

Laparoscopic Evaluation in Infertility

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ABSTRACT

Objective: To describe the different causes of infertility based on findings of diagnostic laparoscopy and their comparative frequency in primary and secondary infertility.

Study Design: A cross-sectional study.

Place and Duration of Study: Obstetrics and Gynaecology Unit of Hayatabad Medical Complex, Peshawar, from January to December 2005.

Methodology: All patients undergoing diagnostic laparoscopy for primary or secondary infertility were included. Male factor infertility cases were excluded. Frequency of the causes and finding was determined.

Results: One hundred and thirty six (70.46%) patients with primary and 57 (29.54%) with secondary infertility underwent diagnostic laparoscopy. Seventy (51.47%) with primary and 26 (45.51%) with secondary infertility had no visible abnormality. Bilateral tubal blockage was found in 32 (23.53%) primary and 16 (28.07%) cases of secondary infertility. Dense pelvic adhesions forming adnexal mass were found in 9 (6.61%) and 6 (10.5%) of primary and secondary respectively. Two cases each of bicornuate uterus and double uterus in primary infertility patients. Ovarian pathology was found in 18 (13.23%) primary and 4 (7.01%) cases of secondary infertility. PCO (polycystic ovaries) were detected in 12 (8.82%) and 2 (3.5%) cases of primary and secondary infertility respectively. Endometriotic cysts and deposits were found in 15 (10.29%) cases of primary and 3 (5.26%) cases of secondary infertility.

Conclusion: Tubal disease is a common factor responsible for infertility and diagnostic laparoscopy is a valuable technique for complete assessment of female infertility and making treatment decisions according to the cause.

Key words: Infertility. Causes. Diagnostic laparoscopy. Tubal block. Adnexal mass. Polycystic ovary. Uterine malformation.

INTRODUCTION

Infertility is defined as failure to achieve pregnancy during one year of frequent, unprotected intercourse.¹ The main causes of infertility include ovulatory disorders, tubal disease, uterine or cervical factor and endometriosis and male factor infertility.^{1,2} Evaluation generally begins after 12 months, but can be initiated earlier if infertility is suspected based on history or the female partner is older than 35 years.¹ Incidence of infertility appears to be increasing in developed communities for reasons different from those in developing countries. Major causes according to WHO (World Health Organisation) on a global basis are pelvic tuberculosis, postabortal and postpartum infections leading to tubal blockade and malnutrition.³

A careful history and physical examination can suggest a single or multifactorial etiology and can direct further investigations. Pelvic ultrasonography, hormonal assay and hysterosalpingography are the initial investigations for uterine, ovarian and tubal disease. Hysteroscopy and/or laparoscopy are used if no abnormality is found

on initial screening. Diagnostic laparoscopy is normally the standard procedure performed as the final test in the infertility work up before progressing to infertility treatment.^{4,5}

Infertility is a major problem affecting women's health and quality of life leading to social and psychological upsets and bringing misery and insecurity to many women. Poverty, poor general health, tuberculosis, postabortal and postpartum infection leading to infertility are commonly observed in our setup. This study was carried out to describe the different causes of infertility on diagnostic laparoscopy, and their frequency in patients with primary and secondary infertility.

METHODOLOGY

This observational study was carried out from January to December 2005 at the Gynaecology and Obstetrics Unit, Hayatabad Medical Complex, Peshawar. All the patients undergoing diagnostic laparoscopy for primary or secondary infertility were included in the study using convenience sampling. Cases in the male factor infertility and patients with previous abdominal/ pelvic surgery were also excluded. The protocol for infertility workup included a complete history, physical examination with special reference to secondary sexual characteristics, thyroid status and abdominal and pelvic examination. Initial investigations were done in the outpatient department. Baseline investigations included

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haemoglobin, urinalysis, and random blood sugar. Hormonal evaluation for FSH (follicle stimulating hormone), LH (leutinizing hormone), prolactin levels and thyroid function tests (TFT) were done only in patients with menstrual cycle problems, galactorrhoea or those with clinical history suggestive of polycystic ovaries (PCOs), hirsutism, obesity or thyroid disorder. Abdominal and pelvic ultrasound was carried out in all patients. Hysterosalpingography (HSG), was not routinely performed. All the patients were admitted a day before the procedure, preferably in the pre-menstrual phase. Pre-anesthetic evaluation was carried out in the evening. Prophylactic antibiotics were injected and diagnostic laparoscopy was carried out under general anesthesia.

