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Comparative Study Between Laparoscopic Tubal Disconnection and Hysteroscopic Tubal Occlusion in Management of Hydrosalpinx Prior to Intracytoplasmic Sperm Injection

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Abstract

Background: More than 35% of all cases of female infertility can be attributed to tubal factor infertility caused by various forms of tuboperitoneal injury. Hydrosalpinx is one of the most serious complications of tubal pathology. The Greek word for a clogged Fallopian tube is hydrosalpinx.

Aim and objectives: To evaluate the relative merits of two methods for treating hydrosalpinx hysteroscopic tubal electrocoagulation and laparoscopic proximal tubal occlusion in the lead-up to intracytoplasmic sperm injection (ICSI). The main objective is to evaluate their effect on the success of an ICSI cycle.

Patients and methods: The Obstetrics and Gynecology Departments at El Huseen and Sayed Galal Universities hosted this randomized controlled experiment. The study included 200 individuals who were suitable for ICSI cycles and who had tubal factor infertility due to hydrosalpinx.

Results: A comparison of the two groups' ages and body mass indices found no statistically significant variance (P value > 0.05). Chemical pregnancy (69% vs. 55%) and clinical pregnancy (65% vs. 46%) rates were significantly greater with hysteroscopic tubal electrocoagulation contrasted with laparoscopic proximal tubal blockage (peak value 0.05). In addition, hysteroscopic tubal electrocoagulation was correlated with a higher incidence of twin gestational sacs compared with laparoscopic proximal tubal occlusion.

Conclusion: Although both methods are typically safe and practicable, with similar efficacy and chemical pregnancy rate, hysteroscopic tubal electrocoagulation was deemed preferable to laparoscopic due to a greater prevalence rate of chemical and clinical pregnancy in the hysteroscopic group.

Keywords: Hydrosalpinx, Hysteroscopic tubal occlusion, Intracytoplasmic sperm injection, Laparoscopic tubal disconnection

1. Introduction

Tubal factor infertility, which results from damage to the tubules or tubuloperitoneum, accounts for above 35% of all cases of female infertility. Hydrosalpinx is a devastating complication of tubal pathology. The Greek word for a clogged Fallopian tube is hydrosalpinx. Pregnancy and implantation rates are lower in people with hydrosalpinges than in those with other tubal diseases.

Numerous studies reveal that hydrosalpinx considerably worsens the already poor outcome of *in vitro* fertilization (IVF), which is associated with a higher likelihood of early pregnancy loss and an increased risk of ectopic pregnancies.¹

Having hydrosalpinx surgically corrected can improve the odds of having a healthy pregnancy. The severity and kind of adhesions, hydrosalpinx size, macroscopic endosalpinx status, and tubal wall thickness all play a role in prognosis.²

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Factors include the number of secretory cells, especially in the ampulla, the shape of the folds, the presence or absence of cilia on ciliated cells, and the degree of epithelial degradation all influence pregnancy outcomes. These findings were confirmed by a scanning and transmission electron microscopy investigation of pre-salpingostomy microbiopsies.³

The success rate of pregnancies after laparoscopic and microsurgical salpingostomies is roughly the same, however, laparoscopic procedures have some benefits.⁴

Numerous studies have found that hydrosalpinx is associated with reduced pregnancy and implantation rates in IVF cycles.⁵

Fluid leaking from a hydrosalpinx into the uterine cavity has been linked to a reduction in implantation success because it reduces the expression of endometrial receptivity markers (HOXA10, -integrin, and leukemia inhibitory factor).⁶

Success rates of IVF for persons with hydrosalpinx after salpingectomy or proximal tubal ligation were compared in a recent meta-analysis. Rates of clinical pregnancy and implantation, as well as rates of oocyte retrieval and embryo transfer, and days of response to controlled ovarian hyperstimulation, have been reported to be comparable among the two approaches.⁷

Study participants underwent either hysteroscopic tubal electrocoagulation or laparoscopic proximal tubal occlusion to treat hydrosalpinx prior to intracytoplasmic sperm injection (ICSI), and success rates were compared. Finding out if they affect the success of an ICSI cycle is the primary goal.

