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Endometritis in Hydrosalpinx and Laparoscopic Salpingectomy Versus Laparoscopic Tubal Disconnection in Cases of Hydrosalpinx Regarding the Effect on Ovarian Stromal Blood Flow and Outcome of Intracytoplasmic Sperm Injection

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Abstract: Hydrosalpinx is a chronic pathologic condition of the fallopian tube and is a major cause of infertility. The occlusion usually occurs secondary to pelvic inflammatory disease and Endometriosis. The aim of the study is to detect the effect of laparoscopic tubal disconnection and laparoscopic salpingectomy on ovarian stromal blood flow and outcome of intracytoplasmic sperm injection. One hundred patients complaining of tubal factor of infertility presented with hydrosalpinx were enrolled in the study. Transvaginal Ultrasound was performed before laparoscopic management and two weeks after the operation to detect the effect on ovarian stromal blood flow. They were divided into two groups: the first group (50 patients) had laparoscopic salpingectomy; while the second group (50 patients) had laparoscopic tubal disconnection then all patients were transferred to IVF unit at Kasr El Aini Hospital, Cairo, Egypt. The results indicated that no statistical difference between the two groups regarding their effect on the ovarian stromal blood flow or the outcome of intracytoplasmic sperm injection.

Key words: Salpingectomy · Tubal disconnection · Hydosalpinx · ICSI

INTRODUCTION

Hydrosalpinx result from an accumulation of secretions when the tube is occluded at its distal end or at both ends. On rare occasions, transient distention of fallopian tubes occurs because of retrograde passage of blood from the uterus without complete distal occlusion. Hydrosalpinx is most commonly a sequel of pelvic infalmmatory disease or may develop in patients undergoing tubal ligation or ovulation induction. Other causes include primary or secondary tumors of the fallopian tubes [1]. As hydrosalpinxis almost always a result of a past pelvic infection. The most common causative organisms are gonorrhea, chlamydia, staphylococcus, streptococcus and pelvic tuberculosis [2]. Laparoscopic salpingectomy and tubal disconnection were the most popular treatment option offered by the clinicians, followed by the open salpingectomy, salpingostomy, proximal tubal occlusion and transvaginal ultrasonographic guided hydrosalpinx aspiration either before or during oocyte retrieval. The latest treatment option introduced was proximal occlusion of hydrosalpinx by hysteroscopic placement of micro inserts. Clinicianswouls still perform open salpingectomy. The possible explanation for this could be the lack of training in endoscopic surgery and/or those patients with tubal disease may have significant pelvic adhesions necessitating open surgery [3]. The aim of the study is to detect the prevalence of endometritis in cases of hydrosalpinx and the effect of laparoscopic tubal disconnection and laparoscopic salpingectomy on ovarian stromal blood flow and outcome of intracytoplasmic sperm injection.

MATERIALS AND METHODS

Patients: This prospective study was conducted at Obstetrics & Gynecology Department, Kasr El Aini

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Hospital, Cairo University, Egypt in the period from January 2013 to July 2014. One hundred patients complaining of tubal factor of infertility presented with hydrosalpinx were enrolled in the study. They were divided into two groups; the first group (50 patients) had laparoscopic salpingectomy while the second group (50 patients) had laparoscopic tubal disconnection then all patients were transferred to IVF unit at Kasr El Aini Hospital. Patients included in the study have the following criteria:

Inclusion Criteria:

- Age more than 20 years, less than 40 years.
- Primary or secondary infertility.
- Complaining of tubal factor of infertility.
- Unilateral or bilateral hydrosalpinx.
- Scheduled for *in vitro* Fertilization.

Exclusion Criteria:

- Patients with ovarian factor of infertility.
- Obese patients with BMI over 30.
- Patients complaining of any medical disorders interfering with pregnancy.