Laparoscopy was performed through a single port just below the umbilicus. A second port was used only in a few cases for mobilization of pelvic organs. A pneumoperitoneum was created with 1.5-2.0 liters of CO₂ gas. Pelvic organs were manipulated by an assistant using a uterine canula and volsellum applied to the anterior lip of the cervix. The uterus, fallopian tubes, ovaries, round ligaments, uterovesical pouch, and the pouch of Douglas were inspected. The tubes were inspected for their length, shape, dilatation and fimbrial ends. The ovaries were examined regarding their surface, size, evidence of ovulation and relation with fimbrial ends of the tubes. Peritubal, periovarian or omental adhesions, tubo-ovarian masses, endometriotic deposits and cysts, fibroids, uterine abnormality or any other abnormality were noted. The patency of the fallopian tubes was ascertained by injecting methylene blue dye into the uterine cavity through the uterine cannula or a Foley's catheter, and observing its spill through the fimbrial ends. Dilatation and curettage was carried out in patients with menstrual abnormalities or suspected endometrial tuberculosis, and endometrium was sent for histopathology. The data was collected on a proforma, and analysed on SPSS, percentages and frequencies were calculated.

RESULTS

One hundred and ninety three patients underwent diagnostic laparoscopy for primary or secondary infertility. Couples with male factor infertility were not included. One hundred and thirty six (70.46%) had primary infertility and 57 (29.54%) had secondary infertility. Mean duration of infertility was 6.9 years. One hundred and three (56.36%) patients with primary infertility and 33 (17.09%) with secondary infertility were aged between 21-30 years, while 20 (10.36%) and 22 (11.39%) were 31-40 years of age respectively. The main presenting complaints are shown in Table I.

Table II shows the outcome of different investigations. Pelvic ultrasound was normal in 82.35% of primary and

Table I: Demographic characteristics and symptoms.

Characteristics	Primary infertility n=136	Percentage	Secondary infertility n=57	Percentage
Age				
< 20 years	15	7.77	--	--
21-30 years	103	53.36	33	57.89
31-40 years	20	10.36	22	38.59
Duration				
< 5 years	51	37.50	23	40.35
5-10 years	64	47.06	27	47.36
> 10 years	21	15.44	7	12.28
Symptoms				
No symptoms	67	34.71	25	43.85
Dysmenorrhoea	25	12.95	3	5.26
Pelvic pain	18	9.32	13	22.80
Menstrual problems	26	13.46	16	28.06

Table II: Investigations.

Investigation	Primary infertility n=136	Percentage	Secondary infertility n=57	Percentage
Pelvic USG				
Normal	112	82.35	44	77.19
Follicular cyst	5	3.67	4	7.01
PCOs	9	6.61	3	5.26
Adnexal mass	3	2.20	1	1.75
Uterine abnormalities	7	5.14	5	8.77
HSG				
Total	45	33.08	8	14.03
Normal	33	24.26	3	5.26
Blocked tubes	9	6.61	3	5.26
Dilated tubes	2	1.47	1	1.75

77.19% of secondary infertility cases. Uterine abnormalities included fibroid and double uterus in 7 and 5 cases, adnexal mass in 3 and 1, and polycystic ovaries (PCOs) in 9 (6.61%) and 3 (5.26%) cases of primary and secondary infertility respectively. In total, 53 patients had HSG done; 33 with primary and 8 with secondary infertility had normal HSG findings and patent tubes. Nine patients with primary and 3 with secondary infertility had tubal blockage on HSG.

