Hysteroscopic morcellator system can be used for removal of a uterine septum

Michiel Simons, M.D.,[a] *Tjalina W. O. Hamerlynck, M.D.,*[b] *Leyla Abdulkadir, M.D.,*[a] *and Benedictus C. Schoot, M.D., Ph.D.*[a]

[a] Department of Obstetrics and Gynecology, Catharina Hospital, Eindhoven, the Netherlands; and [b] Women's Clinic, Ghent University Hospital, Ghent, Belgium

Objective: To evaluate whether the hysteroscopic morcellator (HM) can be used as an alternative for uterine septum removal.
Design: Case report.
Setting: Outpatient clinic of a university-affiliated teaching hospital (Catharina Hospital, Eindhoven, the Netherlands).
Patient(s): A 34-year-old Asian woman with recurrent miscarriages and a large uterine septum and bicornuate uterus.
Intervention(s): Septum removal using the HM.
Main Outcome Measure(s): Successful removal of a uterine septum.
Result(s): Considering obstetric complications, septum removal was carried out. Currently, septum transection using the resectoscope is the gold standard. Instead of transection we achieved nearly complete removal of a septum, using the HM.
Conclusion(s): The HM is a safe, effective, and easily manageable alternative for uterine septum removal compared with classic resectoscopy. (Fertil Steril® 2011;96:e118–21. ©2011 by American Society for Reproductive Medicine.)

Key Words: Uterine septum, removal, hysteroscopic morcellator, resectoscopy

During the early, indifferent stage of gonadal development in the human embryo the paramesonephric ducts, also known as the müllerian ducts, arise bilaterally and approach each other caudally to fuse and eventually form the uterus, cervix, and the vagina. The cranial ends of the müllerian ducts form the fallopian tubes (1).

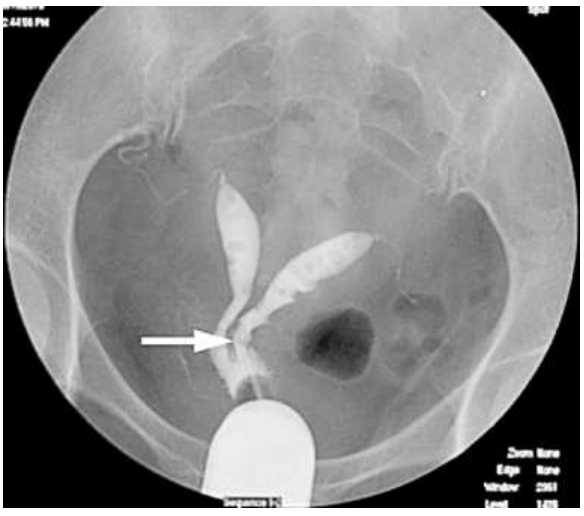
Failure of the müllerian ducts to fuse, be completely resorbed, or migrate may result in reproductive anomalies, occurring in 3.8% of the general population (1–3). Bicornuate uteri can occur combined with large uterine septa (4). The septate uterus, which can be partial or complete, is one of the most common müllerian anomalies, constituting 35% of the total, and is most frequently associated with obstetric complications (1, 3, 5, 6). Uterine septa occur in 1% of the general population (2, 3, 5). The literature reports a spontaneous abortion rate ranging from 27% to 44.3%, a preterm labor rate from 12% to 22.4%, and a term delivery rate up to 33% and 61% for partial and complete septa, respectively (2, 5). Miscarriage rates up to 79% for both partial and total septa together have been reported (3, 6). This is hypothesized to be caused by suboptimal implantation of the conceptus due to poor vascularization in the septum (5, 6).

Received March 29, 2011; revised May 21, 2011; accepted May 27, 2011; published online June 30, 2011.
M.S. has nothing to disclose. T.W.O.H. has nothing to disclose. L.A. has nothing to disclose. B.C.S. has nothing to disclose.
Reprint requests: Benedictus C. Schoot, M.D., Ph.D., Department of Obstetrics and Gynecology, Catharina Hospital, P.O. Box 1350, 5602 ZA, Eindhoven, the Netherlands (E-mail: dick@schoot.com).

