Original Research Article

Laparoscopic assessment of the Tubo Ovarian Relationship in Unexplained Infertility

Abstract:

Background: Unexplained infertility is usually a diagnosis of exclusion. Thus, there must be an absence of an identifiable cause of infertility despite thorough testing and medical investigation demonstrating tubal patency, normal semen parameters, regular ovulation, normal ovarian reserve, and a normal endometrial cavity. The aim of the study is to assess the prevalence of abnormal tubo-ovarian relationship in women with unexplained infertility by using laparoscopy.

Methods: This was a prospective study which was conducted on 30 couples with unexplained infertility. Evaluation of the tubo ovarian relation with laparoscopy for patient with unexplained infertility who desire spontaneous pregnancy. The main object of the corrective procedure is to get free mobile fallopian tube along with satisfactory tubo-ovaian relation.

Results: There were 53.3% of cases had disturbed tubo-ovarian relation, many corrective measures done by laparoscopy, such as adhesiolysis for 30% of cases, excision of cysts for 6.7% of cases, MSH for 16.6% of cases and cauterization of endometriotic patches for 16.6% of cases. In the present study a pregnancy rate of 53,3% (9/16) was seen in cases that showed disturbed tubo ovarian relation and required operative intervention higher than other cases with no detected pathology (4/14) 47.7%. We were able to achieve a higher conception rate among cases owing to operative procedure.

Conclusions: The ovum pick up by the fimbrial end of the tube is an essential determining factor for female infertility. The present study confirmed that laparoscopy provided a precise diagnosis of tubo ovarian factor and may switch the initial treatment of unexplained infertility .

Keywords: Laparoscopic assessment, Tubo Ovarian Relationship, Unexplained Infertility

Introduction

Infertility is one of the most common medical problems affecting reproductive age adults . Although the estimated prevalence is between 10% and 15%, the true prevalence is likely greater owing to the social stigma associated with this diagnosis . In couples experiencing infertility, it has been estimated that between 15% and 37% have infertility with

no identifiable etiology (1). Unexplained infertility is defined as failure of couple to achieve pregnancy without presence of definite cause after 12 months of trying conception, or after 6 months in female more than or equal 35 years old (2).

Diagnostic laparoscopy is the final step in determining the cause of infertility and is also frequently performed as a standard procedure in diagnosing infertility (3). Some surgeons feel that a single adhesive band is more likely to cause clinical obstruction than a series of adhesive connections(4) then the incidence of obstruction may actually be increased by procedures that decrease the number of adhesions without eliminating all of them. Incomplete lysis of adhesions is a frequent occurrence, particularly in patients with extensive, matted adhesions (5). Pelvic adhesions that result from pelvic infections, endometriosis and previous surgeries may have a role in subfertility (6). Pelvic adhesions can contribute to tubal dysfunction even if HSG is normal. Peri adnexal adhesions may be the sole causative factor for infertility, which encapsulate

the fimbriae portion of the patent tube and prevent the oocyte from being captured by otherwise normal fimbria. In addition, periovarian adhesions may adversely affect follicular development (7).

Diagnostic laparoscopy is thus essential in determining the optimal management plan. Consider for adhesiolysis any patient with chronic pelvic pain for more than 6 months or infertility for more than 1 year, after ruling out other potential etiologies. Patients who complain of localized pelvic pain are more likely to have adhesions than those with diffuse symptoms. But adhesions may be found even in women with diffuse pain. Although this pathology cannot always be incriminated as the cause of the pain, adhesiolysis often leads to a reduction of symptoms (8). The aim of the study is to assess the prevalence of abnormal tubo-ovarian relationship in women with unexplained infertility by using laparoscopy.

Patients and Methods

This was a prospective study which was conducted at the department of obstetrics and gynecology of Tanta University on 30 couples with unexplained infertility after approval from local ethical committee Informed consent was taken from all participants. They were enrolled in this study from January 2019 till August 2020. The inclusion criteria were Patients with infertility duration more than 2 years with regular cycles, patients aged 25 _35 years and body mass index 20 up to 24 Kg/m2, normal hysterosalpingography and normal semen analysis. The Exclusion criteria were patients with history of abdominal surgery or

chronic systemic diseases, Ultrasonography suggestive of fibroid, adenomyosis, chocolate cyst, or tubo-ovarian mass, hormonal abnormalities known to cause anovulation such as, hyperprolactinemia, and polycystic ovarian syndrome, couples with abnormal semen analysis and presence of intrauterine abnormalities.

