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Assessment of Efficacy of Hysteroscopic Tubal Occlusion in Infertile Patients With Hydrosalpinx

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Abstract

One of the most common reasons for undergoing *in vitro* fertilization and embryo transfer (IVF-ET) is tubal infertility. There is a high prevalence of adnexal injuries that lead to sterility. Some are pathogenic as a result of pelvic infectious disease that causes tubal blockage and/or hydrosalpinx, or endometriosis. After a tubal ectopic pregnancy, tubal damage is a common complication. Possible iatrogenic causes of tubal injury include sterilization and prior pelvic surgery. In our study we aimed to Assess the efficacy of hysteroscopic tubal occlusion by using electrocoagulation in infertile patients with hydrosalpinx, our study was conducted at the obstetrics and gynecology department of Al-Azhar University Hospitals, between November 2021 and January 2023. The study included 60 patients who were selected from attendees of the Obstetrics and Gynecology Department of Al-Azhar University Hospitals. Our results showed that successful tubal occlusion (89.29 %) and failed tubal occlusion (10.71 %) Therefore, efficacy was up to 89.29 %. we concluded that the Treatment of hydrosalpinges with hysteroscopic tubal electrocoagulation was found to be effective. Hysteroscopic tubal occlusion has the advantages of a lack of requirement for anesthesia, better patient acceptance, less time required, and fewer operative complications than other incisional surgical methods and procedures.

Keywords: Hydrosalpinx, Hysteroscopic tubal occlusion, Infertile patients

1. Introduction

Tubal infertility is one of the most common reasons for *in vitro* fertilization and embryo transfer (IVF-ET). Several adnexal injuries result in infertility. Some are pathogenic as a result of endometriosis or pelvic infectious illness that causes tubal blockage and/or hydrosalpinx. Tubal injury as a result of tubal ectopic pregnancy is not uncommon. Iatrogenic reasons (sterilization procedures and earlier pelvic operations) could be to blame for tubal damage.¹

Infertility in women often results from hydrosalpinx. Hydrosalpinges have been linked to lower implantation and pregnancy rates in women. It is unclear how Hydrosalpinx disrupts the implantation process in a detrimental way. The poor IVF success in the presence of hydrosalpinx may be due to mechanical issues, the toxicity of the

hydrosalpingeal fluid, or receptivity failure. Hydrosalpinx can sometimes be diagnosed and treated with laparoscopic surgery.²

Hydrosalpinx has been shown in multiple trials to have a detrimental impact on pregnancy, implantation, early pregnancy loss, premature birth, and live delivery rates in IVF patients.³

In patients with substantial intra-abdominal adhesions, laparoscopic salpingectomy is an invasive treatment with a high risk of complications. Additionally, it may cause a decrease in ovarian reserve by disrupting blood flow to the ovaries.⁴

Although laparoscopic proximal tubal occlusion has shown some encouraging outcomes, it still requires a potentially life-threatening incision in the lower abdominal wall. Tubal occlusion without the need for invasive surgery has been the subject of extensive research and development. In women with hydrosalpinx, hysteroscopic proximal tubal

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blockage using the Essure microinsert appears to be a successful option.⁵

A randomized controlled trial of hysteroscopic rollerball coagulation for proximal tubal occlusion was carried out in a resource-limited area.⁶

This work aimed to assess the efficacy of hysteroscopic tubal occlusion by using electrocoagulation in infertile patients with hydrosalpinx.

2. Patients and methods

This prospective observational study was conducted at the obstetrics and gynecology department of Al-Azhar University Hospitals Between November 2021 and January 2023.

This research was based on a study conducted by Arora and colleagues.⁷ Epi Info STATCALC was utilized to calculate the sample size based on the aforementioned hypotheses. Given a two-sided confidence level of 95 %, a power of 80 %, and a margin of error of 5 %, the calculated odds ratio is 1.115. The maximum sample size derived from the Epi-Info output was 52. As a result, the sample size was increased to 60 cases to account for potential dropouts during the follow-up phase.

This research was conducted on 60 patients selected from the obstetrics and gynecology Department of Al-Azhar University Hospitals.

Inclusion Criteria for the studied group were: age (18–40 years), good ovarian function, ability to understand and be cooperative, primary or secondary infertile female, and Unilateral or bilateral hydrosalpinx.

The criteria of good ovarian function include normal levels of hormonal profile (AMH, FSH, LH, Estradiol, Prolactin, and TSH) and normal appearance of ovaries by the US.

Exclusion criteria for the studied group were: age less than 40 years, BMI less than 30 kg/m², patients with autoimmune diseases, e.g., SLE, anti-phospholipid syndrome, patients with uterine anomalies (e.g., bicornuate uterus, septate uterus, etc.) and chronic medical disorders (e.g., DM).

All patients who were diagnosed with unilateral or bilateral hydrosalpinx by using a hysterosalpingogram were subjected to the following: every participant gave their informed consent before undergoing a thorough history-taking, clinical examination, and laboratory investigations.

