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Comparative Evaluation of Septolysis Surgery and Pregnancy Outcome in Resectoscope Versus Hysteroscopic Scissor

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Abstract

Objectives: This study aimed to evaluate the short-term and long-term outcomes of adopting two types of resectoscopes and hysteroscopic scissors metroplasty methods.

Methods: In this prospective, comparative, and cohort study, participants who were candidates for septum resection were recruited during 2015-2018. The uterine septum was removed using hysteroscopic scissors or a resectoscope. The second-look hysteroscopy was performed in the follicular phase after two months. In the second-look hysteroscopy, surgery outcomes were evaluated, and the residual septa or adhesions were removed in case of incidence. The study followed participants for up to five years to observe pregnancy outcomes. This involved recording the duration from hysteroscopy to pregnancy and determining if these pregnancies led to live births.

Results: A total of 119 female patients with a mean age of 30.20±6.14 years were enrolled in this study, out of who 62 cases (52.1%) were in the hysteroscopic scissors group, and 57 cases (47.9%) were in the resectoscope group. The 63 (52.9%) cases had primary infertility, and the prevalence of abortion was 46 (38.7%). During the second look, hysteroscopy adhesion was diagnosed in 18 cases (15.1%), and septum residue was seen in 49 cases (67.1%). The adhesion rate in the hysteroscopic scissors group was higher than that in the resectoscope group, but it was insignificant ($P=0.223$). At the second follow-up stage, only 85 patients out of 119 ones were available. The successful pregnancy rate was 46 out of 85 (54.1%). The mean age of the patients in the successful pregnancy group was significantly lower than that in the unsuccessful pregnancy group ($P<0.001$).

Conclusion: There were no differences among resectoscope and hysteroscopic scissor methods' outcomes in term of metroplasty associated with septate uterus (SU).

Keywords: Septolysis, Hysteroscopy, Resectoscope, Scissor, Pregnancy

Introduction

Uterine abnormalities, generally known as Müllerian anomalies, are a leading cause of infertility worldwide (1-4). The septate uterus (SU), a condition in which a septum splits the uterus into two cavities, constitutes a significant portion of uterine abnormalities (1). SU is associated with infertility, abortion, changes in a fetal position, and labor complications such as premature labor (1-4).

Currently, surgical resection is considered the treatment of choice for managing SU. This was initially performed through open abdominal surgery; owing to recent advances, however, the hysteroscopic surgical intervention is now recommended as the standard surgical method for resection of SU (1,3), since it is a simple technique with minor complications. In addition, hysteroscopic metroplasty in the clinic has been accepted by clinical specialists for dealing with short uterine septa (5). Hysteroscopic metroplasty can assist patients in achieving favorable fertility outcomes (6-12). Even in cases with residual uterine septa after primary septoplasty, a secondary metroplasty can produce more favorable fertility results (5). However, improvements in preterm birth and recurrent abortion rates after metroplasty have not been fully elucidated (13,14). In one meta-analysis, the pooled pregnancy rate and live birth rate after metroplasty were 64 and 50 percent, respectively (1). However, pre-procedure rates were not assessed in the given study.

Furthermore, the benefits of metroplasty on fertility outcomes in women with repetitive pregnancy losses have not been established, and conflicting results have been reported about them. In addition, different methods are used for surgical management of SU, and the advantages and disadvantages of these methods still need to be investigated and compared thoroughly.

This study, therefore, aimed to evaluate and compare the short-term and long-term outcomes of adopting resectoscopes and scissors hysteroscopic metroplasty methods.

Materials and Methods

Study Design

This single-center prospective study was conducted at Imam Reza hospital, Mashhad, Iran.

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Key Messages

- Uterine abnormalities are a leading cause of infertility. The septate uterus is a significant portion of uterine abnormalities. Resectoscopes and hysteroscopic scissors are suitable methods for managing SU, and their outcomes are similar.

Patients

Patients with SU who were candidates for septum resection in the gynecology ward of Imam Reza hospital, Mashhad, Iran, were recruited from 2015 to 2018. All patients were informed of the study's purpose and protocol and, then, were asked to sign an informed written consent. The diagnosis of SU was established based on hysterosalpingography, magnetic resonance imaging (MRI), or sonohysterosalpingography.

