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Original Research Article

The role of combined diagnostic hysterolaparoscopy in unexplained infertility

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ABSTRACT

Background: The two approaches for evaluating the female reproductive system are hysteroscopy and laparoscopy. Laparoscopy is becoming a standard component of infertility evaluation by virtue of its capability to visualize and manipulate the uterus, the ovaries and fallopian tubes. Hysteroscopy has become an important investigative tool for discovering possible causes of female infertility by examining the uterine cavity. The goal of this study was to examine the role of hystero-laparoscopy in diagnosis women with unexplained infertility.
Methods: A total of 202 cases who were 20-35 years old women with 1ry or 2ry unexplained infertility were studied in this cross-sectional observational analytical study. All patients were subjected to: evaluation (physical, abdominal and bimanual), routine laboratory investigations, basic investigations (documentation of sound ovarian factor: hormonal assays and pelvic ultrasonography, normal hysterosalpingography, normal husband semen analysis) and hysterosalpingography (HSG) was reviewed or completed.
Results: Abnormal laparoscopic was significantly higher in secondary cases compered to primary infertility (p=0.043). Abnormal combined hystero-laparoscopic was significantly higher in 2ry infertile cases compered to 1ry infertile cases (p=0.006). Pairwise comparison between 1ry and 2ry infertility was statistically significant difference (P=0.004).
Conclusions: The percentage of abnormalities found during laparoscopy and hysteroscopy, are difficult to be visualized by the use of other noninvasive methods. While a thorough history, thorough examination, and early studies such as pelvic ultrasonography can all lead to the suspicion of numerous abnormalities, a considerable percentage of abnormalities may go undetected.

Keywords: Combined diagnostic, Hysteroscopy, Laparoscopy, Hysterolaparoscopy, Unexplained infertility

INTRODUCTION

Infertility is a complicated condition that has a huge impact on patients as regards medical, psychosocial, and economic aspects. Aspects of having children from a cultural and religious perspective play some roles. Infertile couples who were undergoing therapy for infertility reported higher levels of emotional discomfort and lower marital satisfaction.[1,2]

Infertility is defined as a reproductive system disorder characterized by the failure of clinical pregnancy after twelve months or more of unprotected sexual contact, according to the World Health Organization.[3] Globally, the number of infertile people is rapidly rising. It affects roughly 10-15% of couples in their reproductive years. Female causes are responsible for 40-45% in etiology of infertility.[4] In the USA, it is estimated that 10% of women aged 15 to 44 have trouble getting pregnant or

keeping pregnant. Fertility difficulties affect 8 to 12 percent of couples worldwide.[5]

Unexplained infertility refers to a couple's inability to conceive after a year of trying despite a thorough examination, or after six months in females of 35 years old and older.[6] Authorities' views on what constitutes a thorough examination differ, and these views have developed through time. Documentation of ovulation, normal uterine cavity, adequate ovarian oocyte reserve, tubal patency, and normal semen analysis are currently included in a complete review.[7]

Female unexplained infertility diagnosis and therapy continues to stand out as the fastest growing expanding issue in reproductive medicine. Infertile women's pelvic examinations and diagnostic techniques frequently fail to appropriately diagnose the majority of pelvic disease.[8]

The two methods for evaluating the female reproductive system are hysteroscopy and laparoscopy.[9] Laparoscopy has become a significant part of infertility examination because of its ability to visualise and manage the ovaries, uterus, and fallopian tubes. Hysteroscopy has become a valuable investigative method for examining the uterine cavity and determining the reasons of female infertility. Uterine cavity abnormalities ovarian morphology, any undetected pelvic disease, and tubal morphology and patency can all be accurately resolved in a single session.[10] Despite breakthroughs in 3D/4D imaging, pelvic endometriosis few adhesion bands uterine polyps, and pelvic/peritoneal/periovarian adhesions can still be undetected, resulting in infertility.[11]

Many cases of previously enrolled as having unexplained infertility, might be further confirmed as having an explanation for their infertility, after laparoscopy and/or hysteroscopy. The diagnosis of cases of unexplained infertility cannot be optimal without laparoscopy and hysteroscopy. The goal of this study is to assess the role of hystero-laparoscopy in diagnosing women with unexplained infertility.

METHODS

A total of 202 cases were studied from January 2018 to July 2020 in this cross-sectional observational analytical investigation. The study was conducted at Obstetrics and Gynecology Department, Tanta University Hospitals after being approved from the institutional ethical committee, Tanta University.

Informed written consent was obtained from all patients included in the study. 20-35 years old women with 1ry or 2ry unexplained infertility, BMI<27.5kg/m^2, normal serum levels of Prolactin, FSH, LH, AMH, normal pelvic ultrasound, normal hysterosalpingography and normal seminogram reports were enrolled.