These guidelines instructed before coming to the hospital for the laparoscopy: Do not eat, drink (including water) or smoke after midnight the day before your surgery- Wear low-heeled shoes the day of surgery. She might be drowsy from the anesthesia and unsteady on your feet- Do not wear jewelry. (Wedding rings may be worn.)- Wear loose-fitting cloths. she would have some abdominal tenderness and cramping after surgery- Remove any nail polish before surgery.

The endoscopic methods such as laparoscopy is commonly used in an evaluation of abdomen and pelvic organs in cases of infertility and pelvic pain . The method of laparoscopy is diagnostic as well as therapeutic for pelvic and abdominal pathologies in the same sitting (9).

Under general anesthesia during proliferative phase of the menstrual cycle to exclude current pregnancy and to minimize bleeding at operative laparoscopy according to American Fertility Society classification(10), Laparoscopic surgery uses several 0.5-1cm incisions. Each incision is a port, a trocar is inserted. A special camera passed through the trocars during the procedure. At the beginning of the procedure, the abdomen is inflated with carbon dioxide gas to provide a working and viewing space for the surgeon. The case was slightly tilted with head lower than her feet. The laparoscope transmitted images from the abdominal cavity to high resolution video monitors in the operating room. During the operation the surgeon watched detailed images of the abdomen on the monitor. This system allowed the surgeon to perform the same operations as traditional surgery but with smaller incisions. During laparoscopy, In all of cases, the fimbrio-ovarian relation was assessed by determining the length of the free ovarian border between the ovarian ligament and the fimbria ovarica that contains the corpus luteum (the ovulation border), The fimbriae were held by non-traumatizing grasper and their ability to reach and cover the ovulation site was taken as a prove for successful ovum pickup.

The prevalence of disturbed tubo- ovarian relationship was evaluated. If there were any relationship abnormalities liable for correction they were treated. The abnormalities noted at laparoscopy and their incidence in our present study were as follows:

1. Tubal kinks due to serosa-to-serosa adhesion (13.3%).
2. Peri tubal adhesions causing problem in tubal mobility and adhesions in the pouch of Douglas (POD) causing hindrance to reservoir function and egg pickup (16.6%).
3. Pedunculated fimbrial cysts, which can block the fimbrial opening of respective fallopian tube like a ball valve causing temporary tubal block (6.7%).
4. ovary adherent to lateral pelvic wall (3.3%)

The tubal kinks which were formed by serosa to serosal adhesion and thereby shortening of the effective tubal length were corrected by a simple procedure called squeezing, manipulation and hydrotubation (SMH) technique. Forceps blades help in milking the tubal walls without causing injury. The forceps break the serosa to serosal adhesions thereby relieving the tubal kinks. Tubes were then milked from cornu to the fimbriae. As a result, any sludge inside the tube was removed. The tubes got back their normal length. Hydrotubation with dye helped to wash out the remains. Peritubal adhesions and ovarian adhesions to lateral pelvic wall needed use of multiple instruments to stretch the tube or the ovary on one side and adherent structures on the other. The adhesion bands or membranes were then separated either by blunt dissection with the palpating rod or by sharp dissection with endoscopic scissors restoration of the normal tubo-ovarian relation. Any bleeding was coagulated by bipolar diathermy. Adhesions in the pouch of Douglas (POD) observed carefully. Filmy adhesions were either excised when they were avascular or divided with diathermy hook.

Pedunculated fimbrial cysts were of special mention. It was difficult to diagnose them in usual tubal patency tests as tubes were always patent. The alternate contraction of circular & longitudinal muscles of tubal wall created a negative pressure inside the fallopian tube which sucked the oocyte along with follicular fluid towards abdominal ostium. The pedunculated fimbrial cyst that usually floated in follicular fluid might be drawn towards the abdominal ostium of fallopian tube and might block that tubal opening temporarily hindering egg pickup. Tubal cysts were easily excised using diathermy or scissors.