2. Patients and methods

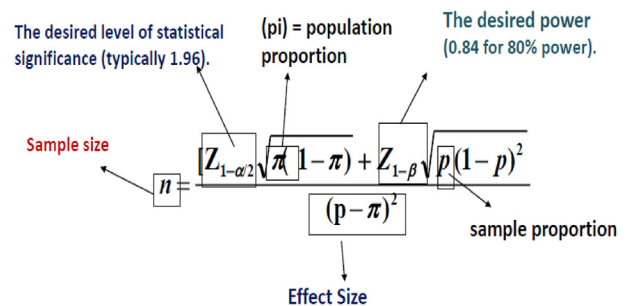
The El Huseen University Hospital's Obstetrics and Gynecology Department handled the randomized controlled experiment that was conducted there in the period between December 2021 and August 2023. The infertility of these participants was due to hydrosalpinx, and as a result, they were candidates for ICSI treatment cycles, therefore a total of 200 of them were included in the study. Cases consented to their informed treatment both verbally and in writing. This study included two groups, each consisting of 100 women. The first group underwent ICSI after having laparoscopic proximal tubal occlusion performed initially. In contrast, hysteroscopic tubal electrocoagulation was performed on the members of the second group.

Inclusion criteria: to individuals who are now in their twenties and thirties, both unilateral and bilateral hydrosalpinx have been associated to female infertility, this can be because of an underlying problem or because of therapy for the hydrosalpinx.

An expanded approach of inducing ovulation with the help of ICSI is currently being developed.

Exclusion criteria: covers individuals who have a body mass index (BMI) above 30 and those complaining of any medical issues, as well as male factor of infertility, uterine factor of infertility, inadequate ovarian reserve, or poor responders.

Sample Size: for the purpose of this inquiry, which was founded on the work of Hamza, Epi-Info STATCALC was utilized to determine the sample size, with 95% certainty, 80% certainty, and a 5% margin of error for a two-sided test. According to the findings of Epi-Info, the maximum number of participants in the sample that can be used was determined to be 185. The original sample size of 100 people was enlarged to 200 so that there would be enough room for any patients who might drop out during the follow-up.⁸



2.1. Method

The cervix will be examined with a speculum, the discharge will be examined visually, and a per vaginal and bimanual examination will be performed to check for tenderness, discharge, anomalies, uterine size, cervical mobility, cervical or adnexal masses, and tenderness. Hysterosalpingography, transvaginal ultrasound, hysteroscope inspection of the uterine cavity, and laparoscope examination of the abdominal cavity are the diagnostic procedures that are performed as part of the preparatory diagnostic work for IVF procedures such as ovulation induction and embryo transfer.

Surgical Techniques: laparoscopic disconnection of tubal structures (LD group)

Procedure involving the insertion of a uterine manipulator. After performing CO₂ insufflation of the abdomen with the assistance of a Veress needle, the next step is to make a vertical umbilical incision, then remove the Veress needle and implant a 10 mm port. Access can be gained through the 25 mm slots that are located in the bottom right and

left corners. Identifying the symptoms of a dysfunctional fallopian tube the fallopian tubes are grabbed and then treated to bipolar diathermy ~2–3 cm away from the cornu.

(HO group) refers to hysteroscopic tubal occlusion.

Rigid hysteroscopy was developed to rule out the presence of any abnormalities in the uterine cavity and to evaluate the condition of both tubal ostia. Saline is the distention media that is used during rigid hysteroscopy procedures. The coagulation of each tubal ostium takes 3 s and requires the use of a bipolar coagulation rod.

2.2. Ethical consideration

Any information on the participants, including their identities, will be kept strictly confidential. In any report or publication about the study, there was no identifying information of any kind given on the people who participated in the research. Before taking part in this study, participants were provided with extensive information regarding the objectives, procedures, and any potential risks or benefits involved with the study. a consensus that was arrived at after giving due consideration to the various outcomes that could occur.

