

Correspondence

Single incision laparoscopic myomectomy in pregnancy

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Dear editor,

The prevalence of fibroids in pregnancy ranges from 2% to 10%. About 10% of these fibroids lead to complications in pregnancy including pain, intrauterine growth restriction, morbidly adherent placentation, placental abruption, dystocia, and postpartum hemorrhage.¹ Pain is the most common complication of fibroids during pregnancy.² Causes of pain include increased pressure on the fibroid itself, torsion of a pedunculated fibroid, and degeneration due to rapid fibroid growth.² Pain can first be managed conservatively with rest, hydration, and analgesics; however, if pain is refractory to conservative management, surgical management with myomectomy may be indicated.³ Spyropoulou K et al.⁴ performed a review of the literature regarding myomectomy in pregnancy. This review found that majority of myomectomies in pregnancy were performed via laparotomy with overall favorable pregnancy outcomes and few complications, concluding that myomectomy in pregnancy is safe in cases not responding to conservative management.⁴ With the majority of the literature describing the safety of myomectomy via laparotomy in pregnancy, there are few cases in the literature regarding the safety and feasibility of laparoscopic myomectomy during pregnancy. In the cases reported thus far describing laparoscopic myomectomy in pregnancy, there were no intraoperative or obstetric complications, and all women had healthy, term deliveries.⁴⁻¹² We present a case of a patient with a 10 cm pedunculated fibroid who presented with severe abdominal pain at 21 weeks gestation. The patient's pain did not respond to conservative therapy, and she subsequently underwent single incision laparoscopic surgery (SILS) myomectomy. On review of the literature, this is the first case identified in which laparoscopic myomectomy was performed using a single abdominal incision. This case report was deemed Institutional Review Board (IRB) exempt, and signed consent was obtained from the patient described.

A 39 year old nulliparous woman with a known 10 cm pedunculated

fibroid presented to our obstetrics triage unit at 20 weeks 5 days gestation reporting severe abdominal pain and cramping that had been progressively worsening over one day. The pain was located in the right lower quadrant and did not improve with acetaminophen prior to presentation. Her vital signs were within normal limits and she was afebrile. On physical exam, a fibroid was palpable and tender to palpation. Labs were notable for mild leukocytosis with white blood cell count $13 \times 10^3/\mu\text{l}$. At this point in her evaluation, the differential diagnosis of her pain included fibroid degeneration versus fibroid torsion, ovarian torsion, and acute appendicitis. Abdominal MRI showed an 11 cm \times 10 cm \times 9 cm pedunculated fibroid arising from the right lateral aspect of the uterine fundus (Fig. 1). The adnexa and appendix were normal in appearance. Given the above findings, the etiology of her pain was determined to be due to early fibroid degeneration. The patient's pain significantly improved with Indocin and she was discharged home the next day.

Three days later, patient presented to our obstetrics triage unit in significant distress, reporting excruciating pain in the right lower quadrant, described as 9/10 in severity. Pain was worse with movement to the point where she was unable to ambulate. On admission, vital signs were within normal limits. Physical exam was again notable for palpable fibroid in the right lower quadrant, but with severe tenderness to palpation, rebound, and guarding. Conservative management with analgesics and Indocin was initiated, but the pain was refractory to medical treatment. As the fibroid base measured 4 cm, degeneration remained the leading diagnosis rather than torsion. Given the failure of medical management, decision was made to proceed with surgical management.

The patient underwent single incision laparoscopic surgery myomectomy at 21 weeks 3 days gestation. Prior to surgery, fetal heart rate was confirmed via dopplers and 5000 units heparin was administered subcutaneously for deep venous thrombosis prophylaxis. Fetal monitoring was not performed intraoperatively. Sequential compression

