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Ultrasonography versus laparoscopy in transcervical resection of septa: a randomized clinical trial

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Summary

Objective: To compare the effects of ultrasonography with laparoscopy on transcervical resection of septa (TCRS). *Materials and Methods:* The study included 126 patients with uterine septum at the present hospital between January 2010 and August 2012 that were randomly divided into two groups. Seventy patients had TCRS monitored by ultrasound (ultrasound group) while 56 patients were monitored by laparoscope (laparoscope group). Both groups were followed up for six to 24 months. The intraoperative status, short-term and long-term complications after operation, and pregnancy outcome of two groups were compared. *Results:* The operations of both groups were successfully completed. The operating time, the first time to get out of bed, postoperative 24hNRS (numeric rating scale) values, postoperative hospital stay, and the incidence of postoperative septum residue of ultrasound group were significantly less than laparoscope group ($p < 0.05$). No statistical differences were observed in intraoperative complications and pregnancy ratio between the two groups. *Conclusion:* Both ultrasound and laparoscope monitored TCRS were safe and effective in the treatment of uterine septum. Ultrasound monitored TCRS was more simple, economical, accurate, and non-invasive. For patients without abnormal lesions in pelvic cavity, the present authors tend to choose the ultrasound monitored TCRS.

Key words: Uterine septum; Ultrasound; Laparoscope; Transcervical resection of septa.

Introduction

Uterine septum is the most common type of uterine malformations and accounts for approximately 80% to 90% of uterine malformations [1]. Uterine septum is related to infertility, miscarriage, premature birth, and restriction of intrauterine fetal growth [2]. The purpose of the uterine operation is to restore the normal shape of uterine cavity which is necessary for pregnancy. Traditional abdominal uteroplasty includes abdominal incision of uterus, uterine septum resection, and suture with disadvantages of major trauma, long recovery time, and influence on pregnancy. Transcervical resection of septa (TCRS) with advantages such as safety, less surgical trauma, and shorter operating time has become increasingly popular in clinical application since 1981 [3]. Besides good hysteroscopic surgical skills, appropriate monitoring method is the key to ensure successful operation, decrease operating time, and reduce the postoperative complications.

Both ultrasonography and laparoscopy are used clinically with respective advantages and disadvantages. The present work compared the effects of ultrasonography with laparoscopy on TCRS operation and to choose the appropriate monitoring method during TCRS operation.

Materials and Methods

Clinical data

The study included 126 patients with uterine septum diagnosed by 3D ultrasound and hysteroscopy that were selected from the First Affiliated Hospital of Zhengzhou University from January 2010 to August 2012. The patients were randomly divided into two groups. Seventy patients were monitored by ultrasound (ultrasound group) while 56 patients were monitored by laparoscope (laparoscope group) during the TCRS operation. As shown in Table 1, the general information of the patients in two groups had no significant difference ($p > 0.05$). All the patients had no complications. This study was conducted in accordance with the declaration of Helsinki. This study was conducted with approval from the Ethics Committee of the First Affiliated Hospital of Zhengzhou University. Written informed consent was obtained from all participants.

Operative procedure

All patients underwent surgery by experienced physicians and 400 μg of misoprostol was placed in the posterior vaginal fornix on the night before surgery. The partial uterine septum was cut using needle or ring electrode from the transverse tip to the septum base. The complete uterine septum was first made an incision in 0.5 cm above the internal orifice of uterus and then the septum was cut using needle or ring electrode from the transverse tip to the septum base. The electrotomy mirror direction and cutting depth were monitored by abdominal ultrasonography in ultrasound group. When the distance between cutting end and serosa in cervical bottom was one cm and the thickness of the cervical bottom was coherent, the cutting was stopped. In laparoscope

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Table 1. — *General information of patients.*

Groups	Average age (years)	Septum type		Gestation and birth	
		Complete septum	Partial septum	Abortion	Abnormal gestation and birth
Ultrasound group	25.6 ± 3.4	18	52	26	44
Laparoscope group	27.5 ± 2.8	10	46	15	41

Table 2. — *Perioperative status ($\bar{x} \pm s$).*

Groups	Cases	Operating time (min)	First time to get out of bed (h)	Postoperative 24hNRS values	Postoperative hospital stay (d)
Ultrasound group	70	19.26±2.65	7.76±1.37	3.11±1.11	3.39±0.77
Laparoscope group	56	48.91±6.79*	10.59±1.58*	4.55±1.09*	4.14±0.77*

* $p < 0.05$.

group, the hysteroscope was placed in the uterine horn recess and the operation was stopped when the uterus showed even light transmission. The uterine cavity of all patients was injected with biomedical fibrin glue and the metal ring was placed in the uterus after surgery. Three artificial menstrual cycles were induced (dydrogesterone ten mg/day for five days + estradiol valerate one mg/day for 21 days) to promote endometrial repair. Hysteroscopy and ring removal were performed three months after surgery.

The operating time, complications such as uterine perforation and water intoxication, the first time to get out of bed, postoperative 24hNRS values, and postoperative hospital stay were recorded.

Follow-up

Ultrasonography combined with hysteroscopy was performed in all patients for diagnosis of uterine septum and measurement of the residue three months after surgery. Pregnancy and delivery follow-up for six to 24 months was done using single blind method.