Exclusion criteria

previous abdominal or pelvic surgery, except for cesarean section or termination of pregnancy in cases of secondary infertility history of puerperal infection in cases of secondary infertility, undiagnosed abnormal uterine bleeding, endocrinal abnormalities as thyroid, and adrenal disorders, current genital infections that contraindicate HSG or uterine manipulations, operative risks as (cardiac, respiratory, anesthetic, and severe anemia) and patients not willing for surgery.

All women who attended to the outpatient clinic of the Gynecology Department through the study period, and were diagnosed as having primary or secondary unexplained infertility were the sampling frame (n=316). Diagnosis of unexplained infertility was based on history taking, gynecological investigation and reviewing all investigations (semen analysis, baseline endocrinal investigations, ovulation study, hysterosalpingography (HSG)) [NICE 2013: unexplained infertility =15-30% of infertility].[12]

All patients were subjected to

Obtaining a whole history (personal history, obstetric history, past history, menstrual history, psychological problems, sexual and husband history), evaluation (General physical, abdominal examination, per speculum examination and bimanual examination), routine investigations (Hemoglobin and blood counts, blood sugar, blood urea, blood grouping and Rh-typing, VDRL, serum creatinine, urine analysis and chest X-ray), basic investigations (documentation of sound ovarian factor: hormonal assays (Progesterone, prolactin, T3, T4, TSH, AMH) and pelvic ultrasonography (Structural, masses and folliculomery), normal hysterosalpingography and normal husband semen analysis) and special Notes to review investigations: hysterosalpingography (HSG) was reviewed or completed. If preliminary HSG was to be completed, it was done using water- soluble contrast, transvaginal ultrasound using a Samsung ultrasound machine, model H60, USS- H60NF4K/WR (Samsung; Seoul, South Korea) with Samsung Medison 3D Endocavitary Probe: 5 to 7.5 MHz. Before the surgery, the patients were instructed to empty their urine bladder. The patient was in the lithotomy position at the time, the transducer tip was coated with ultrasound coupling gel and introduced into a rubberized sheet (condom), and then the probe tip was covered with a little amount of gel and gently inserted into the vagina. For getting images in varying directions, tilting or angling the shaft by its handle gently along the probe's longitudinal axis to shift the scanning plane over a 360-degree range for detecting of presence of any lesion as polyp, myoma and the myometrial thickness and folliculomery, besides testing for ovarian reserve (antral follicle count (AFC) >5, and anti-mullerian hormone (AMH) >1.1 ng/ml), evidence for ovulation (repeated serum progesterone).

Diagnostic hysteroscopy

As an antiseptic solution, the perineum and vagina are gently swabbed with 10% povidone iodine. In the posterior vagina, a Sims' retractor is inserted and retracted downwards. A single toothed tenaculum holds the cervix's anterior lip in place. The hysteroscope is inserted into the cervix under direct vision, and a thorough examination is performed.

Diagnostic laparoscopy

The veress needle for pneumoperitoneum is inserted through an abdominal incision and the position of the needle is checked using a saline test. Gas (CO_2) is insufflated at a rate of 10-20 ml/min at pressures of no more than 15-20 mmHg.

Site of preference is intra-umbilical. Betadine and alcohol have been used to disinfect this area. After that, a 1 to 2 cm wide stab incision was made transversely 1cm below the umbilicus with a sharp knife.

Trocar insertion

To avoid unintended harm to the aorta, colon, and iliac arteries, and a full bladder, it is necessary to maintain the abdomen wall raised. Place the trocar towards true pelvis. Because the trocar's sharp edges will cause substantial tissue injury, it is inserted using a screwing action. The decrease of resistance to the trocar indicates fascia penetration. The trocar is halted once it has entered the cavity. The trocar is removed, and the telescope is put into the sheath and slowly advanced.

Scope insertion

Karl Storz one 10 mm. 2 trocers 5 mm, Camera: Karl Storz image 1 HD, CO_2 insufflator Karl Storz 20 liter. One to two auxiliary ports were constructed since an ancillary puncture site was frequently required to perform a complete evaluation of the pelvis. The location of secondary puncture was indented with the finger after establishing that the bladder was empty, and the 5 or 7 mm trocar was inserted without harming the inferior epigastric vessels under direct vision from the laparoscope.

Uterine manipulation

Sim's speculum was used to expose the cervix, a volsellum was used to catch the anterior lip, and the uterine manipulator (elevator) was used to mobilise the uterus and for chromotubation.

Chromopertubation (tubal perfusion)

The uterine elevator was removed and a cannula was placed into the cervical canal following thorough inspection of the pelvis. Methylene blue solution was injected into the uterine cavity by using the uterine cannula during chromotubation. Then, depending on the dye spill and fill, we looked for tubal patency or the tubal block and its location. For chromotubation, 10-20 ml of methylene blue solution was usually sufficient. Forcible injection of extra dye was required to dislodge a few flimsy endosalpingeal adhesions and detritus from the tubes.