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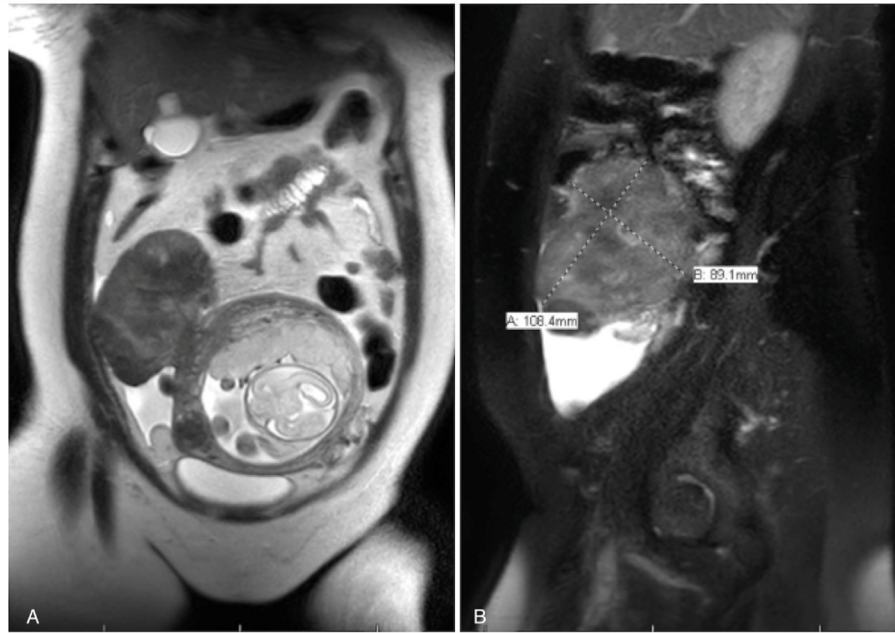


Fig. 1. MRI pelvis demonstrating a 11 cm × 10 cm × 9 cm pedunculated fibroid arising from the right lateral aspect of the uterine fundus. A. Coronal position; B. Sagittal position.

leggings were placed on each calf and general endotracheal anesthesia initiated. The patient was placed in dorsal lithotomy position using Allen stirrups, with hands and arms tucked at the side. A 2 cm skin incision was made at the umbilicus and carried down in layers until the abdominal cavity was entered. A GelPOINT mini advance access platform (applied medical) was inserted in the incision and the abdomen insufflated. As the gravid uterus can increase intra-abdominal pressure, less trendelenburg position was utilized and pressure of pneumoperitoneum was maintained at 12 mmHg. Fig. 2 illustrates intraoperative findings and demonstration of surgical technique. Using a 10 mm 30° laparoscope, survey of the pelvis showed a 12 cm pedunculated fibroid from the right uterine fundus on a 4 cm stalk. The fibroid appeared degenerated. In addition to

the camera port, three additional operative ports were placed through the gelport. Various instruments were used including a 37 cm laparoscopic cobra grasping forcep, 37 cm laparoscopic Maryland bipolar forcep, 37 cm laparoscopic tenaculum, 44 cm laparoscopic needle driver and 44 cm harmonic scalpel. To assist with hemostasis during the case, an 0 Vicryl suture was tied extracorporeally through the abdominal incision and around the base of the fibroid stalk. The stalk was then serially cauterized with bipolar energy and then transected using the harmonic scalpel. The fibroid was completely detached from the uterus. The stalk was sutured at the site of transection using 2-0 V-Loc suture. The fibroid was placed in a 15 mm Endo Catch bag. The GelSeal Cap was removed and the Endo Catch bag containing the fibroid was brought to the