Statistical analysis

All the data were analyzed by SPSS17.0 software and were expressed as the mean ± standard deviation. Differences in measurement data were compared using t inspection and count data were compared using Fisher's Exact Test or χ^2 inspection. A $p < 0.05$ was considered statistically significant.

Results

Perioperative status

All patients in two groups underwent surgery successfully. As shown in Table 2, the operating time, the first time to get out of bed, postoperative 24hNRS values, and postoperative hospital stay of ultrasound group were significantly less than laparoscope group ($p < 0.05$).

Complications

All patients had no complications of uterine perforation, water intoxication, and uterine rupture. Three months after surgery, five cases lost of follow up and eight cases had intrauterine adhesions in ultrasound group. In laparoscope group, two cases lost of follow up and eight cases had intrauterine adhesions. Five cases had septum residue with the length of 1.0 - 2.3 cm in which three cases had TCRS twice. As shown in Table 3, there was significant difference between the two groups in the ratio of septum residue ($p < 0.05$). The ratio of short-term and long-term complications in two groups had no significant difference.

Table 3. — *Comparison of short-term and long-term complications (cases).*

Groups	Intraoperative complications	Short-term complications after surgery		Long-term complications after surgery (uterine rupture)
		Septum residue	Intrauterine adhesion	
Ultrasound group	0	0	8 (8/65)	0
Laparoscope group	0	5 (5/54)*	8 (8/54)	0

* $p < 0.05$.

Followed up between three months and two years, eight cases lost to follow up, and 44 cases became pregnant including eight cases of spontaneous abortion, three cases of premature birth, two cases of tubal pregnancy, and 31 cases of term birth in ultrasound group. In laparoscope group, five cases lost to follow up and 39 cases became pregnant, including nine cases of spontaneous abortion, two cases of premature birth, one cases of tubal pregnancy, and 27 cases of term birth. There was no statistically significant difference between the two groups in the pregnancy outcome ($p > 0.05$).

Discussion

Uterine embryogenesis derived from Mullerian duct. From four to six weeks of embryonic development, paramesonephric ducts fused and the middle septum began to degenerate which gradually formed the vagina and uterus. When the septum did not disappear or disappear incompletely, it became varying degrees of uterine septum. Uterine septum destroyed the normal shape of uterine cavity and induced irregular differentiation of endometrial gland which might lead uncomfortable nidation or incomplete decidualization. Therefore, the patients with uterine septum often presents with infertility, recurrent spontaneous abortion and premature birth [4].

To resect the uterine septum and correct the uterine cavity shape is the most important way to treat uterine septum. Not all patients with uterine septum require surgery except those have abnormal gestation and birth or patients with long term infertility [5]. TCRS by hysteroscopy is a minimally invasive surgery to uterine cavity [6, 7]. Among all the uterine malformations, uterine septum is the only one which can be treated and corrected by hysteroscopic sur-

gery. The common methods of TCRS include laser, electroresection, and microscissors which are only different in the energy resources. Hysteroscopic electrosurgical excision of the uterine septum is more widely accepted and used among endoscopists in China.

The common monitoring methods used clinically are ultrasonography and laparoscopy with respective advantages and disadvantages. Ultrasonography could monitor the operating direction and measure the endometrial thickness in real time and therefore enhance the operation's safety. Laparoscopy could describe the contour of uterus more accurately and treat pelvic lesions. Fedele *et al.* tended to choose non-invasive and economical ultrasonography as long as the preoperative diagnosis was clear, the end of the operation was easy to confirm, and the patients did not have pelvic adhesions [8]. The present work was to compare clinical data of the two monitoring methods and choose the more safe and effective monitoring method. The authors compared the perioperative data and found that the operating time, the first time to get out of bed, postoperative 24hNRS values, and postoperative hospital stay of ultrasound group was much less than laparoscope group. Thus, ultrasound monitored TCRS was more simple, minimally invasive, and easy to be widely used.

Uterus perforation, water intoxication, intrauterine adhesions, septum residue, and uterine rupture are common complications in TCRS. The present study showed that all patients in both groups had no complications of uterus perforation, water intoxication or uterine rupture which illustrated that both ultrasonography and laparoscopy are safe in TCRS. The ratio of intrauterine adhesions in two groups had no significant difference, meaning that it was not related to the monitoring method.

It is worth mentioning that no patients had septum residue in ultrasound group since ultrasonography could measure the endometrial thickness in real time and controlled the cutting depth. However, five patients in laparoscope group had septum residue and three of them had TCRS twice, since laparoscopy could not measure the endometrial thickness directly. The present results showed that ultrasound monitored TCRS was more effective than that monitored by laparoscope. The ultimate aim of TCRS is to improve pregnancy outcome. There was no significant difference between the two groups in pregnancy outcome. Both ultrasound and laparoscope monitored TCRS increased pregnancy rate and live birth rate which was consistent with that reported [5, 9, 10].

In conclusion, both ultrasound and laparoscope monitored TCRS could effectively treat uterine septum. Ultrasound monitored TCRS is more simple, economical, accurate, and non-invasive. For patients without abnormal lesions in pelvic cavity, the present authors tend to choose the ultrasound monitored TCRS.

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