Reliance on laparoscopy for endometriosis diagnosis supports the view point that the presence of identifiable lesions in the pelvis is the central diagnostic method of endometriosis, rather than approaching endometriosis as a menstrual cycle dependent, chronic, inflammatory, systemic disease that often presents as pelvic pain. Various laparoscopic surgeries for endometriosis include adhesiolysis, excision/ablation of

endometriotic implants. In most cases, the cases went home not long after laparoscopy. The cases were waiting until the anesthesia has worn off and the healthcare provider has made the case was not experiencing any side effects from the procedure.

Follow up for six successive months for the occurrence of pregnancy was done.

Statistical analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 19, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test (□2). For comparison between means of two groups of parametric data of independent samples, student t-test was used. Significance was adopted at $p<0.05$ for interpretation of results of tests of significance. (11)

Results:

Age years and body mass index (BMI) among the studied females are shown in

Table 1: Age years, BMI and Obstetric history among the studied 30 females with unexplained infertility.

Variables	The studied females with unexplained infertility (n=30)	
	N	%
Age years:		
<30	19	63.3
≥30	11	36.7
Range	22-38	
Mean±SD	27.07±4.08	
Median	26.00	
BMI:		
Range	20.19-23.00	
Mean±SD	21.90±1.00	
Median	21.96	
Gravidity:		
G0	16	53.3
G1	4	13.3
G2	7	23.3
G3	2	6.7
G4	1	3.3
Parity:		
P0	18	60.0
P1	9	30.0

P2	3	10.0
Abortion:		
No abortion	22	73.3
A1	6	20.0
A2	1	3.3
A3	1	3.3
Living birth:		
No	18	60.0
L1	11	36.7
L2	1	3.3
Ectopic pregnancy:		
No	29	96.7
E1	1	3.3

Infertility history of the studied 30 females with unexplained infertility. Table 2

Table 2: Infertility history of the studied 30 females with unexplained infertility.

Variables	The studied females with unexplained infertility (n=30)	
	N	%
Infertility type:		
Primary	16	53.3
Secondary	14	46.7
Infertility duration (years):		
Range	2.20-4.40	
Mean±SD	3.19±0.68	
Median	3.05	
Infertility symptoms:		
Asymptomatic	14	46.7
Chronic pelvic pain	4	13.3
Dysmenorrhea	3	10.0
Dysmenorrhea & chronic pelvic pain	2	6.7
Dyspareunia	6	20.0
Dyspareunia & dysmenorrhea	1	3.3

Laparoscopic findings of the studied 30 females with unexplained infertility.

Table 3: Laparoscopic findings of the studied 30 females with unexplained infertility.

Variables	The studied females with unexplained infertility (n=30)	
	N	%
Laparoscopic finding:		
Detected pathology	17	56.7
Normal	13	43.3
Endometriosis:		
Mild	7	23.3
Minimal	6	20.0
No	17	56.7

Tubo-ovarian relationship:		
Disturbed	16	53.3
Normal	14	46.7
Tubo-ovarian pathology:		
-None	14	46.7
-Ovarian adhesion to lateral pelvic wall	1	3.3
-Pedunculated fimbrial cyst	2	6.7
-Periovarian adhesion	3	10.0
-Peri tubal adhesion	4	13.3
-Peri tubal adhesion+ everted fimbriae	1	3.3
-Terminal tubal block	1	3.3
-Tubal kink	4	13.3

Laparoscopic management and occurrence of pregnancy of the studied 30 females with unexplained infertility. Table 4

able 4: Laparoscopic management and occurrence of pregnancy of the studied 30 females with unexplained infertility.

Variables	The studied females with unexplained infertility (n=30)	
	N	%
Laparoscopic management:		
-Adhesiolysis & Cauterization of patches	2	6.7
-Cauterization of patches	1	3.3
-Excised diathermy of tubal cyst	2	6.7
-Hydrotubation, squeezing, milking & patches cauterization	1	3.3
-Laparoscopic adhesiolysis	7	23.3
-None	13	43.3
-Squeezing, manipulation, hydrotubation, adhesiolysis &patches cauterization	1	3.3
-Squeezing, manipulation, hydrotubation & adhesiolysis	3	10.0
Pregnancy occurrence:		
+ve	13	43.3
-ve	17	56.7

Occurrence of pregnancy in relation to infertility type, symptoms and duration of infertility among the studied 30 females with unexplained infertility. Table 5

Table 5: Occurrence of pregnancy in relation to infertility type, symptoms and duration of infertility among the studied 30 females with unexplained infertility.

