Laparoscopic metroplasty in bicornuate and didelphic uteri

Division of Infertility and Gynecologic Endoscopy, Department of Obstetrics and Gynecology, Shiraz University of Medical Sciences, Shiraz, Iran

Objective: To determine the feasibility of laparoscopic metroplasty in the treatment of bicornuate and didelphic uteri.

Design: Case report.

Setting: University and private hospitals.

Patient(s): Four women with a diagnosis of double uterine cavity (two bicornuate and two didelphic uteri) with a history of two recurrent spontaneous abortions at less than 5 months of pregnancy.

Intervention(s): Laparoscopic metroplasty with diagnostic hysteroscopy was performed for the unification of the uterus. Second-look laparoscopy and hysteroscopy was performed about 3 months later.

Main Outcome Measure(s): Evaluation of the uterine compliance to high intrauterine pressure and presence of adhesions in the pelvic and uterine cavities.

Result(s): In all four patients, laparoscopic metroplasty resulted in a unified uterus with a good cavity and tolerance to high intrauterine pressure. Minimal pelvic adhesions were noted in the two patients at the second surgery.

Conclusion(s): This new technique of laparoscopic metroplasty is an acceptable alternative for abdominal metroplasty, with minimal adhesion formation. (Fertil Steril 2009;92:352–5. ©2009 by American Society for Reproductive Medicine.)

Key Words: Adhesion formation, bicornuate uterus, didelphic uterus, laparoscopy, metroplasty

Müllerian duct anomalies are a common cause of recurrent abortion and poor pregnancy outcome. Patients with Müllerian duct anomalies are known to have a higher incidence of infertility, repeating first trimester spontaneous abortion, intrauterine fetal growth retardation, fetal malposition, preterm labor, and retained placenta (1, 2). The mean prevalence of these anomalies in the infertile women is 3.5%, and in women with recurrent abortion it is 13% (3).

The mean incidence of bicornuate uterus in Müllerian duct anomalies is approximately 25%. This figure for the didelphic uterus is 11%. It seems that patients with bicornuate and didelphic uterus have a poor pregnancy outcome (3). In patients with bicornuate uterus, the rates of abortion, preterm delivery, and term delivery are 36%, 23%, and 40.6%, respectively, and in those with didelphic uterus, the rates of abortion, preterm delivery, and term delivery are 37%, 16.4%, and 43.3%, respectively (3). Therefore, for a woman with repeated pregnancy losses, surgical intervention may be the only option available. The ability of the Strassman procedure to prolong subsequent gestations in such cases is uncertain, but it has been shown to be effective in a select group who has experienced recurrent pregnancy losses (4, 5). Abdominal metroplasty has a real chance of creating adhesion formation, so laparoscopic metroplasty can be a viable alternative to the abdominal approach. Laparoscopic metroplasty for the bicornuate uterus was reported for the first time in one patient in January 2006 with a successful outcome (6). Unification of the didelphic uterus is a more difficult technique, and to the best of our knowledge, this is the first report on laparoscopic metroplasty for two patients with this problem according to previous studies and another two patients with bicornuate uterus. This technique has been evaluated by second-look laparoscopy and hysteroscopy.

CASE REPORT

Strassman metroplasty by laparoscopy was performed in four patients with a double uterine cavity (two bicornuate and two didelphic uteri). Each patient had a history of two recurrent spontaneous abortions at less than 5 months of pregnancy. The mean age of the subjects was 30 years (range, 24–36 years). Pelvic examination revealed a normal vagina and single fully formed cervix in the patients with the bicornuate uteri and two fully formed cervixes with longitudinal vaginal
septum in the patients with didelphic uteri. Hysterosalpingography was done for all patients and revealed a double cavity with patent tubes; therefore sonohysterography was done to differentiate the septate and bicornuate uteri (7). Other causes of recurrent abortion and preterm labor such as hormonal disorders, infections, genetic anomalies, and immunologic problems were ruled out in these patients.

MATERIALS AND METHODS

Operative Procedure

Laparoscopic metroplasty with diagnostic hysteroscopy was performed in the early proliferative phase. Antibiotics were administered before the surgery. A special written informed consent of the patients and their husbands was taken that explained the procedure and its potential risks and complications during and after the operation. This study was approved by the Shiraz University of Medical Sciences Institutional Board Review.

In the lithotomy position, a diagnostic laparoscopy and hysteroscopy were performed in all patients, and the diagnosis of complete bicornuate or didelphic uterus was confirmed.

The Laparoscopic Metroplasty Procedure

A 10-mm trocar was inserted just below the umbilicus and insufflated with carbon dioxide at a present pressure of a 15 mmHg. On direct view, a 5-mm trocar was placed in the right lower quadrant abdomen medial to hypogastric vessels, and another 10-mm trocar was placed lateral to the hypogastric vessels in the left lower quadrant of the abdomen for inserting and removing the needle and sutures. Then a 5-mm trocar was placed in the midline between them. There was no adhesion of the uterus to the bowel or bladder or in the pelvic cavity in patients with bicornuate uterus, but there was an adhesion band of the rectum to the bladder in the didelphic uterus, which was released. The fallopian tubes and ovaries were normal in all patients.

