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Mechanical versus unipolar hysteroscopic removal of endometrial polyp before intracytoplasmic sperm injection (ICSI)

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***Abstract*---**Background: The most common problematic finding in the uterus is endometrial polyps, which are usually benign overgrowth. Aim and objectives: The purpose of this research was to compare the results of hysteroscopic endometrial polyp removal with unipolar electrodes against mechanical removal. Subjects and methods:This was arandomized controlled trials included 40 infertile women with endometrial polyps who visited the infertility clinic at Qena university hospital , south valley university, Egypt. Cases were randomized into two groups. Group A: 20 patients who will undergo hysteroscopic surgery of endometrial polyps via the unipolar electrodes Group (B):20 patients who undergo surgical treatment via mechanical (scissor) treatment under hystroscopy. Result: The study showed that unipolar electrode have lesser blood loss ,shorter operative time and technically more feasible than the mechanical methode. Outcome in group (A) show that half of the patients had regular menstrual cycle and the majority of them were pregnant. There was 2 (10%) miscarriage and 1 (5.0%) ectopic pregnancy. In group (B) more than half of the patients had irregular menstrual cycle and more than half of them were pregnant. There was 2 (10%) miscarriage and 2 (10.0%) ectopic pregnancy. However, there was no statistically significant difference between group (A) and group (B). Conclusion: Both Mechanical and unipolar were safe and effective in hysteroscopic removal of endometrial polyp. The mechanical hysteroscopic removal was

preferable in terms of operative time, polypectomy time and Pain tolerance. Mechanical hysteroscopic removal non significantly improve the clinical pregnancy.

***Keywords*---**mechanical, unipolar hysteroscopic, endometrial polyp, sperm injection.

Introduction

The most common problematic finding in the uterus is endometrial polyps, which are usually benign enlargements. Although the actual prevalence of endometrial polyps is unknown, it has been estimated that 82% of women with polyps are asymptomatic. Endometrial polyps are to blame for half of all abnormal uterine bleeding instances (1). If a polyp is identified prior to in vitro fertilization or a frozen embryo transfer cycle, the procedure will be stopped, most doctors recommend hysteroscopy and polyp excision. During assisted reproduction technology cycles, clinical data and the effectiveness of various management techniques, on the other hand, are contradictory (2). The endometrial polyp is focal hyperplasia of the basal endometrial originating as a localized tumor and is covered by glandular epithelium. Histologically, it is recognized as glands that behave in a different manner composed of fibrous stroma and vessels with thickened walls (3). The lack of a relationship between polyp size and fertility outcomes defies a mechanistic impact, as larger polyps would be expected to have a larger effect (4). The purpose of this study was to compare the results of hysteroscopic endometrial polyp removal with unipolar electrodes against mechanical removal (scissors).

Patients and Methods

A randomized controlled Trial was carried out on 40 infertile women with endometrial polyps who visited the infertility clinic at Qena University Hospital, South Valley University, Egypt.

Inclusion criteria

Women were recruited for IVF / ICSI**,** BMI 18 -25 kg/m2**,** endometrial polyp <2 cm in size and with a maximum of three in no. and before being enrolled in the trial, An Informed Consent form was signed by the studied cases.

Exclusion criteria

studied cases with severe acute or chronic renal, hepatic or cardiac diseases, patients with Past or present history of genital malignancy or intrauterine adhesions, patients with ovarian masses or pelvic abdominal masses, and contraindications to hysteroscopy and general anesthesia.

Eligible women

A randomized trial Included 40 infertile women with endometrial polyps. The studied cases were divided into 2 groups at random.: Group A: 20 studied cases who will undergo hysteroscopic surgery of the endometrial polyps via the unipolar electrodes ((karl Storz unipolar resectoscope). Group B: 20 patients who underwent surgical treatment via mechanical (scissor) treatment under hysteroscopy.

