

Laparoscopic metroplasty for bicornuate uterus

Rakesh Sinha, MD, Chaitali Mahajan, MD, Aparna Hegde, MD, and Anshumala Shukla, MD

From the Bombay Endoscopic Academy and Centre for Minimally Invasive Surgery Research Co. Pvt. Ltd. (all authors).

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Abstract. This is a case study of a 29-year-old nulliparous woman with a bicornuate uterus who had a poor obstetric history in whom we performed a laparoscopic metroplasty. She was advised to use barrier contraception for 3 months. A repeat hystero-laparoscopy performed 3 months later revealed a single large uniform uterine cavity without any adhesions. The patient had an incompetent cervical os after surgery and was advised to undergo cervical cerclage on conception.

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The mean prevalence of uterine malformations in infertile women is approximately 3.5%, and in patients with recurrent pregnancy losses, it is approximately 13%.¹ Bicornuate uteri form in 25% of these cases.¹ Patients usually have no difficulty conceiving with bicornuate uteri.² Approximately 60% of patients can expect to deliver a viable infant, although they may experience premature labor.² Bicornuate uteri seldom require surgical reconstruction. But for a woman with repeated mid-trimester pregnancy losses, surgical intervention may be the only option available. In such cases, Strassman's procedure is the surgical treatment of choice for bicornuate uteri. In this case report we describe a case of laparoscopic metroplasty, which could form a viable alternative to abdominal Strassman's metroplasty.

Case report

A 29-year-old woman who had a history of two second-trimester pregnancy losses was referred to our institution in

Corresponding author: Chaitali Mahajan, MD, 674, 16th Cross Rd, Behind Khar Gymkhana, Khar Pali, Khar (W), Mumbai-400 052, India.

E-mail: drchaitali01@yahoo.com

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February 2004. She had the first pregnancy loss in 2000 and underwent an ultrasound examination and hysterosalpingography. She was diagnosed to have either a septate or a bicornuate uterus with patent fallopian tubes. Diagnostic laparoscopy performed later revealed the presence of a bicornuate uterus with well-developed horns separated by a rectovaginal septum. The adnexa appeared normal. The patient conceived again in 2002, but miscarried in the second trimester.

She wanted to undergo laparoscopic metroplasty and thus was referred to our institution. Physical examination at our center revealed normal growth and development and the presence of age-appropriate secondary sexual characteristics. She did not have any skeletal defects. External genitalia were normal. Pelvic examination revealed a normal vagina and single fully formed cervix. On ultrasonography, the uterus was bicornuate, with two symmetrical uterine horns each measuring $7.3 \times 6.6 \times 3.4$ cm with an endometrial thickness of 6 mm. Both cornu were widely separated. A single cervix was seen. Both ovaries were normal. The hysterosalpingogram revealed a bicornuate unicollis uterus with patent tubes. Intravenous pyelography and renal ultrasound study excluded any urinary tract anomalies. The patient was examined to rule out other causes of recurrent pregnancy losses such as genetic, anatomic, hormonal, infective, and immune causes.

Operative procedure

Laparoscopic metroplasty with diagnostic hysteroscopy was performed in the early proliferative phase. The patient was placed on a liquid diet for 2 days, and bowel preparation with isosmotic solution (Pegelac; Roussel Morishita Co. Ltd., Osaka, Japan) was done before surgery to ensure that the bowel loops would be empty during the procedure. Prophylactic measures were used to prevent thromboembolism (antiembolic stockings, subcutaneous injection of low-molecular weight heparin). Antibiotics were also administered before surgery. A special written informed valid consent of the patient and her husband was taken explaining the procedure and its potential risks and complications during and after operation (i.e., the effects on her reproductive outcome). It was also explained to her that this procedure had not been performed earlier laparoscopically.

With the patient in the lithotomy position and the bladder catheterized, a diagnostic hysteroscopy was performed using a 4-mm 30-degree fore-oblique telescope. The diagnosis of complete bicornuate uterus was confirmed. The uterus had two symmetrical, communicating, functional horns with one well-formed cervix. The two tubal ostia appeared normal, with one ostium placed in each of the two horns.

