

Spectrum of Radiological Findings in Hysterosalpingography for Female Subfertility: A Retrospective Cross-Sectional Study in a Tertiary Care Center of Nepal

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ABSTRACT

Introduction:

Hysterosalpingography (HSG) is a commonly used diagnostic procedure to investigate the causes of female subfertility. This study aimed to evaluate the range of findings observed in HSG examinations conducted for this purpose.

Methods:

A prospective cross-sectional study was conducted at the Department of Radiology and Imaging, Tribhuvan University Teaching Hospital, from December 2022 to April 2023. The study included 196 female participants who underwent HSG and met the inclusion criteria.

Results:

Out of the 196 participants, 127 (64.8%) were categorized as having primary subfertility, while 69 (35.2%) had secondary subfertility. The mean age of the participants was 30.61 ± 5.623 years, with an age range of 20 to 45 years. Among the participants, 142 (72.4%) exhibited a normal uterus, 23 (11.7%) displayed left tubal occlusion, 17 (8.7%) showed right tubal occlusion, 13 (6.6%) had other findings, and 1 (0.5%) was diagnosed with uterine fibroids.

Conclusions:

This study demonstrated that approximately one out of every five HSG examinations performed to evaluate subfertility revealed tubal occlusion. Consequently, the high detection rate of uterine and tubal pathologies using HSG underscores its critical role as a diagnostic tool for assessing women with subfertility.

Keywords: Female Subfertility; Hysterosalpingography; Tubal Occlusion; Uterine Fibroids

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INTRODUCTION

Hysterosalpingography (HSG) is a widely utilized radiographic procedure for investigating female infertility. This technique involves radiological assessment of the uterus and fallopian tubes through the introduction of radio-opaque contrast media via the cervical canal. Conducted during the follicular phase of the menstrual cycle to avoid interference with potential early pregnancy, HSG yields optimal outcomes through fluoroscopy with image intensification. The enduring popularity of HSG can be attributed to its affordability, accessibility, and straightforward interpretability^{1,2,3}

Despite its invasive nature, HSG retains its pivotal role in infertility management, having served as a cornerstone of clinical gynaecology for many years. It proves especially valuable in exploring uterine and tubal factors contributing to female infertility. The primary objective of HSG is to assess fallopian tube morphology and patency. Even in the face of newer imaging modalities, HSG remains the premier method for evaluating female infertility, as it aims to identify uterine and tubal irregularities that might underlie infertility, elucidating their distinctive radiographic traits.^{4,5,6}

This approach furnishes essential insights into the dimensions, contours, and inner anatomical features of fallopian tubes, setting the gold standard for appraising tubal luminal status. Particularly in resource-constrained environments, HSG maintains its significance for gauging tubal patency. In such settings, tubal occlusion emerges as the leading cause of female infertility.^{7,8}

This study assesses Hysterosalpingography (HSG) outcomes for female subfertility, enhancing diagnostic insights. It distinguishes normal/abnormal results, evaluates aberrations, and identifies common findings by age group. Stratifying the population by age offers insights into age-related subfertility aspects.

METHODS

This was a quantitative, retrospective cross-sectional study conducted in the Department of Radiology and Imaging, Tribhuvan University Teaching Hospital (TUTH). A total of 196 females, undergoing HSG done for three months, meeting the including criteria, were included in the study. The study was done after ethical clearance from the Institutional Review Committee after obtaining verbal and written informed consent from the patients.

A sample size of 196 was determined by following the formula applying a 95% confidence interval and a 7% margin of error. A purposive nonprobability sampling technique was adopted.

The inclusion criteria encompassed patients referred for HSG in the Radiology Department. Exclusion criteria involved females with urinary tract infection (UTI), purulent vaginal discharge, pregnancy, contraindications for HSG, difficult cannulation, and incomplete procedures.

The Hysterosalpingography (HSG) procedure was conducted at the Radiology Department of TUTH, involving patients referred with gynaecologists' request forms. Patients provided informed consent after receiving a comprehensive explanation of the procedure and potential complications. The examination was scheduled between days 7 and 12 of the menstrual cycle, ensuring a thin endometrium during the proliferative phase and ruling out pregnancy. Employing a Siemens Axion Luminos DRF Digital fluoroscopy system, the procedure took place in a supine position on a fluoroscopy table. A preliminary pelvic film assessed positioning, technical aspects, and radiopaque lesions. Subsequently, a lithotomy position was adopted, and an aseptic technique facilitated the visualization of the cervix using a vaginal speculum. A matching-size Foley catheter was inserted into the cervical canal, followed by the slow injection of 15-20 ml of urografin 76% w/v contrast medium into the uterine

cavity. Direct image intensification evaluated the uterine cavity and fallopian tube patency, capturing spot films during various phases. A release film confirmed contrast clearance, especially in cases of hydrosalpinx. A single image with four layouts was printed for reporting, encompassing control, early filling, late filling, and peritoneal spillage. All interpretations were based on the direct visualization of HSG images, focusing on contrast spillage, cervical and uterine cavity outlines, and potential anomalies indicative of uterine issues.