Data collected

Detailed history and clinical examination. Ultrasound: Transabdominal and/or transvaginal ultrasound to exclude patients with ovarian masses or pelvi-abdominal masses. Laboratory investigations to fulfill the inclusion and exclusion criteria (Blood picture, serum creatinine, coagulation profile, blood sugar, liver function test). Evaluation of uterine cavity to evaluate the efficacy of procedure pre and postoperative by sis & us. Follow up for six months after the technique was done during the provided the following data were collected (regular cycle, pregnancy rate, and Competence

Primary outcome measures

Feasibility, induced pain to the patient, and surgeon learning curve. Secondary outcome: Operative time, complications, clinical pregnancy, and abortion rate.

Statistical analysis

The obtained data were statistically analyzed and tabulated using the SPSS (Statistical Package for Social Sciences) program version 26.0, Microsoft Excel 2016, and the MedCalC tool version 19.1. For numerical parametric data, such as means (standard deviation) and minimum and maximum ranges, as well as numerical non parametric data, such as median and first and third interquartile ranges, and categorical data, such as number and %, descriptive statistics were produced.

Results

Data were collected during the period February 2020 to March 2022 at Qena faculty of medicine, obstetrics and gynecology, department. Age in group (A) was ranged between 20-38 years with mean ± S.D. 25.25±4.128 years while in the group (B) was ranged between 18-39 years with a mean ± S.D. 29.85±6.483 years. Between groups, there were differences that are statistically significant where P=0.017. Infertility in the group (A) shows that 17(85.0%) had primary infertility and 3(15.0%) had secondary infertility and it ranged between 2-20 years with a mean ± S.D. 6.13±4.401 years while in the group (B) show that 11(55.0%) had primary infertility and 9(45.0%) had secondary infertility and it was ranged between 9 months-17 years with a mean ± S.D. 5.74±4.703 years. There were no analytically significant differences between the two groups. Table (1)

Table 1
Comparison between two groups (G) as regards patient demographic data

	G 1 (N = 20)		G 2 (N = 20)		Test of Sig.	P Value
	No.	%	No.	%		
Age						
Range	20-38		18-39		U=112.00	0.017*
Mean± S.D	25.25±4.128		29.85±6.483			
BMI						
Range	18-23		19-22		U=187.00	0.738
Mean± S.D	20.25±1.650		20.35±1.309			
Infertility Type						
Primary	17	85.0	11	55.0	-----	0.082
Secondary	3	15.0	9	45.0		
Infertility Duration						
Range	2-20		9 months-17 years		U=181.50	0.620
Mean± S.D	6.13±4.401		5.74±4.703			

U: Mann-Whitney test
p: p-value for comparing the two examined groups
At P < 0.05, the difference is statistically significant.

Polyp characteristics in group (1) show that all patients had 1 polyp and its size ranged between 0.6-0.9 mm with a mean ± S.D. 0.78±0.106 mm while group (2) show that 19(95.0%) had one polyp and 1(5.0%) had 2 polyps and its size ranged between 0.5-5.0 mm with mean ± S.D. 1.35±1.103 mm. Between groups(G), there were no statistically significant differences. Table (2)

Table 2
Comparison of two groups in terms of Polyp characteristics

Polyp characteristics	G (1) (N =20.00)		G (2) (N =20.00)		The Sig. test	The P-Value
	No.	%	No.	%		
Number						
1	20	100	19	95.0	-----	1.000
2	00	00	1	5.0		
Size						
Range	00.60 - 00.90		00.50 - 05.00		U=163.50	0.317
Mean± S.D	0.78±0.106		1.35±1.103			

U: Mann-Whitney test
p: p-value for comparing the two examined groups
*: At P < 0.05, the difference is statistically significant.