Irrigation and closure

Finally, the peritoneal cavity was irrigated with Ringer's lactate or isotonic saline, and any bleeders were identified and coagulated with monopolar forceps if necessary. The equipment and telescope were removed from the trocar sleeves at this stage, and the desufflation key was put through the sleeve, deflating the abdomen. The umbilical trocar was then removed, and the gas was forced out of the trocar sleeves by providing moderate upper abdominal manual compression. The trocar and cannula are withdrawn, and the incision on the skin is stitched up.

Sample size estimation was done based on the formula: no= $n_o=Z^2pq/E^2$, where: no is initial sample size. Z equals 1.96 if we use 95% Confidence level. p is the percentage of the phenomena in population from the previous studies, p=0.15 (unexplained infertility prevalence is 15%), q=1-0.15, and q=1-p. E is the accepted bias for p in the sample=0.05. N was calculated to be 195.[13]

Statistical analysis

SPSS (Statistical Package for Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA)was used to code and analyse the obtained data. The Shapiro Walk test was used to determine if the data had a normal distribution. Arithmetic mean value ($\bar{x}$) = the sum of all observations (sum X) divided the number of observations (n) Standard deviation (SD). Inferential statistics: Standard student "t test": a quantitative data comparison test between two independent groups (parametric test). Mann-Whitney U test (U): It is a non-parametric equivalent to t test. Chi-square test ($\chi 2$) for categorical variables. Fisher's Exact (FE) or Monte Carlo correction (MCp) : it is a correction for chi-square ($\chi 2$). upon Level of significance: If the p value is >0.05, it is non-significant; if the p value is ≤0.05, it is significant; and if the p value is <0.01 it is highly significant.

RESULTS

Patients' characteristics were illustrated in Table 1. Plain Hysteroscopic and Plain laparoscopic abnormal finding in all cases according to the used proforma were illustrated in Table 2.

Collective description of laparoscopically diagnosed adhesions, according to the AFSS classification were explained in Table 3.

Table 1: Pertinent clinical and hormonal data.

Parameters	
Clinical parameters	
Age (years)	27.76±3.80
Married since (years)	6.54±2.25
Infertility duration (years)	5.12±2.08
Body mass index (kg/m^2)	24.31±2.17
Hormonal parameters	
Progesterone (P) (ng/mlss)	8.32±2.83
FSH (mIU/ml)	6.32±1.64
LH (mIU/ml)	3.08±0.78
TSH	1.88±1.15
AMH (values ≥1 ng/ml =good reserve)	2.73±0.91
Prolactin (PRL) (ng/ml)	9.47±1.74

Table 2: Plain hysteroscopic and plain laparoscopic abnormal finding in all cases according to the used proforma in all cases.

Hysteroscopic abnormal finding		
Uterine cavity		No
Arcuate		-
Sub-Septate		-
T-shaped		-
Endometrium		
Irregularities		30
Hyperplastic		1
Endometritis		-
Polyps		
Number		5
Nature: thin mucous		Thin
Nature: thick vascular		-
Tubal Ostium- Right		8
Stenosis		5
Bands		-
Polyp		-
Fibrosis		3
Tubal Ostium- Left		3
Stenosis		2
Bands		-
Polyp		-
Fibrosis		1
Adhesions		
Present		42
Extent according to AFSS classification [% of endometrial cavity]	<1/3	33
	1/3-2/3	4
	>2/3	5
Type according to AFSS classification	Filmy	33
	Filmy & Dense	4
	Dense	5
Laparoscopic abnormal finding		
Uterus	**No**	
Gross abnormalities as fibroids	-	-
Endometriotic implants	21	
Utero sacral ligament puckering	38	

Continued.

Hysteroscopic abnormal finding		
Pouch of Douglas		
Presence of fluid	-	
•Endometriotic implants	38	
•Adhesions	-	
•Nodularity	-	
Tubal perfusion (methylene blue)	Right	Left
Phimosis	-	-
Sacculation: location	-	-
No spill/Occlusion	-	-
Opening under pressure	17	15
Pelvic peritoneal cavity	Right	Left
Fluid and its Color	-	-
Defects and pale patches	5	-
Early endometriotic red patches	14	-
Old endometriosis	2	-
Ovarian lesions	Right	Left
Size Shape	Normal	Normal
Displaced by adhesions	18	18
External appearance		
a. Surface - (smoothly wrinkled)	184	184
b. Endometrial implants	13	13
c. Corpus luteum	162	162
Endometriotic cysts	-	-
Tubal pathology	Right	Left
Isthmic portion masses or kinks	17	15
Midportion: distortion/kinks	1	1
Ampulla: Shape and length	-	-
Fimbrial end (visible-no adhesions)	188	192

Table 3: Collective description of laparoscopically diagnosed adhesions according to the AFSS classification.