Methodology: All patients are subjected to the following: History Taking:

- Full history taking with special interest to the case of infertility.
- History of vaginal discharge.
- History of abdominal surgeries.
- History of pelvic inflammatory disease and Intrauterine Device.

General Examination: Including:

- Vital signs, weight (kg), height (m).
- Abdominal examination and presence of scars of previous operations.

Local Examination:

- Per vaginal and bimanual examination for any tenderness, discharge, anomalies, detection of the size of the uterus, cervical mobility and any cervical or adenexal masses or tenderness.
- Speculum examination for inspection of the cervix and visualization of the discharge.

Investigations

Hysterosalpingography: Recent hysterosalpingography done within the previous six months showing unilateral or bilateral fallopian tube dilatation with loss of rugal folds without or decreased contrast in the peritoneal cavity.

Transvaginal Ultrasound: Transvaginal ultrasound was performed by the 7.5 MHz vaginal probe of the Sonoace X6 ultrasound machine before laparoscopic management and two weeks after the operation. The uterus will be scanned in the sagittal plane for detection of any endometrial abnormality, visible hydrosalpinx in the form of elongated, diluted, tortuous tube containing fluid which is anechoic.

Ultrasound Features of Hydrosalpinx: Tubular shape, echogenic wall, folded configurations and linear echos in the lumen of the tube (Timor-Titsch and Rottem, 1987).

For the Ovarian Stromal Blood Flow: Power Doppler imaging was switched on with the volume mode. To reduce the acquisition time for each patient, the volume of the colour box and sweep angle were reduced. The colour frame was adjusted as follow:

- Both colour intensity and colour quality were as low as possible to obtain agood image.
- Pulsed repetition frequency was as high as possible to enable the display of targeted flow velocity.
- Low frequency signals were eliminated by adjusting the wall filters.

At the end of each examination the values of PI, RI and PSV were obtained.

Laparoscopic Assessment of the Peritoneal Cavity after Taking Endometrial Pathology: Under general anathesia, endometrial biopsy is taken by sharp curette the biopsy is formalin fixed paraffin embedded, kept under room temperature for pathological assessment of any endometrial abnormality. CO_2-pneumoperitoneum and introduction of at least two ports was used to detect:

- Presence or absence of endometriosis.
- Peritoneal spill after cervical cannulation with methylene blue.
- Tubal disconnection using bipolar diathermy or salpingectomy.

Induction of Ovulation and Embryo Transfer at IVF Unit: The induction protocol was the long luteal phase agonist protocol. Participants received (GnRHa) long protocol, Decapeptyl 0.1µg SC injection daily for two weeks starting on day 20. After pituitary down regulation had been confirmed by serum E2<50pg/ml, 150-300 IU of hMG per day was started for 7days, then the dose was adjusted according to the response, being monitored by ultrasound on day 8 or 9 to establish the number of ovarian follicles. Triggering of ovulation was done by 10000 units of hCG IM when two or more follicles reach 18 mm in mean diameter. Cycles were cancelled when the follicles remained<10mm after 14 days of stimulation. Ovum retrieval using transvaginal ultrasound was scheduled 36 hours after hCG injection and embryo transfer was done on day 2 or 3 after ovum retrieval. Serum B-hCG test was done to confirm pregnancy two weeks after embryo transfer.

Statistical Analysis: Data were statistically described in terms of range, mean, standard deviation (SD), comparison of the different variables between group of salpingectomy and group of tubal disconnection. A probability value (*P* value) less than 0.05 was considered statistically significant. Statistical calculations were done using computer programs Microsoft Excel version 7 (Microsoft Corporation, NY, USA) and SPSS (Statistical Package for Social Sciences, Chicago, IL, USA) statistical program.

RESULTS

The different findings detected by the different methods were as follows.

Findings on Clinical Basis: The distribution of patients in group one and two according to age, type of infertility and duration of infertility was expressed as means, SD and range (Table 1). The distribution of patients according to the different age groups is shown in Table 2.

