Case Report

Total Robotic Myomectomy in a Complex Case: Extending the Limits

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Abstract

We present the case of a 30-year-old female with primary infertility who had multiple large myomas up to 22 weeks uterine size. She had a body mass index of 42 kg/m^2 and also concurrent endometriosis, for which she was on medical management. After meticulous preoperative planning, total robotic myomectomy and endometriosis clearance was done. Four large myomas weighing a total of 750 g were removed after morcellation. Console time was 160 min, and she made an uneventful recovery with only 0.1 g/dL drop in hemoglobin. Robotic myomectomy is considered as an improvement over laparotomy for patients with up to three myomas and when the surgical time does not exceed 4 hours. We were successful in our attempt at total robotic myomectomy to extend these limits and had a positive surgical outcome.

Keywords: Large myomas, morbid obesity, multiple myomas, total robotic myomectomy

Introduction

With uterine myoma being the most common benign tumor in reproductive age women, and also the most common indication of hysterectomy, fertility-preserving options in women with myomas are few and far between. Medical treatment options for fibroids such as the newer selective progesterone receptor modulators, antiprogestins, and fourth generation progesterone have added to the armamentarium of the gynecologist in dealing with myomas. However, all of these options preclude fertility. The only surgical option for dealing with myomas that allows for fertility preservation is myomectomy. This was traditionally done through the open route and involved a long recovery time, significant blood loss (even necessitating hysterectomy in some cases), and sometimes infertility due to the subsequent adhesion formation. There was also the risk of uterine rupture in future pregnancy, depending on the site and size of myomas removed.[1] With the advent of laparoscopy and improvements in technique, recovery period has become shorter, blood loss more controlled, and risk of adhesion formation reduced. This comes at the cost of a slightly longer operative time and sometimes difficulty in suturing at multiple and inaccessible sites. There is a long learning curve.[2] Robot-assisted myomectomy has been around since 2004.[3] Its advantages over laparoscopy include better vision and access, improved suturing capacity (almost as good as open surgery) with a secure uterine scar, lesser blood loss, and an even faster recovery. This is balanced by the increased cost and operative time, although the learning curve for complex cases is shorter than laparoscopy.[4] Surgical limits have been defined by various experts on the number and size of myomas that can be safely removed by the minimally invasive approach.[5] We attempted to expand these limits by removing two >10 cm intramural myomas and total four myomas by a complete robotic approach in a morbidly obese patient with concurrent endometriosis. To our knowledge, the total weight of myomas removed is the largest to have

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been described in literature to date, using a total robotic (non-hybrid) approach.

Case Report

A 30-year-old P0 + L0 female presented with severe dysmenorrhea and pressure symptoms. She was a known case of multiple uterine myomas and endometriosis for which she had already tried medical management with no significant improvement in symptoms. She was also anxious for conception. She was also hypothyroid and morbidly obese (BMI 42 kg/M^2, Class III Obesity). On clinical evaluation, her uterus was irregularly enlarged to 22 weeks gestation uterine size. The cervix was pulled up and could not be visualized. On preoperative magnetic resonance imaging (MRI), the myomas were noted to be on the anterior, fundal, posterior, and lateral uterine walls, measuring 12 cm (Type 4), 10 cm (Type 5), 6 cm (Type 6), and 5 cm (Type 7), respectively (as per the International Federation of Gynecology and Obstetrics classification system).[6] The two largest ones were intramural and the small ones were subserous in location. The 12 cm myoma was multilobulated and had undergone degeneration and was extending from the uterine fundus to isthmus. The myomas were also causing mass effect on the endometrial cavity [Figure 1-MRI images]. She also had a 5 cm endometriotic cyst in one ovary.

After preoperative workup, she was counseled and consented for robotic myomectomy. This was done using the DaVinci Xi surgical system (Intuitive Surgical, CA, USA). Four ports for each of the robotic arms plus an assistant 12 mm Excel port were used. Port placement was standard as for DaVinci Xi docking for pelvic surgery, keeping the camera port 4 cm above the umbilicus to gain maximum working distance and port R1, R2, and R3 in a horizontal line 9 cm apart [Figure 2]. Robotic instruments used were Monopolar Curved Scissors, Fenestrated Bipolar Grasper, Mega Needle Driver, and Robotic Tenaculum (Intuitive Surgical, Inc., Sunnyvale, CA). Assistant port was used for vasopressin injection, needle pass, suction, and morcellation. No other traditional laparoscopic instruments were utilized. Before docking, vaginoscopic hysteroscopy was done. The cavity was distorted due to the large bulk of fibroids, and vaginal manipulation was also not possible due to the same reason.