Pre-operative Assessment

Prior to hysteroscopy, diagnostic laparoscopy was performed to confirm SU and conduct hysteroscopic septolysis in order for decreasing the possibility of uterine perforation during surgery. During laparoscopy, the cases revealed to have other types of uterine anomalies (e.g., didelphys or bicornate uterus) were excluded from the study. SU cases with concurrent Asherman's syndrome, polyp, or submucosal myoma were also excluded.

Surgical Procedures

The uterine septum was evaluated in terms of length and width by performing hysteroscopy. Then, it was removed by normal saline media using hysteroscopic scissors or by glycine media using L-shape monopolar resectoscope. Septum width was defined as septum thickness extending from one ostium to another. The hysteroscope was graded from its tip in order to measure the septum length. The normal length of the uterus (from the fundus to the end of the cervix), uterine cavity, and cervix were considered as 7-8, 4-5, and 3-4 cm, respectively, and then the septa with lengths of ≤2 cm and over 2 cm were considered as short and long septa, respectively. Hysteroscopic septolysis was performed by a single surgeon and a fellowship of gynecological laparoscopy using the Olympus laparoscope and hysteroscope in the gynecology operation room of Imam Reza hospital, Mashhad, Iran. After the surgery, no intrauterine catheterization was carried out, and patients receive no estrogen. When implementing both methods, the required procedure was followed until both tubal ostia were visualized simultaneously.

The First Stage of Follow up

The patients were asked to return for a follow-up hysteroscopy in the follicular phase after two months, and those who did not return were excluded from the study. In the second-look hysteroscopy, surgery outcomes such as the residual septa as well as the intra uterine adhesions and their severity were evaluated, and then any residual septa or adhesions, if present, were removed.

The adhesion severity was determined based on the criteria proposed by the American Society for Reproductive Medicine. Mild adhesion involved filmy adhesions composed of basalis endometrial tissues causing partial uterine cavity occlusion; moderate adhesion was defined as characteristically thick but still covered with an endometrium that may bleed upon division, partially or totally occluding the uterine cavity; and severe adhesions were adhesions only composed of the connective tissue, lacked any endometrial lining, and unlikely to bleed upon division, which may partially or totally occlude the uterine cavity.

The Second Stage of Follow up

Patients were followed for pregnancy up to five years, and the pregnancy outcomes (e.g., live births and time interval between hysteroscopy and successful pregnancy) were recorded.

Statistical Analysis

Qualitative variables were described using absolute frequencies and percentages, and then were compared using chi-square or Fisher's exact test. Quantitative data were presented as mean ± standard deviation (SD) or median (interquartile range), and then were compared using Mann-Whitney U and student-t tests. Finally, logistic regression was conducted to calculate the odds ratio for successful pregnancy associated with septum residue in the second hysteroscopy. Statistical analyses were performed using SPSS software version 26 (SPSS Inc., Chicago, Illinois, USA). Statistical significance was defined as P value less than 0.05.

Results

Baseline Results

A total of 119 female patients with SU and mean age of 30.20 (±6.14, SD) years were enrolled in this study, out of who 62 cases (52.1%) were in the hysteroscopic scissors group and 57 cases (47.9%) were in the resectoscope group. The demographic characteristics of the patients (e.g., age, chief complaint, and previous pregnancy outcomes) are presented in Table 1. Furthermore, 63 cases (52.9%) had primary infertility with no history of previous pregnancy, and the prevalence of abortion was 46 (38.7%) with a mean frequency of 1.77 (±1.56, SD). As for patients with a history of pregnancy, ectopic pregnancy and fetal death were reported in 4 (3.4%) and 6 cases (5%), respectively. No significant difference was observed between hysteroscopic scissors and resectoscope groups regarding the aforementioned variables (P>0.05).

