Hysteroscopic Evaluation of Uterine Cavity after Septoplasty either By Scissor or Bipolar Resectoscope

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Abstract: Background: Septate uterus is a commonly encountered congenital malformation of the uterus characterized by abnormal resorption of the Mullerian canal during embryogenesis. It has been associated with poor reproductive outcomes, such as abortion and preterm births. **Objective:** The present study was designed to evaluate the uterine cavity after hystroscopic metroplasty either by scissors or bipolar resectoscope**. Patients and Methods:** This is a prospective study which was conducted on women after septoplasty from the outpatient clinic of AL-Azhar University hospital (New Damietta) during the period from December 2017 to last of December 2018. This study include two groups; Group I: 25 women underwent septoplasty by scissor and group II: 25 women underwent septoplasty by bipolar resectoscope. **Results:** As regard to group I, the mean operative time is 10.9min, fluid deficit is 525ml, the mean of pain score is 3 with incidence of residual part of septum 12%, intra-uterine adhesion is 8%, and as regard to group II, the mean operative time is 11 min, fluid deficit is 515 ml, the mean of pain score is 5 with incidence of residual part of septum 4%, intra uterine adhesion is 12%. **Conclusion:** women underwent septoplasty by bipolar resectoscope had pain score less than women underwent septoplasty by scissor.
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1. Introduction

Congenital uterine malformations can defined as deviation from the normal anatomy resulting from embryological maldevelopement of the mullerian ducts. The association between mullerian defects and fertility is asubject which is still much debated **(Vallerie et al., 2010).**

Uterine septum is the most common type of congenital uterine malformations, accounting for approximately 80% to 90% of uterine malformations **(Zhu et al., 2010).** The uterine cavity is divided by a longitudinal septum, the outside of the uterus has a normal typical shape. The wedge-like partition may involve only the superior part of the cavity resulting in an incomplete septum or a subseptate uterus, or less frequently the total length of the cavity (complete septum) and the cervix resulting in a double cervix. The septation may also continue caudally into the vagina resulting in a double vagina **(Heinonen, 2006).** The incidence of congenital uterine malformations has been reported to be as high as 3-4% in the general female population and to be significantly more in patients with infertility and recurrent pregnancy loss **(Nouri et al., 2010).**

Uterine septum is the most common congenital anomaly of the female reproductive tract with an incidence of 2–3% in the general population **(Speroff, 2005).** Septate uterus is associated with poor reproductive performance, including high incidence of first and second trimester abortion, preterm delivery, as well as abnormal presentations and increased cesarean section rates **(Patton et al., 2004).**

Hysteroscopy is a minimally invasive intervention that can be used to diagnose and treat many intrauterine and endocervical problems. Hysteroscopy is useful in a number of uterine conditions as Asherman's syndrome, endometrial polyp, gynecologic bleeding, endometrial ablation, myomectomy for uterine fibroids, congenital uterine malformations (also known as Mullerian malformations), septum, evacuation of retained parts of conception in selected cases and removal of embedded IUDs **(Kalra and Roger, 2017).**

Hystroscopic septoplasy can be done via several procedures, including use of flexible mechanical scissors, electrosurgery with specially designed electrodes fitted to the hystroscope or resectoscope**,** bipolar electrodes, laser and mechanical morcellators **(Simons et al., 2011).**

Hysteroscopic resectoscope using a radio-frequency (RF) energy device with a wire-loop electrode can be used to eliminate large polyps and submucosal myomas, or for the handling of less common conditions such as intrauterine adhesion or uterine septa. A monopolar or bipolar energy source may be used depending on surgeon liking. Select of distending media differs depending on which energy modality is used. However cautious fluid management is critical to ensure patient safety in both conditions. Monopolar electrosurgery requires a non-conducting,

electrolyte-poor fluid such as glycine, sorbitol, or mannitol to avoid spreading of the electrical current. Bipolar electrosurgery may be performed with isotonic solutions such as normal saline or lactated Ringers. The nonconductive distension media carry additional risks of volume overload and electrolyte imbalances with brain damage and deaths reported secondary to hyponatremia. There is also some risk of thermal injury **(Calabrese et al., 2016).**

So, the aim of our study was to evaluate the uterine cavity after hystroscopic metroplasty either by scissor or bipolar resectoscope.