Variables	Occurrence of pregnancy among the studied females with unexplained infertility	χ^2 P

	(n=30)						
	Positive		Negative		Total (n=30)		
	n	%	n	%	N	%	
Infertility type:							
Primary	7	43.8	9	56.3	16	53.3	0.002
Secondary	6	42.9	8	57.1	14	46.7	0.961
Infertility symptoms:							
-Asymptomatic	6	42.9	8	57.1	14	46.7	1.105
-Chronic pelvic pain	2	50.0	2	50.0	4	13.3	0.954
-Dysmenorrhea	1	33.3	2	66.7	3	10.0	
-Dysmenorrhea & chronic pelvic pain	1	50.0	1	50.0	2	6.7	
-Dyspareunia	3	50.0	3	50.0	6	20.0	
-Dyspareunia & dysmenorrhea	0	0	1	100	1	3.3	
Variables	Occurrence of pregnancy among the studied females with unexplained infertility (n=30)						χ^2 P
	Positive		Negative		Total (n=30)		
◆Duration of infertility (years):							
Range	2.20-4.40		2.30-4.20		2.20-4.40		1.458 0.156
Mean±SD	3.34±0.61		2.98±0.72		3.19±0.68		

Occurrence of pregnancy in relation to laparoscopic findings and management among the studied 30 females with unexplained infertility. Table 6

Table 6: Occurrence of pregnancy in relation to laparoscopic findings and management among the studied 30 females with unexplained infertility.

Variables	Occurrence of pregnancy among the studied the studied females with unexplained infertility (n=30)						χ^2 P
	Negative		Positive		Total (n=30)		
	N	%	n	%	n	%	
Laparoscopic finding:							
Detected pathology	8	47.1	9	52.9	17	56.7	1.475
Normal	9	69.2	4	30.8	13	43.3	0.225
Endometriosis:							
Mild	4	57.1	3	42.9	7	23.3	0.341
Minimal	4	66.7	2	33.3	6	20.0	0.843
No	9	52.9	8	47.1	17	56.7	
Tubo-ovarian relationship:							
Disturbed	7	43.8	9	56.3	16	53.3	2.330
Normal	10	71.4	4	28.6	14	46.7	0.127
Tubo-ovarian pathology:							

-None	10	71.4	4	28.6	14	46.7	6.487
-Ovarian adhesion to lateral pelvic 2wall	0	0	1	100	1	3.3	0.484
-Pedunculated fimbrial cyst	1	50.0	1	50.0	2	6.7	
-Periovarian adhesion	2	66.7	1	33.3	3	10.0	
-Peritubal adhesion	2	50.0	2	50.0	4	13.3	
-Peritubal adhesion+everted fimbriae	0	0	1	100	1	3.3	
-Terminal tubal block	1	100	0	0	1	3.3	
-Tubal kink	1	25.0	3	75.0	4	13.3	
Laparoscopic management:							
-Adhesiolysis & Cauterization of patches	1	50.0	1	50.0	2	6.7	7.669 0.363
-Cauterization of patches	1	100	0	0	1	3.3	
-Excissed diathermy	1	50.0	1	50.0	2	6.7	
-Hydrotubation, squeezing, milking & patches cauterization	1	100	0	0	1	3.3	
-Laparoscopic adhesiolysis	3	42.9	4	57.1	7	23.3	
-None	9	69.2	4	30.0	13	43.3	
-Squeezing, manipulation, hydrotubation, adhesiolysis & patches cauterization	1	100	0	0	1	3.3	
-Squeezing, manipulation, hydrotubation & adhesiolysis	0	0	3	100	3	10.0	

Laparoscopic findings of tubo-ovarian relationship in relation to age BMI and obstetric history of the studied of the studied 30 females with unexplained infertility. Table 7

Table 7: Laparoscopic findings of tubo-ovarian relationship in relation to age BMI and obstetric history of the studied of the studied 30 females with unexplained infertility.

