

Original research article

Comparative Study Of HSG in the Evaluation of Primary and Secondary Infertility

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Abstract

Background: Hysterosalpingography is a gold standard and cost effective method of assessing the integrity of the female genital tract. Two important indications for obtaining HSG are evaluation of tubal patency and congenital uterine anomalies. Hysterosalpingography is a safe relatively inexpensive, simple and rapid diagnostic test, when performed properly provides valuable information about the uterine cavity and tubal architecture.

Methodology: This study was conducted in the Department of Obstetrics and Gynaecology, at Darbhanga medical college and Hospital Laheriasarai, Darbhanga. Study duration period of two years. A total of 60 women infertile women, anxious to conceive, coming for infertility work-up in hospitals underwent Hysterosalpingography.

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 such as pelvic sonography, laparoscopy, magnetic resonance imaging.

Keywords: HSG, Primary infertility, Secondary infertility.

Introduction

Infertility is a condition with unique and profound psychological and emotional impacts. *Infertility* is defined as one year of unprotected coitus without conception. It affects approximately 10–15% of couples in the reproductive age group, which makes it an important component of the practices of many physicians. *Fecundability* is the probability of *achieving a pregnancy* within one menstrual cycle (about 25% in normal couples); *fecundity* is the ability to *achieve a live birth* within one menstrual cycle. Infertility is defined as one year of unprotected coitus without conception. It affects almost 10 to 15% of the couples in the reproductive age group which makes it an important component of practice. It is divided into primary and secondary infertility. Primary infertility refers to those who have never conceived in their lifetime whereas secondary infertility refers to those who have conceived at some time in the past regardless of whether the pregnancy ended in abortion. So the evaluation of female genital tract anatomy is an essential part of an investigation of infertility.³

Hysterosalpingography is a radiologic procedure where radiographs are taken of a female reproductive tract after injection of a suitable contrast media via cannula inserted in the cervical canal. The resulting radiographs obtained after the injection of contrast media depicts the uterine cavity, fallopian tubes and possible free spillage of contrast media into the peritoneal cavity if the tubes are patent.

Hysterosalpingography (HSG) is invaluable in the investigation of female infertility, especially in assessing tubal and uterine factors. Infertility is the commonest complaint encountered in the gynaecological out patient clinics in Nigeria. Ojo (1970), reviewing the problem of infertility in Nigeria, concluded that the major single factor responsible for infertility is chronic pelvic inflammatory disease, 'Hystero' means uterus and 'salpingo' means tubes, so hysterosalpingography literally means radiographic demonstration of the uterus and fallopian tube. , patent and functioning fallopian tubes and adequately prepared endometrium for suitable environment for the fertilised ovum where it reaches the uterus. Radiological and imaging techniques have given clear picture of uterus and most probable cause of infertility to the gynaecologists. Our study is to establish the factors that cause primary and secondary infertility by OPD procedures such as hysterosalpingography.

Objectives

To review the HSG findings in women investigated for infertility.

To compare the findings in primary and secondary infertility.

Review of Literature

The World Health Organization (WHO) estimates that 60 to 80 million couples worldwide currently suffer from infertility. Infertility varies across regions of the world and is estimated to affect 8 to 12 per cent of couples worldwide. Underlying these numbers exists a core group of couples, estimated to be 3 to 5 per cent, who are infertile due to unknown or unpreventable conditions. A prevalence of infertility above this level suggests preventable or treatable causes⁴. Infertility tends to be highest in countries with high fertility rates, an occurrence termed "barrenness amid plenty. Many studies have been conducted in the Africa, where the reported prevalence of infertility ranges from 9 per cent in Gambia to 30 per cent in Nigeria, Total infertility is divided into primary and secondary infertility. Definitions of primary infertility vary between studies, but the operational definition, put forth by the WHO, defines primary infertility as the "Inability to conceive within two years of exposure to pregnancy (*i.e.* sexually active, non-contracepting, and non-lactating) among women 15 to 49 year old. Secondary infertility refers to the inability to conceive following a previous pregnancy. Globally, most infertile couples suffer from primary infertility, Sexually transmitted infections (STIs) are generally considered the leading preventable cause of infertility worldwide, especially in developing countries. STIs cause approximately 70 per cent of all pelvic inflammatory disease (PID) cases, which often result in tubal damage, Among Indian women reporting primary infertility and PID, STI prevalence was high. The WHO estimates the overall prevalence of primary infertility in India to be between 3.9 and 16.8 per cent. of primary infertility has also been shown to vary across tribes and castes within the same region in India, In the past the diagnosis of uterine causes for infertility relied solely on dysfunctional uterine bleeding, dysmenorrhoea, and even more seldom dyspareunia. However the most common findings were a poor obstetric history. Bimanual palpation can seldom provide enough evidence for a diagnosis except when cervical or vaginal anomalies are self-evident. Rubin was the first person to recognise tubal obstruction in 1920 and this led to increase interest in the subject of