2. Patients and Methods

This was retrospective clinical study which was conducted on women after septoplasty from the outpatient clinic of AL-Azhar University hospital (New Damietta) during the period from December 2017 to last of December 2018. This study included two groups; Group I: 25 women underwent septoplasty by scissor and group II: 25 women underwent septoplasty by bipolar resectoscope, The patients were eligible in this study after interviews and laboratory tests.

This study was done after oral and informed consent with the following criteria: Infertile patients with a uterine septum, patients with recurrent pregnancy loss with a uterine septum and patient diagnosed by 3D US or HSG to have a uterine septum.

All of the following criteria were excluded; Age after 38 years and Patient with previous history of any uterine surgery.

Methods

Patients eligible for the study was underwent the following: full history, complete examination including general, abdominal and pelvic examination.

Study design

Hysteroscopic Technique according to **(El Saman et al., 2010).**

- Patients received a single dose of prophylactic first generation cephalosporin (Cefamezine) at the beginning of surgery.
- All patients were operated under general anesthesia.
- The patient perineum should be just past the edge of the table. Normal saline was used for uterine distension connected to the inflow channel on the sheath with intravenous tubing.
- Septoplasty was done by either scissor with office hysteroscopy (5 Fr, Karl Storz gmbh of Tuttlingen Germany) or by bipolar resectoscopy (Karl Storz, Autocon II 400) after dilatation of cervix to 8.5-9 mm.
- The labia being gently separated with fingers, the tip of hysteroscope was positioned in the vaginal introitus, the vagina was distended with saline through a small channel in the hysteroscope.
- Introduction of long curved scissors with blunt tip through the previously dilated cervix. The closed scissors was passed in the right uterine hemicavity along the right uterine wall (lateral wall) until it met the resistance of the fundus. Then gentle pressure was exerted against the fundus that was visualized by the monitoring laparoscope. On meeting the resistance of the fundus, a mark was placed on the scissors at the level of the external os denoting the depth of the uterine cavity. Then the closed scissors was pressed against the septum (medial wall of the right hemicavity) and swept down until the resistance of the septum passed off denoting the lower edge of the septum.
- Here, another mark was placed on the scissors denoting the length of the septum. The closed scissors was then passed through the left hemicavity until its fundus, gently pressed against the fundus monitored laparoscopically to reassure the tactile sense; then it was withdrawn, pressed against the medial wall of left hemicavity (septum side) until the resistance passed off, indicating the lower edge of the septum once again. The scissors was then directed toward the lower edge with one blade in each hemicavity opened and closed, cutting the septum from below, upward under direct tactile sense and indirect (external visual) laparoscopic monitoring. Cutting was judged to be complete (endpoint) when an equivalent length to the target length that was measured at the beginning the procedure was reached.
- The duration of the procedure and fluid defect was calculated in each procedure.
- Pain scores: To calculate the severity of postoperative pain, the visual analog scale (VAS) was used. This scale includes a total of 11 points (0–10) from left to right. Zero denotes absence of pain and 10 points conveys the highest degree of pain (**Polat et al., 2006).**
- Any complications were documented.

An outpatient hysteroscopy was routinely performed 3 months after metroplasty to diagnose postoperative uterine synechiae.

Statistical analysis

The collected data were organized, tabulated and statistically analyzed using statistical package for social sciences (SPSS) version 21 (SPSS Inc, Chicago, USA), running on IBM compatible computer. Quantitative data were expressed as the mean ± standard deviation (SD). Qualitative data were presented as relative frequency and percent distribution. For comparison between two groups, the independent samples (t) test. For comparison between categorical groups, the student T test was used. For all tests, P values < 0.05 were considered significant. For

all tests, P values > 0.05 were considered insignificant.

3. Results

This was retrospective study which was conducted on women after septoplasty from the outpatient clinic of AL-Azhar University hospital (New Damietta).