Sites	Adhesions	Number of cases in each category		
		<1/3 enclosure	**1/3 - 2/3 enclosure**	**>2/3 enclosure**
Ovary	R Filmy	13	4	1
	Dense	2	–	1
	L Filmy	16	1	1
	Dense	–	1	–
Tube	R Filmy	17	1	–
	Dense	–	–	–
	L Filmy	15	1	–
	Dense	–	–	–
Fimbrial end enclosure	R side	14		
	L side	10		
Sites	**Adhesions**	**Number of cases in each category**		
		<1cm	**1-3 cm**	**>3 cm**
Peritoneum	Superficial	18	2	4
	Deep	2	–	1
Ovary	R Superficial	6	2	–
	Deep	2	1	2
	L Superficial	8	2	1
	Deep	1	–	1
Superficial implants	Visual distribution of each subtype (%)	Red (R) 14 (58%)	White (W) 5 (22%)	Black (B) 5 (22%)
Douglas Pouch	Obliteration	Partial	Complete	
		36	2	

Table 4: Comparative distribution of the main laparoscopically diagnosed lesions, in relation to type of infertility and age groups (% from raw).

Type of abnormality		Abnormal Laparoscopy in all cases (n=52) (%)	Abnormal Laparoscopy in 1ry infertile cases (n=25) (%)	Abnormal Laparoscopy in 2ry infertile cases (n=27) (%)	X^2	P value
Ovarian adhesions	Filmy	36 (69.2)	13 (36.1)	23 (63.9)	6.71*	0.01*
	Dense	4 (7.7)	2 (50.0)	2 (50.0)	0.006	FEp=1.000
Tubal adhesions	Filmy	34 (65.4)	11 (32.4)	23 (67.6)	9.728*	0.02*
	Dense	-	-	-	–	–
Fimbrial End enclosure		24 (46.1%)	9 (37.5)	15 (62.5)	1.997	0.158
Peritoneum endometriosis	Superficial	24 (46.1)	13 (54.2)	11 (45.8)	0.662	0.416
	Deep	3 (5.8)	1 (33.3)	2 (66.7)	0.277	FEp=1.000
Ovarian endometriosis	Superficial	19 (36.5)	16 (84.2)	3 (15.8)	15.659*	<0.01*
	Deep	7 (14.5)	4 (57.1)	3 (42.9)	0.266	FEp=0.698
Superficial implants Visual	Red (R)	14 (58)	7 (50.0)	7 (50.0)	0.028	0.866
	White (W)	5 (22)	3 (60.0)	2 (40.0)	0.315	FEp=0.662
	Black (B)	5 (22)	1 (20.0)	4 (80.0)	1.697	FEp=0.192
Douglas Pouch Obliteration	Partial	36 (69.2)	14 (38.9)	22 (61.1)	3.957*	0.047*
	Complete	2 (3.8)	1 (50.0)	1 (50.0)	0.003	FEp=1.000

Type of abnormality		Abnormal Laparoscopy in all cases (n=52) (%)	Abnormal Laparoscopy [age of 20 – 25 (18) (%)	Abnormal Laparoscopy [age of >25 – 30 (20)] (%)	Abnormal Laparoscopy [age of >30 – 35 (14) (%)	X^2	P value
Ovarian adhesion-s	Filmy	36 (69.2)	5 (13.9)	18 (50.0)	13 (36.1)	22.24*	<0.01*
	Dense	4 (7.7)	3 (75.0)	1 (25.0)	0 (0.0)	2.107	MCp=0.39
Tubal adhesion	Filmy	34 (65.4)	7 (20.6)	16 (47.1)	11 (32.3)	8.546*	0.014*
	Dense	-	-	-	-	–	–
Fimbrial end enclosure		24 (46.1%)	6 (25.0)	12 (50)	6 (25.0)	2.795	0.247
Peritone-um endomet-riosis	Superficial	24 (46.1)	7 (29.2)	9 (37.5)	8 (33.3)	1.073	0.585
	Deep	3 (5.8)	2 (66.7)	0 (0.0)	1 (33.3)	2.242	MCp=0.36
Ovarian endomet-riosis	Superficial	19 (36.5)	9 (47.4)	8 (42.1)	2 (10.5)	4.500	0.105
	Deep	7 (14.5)	3 (42.9)	2 (28.6)	2 (28.6)	0.549	MCp=0.88
Superfic-ial implants Visual	Red (R)	14 (26.9)	6 (42.9)	3 (21.4)	5 (35.7)	2.466	MCp=0.306
	White (W)	5 (9.6)	1 (20.0)	3 (60.0)	1 (20.0)	1.041	MCp=0.722
	Black (B)	5 (9.6)	5 (9.6)	1 (20.0)	2 (40.0)	1.455	MCp=073
Douglas Pouch Oblitera-tion	Partial	36 (69.2)	8 (22.2)	17 (47.2)	11 (30.6)	8.099*	0.017*
	Complete	2 (3.8)	-	1 (50.0)	1 (50.0)	2.271	MCp=0.27

X^2: Chi square test, MC: Monte Carlo, p: p value for comparing between the studied groups, *: Statistically significant at p≤0.05.

