

Association between hysterosalpingography findings and female infertility - A retrospective study at tertiary care Centre

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How to citation this article: Dr. Gayatri Singh, Prof. Dr. Kanchan Rani, “Association between hysterosalpingography findings and female infertility - A retrospective study at tertiary care Centre”, IJMACR-November – December - 2022, Vol – 5, Issue - 6, P. No. 477 – 484.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: Infertility is a serious issue for society. Approximately 15% couples are affected from infertility in India. Causes are different from place to place and from on population to another. HSG is a diagnostic procedure. Aim of study is to analyze the association between hysterosalpingography findings and female infertility.

Material and Method: Retrospective study was conducted on patients came to OPD at TMMC & RC with infertility over a period of 5 year at Teerthanker Mahaveer Medical College and Research Centre in Moradabad, in the department of Obstetrics & Gynecology. All the patients having infertility and ready to undergo HSG were included in the study.

A detailed history of patient involved in the study was collected, with mainly attention paid to the patient's age, type of infertility, regularity of her menstrual cycle, any past record of pelvic inflammatory disease, tubal blockage or dysfunction, and semen analysis of husband.

HSG was done on 7 to 11th day of menses. Images and data were collected and subjected to statistical analysis.

Results: Primary and secondary infertility was reported in 45.59% and 54.41% of the women respectively. Normal and abnormal hysterosalpingography (HSG) findings were reported in 44.61% and 55.39% of the subjects respectively. Cornual tubal blockage and Hydrosalpinx was found more in secondary infertile females as compared to primary. Tubal pathology can be revealed with HSG.

Conclusion: HSG is a reasonably priced, simple to interpret, and easily accessible imaging technique for determining infertility. All kinds of infertility were significantly more likely to develop when hydrosalpinx was present.

Keywords: Infertility, HSG, hydrosalpinx

Introduction

Infertility is a disease of male and female reproductive system defined by failure to achieve pregnancy after 1

year or more of regular unprotected sexual intercourse.[1]

Around 15% of reproductive-age spouses deal with infertility, but currently it affects 9% to 18% of overall population. [2,3]

There are 2 type of infertility- primary, in which couple has never been pregnant earlier and secondary, in which pregnancy has occurred before, but not necessarily with a successful birth.

Infertility rates are rising as a result of male infertility becoming more common and women delaying childbearing.[4]

Causes of infertility have been categorized into male like poor semen characteristics and female factors included occlusion of fallopian tubes, uterine anomalies and anovulation[5]

Subfertility can be caused by uterine abnormalities in around 10% women. It can be due to leiomyomas, Polyp, intrauterine adhesions or synechiae and congenital Müllerian anomalies.[6]

Imaging is an important tool for diagnosing female infertility.

One of the most common procedures is transvaginal ultrasonography. Saline or contrast hysterosalping so no graphy is available to further examine the abnormal results.

It has been discovered that HSG is extremely sensitive, specific, and precise in detecting uterine disorders, such as polyps and fibroid.

However, its utility in diagnosing tubal anomalies is limited. For the evaluation of congenital Müllerian duct anomalies and diagnosis of leiomyoma, adenomyosis and endometriosis, MRI as a tool can be used, although use for assessment of tubal abnormality is limited. [7-9].

Purpose of HSG is to determine the fallopian tubes morphology and patency.

HSG can reveal tubal anomalies caused by spasm, infection, obstruction, in addition to those caused by congenital conditions and uterine cavity abnormalities. Although HSG has sensitivity and specificity of 60-98% and 15-80% respectively, but the investigation of choice remains hysteroscopy. [2]

The outcomes of HSG investigations have been demonstrated to be significant in the decision-making process for patients undergoing diagnostic hystero-laparoscopy with chromopertubation. [10,11]

Pregnancy, acute pelvic infection, active vaginal or uterine bleeding and recent tubal or uterine surgery are main contraindications for HSG.[12]

HSG is a popular method for assessing female infertility despite having certain drawbacks such pain, discomfort and radiation exposure.

As the HSG pattern in the infertile patients is not much studied. Therefore this retrospective research was done to analyze different HSG finding and its association with female infertility.

Material and Methods

Retrospective research done on 204 patients came to OPD at TMMC & RC with infertility over a period of 5 year from 2017 to 2022 at Teerthanker Mahaveer Medical College and Research Centre in Moradabad, in the department of Obstetrics & Gynaecology. All the patients having infertility and ready to undergo HSG were included in the study. Women with acute infection of the vagina or cervix, active bleeding per vaginum or allergy to iodine-based contrast was excluded.

Detailed record of patients involved in the study was collected, with particular attention paid to the patient's age, type of infertility, regularity of her menstrual cycle,

any past record of pelvic inflammatory disease, tubal blockage or dysfunction, and husband's semen analysis.

Hysterosalpingography procedure

Consent was taken from patient after explaining all the risk associated with procedure, and were posted on day 7 to 11 of menses for HSG.

