Seminal vesicle sparing laparoscopic radical prostatectomy using a low-energy source: Better continence and potency

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ABSTRACT

Objectives: Ongoing with the newer developments in laparoscopic radical prostatectomy (LRP), we report our experience in a consecutive series of 42 patients with a mean 18-month follow-up. We also studied the use of a low-energy source, especially in the region of the prostatic apex and the neurovascular bundle and evaluated its outcome on continence and potency.

Materials and Methods: Between November 2003 and December 2008, 50 patients aged 50–80 yrs underwent LRP with vesicourethral anastomosis and of these, 42 patients who had a minimum follow-up of 3 months were selected for the study. Of these, the initial 16 patients were operated by the routine method and the 26 patients operated in the later part of our experience were operated upon using a minimal energy source.

Results: The mean follow-up was 18 months (range 3–60). Continence was evaluated at 1, 3, 6, and 12 months. Eleven of the 16 patients in Group I were continent as compared with 21 of 26 patients in Group II. The difference in continence rates was mainly due to less use of electrocautery and harmonic scalpel at the bladder neck. Of the eight patients who were potent pre-operatively in Group I, four remained potent 3 months after LRP. In Group II, 20 of the 26 patients were potent pre-operatively and 16 remained potent 3 months after LRP.

Conclusions: Use of a low-energy source at the bladder neck and neurovascular bundle, sparing of seminal vesicle, and leaving behind a long, healthy stump of the urethra during apical dissection, is associated with better continence and potency without compromising oncological outcome.

Key words: Prostate, prostatectomy, radical

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INTRODUCTION

The first laparoscopic radical prostatectomy (LRP) was performed in 1997 by Schuessler et al. Since then, LRP has been reported widely and it has become increasingly important as a treatment for localized carcinoma of the prostate. Two large early series originated in France and LRP has since been described in large series (greater than 50 cases) from Germany, Belgium, Japan, the United Kingdom, the United States, and Italy. Cumulatively, well over 3000 procedures have been published worldwide using various techniques, surgical approaches, and surgical and robotic instruments. Ever since more and more centers are performing LRP with newer technical variations. Gradually, this is leading to a refinement of the techniques. However, the ongoing debate regarding better continence and potency preservation is still going on. We present our initial experience of LRP with the classical transperitoneal technique. We also compared the results of surgery in Group I (16 cases), performed in the initial part of our series between November 2003 and March 2007 using the routine technique, with Group II (26 cases), performed in the latter half of our experience between April 2007 and August 2008 using a low-energy source.

MATERIALS AND METHODS

From November 2003 to December 2008, a total of 50 cases of radical prostatectomy were operated by the laparoscopic technique. Of these, 42 patients with a minimum follow-up of 3 months were selected for the study. The initial 16 patients were operated with the routine technique and 26 patients operated in the latter part (Group II) were operated using a minimal energy source. Both groups were
largely similar with respect to mean patient age, Gleason score, general comorbid conditions, and T stage.

**Procedure**
An inverted U-shaped anterior peritoneotomy incision is placed using a hook electrode cautery. The bladder is then dissected off of the anterior abdominal wall, allowing access to the space of Retzius. The endopelvic fascia is incised, exposing the lateral margins. Puboprostatic ligaments are excised. The dorsal vein complex (DVC) is exposed and dissected all around the DVC, allowing placement of a suture ligature around the DVC for hemostasis. The bladder neck is incised and the incision is carried out all around the bladder neck. Finally, the urethra is transected at the apex of the prostate, leaving behind an adequate length of membranous urethra. Urethrovessical anastomosis is then performed using a 3-0 polyglactin suture with interrupted stitches. In the later part of our experience (Group II), we were specifically careful in our dissection of the region of the bladder neck and the neuromuscular bundle. We also spared the tips of the seminal vesicle, which are closely related to the pelvic nerves [Figure 1].

We used sharp dissection with scissors in this region and reserving pin point sharp cautery to control any bleeding vessels in this region. Thus, a minimal energy source was used in this dissection. Besides this, a healthy urethra was preserved during apical dissection [Figures 2 and 3].

All patients in their postoperative period were administered IV antibiotics and analgesics as per the requirement. All patients were mobilized on the first postoperative day. Patients were discharged as soon as they were comfortable on a perurethral catheter. Pericatheterogram is performed on the 10th postoperative day. In case the anastomosis was healthy, the perurethral catheter was removed. Otherwise, the perurethral catheter was kept for one more week and removed before checking the anastomosis radiographically. The groups were compared according to operating room time, estimated blood loss, transfusion rate, conversion rate, complication profile, catheter days, hospital stay, continence, and erectile function [Tables 1 and 2].