Statistical methods: IBM SPSS Advanced Statistics version 22.0 (SPSS Inc., Chicago, IL) was utilized to analyze the data. The mean, the standard deviation,

the median, and the range are all common methods for representing numerical data. The average, as well as the mode and the median, of the numerical statistics are supplied. The χ^2 test is a statistical method for analyzing the degree to which two or more categorical variables are related to one another. An analysis of variance (ANOVA) or the Kruskal–Wallis test was utilized to compare the quantitative data of the two groups. Appropriate post-hoc testing was then performed to compare the two groups to each other. Every test uses a two-tailed approach. A *P* value of below 0.05 is considered to be acceptable.

3. Results

There were no statistically substantial variations in age or BMI across groups (*P* value > 0.05), hence the groups were well-balanced [Table 2](#).

There is not a significant distinction (*P* value > 0.05) among the two groups in terms of the infertility type and duration, as shown in [Table 1](#). This suggests that both groups are comparable in size [Table 3](#).

Hydrosalpinx site and degree are well matched among groups, as shown in [Table 4](#). There is not a significant distinction among the two groups with a *P* value greater than 0.05.

According to the data in [Table 1](#), Statistical analysis revealed no discernible variation in the number

Table 1. Both groups' demographics were compared.

Variables	Laparoscopic proximal tubal occlusion No. = 100	Hysteroscopic tubal electrocoagulation No. = 100	<i>P</i> value	Significance
Age (y)				
Range	21–30	22–30		
Median [IQR]	28[4]	27[4]	0.458	NS
Mean ± SD	27.17 ± 2.18	26.94 ± 2.19		
BMI				
Range	20–29	21–29		
Median [IQR]	26.7 [4.57]	27.6 [4.33]	0.099	NS
Mean ± SD	26.23 ± 2.82	26.87 ± 2.58		

Table 2. Contrasting the infertility rates of the two group.

Variables	Laparoscopic proximal tubal occlusion No. = 100	Hysteroscopic tubal electrocoagulation No. = 100	<i>P</i> value	Significance
Type of Infertility				
1ry	56 (56%)	54 (54%)	0.776*	NS
2ry	44 (44%)	46 (46%)		
Infertility Duration (y)				
Range	1.5–6	2–6	0.344	NS
Median [IQR]	4[2]	4[2]		
Mean ± SD	3.94 ± 1.42	4.12 ± 1.34		

Table 3. Characteristics of hydrosalpinx in the two groups compared.

Variables	Laparoscopic proximal tubal occlusion (N = 100) [n (%)]	Hysteroscopic tubal electrocoagulation (N = 100) [n (%)]	P value	Significance
Hydrosalpinx site				
Right	64 (64)	76 (76)	0.064	NS
Left	36 (36)	24 (24)		
Hydrosalpinx degree				
Moderate	56 (56)	54 (54)	0.776	NS
Severe	44 (44)	46 (46)		

Table 4. Endometrial thickness and the number of antral follicles were compared between the two groups.

Variables	Hysteroscopic tubal electrocoagulation No. = 100	Laparoscopic proximal tubal occlusion No. = 100	P value	Significance
Antral follicle count				
Range	6–12	5–12	0.121	NS
Mean ± SD	9.68 ± 1.66	9.30 ± 1.78		
Endometrial thickness (mm)				
Range	9.10–14.20	9.20–14	0.907	NS
Mean ± SD	10.44 ± 1.11	10.46 ± 1.08		

Table 5. Comparative historical analysis of the two categories.

Variables	Laparoscopic proximal tubal occlusion (N = 100) [n (%)]	Hysteroscopic tubal electrocoagulation (N = 100) [n (%)]	P value	Significance
Vaginal discharge				
No	74 (74)	75 (75)	0.871	NS
Yes	26 (26)	25 (25)		
Abdominal surgery				
No	96 (96)	95 (95)	0.733	NS
Yes	4 (4)	5 (5)		
PID				
No	84 (84)	88 (88)	0.415	NS
Yes	16 (16)	12 (12)		
IUD				
No	24 (24)	14 (14)	0.071	NS
Yes	76 (76)	86 (86)		

Table 6. Comparison of intervention outcome of the two studied groups.