The existence of a uterine septum can be visualized using hysterosalpingography (HSG), although one cannot differentiate between

FIGURE 1

Diagnostic hysterosalpingogram revealing suspicion of either septate uterus (*arrow*) or bicornuate uterus.

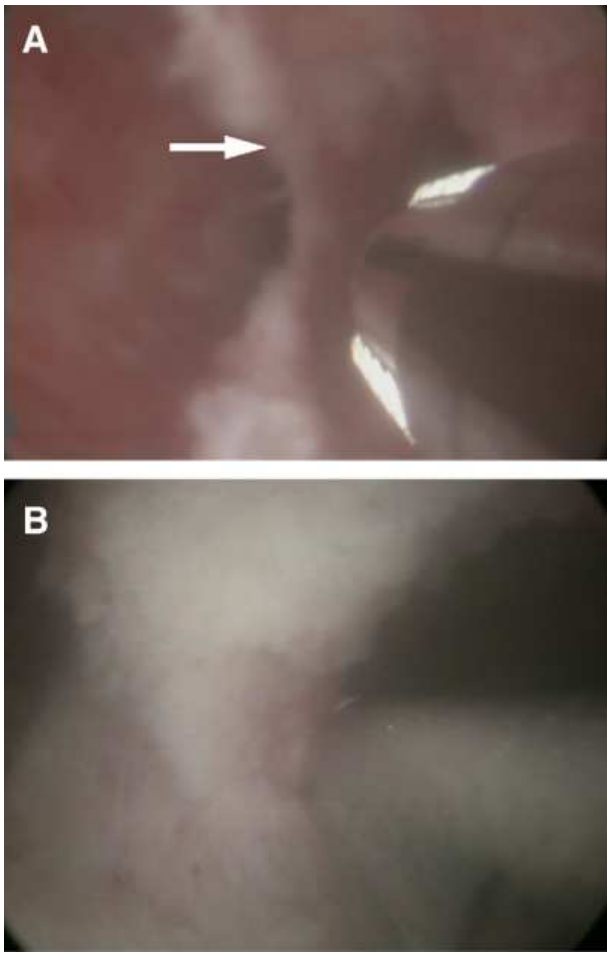


Simons. Hysteroscopic morcellation of a uterine septum. Fertil Steril 2011.

0015-0282/$36.00
doi:10.1016/j.fertnstert.2011.05.098

FIGURE 2

(**A**) A large septum (*arrow*) is clearly present before hysteroscopic morcellation. (**B**) Using the HM, a large part of the septum has been removed completely without complications.



Simons. Hysteroscopic morcellation of a uterine septum. Fertil Steril 2011.

FIGURE 3

Second-look ambulant hysteroscopy after 7 weeks revealed no signs of synechiae.

Simons. Hysteroscopic morcellation of a uterine septum. Fertil Steril 2011.

a septum and bicornuate uterus merely using HSG because it does not provide information on the shape of the exterior of the uterine fundus. Hence, transvaginal ultrasound, MRI, or laparoscopy should be performed additionally to provide a conclusive diagnosis (1, 2, 5–8). In case of poor reproductive performance due to a uterine septum, hysteroscopic resection of the septum can be performed to substantially improve chances of successful full-term pregnancy, using electrosurgery, microscissors, or laser techniques (5–7).

We present a unique case of a patient with recurrent miscarriages due to a partial uterine septum, in which we used the hysteroscopic morcellator system (HM) to perform successful septum removal.

CASE REPORT

A 34-year-old woman of Asian ethnicity with a history of recurrent miscarriages (gravida 4, para 0) presented at our outpatient clinic (Catharina Hospital, Eindhoven, the Netherlands) with complaints of intermenstrual bleeding. There were no other gynecologic complaints or symptoms. An ultrasound examination demonstrated a bicornuate uterus combined with a large uterine septum reaching the internal cervical os, with no Doppler flow in the lower half of the septum. The patient underwent HSG (Fig. 1) and MRI, which confirmed the presence of a large uterine septum and a bicornuate uterus. This revealed no evidence of coexisting urologic anomalies. Hysteroscopic morcellation of the part of the septum with low blood flow was proposed.