After docking, intrapelvic adhesions (omental adhesions on the surface of myomas) as seen in Figure 3a were lysed. Myomas were enucleated after injecting vasopressin 0.4 U/ml in the capsule of each intramural myoma (Type 4 and Type 5). The Type 5 fundal myoma was first enucleated using an elliptical incision which was given at its base. The same incision was extended horizontally to enucleate the type 4 anterior myoma which was extending up to the uterine isthmus and was multilobulated and degenerated. After defining the cleavage plane between the myoma and uterine wall, dissection was accomplished with sparing use of cautery (which was used mainly at the base of the myoma) and pushing the myoma bed down and away rather than excessive traction on the myoma. As vaginal manipulation was not feasible due to severe cavity distortion, the robotic tenaculum was preferred, which had the advantage of lifting the myoma from various angles due to 360° range of motion (ROM) and ability to be used through any of the robotic ports as required, which would have been difficult with the conventional laparoscopic tenaculum. Lack of haptic feedback in robotic surgery did not affect the enucleation of the myomas as visual clues during surgery, and good preoperative MRI helped to map the fibroids accurately. The Type 6 and Type 7 myomas were pedunculated and were cut at the base using a combination of bipolar and monopolar energy.

Myoma bed and uterine surface were approximated with V-loc Absorbable Wound Closure Device1-0 (Covidien, UK) in 2–3 layers depending on the depth of incision. Blood loss was minimal as evidenced by the drop in post-operative Hb of only 0.1 g/dL. Endometrial cavity integrity was not breached, and the uterus was reconstructed successfully [Figure 3b]. This was covered by an adhesion prevention barrier. She also had Grade III endometriosis that was tackled in the same sitting. Bilateral ovaries were adherent to each other and posterior

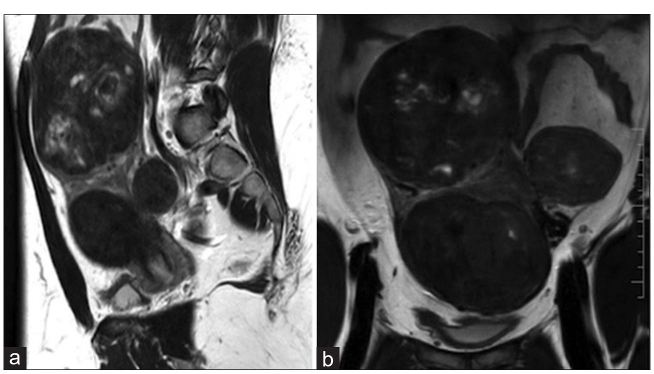

Figure 1: Magnetic resonance imaging images (a and b)

