Robotic Radical Prostatectomy at the Egyptian National Cancer Institute: Overcoming the Challenges in the Initial Case Series

Ashraf Saad Zaghloul
National Cancer Institute, Cairo University

Ahmed Abdelbary (ahmed.abdelbary@nci.cu.edu.eg)
National Cancer Institute, Cairo University

Amr Fergany
Sebastian River Medical Center, Florida

Hatem Aboulkassem
National Cancer Institute, Cairo University

Waleed Mohamed Fadlalla
National Cancer Institute, Cairo University

Research Article

Keywords: Early experience, learning curve, technical difficulties, re-docking, open conversion.

DOI: https://doi.org/10.21203/rs.3.rs-243859/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

Background

Robotic prostatectomy is showing progressive worldwide spread owing to potential clinical benefits, but at a higher cost.

Objective

This article describes the challenges and clinical outcome of the first group of patients undergoing robotic prostatectomy in Egypt.

Design, setting, participants

From 2017 to 2019, the data of all (55) patients undergoing robotic radical prostatectomy at the National Cancer Institute of Egypt was analyzed.

Outcome evaluation

Short term operative outcomes, complications, technical difficulties, pathologic data and biochemical recurrence were reported.

Results

Average blood loss was 296 ml; one patient required blood transfusion. One case required open conversion, another required re-docking of the robot. Setup time was significantly improved from an average of 27.7 minutes in the first 27 cases to an average of 17.3 minutes in the final 28 cases (p < 0.0001). Complications developed in 27% of our patients. Continence recovery at catheter removal, first, third, sixth and twelfth months were 32.7%, 50.9%, 65.5%, 74.5%, and 96%, respectively.

Conclusions

Results from the first series of robotic radical prostatectomy were encouraging. Technical challenges can be overcome in a short period. Acceptable complication rate and satisfactory outcomes regarding continence and blood loss were observed.

Introduction
Prostate cancer is the most common male malignancy in the Western world. In Egypt, it is reported to be the 5th most common solid male malignancy. The number of cases is expected to double in 2025.

Surgical resection is one of the recommended treatment options for localized low/intermediate risk patients with a considerable life expectancy, offering cancer control in most cases. Urinary continence at 12 months after prostatectomy range from 90–97%, results for short term continence recovery are less than spectacular with potential for improvement.

Minimally invasive surgery encouraged urologists to adopt a laparoscopic approach to radical prostatectomy. However, laparoscopic prostatectomy and the anastomosis in the confined pelvis is a highly demanding technical procedure, with a steep learning curve which hindered propagation of the approach. This fact exposes patients to complications related to the early mistakes in the learning curve.

The Da Vinci surgical robot which is a master slave system came as an attractive option to overcome limitations and shorten the learning of standard laparoscopy. In the USA, most radical prostatectomies are performed robotically. Although this technology comes at a high financial cost, the momentum is still in favor of the robotic procedure despite the lack of level I evidence confirming its superiority to open surgery.

Cost is an important aspect to consider in a country with limited resources leading to considerable apprehension regarding the purchase and implementation of a robotic program in Egypt. From 2003 to 2014, no more than 1500 robotic procedures have been performed in the Arab world. One Da Vinci Si system was installed at the National Cancer Institute of Egypt since 2011 which performed less than 200 procedures (unpublished data). In contrast 6000 robotic procedures were performed in Italy in 2011. Economic instability was the main reason of the slow adoption of robotic surgery in Egypt, followed by limited experience with the technology. In the USA, many robotic surgeries are reimbursed by insurance companies, while in Egypt it is not. It is evident that robotic surgery will continue to show worldwide growth, owing to consumer demand. With the awaited arrival of other competing systems, costs of robotic surgery may become reduced. Finally, although technology comes at a price, successful innovation in medicine is priceless.

This report aims at the clinical and technical assessment of our experience with robotic prostatectomy, in hopes of finding opportunities for improvement.

**Patients & Methods**

The data of 58 patients undergoing robotic radical prostatectomy were entered into a pre-set database; including all the relevant variables. All procedures were performed by the da Vinci Si system (Intuitive Surgical Inc., Sunnyvale, CA).

**Surgical Technique**
In most cases, we used the anterior antegrade approach to radical prostatectomy. We used the posterior (Montsouris) approach in 9 cases.

**Study population**

The first case was performed in March 2017, and since then, 58 procedures were performed. All procedures were performed at the National Cancer Institute, Egypt, by the same surgical team. Three patients were excluded from the analysis due to incomplete data/loss to follow up.

