Robotic radical prostatectomy in patients with preexisting inflatable penile prosthesis (IPP)

Jamil Rehman, MD,[1] Khurshid Guru, MD,[2] Bilal Chughtai, MD,[3]
Ridwan Shabsigh, MD,[4] David Samadi, MD[5]

[1]Department of Urology, School of Medicine, SUNY-Stony Brook Health Sciences Center, Stony Brook, New York, USA
[2]Department of Urologic Oncology, Roswell Park Cancer Institute, Buffalo, New York, USA
[3]Division of Urology, Albany Medical College, Albany, New York, USA
[4]Division of Urology, Maimonides Medical Center, Brooklyn, New York, USA
[5]Division of Robotics and Minimal Invasive Surgery, Department of Urology, Mount Sinai School of Medicine and Medical Center New York, New York, USA

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Purpose: *We present our initial experience with performing robotic-assisted prostatectomies in men with a 3-piece inflatable penile prosthesis with a pelvic reservoir.*
Material and methods: *Four patients underwent transperitoneal robotic-assisted radical prostatectomies with a penile prosthetic implant in place. The reservoir was left inflated for easy identification. A flaccid reservoir may be more difficult to identify, and be prone to damage. The reservoir was left attached to the abdominal wall. Dissection was performed outside the fibrous capsule of the reservoir. The tissue around the capsule of the reservoir peeled off without difficulty. Cutting current close to the capsule can be used if needed as per American Medical System with no limit to voltage. The penile prosthesis is then inflated to empty the reservoir creating more prevesical space and preventing the reservoir from obscuring visualization. The remaining portion of the procedure is completed using our standard technique. After completing the urethrovesical anastomosis using the 16 French Foley, the prosthesis is cycled under direct vision and the penile prosthesis is deflated (reservoir full). The prosthesis is not used for 6 weeks to prevent stretching of the urethrovesical anastomosis.*
Results: *All patients (n = 4) had no reported complications and all prostheses are functioning properly. The margin status was negative postoperatively.*
Conclusion: *Robotic prostatectomy is technically feasible in patients with inflatable penile prostheses by surgeons experienced in robotic surgery. However, the presence of an indwelling penile prosthesis does increase the complexity of surgery.*

Key Words: radical prostatectomy, robotic prostatectomy, laparoscopic prostatectomy, penile prosthesis, inflatable penile prosthesis

Introduction

We present our initial experience with performing a robotic-assisted prostatectomy in men with a three-piece inflatable penile prosthesis with a pelvic reservoir.

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Address correspondence to Dr. Jamil Rehman, Department of Urology, Stony Brook University Medical Center, SUNY-Stony Brook, HSC L-9, 040, Stony Brook, NY 11794-8093 USA

Methods

Four men with 3-piece inflatable penile prostheses (AMS 700 Series, American Medical Systems, Minnetonka, Minnesota, USA), with localized cancer of prostate, opted for robotic prostatectomy. These were done with a transperitoneal technique due to surgeon preference. The patients were informed of the complexity of the surgery and potential associated risks including infection, malfunction, and/or the need for revision or temporary removal of the reservoir.

There was no preoperative imaging done specifically to further characterize the location of the reservoir.

Preoperatively, patients were administered vancomycin and gentamicin. Primary access was obtained after inflation through the supraumbilical area, via a closed technique. The reservoir was visible under the parietal peritoneum extending into the space of Retzius. Eight millimeter robotic trocars were placed lateral to the rectus muscle, in the right and left lower quadrants (midway between the umbilicus and anterior superior iliac spine). These were placed under direct vision and away from the reservoir and tubing. Two additional assistant's trocars were placed on the patient's right side using 5 mm and 10 mm step trocars.