Variables	Laparoscopic proximal tubal occlusion No. = 100	Hysteroscopic tubal electrocoagulation No. = 100	P value	Significance
Number of retrieved oocytes				
Range	6–15	6–15	0.189	NS
Mean ± SD	9.58 ± 2.25	9.96 ± 1.80		
Number of MII oocytes				
Range	3–9	2–9	0.076	NS
Mean ± SD	5.28 ± 1.44	5.67 ± 1.64		
Number of fertilized oocytes				
Range	1–6	1–6	0.106	NS
Mean ± SD	3.04 ± 1.13	3.35 ± 1.54		
Number of transferred embryos				
Range	1–2	1–2	0.064	NS
Mean ± SD	1.63 ± 0.48	1.50 ± 0.50		

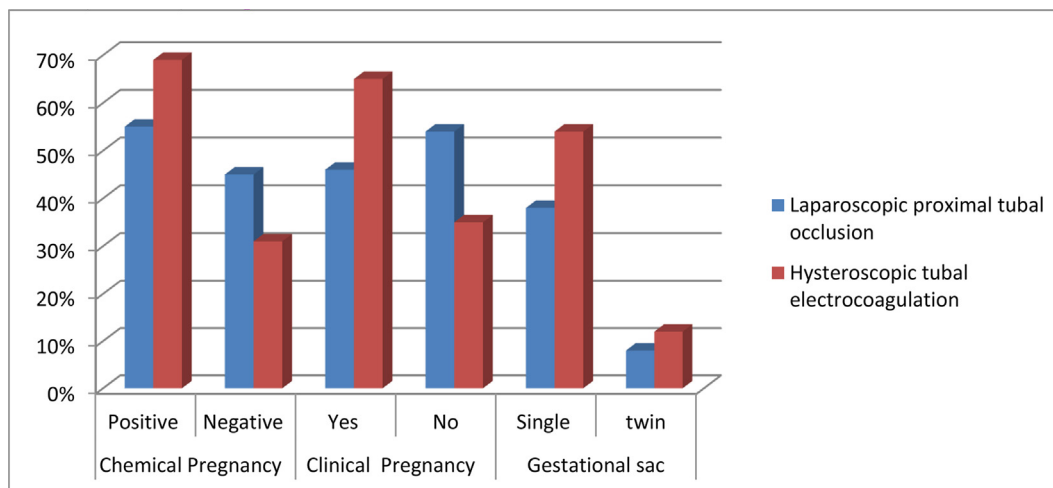


Fig. 1. Comparison of pregnancy outcome of the studied two groups.

Table 7. Comparison of pregnancy outcome of the studied two groups.

Variables	Laparoscopic proximal tubal occlusion (N = 100) [n (%)]	Hysteroscopic tubal electrocoagulation (N = 100) [n (%)]	P value	Significance
Chemical Pregnancy				
Positive	55 (55)	69 (69)	0.041	S
Negative	45 (45)	31 (31)		
Clinical Pregnancy				
Yes	46 (46)	65 (65)	0.007	HS
No	54 (54)	35 (35)		
Gestational sac				
Single	38 (38)	54 (54)	0.012	S
Twin	8 (8)	12 (12)		

P value greater than 0.05: Nonsignificant (NS); P value less than 0.05: Significant (S); P value less than < 0.01: highly significant (HS) * χ^2 Chi square test.

of antral follicles or endometrial thickness between the two groups ($P > 0.05$) Table 5.

Table 1 demonstrates that there was no significant variation in vaginal discharge, abdominal surgery, PID, or IUD use across the groups. This indicates that there was a good degree of similarity between the groups Table 6.

There was not a significant distinction among the two groups with respect to the total number of oocytes recovered, MII oocytes, fertilized oocytes, or transplanted embryos shown in the table above ($P > 0.05$) Fig. 1.

Table 7 illustrates that there is a statistically significant higher pregnancy rate with peak value less than 0.05 in hysteroscopic tubal electrocoagulation than laparoscopic proximal tubal occlusion for both chemical pregnancy 69% versus 55% and clinical pregnancy rate 65% versus 46%. Furthermore, twin gestational sac was more frequent in hysteroscopic tubal electrocoagulation than laparoscopic proximal tubal occlusion (12% vs. 8%).