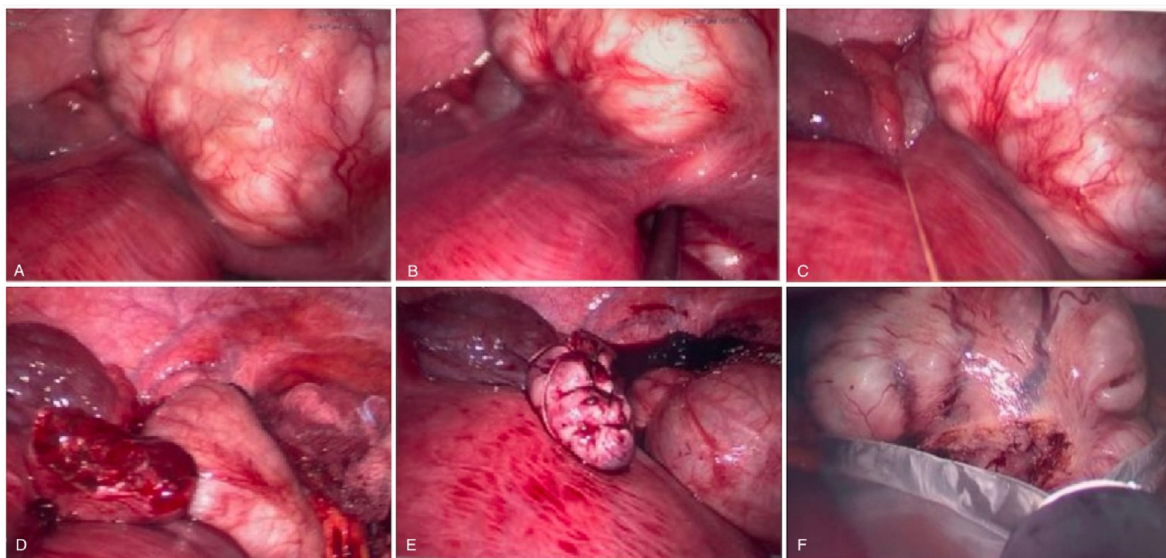


Fig. 2. Intraoperative findings and procedure. Survey of the pelvis showed a 12 cm pedunculated fibroid (A) from the right uterine fundus on a 4 cm stalk (B). To assist with hemostasis during the case, an 0 vicryl suture was tied around the base of fibroid stalk (C). The stalk was then serially cauterized with bipolar energy and then transected using the harmonic scalpel (D). The fibroid was completely detached from the uterus. The stalk was sutured laparoscopically at the site of transection using 2-0 V Lock suture (E). The fibroid was placed in a 15 mm EndoCatch bag (F).

umbilical incision. Using a scalpel, bag contained morcellation was performed and the entire fibroid removed. Total time of morcellation was 22 minutes. The GelSeal Cap was replaced, the abdomen was re-insufflated and hemostasis was assured. The GelPOINT Mini Advance Access platform was removed. The fascia was closed using 0 Ethibond suture in a figure-of-eight technique, and the remaining umbilical incision was closed in layers. There were no intraoperative complications. Estimated blood loss was 50 ml and total operative time was 123 minutes. At the end of the case, a transabdominal ultrasound confirmed fetal heart rate 126 beats per minute. Her postoperative course was unremarkable. Pain was controlled without medications and she was discharged home on postoperative day 2. Her remaining postoperative course and antepartum period was unremarkable.

The patient presented to the obstetrics triage unit at 38 weeks 2 days gestation in labor. Following extensive counseling, she requested elective primary cesarean delivery. The procedure was uncomplicated and she was discharged home on postpartum day 2.

Although the majority of pregnant patients with fibroids remain asymptomatic, about 10% develop complications related to pregnancy.¹ Fibroid degeneration or torsion typically presents with severe pain. This can usually be managed conservatively with analgesia, however, pain can be refractory to conservative management in about 2% of patients necessitating surgical management.¹³ Despite maternal and fetal risks, abdominal surgery during pregnancy is unavoidable in certain clinical scenarios. Minimally invasive surgery has advanced over the last few decades such that laparoscopic surgery is accepted as a reasonable alternative to laparotomy in pregnant patients. The benefits of laparoscopy include decreased postoperative pain and narcotic use, faster recovery, shorter hospitalization, decreased risk for postoperative wound infection, and decreased rates of venous thromboembolism.¹⁴

With proper patient selection, laparoscopic myomectomy should be considered as an alternative to laparotomy when myomectomy is indicated in pregnancy. Patients with either subserosal or pedunculated fibroids are the most appropriate candidates for laparoscopic myomectomy during pregnancy. The gravid uterus has enlarged vessels and increased blood supply, making myomectomy for intramural fibroids less feasible due to concerns for increased intraoperative blood loss. Including our patient, all reported cases of laparoscopic myomectomy thus far have been performed on either subserosal or pedunculated fibroids.^{1,5,7,9–12}