**Outcome assessment**

**Continence** was assessed at catheter removal, first, third, sixth and twelfth post-operative months by: Pad use, number of pads per day, ICIQ-SF score. Continence was defined as use of no pads.

**Potency** was assessed using the IIEF-5 questionnaire at similar intervals; defined as the ability to achieve intercourse with or without the use of PDE-5 inhibitors.

**Oncologic outcome** was assessed by reviewing the pathology report, and serial PSA measurements. Requirement of adjuvant/salvage treatment was also recorded.

**Complications** were graded using the Clavien-Dindo classification.

**Technical difficulties** were reported, including re-docking, conversion to open surgery, and operative times. Setup time was defined as the time taken from skin incision to console.

**Statistical analysis**

Data was analyzed using SPSS Statistical version 21 (SPSS Inc., Chicago, IL). Numerical data were expressed as mean and standard deviation or median and range as appropriate. Qualitative data were expressed as frequency and percentage. A Mann-Whitney test/paired t-test was used to compare numeric variables. Tests were two-tailed, and p-values ≤ 0.05 were considered statistically significant.

**Ethical considerations**

The study was performed according to the World Medical Association Declaration of Helsinki and the ethical standards of the National Cancer Institute, Cairo University. Written informed consent was obtained from all individuals before operation. All interventions performed were part of the routine management of the patients.

**Results**

Baseline data

Baseline patient characteristics are illustrated in Table 1. High risk disease characteristics were evident among this cohort.
Peri-operative parameters

Mean blood loss was 296 ml; one patient required blood transfusion (Table 1). Bilateral nerve sparing surgery was possible in 40% of patients.

Complications

Fifteen patients developed complications (27%), of which 11 were grade III/IV Clavien-Dindo complications (Table 2). There were no visceral injuries. Two cases required temporary PCN insertion.

Three patients developed lymphoceles which required image guided aspiration in two. Bladder neck stenosis occurred in three patients, and required bladder neck incision. One patient developed port site hernia at the camera port site / specimen extraction incision three months post-operatively and underwent mesh hernioplasty. One patient developed left lower extremity DVT six weeks post operatively.

Three post-operative explorations were required due to persistent urinary leak, port site bowel incarceration and exploration of left ureteric entrapment (This patient's robotic procedure was converted to open due to difficulty with urethrovessical anastomosis; he was explored two days later for repair of the injury).

Technical difficulties

Operative time was divided into setup and console time. We compared the first 27 cases to the last 28 cases regarding setup time. Chronologic comparison of console time was not done as the cases were performed by different surgeons. Difference in setup time was statistically significant between the first and the last cases (Fig. 1) (P < 0.0001).

In one patient undocking was required due to clashing of the camera and R1, the port site for the camera was changed 3 cm cranially, and R1 was changed 3 cm laterally and the operation was continued robotically.

One patient required conversion to open surgery due difficulty with the urethrovessical anastomosis. This patient had a BMI of 34, with history of TURP, 70 cc prostate and high D’Amico risk stage.

Functional outcome

**Continence**

Table 3 summarizes continence recovery. 96% of the patients were pad free at one year.

**Potency**

Twelve patients (21.8%) recovered erections sufficient for intercourse. They were stratified according to pre-operative potency and intra-operative neurovascular bundle preservation in Table 3.
Pathologic outcome & biochemical recurrence

Pathologic results are summarized in Table 4. Lymph node metastasis was present in 20% of patients who underwent pelvic lymph node dissection. The most predominant grade was Gleason 7 (50.9%). Biochemical recurrence (BCR) was observed in 25.4%.

Discussion

This work represents the first case series of robotic radical prostatectomy in Egypt. Due to financial and logistic problems; the implementation of the program was slow. In 2017, 2018, and 2019, we performed 21, 15, and 29 cases respectively in urology, representing a consistent increase in the number of cases compared to the previous years.

To our knowledge, this is the first series from an Arab country to report technical difficulties in the initial experience with robotic prostatectomy.

Peri-operative parameters

Average hospital stay was 4.8 days. We kept the patients until we were sure that they are clinically well early in our experience. Many of our patients come from remote locations and their access to well-equipped health care facilities is questionable. Catheter was removed within 12 days in 63% of patients. Lately, our practice has shifted to removing the catheter as early as on the fifth post-operative day if there are no clear contraindications, similar to most modern practices. Transfusion requirements were minimal falling within the limit of western literature.