Table 5: Comparative distribution of the hysteroscopic (HYST) findings, in relation to type of infertility, and in relation to age groups (% from raw).

Items	Type of abnormality	Ab. HYST in all cases (n=42)	Ab. HYST in 1ry infertile cases (n=20)	Ab. HYST in 2ry infertile cases (n=22)	Ab. HYST in age of 20-25 (10)	Ab. HYST in age of >25-30 (23)	Ab. HYST in age of >30-35 (9)
Endometrial	Irregularities	30 (71.4)	11 (36.7)	19 (63.3)	4 (13.3)	18 (60)	8 (26.7)
	X^2		5.49* (p=0.002)		6.71* (p=0.034)		
	Hyperplastic	1 (2.4)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1(100.0)
	Polyps	5 (11.9)	4 (80.0)	1 (20.0)	2 (20.0)	3 (60.0)	0 (0.0)
	# X2(MC p)		3.681 (p=0.283)		5.203 (0.553)		
Tubal ostium stenosis/ fibrosis	Unilateral	5 (62.5)	1 (20.0)	4(80.0)	2	1	2
	Bilateral	3 (37.5)	0 (0.0)	3 (100.0)	-	2	1
	# X2(MC p)		4.289 (p=0.123)		4.206 (0.326)		
Intra uterine adhesion	Filmy	36 (85.7)	16 (44.4)	20 (55.6)	10 (27.0)	21(56.8)	5 (16.2)
	Non-Filmy	6 (14.3)	4 (66.7)	2 (33.3)	0 (0.0)	2 (40.0)	4 (60.0)
	# X2		1.018 (^{FE} p=0.312)		8.938* (^{MC} p=0.011)		
	<1/3	33 (78.6)	16 (48.5)	17 (51.5)	10 (30.3)	19 (57.6)	4 (12.1)
	>1/3	9 (21.4)	4 (44.4)	5 (55.6)	0 (0.0)	4 (44.4)	5 (55.6)
	# X2		0.046 (^{FE} p=1.000)		7.971* (^{MC} p=0.010*)		

Type	**Hysteroscopy**				**Laparoscopy**				**Combined hysterolaparoscopy**			
	Abnormal (n=42)		**Normal (n=160)**		**Abnormal (n=52)**		**Normal (n=150)**		**Abnormal (n=58)**		**Normal (n=144)**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1ry (n=121)	20	16.5	101	83.5	25	20.7	96	79.3	26	21.5	95	78.5
2ry (n=81)	22	27.2	59	72.8	27	33.3	54	66.7	32	39.5	49	60.5
X□	3.330				4.076				7.969			
p	0.068				0.043*				0.006*			

Ab. = Abnormal, HYST = Hysteroscopic, #: Free cases was included in the comparison, X^2: Chi square test, MC: Monte Carlo, FE: Fisher Exact

Table 6: Cumulative hysteroscopic, laparoscopic, and combined hysterolaparoscopic findings in all cases, as regards the age groups, outcome of the cases having normal findings after 6 months follow up, according to their type of and their age groups (% from raw).

Age (years)	Hysteroscopy				Laparoscopy				Hystero-laproscopy				Compare at each age group
	Abnormal (n=42)		Normal (n=160)		Abnormal (n=52)		Normal (n=150)		Abnormal (n=58)		Normal (n=144)		
	N	%	N	%	N	%	N	%	N	%	N	%	
20–25 (n=53)	10	19	43	81	18	34.0	35	66	20	38	33	62	$X^2$1=9.609 p1= (0.008) *
>25–30 (n=101)	23	23	78	77	20	19.8	81	80	23	23	78	77	$X^2$2=0.35 p2= (0.831)
>30–35 (n=48)	9	17	39	81.3	14	29	34	71	15	31	33	69	$X^2$3=4.49 P3= (0.105)
χ^2	0.481				4.032				4.004				
P	0.786				0.133				0.135				
& IUI Type	**Outcome after 6 months**												
	Spontaneous pregnancy within 3 months (n=23)				**Pregnancy after COS and IUI within 3 months (n=21)**								**X^2** **P**
	N		**%**		**N**		**%**						
1ry (n=28/121 cases)	10		35.7		18		64.3						X^2=8.462 0.003**
2ry (n=16/81 cases)	13		81.3		3		18.8						
Pairwise comparison	P1 0.004**				P2 0.003**								
Age (years)													
20–25 (n=15)	12		80.0		3		20.0						X2 =8.633* 0.013*
>25–30 (n=20)	6		30.0		14		70.0						X^2 1=7.013 0.008**
>30–35 (n=9)	5		55.6		4		44.4						X^2 2=7.291 0.007**
Pairwise comparison between age groups as regards the outcome	P1 0.003**	P2 0.002**	P3 >0.05		P4 0.010**	P5 >0.05	P4 0.010**						X^2 3=0.049 ^{FE}p=1.000

