Hysteroscopy for Metroplasty of Uterine Septa and Hypoplastic Uterus

Budi R. Hadibroto
Departemen Obstetri dan Ginekologi Fakultas Kedokteran Universitas Sumatera Utara
RSUP H. Adam Malik – RSUD Dr. Pirngadi Medan

Abstract: A septate uterus is the most frequent congenital malformation of the female reproductive tract. It is a Müllerian anomaly resulting from incomplete resorption of the paramesonephric ducts during the 11th week of fetal development. The incidence of septate uterus is difficult to determine because of the different classification methods. We estimate the incidence to be 5 percent among the general population: it accounts for 9 to 23 percent of genital malformations and 30 percent of uterine malformations. The development of surgical hysteroscopy has simplified the treatment of these malformations, which used to be treated by laparotomy. Surgical hysteroscopy using rigid scissors attached to a channel is no longer performed. Today, these metroplasties are treated using monopolar electrosurgery. Bipolar electrosurgery, which was introduced more recently, seems to be as effective and results in less morbidity.

Keywords: metroplasty, hysteroscopy

INTRODUCTION

A septate uterus is the most frequent congenital malformation of the female reproductive tract. It is a Müllerian anomaly resulting from incomplete resorption of the paramesonephric ducts during the 11th week of fetal development. The incidence of septate uterus is difficult to determine because of the different classification methods.1,2 We estimate the incidence to be 5 percent among the general population: it accounts for 9 to 23 percent of genital malformations and 30 percent of uterine malformations.1,3-5 This anomaly is associated with various types of reproductive failure, including recurrent miscarriage, late abortion and preterm delivery.3,9 No relation has so far been shown, however, between infertility and septate uterus.

A hypoplastic uterus is a rare uterine malformation, except in exposure to diethylstilbestrol (DES) in utero.10 The pathogenesis remains unclear and its cause is still unknown. Several studies showed very poor reproductive performances when the uterine malformation was not treated.11,12 Reproductive performance after hysteroscopic metroplasty in women with a hypoplastic uterus has not been well established, concerning only three reports,13-15 in contrast to women with a septate uterus.16

In the past, metroplasty was offered to women with reproductive failure, in particular, recurrent or missed abortions. The development of surgical hysteroscopy has simplified the treatment of these malformations, which used to be treated by laparotomy.8 Surgical hysteroscopy using rigid scissors attached to a channel is no longer performed. Today, these metroplasties are treated using monopolar electrosurgery. Bipolar electrosurgery, which was introduced more recently,9 seems to be as effective and results in less morbidity.

CLASSIFICATIONS OF UTERINE MALFORMATION BY MUSSET AND THE AFS
In France, the classification of Musset is most commonly used. Elsewhere, the 1988 classification of the American Fertility Society (AFS) is most widely accepted. These classifications may be summarized as follows.

**Müllerian Aplasias**

The Musset classification lists Müllerian aplasias as:
- Bilateral: Mayer-Rokitansky-Kuster-Hauser syndrome.
- Unilateral: unicornuate uterus (without rudimentary horn), pseudounicornuate uterus (with rudimentary horn).

The AFS classification lists Müllerian aplasias as:
- Class I: Hypoplasia, agenesis
- Class II: Unicornuate uterus

**Fusion Defects**

The Musset classification lists fusion defects as:
- Didelphys uterus (complete or partial duplication of the vagina, cervix and uterus).
- Bicornuate uterus: complete (septum from fundus to cervical os), partial (septum to body of uterus), partial (septum confined to the fundus).

The AFS classification lists fusion defects as:
- Class III: Didelphys uterus
- Class IV: Bicornuate uterus

**Resorption Defects**

The Musset classification lists resorption defects as:
- Septate uterus: complete, partial, to body of uterus, confined to the fundus.

The AFS classification lists resorption defects as:
- Class V: Septate uterus
- Class Vb: Complete
- Class Va: Partial

**INDICATIONS AND CONTRAINDICATIONS OF UTERINE METROPLASTY**

**For Septate Uterus**

- **Formal Indications**
  - Pregnancy complications such as second-trimester loss or preterm delivery.
- **Possible Indications**
  - Recurrent first-trimester spontaneous abortion.
- **Controversial Indications**
  - Before in vitro fertilization (as preventative treatment).
- **Contraindications**
  - Contraindications to anesthesia
  - Genitourinary infections
  - Pregnancy
  - Bicornuate uterus.