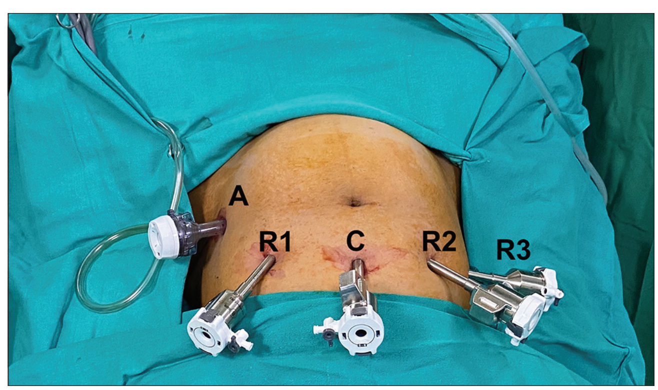

Figure 2: Representative Port Placement for pelvic docking

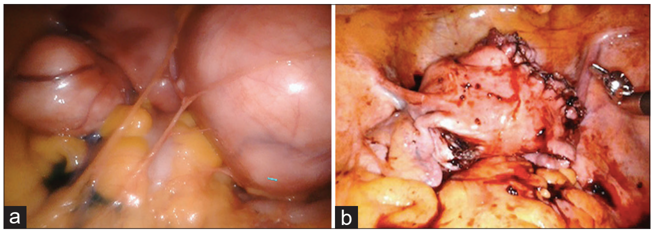

Figure 3: (a) Preoperative and (b) postoperative uterine contour

uterine wall. Endometriotic cyst in the left ovary (4 cm × 5 cm) was drained and its base fulgurated. Endometriotic spots on the surface of the right ovary were fulgurated. The pouch of Douglas was partially obliterated by adhesions, which was also lysed to give her as normal a pelvic anatomy as possible. The myomas were removed after morcellation (in-bag) and weighed total 745 g [Figure 4]. Console time was 160 min (including suture of myoma bed and uterine reconstruction which took 40 min). The total anesthetic time was 320 min (which included patient positioning, docking, and morcellation). Morcellating the large myomas took the most of the other 160 min (nearly 100 min), docking took 10 min, positioning around 20 min, and anesthesia around 30 min. The patient made an uneventful recovery in the postoperative period and resumed normal diet and activity the next day. The final histopathology showed leiomyomata with varying degrees of degeneration. In the postoperative period, Gonadotrophin releasing hormone (GnRH) analog was given to suppress menses for one cycle, followed by ovulation induction. Both short-and longterm recovery were uneventful.

Discussion

This case highlights the importance of judicious patient selection in planning a robotic myomectomy. Complex cases and poor planning can sometimes demoralize a good surgeon if the operative time is too long and specially in the initial cases of robotic myomectomy. The mapping of myoma location, size, number, and nature helps to plan surgery and whether a laparoscopic-assisted hybrid approach or total robotic approach should be adopted. The advantages of using the robotic system are more precise dissection, less tissue trauma, and less blood loss, with better ergonomics and visualization.

This patient had several clinical factors that added to its complexity such as morbid obesity, uterine size 22 weeks, large myomas, concurrent endometriosis, prior medical therapy (which can distort surgical planes), inability to use a uterine manipulator (due to cavity distortion and inability to grasp the cervix from below), and having been counseled for open myomectomy by another surgeon.

Morbid obesity is considered a relative contraindication to laparoscopy. However, it has not been shown to be an adverse predictor for complications in women undergoing robotic myomectomy.[7] Infact, morbidly obese patients are more suitable for robotic surgery rather than laparoscopic surgery because the "remote center" of the robotic arms minimizes the abdominal wall trauma. Several authors have described myomas >5 cm and >3 in number as a contraindication to laparoscopy due to difficulty in suturing multiple sites, whereas others believe the limitation is only in the surgical expertise.

Figure 4: Morcellated myoma fragments

Even for robotic myomectomy, limits have been defined by some experts. Women with uterine size >16 weeks, more than five myomas and single large myoma >15 cm, and myomas at difficult to access sites are considered poor candidates for robotic myomectomy.[8] However, with robotic instruments and 3D-camera, suturing at difficult angles is made as easy as with open surgery. This ensures a secure myoma bed, which sometimes in laparoscopy may not be so, leading to poor healing and risk of uterine rupture.[1] Other factors influencing the risk of uterine rupture in subsequent pregnancies include the size & number of myomas, and whether endometrial integrity is breached during surgery.

Robotic myomectomy has been considered as an improvement over laparotomy in women who have up to three myomas.[9] Systematic reviews and meta-analysis show an improvement in short-term outcomes, but long-term data on fertility and recurrence rates are lacking.[10]

In the present case, we attempted to expand the traditionally defined limits, using a total robotic, non-hybrid approach for the removal of four myomas, whose weight after removal was nearly 750 g. In our review of literature, this appears to be the largest bulk of myomas removed in a total robotic approach.

Conclusion

Advances in technology and improvements in surgical expertise can extend the benefits of minimally invasive surgery even to complex cases.

Ethical statement and declaration of patient consent

This research is exempt from the IRB approval by institutional ethics committee of Fortis Memorial Research Institute.

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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