The procedure of laparoscopic metroplasty

The Veres needle was placed at the Palmer's point because the patient had undergone previous laparoscopic surgery. The abdomen was insufflated with carbon dioxide at a preset pressure of 20 mm Hg. A 5-mm port was placed in the left lateral middle quadrant of the abdomen lateral to the inferior epigastric vessels. A 5-mm 30-degree fore-oblique telescope was inserted through it, and the abdominal cavity was surveyed to look for presence of adhesions. The 10-mm optical trocar was placed in the midline 2.5 cm above the

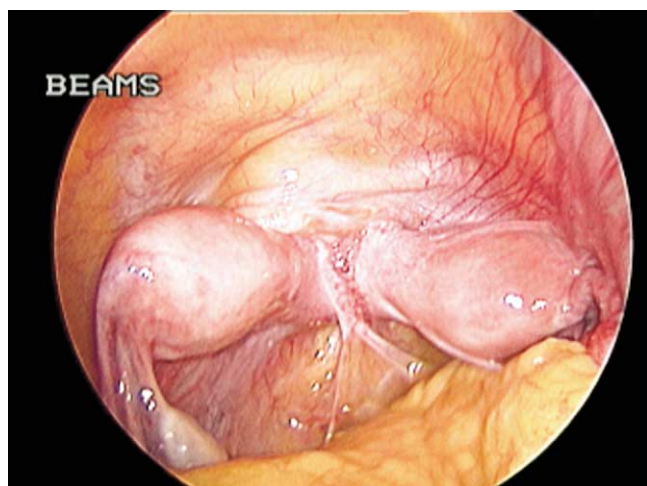


Figure 1 Bicornuate uterus with normal fallopian tubes and ovaries; urinary bladder adherent anteriorly and rectum adherent posteriorly.

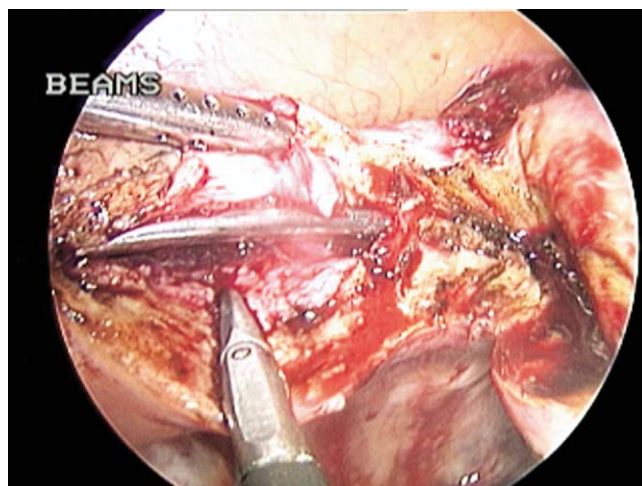


Figure 2 Right horn of uterus shows incision with monopolar needle up to myometrium, and left horn shows incision with curved scissors; opening of endometrial cavity. Ovum forceps seen in this horn. Incision extending from superior aspect of each horn along medial aspect to base of uterus.

umbilicus because this provides adequate distance between the 3 ports and also helps in suturing. We prefer to place this trocar under direct vision to avoid damaging major vessels that are directly beneath the incision site. A 5-mm port was then placed in the right lateral middle quadrant of the abdomen.

The uterus was found to be bicornuate (Figure 1) with the urinary bladder adherent anteriorly and the rectum adherent posteriorly. The fallopian tubes and ovaries were normal. To facilitate manipulation of the uterus, ovum (Randall) forceps was placed in each uterine horn. The ovum forceps is a long instrument with a small rectangular fenestrated tip without a ratchet. With the help of laparoscopic scissors and bipolar coagulation, the urinary bladder and the rectum were progressively dissected off the uterus and the vagina.

Vasopressin 30 mL at a concentration of 5 mIU/100 mL saline solution was infiltrated subserosally along the medial aspect of both the uterine horns. An incision deep enough to cut the myometrium was taken along the medial aspect of the uterine horns meeting at the base with a monopolar needle. The incision with the monopolar needle was not, however, deepened to include the endometrium, because the endometrium would have been damaged by the use of the current and pneumoperitoneum would have been lost. This incision extended from the superior aspect of each horn near the interstitial region of the fallopian tubes to the inferior aspect of the uterus (Figure 2). The endometrial cavity of the two horns was then opened by use of curved scissors along the length of the incision. This caused the myometrial edges to evert naturally. The ovum forceps were removed, and the vagina was packed with a tampon to prevent leakage of carbon dioxide, thus ensuring sufficient abdominal insufflation.