Filmy ovarian adhesions, filmy tubal adhesions, partial douglas pouch obliteration and superficial ovarian endometriosis were statistically significant higher in abnormal laparoscopy in 2ry infertile cases compered to Abnormal Laparoscopy in 1ry infertile cases (p=0.01, p=0.02, p=0.047 and p<0.01 respectively) (Table 4).

Endometrial irregularities, irregularities, filmy endometrial adhesions and endometrial adhesions were significantly different (p=0.002, p=0.034, p=0.011 and p=0.01 respectively). Abnormal laparoscopic was significantly higher in secondary cases compered to primary infertility (p=0.043). Abnormal combined hystero-laparoscopic was significantly higher in 2ry infertile cases compered to 1ry infertile cases (p=0.006) (Table 5).

1ry (n=28/121 cases were statistically significant higher in pregnancy after COS and IUI within 3 months compared to spontaneous Pregnancy within 3 months (p=0.003). Pairwise comparison between 1ry and 2ry infertility was statistically significant difference (p=0.004).

Comparing spontaneous pregnancy verses pregnancy after therapy: The overall comparison showed statistically significant difference (χ^2=8.63, P value =0.013). The comparison age group (20-25) and age group (>25–30), showed statistically significant difference (P value =0.008, p value =0.007).

Pairwise comparison between 1ry and 2ry infertility: In spontaneous pregnancy subgroup showed statistically significant difference (P_1=0.003, P_2=0.002). In therapy related pregnancy subgroup showed statistically significant difference (P_4=0.01, P_6=0.01).

DISCUSSION

The two approaches for evaluating the female reproductive system are hysteroscopy and laparoscopy. Laparoscopy is becoming a standard element of the evaluation of infertility by virtue of its ability to examine and control the ovaries, uterus, and fallopian tubes. Hysteroscopy has become an important investigative tool for discovering possible reasons of female infertility by examining the uterine cavity.

Diagnostic hysteroscopy was normal in 160 cases 160/202 (79.2%). The hysteroscopic abnormalities in relation to the total 202 cases (42 cases; 20.8%) included, endometrial irregularities in 30 cases (14.8%), polyps in 5 cases (2.5%), tubal ostium stenosis or fibrosis in 11 cases (5.4%) and intrauterine adhesions in 42 cases (20.8%) [36 filmy and 6 dense adhesions]. Diagnostic laparoscopy was normal in 150 cases 150/202 (74.3%). The laparoscopic abnormalities in relation to the total 202 cases (52 cases; 25.7%) included pelvic endometriosis was seen in 38 cases (18.8%), partial Douglas pouch obliteration in 36 cases (17.8%), and complete Douglas obliteration in 2/202 cases (0.99%). Superficial endometriotic lesions were seen in 24 cases (11.9%); distributed as red (14), white (5) and black foci (5). Filmy ovarian adhesions were seen in 36 cases (17.8%), filmy tubal adhesions 34 (16.8%), fimbrial end enclosure 24 cases (11.88%), and dense ovarian adhesions 3 cases (1.48%). Our results were similar to what was reported in a study carried by De Cicco et al.[14] which revealed abnormalities in 12% of cases, with pelvic adhesions were found in (21.7%).

Shokeir et al, designed a study, in an infertile eumenorrheic population, to investigate the incidence of endometrial polyps on hysteroscopy.[14] Endometrial polyps were discovered in 36 (13.53%) of the 244 women who had hysteroscopy.

Bakas et al, assessed 217 infertile women.[15] Hysteroscopy detected intrauterine lesions (septa, sub mucosal leiomyomas, polyps, or synechiae) in 148 women (68.2%), and in 69 (31.8%), hysteroscopy detected intrauterine lesions that required operative hysteroscopy. Endometrial polyps were the utmost prevalent intrauterine anomaly, with 26 patients having them (12%). Seyam et al, conducted a prospective study.[16] They included 200 women with unexplained infertility, and used office hysteroscopy. 70% of cases had a normal uterine cavity and endometrial polyps were the most prevalent anomaly, accounting for 20% of the cases.

The need for diagnostic hysteroscopy

Some definitions of unexplained infertility ensure the need for laparoscopy. However, hysteroscopy was not postulated as a primary tool in the unexplained infertility work up.[17]

Molinas et al and Tanahatoe reported that the HSG to check the uterine cavity and tubal patency was part of the basic infertility work-up.[18,19] However, HSG has the potential to miss 35% of uterine abnormalities. HSG usage to examine the cavity of the endometrium has been limited due to its high false-negative rate and low positive predictive value. Hence, the need for hysteroscopy is mandatory for typical endometrial evaluation, especially in unexplained cases.