At first, a superficial incision was held along the medial aspect of the uterine horns meeting at the base with a bipolar needle (Fig. 1A). After that an incision deep enough to cut the myometrium was held along the medial aspect of the uterine horns with a monopolar hook. 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. The

![Figure 1](image-url)
endometrial cavity of the two horns was then opened with hook scissors along the length of the incision (Fig. 2A). This caused the myometrial edges to evert naturally. The vagina was packed with a tampon to prevent the leakage of carbon dioxide.

Apposition of the opposing myometrium was achieved with interrupted vertical simple intracorporeal sutures with 0 vicryl. Interrupted sutures were intermittently placed in the posterior and anterior wall of the uterus with care taken to exclude the endometrium (Figs. 1B and 2B). As the sutures were tied, the opposing myometrial edges were apposed, forming a single uterine cavity.

Finally, the serosa of the uterus was apposed with continuous baseball intracorporeal sutures with 4-0 vicryl to prevent adhesion formation (Figs. 1C and 2C). The peritoneal cavity was irrigated with saline solution, and bleeders were checked. Then the site of the uterine incision was covered with interceed (ETHICON SARL, Neuchatel, Switzerland). The sites of insertion of the instrument were closed in one layer with a monofilament suture for the skin suture.

The total operation time was 90 minutes, and intraoperative blood loss was 50–100 mL. The patients were on IV antibiotics for 1 day after the surgery and then were discharged with oral antibiotic. In these patients, 2.5 mg of conjugated estrogens (Iran Hormone) were administered daily for 21 days, and medroxyprogesterone acetate (Iran Hormone, Tehran, Iran) was administered 10 mg daily for the last 10 days for 3 months.

Second-Look Laparoscopy and Hysteroscopy

A repeat hysteroscopic and laparoscopic examination was performed 3 months later in all cases. Diagnostic laparoscopy revealed a simple uterus (Fig. 1D). There was filmy adhesion of the uterus to omentum, which was easily released with scissors in two patients. The fallopian tubes and ovaries appeared normal. The tubes were confirmed to be patent bilaterally with chromopertubation. On hysteroscopy, the uterus was found to have a spacious uniform cavity. There was a subseptate uterus (<1 cm) or arcuate uterus, which was resected by resectoscope. After laparoscopic metroplasty, sonohysterography of the one of the patients with bicornuate uterus revealed only minimal uterine subseptum (Fig. 2D). Also during hysteroscopy, to evaluate the uterine compliance, we increased the intrauterine pressure up to 150 mmHg with
a continuous positive pressure infusion of 5% dextrose in water and confirmed that the uterine cavity tolerated it.

DISCUSSION

Laparoscopy for treatment of bicornuate uterus is completely safe (6). Strassman metroplasty should be reserved for selected women with bicornuate and didelphic uteri who have experienced recurrent spontaneous abortion or preterm birth. Transabdominal metroplasty has been reported to significantly improve the reproductive outcome in women with bicornuate or didelphic uterus who experience recurrent spontaneous abortions or premature deliveries before surgery (8). The rate of term pregnancy after uterine unification procedures has approached 80%–85% (6).

At first, laparoscopy use was diagnostic, but now major laparoscopic procedures are performed by skilled surgeons (9). The laparoscopic route could be a viable alternative to abdominal Strassman’s metroplasty (6). Decreased prevalence of adhesion formation has been reported after operative laparoscopy (10). Reduced tissue handling and chance of drying, which are inherent in laparoscopy, may contribute to reduced adhesion formation after laparoscopic surgery (11).

Complete mastery over laparoscopic suturing is required to ensure hemostasis and that the myometrial edges are aligned well (12). The monopolar hook needle was used to incise the myometrium only to prevent endometrial damage along the cutting line. 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 (9), 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. This precaution is necessary to reduce the likelihood of healing by secondary intention, which could make the uterine wall fragile during pregnancy (9).

During the first 30 weeks of pregnancy, uterine contractions are seldom greater than 20 mmHg. Then uterine activity increases, and during the first stage of labor, the uterine contractions increase progressively from about 25 mmHg at commencement of labor to 50 mmHg at the end. During the second stage of labor, uterine contractions reach 80–100 mmHg (13). So to evaluate uterine compliance, we increased intrauterine pressure up to 150 mmHg with a continuous positive pressure flow of DW5% and confirmed that the uterine wall tolerated it.

Nevertheless, our plan is to perform elective cesarean section at term pregnancy for these patients.

Residual uterine septum of less than 1 cm in size after metroplasty does not impair the reproductive outcome (14), but because we performed the second-look hysteroscopy, the subseptum was resected by resectoscope during hysteroscopy.

Minimal adhesion after laparoscopic metroplasty was reported in one patient (6). In our patients, we did second-look laparoscopy and observed minimal pelvic adhesion in two of our four patients. Laparoscopic metroplasty is an acceptable alternative for abdominal metroplasty, which results in a good unified uterine cavity and minimal adhesion formation.

REFERENCES