NSAIDS was given prior to reduce pain during procedure.

For HSG lithotomy position was made. Under all aseptic precautionusco’s speculum inserted and ante version of uterus along with uterocervical length was confirmed via uterine sound. Anterior lip of cervix held via vulsellum and Leech Wilkinson cannula was inserted. Water soluble, non-ionic, iodinated contrast was instilled into uterine cavity via Cannula.

Uterine cavity and free spillage in peritoneal cavity was assessed by taking x-ray images. No major complications were reported during or after completion of procedure. Patients were instructed regarding the possible bleeding per vaginum.

Information was compiled & analyzed statistically.

Statistical analysis

Data was analyzed using SPSS version 22.00. Mean and standard deviations was calculated. Difference between both groups was analyzed by student chi square test and p value <0.05 considered as significant.

Results

This study reported, maximum subjects were from the age group of 31-35 years (58.33%) followed by 26-30 years (20.1%). More than 65% of the women live in rural area and were homemakers. Primary and secondary infertility was reported in 45.59% and 54.41% of the women respectively. Only 12.25% of the women had infertility since >10 years.50.49% of the women had infertility since 5-10 years.

Table 1: Characteristics of the study population

Variables	N=204	%
Age Group (in years)		
21-25	23	11.27
26-30	41	20.10
31-35	119	58.33
36-40	21	10.29
Location		
Rural	133	65.20
Urban	61	29.90
Occupation		
Homemaker	137	67.16
Private Job	49	24.02
Government Job	18	8.82
Parity		
0	189	92.65
1	8	3.92
2	7	3.43
Type of Infertility		
Primary	93	45.59
Secondary	111	54.41
Duration of Infertility		
2-4 years	76	37.25
5-10 years	103	50.49
>10yr	25	12.25

Normal and abnormal hysterosalpingography (HSG) findings were reported in 44.61% and 55.39% of the subjects respectively. Abnormal HSG findings like cornual tubal blockage, perimfimbrial blockage, tubal occlusion, hydrosalpinx, fibroid, polyp, uterine synechie and cervical incompetence was found in 11.76%, 13.24%, 2.45%, 21.57%, 2.94%, 1.96%, 0.98% and 0.49% respectively (table 2).

Table 2: Frequency of Normal and Abnormal HSG findings

HSG Findings	N=204	%
Normal	91	44.61
Abnormal	113	55.39
Cornual tubal blockage	24	11.76
Perifimbrial blockage	27	13.24
Tubal occlusion	5	2.45
Hydrosalpinx	44	21.57

Fibroid	6	2.94
Polyp	4	1.96
Uterine synechie	2	0.98
Cervical incompetence	1	0.49

Cornual tubal blockage was reported more in secondary infertile females (17) versus primary infertile cases (7). When cornual tubal blockage was assessed according to primary and secondary infertility using chi square test, statistical difference was significant (table 3).

Table 3: Frequency of distribution of tubal abnormalities on HSG

Cornual tubal blockage	Primary Infertility		Secondary Infertility		Total		P value
	N=91	%	N=113	%	N=204	%	
Left	3	3.09	6	5.30	9	4.41	0.041
Right	4	4.39	10	8.84	14	6.86	
Bilateral	0	0	1	0.88	1	0.49	
					24	11.76	
Perifimbrial blockage							
Left	2	2.20	3	2.65	5	2.45	0.57
Right	3	3.30	4	3.54	7	3.43	
Bilateral	5	5.49	10	8.85	15	7.35	
					27	13.24	
Tubal occlusion							
Left	0	0	2	1.77	2	0.98	0.63
Right	0	0	2	1.77	2	0.98	
Bilateral	0	0	1	0.88	1	0.49	
					5	2.45	

Perifimbrial blockage was reported in 10.99% and of the 15.04% of primary and secondary infertility females respectively. Perifimbrial blockage was found comparable in primary and secondary infertile females as $p > 0.05$.

Tubal occlusion was revealed only in women with secondary infertility (table 3).

Hydrosalpinx was found to be more in women with secondary infertility (23.89%) as compared to primary infertility (18.69%). When hydrosalpinx was according to primary and secondary infertility, significant finding was found as $p < 0.05$ using chi square test (table 4).

Table 4: Hydrosalpinx according to fertility status

Hydrosalpinx	Primary Infertility		Secondary Infertility		Total	
	N=91	%	N=113	%	N=204	%
Left	3	3.30	8	7.08	11	5.39
Right	10	10.99	13	11.50	23	11.27
Bilateral	4	4.40	6	5.31	10	4.90
p value	0.046*				44	21.57

*: statistically significant



Fig 1: HSG showing normal uterus and patent tube.