4. Discussion

Infertility affects about 10% of men and 13% of women. Female infertility most often results from tubal factor infertility, which is caused by tubo-peritoneal damage. It is been estimated that this causes more than 35% of all occurrences of infertility in women.⁹

The main results were as followed:

The ages and BMIs of the participants in this study did not differ significantly (P value > 0.05), indicating that the groups were comparable.

Our findings corroborated those of Elshemy and colleagues who compared the success rates of hysteroscopic tubal occlusion and laparoscopic salpingectomy as a pre-IVF treatment for hydrosalpinx. A total of 78 women participated in the trial, 39 received laparoscopic salpingectomy and the remaining 39 received hysteroscopic proximal occlusion. Individuals ranged in age from 18 to 40.¹⁰

Our results match with those of Abdalla and colleagues who set out to examine the efficacy of hysteroscopic tubal electrocoagulation in treating infertility caused by hydrosalpinx in individuals who did not qualify for laparoscopic surgery. Total 50 patients were included; 25 had hysteroscopic tubal electrocoagulation and the other 25 had laparoscopic tubal disconnection. Regarding age and BMI, the groups showed no significant differences.¹¹

Our results demonstrated no statistically significant variations (P value > 0.05) in infertility type or duration between the two groups, suggesting good grouping.

In addition, El-Maghraby and Allam found no correlation between the various forms of infertility and their respective persistence.¹²

According to the findings of Elshemy and colleagues, we found that 57 (72.2%) patients had a primary infertility status and 21 (26.6%) patients had a secondary infertility status due to hydrosalpinges identified on hysterosalpingography and vaginal ultrasonography.¹⁰

No significant variations in hydrosalpinx location or severity were found among the two groups (P value > 0.05), suggesting accurate grouping.

When Abdalla and colleagues compared the various causes and durations of infertility across the two studies, they found no differences in statistical significance.¹¹

A woman's fertility declines dramatically when hydrosalpinx fluid is present in the uterine cavity, but it quickly recovers after the fluid is drained.¹³

No statistically significant variations in endometrial thickness or the number of antral follicles were found between the two groups, however El-Maghraby and Allam did find a trend toward thinner endometrial layers in the control group.¹²

When analyzing demographic data including vaginal discharge, abdominal surgery, PID use, and IUD use, we found no statistically significant difference (P value > 0.05) between the two groups.

The rates of oocyte recovery, MII oocyte recovery, oocyte fertilization, and embryo transfer were similar across the two groups.

We found a lack of statistical significance among the overall number of MI oocytes and the total number of MII oocytes ($P = 0.817$ and $P = 0.385$, respectively). Both the number of embryos transferred and the number of oocytes collected were not substantially distinct among the two groups.⁶

We observed that hysteroscopic tubal electrocoagulation led to a significantly greater chemical and clinical pregnancy rate than laparoscopic proximal tubal occlusion did (65% vs. 46%). This was discovered when we compared the two

procedures to one another. In addition, the incidence of twin gestational sacs was greater after hysteroscopic tubal electrocoagulation (12%) as compared with laparoscopic proximal tubal occlusion (8%)

Our findings regarding the efficacy of hysteroscopic tubal electrocoagulation for the treatment of hydrosalpinges prior to ICSI cycles are consistent with those that were presented by Abdalla *et al*¹¹

El-Mazny and coworkers set out to examine the efficiency of laparoscopic and hysteroscopic procedures for treating infertility in women undergoing IVF because hydrosalpinx is a disease that can affect fertility. When compared with laparoscopic treatment for hydrosalpinges, the 93% success rate seen in Tey's study is a significant improvement. Despite this, the differences between the two groups were minimal.¹⁴

Xu *et al.* conducted a systematic review involving over 3000 patients and found that the clinical pregnancy and live birth rates of patients managed by hysteroscopic placement of Essure devices prior to IVF were lower than those of patients managed by laparoscopic salpingectomy and laparoscopic proximal tubal occlusion. Over 3000 individuals were included in the Xu *et al.* review.¹⁵

Laparoscopic salpingectomy (LS) did not improve pregnancy rates after IVF and *in vivo* chorionic gonadotropin stimulation (IVF/ICSI) more than hysteroscopic tubal occlusion (HTPO), contrary to the findings of Sharma *et al*¹⁶

4.1. Conclusion

Both techniques are successful and can be performed with minimal risk, however hysteroscopic tubal electrocoagulation is preferable because to the higher rate of chemical and clinical pregnancy in that group. Larger-scale research are needed to confirm our results.

