Diagnostic laparoscopy in female infertility

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ABSTRACT

Objective: To highlight the importance of laparoscopic evaluation in the etiology of infertility and to evaluate the etiology in primary and secondary infertility.
Methods: This retrospective study included 1233 patients complaining of infertility, 919 patients had primary infertility and 314 patients had secondary infertility. All had been subjected to diagnostic laparoscopy at the Infertility Center in Al-Batool Teaching Hospital, Mosul.
Results: Laparoscopy diagnosed pelvic abnormality in 87.27% of infertile patients which was statistically significant difference comparing to no abnormality detected in 12.73%. The ratio of positive findings in secondary infertility was significant in comparison with the positive findings in primary infertility. Single pelvic abnormality detected during laparoscopy among infertility patients was seen in 75.09% of cases and it was statistically different from multiple pelvic abnormality: 24.91%, and it was highly significant among primary infertility patients (77.24%) and among secondary infertility patients (30.87%). Among all infertile patients, ovarian factor was the most common (66.83%) followed by tubal factor (22.03%), endometriosis (4.46%), pelvic inflammatory disease (2.85%), pelvic adhesion (2.10%) and uterine fibroid (1.73%). Ovarian factor was highly significant in primary infertility while tubal factor and pelvic inflammatory disease were the highly significant in secondary infertility.
Multiple pelvic pathology identified by laparoscopy showed the tubal factors associated with poly cystic ovary in 29.49% of cases (31.66% in primary infertility and 25% in secondary infertility with no significant statistical difference). Pelvic inflammatory disease associated with other pelvic abnormality 34.09% was highly significant among secondary infertility patients. Congenital uterine abnormalities was not seen alone, it was seen associated with other causes among primary infertility patients (9 cases 0.72%).
Conclusion: Diagnostic laparoscopy is a valuable technique and is a mandatory invasive investigation for complete assessment of female infertility before the couple progresses to infertility treatment especially where assisted reproductive techniques were not available.
Keywords: Infertility; primary infertility; secondary infertility; diagnostic laparoscopy.

الخلاصة

الهـدف: لتبيان أهمية الناظور التشخيصي في معرفة سبب العقم عند النساء في حالات العقم الأولي والثانوي.
الطريقة: دراسة أستعادية لـ ١٢٣٣ مريضة لديها حالة عقم من اللواتي راجعن مركز العقم في مستشفى البتول التعليمي في الموصل. ٩١٩ مريضة تعاني من العقم الأولي و ٣١٤ مريضة تعاني من العقم الثانوي.
النتائـج: أظهرت النتائج بان الناظور شخّص وجود سبب في الحوض في ٨٧,٢٧% من الحالات وان وجود سبب واحد في الحوض هو الأكثر في حالات العقم الأولي ٧٥,٠٩% بينما وجود عدة أسباب في الحوض كانت الأكثر بين حالات العقم الثانوي. المبيض ومشاكله السبب الرئيسي في حالات العقم وهو السبب الأكبر في العقم الأولي بينما مشكلة الأنابيب

والتهابات الحوض كان السبب الأكبر في حالات العقم الثانوي. وفي حالات العقم عامة التي وجد فيها أكثر من سبب وجد مشكلة الأنابيب وحالة تكيس المبيض في ٢٩,٤٩% ووجد أن مشكلة التهاب الحوض مع أسباب أخرى أكثر حدوثا في حالات العقم الثانوي.

الاستنتاج: الناظور التشخيصي فحص له قيمة لإكمال فحوصات النساء اللواتي لديهم حالة عقم قبل العلاج المتقدم خاصة في حالة عدم توفر وسائل العلاج .

In Iraq (like some other countries), infertility and uncontrolled fertility are two major problems affecting women's health and quality of life leading to social and psychological upsets [1]. Infertility is defined as the inability to conceive after one or two years of unprotected intercourse. It may be primary or secondary in nature [2,3]. It is one of the most prevalent chronic health disorders involving young adults[4]. Major causes of infertility include male and female factors[5]. Female factors include: ovarian dysfunction, tubal disease, endometriosis, and uterine or cervical factors. In approximately one fourth of couples, the cause is uncertain and is referred to as unexplained infertility and the etiology is multifactorial for some couples [5].