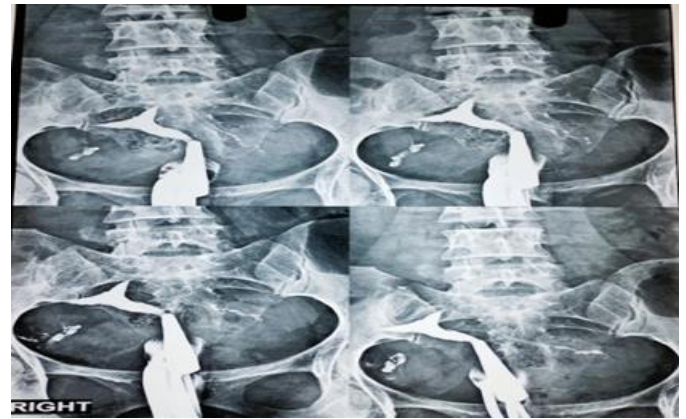


Fig 2: Bilateral cornual block



Fig 3: Left fimbrial blockage



Fig 4: Right fimbrial block

Discussion

One in seven couples suffers from infertility [13]. As a result, it has a substantial overall impact and affects a considerable portion of the population.

Since infertility is more prevalent in developing nations, so more study is needed to implement and integrate diagnosis and treatment of infertility in affordable way. In addition, factors that cause infertility differ depending on the features of the local population.[13] Hence, it is necessary to research the specific reasons of infertility and treat appropriately.

Although the existence of various alternative technologies, HSG is still commonly utilized since it is accessible, affordable, less invasive, and easily interpretable.

The majority of patients in this study (58.33%) were between the ages of 31 and 35. There was significant prevalence of secondary infertility than primary. 12.25% women reported infertility by more than 10 years. 50.49% of females had infertility since 5-10 years.

In different regions of the world, primary or secondary infertility has different incidences and causes. Ibekwe et al [14] also indicated that women between the ages of 26 - 36 had a significantly higher prevalence of infertility. According to research by Adedigba et al,[15] the most common form of infertility is secondary infertility (70.6%), afterward primary infertility (26.4%), and subfertility (3.0%). Similar findings were reported by Eleje GU et al, [16] who found that the occurrence of secondary infertility was three times that of primary. Comparable results have been found in other research done by Kashima JA et al,[17] Okafor CO et al [18] & Ibekwe PC et al [14]. This is in contrast to findings from other research I kechebelu JI et al,[19] Bello TO et al,[20] & Eng CW et al,[21] which show that primary infertility is more prevalent.

According to research by Hind Toufig et al, [22] the frequency of these two subtypes is very similar. Research in India, Deshpande et al, [23] found that

primary infertility was more prevalent than secondary. Correlation was found among patient age & infertility subtype. And found Patients younger than 25 years of age are most likely to experience primary infertility. Patients over the age of 35 had secondary infertility. There may be because of more chance of tubal abnormalities secondary to puerperal sepsis, post - abortion sepsis & sexually transmitted disease.

In the current study, 45.61% of participants reported normal hysterosalpingography (HSG) findings, while 55.39 percent reported abnormal results. Similar findings were reported by Adedigba et al [15]. More than half of the infertile women in the study by Hind Toufig et al [22] showed HSG abnormalities, which is in accordance with the results of Dan Fulani et al [24]. Cases of Cornual blockage were more in secondary infertile patients (17) in Comparison to primary (7) which was statistically significant.

Perifimbrial blockage was reported 10.99% in primary infertility and 15.04% in secondary infertility patient. It was found insignificant among women with primary and secondary infertility as $p > 0.05$. Only 2.45% patients had Tubal occlusion with secondary infertility.

Hydrosalpinx was reported significant in women with secondary infertility (23.89%) as compared to primary infertility (18.69%) which was statistically significant as $p < 0.05$. While Bashiru et al [25] found 14.5% hydrosalpinx.

Patient of secondary infertility were more likely to have cornual tubal obstruction than primary infertility according to Adedigba et al. [15]

As reported by Subhi et al [26] significant number of perifimbrial blockage reported in primary infertile patient than secondary (11:1).

Perifimbrial blockage has been widely reported as on HSG examination.

Fimbrial end adhesions were discovered in 17.3 percent of patients at the Mulago Hospital in Kampala, reported by Uganda et al [27] 23% of infertility cases in Tunisia were caused by fimbrial adhesions [28]. Perifimbrial adhesions reported in 13.24% in our study which is in contrast to 29.8% reported by Mgbor et al [29]. One potential drawback is that study is retrospective. Due to lack of sufficient clinical evidence, knowing the causes of infertility is limited. Therefore, more research is needed.

Conclusion

HSG is a convenient, economical, and easily interpreted imaging method for diagnosing infertility. Women between the ages of 31 to 35 had the greatest rates of all forms of infertility in our research and indicate that secondary infertility is more common. The presence of hydrosalpinx greatly increased the risk of all types of infertility.

So HSG should be performing for diagnosis of infertility before going for major invasive procedures to understand the etiology.

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