Variables	Laparoscopic finding of tubo-ovarian relationship among the studied the studied females with unexplained infertility (n=30)						χ^2 P
	Disturbed		Normal		Total (n=30)		
	n	%	n	%	n	%	
Age years:							
<30	11	57.9	8	42.1	19	63.3	0.433
≥30	5	45.5	6	54.5	11	36.7	0.510
Range Mean±SD	22-34 28.71±4.70		22-38 27.50±3.50				
t-test P	0.809 0.425						
BMI:							
Range Mean±SD	20.19-23.12 21.99±1.02		20.31-23.29 21.82±1.00				
t-test	0.475						
P	0.638						

Gravidity:							
No gravida	10	62.5	6	37.5	16	53.3	6.180
G1	1	25.0	3	75.0	4	13.3	0.186
G2	2	28.6	5	71.4	7	23.3	
G3	2	100	0	0	2	6.7	
G4	1	100	0	0	1	3.3	
Parity:							
No parity	11	61.1	7	38.9	18	60.0	1.205
P1	4	44.4	5	55.6	9	30.0	0.547
P2	1	33.3	2	66.7	3	10.0	
Abortion:							
No abortion	12	54.5	10	45.5	22	73.3	2.058
A1	3	50.0	3	50.0	6	20.0	0.561
A2	0	0	1	100	1	3.3	
A3	1	100	0	0	1	3.3	
Ectopic pregnancy:							
No	15	51.7	14	48.3	29	96.7	0.905
E1	1	100	0	0	1	3.3	0.341

Laparoscopic findings of tubo-ovarian relationship in relation to obstetric history and symptoms of the studied 30 females with unexplained infertility. Table 8

Table 8: Laparoscopic findings of tubo-ovarian relationship in relation to obstetric history and symptoms of the studied 30 females with unexplained infertility.

Variables	Laparoscopic finding of tubo-ovarian relationship among the studied the studied females with unexplained infertility (n=30)						χ^2 P
	Disturbed (n=16)		Normal (n=14)		Total (n=30)		
	n	%	n	%	n	%	
◆Infertility type:							
Primary	10	62.5	6	42.9	16	53.3	1.158
Secondary	6	37.5	8	57.1	14	46.7	0.282
◆Infertility duration (years):							
Range Mean±SD	2.30-4.40 3.31±7.40		2.20-4.30 3.07±0.62		2.20-4.40 3.19±0.68		
t-test P	0.965 0.343						
◆Infertility symptoms:							
-Asymptomatic	4	25.0	10	71.4	14	46.7	11.824
-Chronic pelvic pain	2	12.5	2	14.3	4	13.3	0.037*
-Dysmenorrhea	2	12.5	1	7.1	3	10.0	
-Dysmenorrhea & chronic pelvic pain	2	12.5	0	0	2	6.7	
-Dyspareunia	6	37.5	0	0	6	20.0	
-Dyspareunia & dysmenorrhea	0	0	1	7.1	1	3.3	

Laparoscopic findings of tubo-ovarian relationship in relation to laparoscopic findings and endometriosis of the studied 30 females with unexplained infertility. Table 9

Table 9: Laparoscopic findings of tubo-ovarian relationship in relation to laparoscopic findings and endometriosis of the studied 30 females with unexplained infertility.

Variables	Laparoscopic finding of tubo-ovarian relationship among the studied the studied females with unexplained infertility (n=30)						χ^2 P
	Disturbed (n=16)		Normal (n=14)		Total (n=30)		
	n	%	n	%	n	%	
◆Laparoscopic finding:							
Detected pathology	16	100	1	7.1	17	56.7	26.218
Normal	0	0	13	100	13	43.3	0.0001*
◆Endometriosis:							
Mild	7	43.8	0	0	7	23.3	14.362
Minimal	5	31.3	1	7.1	6	20.0	0.001*
No	4	25.0	13	92.9	17	56.7	

Discussion

Unexplained infertility is a taxing diagnosis for both the patient and the clinician, The treatment is empirical and depend on the availability of resources. [12]

The performance of laparoscopy in unexplained infertility provides diagnostic finding that are helpful in global management of the cases and enable some patient to get pregnant compared to those with ART while avoiding physical, psychological and economic burden associated with ART, in the cases treated with laparoscopic surgery before ICSI, the chance of success is not affected but even increased by reposition of the ovary correcting tubo ovarian relationship [13].

Fallobian tube has many functions in achieving pregnancy, it must be patent with intact endosalpinx, it must have adequate length to reach the pelvic floor, it has to be mobile to reach the site of releasd egg and to create a negative pressure in itself, the fimbria should be normal and free, to direct the egg toward the tubal ostium [14].

