CASE REPORT

Robot-Assisted Laparoscopic Radical Prostatectomy on a Very Large Prostate Gland

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This is a case of a 74-year-old obese male presented with moderate lower urinary tract symptoms and an elevated prostate specific antigen (PSA) of 48.21ng/ml. Multiparametric MRI of the prostate revealed a markedly enlarged prostate (225grams) with a PIRADS 5 lesion at the left posterior peripheral zone. Prostate biopsy done revealed prostate adenocarcinoma Gleason 7(3+4). Metastatic workup was negative for distant metastasis hence the patient was advised robot-assisted laparoscopic prostatectomy (RALP).

Several difficulties were encountered during the surgical technique. The usual posterior approach was not feasible because incising the peritoneum over the rectovesical pouch would not be able to expose the vas deferens and seminal vesicles. An anterior approach was instead done, but this was still difficult due to the lack of space for proper exposure and movement of instruments. The posterior dissection was also challenging; three successive suspension stitches were necessary in order to expose and mobilize the lateral and posterior surface of the prostate. Urethrovesical anastomosis had to be modified by performing a modified posterior repair in order to reduce tension caused by the large gap left by the excised prostate.

RALP is a safe and feasible operative technique for very large prostates as long as the difficulties are foreseen and the necessary adjustments are made.

Robot-assisted laparoscopic prostatectomy (RALP) has emerged as the preferred option in the treatment of localized prostate cancer. As more cases are being performed, more surgeons are encountering challenging cases, such as those with difficult anatomy, prior abdominal surgery and prior radiation therapy. Large prostate glands increase the technical difficulty of performing robot-assisted laparoscopic prostatectomy.[1] Reported is a case of RALP in a patient with prostate size >200. The difficulties and concerns in such situations are also delineated.

Keywords: Robotic radical prostatectomy, robot-assisted laparoscopic prostatectomy, prostate gland

The Case

A 74-year-old male, obese (BMI 32.4kg/m^2), presented with moderate lower urinary tract symptoms and an elevated PSA of 48.21ng/ml. On digital rectal exam, the prostate was enlarged (>100 grams), firm, non-tender and with no palpable nodules. Multiparametric MRI of the prostate revealed a markedly enlarged prostate 6.8cm x 7.3cm x 8.7cm (225grams) with an ill to fairly-defined homogeneous, moderately T2 hypointense focus in the left posterior peripheral zone involving the base, midgland and part of the apex, with associated obliteration of the ipsilateral surgical capsule and extension into the adjacent left posterior central gland at the level of the apex,

graded as PIRADS 5. No enlarged pelvic lymph nodes were seen. The neurovascular bundles were intact and the rectoprostatic angles were normal. Transrectal ultrasound-guided prostate biopsy revealed prostate adenocarcinoma involving almost all cores, with the highest Gleason score of 7(3+4). Total body bone scan was negative for distant metastasis. Sexual health inventory for men score was 15.

The patient underwent robot-assisted laparoscopic prostatectomy with bilateral pelvic lymph node dissection.

Surgical Technique

Under general endotracheal anesthesia the patient was placed on a dorsal lithotomy position with arms secured to his side. Asepsis and antisepsis were done and sterile drapes were applied. Pneumoperitoneum was created using a Veress needle. The trocars were positioned as follows: A 12mm camera port was placed 1cm cephalad to the umbilicus, two 8mm metal robotic ports were placed on each side of the umbilicus, along the midclavicular line. A 5mm accessory port for suctioning was placed on the left superolateral aspect of the camera port, a second 12mm assistant port was placed 9-10cm lateral to the right robotic port, and a third 8mm port was placed 9-10cm lateral to the left robotic port, 2cm above and anterior to the anterior superior iliac spine. The table was adjusted to a 30 degree Trendelenberg position. The da Vinci robotic system (Intuitive Surgical Inc., Sunnyvale, CA, USA) was positioned between the patient's legs, and the four arms were connected to the corresponding ports.