The appropriate selection of investigations based on problem areas identified by history and physical examination would guide the physician in the management of the infertile couple[6]. Diagnostic laparoscopy is not recommended as a first line screening test, however, it should be considered in patients with a history suggestive of endometriosis, previous pelvic inflammatory disease or previous pelvic surgery. Furthermore, if the hysterosalpingography reports an abnormal result, verification should be carried out with diagnostic laparoscopy. Some clinicians hold the view that to diagnose unexplained infertility, both peritoneal factor and endometriosis should be excluded, even in patients with normal hysterosalpingography, by carrying out laparoscopic examination[3]. As a result, diagnostic laparoscopy is a valuable technique and is a mandatory invasive investigation for complete assessment of female infertility in many clinics before the couple progresses to infertility treatment[1, 7-11] and making a decision to go to assisted reproductive technology[12,13].

On visual laparoscopic inspection, the appearances of the ovaries are suggestive of certain clinical conditions[1]. Most ovarian abnormalities can be managed laparoscopically and often a laparoscopic examination of the adnexa will enable the gynecologist to decide if laparotomy is indicated. Laparoscopy is an ideal procedure for diagnosing and staging endometriosis, because the magnification offered by the laparoscope[14]. It is generally accepted that it is the gold standard in diagnosing tubal pathology[15,16] and its etiology[15]. It is superior in evaluation of proximal tubal obstruction[3,4,14], and other intra-abdominal causes of infertility, as pelvic adhesions and endometriosis[1,3,5,8,9,12,14,15,17,18]. It also allows the identification of peritubal adhesions either of inflammatory origin or due to endometriosis[7,19]. For these reasons, the cost and associated surgical morbidity of laparoscopy have traditionally been justified [7].

This study was carried out to highlight the importance of laparoscopic evaluation in the etiology of infertility and to obtain an idea about the etiology of primary and secondary infertility in our locality.

Methods

This 5 years retrospective study was done at the Infertility Center in Al-Batool Teaching Hospital where files of infertile women who have undergone diagnostic laparoscopy from January 2001 to January 2005 were recorded and included in the study.

One year or more of regular unprotected sexual intercourse without conceiving is the definition of infertility considered in this center.

All infertile patients underwent evaluation with history from male and female and clinical examination, as well as evaluation of

ovulation, tubal patency (most cases) and male factor by seminal fluid analysis.

Diagnostic laparoscopy was decided to the infertile patient who had one or more of the following: history suggestive of endometriosis, previous pelvic inflammatory disease, previous pelvic surgery, abnormal hysterosalpingography or there was greater than 36 months period of infertility.

Diagnostic laparoscopy was done using the same method and the same principle in reporting the result by the four gynecologists who work in this center (at study time) who had approximately same experience level in doing laparoscopy.

Laparoscopy was done as a day case under general anaesthesia. Pneumoperitoneum was created by CO_2 gas through varess needle. During the procedure, pelvis was inspected, visualizing uterus, fallopian tubes, ovaries, round ligaments, uterovesical pouch, uterosacral ligaments and pouch of Douglas. The tubes were visualized and any abnormalities were noted. Both ovaries were examined regarding their size, shape, evidence of ovulation. Peritubal, periovarian and omental adhesions, tubo-ovarian masses, endometriotic deposits, fibroid, presence of free fluid in the pouch of Douglas or any other pathology of the appendages if present was noted.

The patency of the fallopian tubes was ascertained by injecting methylene blue into the uterine cavity and observing it as it spilled through the fimbrial ends.

The statistical analysis was performed using statistical program (Minitab version 11) and Fisher test (sometimes). P value <0.05 was considered significant.

Results

In this study total numbers of patients were 1233, upon whom diagnostic laparoscopies were performed. Among them 919 patients (74.53%) had primary infertility, 314 patients (25.47 %) had secondary infertility.

Pelvic abnormality was seen in 1076 patients (87.27%) (791 patients (86.07%) among primary infertility and 285patients (90.70%) among secondary infertility) and it statistically differed from normal pelvis; Table (1). The ratio of positive findings in secondary infertility was statistically significant in comparison with the positive findings in primary infertility.

Table (1): Laparoscopic findings in infertility patients

Type	No pelvic abnormality		Pelvic abnormality	
	No.	%	No.	%
Primary infertility	128	13.93	791	86.07
Secondary infertility	29	9.24	285	90.76
Total	157	12.73	1076	87.27

Single pelvic abnormality was detected during laparoscopy among infertility patients in 75.09%, n=808 of cases and it was statistically different (p value 0.000) from multiple pelvic abnormality 24.91%, n=268 and it was the highly significant among primary infertility patients (77.24%, n=611) and among secondary infertility (30.87%, n=88). As shown in table (2).

Table (2) : Types of pelvic abnormalities among infertility patients.