**For Hypoplastic Uterus**

Hypoplastic uterus with cylindrical uterine cavity and a bulging of the uterine side walls in combination with a history of primary infertility, recurrent abortion and/or preterm delivery before 30 weeks with or without live birth.

**PREOPERATIVE WORK-UP**

The preoperative work-up is important and includes hysterography, diagnostic hysteroscopy and pelvic sonography. Vaginal sonography with accentuated contrast may be added. These examinations should confirm that the patient has a septate uterus and not a bicornuate uterus or hypoplastic uterus and check for other causes of infertility.

During the sonography, it is essential to measure the thickness of bulging of the uterine side walls or of the uterine septum, its height and the depth of the healthy myometrium above the septum up to the serosa. If the ultrasound reveals a groove in the corner facing the posterior surface of the bladder between two half-uteri, the malformation is diagnosed as a bicornuate uterus.

Surgery was scheduled to be done early in the follicular phase or a 1 month preoperative progestogen treatment (e.g. pregnane) or the administration of GnRH analogs (gonadotropin releasing hormone) can be prescribed to prepare the endometrium. The procedure should then be performed about 28 days after starting the treatment.

**OPERATING ROOM SETUP**

**Patient**

- General anesthesia, local-regional anesthesia or paracervical block anesthesia
- Lithotomy position: legs spread at a 45° angle, thighs at a 90° angle from the surface of the table and knees bent at a 90° angle
- Perineal and cervicovaginal preparation
- Prophylactic antibiotics when anesthesia is induced to prevent endometritis
- Urinary catheter (optional).
Budi R. Hadibroto

Team
1. The surgeon is seated between the patient's legs.
2. The assistant stands to the right of the surgeon.
3. The anesthesiologist is at the patient's head.

Equipment
The equipment is on the surgeon's left:
1. Endocamera and monitor.
2. Devices to control pressure and flow of distension media: a constant uterine distension must be maintained. The pressure is controlled continually by suction and irrigation pumps.
3. Distension medium: hyperosmolar glycine solution with monopolar cautery (Glycocolle 1.5%, Aguettant laboratory, Lyon, France), saline with bipolar cautery.
4. Light source: the same type of xenon light source is used for diagnostic hysteroscopy, surgical hysteroscopy and laparoscopy.
5. High-frequency electrosurgical generator:
   a. Unipolar electrosurgery: high-frequency current is used (> 300 000 Hz). Division of tissues is done with an unmodulated current that produces a rapid rise in temperature.
   b. Bipolar electrosurgery with Versapoint® bipolar vaporization system (Gynecare laboratory, Issy-Les-Moulineaux, France): saline is used as the distension medium to decrease the risk of metabolic complications. The operating channel is 5 French.

INSTRUMENTS

Usual Equipment
1. Hegar's dilators (No. 1 to No. 10, diameter increasing from 0.5 to 1 mm).
2. Speculum with detachable valves.
3. Rigid endoscope between 2.7 and 4 mm in diameter; the direction of view normally used in hysteroscopy is 12°.
4. Resectoscope: from 7 to 9 mm with two channels, one internal (irrigation) and one external (suction) for monopolar hysteroscopy or from 5 to 9 mm with two channels and a double current operation channel for bipolar hysteroscopy. In all cases it has an operative handle: passive (electrode in) or active (electrode out) (Resectoscope 26F, optical lens 2.9 mm, Ref. 260020FA; Iglesias's jacket, Ref. 26055 SL; monopolar hook, Ref. 26055 L, Karl Storz, Tuttingen, Germany).
5. Hysteroscope.
6. Irrigation and suction channels.
7. Two pozzi graspers.
8. Hysterometer.