Findings on Pathological Basis: Endometrial pathology shows endometritis in 43 cases of all cases, 20 in group one and 23 in group two (Table 3 and Fig. 1).

Ovarian Stromal Blood Flow: Doppler indices of ovarian stromal blood flow were obtained before laparoscopic management in both groups (Table 4). Doppler indices of ovarian stromal blood flow were obtained after laparoscopic management in both groups show no significant vascularity affection (Table 5).

Embryo Transfer and Clinical Pregnancy: After laparoscopic management the patients were scheduled for IVF cycles. After positive serum B-hCG test an ultrasound was done for gestational sac with fetal echoes and pulsations, no ectopic pregnancies detected in our study (Table 6).

Table 1: Descriptive statistics of the study groups

Groups				
Variables		Salpingectomy group	Tubal disconnection group	*P* value
Age (years)	Range	20-39	21-40	
	Mean ± SD	29 ± 4.5	30± 4.9	
Type of infertility	Primary	35 (70%)	33 (66%)	0.67
	Secondary	15 (30%)	17 (34%)	
Duration of infertility(years)	Range	1-14	1-17	0.26
	Mean ± SD	5.2 ± 3.3	6± 3.8	

Table 2: Distribution of patients according to age group

Groups	Salpingectomy group		Tubal disconnection group		Total	
Age	No. of cases	Percent	No. of cases	Percent	No. of cases	Percent
20-24 years	12	24%	13	26%	25	25%
25-30 years	18	36%	17	34%	35	25%
31-35 years	12	24%	11	22%	23	25%
36-40 years	8	16%	9	18%	17	25%
Total	50	100%	50	100%	100	100%

Table 3: Endometritis in hydrosalpinx (group one and two)

	Group one		Group two		Total	
Variable	No. of cases	Percent	No. of cases	Percent	No. of cases	Percent
Endomrtritis	20	40%	23	46%	43	43%

Table 4: Doppler indices of ovarian stromal blood flow before laparoscopy

Variables		Salpingectomy group	Tubal disconnection group	*P*value
PI	Min	0.52	0.5	0.11
	Max	1.57	1.55	
	Mean± SD	0.82±0.21	0.75±0.22	
RI	Min	0.39	0.37	0.6
	Max	0.66	0.6	
	Mean± SD	0.52±0.13	0.51±0.12	
PSV	Min	4.21	3.96	0.7
	Max	17.1	16.85	
	Mean± SD	10.13±4.51	9.83±4.49	

Table 5: Doppler indices of ovarian stromal blood flow after laparoscopy

Variables		Salpingectomy group	Tubal disconnection group	*P* value
PI	Min	0.48	0.44	0.16
	Max	1.48	1.4	
	Mean± SD	0.75±0.2	0.69±0.212	
RI	Min	0.34	0.31	0.2
	Max	0.61	0.57	
	Mean± SD	0.52±0.12	0.49±0.12	
PSV	Min	4	0.361	0.3
	Max	16.8	16.2	
	Mean± SD	9.98±4.3	9.15±4.12	

Table 6: Clinical pregnancy in both groups

Groups	Group one		Group two		Total	
Variables	No. of cases	Percent	No. of cases	Percent	No. of cases	Percent
Embro transfer	65	--	70	--	135	--
Prgnancies	10	15.3%	12	17%	22	16.2%