infertility. Functionally the urogenital system can be divided into two entirely different components: the **urinary system** and the **genital system**. Embryologically and anatomically, however, they are intimately interwoven. Both develop from a common Mesodermal ridge (**intermediate mesoderm**) along the posterior wall of the abdominal cavity, and initially the excretory ducts of both systems enter a common cavity, the cloaca. Shortly after the solid tip of the paramesonephric ducts reaches the urogenital sinus two solid evaginations grow out from the pelvic part of the sinus. These evaginations, the **sinovaginal bulbs**, proliferate and form a solid **vaginal plate**, increasing the distance between the uterus and the urogenital sinus. By the fifth month, the vaginal outgrowth is entirely canalized

On HSG the complete bicornuate uterus resembles the didelphic uterus except the bicornuate uterus has a single cervical os. There are two separate horns of the uterine cavity usually separated by a wide angle on HSG. Each of the horns has a rather fusiform appearance with a tapered superolateral apex ending in a single fallopian tube.

In the radiographs of HSG, the angle between the uterine horns helps to differentiate the septal uterus from the bicornuate uterus. If the angle of divergent of the uterine cavities was less than 75 degrees, no further studies were done and a diagnosis of a uterine septum was made. If the angle of divergent was greater than 75 degrees but less than 105 degrees and any doubt of the presence of a unified fundus existed other gynaecological examination, abdominal real time ultrasound examination was performed. If the angle of divergence was greater than 108 degrees, a diagnosis of bicornuate uterus was made. In doubtful cases another modality such as US, MRI, laparoscopy or hysteroscopy may be needed to establish diagnosis. Hysteroscopy reveals the broad intrauterine wedge of the bicornuate uterus to be distinctly distinct from the relatively thin septum visualised in the septal uterus. Whenseptal uterus diagnosed, the septum can be removed by means of operative hysteroscopy, the repair of the bicornuate uterus requires a standard surgical approach. Patients with septate uterus have a high incidence of spontaneous abortions and of premature labour. Operative procedures done on the uterus may cause morphologic changes that are evident radiographically. The most common reason for operation include repair of uterine anomalies or delivery by caesarean section., removal of leiomyomas. C-Section involves an incision made over the lower uterine segment. Dilatation may be associated with complete obstruction or with some peritoneal spillage, related to perimembral adhesions.

Material and methods

This is Observational study was conducted in the Department of Obstetrics and Gynaecology, at Darbhanga medical college and Hospital Laheriasarai, Darbhanga Bihar. Study duration period of two years. A total of 60 women infertile women, anxious to conceive, coming for infertility work-up in hospitals underwent Hysterosalpingpography. A total of 60 women infertile women, anxious to conceive, coming for infertility work-up in hospitals were studied.30 patients with primary infertility,30 patients with secondary infertility

Inclusion criteria

Married women from the age of 18 to 40 years with primary/secondaryinfertility willing for infertility workup.

Normal semen analysis of the husband.

Exclusion criteria

Unwilling patients, Endometrial carcinoma, Lower genital tract infection, Pelvic inflammatory disease.