Operation duration in the group (1) ranged between 9-12 min with mean±S.D. 10.50±1.147 min while in the group (2) was ranged between 18-22 min with mean±S.D. 19.95±1.050 min. There were highly statistically significant differences between groups where P=0.017. (Table (3)

Table 3
Comparison between two groups (G) as regards the duration of surgery

Duration of the operation	G (1) (N=20.00)	G (2) (N= 20.00)	U	The p-value
Range	9-12	18-22	0.50	<0.001*
Mean± S.D	10.50±1.147	19.95±1.050		

U: Mann-Whitney test
p: p-value for comparing the two examined groups
*: at P <0.05 is Statistically significant

The outcome in the group (1) show that the half of the patients had regular menstrual cycles and the majority of them were pregnant with 2(10%) miscarriage and 1(5.0%) ectopic pregnancy while the group (2) show that more than half of the patients had irregular menstrual cycle and the more than half of them were pregnant with 2(10%) miscarriage and 2(10.0%) ectopic pregnancy. Between groups, there was no analytically significant difference. Table (4).

Table 4
shows the outcome comparison between two groups(G)

	G (1) (N=20.00)		G (2) (N=20.00)		The P Value
	No.	%	No.	%	
Regularity of cycle					
Regular	10	50.0	8	40.0	0.751
Irregular	10	50.0	12	60.0	
Pregnancy rate					
No	6	30.0	8	40.0	0.741
Yes	14	70.0	12	60.0	
Miscarriage					
No	18	90.0	18	90.0	1.000
Yes	2	10.0	2	10.0	
Ectopic pregnancy					
No	19	95.0	18	90.0	1.000
Yes	1	5.0	2	10.0	

p: p-value for comparing the two groups under investigation
*: at P <0.05 is statistically significant

Complications in the group (1) show less hemorrhage and time with no infections detected and the half of patients (50.0%) had pain and the half of them were treated orally and the other half were treated by injection while the group (2) showed more in hemorrhage and time with 3 patients (15.0%) had infections and treated by Ab and the three-quarter of patients (75.0%) had pain and the 5(25.0%) treated orally and the 10(50.0%) treated by injection. The differences between groups were analytically significant. According to Difficult in use by the doctor, Hemorrhage and time. Table (5)

Table 5
In terms of patient problems, there is a comparison between the two groups(G)

Complications	G (1) (N=20.00)		G (2) (N=20.00)		The P Value
	No.	%	No.	%	
Blood loss					
Less	20	100	0	0	<0.001*
More	0	0	20	100	
Time					
Less	20	100	0	0	<0.001*
More	0	0	20	100	
Infection	0	0	3	15.0	0.231
Pain	10	50.0	15	75.0	0.191
Oral	5	25.0	5	25.0	0.189
Injection	5	25.0	10	50.0	

p: the p-value for comparing the two examined groups
*: at P <0.05 is Statistically significant

Feasibly in the group (1) show that the technology was easy with expensive cost while the practical performance was easy and the scheduling was easy to competence while in group (2) technical was difficult with cheap cost while the practical performance was difficult and the scheduling was less to competence. The difference between groups was statistically significant. Table (6)

Table 6
Comparison of two groups(G) in terms of feasibility

Feasibly	G (1) (N=20.00)		G (2) (N=20.00)		The P-Value
	No.	%	No.	%	
Technical					
Easy	20	100	0	0	<0.001*
Difficult	0	0	20	100	
Cost					
Expensive	20	100	0	0	<0.001*
Cheap	0	0	20	100	
Operational					
Practical Performance Easy	20	100	0	0	<0.001*
Practical Performance difficult	0	0	20	100	
Doctor Competence					
Easy to competence (< 20*minutes*)	20	100	0	0	<0.001*
9 minutes	5	25.0	0	0	
10-11 minutes	10	50	0	0	
12-20 minutes	5	25.0	0	0	
Difficult to competence (>20 minutes)	0	0	20	100	

p: the p-value for comparing the two groups under investigation
*: at P <0.5 is Statistically significant

Discussion

The gold standard for diagnosing and treating endometrial polyps is hysteroscopic polypectomy (5). While both settings have similar success rates, According to some studies, failure to remove a polyp in the office is more common (6). In the current research, the mean age of the studied cases was 30.30± 3.209 years. Age in the group (A) ranged from 20-38 years with a mean ± S.D. 25.25±4.128 years while in a group (B) was ranged between 18-39 years with mean±S.D. 29.85±6.483 years. Where P=0.017, there were no analytically significant differences between groups. Limited studies evacuated the effect of polypectomy on reproduction outcomes, and no studies compared different hysteroscopic systems and their effect on reproduction outcomes. The current study can be supported by Karakuş et al., (7) sought to compare pregnancy rates between subgroups with polyps of varying location, size, and quantity after hysteroscopic polypectomy in infertile patients with endometrial polyps. The study included 91 patients who had their polyps removed hysteroscopically and had their diagnosis confirmed by pathology. The average age of the patients was 33.6±3.8 years.