FSH, LH, prolactin and TFTs evaluation was conducted in 27 patients with primary and 7 cases with secondary infertility having history or examination suggestive of hormonal dysfunction. Raised LH with low FSH level were found in 3 cases with primary and 2 cases of secondary infertility.

Table III shows the laparoscopic findings. Seventy (51, 47%) patients with primary and 30 (52.15%) with secondary infertility had normal pelvic findings and patent tubes. A total of 11 patients had uterine abnormalities, 6 (4.41%) with primary and 4 (7.0%) with secondary infertility. Those included bicornuate uterus in 2 cases of primary and one with secondary infertility, double uterus in 2 cases of primary infertility and fibroids in 3 cases each.

Ovarian pathology was seen in 18 (13.23%) of primary and 4 (7.01%) of secondary infertility. Of those PCO was found in 12 (8.82%) of primary and 2 (3.5%) of secondary infertility.

Table III: Laparoscopic findings.

Findings	Primary infertility n=136	Percentage	Secondary infertility n=57	Percentage
Normal	70	51.47	26	45.61
Uterine abnormalities	6	4.41	4	7.01
Fibroids	3	2.20	3	5.26
Bicornuate	1	0.73	1	1.75
Double uterus	2	1.47	--	--
Ovarian pathology				
Simple cyst	4	2.94	2	3.50
PCO	12	8.82	2	3.50
No follicular activity	2	1.47	--	--
Blocked tubes	36	26.47	19	33.33
Bilateral	32	23.52	16	28.07
Unilateral	4	2.94	3	5.26
Dilated and tortous	10	7.35	7	12.28
PID (Pelvic inflammatory disease)				
Adhesion	15	11.02	8	14.02
Adenexal mass	9	6.61	6	10.51
Endometriosis				
Cysts in ovary	6	4.41	3	5.26
Endometrial deposits	8	5.88	--	--

Tubal abnormalities were seen in 36 (26.47%) and 15 (26.31%) of primary and secondary infertility respectively. Tubes were bilaterally blocked in 32 (23.52%) cases of primary and 11 (21.05%) cases with secondary infertility. Blocked tubes were dilated and tortous in 10 cases of primary and 7 cases of secondary infertility, while tubes were stained but with blocked fimbrial ends and no spill in 5 and 2 cases respectively.

Pelvic inflammatory disease resulting in dense adhesions obscuring pelvic organs and forming adnexal masses were seen in 9 (6.61%) cases of primary and 6 (10.51%) of secondary infertility. Fine adhesions with fluid in the pouch of Douglas were seen in 6 (4.4%) and 2 (3.50%) cases respectively. A second port was introduced in some cases for manipulation and visualization. Pelvic tuberculosis was found in only 2 cases on histopathology.

Endometriosis was diagnosed in 14 cases with primary and 3 cases with secondary infertility. Endometrotic ovarian cysts were present in 5 (4.41%) primary and 3 secondary infertility cases.

Two cases developed trocar site infection and sinus formation. Two cases of throat and chest infection were seen. Complications during anesthesia included one case of cardiac arrest where the patient could not be revived, while 2 other patients had delayed recovery from anesthesia.

DISCUSSION

Diagnostic laparoscopy is an essential part of full assessment and treatment of infertility.^{2,5} It provides information regarding tubal status, any pelvic adhesions, ovaries, uterine pathology, and has replaced certain old

procedures like gas insufflation and even HSG in assessing the tubal patency.^{3,6} In this study 67 patients of primary and 25 cases of secondary infertility had no specific symptoms except failure to conceive. Dysmenorrhoea was not common, while pelvic pain and dyspareunia was common in patients with secondary infertility indicating pelvic infection or PID (pelvic inflammatory diseases).

Ultrasonic assessment of the pelvic organ is a basic part of infertility investigation, and recent advances have shown that it can replace routine invasive investigation procedures.⁷ It was normal in the majority of cases of both types of infertility. Ovarian pathology including simple follicular cysts, polycystic ovaries and adnexal masses indicating adhesion and inflammatory process reported on ultrasonography, were confirmed on laparoscopy.