The intervention was performed under spinal anesthesia. The Truclear hysteroscopic operative system (Smith & Nephew) was used for the procedure. Normal saline was used for distention and irrigation of the uterine cavity. After dilatation of the internal cervical os, the hysteroscope was introduced atraumatically.

The HM consists of two hollow tubes, the inner tube rotating within the outer tube. Both tubes have a window opening at the end, through which blades with cutting edges emerge. A vacuum source connected to the inner tube sucks out the removed tissue as rotation is maintained. If no rotation is being conducted, suction of distention fluid or uterine wall is prohibited by automatic closure of the window opening. Collected tissue is available for pathology analysis. Flow is regulated continuously to provide optimal distention and vision and is similar to flow regulation when using the resectoscope. Operating features of the HM have been described earlier in extensive detail (9).

The intervention was performed by first cutting the septum in the middle part, followed by removal of the anterior and the posterior ridge until either the septum was completely removed or blood loss was observed (Fig. 2A). The septum was removed until bleeding was encountered near the lower uterine segment, at which time the procedure was discontinued (after removal of approximately 2 cm of septum) (Fig. 2B). Procedure time was 23 minutes. Isotonic fluid deficit was 270 mL. Blood loss was estimated at $<$100 mL.

Histologic examination of the removed tissue confirmed endometrium in the menstrual phase without evidence of hyperplasia or atypia. Second-look ambulant hysteroscopy after 7 weeks revealed

a uterine cavity containing a small septum and suspicion of a uterus bicornis (Fig. 3). Follow-up MRI at 10 weeks (Fig. 4A and B) and HSG at 18 weeks (Fig. 5) both showed no signs of a septum but presence of a bicornuate uterus.