Septa Anatomical Features

Morphologic characteristics of uterine septa, including septum width and length, are shown in Table 2. Septa were

Table 1. Characteristics of 119 Women in Hysteroscopic Scissors Group and Resectoscope Group

Variable			Hysteroscopic Scissors	Resectoscope	*P* Value[a]
Age (y), Mean (SD)		30.20 (6.14)	29.89 (6.43)	30.48 (5.90)	0.448[b]
Chief complaint, No. (%)	Abortion	46 (38.7)	26 (45.6)	20 (32.3)	0.197
	Infertility	63 (52.9)	28 (49.1)	35 (56.5)	
	Premature delivery	4 (3.4)	1 (1.8)	2 (3.2)	
	Abnormal uterine bleeding	3 (2.5)	2 (3.5)	1 (1.6)	
	Accidental finding (asymptomatic)	3 (2.5)	1 (1.8)	2 (3.2)	

[a] Chi-square test; [b] Student *t* test SD: standard deviation.

Table 2. Uterus Septum Features in Hysteroscopic Scissors Group and Resectoscope Group

Variable		Scissors Hysteroscopy	Resectoscope Hysteroscopy	*P* Value[a]
Septum length, No. (%)	Long	41 (71.9)	48 (77.4)	0.491
	Short	16 (28.1)	14 (22.6)	
Septum width, No. (%)	Wide	55 (96.5)	54 (87.1)	0.065
	Narrow	2 (3.5)	8 (12.9)	

[a] Chi-square test; SD: standard deviation.

long in 89 cases (74.8%) but short in 30 (25.2%). Septum width was wide in 109 cases (91.6%) but was narrow in 10 cases (8.4%). No significant difference was seen between hysteroscopic scissors and resectoscope groups in terms of septa length and width ($P>0.05$).

First Stage Follow-up

The rate of intra-uterus adhesion, its severity, and septum residue in second-look hysteroscopy are provided in Table 3. The mean interval time between resection hysteroscopy and second-look hysteroscopy was 2.04 (±2.24, SD) months. Adhesion was observed in 18 cases (15.1%), out of who 15 cases had mild adhesion and three cases had moderate adhesion. Septum residue was seen in 49 cases (67.1%), with a mean size of 1.13 (±0.74, SD) centimeters. The rates of adhesion in the hysteroscopic scissor group were higher than those in the resectoscope group, but the difference was not statistically significant (P=0.223). No significant difference was detected between the two septolysis methods in terms of IUA severity and incidence of septum residue ($P>0.05$). Finally, no significant difference was found between two groups in terms of residual septa and septal width ($P=0.216$) or length ($P=0.058$).

Second Stage Follow-up

Out of 119 patients, 85 ones were available at the second stage of follow-up, and 46 patients (54.1%) out of 85 ones had pregnancy leading to live birth. The mean interval time between the first hysteroscopy and live birth was 14.21 (±10.59, SD) months, with a minimum of one month and a maximum of 36 months. The mean age of patients giving live births was significantly lower than that of others ($P<0.001$) (Table 4).

Discussion

Hysteroscopic metroplasty may be a prompt, simple, and minimally-invasive procedure with low intraoperative and postoperative morbidity, shorter hospital stays, reduced need for analgesia, lower risk of uterine rupture during pregnancy, and lower probability of planning a vaginal delivery. Therefore, hysteroscopic metroplasty is the first-choice surgical approach for dealing with SU (7,15-18). In this prospective study, the short-term and long-term outcomes of resectoscopes and hysteroscopic scissor, two surgical methods for managing SU, were evaluated. Our results demonstrated that both methods produced similar short-term and long-term outcomes.

Our study results revealed that there was no significant difference between the resectoscope and hysteroscopic scissor methods in terms of residual septa and septa features. Hur et al investigated 260 cases with SU and undergoing hysteroscopic septolysis with scissors, and reported that the procedure was successful in 93.1% of the

Table 3. Resection Outcomes in Scissors Hysteroscopy Group and Resectoscope Hysteroscopy Group

Variable		Scissors Hysteroscopy	Resectoscope Hysteroscopy	*P* Value[a]
Adhesion	Positive	11 (19.3)	7 (11.3)	0.223
	Negative	44 (80.7)	57 (88.7)	
Adhesion severity	Mild	10 (76.9)	5 (100)	0.239
	Moderate	3 (23.1)	0 (0)	
Septum residue	Positive	11 (37.9)	13 (29.5)	0.455
	Negative	18 (62.1)	31 (70.5)	

[a] Chi-square test.

