
Structural Findings on Hysterosalpingography in Primary Infertility

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Abstract

Objective: to determine the frequency of common structural findings at hysterosalpingography in women with primary infertility.

Study Design: descriptive cross sectional study.

Place and Duration of study: department of Gynecology and Obstetrics, Jinnah Postgraduate Medical Centre, Karachi, Pakistan from 17th December 2013 to 16th June 2014.

Methodology: 214 patients of age 22-35 years married for more than one year were selected. Patients taking hormonal therapy, contraceptives and husbands with infertility problems, secondary infertility and those with pelvic surgery were excluded from the study. Mean \pm SD were expressed for continuous while frequencies and percentages for categorical variables. Chi-square was used as a test of significance with P Value >0.05 .

Results: mean age \pm SD was 28.53 ± 4.05 years. Duration of marriage was 5.18 ± 2.15 years. About one third of women (32.24%) were obese. Bilateral tubal blockage was found in 7.94%, uterine fibroids in 6.54%, unilateral tubal blockage in 6.07%, hydrosalpinx in 4.67%, and loculated contrast spillage was detected in 4.21% patients. Hysterosalpingography (HSG) was normal in 70.57% of patients. Age and duration of marriage had no significant (P-value=0.559 and 0.308 respectively) effect on modification of frequency of such findings but obesity did as frequencies of loculated contrast spillage and unilateral tubal blockage were more among obese (P-value =0.026).

Conclusion: Hysterosalpingography revealed tubal blockage as the commonest structural finding in women with primary infertility. Hysterosalpingography is recommended for routine initial workup for infertility.

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Key words: female infertility, Hysterosalpingography, Tubal blockage, Uterine fibroid.

Introduction

The primary role of hysterosalpingography(HSG) is to evaluate the morphology and patency of fallopian tubes together with uterine structural abnormalities. Imaging plays a key role in the diagnostic evaluation of female infertility¹. Transvaginal scan is standard and first choice procedure. Abnormal findings can be further evaluated with saline or contrast hysterosalpingography (HycoSY)². However, its value is limited for assessment of tubal- abnormalities .Magnetic resonance imaging can be used to evaluate uterine pathologies. It is costly and its role in tubal assessment is limited^{3,4}. Infertility evaluation is typically initiated after one year of trying to conceive but in couples with advanced female age more than 35 years, most practitioners initiate diagnostic evaluations after six months of marriage. The Practice Committee of the American Society for Reproductive medicine (ASRM) has published guidelines for a standard infertility evaluation. The incidence of primary infertility has increased with concurrent decrease in secondary infertility most likely as a result of social changes like delayed child bearing⁵.

Indications of HSG in young include early sexual practice, arise in the number of STI, endometriosis and pelvic surgery⁶. HSG may be used as a diagnostic tool prior to IVF to confirm uterine cavity is normal and fallopian tubes are open⁷. HSG is also a method of choice to see some not so common conditions such as uterosubvesical fistula and other uterine fistula that may have a negative impact on conception⁸.

The aim of the study is to describe the pattern of pathologies encountered on hysterosalpingography in females presenting with primary infertility to sensitize

the patients as well as physicians to the benefits of this investigation.

Methodology

A Descriptive cross-sectional study was carried out for a period of six months from 17th December 2013 to 16th June,2014. 214 women with primary infertility were enrolled. Sample size was calculated using WHO calculator on the basis of the following prerequisites:

1. Percentage of unilateral tubal blockage = 3.6% confidence interval= 95%.
2. Margin of error=2.5%.sampling technique was non-probability consecutive.

Inclusion Criteria: women with primary infertility, age 22-35 years, duration of marriage more than one year and a regular menstrual cycle were included.

Exclusion Criteria: women on hormonal therapy including contraceptive methods, secondary infertility, male infertility, previous pelvic surgery and known hypersensitivity to contrast medium used in the procedure were excluded from the study.