In the present study, there were nearly comparable between both groups regarding age and BMI; age was 28.9±3.55 years in group I Vs 30.0±4.18 years in group II and BMI was 25.21±1.15 kg/m2 Vs 23.67±3.9 kg/m2 respectively. **(table 1)**

In the present study, there were nearly comparable between both groups regarding primary and secondary infertility. The primary infertility was found in 14 cases (56%) in group I and 13 cases (52%) in group II. There were 11 cases (44%) in group I suffered from secondary infertility and 12 cases (48%) in group II. **(Table 2)**

In the present study, there were nearly comparable between studied groups regarding operative time and fluid deficit with no significant differences but there was a significant differences between studied groups regarding pain score 3.0±1.58 in group I Vs 5.88±1.62 in group II. **(Table 3)**

In the present study, the visual analog scale showed 16 cases (64%) suffered from mild pain in group I and 7 (28%) in group II, 9 cases (36%) suffered from moderate pain in group I and 18 cases (72%) in group II with statistical significant differences. **(Table 4)**

In the present study, there were 4 cases (16%) suffered from post-operative fever in group I and 3 cases (12%) in group II and 3 (12%) suffered from in-complete removal of septum in group I and 1 (4%) in group II with no statistical significant differences. **(Table 5)**

In the present study, there were 3 cases (12%) suffered from Residual part of septum in group I and 1 cases (4%) in group II and also there was two case (8%) in group I Vs 3 (12%) in group II suffered from intra-uterine adhesion with no statistical significant differences. **(Table 6)**

Table (1): Demographic data of the studied cases.

Parameters		Mean	SD	mini	max	T test	P value
Age (years)	**Group I**	28.9	3.55	24	37	0.95	0.35 (NS)
	Group II	30.0	4.18	24	36		
BMI (kg/m^2)	**Group I**	25.21	1.15	23.5	27.5	1.97	0.06 (NS)
	Group II	23.67	3.9	21	27.9		

Group (I): women underwent septoplasty by scissor.
Group (II): women underwent septoplasty by bipolar resectoscope. **NS:** indicate non significance.

Table (2): comparison between studied cases regarding type of infertility.

	Group I	Group II	T test	P value
1ry infertility (No)	14 (56%)	13 (52%)	0.28	0.77 (NS)
2nd infertility (No)	11 (44%)	12 (48%)		

Group (I): women underwent septoplasty by scissor.
Group (II): women underwent septoplasty by bipolar resectoscope.
No: number of women in the study. **NS:** indicate non significance.

Table (3): Comparison between studied cases regarding operative time, fluid deficit and pain score

Parameters		Mean	SD	mini	max	T test	P value
Operative time (Min)	**Group I**	10.96	1.96	8	15	0.11	0.91 (NS)
	Group II	11.04	3.1	8	18		
Fluid deficit (ml)	**Group I**	525.2	47.18	390	600	0.54	0.59 (NS)
	Group II	515.4	77.9	370	610		
Pain score	**Group I**	3.0	1.58	1	6	6.37	<0.001 (S)
	Group II	5.88	1.62	4	10		

Group (I): women underwent septoplasty by scissor. **Group (II):** women underwent septoplasty by bipolar resectoscope.
NS: indicate non significance. **S:** indicate significance.

Table (4): Pain score of the studied cases.

Score	Group I	Group II	X^2	P value
0 (No pain)	0 (0%)	0 (0%)	2.5	0.01(S)
1-3 (Mild pain)	16 (64%)	7 (28%)		
4-6 (Moderate pain)	9 (36%)	18 (72%)		

X2: chi-square test. **Group (I):** women underwent septoplasty by scissor. **Group (II):** women underwent septoplasty by bipolar resectoscope. **S:** indicate significance.

Table (5): Post-operative complications of the studied cases.

Parameters	Group I	Group II	Z score	P value
Fever	4 (16%)	3 (12%)	0.41	0.68 (NS)
Pulmonary edema	0 (0%)	0 (0%)	0	1 (NS)
In-complete removal of septum	3 (12%)	1(4%)	1.04	0.29 (NS)

Group (I): women underwent septoplasty by scissor. **Group (II):** women underwent septoplasty by bipolar resectoscope.
NS: indicate non significance.

Table (6): post-hysteroscopic evaluation of the studied cases

Parameters	Group I	Group II	Z score	P value
Residual part of septum	3 (12%)	1 (4%)	1.04	0.29
Intra-uterine adhesion	2 (8%)	3 (12%)	0.47	0.64
Type of adhesion (Filmy adhesions**)**	2 (8%)	3 (12%)	0.47	0.64

Group (I): women underwent septoplasty by scissor. **Group (II):** women underwent septoplasty by bipolar resectoscope.