Type	Single pelvic abnormality		Multiple pelvic abnormalities		P-value	Chi .sq
	No.	%	No.	%		
Primary infertility (n=791)	611	77.24	180	22.76	0.000	409.686
Secondary infertility (n=285)	197	69.12	88	30.88	0.000	83.375
Total (n=1076)	808	75.09	268	24.91	0.000	542.00

Ovarian factor (66.83%, n=540) was the highest abnormality seen among infertility patients followed by tubal factor (22.03%, n=178), endometriosis (4.46%,n=36), pelvic inflammatory disease (PID) (2.85%, n=23), pelvic adhesion (2.10%, n=17) and uterine fibroid (1.73%, n=14). Bilateral tubal blockage diagnosed in 74.43% of tubal factor cases.

Although ovarian factor was the most common cause identified in both primary (n=445, 72.83%) and secondary infertility (n=95, 48.22%) but it was highly significant in primary infertility (p value=0.000). Tubal factor (39.09%) and pelvic inflammatory disease (5.08%) were significantly different (p value 0.000, 0.03 respectively) in secondary infertility than primary infertility (16.53%, 2.13%). Other causes showed no significant difference between them. Table (3).

Most tubal factor cases of primary and secondary infertility were diagnosed to have bilateral blockage (69.306% and 81.33% respectively) with no significant difference between them.

Table (3): Distribution of causes among primary and secondary infertility.

Causes	Primary infertility		Secondary infertility		P-value	Chi sq
	No.	%	No.	%		
Ovarian	445	72.83	95	48.22	0.000	40.695
Tubal	101	16.53	77	39.09	0.000	25.903
Pelvic inflammatory disease (PID)	13	2.13	10	5.08	0.037	4.360
Endometriosis	30	4.91	6	3.04	0.289	1.123
Pelvic adhesion	13	2.13	4	2.03	0.934	0.007
Uterine Fibroid	9	1.47	5	2.54	0.319	0.993
Total	611		197			

Polycystic ovary was the common finding among infertility patients (97.2% (primary 97.3% and secondary 96.84% of ovarian factors) while ovarian cyst and tumour constitute 2.7%; table (4). There was no significant statistical difference between primary and secondary infertility.

Table (4): Ovarian pathologies seen in laparoscopy

Pathology	infertility		Primary infertility		Secondary infertility		P-value	Chi sq
	No.	%	No.	%	No.	%		
Poly cystic ovary (PCO)	525	97.22	433	97.3	92	96.84	0.976	0.001
Ovarian cyst and tumour	15	2.78	12	2.7	3	3.16	0.809	0.058
Total	540		445		95			

In the study multiple pelvic abnormalities identified by laparoscopy showed the tubal factor associated with poly cystic ovary (PCO) in 83 cases (39.71%), (61 cases primary infertility (44.52%) and 22 cases secondary infertility (30.55%)) with no significant statistical difference.

Among patients with tubal blockage with other apparent pelvic pathology, 71 cases (76.34%) due to pelvic inflammatory disease (PID), 17cases (18.28%) due to endometriosis, 5 cases (5.38%) due to pelvic adhesion.

Pelvic inflammatory disease associated with other abnormality seen in 71 cases (26.49%) with statistical difference between secondary infertility (n=30, 34.09%) and primary infertility (n=41, 22.77%).

All cases of uterine abnormality(9 cases, 0.72%) were seen in primary infertility associated with other abnormality (7cases with polycystic ovary and 2 with tubal blockage).

Other associations between multiple pelvic abnormalities show no significant difference between primary and secondary infertility.

Discussion

According to the criteria followed in this study for choosing infertile patients for diagnostic laparoscopy, 74.53% had primary infertility and 25.47% had secondary infertility. It is nearly similar to the laparoscopic study conducted in Bahawal Victoria Hospital[1] where (72.19%) of infertile women had primary infertility and (27.81%) had secondary infertility and to the result of Krishna et-al study[20] where 70.44% primary infertility and 29.55% secondary infertility, as well as to Cairo study[14] where primary and secondary infertility affected 70.7% and 29.3% of the couples respectively .

Pelvic abnormalities were diagnosed in this study in 87.27% of infertility cases which is higher than other studies where seen in 61.03% in Bitzer et-al study[17], 62% in Oxford[7] and 58.58% in Mehmood study[1].