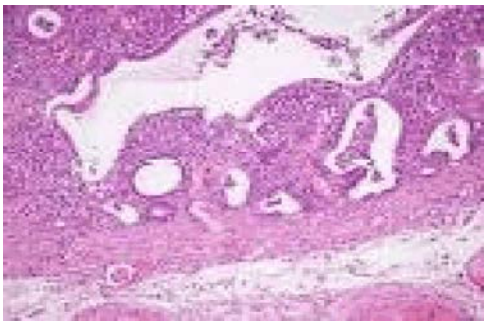

Fig. 1: Endometritis in case of hydrosalpinx

DISCUSSION

Laparoscopy is an important diagnostic and operative tool in gynecology especially in the problem of infertility as it gives an accurate assessment of pelvic organs, tubal patency, ovaries and pelvic peritoneum. It also enables good evaluation of endometriosis and pelvic adhesions and reduces the diagnostic pitfalls especially after HSG [4]. There is no significant statistical difference between both groups regarding age, type and duration of infertility. Analyzing the outcome of 556 pregnancies established in 3103 IVF/embryo transfer cycles [5] noted 48 ectopic pregnancies (1.6 of cycles, 8.6 of established pregnancies). Of these, 43 (89.6% of all ectopic pregnancies, 11.1% of total pregnancies) were in women with tubal infertility. No ectopic pregnancy reported in our study which may be due to limited population size. Many reports suggest that hydrosalpinges are associated with reduced pregnancy rates and increased miscarriage rates in patients undergoing IVF and embryo transfer. Andersen *et al.* [6], Kassabji *et al.* [7], Strandell *et al.* [8], Sowter *et al.* [9] and

Akman *et al.* [10] reported that both pregnancy and implantation rates were significantly lower in patients with sonographically documented hydrosalpinges after of cryopreserved thawed embryos during a nature cycle. Andersen *et al.*[6] showed that the presence of a hydrosalpinx is associated with a reduced pregnancy rate (19.2 versus 32.6%), reduced implantation rate (2.9 versus 10.3%), reduced delivery rate aspiration (5.8 versus 20.9%) and reduced delivery rate per embryo transfer (6.6 versus 22.8%) with 10 clinical pregnancies (15.3% of embryo transfer), while group two had 70 trials with 12 clinical pregnancies (17% of embryo transfer) with no ectopic pregnancies in our study.

The pregnancy rate for patients with hydrosalpinx was only half that of patients with other tubal damage [8]. Furthermore, due to a tendency towards a higher pregnancy loss. The delivery rate for patients with a hydrosalpinx was only one-third of that for patients with other tubal lesions [8]. Based on US diagnosis, Katz *et al.* [11] noted the presence of hydrosalpinx in 118 cycles, whereas in 1648 cycles, there was no hydrosalpinx. The hydrosalpinx group displayed a significantly lower pregnancy rate per transfer (16.84 versus 36.83%) and a lower implantation rate (3.92 versus 11.53%) than the control group. Katz *et al.* [11] concluded that the presence of hydrosalpinx adversely affected. A few studies have not confirmed an effect of hydrosalpinx on pregnancy rate in IVF. Ng *et al.* [12] evaluated the effect of hydrosalpinx on the outcome of IVF and reported that the mean implantation rate and clinical pregnancy rate were similar in patients with or without hydrosalpinx. There was no increase in the clinical abortion rate but ectopic pregnancies were more common in patients with hydrosalpinx and they concluded that hydrosalpinx did not adversely affect the implantation rates. Other studies showed that there was a trend for a higher implantation rate and ongoing pregnancy rate in the no-hydrosalpinx group compared to the hydrosalpinx group; however, this did not reach statistical significance. Ovarian stromal blood flow shows no statistically significant difference between both groups before and after laparoscopic management. The relationship between ovarian stromal blood flow velocity and ovarian follicular response had been studied by Zaidi *et al.* [13]. They found that poor responders had low peak systolic velocity of ovarian blood flow in the early follicular phase. Another study showed that an RI of stromal blood flow of >0.56 was suggested to predict poor response [14].

CONCLUSION

Hydrosalpinx is an important cause of failure of ICSI. No difference between salpingectomy and disconnection regarding ovarian stromal blood flow affection and IVF outcome. Hydrosalpinx is associated with endometritis in many cases. The significance of cytokines, chemical composition and murine embryo development in hydrosalpinx fluid for predicting the IVF outcome in women with hydrosalpinx.

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