4. Discussion

The septate uterus is accompanied with some of the poorest reproductive outcomes which improved after hysteroscopic metroplasty (**Gouhar and Siam, 2013).** The presence of a septate uterus is associated with a reduced clinical pregnancy rate. It also increases the risk of first trimester miscarriage, second-trimester miscarriage, preterm birth and fetal malpresentation (**Chan et al., 2011).** Septate uterus is associated with high incidence of miscarriage and habitual abortion can easily be treated by hysteroscopy. Hysteroscopic metroplasty of the septate cavity decreases the rate of miscarriage from 85% to 15% and improves the term birth rate from less than 10% to more than 20% (**Abo Dewan et al., 2014**).

The diagnosis of septate uterus may be confused with uterine didelphys, especially in cases where the uterine septum is complete, with duplication of the cervix and a longitudinal vagina septum are present. The management of these uterine anomalies are different and thus, getting the correct diagnosis is important in planning for any surgical intervention, and this can be achieved with multimodality imaging through hysterosalpingography, ultrasonography, and MRI (**Seet et al., 2015).**

Hysteroscopic metroplasty is the accepted approach for surgical removal of a uterine septum. A hysteroscopic procedure has many benefits over an abdominal approach including minimal associated morbidity, the ability to perform the procedure on an outpatient basis, no delay in pregnancy and the ability to have a subsequent vaginal delivery (**Hollett-Caines et al., 2006)**.

This work aimed to evaluate the uterine cavity after hystroscopic metroplasty either by scissor or bipolar resectoscope.

In the present study, age and BMI were nearly comparable between each other in the studied groups; age was 28.9±3.55 years in group I Vs 30.0±4.18 years in group II and body mass index (BMI) was 25.21±1.15 kg/m^2 Vs 23.67±3.9 kg/m^2 respectively. These results agree with **Sardo et al. (2016)** who showed that no statistical differences observed in the main baseline characteristics between groups with hysteroscopic metroplasty regarding age and BMI.

Esmaeilzadeh et al. (2014) the mean age of the patients who suffered from infertility with septum were 30.5±5.1years and mean BMI were 27±4.3 kg/m^2.

In the present study, the types of infertility were nearly comparable between both groups. **Esmaeilzadeh et al. (2014)** reported no significant difference between infertility type in patients undergoing hysteroscopic metroplasty.

Diminished size of the uterine cavity and cervical incompetence, associated with septate uterus, may be the factors involved in causing a poor reproductive outcome. Ultrastructural alterations in the septal wall compared to the lateral uterine wall

could be the cause of infertility in women with septate uterus. The septal wall consists of fibroelastic tissue with alterations in the endometrial myometrial blood vessels, which cause a negative impact on placental development (**Pai et al., 2009).**

Hysteroscopic metroplasty has been recommended as a therapeutic procedure for the management of symptomatic patients with recurrent miscarriage and preterm labor but also in asymptomatic patients as a prophylactic procedure in order to improve their chances for a successful delivery **(Grimbizis et al., 2001)**.

Maturation defects of the septal endometrium with reduced numbers of glandular ostia, incomplete cilia development and reduced ciliated cell ratio could support incomplete differentiation and maturation of the endometrium covering the septum **(Bakas et al., 2012).** These developmental and maturation endometrial defects could affect endometrial receptivity, implantation and early pregnancy processes playing a role in the pathogenesis of recurrent abortion and primary infertility in women with septate uterus **(Mollo et al., 2009).**

In the present study, serum sodium levels were nearly comparable between studied groups before and after hysteroscoic metroplasty. These results agree with **Seet et al. (2015)** who noticed that the usage of bipolar energy devices reducing the risks of hypernatremia due to this device allows the use of isotonic saline as a distention media.

In the present study, there were nearly comparable between studied groups regarding operative time and fluid deficit with no significant differences but there was a significant differences between studied groups regarding pain score 3.0±1.58 in group I Vs 5.88±1.62 in group II. These results agree with **Roy et al. (2015)** who done their work to campare between unipolar and bipolar resectoscopy for septal resection and reported nosignificant difference in operation time and fluid deficit between the two groups.

Also agree with **Kamel et al. (2014)** who noticed the operative time and fluid deficit were less in group B (bipolar) than in group A (scissor) but the difference did not reach the level of statistic significance.