Functional outcome

Continence recovery was in the range of published studies even from centers of excellence. Recovery of potency is one of the most unpredictable events after radical prostatectomy as it is affected by multiple variables. Many patients had considerable pre-operative erectile dysfunction making recovery predictably poor. Overall, 21.8% of patients recovered their potency fully. Wide resection of the neurovascular bundle was required in seven patients due to advanced disease, while full bilateral nerve sparing was possible in 22 patients.

Complications

Bladder neck stenosis occurred in 5 patients (9%). This complication is reported to range from 0.3–3.3%. Bladder neck incision was performed in 3 patients with worsening of urinary control in two.

Urethral anastomotic leakage is one of the common complications after radical prostatectomy, ranging from 0.3–15.4%. Urinary leak occurred in six patients (10.9%). Three patients required invasive interventions; including exploration and re-anastomosis in one, and bilateral PCN insertion in two. All the three complications were from the first 20 patients in the cohort. For the subsequent 35 cases, 2 patients
(5.7%) developed increased drain output, and were successfully managed by extending the catheterization period to three weeks.

**Ureteric injury** occurred in two patients (3.5%). In one patient, the left ureter was transected during lymph node dissection. Repair was performed robotically by a psoas hitch followed by ureteric re-implantation in the dome of the bladder through a submucosal tunnel. The patient experienced an uneventful post-operative course. The other patient with history of TURP, had his robotic procedure converted to open, the left ureter was entrapped within the anastomotic stitches and the patient was explored on post-operative day 2. Identification and ureteroneocystostomy was performed. Ureteric injury during robotic prostatectomy occurs in 0.06–0.9%, which is lower than the incidence in this series. It is important to be cognizant of this avoidable complication at certain steps of the operation; posterior bladder neck dissection, during the urethrovesical anastomosis, and the proximal portion of lymph node dissection.

**Port site hernia** occurred in one patient at 3 months of follow up. Another patient developed herniation of small bowel in the immediate post-operative period. The patient presented with small bowel obstruction on Day 3. Laparoscopic assessment was performed and revealed incarcerated small bowel through the assistant port site, bowel was reduced and the defect repaired. This complication is reported in 0.04–0.477%, and occurs at sites of 10mm or larger trocars. Interrupted closure of specimen extraction site and using transverse incisions can potentially limit this complication. Although a rare occurrence, this complication was associated with extension of hospital stay to 21 days.

**Lymphoceles** were detected in 3 patients (5.5%), which is within range of most published studies (0.9–30%). In one patient, it was symptomatic, causing progressive pelvic pain and reduced bladder capacity. This was aspirated followed by sclerosis causing dramatic improvement.

Pathologic outcome and biochemical recurrence

Seven patients had positive margins (12.7%) which falls within the reported range (6.5–32%). Lymph node metastasis was detected in 20.4%.

Biochemical recurrence ranges between 8%-40%, and is a powerful surrogate for oncologic outcomes. None of our patients were screen-detected and 36% were of high risk D’Amico stage. Biochemical recurrence developed in 14 patients (25.4%) until last follow up. Mean follow up was 17 months (range: 6–36 months and ongoing). Longer follow up is required to appropriately assess oncologic outcome, results of long term follow up will provide insight on the natural history of prostate cancer in this high risk population.

Technical difficulties

Operative time was divided to setup/preparation and console time. The same operating team was included in all cases in order to allow for improvement with experience and a dedicated program director who is an experienced uro-oncologic surgeon. To reduce the learning curve associated with console time,
an experienced robotic surgeon (AF) performed the first 12 surgeries. Three surgeons with good exposure to open prostatectomy visited centers of excellence to acquire the surgical know-how, including simulator training, and attempt to bypass potential early mistakes.

**Setup time** was reduced from an average of 27.7 minutes in the first 27 cases to 17.3 minutes, \((p < 0.0001)\) in the last cases.

We modified our technique for assistant port placement; assistant port was liable to arm collision and poor access to the field in some steps of the operation; especially during access to the pelvic floor on the left side. After the first 13 cases, we decided to place the assistant port after docking is complete, to identify the most ergonomic site for the port. A second 5 mm port could be utilized in difficult cases; in a position between the camera port and the right working port. We only needed an additional assistant port in five cases; usually for cranial traction on the colon and the bladder in fatty patients.

