Video Article

Robot-Assisted Laparoscopic Myomectomy for FIGO Type II Submucosal Leiomyoma without Endometrial Injury for a Patient with History of Miscarriage
Hijazi et al. Myomectomy for FIGO Type II Leiomyoma

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Abstract
To introduce our technique of robot-assisted laparoscopic myomectomy for FIGO type II submucosal leiomyoma (>50% myometrial extension) without endometrial injury. A narrated video demonstration of our technique has been provided. Our patient was a 35-year-old, gravida 1, para 0, with secondary infertility. She had been married for 3 years. She complained of heavy menstrual bleeding and severe dysmenorrhea with a VAS (visual analogue scale) pain score of 10. Surgery was done after thorough counseling and an informed consent was taken. Institutional Review Board (IRB) number: KC17OESI0375, approval date: Sep. 21, 2018. Several steps can be done to help prevent endometrial injury, and these include: (1) proper preoperative imaging to plan surgery; (2) use of intraoperative ultrasound to determine best location of incision; (3) use of a “cold cut” technique with monopolar curved scissors without energy to avoid obscuring the border between the leiomyoma and the endometrium; (4) careful millimeter by millimeter dissection; (5) use of diluted indigo carmine to aid delineation of the endometrial cavity during dissection. The patient had a normal post-operative course, on follow up her VAS pain score was 0. Transvaginal ultrasound repeated 4 months postoperatively showed normalization of uterine anatomy and endometrial contour. Robot-assisted laparoscopic myomectomy may be an option to preserve fertility and minimize endometrial injury. This surgical method allows complete removal of large submucosal leiomyomas in one setting with exact suturing.

Keywords: Endometrium, surgical procedures, robotic, fibroid uterus
**Introduction**

Uterine leiomyomas are the most common benign gynecologic tumors, with an estimated 70% to 80% of reproductive-aged women having leiomyomas (1). Most patients are asymptomatic, however, around 30% to 40% present with symptoms. Symptoms depend on location, size and number of leiomyomas (2) and include heavy menstrual bleeding, pain, pressure symptoms, infertility and recurrent pregnancy loss (3).

Around 5% to 10% of patients with infertility are found to have leiomyomas, with 1% to 2.4% having them as the only finding. Patients with submucous myomas were found to have a lower clinical pregnancy rate, implantation rate, and ongoing pregnancy and live birth rate, with a significantly higher spontaneous abortion rate (4). Casini et al. found that pregnancy rates were higher after myomectomy in women with submucosal leiomyomas compared with expectant management (5).

In this video (video1) we present our technique for management of type II leiomyoma, in a 35-year-old woman with a history of infertility. She had a history of one first trimester miscarriage and was complaining of heavy menstrual bleeding and severe dysmenorrhea. Management options were discussed, and we decided to go for robot-assisted laparoscopic removal as we believed that in her case hysteroscopic removal will lead to a significant destruction of the endometrial surface. Robot-assisted laparoscopic removal can also be beneficial when the leiomyoma is large and may need more than operation for complete removal. It’s also a good option when the distance between the leiomyoma and the serosa is small, in order to avoid the risk of perforation.

We aimed to keep the endometrium intact and this was achieved through several steps starting with proper preoperative imaging (Figure 1) and planning. It’s also helpful to use a transvaginal ultrasound to determine the best location for your incision. With the use of “cold cut” technique using a monopolar curved scissors without energy, and by careful millimeter by millimeter dissection we achieved removal of the leiomyoma with minimal damage to the adjacent myometrium. Diluted indigo carmine can aid in dissection as it delineates the cavity, it can also aid in suturing the endometrium in case of injury (Figure 2).

After we removed the leiomyoma, we closed the defect in two layers, the leiomyoma was then removed via contained morcellation. The patient was followed up with an ultrasound four months after surgery which showed normalization of the uterine anatomy and endometrial contour (Figure 3).

Robot-assisted laparoscopic myomectomy may be an option to preserve fertility and minimize endometrial injury. This surgical method allows complete removal of large submucosal leiomyomas in one setting with exact suturing.

**References**

Figure 1. Pelvic magnetic resonance imaging (MRI). (A) Sagittal and (B) Coronal pelvic MRI showed a submucosal posterior fundal uterine leiomyoma measuring 4*4*4.5 cm.

Figure 2. Surgical procedure. Monopolar curved scissors without electrocauterization (also called a ‘cold-cut’), is used to make a transverse incision along the uterine wall overlying the leiomyoma (A). A tenaculum forceps is then used to provide traction while sharp and mechanical dissection is continued (B). To ascertain endometrial integrity and to aid in
dissection a diluted indigo carmine solution is injected into the endometrial cavity through the RUMI uterine manipulator (C). After enucleation of the leiomyoma, the defect is sutured in two layers (D).

**Figure 3.** Transvaginal ultrasound of the uterus. Follow up transvaginal ultrasound (B) done 4 months postoperatively showed normalization of uterine anatomy and endometrial contour, compared to the preoperative ultrasound (A).