Surgical technique

The bladder was filled with 120 cc of saline, the urachus and the medial umbilical ligaments were taken down high with cautery, and the space of Retzius was entered. The reservoir and tubing were identified. The reservoir was left inflated, which helped its identification, keeping the capsule stretched and helping to peel the tissue from the reservoir fibrous capsule. The reservoir was left attached to the abdominal wall. The dissection was completed outside the fibrous capsule of the reservoir. The capsule around the reservoir actually peeled off nicely from the surrounding tissue (dissection plane). If needed, cutting current close to the capsule was used (American Medical Systems cutting current can be used with no limit to voltage, though coagulation may damage the prosthesis due to generation of heat). The bladder and endopelvic fascia were cleared of fat. Then, the penile prosthesis was inflated in order to transfer as much fluid as possible from the pelvic reservoir to the penile cylinders. This allowed improvement in visualization of the left side of the pelvis. The bladder neck was opened. Once the posterior dissection between the bladder and prostate was performed, the vasa and seminal vesicles were identified and dissected. Denonvilliers fascia was opened, and the prostate was dissected from the rectum. The pedicle was taken and interfascial neurovascular preservation was performed. Therefore, we proceeded to perform the apical dissection. Once the dorsal venous complex, urethra, and rectourethralis were divided and cut, the dorsal venous complex was sutured. Then, urethrovesical anastomosis was performed with a running Monocryl suture (Von volthoven). A 16 French Foley was inserted before completing the anastomosis. After completing the urethrovesical anastomosis, the prosthesis was cycled under direct vision to ensure there was no disruption of the anastomosis and the penile prosthesis was deflated (reservoir full). The patients were advised to not use the prostheses for 6 weeks, to prevent stretching of urethrovesical anastomosis.

Results

The patients were discharged home postoperative day 1, which is routine protocol at our institution. All prostheses continued to function well, and patients reported satisfactory intercourse. All patients had negative surgical margins, Table 1.

Discussions

To our knowledge, these are the first-reported cases of robotic prostatectomy in patients with a 3-piece inflatable penile prosthesis. There have been four previous reports of open prostatectomy in this patient population, for a total of eight patients.[1] Of these patients, there was only one reported complication related to the prosthesis. This 4% complication rate is similar to the overall complication rates reported by the manufacturers, which is less than 5%. In six of the reported patients, the reservoir was removed at the time of the prostatectomy. In three of these patients, a reservoir was replaced electively at a later date.[1] In three patients, the reservoir was relocated at the

TABLE 1. **Demographic data**

Patient	Age	Race	Indication for prothesis	Prosthesis type	Gleason grade	Disease volume	Margin status
1	68	Black	Diabetes	AMS 700	3 + 3 = 6	20%	Negative
2	58	Black	Hypertension/ diabetes	AMS 700	3 + 4 = 7	30%	Negative
3	53	White	Diabetes	AMS 700	3 + 3 = 6	20%	Negative
4	63	White	Peroneal trauma	AMS 700	3 + 3 = 6	12%	Negative

time of the prostatectomy.[2] In one patient; the tubing was punctured by a needle while closing the fascia. This was recognized intraoperatively and repaired.[3] Others have reported no significant change in surgical technique with no device-related complications.[4]

In our patient, the reservoir was visible under the parietal peritoneum just to the left of the bladder extending into the space of Retzius. While developing the space of Retzius robotically, great care was taken to identify and protect the reservoir and tubing. Harmonic was not used, as it may damage the prosthesis. During dissection the reservoir was kept full, as flaccid reservoirs may be more difficult to identify, and may be more prone to damage. The cutting current does not damage the prosthesis, but coagulation on the prosthesis may damage the prosthesis (communication from American Medical Systems). Although, this technique has not been described in the literature previously, there was no increase in frequency of positive margins in patients with indwelling penile prostheses.[4] Limitations of this study include that it is retrospective in nature and has a small sample size. Larger studies will be needed to be conducted to further delineate outcome data.

Conclusion

When performed by surgeons experienced in robotic surgery, robotic prostatectomy is technically feasible in patients with inflatable penile prostheses. □

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