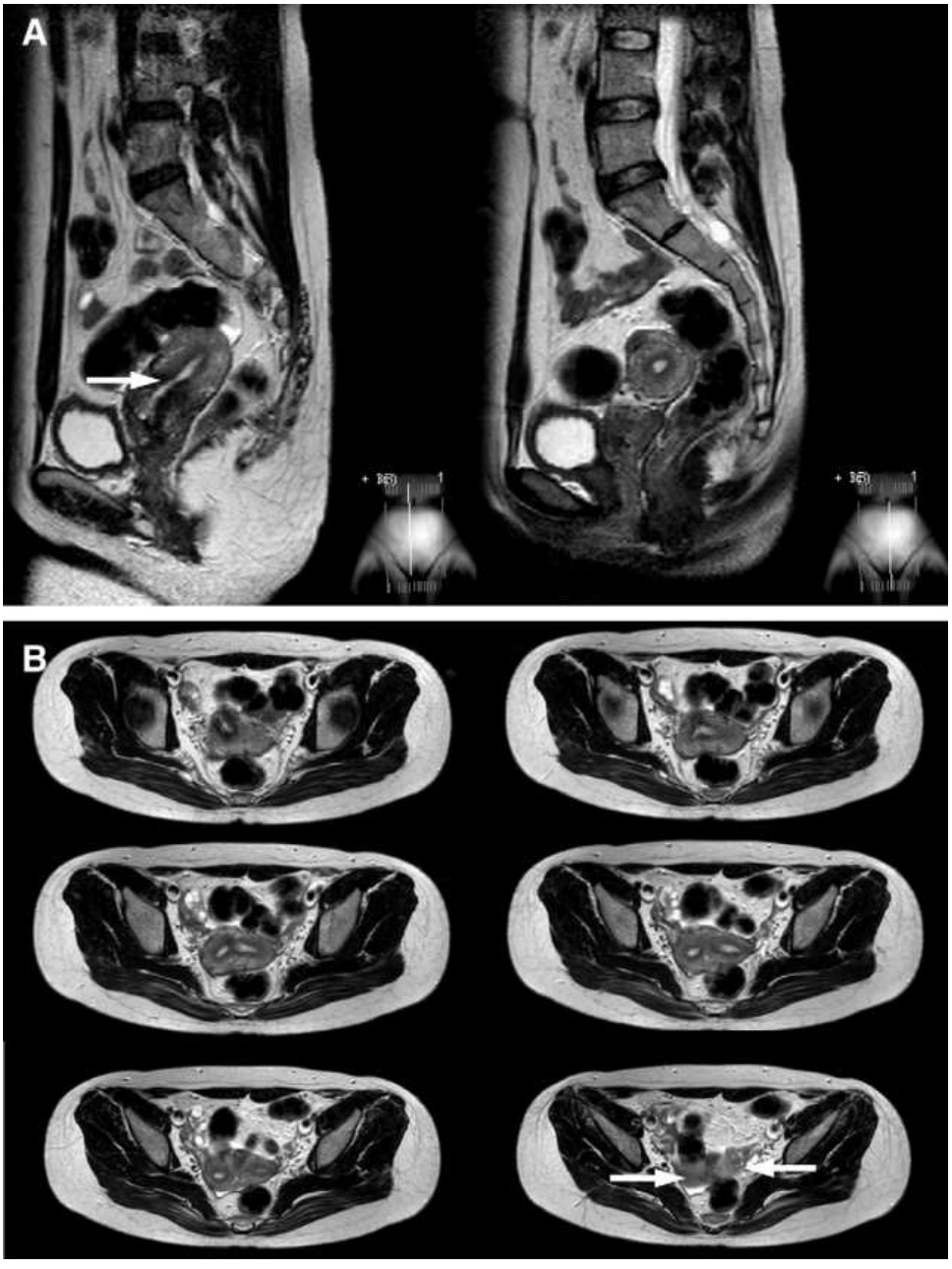
DISCUSSION

In patients with obstetric complications and evidence of uterine septa, surgical intervention should be considered. First-trimester miscarriage may be explained by poor vascularization of the septum, which renders it a suboptimal implantation locus owing to lack of blood supply (5–7). Preterm labor may be explained by increased intrauterine pressure due to redistribution of volume departments caused by the presence of the longitudinal septum (7).

Substantial improvement in reproductive performance after metroplasty is reported in the literature. After hysteroscopic metroplasty, miscarriage rate is reported to drop from 88% to 5.9%–14% (6, 7). Eighty percent of women were found to have a term live birth after metroplasty, compared with 3% of patients without metroplasty (6). Miscarriage rate is observed to drop from 90% to

FIGURE 4

(**A**) Sagittal MR images show continuity of the uterine cavity (*arrow*) and presence of a bicornuate uterus (left cornus with small intramural myoma anteriorly). (**B**) Transversal MR images of the bicornuate uterus (arrows).



Simons. Hysteroscopic morcellation of a uterine septum. Fertil Steril 2011.

FIGURE 5

Control HSG after septum removal reveals no presence of a septum.

Simons. Hysteroscopic morcellation of a uterine septum. Fertil Steril 2011.

17% after abdominal metroplasty (7). Additionally, patients after metroplasty and otherwise unexplained infertility are more likely to conceive and have live births than patients with idiopathic infertility (10).

Since the introduction of hysteroscopy, surgical resection of uterine septa is the gold standard. Although fertility rates are comparable, hysteroscopic metroplasty has drastically improved several additional clinical outcomes compared with abdominal metroplasty. Intrauterine volume is maintained, the occurence of intraperitoneal adhesions is practically eliminated, and the mode of delivery is not inevitably a cesarean section due to hysterotomy and the risk of uterine scar rupture during pregancy and labor. In addition, recovery time and hospital stay are significantly shortened (7).

During hysteroscopic resectoscopy, resection of the septum is performed, which actually comprises an incision throught the apex of the septum for small septae (the "shortening" technique) or bilateral incisions along each side of the septum alternately for wide septae (the "thinning" technique), which eventually ends in an incision from one cornual end to another. Hence, the term septum resection for these techniques does not describe the procedure properly. For this reason, we will refer to this technique as *septum transection*.

Several techniques are currently used to perform septum transection, including scissors, laser, and electrosurgery. Electrosurgery is most widely accepted for septum transection because it is inexpensive, easy to perform, and most readily available. Moreover, operating time is short, and hemostasis can be simultaneously achieved through use of current. However, the use of electricity can cause thermal damage to the endometrium and myometrium, as well as high-energy trauma in case of perforation (7, 11). Besides, it requires the use of nonconducting, electrolyte-free fluid to irrigate and distend the uterine cavity. Excessive intravasation can lead to life-threatening electrolyte shifts if hypertonic fluids are infused through uterine vessels (7, 9, 10, 12).