Data Collection: patients meeting the inclusion criteria attending the outpatient clinic of Gynaecology and Obstetrics Jinnah Postgraduate Medical Centre (JPMC), Karachi **Permission from Ethical review committee of JPMC was sought. Informed and written consent was sought and respondents were assured of confidentiality.**

HSG was performed between 7th -10th day of menstrual cycle. Water soluble contrast medium was introduced using a cannula placed in the cervical canal under aseptic condition. Radiological films were obtained in the supine antero-posterior position. On average 10-15 ml of contrast was administered. Consultant radiologist having more than five years of experience performed and interpreted the findings. The demographic data

age, duration of infertility was documented by the researcher on a structured proforma.

Data Analysis: SPSS version 20 was used for data entry and analysis. Mean ± SD were calculated for age of the patient and duration of marriage. Frequency and percentages were calculated for obesity (BMI more than 30 kg/m²) and common structural findings like tubal blockage, hydrosalpinx, loculated spillage and uterine fibroids. Effect modifiers were controlled through stratification of age, duration of marriage and obesity to determine the effect of these outcomes. Chi-square test was applied and P value ≤ 0.05 was taken as significant.

Results

In this study, the frequencies of common structural findings were tubal blockage. The stratification analysis showed that age of the patient was effect modifier towards frequency of common structural findings at HSG in women with primary infertility. Percentages of almost all HSG findings non-significantly decreased with increase in age of patients. (P-value=0.559, Table I)

Table I. Effect of age on frequency of common structural findings at HSG in women with primary infertility

| Common Structural Findings | Age Category (Years) | | | Total | P-Value |
|-----------------------------|----------------------|--------|---------|--------|---------|
| | Upto 25 | 26 –30 | 31 – 35 | | |
| Bilateral Tubal Blockage | 8 | 5 | 4 | 17 | 0.559 |
| | 12.30% | 6.80% | 5.30% | 7.90% | |
| Uterine Fibroids | 5 | 4 | 5 | 14 | |
| | 7.70% | 5.40% | 6.70% | 6.50% | |
| Unilateral Tubal Blockage | 5 | 4 | 4 | 13 | |
| | 7.70% | 5.40% | 5.30% | 6.10% | |
| Hydrosalpinx | 4 | 2 | 4 | 10 | |
| | 6.20% | 2.70% | 5.30% | 4.70% | |
| Loculated Contrast Spillage | 1 | 6 | 2 | 9 | |
| | 1.50% | 8.10% | 2.70% | 4.20% | |
| Normal HSG Findings | 42 | 53 | 56 | 151 | |
| | 64.60% | 71.60% | 74.70% | 70.60% | |
| Total | 65 | 74 | 75 | 214 | |

Another non-significant (P-value =0.308) finding was increase in duration of marriage was variability in frequency of HSG structural findings showing effect modification. (Table II)

Finally, unilateral tubal blockage and loculated contrast spillage were more frequent in obese women as compared to bilateral tubal blockage, uterine fibroids, hydrosalpinx which were more common in non-obese women. This finding was statistically significant (P-value=0.026); Table III

Table II. Effect of Marriage Duration on Frequency of Common Structural Findings at HSG in women with primary infertility

| Common Structural Findings | Duration of Marriage (Years) | | | Total | P-Value |
|-----------------------------|------------------------------|--------|--------|--------|---------|
| | Upto 2 | 3 –5 | 6 – 10 | | |
| Bilateral Tubal Blockage | 3 | 7 | 7 | 17 | 0.308 |
| | 13.00% | 6.10% | 9.10% | 7.90% | |
| Uterine Fibroids | 0 | 7 | 7 | 14 | |
| | 0.00% | 6.10% | 9.10% | 6.50% | |
| Unilateral Tubal Blockage | 1 | 8 | 4 | 13 | |
| | 4.30% | 7.00% | 5.20% | 6.10% | |
| Hydrosalpinx | 0 | 6 | 4 | 10 | |
| | 0.00% | 5.30% | 5.20% | 4.70% | |
| Loculated Contrast Spillage | 3 | 2 | 4 | 9 | |
| | 13.00% | 1.80% | 5.20% | 4.20% | |
| Normal HSG Findings | 16 | 84 | 51 | 151 | |
| | 69.60% | 73.70% | 66.20% | 70.60% | |
| Total | 23 | 114 | 77 | 214 | |

Table III. Effect of Obesity on frequency of common structural findings at HSG in women with primary infertility.