This can be explained by the design of most other studies which include unexplained infertility only.

pelvic abnormality in primary infertility was seen in 73.51% and in secondary infertility in 26.49% in this study which is nearly similar to the result seen in Bahwall study[1] where 73.73% of primary infertility and 26.26% of secondary infertility, But it differs from Bitzer et-al study[17] which showed the same percentage of abnormal findings in primary and secondary infertility. The positive findings in secondary infertility were significantly higher than primary infertility which conforms with Hovav et-al study[21].

During evaluation of infertility causes in this study, the ovarian factor (66.83%) was the most common cause followed by tubal factor (22.03%) which differ from Mehmood study[1] and Usmani et-al study[22] where the tubal factor was the most common cause and constituted 35.85%, and 37.6% of cases respectively while ovarian factor was seen in 32.83%, and 26.08% of cases respectively. These difference can be explained by the omission of diagnostic curettage as a routine investigation which was done by different category health personnels during evaluation of infertile patient in Mehmood study as well as lower incidence of sexually transmitted disease .

Pelvic endometriosis (4.46%) was seen less frequently than in other studies (16.16%[1], 5.35% [22]) due to the difference in racial and environmental factor as well as to the practice of avoiding sexual intercourse at time of menstruation. But it is seen more than in Ololorin et-al study[23] (1.8%) which may be due to difficulty in diagnosing mild cases in early use of laparoscopy as it was done in 1987.

Pelvic inflammatory disease (2.85%) and pelvic adhesion (2.1%) in our study was seen less frequently than in other studies[23,24]; it may be due to low incidence of sexually transmitted diseases in our locality.

Uterine fibroids (1.73%) diagnosed in infertility patients in this study was much lower than in other studies where was seen in 7.14%[22] and 15.15% [1, 23] which could be explained by the difference in racial and environmental factors between the studies.

Polycystic ovary seen in 97.22% of cases among ovarian factor of infertility which is somewhat similar to Usmani et-al study[22] where it accounted for all cases. Bilateral tubal blockage constituted 74.43% of patients with tubal blockage which is higher than Vasiljevic et-al study[25] where was seen in 50.94% of cases and lower than 78.57% seen among infertile Nigerian women[23].

While comparing the most significant cause among primary and secondary infertility, the

result showed ovarian factor (72.38%) among primary infertility group and tubal factor (39.09%) among secondary infertility group, which differ from other studies[24,26] where all showed the tubal factor was the significant cause among primary and secondary infertility.

This could be explained by the fact of low occurrence of pelvic infection in primary infertility and the high occurrence of post partum and post abortal infection and pelvic inflammatory disease in secondary infertility.

During laparoscopy multiple pelvic abnormalities were seen and the association of tubal factor with polycystic ovary (PCO) was seen in 39.71% of cases which is lower than Kousta et al study[27] where was seen in 50% of cases.

In this study, among patients with tubal blockage, it appears mainly due to pelvic inflammatory disease, endometriosis and pelvic adhesion, while in Jamal study[28] the cause was mainly due to pelvic inflammatory disease, tuberculosis and endometriosis.

The higher incidence of pelvic inflammatory disease associated with other abnormality in secondary infertility can be explained by higher incidence of pelvic inflammatory disease among secondary infertility and its sequela of tubal blockage and pelvic adhesion which is seen later.

All cases of uterine abnormality 0.72% seen on laparoscopy among infertility patients were diagnosed among primary infertility and all associated with other pelvic abnormality, which is less than in other studies where it was seen in 2.9%[25] and 5%[26].

Conclusion

The diagnostic laparoscopy is a valuable technique and is a mandatory invasive investigation for complete assessment of female infertility.

Recommendation

As the high cost of In Vitro Fertilization (IVF) needed and its unavailability in our locality, it is a good practice for infertile women to complete all investigations of infertility including laparoscopy before referral of patient to In Vitro Fertilization.