| Table 1: Patients' profile |
|---------------------------|
|                          | Total | Group I | Group II |
| No. of patients           | 42    | 16      | 26       |
| Patients' age range       | 50–78 | 52–73   | 50–80    |
| Gleason range             | 5–8   | 5–8     | 5–7      |
| Prostatic volume (gm)     | 15–70 | 15–70   | 20–50    |

| Table 2: Operative and postoperative results |
|---------------------------------------------|
|                                            | Group I (n = 16) | Group II (n = 26) |
| Mean operating time in min (range)         | 231 (200–270)   | 218 (18–250)      |
| Median blood loss in cc (range)            | 890 (800–1200)  | 920 (600–1058)    |
| Average transfusion units (range)          | 1.56 (0–4)      | 1.60 (0–5)        |
| Conversion to open                         | 4/16            | 2/26               |
| Rectal injury                              | 2/16            | 1/26               |
| Hospital stay in days (range)              | 4.25 (3–12)     | 4.71 (3–9)        |
| Continence at 3 months                     | 11/16           | 21/26              |
| Potency                                    | 4/8             | 16/20              |

Figure 1: Intra-operative photograph of sparing of the seminal vesicle

Figure 2: Postoperative photograph of the incision length and port site

Figure 3: Postoperative specimen of the prostate
RESULTS

The mean operative time for Group I (routine LRP) was 231 min and for Group II (LRP with low-energy usage) was 218 min. The median blood loss in Group I was 890 ml and in Group II was 920 ml. However, the average transfusion requirement (allogenic) was 1.56 units in Group I and 1.60 units in Group II, which is not statically significant.

Conversion to open surgery due to bleeding or rectal injury was 25% (4/16) in Group I and 7.6% (2/26) in Group II. Incidence of rectal injury in Group I was two patient, 12.5% (2/16), and in Group II was 3.8% (1/26). All patients with rectal injury were diagnosed intra-operatively and converted to open procedure and the injury was repaired in two layers and a rectal drain was placed for 5 days postoperatively. No incidence of delayed rectal leakage was seen in any of the three cases.

Patients were kept in the hospital till the patients were ambulatory and felt fit enough to go home.

In Group I, the hospital stay was 4.25 days, with one patient of rectal injury staying up to 12 days due to subacute intestinal obstruction. This was not statically different for the average hospital stay of 4.71 days in Group II.

Continence was evaluated at 1, 3, 6, and 12 months. Eleven of the 16 (68.7%) patients in Group I were continent as compared with 21 of the 26 (80.7%) patients in Group II.

In Group I, only eight patients of the 16 were potent pre-operatively and four (50%) of them remained potent 3 months after LRP. In Group II, 20 of the 26 patients were potent pre-operatively and 16 (80%) remained potent 3 months after LRP.

DISCUSSION

The mean operative time for Group I (routine LRP) was 231 min and for Group II (LRP with low-energy usage) was 218 min. Moreover, the slight increase in duration in Group I may be due to the learning curve and also the increased number of rectal injury in Group I.

The median blood loss in Group I was 890 ml and in Group II was 920 ml. The median estimated blood loss was slightly higher in Group II with less use of electrocautery and harmonic scalpel. Higher blood loss was also expected as a part of the procedure due to vigorous use of scissors and sharp dissection in Group II. However, the average transfusion requirement (allogenic) was 1.56 units in Group I and 1.60 units in Group II.

Conversion to open surgery was 25% (4/16) in Group I and 7.6% (2/26) in Group II. No increases in the conversion rate were seen in Group II despite sharp dissection and slight increase in bleeding. The reason for open conversion was either rectal injury or bleeding in most cases. One case had to be converted to open surgery due to difficulty in dissection at the apex.

Incidence of rectal injury in Group I was two patients, 12.5% (2/16), and in Group II was 3.8% (1/26).

Patients were kept in the hospital till patients were ambulatory and felt fit enough to go home. In Group I, the hospital stay was 4.25 days, with one patient of rectal injury staying up to 12 days due to subacute intestinal obstruction. This was not statistically different for the average hospital stay of 4.71 days in Group II.

Continence was evaluated at 1, 3, 6, and 12 months. Eleven of the 16 patients (68.7%) in Group I were continent as compared with 21 of the 26 (80.7%) patients in Group II. The difference in the continence rates was mainly due to less use of electrocautery and harmonic scalpel at the bladder neck, sparing of seminal vesicle, and preservation of the healthy urethra during dissection. Sharp dissection and less use of electrocautery and harmonic scalpel causes lesser damage to the nerves in the vicinity of the neurovascular bundle and also helps in better preservation of the external sphincter at the neck.

In Group I, only eight of the 16 patients were potent pre-operatively and four (50%) of them remained potent 3 months after LRP. In Group II, 20 of the 26 patients were potent pre-operatively and 16 (80%) remained potent 3 months after LRP. The erectile function is better in Group II. The patient population in our study is small. Therefore, longer follow-up and studies including larger population of patients are required to evaluate the same.

CONCLUSION

Since its inception by Schuessler et al. in the early 1990s, LRP has gained tremendous popularity and widespread implementation at specialized centers worldwide. LRP represents a technically demanding laparoscopic procedure, but it can be performed systematically with standard techniques. Meanwhile, the constant effort to improve upon the technique to attain better results is still on in the urological community world over. In the same context, our initial observation that the use of a low-energy source at the bladder neck and the neurovascular bundle, sparing of seminal vesicle, and preservation of the healthy urethra during dissection is associated with better continence and potency is encouraging. Nevertheless, longer follow-up and more mature data are needed definitively to establish the fact.
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