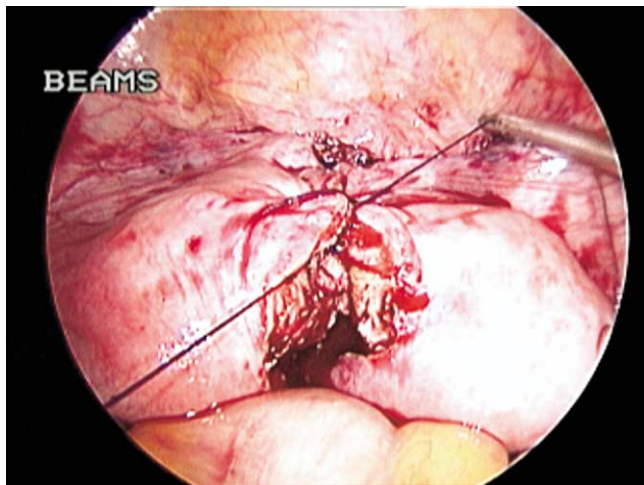


Figure 3 Interrupted vertical figure of eight intracorporeal sutures along anterior wall of uterus. Care was taken to exclude endometrium.

Apposition of the opposing myometrium was achieved with interrupted vertical figure-of-eight intracorporeal sutures with 2-0 polyglactin 910 (Vicryl; Ethicon, Somerville, NJ) used along the posterior and anterior uterine walls, with care taken to exclude the endometrium. The first two sutures were placed posteriorly at the base, because access to this area would be difficult later. Then we proceeded anteriorly starting at the base reaching up to the fundus (Figure 3). Care was taken during placement of the fundal suture because it was quite close to the tubal ostia. As the sutures were tied, the opposing myometrial edges apposed, forming a single uterine cavity. Care was taken not to expose any of the suture knots to the peritoneal cavity to prevent adhesion formation (Figure 4). The peritoneal cavity was irrigated with saline solution, and about 500 mL of saline solution was left in the peritoneal cavity. The supraumbilical port was closed in two layers with a monofilament suture for the skin suture. The intraoperative blood loss was 50 mL, and the operative time was 90 minutes.

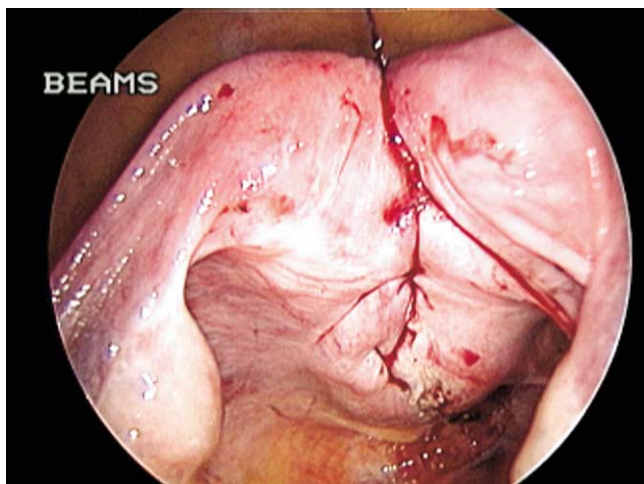


Figure 4 Posterior surface of uterus sutured. No suture knots exposed to peritoneal cavity.

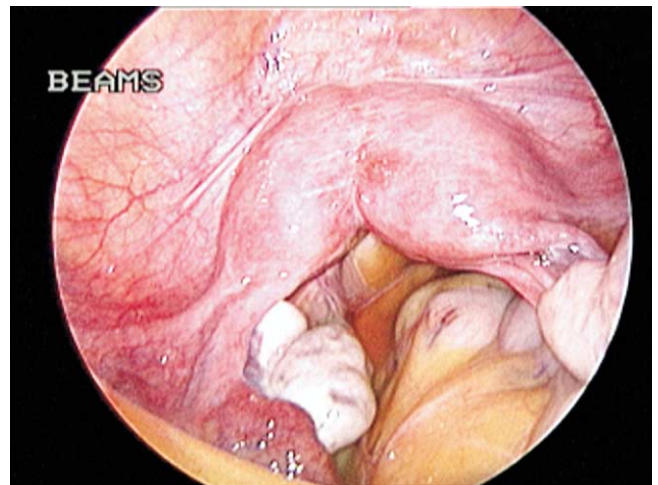


Figure 5 Laparoscopy shows single uterus with normal fallopian tubes and ovaries and no adhesions.

Postoperative management

The patient withstood the surgery well. The antibiotics were continued for 5 days after the operation. The patient's recovery was uneventful, and she had minimal vaginal bleeding. She was discharged on the third postoperative day. Barrier contraception was advised for 3 months.

A repeat hysteroscopic and laparoscopic examination was performed 3 months later. On dilation we found an incompetent os. On hysteroscopy, the uterus was found to have a spacious uniform cavity. There were flimsy adhesions near the left ostial opening. These flimsy adhesions could be easily removed with the help of a Gynecare Versapoint probe (Ethicon, Somerville, NJ) mechanically without the use of bipolar current.