After the enrollment, demographic data such as age, religion, education, socio economic status, were obtained through an interview. Detailed history including complaints, married life, obstetric, sexual, menstrual, medical and pharmacological history was documented and clinical examination was performed. Routine investigations such as haemoglobin percentage, blood group and Rh type, VDRL, RBS, Urine routine examination and microscopy. Specific investigations like Semen analysis were done to rule out the male factors of infertility, Pelvicultrasound in some specific cases. After taking the woman's reproductive history, a detailed clinical pelvic examination is the next step to take before scheduling a woman for hysterosalpingography. Very anxious patients are usually given Diazepam injection-10mg, intravenously Buscopan injection 20mg stat and analgesics i.e. Pentazocine 20mg intramuscularly start to minimize discomfort resulting from uterine/tubal spasm and peritoneal irritation by contrast media. The patient must be booked for the examination as to avoid performing the examination in a pregnant patient or during active menstruation



Figure 1: Instrument tray

The present study was conducted in the Department of Obstetrics and Gynaecology, Darbhanga medical college and Hospital, Laheriasarai, Darbhanga. A total of 60 women infertile women, anxious to conceive, coming for infertility work-up in hospitals attached to DMCH, Darbhanga, Bihar. All the women underwent hysterosalpingography.

Table 1:

	QUALIFICATION		Pri	sec	Total
EDUCATION	GRAD/PG	Count	5	4	9
		%	16.7%	13.3%	15.0%
	INTER/HS/DIP	Count	4	13	17
		%	13.3%	43.3%	28.3%
	HIGH SCH	Count	12	12	24
		%	40.0%	40.0%	40.0%
	PRIMARY	Count	9	1	10
		%	30.0%	3.3%	16.7%
Total	Count	30	30	60	
	%	100.0%	100.0%	100.0%	

based on Kuppaswamy index 40% of the women had education upto grade IV in primary and upto grade III in secondary infertility.

Table 2: History of consanguinous marriage

Consanguinous marriage	Distribution (n=100)	
	PRIMARY	SECONDARY
Yes	9	12
No	21	18
Total	30	30

history of consanguinous marriage was noted in 20% and non consanguinity in 80% majority were non consanguinous in both primary and secondary infertility.

Table 3: Duration of infertility

Duration (Years)	Distribution (n=100)			
	Primary	%	Secondary	%
2 - 6	25	83%	28	93.3%
7 – 11	5	17%	1	3.3%
12 – 16	0	0	1	3.3%
Total	30	100%	30	100%

study almost of the study population (88%) had duration of infertility between 2 to 6 years followed by 20% women with 7-11 years. The mean duration of infertility was 2 years.

Table 4:

VERSION	PRIMARY		SECONDARY	
	Number	Percentage	Number	Percentage
Anteverted	27	90%	24	80%
Retroverted	3	10%	06	20%
Total	30	100%	30	100%

Study bimanual examination of the uterus revealed anteverted uterus in 85% of the women while 15% of the women had retroverted uterus. Retroversion was more seen in secondary infertility.

Table 5: Filling defects of the uterus:

FILLING		Count	Primary	Secondary	Total
-		29	29	58	
	%	96.7%	96.7%	96.7%	
+		1	1	2	
	%	3.3%	3.3%	3.3%	
Total		30	30	60	
	%	100.0%	100.0%	100.0%	

Filling defects were absent in 97% of cases. Filling defects were seen in both primary and secondary infertility in about 3.3% each.

The study majorly shows normal uterus with normal spillage in 90% of primary and 80% of secondary cases. Normal uterus with no spillage was seen in 3 cases(10%) of secondary infertility. Normal uterus with left spillage is seen in 2 cases (6.7%) of secondary infertility. Normal uterus with right spillage is seen in 2 cases (6.7%) of secondary infertility.

