Robotically Assisted Laparoscopic Myomectomy: A Canadian Experience

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Abstract

Objective: To compare operative and immediate postoperative outcomes of robotically assisted laparoscopic myomectomy (RALM) and open myomectomy.

Methods: We conducted a retrospective review of 38 cases of RALM performed in women of reproductive age with symptomatic uterine fibroids between October 2008 and February 2011. Twenty-one cases of open myomectomy were used as historical controls. Operative and immediate postoperative outcomes were compared. Data analysis was performed using Student *t* test, chi-square test, and analysis of covariance where appropriate.

Results: The two groups were comparable in age, body mass index, parity, and symptoms. Up to 12 fibroids were resected robotically with a mean diameter of 9.1 ± 2.0 cm and a mean weight of 389 ± 170 g (range 73 to 900 g). RALM was associated with less blood loss (decrease in hemoglobin concentration 25.6 ± 12.0g/L) than open myomectomy (37.7 ± 20.1 g/L) (P = 0.018). Adjusting for baseline levels, postoperative hemoglobin levels were 99 g/L and 88 g/L in the robotic and open groups, respectively (P = 0.005). RALM was associated with shorter hospitalization (1.2 ± 0.5 vs. 2.5 ± 0.6 days, P < 0.001) and longer operating times (189.7 ± 71.5 vs. 92.5 ± 33.0 minutes, P < 0.001). Three patients in the open myomectomy group and one in the robotic group required blood transfusion. One patient in the robotic group developed lumbar plexopathy postoperatively.

Conclusion: Robotically assisted laparoscopic myomectomy is associated with less blood loss and shorter hospital stay than myomectomy by laparotomy. Accumulating evidence of the risks and benefits of RALM will contribute to enhancing access to this technology on the part of women and their surgeons.

Key Words: Leiomyoma, robotics, myomectomy

Competing Interests: See Acknowledgement.

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Résumé

Objectif : Comparer les issues opératoires et les issues postopératoires immédiates de la myomectomie laparoscopique à assistance robotisée (MLAR) et de la myomectomie effractive.

Méthodes : Nous avons mené une analyse rétrospective de 38 cas de MLAR effectuée chez des femmes en âge de procréer qui présentaient des fibromes utérins symptomatiques entre octobre 2008 et février 2011. Vingt et un cas de myomectomie effractive ont été utilisés à titre de témoins historiques. Les issues opératoires et les issues postopératoires immédiates ont été comparées. L'analyse des données a été menée au moyen du test *t* de Student, du test de chi carré et de l'analyse de covariance, au besoin.

Résultats : Les deux groupes étaient comparables en matière d'âge, d'indice de masse corporelle, de parité et de symptômes. Jusqu'à 12 fibromes ont été réséqués par assistance robotisée; le diamètre moyen de ceux-ci était de 9,1 ± 2,0 cm et leur poids moyen était de 389 ± 170 g (plage de 73 à 900 g). La MLAR a été associée à une perte sanguine (baisse de la concentration en hémoglobine : 25,6 ± 12,0 g/l) moins importante que celle qui a été constatée pour ce qui est de la myomectomie effractive (37,7 ± 20,1 g/l) (P = 0,018). À la suite de la neutralisation des effets des taux de base, les taux postopératoires d'hémoglobine étaient de 99 g/l et de 88 g/l au sein des groupes « robotisée » et « effractive », respectivement (P = 0,005). La MLAR a été associée à une hospitalisation plus courte (1,2 ± 0,5 vs 2,5 ± 0,6 jours, P < 0,001) et à une durée opératoire plus longue (189,7 ± 71,5 vs 92,5 ± 33,0 minutes, P < 0,001). Trois patientes du groupe « myomectomie effractive » et une patiente du groupe « myomectomie laparoscopique à assistance robotisée » ont nécessité une transfusion sanguine. Une patiente du groupe « myomectomie laparoscopique à assistance robotisée » en est venue à présenter une plexopathie lombaire à la suite de l'intervention.

Conclusion : La myomectomie laparoscopique à assistance robotisée est associée à une perte sanguine moindre et à une hospitalisation de moindre durée, par comparaison avec la myomectomie par laparotomie. L'accumulation de données sur les risques et les avantages de la MLAR contribuera à faciliter l'accès à cette technologie pour les femmes et leurs chirurgiens.