| Common Structural Findings | Obesity BMI > 30kg/m ² | | Total | P-Value |
|-----------------------------|-----------------------------------|--------|--------|---------|
| | Yes | No | | |
| Bilateral Tubal Blockage | 5 | 12 | 17 | 0.026 |
| | 7.20% | 8.30% | 7.90% | |
| Uterine Fibroids | 4 | 10 | 14 | |
| | 5.80% | 6.90% | 6.50% | |
| Unilateral Tubal Blockage | 10 | 3 | 13 | |
| | 14.50% | 2.10% | 6.10% | |
| Hydrosalpinx | 3 | 7 | 10 | |
| | 4.30% | 4.80% | 4.70% | |
| Loculated Contrast Spillage | 3 | 6 | 9 | |
| | 4.30% | 4.10% | 4.20% | |
| Normal HSG Findings | 44 | 107 | 151 | |
| | 63.80% | 73.80% | 70.60% | |
| Total | 69 | 145 | 214 | |

Discussion

Infertility affects relatively large number of couples at some point of their reproductive lives⁹, globally between 50-80 million couples (WHO, Geneva, 1994). Among these primary infertility is more common, which is defined as inability of a couple to achieve a pregnancy within one year of defined time of unprotected intercourse¹¹⁻¹⁶. It is seldom, if ever a physically debilitating disease. Still it has devastating consequences which jeopardizes a couple's psychological harmony and shatter their marital stability.

Age alone impacts on infertility (Mosher)¹⁰ in this study, maximum number of infertile females (30.37%) belong to age group 20-25 years. These findings are in match with other studies which showed maximum fertility potential by the age of 24years¹⁷. Fertility potential begins to decline by the age of 30 years.

The most commonly observed pathology in our study is tubal blockage.¹⁸ These findings are supported by Poonam et al.¹⁹ Kanal Petal, in a study documented that tubal block with adhesions was the commonest reason of primary infertility.²⁰ However, it may be difficult to differentiate tubal obstruction from cornual spasm and those due to technical reasons. The high incidence of tubal blockage in primary infertility may be a reflection of high prevalence rate of pelvic inflammatory diseases and especially tuberculosis in our environment. Second most common abnormality noted in our study was uterine fibroid. Uterine cavity abnormalities can be the cause of infertility in 10-15% of women. Abnormal uterine findings occur in approximately 50% of infertile women. Because of the high prevalence of uterine abnormalities, inspection of the uterine cavity is routinely performed in the work up of infertility.

It is important to note that in our study, among 70.57% women the HSG was normal. It is in common to a study by T.O.Belloetal²¹, where normal examination was noted in 60% cases. A study by Kiguli-Malwadde et al reported the normal findings in 16.6% which indicated that the cause of infertility was not physical²². This rate is quite low to that seen in current study. This may be due to the reason that samples of patients are from infertility clinics and not from population of patients reaching to a tertiary care hospital which is the case in current study. This study also evaluated that obesity have significant effect modification of frequency of such findings (P-value=0.026).

Though Hysterosalpingography is a very effective proven method of evaluating and diagnosing the genital tract reason of infertility especially the tubal blockage ,yet other studies found other techniques also effective.²³⁻²⁵

The current study has certain limitations as well. Firstly, the sampling was made through consecutive sampling method because there was no special clinic for infertility at study site and patients were seen in general gynecology clinic which made difficult to define sampling frame. Secondly, resources were limited therefore the sample taken was small. Despite of these limitations, the study has highlighted the crucial method of evaluating primary infertility in females.

Conclusion

Hysterosalpingography is highly sensitive and specific in diagnostic work up of patients with infertility. It is also cost-effective and can be used as a sole radiologic evaluation tool for female infertility or complimentary with other radiological and non-radiological investigations.