Discussion

Hysterosalpingography is a radiological procedure where radiographs of female reproductive tract are taken after injection of a suitable contrast media via cannula inserted in the cervical canal. Hysterosalpingography is a gold standard and cost effective method of assessing the integrity of the female genital tract. Two important indications for obtaining HSG are evaluation of tubal patency and congenital uterine anomalies. Hysterosalpingography is a safe relatively inexpensive, simple and rapid diagnostic test, when performed properly provides valuable information about tubes, uterus and the cervix. study the commonest age groups was 26 to 30 years (38%). Primary infertility was mainly seen in the age group of 21 – 25 years and secondary infertility in 26 – 30 years.

The mean age of the study population was 27.27 ± 3.59 years. Kore S et al, in their study reported similar observation where most of the women study were between 25-30 years of age. The menarcheal age in 52% of the women was 13 years. Majority (81%) of the women reported regular cycles while 19% of the women reported irregular menstrual history. Menstrual history was normal in around 88% of the cases, being 83% in primary and 93% in secondary infertility. Oligomenorrhoea was 10% in primary infertility. Menorrhagia was seen equally of 6.7% in both primary and secondary infertility. Tubal patency was present in 93% of primary and 83% of secondary infertility. Left tubal block was seen in 6.7% of primary infertility and right tubal block in 6.7% of secondary infertility. Bilateral tubal block was seen in 10% of secondary infertility. Tubal block was seen more in secondary infertility. Bilateral spillage was present in 88% of cases. Kitilla T studied all infertility clinical records of five years (2001-2005) at FGAE central clinic were retrieved and those women who had undergone HSG procedure selected. The type and duration of infertility, socio-demographic factors and the recorded results of HSG were analyzed. Among the total of 8582 attendants of the infertility clinic, 96% were women and 4% males. HSG was undertaken on 1716 (21%) women. Secondary and primary infertility were 894 (53%) and 804 (47%) respectively.

According to Elsie Kiguli-Malwadde and Rosemary K. Byanyima, in a study in 2004, the commonest age group seen was 26 – 30yrs. Most were of low parity. Abnormal findings at hysterosalpingography were found in 83.4%. The commonest finding was tubal blockage. Okafor co et al reviewed the pattern of hysterosalpingographic findings among women being investiagted for infertility in Nmamdi, Azikiwe university teaching hospital Nnewi, Nigeria over a period of 5 years (2001 to 2005). He obtained data from the request forms and radiologists reports were analysed. Out of 320 studied 230 were found suitable for analysis, aged between 20 to 44 years. Hysterosalpingography (HSG) has become a commonly performed examination due to recent advances and improvements in, as well as the increasing popularity of, reproductive medicine. HSG plays an important role in the evaluation of abnormalities related to the uterus and fallopian tubes. Uterine abnormalities that can be detected at HSG include congenital anomalies, polyps, leiomyomas, surgical changes, synechiae, and adenomyosis. Tubal abnormalities that can be detected include tubal occlusion, salpingitis isthmica nodosum, polyps, hydrosalpinx, and peritubal adhesions. According to S. Mesbahi , M. Pourissa , S. Refahi , Y. Tabarraei and M.H. Dehghan the study of

hysterosalpingograms of 100 infertile women who were referred between January 2007 to June 2008 at the hospitals affiliated to Tabriz University of Medical Sciences, Iran. The obtained findings were abnormal in 42% of cases. 79% had primary infertility. Abnormal uterine was seen in 25% and abnormal fallopian tubes in 21%. Abnormal uterine shape and tubal blockage were the commonest abnormal finding regarding uterine and fallopian tubes. Overall the present study showed the usefulness of hysterosalpingography in the diagnosis of primary and secondary infertility. The limitation of the study was that, we encountered various diagnosis with small proportion of patients which limited this study from establishing the association between type of infertility and commonest etiology.

Conclusion

Hysterosalpingography is the Gold-Standard and cost effective method of assessing the integrity of the female genital tract. It questions the state of the uterus and the fallopian tubes gives a clean bill of health or reveals the disease process afflicting the uterus and fallopian tubes precisely. 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 such as pelvic sonography, laparoscopy, magnetic resonance imaging. In some cases of female infertility, its therapeutic role is something to behold. HSG is still the most common first-line diagnostic test to evaluate the uterine cavity and tubal patency.

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