An attempt to approach the case posteriorly by incising the peritoneum over the rectovesical pouch was unsuccessful in exposing the vas deferens and seminal vesicles. The authors thus decided to perform the anterior approach by dropping down the bladder. The anterior prostatic surface and the endopelvic fascia were difficult to expose due to limited space. Control of the deep dorsal vein complex was achieved by a figure of eight ligation using Biosyn O-T10 sutures. The bladder neck was readily identified and transected, separating the prostate from the bladder. Denonvillier's fascia was incised at the prostatic base. Lateral pedicles of the prostate were serially clipped with 10mm Hemolok clips and then transected. The posterior aspect of the prostate was mobilized from the surrounding tissues by placing sequential traction sutures on the prostate and elevating the prostate gland with the fourth arm. In order to avoid rectal injury, the dissection of the apical and lateral pedicles was performed first and progressed towards the midline. The deep dorsal vein was transected and the membranous urethra was mobilized. The urethra was transected at the prostatomembranous junction. The prostate was secured in a large Endo sack bag. Pelvic lymph node dissection was done on bilateral internal iliac and obturator lymph node groups. Following the removal of the prostate, the large bladder neck was reconstructed using tennis racket technique with Vicryl 2-0 sutures. There was a wide gap between the bladder and the urethra that was left following the removal of the huge prostate. In order to prevent tension in the urethrovesical anastomosis, a modified Rocco stitch was performed using Monocryl 3-0 sutures. The urethrovesical anastomosis was done using two pre-tied Monocryl 3-0 sutures, utilizing a continuous technique. A French 18 Foley catheter was inserted per urethra and left indwelling with balloon inflated to 15cc. Plain saline was infused per urethral catheter, noting no leakage at the anastomosis. The bladder was drained. Hemostasis was ensured. Washing was done with plain saline solution. A 100cc Jackson-Pratt drain was inserted via the far left hemiabdominal robotic port after undocking the third instrument arm, and placed in the pelvis, near the area of anastomosis. The specimen was delivered and sent for histopathology. The remaining arms were undocked. The ports were removed under direct vision. The incisions were closed in layers: fascia was repaired using Vicryl 2-0 sutures, figure-of-eight technique, the skin was closed using Monocryl 4-0 sutures, subcuticular technique.

Total operative time was 6 hours and 20 minutes. The surgical console time was 5 hours. Estimated blood loss was 850mL. Postoperatively, the patient was stable and was eventually transferred to his room without requiring close monitoring at the intensive care unit.

The patient recovered uneventfully and was discharged on the third postoperative day. The following images were taken before the specimen was sent for histopathology.

Final histopathology report showed prostate adenocarcinoma Gleason 7(3+4) with the tumor moderately involving the right lobe and minimally involving the left lobe. No extraprostatic extension was identified but positive surgical margins were noted at the right base. All eight pelvic lymph nodes harvested were negative for tumor. The prostate weighed 220 grams.

Figure 1. Superior view

Figure 2. Posterior view

Figure 3. Lateral view

Discussion

The trend in surgery today is towards less invasive procedures such as laparoscopic and robot-assisted surgeries. RALP is being performed more commonly nowadays because it is less invasive and has fewer morbidities as compared to open radical prostatectomy. One of the clear advantages of RALP over open prostatectomy is reduced blood loss and less intraoperative adverse event rate.[2] In line with this, blood transfusion rate is also lower in RALP. Hospital stay is significantly shorter for patients who underwent RALP, and postoperative pain control is slightly better.[3] Different large-scale studies in Canada[4], Turkey[5] and Southeast Asia[6] have concluded that RALP is a safe and feasible treatment for localized prostate cancer.

RALP helps improve dissection due to the improved visual field as well as the fine movements allowed by the Da Vinci system. Factors such as prostate size may contribute to the difficulty of the surgery as this limits the mobility of the instruments in the pelvic region. Visualization of the surrounding structures may also be decreased due to the obstructed view from the enlarged prostate. A study by Skolarus, et al.[1] compared operative outcomes of RALP and divided the patients into very large (>100grams), large (50-100grams) and small (<50grams)

prostates. They concluded that, similar to open retropubic prostatectomies, larger prostate size tends to have a longer operative time and more blood loss. Postoperatively, urinary continence was worse in larger prostates, but after three months, recovery of continence is comparable between all three groups. Bishara, et al.[7] also had similar findings with note of increased hospital stay and longer catheterization time with larger prostates. Murphy, et al.[8] noted longer hospital stay, increased blood loss and complication rate with larger prostates. These findings state that a large prostate size usually equates to a more difficult operation and poses a challenge whatever the surgical approach may be.

Although a large prostate gland will make the robotic-assisted laparoscopic prostatectomy harder, long term complications such as incontinence and potency were similar regardless of prostate size. RALP has been shown to be a feasible option even for those with large prostate glands.[9]

One of the largest existing prostate adenocarcinomas that underwent RALP was done by Tugcu, et al.[10] Here, they had a patient with a prostate size of 130 grams. The approach was robotic perineal radical prostatectomy which was completed after 140 minutes with minimal bleeding.

This prostate in the present case is significantly larger compared to the previously reported cases. Several difficulties were encountered during the surgical technique. The first difficulty encountered was realizing that the usual posterior approach was not feasible because incising the peritoneum over the rectovesical pouch will not be able to expose the vas deferens and seminal vesicles. An anterior approach was instead done, but this was still difficult due to the lack of space for proper exposure and movement of instruments. The posterior dissection was also challenging; three successive suspension stitches were necessary in order to expose and mobilize the lateral and posterior surface of the prostate. Urethrovesical anastomosis had to be modified by performing a modified posterior repair in order to reduce tension caused by the large gap left by the excised prostate.

Conclusion

Robot-assisted radical prostatectomy is a safe and feasible operative technique for very large prostates as long as the possible difficulties are foreseen and the necessary adjustments are made.

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