on the anterior aspect of the prostate, as in AA RP. Careful review of the magnetic resonance imaging (MRI) scan and the pattern of positive prostate biopsies is even more important in controlling the PSM rate following RS-RARP than that for AA-RARP.

The inability to look inside the bladder during RS-RARP, together with the proximity of the distal ureters to the lateral pedicles of the prostate, has led to a number of published as well as unpublished ureteric injuries. Since ureteric injury is also a recognized complication of AA-RARP, it would be unreasonable to criticize a relatively new

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**Table 1: Published series of Retzius-sparing robot-assisted radical prostatectomy**

| Patient (%), Gland weight (g), Operating time (min), Transfusion patient (number of unit), Hospital stay (day), Clavien 1/2/3 complications (n), Positive margin, pT2/pT3 (%) | Eden (unpublished) |
|-------------------------------------------------|-----------------|
| Patient (n) | Gland weight (g) | Operating time (min) | Transfusion patient (number of unit) | Hospital stay (day) | Clavien 1/2/3 complications (n) | Positive margin, pT2/pT3 (%) | Pad-free at 4 weeks (%) |
|-------------------------------------------------|-----------------|
| Prostate <70 g | 235 | 36.0 | 179 | 3 (2) | 1.9 | 8/3/7 | 18.7/38.8 | 94.0 |
| Prostate >70 g | 85 | 87.0 | 177 | 1 (2) | 1.8 | 5/1/2 | 11.8/29.4 | 77.6 |
| P | <0.0001 | 1.00 | 0.94 | 1.00 | 0.98/0.94/0.76 | 0.98/0.13 | <0.0001 |
technique prematurely because of this. The fifth patient in the author’s series had a ureteric injury, but he has encountered no further instances in the past 405 patients despite 23% of cases being done for T3 disease. It appears that patients with large middle lobes of prostate (Figure 1), previous bladder-outlet surgery, patients with locally advanced prostate cancer, and perhaps also salvage cases are most at risk of ureteric injury, but as with PSM rates, larger numbers of patients operated on by surgeons beyond their learning curve are needed to determine any association between the choice of surgical approach and the probability of ureteric injury.

In a similar vein, although published series have reported similar complication and biochemical recurrence rates (Table 1), it is impossible given the small sample size and limited follow-up to comment definitively on these variables.

THE FUTURE

Until every patient leaves the hospital following RP with no trace of cancer remaining, no complications, and full continence and potency, urologists have a moral and ethical obligation to continue to develop their surgical technique to improve their results and thereby patient outcomes. RS-RARP represents one such endeavor, but we can be certain that there will be others. Patient safety remains a paramount concern, but this should not be used as an excuse for complacency or to stifle progress. Clearly, further follow-up in a larger number of cases operated on by surgeons experienced in the technique is needed to determine the true role of RS-RARP in the surgical management of prostate cancer, regularly analyzing one’s results to fine-tune the technique and improve results, but in the meanwhile, there is sufficient justification to cautiously and slowly disseminate RS-RARP.

COMPETING INTERESTS

The author declares no competing interests.

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