References

1. Mehmood S. An audit of diagnostic laparoscopies for infertility. JSP Journal of surgery Pakistan International 2003;8(3): 8-10.
2. Edmonds D. Infertility. Dewhursts textbook of obstetrics and gynaecology,7th ed, India, 2007; 440-60.
3. LuEsley D, Baker P. Female infertility. obstetric and gynecology -An evidence-based text for MRCOG. 1st ed, India, 2004; 566-73.
4. Smith S , Pfiefer M , Collins J. Diagnosis and management of female infertility. JAMA 2003;290(13):1767-70.
5. Jose-miller A,. Boyden A, Frey K. Infertility. American Family Physicians 2007;75(6) :849-56.
6. Yu SL,Yap C. Investigation of infertile couple. Ann Acad Med Singapore 2003;32(5) :611-3.
7. Ayida G, Chamberlain P, Barlow D, Koninckx P, Golding S, Kennedy S. Is routine diagnostic laparoscopy for infertility still justified? A pilot study assessing the use of hysterosalpingocontrast sonography and magnetic resonance imaging. Human Reproduction 1997;12 (7):1436–39.
8. Tanahatoe S, Hompes P, Lambalk C. Investigation of the infertile couple Should diagnostic laparoscopy be performed in the infertility work up programme in patients undergoing intrauterine insemination?. Human Reproduction 2003;18(1):8-11.
9. El-Yahia AW. Laparoscopic evaluation of apparently normal infertile women. Aust N Z J Obstet Gynaecol 1994;34(4):440-2.
10. Donnez J, Langerock S, Lecart C, Thomas K. Incidence of pathological factors not revealed by Hysterosalpingography but disclosed by laparoscopy in 500 infertile women. Eur J Obstet Gynecol Reprod Biol 1982;13(6):369-75.
11. Malinowski A, Nowak M, Podciechowski L, Kaminski T, Szpakowski M. The cost of laparoscopy in the diagnosis of female infertility. Ginekol Pol 1998;69(12):1198-202.

12. Corson SL, Cheng A, Gutmann JN. Laparoscopy in the normal infertile patient: a question revisited. J Am Assoc Gynecol Laparosc 2000; 7 (3): 317- 24.
13. Komori S, Fukuda Y, Horiuchi I,Tanaka H, Kasumi H, Shigeta M, Tuji Y, Koyama K. Diagnostic laparoscopy in infertility: a retrospective study. J Laparoendosc Adv Surg Tech A 2003; 13(3):147-51.
14. EL-Tabbakh M, Amin A. Diagnostic laparoscopy in gynecological problems: A retro-spective study. OBGYN.net, laparoscopy and hysteroscopy.WEB SITE: http:// 64.4.18.250/cgi-bin/linkrd
15. Yang Y, Hao M, Zhu Y. Laparoscopic diagnosis of tubal infertility and fallopian tube lesions. Zhonghua Fu Chan Ke Za Zhi 1996; 31(6):327-9.
16. Ismajovich B, Wexler S, Golan A, Langer L, David MP. The accuracy of hysterosalp-ingography versus laparoscopy in evaluation of infertile women. Int J Gynaecol Obstet 1986; 24(1): 9-12.
17. Bitzer J, Korber HR. Laparoscopy finding in infertile women. Geburtshilfe Frauenheilkd 1983; 43 (5) : 294 - 8.
18. Bacevac J, Ganovic R. Diagnostic value of hysterosalpingography in examination of fallopian tubes in infertile women. Srp Arh Celok Lek 2001; 129 (1-2):18 - 21.
19. Forti G, Krausz C. Evaluation and treatment of the infertile couple. The Journal of Clinical Endocrinology & Metabolism 1998 ; 83 (12) : 4177 - 88.
20. Krishna UR, Sathe AV, Mehta H, Wagle S, Purandare VN. Tubal factors in sterility: alaproscopic study of 697 cases of sterility. J Obstet Gynaecol India 1979; 29(3):663-7.
21. Hovav Y, Hornstein E, Almagor M, Yaffe C. Diagnostic laparoscopy in primary and secondaey infertility. J Assist Reprod Genet 1998; 15(9):535-7.
22. Usmani A, Shaheen F, Waheed N. Laparoscopic evaluation of female infertility. Pak Armed Forces Med J 1995;45(2):63-5.
23. Otolorin EO,Ojengbede O, Falase AO. Laparoscopic evaluation of the tuboperitoneal factor in infertile Nigerian women. Int J Gynaecol Obstet 1987;25(1):47-52.
24. Ashraf V, Baqai S. Laparoscopy; diagnostic role in infertility. Professional Med J Mar 2005;12(1):74-79.
25. Vasiljevic M, Ganovic R, Jovanovic R, Markovic A. Diagnostic value of hysterosalp- ingography and laparoscopy in infertile women. Srp Arh Celok Lek 1996;124(5-6):135-8.
26. Kanal P. Sharma S. Study of primary infertility in females by diagnostic laparoscopy. IJMU 2006;1(2):6-8
27. Kousta E,White D, Cela E, McCarthy M,Franks S. The prevalence of polycystic ovaries in women with infertility. Human Reproduction 1999;14(11):2720-23.
28. Jamal T. Tubal factor in Infertility. J Postgrad Med Inst 2004;18(2):255-60.