Diagnostic laparoscopy revealed a single uterus (Figure 5). There were no adhesions, and the fallopian tubes and ovaries appeared normal. The tubes were confirmed to be patent bilaterally with chromopertubation.

The patient was advised to attempt conception after 3 months and cervical cerclage subsequently. She was advised to have a caesarean delivery at term. The patient conceived naturally in June 2005. She underwent cervical encercage at 15 weeks of pregnancy after an anomaly scan and blood tests. She had one episode of spotting at 18 weeks of pregnancy which was controlled with bed rest. Ultrasound examination revealed no abnormality. At present she is continuing with her pregnancy with complete bed rest and tocolytics.

Discussion

Laparoscopy for treatment of mullerian duct anomalies has been increasingly reported as safe, using various techniques.³ Metroplasty is reserved for women who have experienced recurrent spontaneous abortion, mid-trimester loss, premature birth, and in whom no other etiologic factor

has been identified. Transabdominal metroplasty has been reported to significantly improve the reproductive outcome in women with bicornuate uteri who experience recurrent spontaneous abortions or premature deliveries before surgery.³ Term pregnancy rates after uterine unification procedures have approached 80% to 85%.⁴

Although there is limited experience with laparoscopic correction of mullerian duct anomalies, the laparoscopic route could form a viable alternative to abdominal Strassman's metroplasty. One prime concern while performing any operative procedure in women with poor obstetric history is the preservation of tubo-ovarian anatomy with as few postoperative adhesions as possible.⁵ Reduced tissue handling and drying, which are inherent in laparoscopy, may contribute to reduced adhesion formation after laparoscopic surgery.⁶

Strassmann metroplasty is technically quite challenging when performed through the laparoscopic route. Manipulation of the needle holders in the limited space available while suturing the base of the posterior uterine wall can be extremely difficult. This is because anteversion of the uterus to reach the base of the posterior uterine wall is not an easy task, because a uterine manipulator cannot be inserted into the uterus after the horns are opened. Complete mastery over laparoscopic suturing is also required to ensure that the myometrial edges are aligned well. The second major concern is that of hemostasis. Hemostasis in this case was maintained with the help of intracorporeal suturing and injection of vasopressin. The blood loss in this case was a minimal 50 mL. Endoscopic approach is a trial, and the risk of rupture by single-layer reconstruction is unknown. In cases of caesarean sections, the single-layer technique is safe in the perioperative period, with decreased risk of endometritis. It has the additional theoretical advantage of less tissue damage, which may result in a stronger wound and thus in a reduced risk of rupture with subsequent labor.⁷

We also prefer to use a 10-mm 30-degree fore-oblique telescope because it accords optimum vision of the operative site through various angles, a versatility that may be difficult to achieve with the 0-degree telescope.

The monopolar needle was used to incise the myometrium only. Incising the complete uterine wall would have opened the uterine cavity at this stage, causing loss of pneumoperitoneum and making it difficult to take the complete incision. Also to be extra cautious and to prevent endometrial damage along the cutting line, we did not use current here. The myometrium is damaged to a certain extent by this technique, which causes weakening of the scar, but it gives good hemostasis. Because there is good scar integrity in myomectomy cases wherein the capsule of the fibroid is opened with a monopolar needle, we preferred

using the monopolar needle. It is essential to ensure that myometrial edges are approximated without tension and that no hematoma forms deep within the myometrium.⁸ This precaution is necessary to reduce the likelihood of healing by secondary intent, which could make the uterine wall fragile during pregnancy. Also it is necessary to invert the edges of myometrium to prevent growth of endometrial glands in the uterine scar.⁸

The critical issue is the skill necessary for the operating surgeon.⁸ In the hands of a skilled laparoscopic surgeon, ably assisted by well-trained assistants, the procedure replicates the basic conventions of abdominal Strassman's metroplasty.

Incompetence of cervix can occur when the cervical portion of the septum starts at the level of the internal os.⁴ Overdilation, although rare, could also be a cause. The end point of this surgery should be a successful pregnancy outcome. The final size of the uterine cavity seems to be relatively unimportant to reproductive capability; uterine symmetry appears to be a more important factor.⁴ Often the constructed cavity is quite small compared with the normal uterus. This procedure can be kept as a surgical option in cases that require uterine unification for bicornuate uteri.⁴

Comparison of the reproductive outcome after this procedure and the abdominal Strassman's metroplasty requires more study. But coupling with the obvious advantages of laparoscopic surgery over laparotomy, laparoscopic metroplasty could form a viable alternative.

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