The HM is a relatively new technique that avoids these risks. Previous studies have pointed out that use of the HM instead of the resectoscope for removing intrauterine myomas and polyps results in >50% reduction of operating time and that the techniques required to use the HM are easy to adopt (9, 13, 14). In addition, the removed tissue can be taken out of the uterus without changing instruments, allowing fewer insertions of instruments into the uterus, thereby reducing chances of perforation (9, 13). In case of perforation, the absence of electrical current causes a low-energy trauma instead of high-energy trauma. Moreover, isotonic distention fluids are used, which substantially reduces the chance of life-threatening electrolyte shifts in case of excessive intravasation of fluid.

The HM enables the operator to perform removal instead of transection, which might possibly reduce occurrence of synchiae, although the literature does not report on this.

In our case, a large partial uterine septum was successfully removed using the HM. We propose that the HM might be a safe and effective alternative for resectoscopy in removing avascular uterine septa and that it may cause fewer complications like life-threatening electrolyte shifts or thermal injuries to the uterine wall. In addition it is associated with reduced operating time, and removal instead of transection may lead to less frequently occurring synechiae, although further research is needed to confirm this.

In conclusion, the uterine septum is the most common müllerian anomaly and most frequently associated with reproductive failure. In case of a uterine septum in combination with poor obstetric performance, removal of the septum should be considered to improve obstetric outcomes. Removal, using the HM, seems to be an effective and easily manageable alternative to classic transection using the resectoscope.

REFERENCES

1. Lin PC, Bhatnagar KP, Nettleton GS, Nakajima ST. Female genital anomalies affecting reproduction. Fertil Steril 2002;78:899–915.
2. Rackow BW, Arici A. Reproductive performance of women with müllerian anomalies. Curr Opin Obstet Gynecol 2007;19:229–37.
3. Raga F, Bauset C, Remohi J, Bonilla-Musoles F, Simón C, Pellicer A. Reproductive impact of congenital Müllerian anomalies. Hum Reprod 1997;12:2277–81.
4. El Saman AM, Nasr A, Tawfik RM, Saadeldeen HS. Müllerian duct anomalies: successful endoscopic management of a hybrid bicornuate/septate variety. J Pediatr Adolesc Gynecol 2011;24:e89–92.
5. Fedele L, Bianchi S, Frontino G. Septums and synechiae: approaches to surgical correction. Clin Obstet Gynecol 2006;49:767–88.
6. Taylor E, Gomel V. The uterus and fertility. Fertil Steril 2008;89:1–16.
7. Homer HA, Li TC, Cooke ID. The septate uterus: a review of management and reproductive outcome. Fertil Steril 2000;73:1–14.
8. Pui MH. Imaging diagnosis of congenital uterine malformation. Comput Med Imaging Graph 2004;28:425–33.
9. Emanuel MH, Wamsteker K. The Intra Uterine Morcellator: a new hysteroscopic operating technique to remove intrauterine polyps and myomas. J Minim Invasive Gynecol 2005;12:62–6.
10. Mollo A, De Franciscis P, Colacurci N, Cobellis L, Perino A, Venezia R, et al. Hysteroscopic resection of the septum improves the pregnancy rate of women with unexplained infertility: a prospective controlled trial. Fertil Steril 2009;91:2628–31.
11. Bradley LD. Complications in hysteroscopy: prevention, treatment and legal risk. Curr Opin Obstet Gynecol 2002;14:409–15.
12. Istre O, Bjoennes J, Naess R, Hornbaek K, Forman A. Postoperative cerebral oedema after transcervical endometrial resection and uterine irrigation with 1.5% glycine. Lancet 1994;344:1187–9.
13. Van Dongen H, Emanuel MH, Wolterbeek R, Trimbos JB, Jansen FW. Hysteroscopic morcellator for removal of intrauterine polyps and myomas: a randomized controlled pilot study among residents in training. J Minim Invasive Gynecol 2008;15:466–71.
14. Hamerlynck TWO, Schoot BC, Dietz V. Clinical implementation of the hysteroscopic morcellator for removal of intrauterine myomas and polyps. A retrospective descriptive study. Gynecol Surg 2011;8:193–6.