

LAPAROSCOPY-ASSISTED ROBOTIC MYOMECTOMY USING THE DA VINCI SYSTEM

Shih-Peng Mao^{1,2}, Hung-Cheng Lai¹, Fung-Wei Chang¹, Mu-Hsien Yu¹, Cheng-Chang Chang^{1*}

¹Department of Obstetrics and Gynecology, Tri-Service General Hospital, Taipei, and

²Section of Obstetrics and Gynecology, Kaohsiung Armed Forces General Hospital, Kaohsiung, Taiwan.

SUMMARY

Objective: To report a case of a woman with a large uterine myoma who underwent laparoscopy-assisted robotic myomectomy using the da Vinci system.

Case Report: A 38-year-old, gravida 2, para 2, female patient presented to our office with a chief complaint of lower abdominal pressure and pain. A pelvic sonogram disclosed a subserosal myoma with a broad base, measuring approximately $9 \times 8 \times 7$ cm, which was located at the anterior uterine wall. The patient insisted on preserving her uterus and was concerned with the cosmetic results after the surgery. She showed willingness to undergo myomectomy using the newly developed laparoscopy-assisted robotic system (da Vinci) and signed the consent form. The operation time was about 3 hours, with an estimated blood loss of 150 mL. The patient passed flatus and resumed oral intake on the following day.

Conclusion: Minimally invasive surgery is the trend of the future. Robot-assisted laparoscopic surgery is a new technique for myomectomy. This robotic system provides a three-dimensional operative field and an easy-to-use control panel, which may be of great help when applying the suturing techniques and may shorten the learning curve. More experience with and long-term follow-up of robotic surgery may be warranted to further validate the role the robot-assisted approach in gynecologic surgery. [*Taiwan J Obstet Gynecol* 2007;46(2):174–176]

Key Words: da Vinci system, laparoscopy, myomectomy, robotic surgery

Introduction

During the past decade, the adoption of laparoscopic myomectomy has offered the advantages of using minimally invasive surgeries. Nevertheless, repair of the myometrium is difficult in the case of a large uterine myoma. The da Vinci system (da Vinci® Surgical System, Intuitive Surgical Inc, CA, USA) was cleared by the Food and Drug Administration of the United States in July 2000 for laparoscopic surgeries. The instruments of this surgical system provide surgeons with natural dexterity and full range of motion for precise operation through tiny incisions and offer an even greater range of motion than the human hand. The da Vinci system takes surgical

precision and technique beyond the limits of the human hand and allows for rapid and precise suturing, dissection and tissue manipulation which are standard techniques for repair of the myometrium. We present a woman with a large uterine myoma who underwent laparoscopy-assisted robotic myomectomy.

Case Report

A 38-year-old, gravida 2, para 2, woman visited our office with a chief complaint of lower abdominal pressure and pain. A pelvic sonogram disclosed a subserosal myoma with a broad base, measuring approximately $9 \times 8 \times 7$ cm, which was located at the anterior uterine wall. The patient insisted on preserving her uterus and was concerned with the cosmetic results after the operation. She showed willingness to undergo myomectomy using the newly developed robotic-assisted laparoscopic system (da Vinci) and signed the consent form. A total

*Correspondence to: Dr Cheng-Chang Chang, Department of Obstetrics and Gynecology, Tri-Service General Hospital, 325, Section 2, Cheng-Gong Road, Neihu, Taipei 114, Taiwan.
E-mail: chang1969@ndmctsg.h.edu.tw
Accepted: March 5, 2007