Hysterosalpingography or Hycosy (hysterosalping-contrast-sonography), using saline or ultrasound specific contrast media for evaluation of uterine cavity and tubal patency is a simple, safe and economical outpatient method prior to any invasive procedure or even hysterosalpingography, and has the same high concordance as laparoscopy.^{8,9} It can be performed at the time of routine ultrasound scan. It was not done in any of the patients studied. HSG was performed in 53 patients showing normal findings in 26 patients.

Diagnostic laparoscopy alone can provide information regarding uterine pathology, ovarian and tubal status and to some extent can pinpoint the sight of tubal obstruction.³ In symptomatic patients, laparoscopy should be used early in diagnostic infertility work. It may be omitted in asymptomatic patients with normal ultrasonography and HSG.^{10,11} In women without clinical or ultrasound evidence of pelvic disease, fertiloscopy (salpingoscopy) is considered an alternative to routine laparoscopy.¹² In this study, 70 cases of primary infertility and 30 of secondary infertility had normal pelvic findings and patient tubes on laparoscopy. Congenital uterine abnormalities were more frequent in primary infertility with 2 cases of double uterus and one case of bicornuate uterus, while one patient with previous abortion also had bicornuate uterus. Similarly, in an endoscopic evaluation of 636 patients, congenital malformation of the uterus was more often seen in primary infertility, while submucosal myomas and intra-uterine adhesions were less common.¹³ In the same study, 30% of patients with primary infertility had no visible abnormality in the pelvic region; the remaining 70% had PCO and endometriosis, whereas, peri-adenexal adhesions and tubal impatency were more common in secondary infertility.

Ovulatory disorders represent a major cause of infertility and PCO is the most common cause of oligo-ovulation and anovulation.¹⁴ In this study PCO were seen in 12

(8.82%) cases of primary and 2 (3.5%) cases of secondary infertility. Tubal pathology and blockage were seen in 36 (26.47%) cases of primary and 19 (33.33%) cases of secondary infertility. Blocked, dilated and tortuous tubes were more frequently found in secondary (12.28%) than in primary infertility (7.35%). Fimbrial clubbing with no dye spillage was found in 5 and 2 cases respectively, while in other cases tubes were normal looking, indicating cornual blockage. Sinawat *et al.* reported tubal abnormalities in over one fourth of all infertile females including cornual occlusion (46.04%), distal tubal occlusion (8.42%), hydrosalpinx (3.47%) and peritubal adhesions in (3.96%) cases.¹⁵

Pelvic adhesions obscuring tubes and ovaries indicating PID were seen in 9 (6.6%) of primary as compared to 6 (10.52%) in secondary infertility. Endometriosis was not commonly seen. Chocolate cysts were present in 6 (4.41%) and 3 (5.26%) cases respectively while small endometrial deposits and fine adhesions were seen in 8 (5.88%) cases of primary infertility only. However, endometriosis has been reported in 16.16% and 61.49% cases of infertility by others.^{3,15} It was found that PID and tubal blockage were more frequently seen in secondary infertility patients; however, larger studies are needed. In this study no statistically significant difference was observed in the etiology of primary and secondary infertility.

Many of the infertile couples with normal laparoscopic findings conceived within next couple of months. Others have also reported similar results in women with normal tubes and in those with early signs of endometriosis.³ Unexplained infertility however, may be managed with ovulation induction, intrauterine insemination or both, with better pregnancy rates, while ART could be performed with high pregnancy rates.¹⁶

CONCLUSION

Tubal disease is a common factor responsible for infertility and diagnostic laparoscopy is a valuable technique for complete assessment of female infertility and making treatment decisions according to the cause.

Laparoscopy is a valuable technique and is a mandatory procedure for complete assessment of female infertility, especially in symptomatic patients and should be used early in their diagnostic work. Ovulatory dysfunction is higher in patients with primary infertility where as tubal disease and PID are seen more in secondary infertility. More effective treatment decisions and interventions can be made in the light of laparoscopic findings in managing infertility.

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