As the field of minimally invasive surgery advances, the utilization of SILS has become increasingly popular. At our institution, most of our gynecologic surgeries are performed using a single incision laparoscopic surgery technique. This technique has been widely used in various surgical procedures including cholecystectomy, appendectomy, nephrectomy, splenectomy, inguinal hernia repair, and colectomy,¹⁵ in addition to gynecologic procedures including laparoscopic hysterectomy and adnexal surgery.^{16,17} There is limited data describing single incision laparoscopic surgery in pregnancy, however four case series have described this technique in pregnant patients.^{18–21} On review of these cases, 62 pregnant patients successfully underwent laparoendoscopic single site surgery without complications. For our patient, we utilized SILS technique given its many benefits. First, there is overall improved patient satisfaction with cosmetic outcomes as there are not multiple port site incisions, and the single 2–3 cm umbilical incision is easily hidden within the umbilicus.¹⁶ Second, the abdomen is entered via open entry technique, reducing the risk of injury to surrounding vessels, viscera, and gravid uterus. Third, there is decreased postoperative pain compared to multi-port laparoscopy,^{17,20,22} resulting in less narcotic pain medication use and exposure to the fetus. A retrospective cohort study evaluating the outcomes of SILS and multiple port laparoscopy in pregnancy found that both routes of surgery were feasible, however SILS was associated with less postoperative pain, shorter hospitalization, and decreased patient anxiety.²⁰ Lastly, the larger 2–3 cm umbilical incision facilitates the extraction of large myomas at the time of myomectomy. As described in our case, once the fibroid is placed in an Endo Catch bag, the bag

containing the specimen is easily delivered through the 3 cm incision. At this point, bag contained morcellation can safely be performed using a scalpel. Although multiport laparoscopy also utilizes a 2–3 cm incision for tissue extraction, additional ports are not used for SILS and the entire surgery and tissue extraction is performed through the same umbilical incision. Again, this is valuable for improved cosmesis.

There is concern for potential increased risk of umbilical hernia formation in the SILS umbilical incision, particularly in pregnancy. In the non-pregnant population, the risk of hernia remains low.²³ However during pregnancy, there is increased intra-abdominal pressure with the enlarging gravid uterus and laxity of connective tissues. In addition, there is increased intra-abdominal pressure with valsalva during a vaginal delivery; all of which are potential risk factors for umbilical hernia formation. Although this data is limited, zero patients experienced umbilical hernia after SILS in pregnancy on review of 62 cases above, including our patient.^{18–21} Similar to the technique we utilized, the risk of umbilical hernia formation can be minimized by closing the fascial defect using 0 Ethibond suture in an interrupted figure-of-eight technique.¹⁹ Overall, there are no reports in the literature assessing the risk of umbilical hernia formation after SILS during pregnancy, warranting further investigation. However, based off our experience and the case series above, with proper technique, the risk of umbilical hernia formation after SILS in pregnancy remains low.

Although the use of SILS in pregnancy is a reasonable alternative to laparotomy or even multiport laparoscopy, it does have some limitations. Compared to multiport laparoscopy, single-incision laparoscopy can be technically challenging due to lack of triangulation and crowding of instruments. Laparoscopic suturing can be particularly challenging without triangulation of instruments. In our case, laparoscopic myomectomy and suturing was performed in 74 minutes, with a total case time of 123 minutes. The prolonged time of fibroid removal and suturing were mainly due to the slow movements in reducing the disturbance of the pregnant uterus. As we all know, operative time is an important consideration, particularly during pregnancy, as the fetus is exposed to anesthetic agents intraoperatively. We recommend placing an additional 5 mm port in the upper or lower quadrant in more challenging cases. Perhaps an additional port in our case could have been utilized to improve efficiency and decrease operative time. However, when SILS is performed by a surgeon experienced in this technique, there is no difference in operative time compared to multiport laparoscopy.²⁰ Prior to performing SILS in pregnancy, a surgeon should first be comfortable with this technique in non-pregnant patients. In our case, this particular surgeon has been performing single-incision laparoscopic gynecologic surgery including single-site myomectomy for 8 years, performing more than one thousand cases to date.^{24–26} Ultimately, the surgeon must perform the route of surgery he or she is most comfortable with, in order to ensure optimal patient outcomes.

To conclude, myomectomy performed via single-incision laparoscopic surgery in pregnancy is safe and feasible when performed by a surgeon trained in this technique. Our patient's surgery was successful and without complications, resulting in a routine term delivery.

Conflict of interest

The authors have no conflicts of interest.

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