Al-Turki HA conducted a study in 2018 evaluating hysteroscopy usage in diagnosing of uterine diseases in infertile females with recurrent implantation failure (RIF) following IVF.[20] Out of 266 studied patients, 162 patients (60.9%), had no abnormalities and one or more aberrant results were found in 104 individuals (39.1%).

However, the reported results in this study, as well as the abovementioned published reports, mandate the need for hysteroscopy, so that we might be sure from our diagnosis. There is no need for further time loss in such sensitive cases and waiting for IVF failure to recommend

hysteroscopy. Also, hysteroscopy may avoid IVF failure if needed.

Diagnostic hystero-laparoscopy

Ramesh et al had conducted a diagnostic hysterolaparoscopy on 250 patients.[21] He reported that the most common finding at hysteroscopy was intrauterine septum, myoma with a percentages of 13.7% and 12.6%. He reported that blocked ostea reported 5.8%, abnormal endometrium 5.3 %, hypoplastic uterus 2.1% and intrauterine synechae 1.1%. With laparoscopy, he had similar results as our study but with different percentages. He reported that the most common finding was pelvic adhesions with percentage 21.1%. Endometriosis came after with a percentage 20.5%, myoma 18.5% and PCOS 13.2%. Finally, he concluded that combined hystero-laparoscopy has a great value in direct visualization of defects that can be missed with regular diagnostic methods and help in the final diagnosis of infertility.

After doing the diagnostic hysterolaparoscopy (DHL) in the current study, out of total 202 cases, the abnormalities were seen in 58 cases (28.7%). 121 cases had primary infertility; with 26 cases out of them (21.5%) had abnormal DHL. 81 cases had secondary infertility; with 32 cases out of them (39.5%) had had abnormal DHL. Abnormal laparoscopic finding was found in (25/121) 20.7% of primary infertile cases, compared to (27/81) 33.3% of secondary infertile cases (p=0.04). Abnormal hysteroscopy was found in (20/121) 16.5% of primary infertile cases, compared to (22/81) 27.2% of secondary infertile cases (p=0.06).

On laparoscop, more than two thirds (67.6%) of cases having filmy tubal adhesions were in 2ry infertile cases, compared with (32.4%) of 1ry cases, indicating a statistically significant difference (p value=0.002). Regarding ovarian endometriosis (84.2%) of superficial implants were found in 1ry infertile cases, compared to (15.8%) in 2ry cases, where deep implants (57.1%) were present in 1ry infertile cases, compared to (42.9%) in 2ry cases (p value<0.001). On hysteroscopy: 30 cases out of 42 had endometrial irregularities. 11 cases (36.7%) were 1ry and 19 cases (63.3%) were 2ry infertility (p value <0.002).

Nanaware et al performed hysterolaparoscopy for 85 infertile patients [67 (78.82%) had 1ry infertility and 2ry infertility affected 18 people (21.17%).[22] The most prevalent abnormalities found were tubal pathology (43.2%) and pelvic adhesion (40%). In both groups, the uterine septum was the most common intrauterine pathology. Tubal blockage occurs in 22.38% of 1ry infertility cases and 27% of 2ry infertility cases, respectively, in chromopertubation.

El-Gergawy AE, and El Bohoty studied 423 patients diagnosed as having unexplained infertility after the usual workup.[23] They were randomized to either controlled ovarian stimulation and IUI or laparoscopy. The laparoscopy provided diagnostic findings and enabled the management of the cases, resulting in a significantly greater number of spontaneous pregnancies. This could avoid psychological and economic burdens.

Study limitations

there were no published studies to estimate the prevalence of the cases of unexplained infertility in our locality, Covid 19 pandemics had affected our study; with marked limitation in the number of the patients, the great debate between practitioners with its reflection on the patient decision, as regards the utilization of laparoscopy, hysteroscopy or hystero-laparoscopy versus starting the immediate empiric treatment and conserving endoscopy for failed cases and very limited literature studying the differential distribution of cases of DHL in unexplained infertility, with regard to the different age groups.

CONCLUSION

The percentage of abnormalities found during laparoscopy and hysteroscopy, are difficult to be visualized by the use of other non-invasive methods. While a thorough history, thorough examination, and early studies such as pelvic ultrasonography can all lead to the suspicion of numerous abnormalities, a considerable percentage of abnormalities may remain undetected.

Diagnostic hysteroscopy is an efficient, precise, minimally invasive method for assessing subtle conditions in the endometrium. Diagnostic laparoscopy provides a clear picture of the ovaries' morphology and periovarian adhesions, and tubal patency. Combined diagnostic hysterolaparoscopy is a useful procedure for assessing unexplained infertility, especially for detecting various subtle abnormalities.