On many occasions tubal kinks and thereby shortening of the effective tubal length, can happen due to chemical inflammation arising from endometriotic blood in the pelvis in which tubes float following menstruation. Even in minimal or mild endometriosis, this proinflammatory state can cause adhesive disease leading to subfertility [15].

These tubal kinks cause shortening of the effective length of the fallopian tubes. As a result, tubal fimbriae fail to reach the pelvic floor and thereby fail to achieve egg pick up. Sometimes tubal defects are results of post abortal or puerperal infections as it happens in secondary infertility [16].

Fimbrial pathology is another condition worth mentioning in group of tubal defects which can arise from mild or minimal endometriosis or some other mild form of pelvic infection [17].

The minimal tubal defects are mostly associated with endometriosis.

Laparoscopy is commonly used in an evaluation of abdomen and pelvic organs in cases of infertility and pelvic pain. The method of laparoscopy is diagnostic as well as therapeutic for pelvic and abdominal pathologies in the same sitting [18].

During laparoscopy, in all of cases, the fimbrio-ovarian relation was assessed by determining the length of the free ovarian border between the ovarian ligament and the fimbria ovarica that contains the corpus luteum (the ovulation border), The fimbriae was held by non-traumatizing grasper and their ability to reach to cover the ovulation site was taken as a prove for successful ovum pickup.

The prevalence of disturbed tubo-ovarian relationship was evaluated.

If there are any relationship abnormalities liable for correction, they were management.

The tubal kinks which were formed by serosa to serosal adhesion and thereby shortening of the effective tubal length were corrected by a simple procedure called squeezing, manipulation and hydrotubation (SMH) technique. The forceps break the serosa to serosal adhesions thereby relieving the tubal kinks. Tubes were then milked from cornu to the fimbriae. As a result, any sludge inside the tube was removed. The tubes got back their normal length. Hydrotubation with dye helped to wash out the remains and the tubes were opened when free spill occurred.

Peritubal adhesions and ovarian adhesions to laleral pelvic wall were then separated either by blunt dissection with the palpating rod or by sharp dissection with endoscopic scissors restoration of the normal tubo ovarian relation.

Pedunculated fimbrial cysts were easily excised using diathermy or scissors.

Detected endometriosis via laparoscopy managed by excision/ablation of endometriotic implants.

Laparoscopy is the best diagnostic procedure of female infertility as out lined by the WHO guidline [18].

In the present study, we tried to evaluate the tubo-ovarian relation by laparoscopy so that diagnosis and management of conditions with disturbed tubo-ovarian relation in unexplained infertility have been done.

As regard the percent of laparoscopic finding, in the present study, (17/30) 56.6% of patients were found to have evidence of pelvic pathology and normal pelvis in(13/30)43.3% of cases .

Pelvic endometriosis was the most common pathology, accounting for 43.3% of all pelvic disease, From 30 patients we detected minimal and mild endometriosis by 20% and 23%, respectively totally (13/30) 43.3% of cases, These results were approximately similar to those quoted from **Gad et al [19] , Pantou et al [20]** and **Kansouh et al**. [21] .

Gad et al [22] reported that laparoscopic diagnosis of endometriosis was reported in 33 (33%) patients with unexplained infertility and chronic pelvic pain.

Pantou et al [20] study revealed 30 out of the 62 (48.38%) women with unexplained infertility diagnosed with endometriosis following laparoscopic investigation .

Kansouh et al [21] study revealed 46% cases had no detectable pathology on laparoscopy; 22 and 16% had minimal and mild endometriosis,

Where in a study done by **kemoto et al [23].** In the laparoscopy group, endometriosis was found in 62.7% of patients with unexplained infertility, This discrepancy may be explained by that his his study performed on large number of cases.

In the present study cases with pathologies disturbing the tubo ovarian relation was(16/30) 54.3% .

These results were approximately similar to those quoted from **Bhandari et al [24]**. Where from 198 patients with unexplained infertility included in the study, 103 (52%) had pathological findings at laparoscope,

In present study, these tubo ovarian pathology were

Tubal kink(4/30) 13.3%.

Pedunculated fimbrial cyst(2/30) 6.7%.

Peritubal adhesion (5/30)16.6%.

Periovarian adhesion(3/30) 10.0%

Ovarian adhesion to lateral pelvic wall(1/30) 3.3%.