ADJUSTMENT OF THE SYSTEM

Monopolar System
The resection techniques described use monopolar current. The suction-irrigation pump must be preset to maintain an intrauterine pressure < 100 mm Hg, a 250 mL/s flow rate, a 0.2 bar suction pressure and 45 watts of power. The procedure must not last longer than 45 minutes. The total volume of glycocele used must be limited to 6 liters. Precise monitoring of the distension liquid inflow and outflow must be done, and the procedure must be stopped immediately if there is a difference between the irrigation and suction flow rates (a 500 mL difference can be allowed). If there is too much of a difference, or if the procedure lasts too long, a chemistry panel must be performed immediately after the procedure to check for metabolic complications (hyponatremia).

Bipolar System
Bipolar spray electrosurgery is a more recent system. Its efficacy seems to be equivalent to monopolar electrosurgery, with a decrease in morbidity. The suction-irrigation pump should be preset to maintain a flow of 150 mL/s, a pressure of 80 mm Hg and 100 watts or less of power. There are no limits to the duration of the procedure.

Bipolar systems have the advantage of being safer, because they can be used with saline, thereby decreasing metabolic complications. In contrast to the monopolar system, which penetrates into the tissues and can be partly obscured at certain points, the bipolar system is constantly visible. This lowers the risk of uterine perforation.

OPERATIVE STEPS

Dilation of the Cervix
Biannual examination is carried out to evaluate the position of the uterus before dilation. A speculum is inserted and the cervix is grasped with 2 pozzi graspers placed in a 3 o'clock and 9 o'clock position to exert traction on the uterus in order to bring it into an intermediary position and to rectify an anteversion or a major retroversion. Hysterometry is routinely performed before
beginning the dilation. The cervix is then dilated with Hegar's dilators, using progressively larger dilators. Dilation of the cervix must be done carefully to avoid a uterine perforation.

**Inserting the Rectoscope**

The endocamera, the resectoscope and the electrode are assembled and connected to the xenon light source, the hysteroscopic unit, the electrosurgical generator and the suction-irrigation tubing. Care must be taken to remove all air bubbles from the tubing. The resectoscope is then introduced under videoscopic guidance.

**Landmarks**

Thorough visual exploration of the uterine cavity is essential. The two tubal ostia must be perfectly discerned to locate the base of the septum.

**DIVISION OF THE SEPTATE UTERUS**

The division is performed in a progressive manner using repetitive contact between the electrode and the septum. The uterine septum is divided transversely starting at its apex, halfway between its anterior and posterior surfaces, causing it to retract and become a part of the corresponding surfaces of the uterus. Distension of the uterus is progressively achieved as the septum is divided (the cavity opens like a book), and the cavity gradually acquires a normal aspect.

The tissue of the septum is fibrous and does not bleed. The septum ends where healthy myometrium is revealed by the occurrence of minimal bleeding. When this bleeding occurs, the division should be stopped, because it indicates that the septum has been completely divided.

**Major Principles**

Cutting current is used for dissection. The septum should be divided but not removed, to avoid destroying the endometrium. The procedure is performed under constant visual guidance and consists of transversely dividing the uterine septum halfway between the two uterine surfaces, until the two tubal ostia can be visualized in the same hysteroscopic field.

**SPECIAL CASES**

**Special Case 1**

When the septum extends down to the cervix, it is first divided with cold scissors or with a cutting electrosurgical probe. The resection begins at the level of the cervix, and extends from the external os towards the uterus. The division of the uterine septum is continued, with care taken to preserve the plane of the tubal ostia.

**Special Case 2**

When the uterine septum is wide, division must be stopped as soon as any bleeding occurs. The procedure is then performed in 2 phases with a second operation scheduled 2 months later to complete the procedure.

**Special Case 3**

The operative step begins by dividing the vaginal septum using monopolar electrosurgery, with resection of the septum up to the anterior and posterior cul-de-sacs, and suture of the anterior and posterior surfaces of the vagina with interrupted absorbable suture. The procedure is then continued as for septate uterus.

**End of Procedure**

At the end of the procedure, it is preferable to leave a fundic spur of less than 1 cm in place, to avoid weakening the fundic myometrium. The procedure is ended when both tubal ostia are visible under the same hysteroscopic view. This is important, because the risk of perforation increases if the resection is carried out too far. Some surgeons recommend follow-up sonography to make sure that there has been no perforation.