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REFERENCES

1. Passet-Wittig J, Greil AL. Factors associated with medical help-seeking for infertility in developed countries: A narrative review of recent literature. Social Sci Med. 2021;277:113782.
2. Massarotti C, Gentile G, Ferreccio C. Impact of infertility and infertility treatments on quality of life and levels of anxiety and depression in women undergoing in vitro fertilization. Gynecological Endocrinology. 2019;35(6):485-9.
3. Borght VM, Wyns C. Fertility and infertility: Definition and epidemiology. Clinical Biochemistry. 2018;62:2-10.

4. Kushnir VA, Smith GD, Adashi EY. The Future of IVF: The New Normal in Human Reproduction. Reproductive Sci. 2022;1-8.
5. Gullo G, Cucinella G, Perino A. The gender gap in the diagnostic-therapeutic journey of the infertile couple. Int J Environmental Res Public Health. 2021;18(12):6184.
6. Hamed IAI, Shady NW, Ait-Allah AS. The Role of Diagnostic Laparoscopy in the Unexplained Infertility Cases. J Sci Res Med Biological Sci. 2021;2(4):57-63.
7. Carson SA, Kallen AN. Diagnosis and management of infertility: a review. Jama. 2021;326(1):65-76.
8. Satwik R, Kochhar M. Unexplained infertility categorization based on female laparoscopy and total motile sperm count, and its impact on cumulative live-births after one in-vitro fertilization cycle. A retrospective cohort study involving 721 cycles. Reproductive Med Biology. 2021;20(2):190-8.
9. Reyes-Muñoz E, Vitale SG, Alvarado-Rosales D. Müllerian anomalies prevalence diagnosed by hysteroscopy and laparoscopy in mexican infertile women: results from a cohort study. Diagnostics. 2019;9(4):149.
10. Yanar BA, Pek E, Unsal MA. Can hysteroscopy be substituted to hysterosalpingography in the assessment of infertility? Methods of showing tubal transition as hysteroscopic. Clin Exp Obstet Gynecol. 2022;49(1):014.
11. Choudhary S, Sirsat A, Tandulwadkar SR. Role of hysterolaparoscopy in unexplained infertility. Int J Rep Contra Obstet Gynecol. 2019;8(7):2592-8.
12. O'Flynn N. Assessment and treatment for people with fertility problems: NICE guideline. Br J Gen Pract. 2014;64(618):50-1.
13. Levy PS, Lemeshow S. Sampling of populations: methods and applications: John Wiley & Sons; 2013.
14. Cicco DS, Tagliaferri V, Selvaggi L. Expectant management may reduce overtreatment in women affected by unexplained infertility confirmed by diagnostic laparoscopy. Arch Gynecol Obstet. 2017;295(2):427-33.
15. Bakas P, Hassiakos D, Grigoriadis C. Role of hysteroscopy prior to assisted reproduction techniques. J Minim Invasive Gynecol. 2013;21(2):233-7.
16. Seyam EM, Hassan MM, Gad MSMT. Pregnancy Outcome after Office Microhysteroscopy in Women with Unexplained Infertility. Int J Fertil Steril. 2015;9(2):168-75.
17. Citu C, Gorun F, Motoc A. Hysteroscopy as a Primary Tool in Exploration and Treatment of Infertility: Single Center Experience in Western Romania. Diagnostics (Basel). 2021;11(10).
18. Molinas CR, Campo R. Office hysteroscopy and adenomyosis. Best Pract Res Clin Obstet Gynaecol. 2006;20(4):557-67.
19. Tanahatoe S, Lambalk C, McDonnell J. Diagnostic laparoscopy is needed after abnormal hysterosalpingography to prevent over-treatment with IVF. Reprod Biomed Online. 2008;16(3):410-5.
20. Kozachenko IF, Adamyan LV, Kalinina EA. Hysteroscopy Before In Vitro Fertilization (IVF): The Safety and Diagnostic Value. J Minim Invasive Gynecol. 2015;22(6s):S112-3.
21. Ramesh B, Kurkuri SN. Role of combined hystero-laparoscopy in the evaluation of female infertility as one step procedure: a retrospective analytical study of 250 patients. Int J Reproduction, Contraception, Obstetrics Gynecol. 2016;5(2):396-402.
22. Nanaware SS, Saswade M, Shende PN. Role of hysterolaparoscopy in the evaluation of female infertility in tertiary care centre. Int J Contem Med Res. 2016;3(10):3063-5.
23. El-Gergawy AE, Elbohoty SB. Laparoscopy and the Era of ART in Unexplained Primary Infertility: Randomized Clinical Trial. Open J Obstetrics Gynecology. 2019;9(12):1586.

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