As well, the study by Ghaffari et al., (8) aimed to examine the impact of hysteroscopic polypectomy during the ovarian stimulation phase on the success of in vitro fertilization (IVF) and/or intracytoplasmic sperm injection (ICSI) cycles. The study included 160 participants who were diagnosed with polyps less than 20 mm by chance. 58 patients had hysteroscopic polypectomy without having their cycles canceled. In terms of age, there was no statistically significant difference between the groups with and without polypectomy. Also, Tsuchiya et al., (9) aimed to evaluate the mechanical morcellator, Compared to traditional electrosurgical resection in terms of operating time, surgeon convenience, and patient effect. A total of 67 women were randomly assigned to one of two groups: morcellation (n = 34) or electrosurgical resection (n = 33). In terms of age, there was no statistically significant difference.

Furthermore, Stoll et al., (10) The goal of this study was to examine the hysteroscopic therapy of uterine polyps with a reusable hysteroscopic morcellator and standard resectoscopes. The participants in the study were: Ninety patients were randomly assigned to one of two groups: hysteroscopic morcellation or conventional resectoscope. In terms of age, there was no statistically significant difference. The comparison between the two groups regarding infertility characteristics presented that infertility in a group (A) there were 17(85.0%) had primary infertility and 3(15.0%) had secondary infertility and it was ranged between 2-20 years with mean ± S.D. 6.13±4.401 years while in group (B) there were 11(55.0%) had primary infertility and 9(45.0%) had secondary infertility and it was ranged between 9 months-17 years with mean±S.D. 5.74±4.703 years. Between groups, there were no statistically significant differences.

However, the study by Karakuş et al., (7) The average length of infertility was 4.3±2.5 years, according to the study. In the study by Ghaffari et al., (8) in terms of duration of infertility and reason for infertility, According to the study, there

was no analytically significant difference between groups with and without polypectomy. Furthermore, Tsuchiya et al., (9) reported that in terms of infertility, there was no analytically significant difference between the Morcellation and Electrosurgical Resection groups. Also, Tsuchiya et al., (9) reported that in terms of the number of polyps, highest polyp size, polyp weight, and polyp location, there was no statistically significant difference between the morcellation and electrosurgical resection groups.

As well, Pampalona et al., (11) reported that in terms of the number of polyps, polyp size, and polyp position, there was no statistically significant difference between the Mechanical and Bipolar resection groups. Regarding operating time and polypectomy time we found that the operation duration in a group (A) ranged between 9-18 min with mean±S.D. 10.90±1.971 min while in a group (B) was ranged between 18-22 min with mean±S.D. 19.95±1.050 min. P=0.017 revealed very statistically significant differences across groups. This morcellator system cuts and aspirates intrauterine endometrial polyps with a disposable mechanical cutting device. There is no need for multiple insertions to extract the mass because this mechanical cutting device can simultaneously cut and aspirate intrauterine masses, allowing the operating field to remain clear and minimizing the operating time (9).