**Postoperative Management**

No intrauterine device is needed. Estrogen therapy is administered for 2 months to facilitate the follow-up hysteroscopy (its therapeutic advantages have not been demonstrated, however). During the immediate postoperative period:

- If the inflow-outflow assessment is more than 500 mL, a chemistry panel must be performed.

**After 2 months**

A follow-up diagnostic hysteroscopy is performed:

- To check for possible adhesions. It is usually easy to remove these new, fine adhesions during the diagnostic procedure with the pointed tip of the hysteroscope.
- If the remaining fundic spur is larger than 1 cm, a second procedure is indicated and can be performed immediately if we use bipolar electrosurgery under local anesthesia or without anesthesia.
The only criterion of success is a subsequent pregnancy resulting in a viable birth.

PROCEDURE FOR HYPOPLASTIC UTERUS
The surgical procedure was performed under general or locoregional anesthesia by a senior surgeon after cervical dilatation, with an operative hysteroscope (fitted with a monopolar hook). The uterine cavity was distended using a glycocele solution, the flow of which was controlled electronically. Also, we used the Versapoint® bipolar vaporization system effective in saline solution, through the 5F operating channel of a 5.5 mm hysteroscope, as previously described by Fernandez et al.[11] The hook was introduced into the uterine horn and the incision was performed under direct vision from the fundus to the isthmus, perpendicularly to the lateral wall of the uterus and decreasing the depth of the incision as the section advanced. Two incisions in the same groove were performed, until a normal uterine triangular and symmetric cavity was achieved. The same incisions were repeated on the other lateral wall. The depth of incision did not exceed 5 to 7 mm.

All women were discharged on the day of surgery with postoperative medication including sequential estroprogestative medication for two months (50 pg of ethinylestradiol). In all cases, diagnostic hysteroscopy was repeated two months postoperatively, to identify a marginal synechia and to evaluate the configuration of the uterine cavity.

The criterion for second procedure was the presence of synechia observed during the diagnostic hysteroscopy.

COMPLICATIONS OF HYSTEROPLASTIC METROPLASTY

Mechanical Complications
Uterine perforation is the most common complication. It occurs either during dilation of the cervix or during the resection of the septum. There is a risk of visceral burns if the perforation is not detected. For this reason, some authors recommend intraoperative sonography or laparoscopy.

Postoperative Infection
Post-hysteroscopic endometritis occurs in 1 percent to 5 percent of cases, justifying the systematic use of intraoperative prophylactic antibiotics (cephalosporin).

Metabolic Complications
The intravascular passage of a significant quantity of irrigation fluid can lead to hemodilution. This "transurethral resection syndrome" was first described by urologists. Preventative measures are dependent on adherence to procedural protocol, the most important of which is a meticulous monitoring of the inflow and outflow of fluids.

CONCLUSION
The hysteroscopic metroplasty seems to be an operation that improves the rate of live births for women with a hypoplastic uterus and a history of primary infertility and/or recurrent abortion and/or preterm delivery. In the past, however, correction of these uterine abnormalities was not undertaken. Ideally, in order to evaluate the efficiency of this new technique, a randomized study ought to be undertaken, in multiple centers, taking into account a larger number of women suffering from this type of abnormality.

Endoscopic metroplasty should be proposed to patients with recurrent abortions as soon as septate uterus is diagnosed, to increase the live birth rate and to improve the obstetrical outcome. We propose endoscopic transactions to this group despite the lack of significant change in the live birth rate.

For patients with primary infertility, the endoscopic metroplasty seems to increase fertility. This is particularly true when the infertility is idiopathic and requires treatment by in vitro fertilization. Moreover no abortions occurred in this group. Only randomized controlled trial can reach a definitive conclusion on this issue.

Obstetrical complications were nearly the same except in the late abortion group, where 70 percent of the patients had a cervical cerclage. The question of systematic cervical cerclage remains open. Perhaps the coaxial bipolar electrode should be a good alternative.

It thus seems clear that waiting for an abortion or other obstetrical complication in infertile patients with a septate uterus is not a good management strategy, especially since endoscopic surgery reduces morbidity and postoperative adhesions, restores the normal size of the uterine cavity, and does not require systematic cesarean section.
REFERENCES