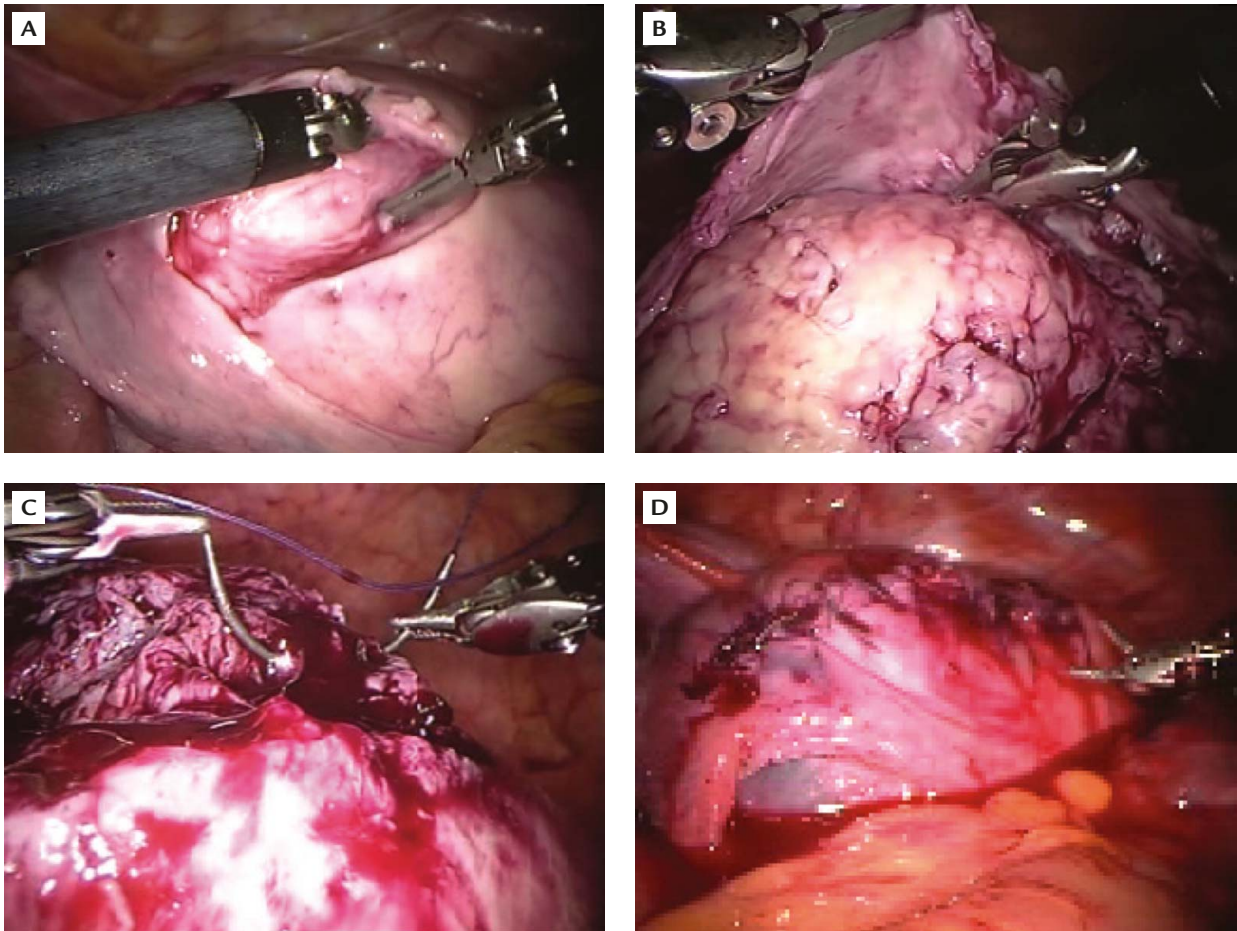


Figure. Laparoscopic views of laparoscopy-assisted robotic myomectomy with da Vinci system. (A) The serosal layer of the uterus is being dissected. (B) Myoma is extruded using the “onion-skinning” technique. (C) The myomectomy wound is repaired layer-by-layer by robotic suturing with 1-0 and 2-0 vicryl, to achieve good hemostasis. (D) Completion of surgery.

dose of 400 µg of misoprostol (Cytotec, 200 µg; GD Searle, Chicago, IL, USA) was administered intrarectally 30 minutes before the surgery. Three trocar sites for the da Vinci robotic system and one for the laparoscopic instruments were used. After entering the peritoneal cavity, diluted vasopressin (1:40; Pitressin, 20 U/mL; Parke-Davis, Taiwan) was injected to the subserosa of the myoma first, which provided a good hemostasis and surgical field. The EndoWrist instrument (Intuitive Surgical, California, USA) was controlled by a surgeon at the console under a three-dimensional scope, and the tenaculum forceps (Karl Storz, Tuttlingen, Germany) was handled by an assistant. The myoma was extruded using the “onion-skinning” technique (Figures A and B). The wound of the myomectomy on the uterus was repaired layer by layer by robotic suturing with 1-0 vicryl (deepest layer) and 2-0 vicryl (seromuscularis layer) to achieve good hemostasis (Figures C and D). The operation time was about 3 hours with an estimated blood loss of 150 mL. The patient passed flatus and resumed oral intake on the following day.