The rate of intra-operative conversion to open surgery ranges from 0.9–5%. According to literature, predictors of conversion were obesity, presence of adhesions, and early learning curve. Only one patient in this study required conversion; this patient had a BMI of 34, history of TURP, 70 cc prostate and high D’Amico risk stage. This highlights the importance of proper patient selection, tackling challenging cases only when the early phase of the learning curve has been completed. We did not encounter device malfunction in our series.

In our experience, we felt that using the “Montsouris approach” had a profound impact on facilitating bladder neck dissection, which can be confusing in the early experience. Using the 30° camera also helped provide a better vantage point.

Egypt, a developing nation with significant economic constraints, has purchased and adopted robotic surgery through its only system at the National Cancer Institute. Experience with the first series of radical prostatectomy in a robot naïve center proved that satisfactory clinical results in terms of minimal blood loss, early recovery, and return of urinary control, can be achieved. Technical difficulties with adopting this technology can be overcome as well; using a dedicated team supplemented by institutional support and international proctoring. A health economic analysis is recommended to evaluate the cost-benefit of the robot and the feasibility of continuing the service.

**Declarations**

**Competing interests:** none

**Funding:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Ethics approval and consent to participate:** Written informed consent was obtained from all individuals before operation. All interventions performed were part of the routine management of the patients.
Data availability: Data is available upon request.

Authors’s contributions:

Zaghloul AS: Project development, Program director, Primary surgeon, manuscript revision.

Abdelbary A: Protocol writing, data collection, manuscript writing.

Fergany A: Primary surgeon, International Proctor, manuscript revision.

Aboulkassem H: Project development, manuscript revision.

Fadlalla WM: Protocol writing, data collection, manuscript revision.

References

1. Ibrahim AS, Khaled HM, Mikhail NNH, Baraka H, and Kamel H (2014). “Cancer Incidence in Egypt: Results of the National Population-Based Cancer Registry Program,” Journal of Cancer Epidemiology, vol. 2014, Article ID 437971, 18 pages.

2. Gretzer MB, Trock BJ, Han M et al (2000). A critical analysis of the interpretation of biochemical failure in surgically treated patients using the American Society for Therapeutic Radiation and Oncology criteria. J Urol 2002; 168: 1419.

3. Bianco FJ, Scardino PT and Eastham JA: Radical prostatectomy (2005). Long-term cancer control and recovery of sexual and urinary function (“trifecta”). Urology 2005; 66: 83.

4. Cathelineau X, Arroyo C, Rozet F, Baumert H, Vallancien G (2004). Laparoscopic radical prostatectomy: the new gold standard? Curr Urol Rep. 2004 Apr; 5(2):108-14.

5. Kolata G. Results Unproven, Robot Surgery Wins Converts. New York Times. 2010 Feb 14;:A1.

6. Elawdy MM (2017). Robotic Surgery: A Mini-Review from a Middle Eastern Perspective. Ely J Uro 1(1): 103

7. Kamran Zargar-Shoshtari, Declan G. Murphy, Homayoun Zargar. Re: Robot-assisted Laparoscopic Prostatectomy Versus Open Radical Retropubic Prostatectomy: Early Outcomes from a Randomised Controlled Phase 3 Study. January 2017 Volume 71, Issue 1, Pages 140–141.

8. Matanes E, Boulus S and Lowenstein L (2015). The implementation of robotic surgery in Israel. IMAJ, VOL 17, September 2015.

9. Menon M, Tewari A, Peabody JO, Shrivastava A, Kaul S, Bhandari A, Hemal AK (2004). Vattikuti Institute prostatectomy, a technique of robotic radical prostatectomy for management of localized carcinoma of the prostate: experience of over 1100 cases. Urol Clin North Am. 2004 Nov; 31(4):701-17.

10. B Guillonneau, G Vallancien (2000). Laparoscopic radical prostatectomy: the Montsouris technique J Urol. 2000 Jun;163(6):1643-9. doi: 10.1016/s0022-5347(05)67512-x.
11. Dindo D, Demartines N, Clavien PA (2004). Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. Ann Surg 2004; 240:205–13.

12. Gratzke C, Dovey Z, Novara G, Geurts N, De Groote R, Schatteman P, de Naeyer G, Gandaglia G, Mottrie A (2016). Early Catheter Removal after Robot-assisted Radical Prostatectomy: Surgical Technique and Outcomes for the Aalst Technique (ECaRemA Study). May 2016 Volume 69, Issue 5, Pages 917–923.

