

# 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 17<sup>th</sup> December 2013 to 16<sup>th</sup> 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  $28.53\pm 4.05$  years. Duration of marriage was  $5.18\pm 2.15$  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.

**Authorship Contribution:** <sup>1,2</sup> Randomization of study and writing the article, reviewed the study. <sup>2</sup> Data Analysis

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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 infertility<sup>1</sup>. Transvaginal scan is standard and first choice procedure. Abnormal findings can be further evaluated with saline or contrast hysterosalpingography (HycoSY)<sup>2</sup>. 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<sup>3,4</sup>. 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 bearing<sup>5</sup>.

Indications of HSG in young include early sexual practice, arise in the number of STI, endometriosis and pelvic surgery<sup>6</sup>. HSG may be used as a diagnostic tool prior to IVF to confirm uterine cavity is normal and fallopian tubes are open<sup>7</sup>. 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 conception<sup>8</sup>.

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 17<sup>th</sup> December 2013 to 16<sup>th</sup> 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 7<sup>th</sup> -10<sup>th</sup> 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/m<sup>2</sup>) 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%	
<b>Total</b>	<b>65</b>	<b>74</b>	<b>75</b>	<b>214</b>	

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%	
<b>Total</b>	<b>23</b>	<b>114</b>	<b>77</b>	<b>214</b>	

**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 <sup>2</sup>		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%	
<b>Total</b>	<b>69</b>	<b>145</b>	<b>214</b>	

## Discussion

Infertility affects relatively large number of couples at some point of their reproductive lives<sup>9</sup>, 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 intercourse<sup>11-16</sup>. 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)<sup>10</sup> 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 24years<sup>17</sup>. Fertility potential begins to decline by the age of 30 years.

The most commonly observed pathology in our study is tubal blockage.<sup>18</sup> These findings are supported by Poonam et al.<sup>19</sup> Kanal Petal, in a study documented that tubal block with adhesions was the commonest reason of primary infertility.<sup>20</sup> 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.Belloetal<sup>21</sup>, 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 physical<sup>22</sup>. 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.<sup>23-25</sup>

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.

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Secondary infertility was commoner than primary infertility. Abnormal findings at hysterosalpingography were found in 83.4%. The commonest finding was tubal blockage. Conclusion: The commonest pathology found on HSG in women presenting with infertility in Kampala is tubal blockage possibly secondary to chronic pelvic inflammation. The fact that secondary infertility is common points to pelvic infection complicating mismanaged pregnancies, septic abortions or sexually transmitted infections. The commonest structural cause of infertility in Uganda as per this study is tubal blockage and is commoner in patients with secondary infertility. Factors associated with this are not yet established and a study to elucidate them is recommended.

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3. Hysterosalpingography (HSG) is a radiographic diagnostic study of the uterus and fallopian tubes most commonly used in the evaluation of infertility. Uterine abnormalities are thought to be a contributing factor in approximately 10% of infertile women and 50% of women with recurrent early pregnancy loss, while the prevalence of tubal abnormality is 10-15%. Hysterosalpingography in infertility--an experience of 3,631 examinations. *Aust N Z J Obstet Gynaecol.* 1988 May. Findings of hysterosalpingography In this study, abnormal hysterosalpingography findings were recorded in 72.3% of cases. Tubal pathologies were the most common abnormalities in 112 (46.3%). Of these, tubal occlusion was the most documented tubal abnormality accounting for 99 (41.0%) of all the cases.

4. Infertility is the leading indication of HSG and the most common structural abnormality was tubal occlusion. Factors independently associated with abnormal findings on HSG were a history of recurrent pregnancy loss and an indication of infertility.

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7. Hysterosalpingography can be successfully performed by Ayurvedic gynaecologists to investigate tubal blockage and many other undiagnosed causes of infertility, if proper care is taken before, during and after procedure. It is important to know the problems which can come during and after the procedure and be prepared to manage them through Ayurveda.