These results were approximately similar to those quoted from **Siddhartha et al** [25] who enrolled 1726 patients of initially declared unexplained infertility were investigated by laparoscopy. These patients were aged between 26 and 37 years with infertility between 5 – 7 years durations. as laparoscopic finding were Tubal kinks (15%),Peritubal adhesions (4%), Pedunculated fimbrial cysts (6%).

Aproximately similar to a study conducted by **Meena et al** [23] that showed incidence of Peritubal adhesion seen in 16.6% of cases .

And similar to a study conducted by **De Cicco et al** [26] that revealed pelvic adhesions were found in (21.7%) of patients ,in 12% of cases we observed an involvement of Fallopian tubes; in the remaining 8.8% of cases ovaries were more involved.

Also similar to the study of **Pantou et al** [27] who showed (23.3%) were diagnosed with periadnexal and pelvic adhesions.

El Gharib et al [28] study also reported that 30 cases of unexplained infertility underwent Laparoscopic examination revealed that pelvic and peritubal abnormalities were also found in 13.56% of cases with unexplained infertility.

The percentage of these abnormalities found in the present study were (46.4%) higher than the findings by a study conducted by **Kim GS et al** [23] reporting tubal sacculation, constriction, fibrosis, and kinking with segmentation. likely due to different inclusion criteria. Who excluded patients with signs or symptoms of endometriosis, and the present study did not.

Even **Marcoux et al**[29] , **Kennedy et al** [30]and **Tulandi et al**[31] who do not agree with routine laparoscopy in the investigation of infertility, do not deny the possibility that laparoscopic lysis of adhesion or pelvic endometriosis implants excision leads to higher fecundity rate .

As regard the spontaneous pregnancy rate in the present study where 30 patients underwent laparoscopy the total pregnancy rate was (13/30) 43.3%. a pregnancy rate of (9/30)30% was seen in cases that showed disturbed tubo-ovarian relation and required operative intervention , these spontanous pregnancies achieved within the first 6 months.

In the present study a pregnancy rate of 53,3% (9/16) was seen in cases that showed disturbed tubo ovarian relation and required operative intervention higher than other cases with no detected pathology (4/14) 47.7% .

The present study results are compared with a study results by **kansouh et al**. [21], where laparoscopy was done in 250 patients with unexplained infertility. A pregnancy rate of (35.2%)88 cases was seen in cases that required operative intervention.

As regard pregnancy result`s ,the present study was compared with a study by **Tsuji et al** [32] ,where 57 infertile patients with normal HSG findings underwent diagnostic laparoscopy at Kinki University Hospital. diagnostic laparoscopy revealed pathologic abnormalities. A pregnancy rate of 44.4% was seen in cases that required operative intervention.

This increase in pregnancy rate is explained by the role of laparoscopy in the diagnosis and treating minimal to mild and moderate endometriosis (47.6%) and the performance of adhesiolysis in the presence of significant peritubal adhesions.

Balasch et al [22] in a debate article discussing the usefulness of conventional methods of infertility evaluation, stresses the difficulties in persuading a woman with a normal HSG to undergo an invasive procedure such as laparoscopy. He states that clinicians increasingly believe that turning to ART is appropriate even without laparoscopy, and that this attitude towards laparoscopy represents a move from ‘‘diagnostic work-up’’ to a ‘‘prognosis oriented approach’’ in the investigation and treatment of infertile couples.

Pantou et al [20], El-Gergawy et al [33] denoted that laparoscopy is a valuable approach that can provide significant diagnostic findings that enable us to avoid IVF overuse regarding patients of unexplained infertility presenting with recurrent attempts of IVF failure [110] .

Tubo-ovarian relation was evaluated with great care and corrective measures were undertaken .The main object of the corrective procedures were to get a freely mobile Fallopian tube, having proper length and fimbrial function along with satisfactory tubo-ovarian relation .

Recommendations: Laparoscopy should be carried out to all women with unexplained infertility to look for any disturbance of tubo ovarian relation when all other examination have returned normal results.

Large scale studies are needed to confirm these results.

Conclusion

The ovum pick up by the fimbrial end of the tube is an essential determining factor for female infertility. The present study confirmed that laparoscopy provided a precise diagnosis of tubo ovarian factor and may switch the initial treatment of unexplained infertility .

Financial support and sponsorship: Nil

Conflict of Interest: Nil

SPSS Inc.

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