References

1. Steinkeler JA, Woodfield CA, Lazarus E, Hillstrom MM. Female fertility: a systemic approach to radiologic imaging and diagnosis. *Radio graphics*. 2009; 29(5):1353-1370.
2. Pundir J, El-Toukhy T. Uterine cavity assessment prior to IVF. *Womens Health (London Engl)*. 2010; 6(6):841-848.
3. Imoakal, Wada A, Matsuo M, Yoshida M, Kitagaki H, Sugimura K. MR. Imaging of disorders associated with female infertility: use in diagnosis, treatment and management. *Radio graphics*. 2003; 23(6):1401-1421.
4. Simpson WL Jr, Beitia LG, Mester J. Hysterosalpingography: a reemerging study. *Radio graphics*. 2006; 26(2):419-431.
5. Hysterosalpingography in Infertility. Masuda Islam Khan, Suha Jesmi, Jesmin Jerin, Shahana Sherin, TA Chowdhury. *Delta Med Col J*. Jan 2014; 2(1): 9-12.
6. *Int Journey of Nursery and Midwifery Vol.3 (11)*, pp.178-181, November 2011. DOI . 10.5897/IJNM 11.039.
7. Is Hysterosalpingography Still Relevant in Workup of Infertility ? A review article. Olarinoye AO and Ogubtoyinbo, *J Women's Health Care* 2014, 3:5.
8. Rymskip, wozniak J, Opala T3-(20140) Uterosubvesical fistula as a cause of infertility. In *JGynaecol Obstet* 126:92-93
9. WHO: Challenges in reproductive health research: Biennial report 1992-1993, Geneva, WHO (1994)
10. Mosher WD, National survey of family growth Report No. 19: 1997; series 23.
11. Akanda V, Turner C, Horner P, Horne A, Pacey A . Impact of Chlamydia trachomatis in the reproductive setting: British Fertility Society Guidelines for practice. *Hum Fertil (Camnb)*. 2010; 13 (3)115-125.
12. Brown SE, Coddington CC, Schonrrr J, Tone JP, Gibbons W , Oehinger S. Evaluation of outpatient hysteroscopy, saline infusion hysterosonography and hysterosalpingography in infertile women: a prospective randomized study. *Fertil Steril*. 2007; 74 (5):1029-1034.
13. Kuohung W, Mark, Hornstein D, Robert L barbieri, Vanessa A. Overview of infertility. *Barss Eval Female Infert*. 2009; 17:3.
14. Sloboda DM, Hickey M, Hart R, Reproduction in females: the role of the early life environment. *Human Reprod*. 2010; 17(2):210-227.
15. Brydoy M, Fossa SD, Dahl O, Bjoro T, Acta T. Sperm counts and endocrinological markers of spermatogenesis in long-term survivors of testicular cancer. *Oncol*. 2007; 46(4):480-489.
16. Agboola A. Text book of Obstetrics and Gynecology, Heinman Educational books, Ibadan, Vol. 2004; 174-176.
17. Buy a los, Daneshmand and Brzechiffa 1997.
18. Pattern of Pathologies on Hysterosalpingography in primary infertility and Review of Literature. Saima Naqvi, Syed Shafqat-ul-Islam, Sibtainraza, Haji Haroon. *PJR* 2008; 18(3):82-86.
19. Poonam. The role hysterosalpingography in cases of subfertility. *Kathmandu University Medical Journal* 2007; 5(4):456-460.
20. Kenal P, Sharma S, Study of Primary Infertility in females by diagnostic Laparoscopy. *I J Medical update* 2006; 1(2):7-9.
21. Bello T.O. Pattern of tubal pathology in infertile women on hysterosalpingography in Ilorin, Nigeria. *Annals of African Medicine* 2004; 3(2):77-79.
22. Kiguli-Malwadde t, Byanyima RK. Structural finding at hysteroscopy in patients with infertility at two private clinics in Kampala, Uganda. *African Health sci*. 2004; 4(3):178-181.
23. Heikkinen H, Tekay A, Volpi E, Martikainen H, Jouppila P. Transvaginal salpingography for the assessment of tubal patency in infertile women: methodological and clinical experiences. *Fertil Steril*. 1995; 64(2): 293-298.
24. Case AM, Pierson RA, *J Obstet Gynaecol Can*. Clinical use of sonohysterography in the evaluation of infertility. 2003; 25(8):641-648.
25. Saini VK, Patel SC, Kawad K. Role of Diagnostic Laparoscopy in Infertility- Study of 50 cases. *J. Sci Research* .2013; 2(7):290-292.