Our findings were backed up by Tsuchiya et al., (9) who found that the average operating time (8.3 min vs. 12.0 min, P = 0.014), insertion time (5.0 min vs. 9.0 min, P 0.001), and a number of insertions (1.0 vs. 8.2, P 0.001) were considerably lower in the morcellation arm than in the electrosurgical resection arm. Also, the study by Hamerlynck et al., (12) reported that in the hysteroscopic morcellation and resectoscopy groups, the median operating time was 4.0 minutes (2.5–7.1 minutes) and 6.0 minutes (3.8–11.7minutes), respectively. The hysteroscopic morcellation group saw a 38 percent reduction in operating time (95 % CI 5–60 percent, p =.028). The hysteroscopic morcellation group had a lower procedure time (median 9.5 minutes (7.6–12.2 minutes), p =.072, than the hysteroscopic morcellation group (median 12.2 minutes (8.8–16.0 minutes). The mean VAS score in a group (I) and group (II) was 4.0± 1.01 and 3.80± 0.88 respectively. The two studied groups showed no statistically significant differences in VAS scores (p=0.163).

In line with our results by Pampalona et al., (11) According to the study, regardless of the hysteroscopic method utilized, there was no significant difference in discomfort reported by patients once the procedure was completed (p >.05). The worldwide median pain score on the VAS was 6.9. When the senior specialist who performed the procedure using the resection and mechanical systems evaluated pain tolerance, he discovered that good pain tolerance was present in 66% and 75% of patients, fair pain tolerance in 23% and 17% of patients, and poor pain tolerance in 11% and 8% of patients, respectively. Also, Stoll et al., (10) reported that the pain difference between the hysteroscopic morcellator and traditional resectoscopes was not significant. Regarding the rate of clinical pregnancy and abortion among the studied groups we found that there were 18 (30%) patients in group I and 24 (40%) patients who succeeded to have clinical pregnancy with no significant differences between the two groups (p=0.251). 6 (10%) patients in group I and 6 (10%) patients experienced clinical

abortion with no significant differences between the two groups (p=1.00).

A prospective randomized study by Pérez-Medina et al., (13) Women who had polypectomy before IUI treatment had a better likelihood of getting pregnant, according to the study. In the polypectomy group, women who were sent to IUI as a result of unexplained, female factor or male infertility had a higher risk of clinical pregnancy. Surprisingly, the majority of pregnancies happened naturally before the first IUI round. The systematic review by Zhang et al., (14) According to the researchers, the influence of endometrial polyps and hysteroscopic polypectomy on pregnancy outcomes following assisted reproductive technologies remains unknown. The current systematic study found that hysteroscopic removal of endometrial polyps less than 2 cm in diameter was linked to higher clinical pregnancy rates after IUI.

Our findings can be supported by Stoll et al., (10) who reported that operator comfort (8.40 vs 7.40; p [HM > SR] = 0.999) and visualisation (4 vs 3.7; p [HM > SR] =0.911, strongly plausible) were both higher in the HM group. The SR group had more surgical complications (5 vs 0; p [HM SR] =.989]). An anesthetic complication (anaphylactic shock complicated by pulmonary embolism) claimed the life of one patient in the SR group after surgery). There were no changes in pain evaluation, length of hospitalization, or outcome on review hysteroscopy between the groups. Also, Pampalona et al., (11) reported that during the mechanical tissue removal and bipolar electrical resection procedures, There were no issues for any of the research participants (such as excessive bleeding, vagal syndrome, or uterine perforation). Finally, we found that feasibly in a group (A) show that the technology was easy with expensive cost while the practical performance was easy and the scheduling was easy to achieve the goal of a learning curve and time-consuming while in a group (B) technical was difficult with cheap cost while the practical performance was difficult and the scheduling was less to achieve the goal of the learning curve and more time-consuming. The difference between the groups was statistically significant. The study by Pampalona et al., (11) reported a significant difference in favor of hysteroscopy using mechanical tissue removal systems, specifically in polypectomy time, where the difference worked out to almost 5 minutes (a 63 percent reduction in time) in favour of the mechanical tissue removal system versus the bipolar electro surgery system, strictly speaking (3 minutes 7 seconds for the TRUCLEAR System vs 8 minutes 25 seconds for the VERSAPOINT System).

Conclusion

In hysteroscopic removal of endometrial polyps, both compared mechanical and unipolar were safe and effective. In terms of surgical time, polypectomy time, and pain tolerance, mechanical hysteroscopic removal was preferred. Mechanical hysteroscopic removal non significantly improve the clinical pregnancy.

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