13. Korets R, Weinberg AC, Alberts BD, Woldu SL, Mann MJ, Badani KK (2014). Utilization and timing of blood transfusions following open and robot-assisted radical prostatectomy. J Endourol. 2014;28(12):1418-1423. doi:10.1089/end.2014.0225

14. Agarwal PK, Sammon J, Bhandari A, et al (2011). Safety profile of robot-assisted radical prostatectomy: a standardized report of complications in 3317 patients. Eur Urol. 2011;59(5):684-698. doi:10.1016/j.eururo.2011.01.045

15. Reeves F, Preece P, Kapoor J, Everaerts W, Murphy DG, Corcoran NM, Costello AJ (2015). Preservation of the neurovascular bundles is associated with improved time to continence after radical prostatectomy but not long-term continence rates: results of a systematic review and meta-analysis. Eur Urol. 2015;68(4):692–704.

16. Li, X., Zhang, H., Jia, Z. et al (2020). Urinary continence outcomes of four years of follow-up and predictors of early and late urinary continence in patients undergoing robot-assisted radical prostatectomy. BMC Urol 20, 29 (2020). https://doi.org/10.1186/s12894-020-00601-w

17. Xylinas E, Durand X, Ploussard G, Campeggi A, Allory Y, Vordos D, Hoznek A, Abbou CC, de la Taille A, Salomon L (2013). Evaluation of combined oncologic and functional outcomes after robotic-assisted laparoscopic extraperitoneal radical prostatectomy: trifecta rate of achieving continence, potency and cancer control. Urol Oncol. 2013;31(1):99–103.

18. Ficarra V, Novara G, Rosen RC, Artibani W et al. (2012). Systematic Review and Meta-analysis of Studies Reporting Urinary Continence Recovery After Robot-assisted Radical Prostatectomy. EUROPEAN UROLOGY 62 (2012) 405–417.

19. Brede C, Angermeier K, Wood H (2014). Continence outcomes after treatment of recalcitrant post prostatectomy bladder neck contracture and review of the literature. Urology 2014; 83: 648-652.

20. Tyritzis SI, Katafigiotis I, Constantinides CA (2012). All You Need to Know About Urethrovessical Anastomotic Urinary Leakage Following Radical Prostatectomy. THE JOURNAL OF UROLOGY® Vol. 188, 369-376, August 2012.

21. Politano VA, Leadbetter WF (1958). An operative technique for the correction of vesicoureteral reflux. J Urol. 1958 Jun;79(6):932-41. doi: 10.1016/s0022-5347(17)66369-9. PMID: 13539988.

22. Daniel Pucheril a, Logan Campbell a, Ricarda M. Bauer b, Francesco Montorsi c, Jesse D. Sammon a, Thorsten Schlommm (2016). A Clinician’s Guide to Avoiding and Managing Common Complications During and After Robot-assisted Laparoscopic Radical Prostatectomy. EUROPEAN UROLOGY FOCUS 2 (2016) 30 – 48.
23. Coelho, R.F., Palmer, K.J., Rocco, B. et al (2010). Early complication rates in a single-surgeon series of 2500 robotic-assisted radical prostatectomies: report applying a standardized grading system. Eur Urol. 2010; 57: 945–952

24. Beck S, Skarecky D, Osann K, Juarez R, Ahlering TE (2011). Transverse versus vertical camera port incision in robotic radical prostatectomy: effect on incisional hernias and cosmesis. Urology 2011;78: 586–90.

25. Novara, G., Ficarra, V., Mocellin, S. et al (2012). Systematic review and meta-analysis of studies reporting oncologic outcome after robot-assisted radical prostatectomy. Eur Urol. 2012; 62: 382–404

26. Artibani W, Porcaro AB, De Marco V, Cerruto MA, Siracusano S (2018). Management of Biochemical Recurrence after Primary Curative Treatment for Prostate Cancer: A Review. Urol Int 2018;100:251–262

27. Bentas W, Wolfram M, Jones J, Brautigam R, Kramer W, Binder J (2003). Robotic technology and the translation of open radical prostatectomy to laparoscopy: the early Frankfurt experience with robotic radical prostatectomy and one year follow-up. Eur Urol 2003;44:175–81.