Discussion

Uterine myomas are the most common benign uterine tumors. They are estimated to be present in at least 20% of all women of reproductive age [1]. Hysterectomy has long been considered as the definitive management of symptomatic uterine leiomyomas. For women who wish to preserve their uterus, myomectomy is an alternative for these patients. Meticulous repair of the myometrium to minimize the risk of uterine rupture is essential for women considering pregnancy after laparoscopic myomectomy [2].

There were two reports on minimizing blood loss during myomectomy. Vasopressin is effective in preventing blood loss and reducing the need for blood transfusion during myomectomy [3]. Vasopressin is a standard procedure for myomectomy via laparotomy or laparoscopy. Nevertheless, laparoscopy-assisted robotic myomectomy requires skill and is not easy to do in a short operating time, especially for large or multiple myomas. Surgeons must have good suturing techniques

to shorten the operating time before the effects of vasopressin start to wane. The da Vinci system allows for an easy suturing technique. Some have reported the need for a single preoperative dose of vaginal misoprostol (400 µg), a simple and reliable method for reducing intraoperative blood loss and reducing the need for postoperative blood transfusion after abdominal myomectomy [4]. With proven results of the hemostatic effects of vasopressin and misoprostol, we used vasopressin plus misoprostol in this case to prolong the hemostatic effects and have a better view of the surgical field.

The da Vinci three-dimensional vision offers superior visualization and definition of the operative anatomy. In addition to helping close dead space and prevent hematoma formation, the EndoWrist technology enhances the precision of the myomectomy and decreases risk of perforation of the uterine cavity which may predispose the patient to synechiae or a weak scar with adenomyosis. According to Advincula et al [5], robotic-assisted surgery may provide a way to improve surgical training and the acquisition of advanced skills, based on studies which evaluated the impact of robotic technology for these purposes. Furthermore, robot-assisted laparoscopic myomectomy is a promising new technique that may overcome many of the surgical limitations of conventional laparoscopy [5].

The main advantage of the system is the translation of open surgical skills to laparoscopy. Despite recent developments of basic tools (e.g. bipolar forceps) for

the da Vinci robot, the investment and maintenance costs still have been the major limitations of the device. Moreover, the device does not provide any haptic sense (i.e. tactile feedback). Robotic surgery represents a turning point in surgical research. However, broad use of robotic systems is limited mainly because of the high investment and running costs [6]. The application and efficacy of robotic gynecologic surgery remain to be tested in large scale trials with long-term follow-up.

References

1. Marshall LM, Spiegelman D, Barbieri RL, et al. Variation in the incidence of uterine leiomyoma among premenopausal women by age and race. *Obstet Gynecol* 1997;90:967-73.
2. Hurst BS, Matthews ML, Marshburn PB. Laparoscopic myomectomy for symptomatic uterine myomas. *Fertil Steril* 2005;83:1-23.
3. Frederick J, Fletcher H, Simeon D, Mullings A, Hardie M. Intramyometrial vasopressin as a haemostatic agent during myomectomy. *Br J Obstet Gynaecol* 1994;101:435-7.
4. Celik H, Sapmaz E. Use of a single preoperative dose of misoprostol is efficacious for patients who undergo abdominal myomectomy. *Fertil Steril* 2003;79:1207-10.
5. Advincula AP, Song A, Burke W, Reynolds RK. Preliminary experience with robot-assisted laparoscopic myomectomy. *J Am Assoc Gynecol Laparosc* 2004;11:511-8.
6. Rassweiler, Safi, Subotic, Teber, Frede. Robotics and telesurgery—an update on their position in laparoscopic radical prostatectomy. *Minim Invasive Ther Allied Technol* 2005;14:109-22.