Conflicts of interest

No conflict of interest.

References

1. Strandell A. *Management of hydrosalpinx*. In *Textbook of assisted reproductive techniques*. CRC Press; 2017:773–783.
2. Rehmer JM, Llarena NC, Hur C, et al. *Hydrosalpinges: repair or excise*. In *Reproductive surgery: current techniques to optimize fertility*. Cham: Springer International Publishing; 2022: 107–117.
3. Thomas KT, Vijayan N. *Utero-ovarian and endocrine pathology in goats*. 15. 2008:134, Kerala, India.
4. Bontis JN, Theodoridis TD. Laparoscopic management of hydrosalpinx. *Ann N Y Acad Sci*. 2006;1092:199–210.

5. Fouda UM, Sayed AM, Abdelmoty HI, et al. Ultrasound guided aspiration of hydrosalpinx fluid versus salpingectomy in the management of patients with ultrasound visible hydrosalpinx undergoing IVF-ET: a randomized controlled trial. *BMC Wom Health*. 2015;15:1–8.
6. El Tamamy MM, Elshamewy H, Bassiouny YA, et al. Comparison between laparoscopic tubal disconnection and hysteroscopic tubal occlusion for the management of hydrosalpinx prior to icsi. 42. 2017;20–22.
7. Zhang JD, Spanswick C, Behzad F, et al. Integrins beta 5, beta 3 and alpha v are apically distributed in endometrial epithelium. *Mol Hum Reprod*. 2015;2:527–534.
8. Hamza M. Comparative study between laparoscopic tubal disconnection and ultrasound guided tubal aspiration in the management of hydrosalpinx prior to ICSI. *Egypt J Fertil Steril*. 2017;21:30–35 [].
9. Agarwal A, Mulgund A, Hamada A, et al. A unique view on male infertility around the globe. *Reprod biol endocrin*. 2015;13: 1–9.
10. Elshemy S, El Minawi A, Elsetohy K, et al. Comparison between hysteroscopic proximal tubal occlusion versus laparoscopic salpingectomy on pregnancy rates following intracytoplasmic sperm injection in infertile cases of hydrosalpinx: controlled clinical trial. *Evid Based Women's Health J*. 2023;13:55–59.
11. Abdalla M, Ebrashy A, El-Mazny A, et al. ICSI pregnancy outcomes following hysteroscopic tubal electrocoagulation versus laparoscopic tubal disconnection for patients with hydrosalpinges. *Indian J Publ Health*. 2020;11: 2561.
12. El-Maghraby IM, Allam AG. Laparoscopic salpingectomy or hysteroscopic tubal occlusion in patients with hydrosalpinx and intracytoplasmic sperm injection outcomes. *Egypt J Hosp Med*. 2022;86:452–456.
13. Ozgur K, Bulut H, Berkkanoglu M, et al. ICSI pregnancy outcomes following hysteroscopic placement of Essure devices for hydrosalpinx in laparoscopic contraindicated patients. *Reprod Biomed Online*. 2014;29:113–118.
14. El-Mazny A, Abou-Salem N, Hammam M, et al. Hysteroscopic tubal electrocoagulation versus laparoscopic tubal ligation for patients with hydrosalpinges undergoing in vitro fertilization. *Int J Gynecol Obstet*. 2015;130:250–252.
15. Xu B, Zhang Q, Zhao J, et al. Pregnancy outcome of in vitro fertilization after Essure and laparoscopic management of hydrosalpinx: a systematic review and meta-analysis. *Fertil Steril*. 2017;108:84–95.
16. Sharma S, RoyChoudhury S, Bathwal S, Chattopadhyay R, et al. Pregnancy and live birth rates are comparable in young infertile women presenting with severe endometriosis and tubal infertility. *Reprod Sci*. 2020;27:1340–1349.