The surgery was done right after menstruation, and either general anesthesia or saddle anesthesia was used. Hegar 6 was used to gently dilate the cervix, and a rigid hysteroscope was introduced to view the uterine cavity and both tubal ostia and rule out any pathology. A needle electrode was inserted

within the peritubal bulge, which is the proximal end of the intramural segment of the tube, and triggered at 50 Watts for roughly 8 s. The patients were then released a few hours later. Tubal occlusion of the affected side was confirmed by a hysterosalpingogram after 2 months.

Diagnosis of hydrosalpinx was done by using a hysterosalpingogram in which the tubes appear dilated and tortuous and are folded upon themselves to form a C or S shape.

2.1. Ethical consideration

The Institutional Review Board at Al-Azhar University had submitted the study protocol for approval. All study participants gave their informed verbal consent, and their privacy and confidentiality were protected at all times.

2.2. Statistical methods

SPSS, a statistical package for the social sciences, version 20.0, was used for the data analysis. The quantitative information was summarized as a mean SD. Quantitative information was presented as averages and percentages.

3. Results

Table 1.

This table shows that the mean age was 31.52 years, with a SD of 5.5 years. Also, the BMI mean reached 27.5 kg/m² with an SD of 3.6. This table also shows that the nulliparous women in this study were 33 (55 %) cases, para 1 were 22 (36.7 %) cases, and para 2 was 5 (8.3 %) cases [Table 2](#).

The time of operation was less than 20 min in 18 (30 %) cases, from 20 to 30 min in 36 (60 %) cases,

Table 1. Distribution of women according to their demographic data.

Demographic data	Total (n = 60)
Age (y)	31.52 (5.5)
BMI (Kg/m ²)	27.5 (3.6)
Parity	
Nulliparous	33 (55 %)
Para 1	22 (36.7 %)
Para 2	5 (8.33 %)

Table 2. Time of operation.

	Total (n = 60)
Less than 20 min	18 (30 %)
From 20 to 30 min	36 (60 %)
More than 30 min	6 (10 %)
Mean operative time	23.5 ± 5.6

and more than 30 min in 6 (10 %) cases. The mean operative time was 23.5 min, with an SD of 5.6 Table 3.

Difficult entry was reported in 8 (13.33 %) cases only Table 4.

Complications of anesthesia occurred in 2 (3.33 %) cases, and they were complicated by delayed recovery. Intraoperative uterine perforation was reported in 1 (1.67 %) case, and intra-operative hemorrhage was reported in 2 (3.33 %) cases. Post-operative infection was found in 4 (6.67 %) cases, while the mean postoperative pain as measured by the VAS (Visual Analogue Scale) was 1.92 ± 1.4 Table 5.

This table shows that 56 cases performed HSG after 2 months, 2 cases refused to perform it, and 2 cases did not follow-up. Successful tubal occlusion occurred in 50 (89.29 %) cases, and failed tubal occlusion occurred in 6 (10.71 %) cases. Therefore, efficacy was up to 89.29 % Table 6.

Accidentally discovered uterine polyps during hysteroscopy were reported in 3 (5 %) cases,

submucous myoma in 1 (1.67 %) case, and endometrial adhesions in 5 (8.33 %) cases.

4. Discussion

25 %–35 % of female infertility is due to the tubal factor. In 50 % of instances, pelvic inflammatory disease results in tubal dysfunction, and distal tubal blockage can result in the development of hydrosalpinges.²

The main results were as follows:

Statistics on the proportion of women based on their BMI and age: the mean age was 31.52 years with a SD of 5.5 years. Also, the BMI mean reached 27.5 kg/m^2 with a SD of 3.6.

In this study, Parity-based allocation of women showed that Nulliparous patients were 33 (55.0 %) cases, Para 1 patients were 22 (36.7 %) cases, and para 2 patients were 5 (8.3 %) cases.

Hefny et al.⁸ who set out to assess diagnostic hysteroscopy as a technique for diagnosing tubal causes of infertility in contrast to diagnostic laparoscopy, corroborated our findings. One hundred women participated in the study, all of whom had diagnostic hysteroscopy and laparoscopy. The range of age was 21–46 with mean 34.37 ± 6.80 , while the range of BMI was 24–33 with mean of 27.85 ± 5.33 . He also reported that Parity distribution among women was as follows: Nulliparous (48.0 %), Para 1 (30.0 %), Para 2 (14.0 %), and para 3 (8.0 %).

Our results showed that the time of operation was less than 20 min in 18 (30 %) cases, from 20 to 30 min in 36 (60 %) cases, and more than 30 min in 6 (10 %) cases, and the mean operation time was 23.5 min with a SD of 5.6.

Our results were in agreement with Rosenfield et al.⁹ which he performed tubal occlusion using the ESSURE devices and found that on average the procedure took 36 min, with hysteroscopy taking an additional 13 min.