A structured form was designed to systematically document the clinical indications for patients undergoing Hysterosalpingography (HSG) procedures, along with the subsequent findings as reported by radiologists. The form was bifurcated into two sections: the initial section captured the patients’ clinical indications, while the second section documented the HSG findings. The process began by obtaining the referral request form from patients scheduled for HSG examinations in the radiology department. Following this, verbal informed consent was obtained from each patient,

and a comprehensive review of the referral form ensured its completeness. The clinical indication provided by the gynaecologist in the referral form was transcribed onto the designated section of the form. After the radiologists reported the HSG results, the corresponding findings for each patient were meticulously recorded in the form.

Data compilation and analysis were performed using IBM SPSS version 25 and Microsoft Excel. The analysis primarily employed descriptive statistics to elucidate the collected data.

RESULTS

A total of 196 female patients were involved in this study. The mean age of participants was 30.61±5.623 years. The minimum age of participants was 20 years and the maximum age of participants was 45 years.

Among the clinical indications stated by the gynaecologist on the referral request form, 127(64.8%) were primary subfertility whereas 69(35.2%) were secondary subfertility.

In the course of an HSG examination conducted on a cohort of 196 patients, the majority of subjects exhibited typical HSG findings (Figure 1). Subsequently, the prevalence of left tubal blockage (Figure 2), was observed to be higher than that of right tubal blockage (Figure 3). Additionally, uterine fibroids and other related findings were documented (Table 1).

Table 1: Various HSG findings in our study

HSG findings	Total Number (Percentage)	Primary infertility	Secondary infertility
Normal	142 (72.4%)	105(82.7%)	37(53.62%)
Left tubal occlusion	23(11.7%)	8(6.3%)	15(21.74%)
Right tubal occlusion	17(8.7%)	8(6.3%)	9(13.04%)
Uterine Fibroid	1(0.5%)	0	1(1.45%)
Other findings	13(6.7%)	6(4.7%)	7(10.15%)

Fibroid was seen in one case of secondary fertility. Both left and right tubal occlusion were most commonly seen in patients with secondary fertility.

Other findings in HSG include the presence of variants like myometrial folds, and pelvic inflammatory disease with dilated tubes.



Figure 1: Normal HSG with patent bilateral fallopian tubes



Figure 2: HSG image showing left tubal blockage



Figure 3: HSG image showing right tubal blockage

DISCUSSION

The optimum time to perform HSG is toward the end of the first week after the menstrual period when the

isthmus is at its most distensible and the fallopian tube is most readily filled by contrast medium. HSG is avoided in the second part of the cycle out of concern about unintentionally irradiating an ongoing pregnancy and because of the potential of venous intravasation that could result in a false-positive diagnostic of cornual occlusion due to the thicker secretory endometrium.

In the current study, among the sample size of 196, 72.45% of cases had normal fallopian tubes with free contrast material spillage. A similar study was conducted by M. Danfulani et al (2015) in Sokoto, North Western, Nigeria and Onwuchekwa CR et al. (2017) where 43.85% and 49.5% of cases had normal HSG, respectively. This might be due to the age group selection as current study participants range in age from 20-45 yrs whereas in Nigeria is 17-48 and in Onwuchekwa CR et al. (2017) study is 15-49 reproductive age.^{8,9}

Santhalia PK et al. (2013) conducted a similar study in 44 patients, 26 (59.0%) were infertile from the start, while 18 (41.0%) were infertile from secondary causes. Twenty-eight individuals (63.6%) had tubal abnormalities, while 2 (4.6%) had uterine abnormalities. On HSG, tubal block was the most frequently found abnormality (50.0%). The distribution of unilateral and bilateral tubal blocks was equal (50.0% each), 8 (36.4%) patients had proximal tubal block, while 13 (59.1%) patients had distal tubal block, 15 individuals (34.1%) had hydrosalpinx. However, this study's findings are higher than the current study, only 20.4% had tubal occlusion in our study the probable result may be a higher number of cases (196) than the study conducted in Eastern Nepal.⁶

Concerning fallopian tube abnormalities 27.2% of cases had fallopian tube abnormalities this is low compared to the research conducted in Eastern Nepal, 63.3%, and Nigeria 35.33% tubal abnormalities. Thus, variations may be due to the socio-cultural-economic status of patients in particular areas of respective countries. Besides the source of difference may also be the methodological variation.

This is a study that was completed in a short amount

of time and using a small number of samples. The results obtained from these samples may or may not apply to Hysterosalpingography taken at other times. If the study was conducted over a longer period with a larger number of samples Hysterosalpingography, the results on adequacy would be more accurate.

CONCLUSION

The HSG examination and a spectrum of common causes of subfertility in women detected in TUTH tertiary care hospital have been described. This study concluded that out of every five HSGs done for evaluation of subfertility, one examination would be showing tubal occlusion. Hence, the high detection rate of uterine and tubal pathology in HSG makes it a very important diagnostic tool for the evaluation of subfertile women.

CONFLICT OF INTEREST

None

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None

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