Table 4. Comparing Pregnancy Outcomes With Participant Characteristics, Hysteroscopy Methods, and First Stage Follow-ups

Variable		Having Child	Without Child	*P* Value[a]
Hysteroscopy method, No. (%)	Resectoscope	31 (67.4)	22 (56.4)	0.298
	Scissor	15 (32.6)	17 (43.6)	
Adhesion, No. (%)	Positive	5 (10.9)	5 (12.8)	0.781
	Negative	41 (89.1)	34 (87.2)	
Septum residue, No. (%)	Positive	22 (56.4)	24 (80)	0.039
	Negative	17 (43.6)	6 (20)	
Septum residual size (cm)	Median (IQR)	1 (0.5-2)	1 (0.5-1.37)	0.63[b]
Age (y)	Mean (SD)	25.58 (6.36)	33.28 (5.46)	<0.001[c]
Chief complaint, No. (%)	Abortion	17 (43.6)	15 (417)	0.866
	Infertility	22 (54.6)	21 (58.3)	
Septum length, No. (%)	Long	35 (76.1)	28 (71.8)	0.65
	Short	11 (23.9	11 (28.2)	
Septum width, No. (%)	Wide	42 (91.3)	38 (97.4)	0.23
	Narrow	4 (8.7)	1 (2.6)	

[a] Chi-square test; [b] Mann–Whitney U test; [c] Student *t* test; IQR: interquartile range; SD: standard deviation.

cases without producing any residual septum. In addition, they discovered that the highest rate of septum residue was in cases with a long septum (5).

According to our study results, the rate of adhesion was significantly higher in the scissor group (*P*=0.025). In a study evaluating the number of IUA related to hysteroscopic metroplasty with scissors, it was reported that 6 cases (9.5%) out of 63 ones had IUA (19). In another study, the rate of IUA following a septal incision was found to be nearly 6.7% (20). In a study by Wang et al, on the other hand, no cases of IUA were reported after performing resectoscope hysteroscopy on 190 SU cases (21). In our study, the adhesion rate after scissors hysteroscopy was 19.3%, which was higher than that in the aforementioned studies; however, it was not significantly different from the rate after resectoscope hysteroscopy.

Previous research on pregnancy outcomes in women with SU indicated that the uterine septum was associated with spontaneous and recurrent abortion (22, 23). In our study population, similarly, 52.9% of the cases had primary infertility, and 38.7% of them had a history of abortion.

In a review article by Daniilidis et al, the authors found no statistically significant difference between resectoscopes and scissors methods regarding the reproductive outcomes (24), which was in line with our study result. In our study, pregnancy leading to live birth after metroplasty was seen in 46 out of 85 patients (54.1%). In the study by Querleu et al exploring pregnancy outcomes in 24 patients after metroplasty with 4 mm endoscopic scissors, on the other hand, a pregnancy rate of 91.7% and a delivery rate of 72.7% were reported (25).

Our study found no significant difference between the resectoscope versus the scissor groups in terms of pregnancy outcomes. Litta et al compared resectoscopes and versa point for hysteroscopic metroplasty in 63 cases, and showed that the mean interval between metroplasty and the rate of conception and pregnancy was not significantly different in the two groups (26).

In our study, septum residue was detected in 49 cases (41.2%), and its incidence did not significantly differ when adopting either scissor method or resectoscope method. Other studies have demonstrated that a small residual septum of less than 1 cm after hysteroscopic metroplasty has no effect on the reproductive outcome and preserves the functional anatomical integrity of the uterus (13,25).

Conclusions

In sum, our study results suggested that both resectoscopes and hysteroscopic scissors were suitable methods for managing SU, and their outcomes were similar. Adhesion as a complication of surgery was relatively uncommon in both methods, and the rate of pregnancy leading to live birth was similar during the 5-year follow-up after surgery.

Authors' Contribution

Conceptualization: Golrokh Sherafati.
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Visualization: Mina Bradaran.

Conflict of Interests

Authors declare that they have no conflict of interests.

Data Availability Statement

Data are available on reasonable request from the corresponding author.

Ethical Issues

The protocol of the study was approved by the Research Ethics Committee

of Mashhad University of Medical Sciences (code: IR.MUMS.MEDICAL.REC.1398.174).

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