28. Weiner AB, Murthy P, Richards KA, Patel SG, Eggener SE (2015). Population based analysis of incidence and predictors of open conversion during minimally invasive radical prostatectomy. J Urol. 2015;193(3):826-831. doi:10.1016/j.juro.2014.09.113

29. Skarecky DW (2013). Robotic-assisted radical prostatectomy after the first decade: surgical evolution or new paradigm. ISRN Urol. 2013;2013:157379. Published 2013 Apr 3. doi:10.1155/2013/157379

Tables

Table 1. Baseline patient data & operative data
| Variable                        | Mean (Range/Percent) |
|--------------------------------|----------------------|
| Age                            | 63 years (50 – 71)   |
| BMI                            | 28.1 (16 – 40)       |
| Prostate volume                | 58 (21 – 240)        |
| PSA                            | 21.3 (5.3 – 109)     |
| Gleason score (pre-operative)  |                      |
| 6                              | 14                   |
| 3+4                            | 26                   |
| 4+3                            | 10                   |
| 8,9,10                         | 7                    |
| D’Amico risk group             |                      |
| Low                            | 5.3%                 |
| Intermediate                   | 57.9%                |
| High                           | 36.8%                |
| SHIM score                     | 16 (5 – 25)          |
| Pre-operatively potent         | 26 (47.3%)           |
| Follow up (months)             | 17 (6 – 36)          |
| Length of hospital stay        | 4.8 (2 – 56)         |
| Catheterization time           | 15 (5 – 70)          |
| Blood loss                     | 296 ml (90 – 2000)   |
| Transfusion                    | 1/55 (1.8%)          |

Table 2. Complications & technical difficulties
| Complication*                          | Number (%)          |
|---------------------------------------|---------------------|
| Wound infection                       | 1/55 (1.8%)         |
| Urine leak                            | 6/55 (10.9%)        |
| Urine leak requiring exploration      | 1/55 (1.8%)         |
| Urine leak requiring PCN              | 2/55 (3.6%)         |
| Ureteric injury                       | 2/55 (3.6%)         |
| Transfusion                           | 1/55 (1.8%)         |
| UTI                                   | 1 (1.8%)            |
| Bladder neck stenosis                 | 3/55 (5.5%)         |
| VTE**                                 | 1                   |
| Lymphocele                            | 3                   |
| Port-site herna                       | 2                   |
| Neuropraxia/compartment syndrome      | 0                   |
| Small bowel obstruction               | 1                   |
| Death                                 | 0                   |
| Technical difficulties                | Number (%)          |
| Re-docking                            | 1 (1.8%)            |
| Conversion                            | 1 (1.8%)            |
| Device malfunction                    | 0                   |
| Patients who developed complications* | 15/55 (27%)         |
| Grade I/II                            | 4                   |
| Grade III/IV                          | 11                  |

*A total of 11 patients developed grade III/IV events, however, total grade III/IV events were 15.

** Venous thromboembolism

Table 3. Continence and potency recovery
|                          |       |
|--------------------------|-------|
| Immediate continence     | 18 (32.7%) |
| Continence at 1\(^{st}\) month | 28 (50.9%) |
| Continence at 3\(^{rd}\) month | 36 (65.5%) |
| Continence at 6\(^{th}\) month | 41 (74.5%) |
| Continence at 1 year     | 53 (96%) |
| (1) Potency recovery     | 12 (21.8%) |
| (2) Potency recovery if full NVB sparing | 8/20 (40%) (p=0.03) |
| (3) Potency recovery if potent pre-operatively | 9/25 (36%) (p=0.048) |
| (2) & (3)                | 7/13 (53.8%) (p=0.01) |

* Continence defined as being pad-free.

Table 4. Pathology and adjuvant therapy
| Pathologic T stage         |   |
|---------------------------|---|
| Organ confined            | 38|
| pT3a                      | 9 |
| pT3b                      | 6 |
| pT4                       | 2 |

| Gleason score             |   |
|---------------------------|---|
| 6                         | 16 (29.1%) |
| 7 (3+4)                   | 16 (29.1%) |
| 7 (4+3)                   | 12 (21.8%) |
| 8 or higher               | 11 (20%)  |

| Lymph node metastasis     |   |
|---------------------------|---|
|                           | 10/49 (20.4%) |

| Positive margin           |   |
|---------------------------|---|
| Apical                    | 5 |
| Bladder neck              | 5 |
| Circumferential           | 3 |

| Biochemical recurrence    |   |
|---------------------------|---|
|                           | 14 (25.4%) |

| Adjuvant/salvage therapy  |   |
|---------------------------|---|
| RTH alone                 | 4 |
| ADT alone                 | 5 |
| Both                      | 7 |