According to Dreyer et al.¹⁰ women who received hysteroscopic tubal occlusion had a considerably lower median operation duration [7.0 min (5.0–12.0)] than those who underwent laparoscopic salpingectomy [41.0 min (35.0–55.0)]; therefore, these results revealed that hysteroscopic tubal occlusion was found to require less time.

Our results showed that an accidentally discovered uterine polyp during hysteroscopy was reported in 3 (5 %) cases, a submucous myoma in 1 (1.67 %) case, and endometrial adhesions in 5 (8.33 %) findings concurred with those of Sahu et al.¹¹ who discovered that 85.12 % of patients had normal uterine cavities. 10 (3.08 %) of the cases had a spetate uterus,

Table 3. Entry of the hysteroscope.

	Total (n = 60)
Feasible entry	52 (86.67 %)
Difficult entry	8 (13.33 %)

Table 4. Operative complications.

	Total (n = 60)
Complications of anesthesia	2 (3.33 %)
Intraoperative	
Uterine perforation	1 (1.67 %)
Hemorrhage	2 (3.33 %)
Postoperative	
Infection	4 (6.67 %)
Pain (VAS score)	1.92 ± 1.4

Table 5. Follow-up by hysterosalpingogram after 2 months.

	Total (n = 60)
Cases performed HSG	56
Cases refused to perform it	2
Cases did not follow-up	2
	Total (n=56)
Successful occlusion	50 (89.29 %)
Failed occlusion	6 (10.71 %)

Table 6. Diagnostic advantages of hysteroscopy.

	Total (n = 60)
Accidentally discovered	
Uterine polyp	3 (5 %)
Submucous myoma	1 (1.67 %)
Endometrial adhesions	5 (8.33 %)

16 (4.93 %) had intrauterine adhesions, 2 (0.62 %) had submucous myoma, 15 (3.71 %) had a deformed cavity, and 2 (0.62 %) had endometrial polyps.

These results showed that hysteroscopic tubal occlusion added valuable evaluation to the endometrial cavity prior to IVF.

Our results showed that Complications of anesthesia occurred in 2 (3.33 %) cases, and they were complicated by delayed recovery.

Our results showed that uterine perforation during hysteroscopy was reported in 1 (1.67 %) case. Hemorrhage during hysteroscopy was reported in 2 (3.33 %) cases. Postoperative infection was found in 4 (6.67 %) cases, and the mean postoperative pain as measured by the VAS score was 1.92 ± 1.4 .

Our results were in agreement with Cao et al.¹² who found that the most common complications of hysteroscopic surgery were uterine perforation (0.12 %), intraoperative bleeding (0.03 %), and postoperative infection (0.01 %).

Our results were also supported by Ahmed S. Rashwan et al.¹³, who compared hysteroscopic versus laparoscopic management in patients with hydrosalpinx and found that the complications of the hysteroscopic group were uterine perforation in 1 (1.85 %) case, and the average VAS score for postoperative pain was 1.81 ± 1.35 .

Regarding the incidence of these complications, we found that our operation had the advantage of a lack of requirement for anesthesia and fewer complications than traditional incisional surgical treatments of hydrosalpinx.

Our results also showed that during follow-up by hysterosalpingogram after two months, 56 cases performed it, two cases refused to perform it, and two cases did not follow-up. We found that successful tubal occlusion occurred in 50 (89.29 %) cases and failed occlusion occurred in 6 (10.71 %) cases. Therefore, efficacy was up to 89.29 %.

Similarly, to what Ahmed S. Rashwan et al.¹³ found regarding the success rate of tubal occlusion, we also found that the laparoscopic method was more effective than the hysteroscopic method, with 75 of 78 tubes successfully occluded (96.15 %) compared with 65 of 75 tubes (86.67 %) in the hysteroscopy group. Although laparoscopic tubal disconnection has a higher rate of success, the hysteroscopic technique is another option whose limitations can be evaluated using a hysterosalpingogram. This is especially useful when laparoscopy is contraindicated, technically challenging, or the patient refuses the procedure.

Similar to what Galen I et al.¹⁴ reported, our findings supported the use of Essure devices for

hysteroscopic proximal occlusion of hydrosalpinges. For 9 out of 10 patients, inducing full proximal occlusion resulted in a successful outcome.

4.1. Conclusion

Hydrosalpinges can be effectively treated with hysteroscopic tubal electrocoagulation. Hysteroscopic tubal occlusion has the advantages of a lack of requirement for anesthesia, better patient acceptance, less time required, adding valuable evaluation of the endometrial cavity prior to IVF, having fewer complications than traditional incisional surgical treatments of hydrosalpinx, and being less invasive.

4.2. Recommendations

Further studies with larger sample size are needed to confirm the current results. Further studies with larger sample size and longer follow-up are needed to confirm that Hysteroscopic tubal electrocoagulation is a successful treatment for hydrosalpinges for long time.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article.

Conflicts of interest

The authors declared that there were NO conflicts of Interest.

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