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INTRODUCTION

The traditional open approach to myomectomy is associated with significant operative morbidity. In the past decade, myomectomy has also been performed via laparoscopy. A recent review of the literature concluded that laparoscopic myomectomy "provides the advantages of shorter hospitalization, faster recovery, fewer adhesions, and less blood loss than abdominal myomectomy when performed by skilled surgeons."[1] However, evidence is still lacking on obstetrical outcomes and the risks of uterine rupture after repair of the myometrium by laparoscopy. Deviation from standard open technique with failure to suture myometrial defects adequately, the lack of hemostasis and hematoma formation, or the excessive use of electrosurgery with devascularization of the myometrium have been suggested as risk factors for uterine rupture after laparoscopic myomectomy.[2–4]

The use of robotics provides surgeons with wristed instruments for enhanced dexterity. As suggested by current evidence, these surgical robots allow for a precise enucleation of fibroids and approximation of the myometrium, allowing for multi-layer closure of the defect.[5] The previously demonstrated advantages of laparoscopy are maintained while allowing a repair of the defect similar to that of open surgery, which is the current standard of care.

Unfortunately, the use of robotics is associated with higher costs than laparoscopy and requires a designated operating room with experienced personnel. The majority of myomectomies performed in Canada are done by laparotomy, and access to robotic surgery is very limited in this country. Increased costs linked to robotic technology may be offset by the significantly shorter hospital stay and decreased operative morbidity if it allows conversion of an open laparotomy to a minimally invasive operation.

The objective of this study was to compare the short-term surgical outcomes of the first 39 cases of robotically assisted laparoscopic myomectomies performed in Canada with those of a historical control group of open myomectomies.

MATERIAL AND METHODS

From October 2008 to February 2011, 39 patients consented and were scheduled for robotically assisted laparoscopic myomectomy. All patients were recruited from new referrals to the Women's Health Centre at St. Michael's Hospital in Toronto, Ontario. Candidates selected for robotic approach met the following criteria:

1. women of reproductive age with desire for future fertility,
2. uterine size less than 20 weeks' gestation on bimanual examination, with the dominant fibroid either subserosal or intramural,
3. sufficient space in the upper and lateral abdomen to allow for port placement, and
4. absence of comorbidities precluding laparoscopy and steep Trendelenburg positioning.

All robotic surgeries were performed in a similar fashion. After induction of general anaesthesia, patients were examined and placed in the dorsal lithotomy position with legs in yellow-fin stirrups. A sterile field was established and a Valtchev uterine manipulator was placed. A pneumoperitoneum was created with CO_2 gas insufflated through a Veress needle inserted at the umbilicus. At an intraperitoneal pressure of 20 mmHg, a 12-mm disposable trocar was inserted below the xiphoid process. The abdomen was explored laparoscopically to confirm anatomy and pathology, and other trocars were placed under direct vision. Two 8-mm trocars were placed for the robotic arms and a 12-mm trocar was placed for the assistant port. The patient was then placed in steep Trendelenburg position and the daVinci robot was docked. Using a spinal needle inserted through the abdominal wall, vasopressin (40 units in 100 mL of normal saline) was infiltrated into the uterine serosa overlying the proposed surgical site to minimize blood loss. Dissection and enucleation of fibroids was performed using robotic scissors and dissectors. Monopolar and bipolar electrocoagulation was used for dissection and control of hemostasis. The myometrial defects were repaired in multiple layers using 0 polyglactin sutures on CT-1 needles (Vicryl, Ethicon) placed in interrupted or figure-eight fashion. A total of two or three layers were placed depending on the size of the defect. The uterine serosa was re-approximated with 2–0 polyglactin sutures on SH needles (Vicryl, Ethicon) in a running non-locking fashion. Hemostasis was confirmed, the robot was then undocked, and the patient was brought out of steep Trendelenburg position. The assistant port was extended to 15 mm to allow placement of the fibroid Rotocut G1 morcellator (Karl Storz Endoscopy Canada). Using laparoscopy, the fibroids were morcellated and removed from the abdomen. An adhesion barrier slurry was prepared using two sheets of SepraFilm (Genzyme Biosurgery) mixed in a total of 20 mL of sterile normal saline. The slurry was placed in a Toomey syringe and sprayed on the uterine incisions using a red rubber catheter through an accessory port.[6] The ports were then closed and the procedure terminated.

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