Colacurci et al. (2007) and Litta et al. (2007) comparing unipolar resectoscopes and bipolar (Versa-point) and demonstrated comparable reproductive outcomes but shorter operating times and lower complication rates for the Versapoint group. **Nouri et al. (2010)** reported that the use of scissors for resection was found to be the simplest, fastest, and least expensive method for correction of uterine septum.

Cicinelli (2010) noted that severe pain and adverse effects may occur rarely even with mini-instruments as in operative hysteroscopy. Women with a history of cesarean section, chronic pelvic pain, or anxiety, or are menopausal should be considered at risk of pain perception.

In the present study, the visual analog scale showed 16 cases (36%) suffered from mild pain in group I, 9 cases (36%) suffered from moderate pain in group I and 18 cases (72%) in group II but in group II only there were 7 cases (28%) suffered from severe pain with statistical significant differences.

The visual analog scales (VAS) that detect pain score showed a statistically significant difference between the two groups. Patients in group B (bipolar) had higher pain scores than patients who underwent mechanical metroplasty (scissor). This could be explained by the transmission of bipolar thermal energy as soon as the resection started, causing stimulation of the adjacent uterine wall **(Vilos and Abu-Rafea, 2005).**

The need for analgesia for performing hysteroscopy is still controversial. Many factors explain the lack of agreement on this study depending on the instruments used, the approach of entry, indication, the operator's skill, and the patient's characteristics (**Cicinelli, 2010).**

Bettochi et al. (2002) used a special technique in their center, based on their observation that the default setting of the versapoint generator causes more discomfort, when the operative procedure is done in an office setting without analgesia. They adapted the generator setting to the mildest vapor-cutting mode (VC3) instead of VC1 and reduced the power setting to 50Winstead of 100W. **Bettochi et al. (2004)** in a later study analyzed 4863 cases performed with mechanical instruments (scissor or grasping forceps) in an office setting without analgesia. The procedures were performed without discomfort in 71.9%– 93% of the patients.

In the present study, there were 4 cases (16%) suffered from post-operative fever in group I and 3 cases (12%) in group II with no statistical significant differences.

Postoperative pain is minimal after hysteroscopic metroplasty, typically requiring a mild narcotic and NSAID for several days. Fever is uncommon. Patients should be instructed to call if they develop a fever or experience increasing pelvic pain (**Bradley and Dayaratna, 2008)**.

Bipolar resectoscope has the advantage of better visibility and reduced cost (**Mencaglia et al., 2009).** It does not require disposable instruments, and compatible components of existing unipolar resectoscopes can be used. Cervical trauma and other

complications can be prevented by use of vaginal prostaglandins preoperatively (**Polyzos et al., 2012)**.

The advantages of hysteroscopic repair of septate uteri include less morbidity, no abdominal or transmyometrial incisions, and a shorter time until the patient can return to normal activities. Because no abdominal incision is made in this method, possible infections and intraabdominal adhesions that may cause future fertility problems or pain are avoided (**Ayas et al., 2011)**.

In the present study, reformation of septum and Intra-uterine adhesion were nearly comparable between both groups with no statistical significant differences.

The patients were evaluated postoperatively by HSG performed after hormone withdrawal bleed or first spontaneous menses. There were no intrauterine adhesions detected in either group, and there was no difference in incidence of a residual uterine septum (**Abu Rafea et al., 2013).**

The postoperative adhesions after hysteroscopic metroplasty lead to infertility and scar rupture in future pregnancies. In addition, laparotomy also results in a longer hospital stay. Even in cases where laparotomy is required, hysteroscopic metroplasty is still the preferred approach to prevent potential subsequent risk especially scar rupture in future pregnancies **(Homer et al., 2000).**

Bettocchi et al. (2007) reported that office hysteroscopic metroplasty was successfully performed using 5Fr scissors through an office hysteroscope with an outer sheath measuring 4 mm in diameter without any analgesia or anaesthesia. Although the introduction of mini-hysteroscopes reduces uterine injury, and the safety of bipolar surgery in reducing electrolyte imbalance and thermal injury.

The postoperative intrauterine device (IUD) placement and hormone therapy, as well as artificial cycle treatment, could help prevent the uterine wound adhesions and promote endometrial repair **(Wang et al., 2013).** On the contrary, the placement of an IUD would result in an intrauterine local inflammatory response and an increased probability of the occurrence of uterus and fallopian tube infection (**Tonguc et al., 2010).**

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1/2/2019