Hysterosalpingographic Evaluation of Infertile Women in Tertiary Care Center

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ABSTRACT

Background

Infertility refers to a inability of couple to achieve pregnancy after one year of consistent, unprotected intercourse. Conditions involving the fallopian tubes are responsible for an estimated 35–40% of female infertility cases. Hysterosalpingography (HSG) offers a cost-effective method to assess the patency of the fallopian tubes and the structure of the uterus. This study aims to examine the frequency of abnormal uterine and tubal findings among infertile women undergoing HSG at Nepal Police Hospital.

Method

This is a retrospective study done in Nepal Police Hospital from from 1st July 2023 till 31st December 2024. It has included all women with a history of primary or secondary infertility coming for infertility assessment and had undergone HSG during that period. HSG examination was done during the follicular phase of menstrual cycle, between 6 and 11 cycle day. It was conducted by gynaecologist under the supervision of experienced radiographer. The findings analyzed by experienced radiologists and kept in hospital records Data regarding information about the patients and HSG findings were obtained from hospital records and entered in MS-Excel were processed and interpreted using IBM SPSS Statistics software, version 22.0.

Result

A total 112 women were included in the study. Age of the patients ranged from 21 to 40 years The mean age of patients was 29 years with maximum (41.07%) of them belonging to the age group of 26- 30 years. Out of the total, 82 women (73.21%) were diagnosed with primary infertility, whereas 30 (26.7%) had secondary infertility.

HSG abnormalities were seen in 28 patients (25%). Abnormal HSG finding was more common in primary infertility (78.57 %) than in secondary infertily (21.4%). Among HSG findings, tubal abnormalities were most common, identified in 20 patients (17.85%), followed by uterine anomalies in 4.46% and a combination of uterine and tubal abnormalities in 2.6% of cases. The most common tubal abnormality detected on HSG was tubal block seen in 82.6% of the total. A single tubal blockage was identified in 73.9% of cases, while bilateral tubal blockages were found in 8.6%. Uterine abnormalities seen in 7.14% (8/112). Among all uterine abnormalities, two uterine cavity is most common(37.5%).

Conclusion

HSG is an easy, relatively safe and cost effective procedure which can diagnose most structural cause of infertility i.e. uterine and tubal abnormalities. So, invasive procedures like laparoscopy and hysteroscopy are not indicated in patients with normal HSG findings. Hence it can minimize the use of invasive procedures and patients may be managed conservatively. It also increases the probability of conception by opening up flimsy adhesion.

Keywords: Infertility, hysterosalpingography, tubal block, uterine abnormalities.

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Introduction

Infertility describes the condition where a couple is unable to become pregnant after one year of regular, unprotected sexual activity.[1] It can be divided into two broad categories - primary and secondary subfertility Primary infertility occurs when a couple has never experienced a pregnancy, while secondary infertility involves difficulty in conceiving following at least one prior pregnancy, regardless of the outcome which may or may not have led to live birth.[2]. According to recent survey done by WHO 2023, 17.5% of the couples experience infertility worldwide.[3]

Infertility in women could be caused by abnormalities in the fallopian tubes, uterus, cervix, ovaries and endocrinological problems. About 35–40% of infertility is caused by specifically a disorder in the fallopian tubes.[4]

Hysterosalpingography (HSG) is considered the most effective technique for evaluating fallopian tube patency as well as the anatomical structure of the uterus and cervix. It is one of the simple, safe and inexpensive methods of evaluation of these structures. Hysterosalpingography is highly effective in identifying tubal blockages, with an estimated sensitivity of 94% and a specificity of nearly 92%. The diagnostic accuracy of HSG in identifying tubal obstruction is high, with sensitivity reaching 94% and specificity around 92%[5]. It is an affordable and non invasive option for initial treatment which can be done in most centers in Nepal. It helps in early diagnosis of cause of infertility and facilitates for early treatment. It also increases the probability of conception by opening up flimsy adhesion, thereby decreases the burden of IVF.

Considering the increasing incidence of infertility both globally as well as in Nepal, the objectives of the study are to assess tubal and uterine abnormalities as the causative factors of infertility in patients attending Nepal police Hospital

Material and Methods

This retrospective study was conducted at Nepal police Hospital from 1st July 2023 till 31st December 2024. Approval for the study was granted by the Institutional Review Committee of Nepal Police Hospital (NPH-IRC, Reference No: 35). It included all women with a history of primary or secondary infertility coming for infertility assessment and had undergone HSG at Nepal police Hospital from 1st July 2023 till 31st December 2024.

HSG procedures were performed during the follicular phase of the menstrual cycle, specifically between the 6th and 11th day. Patients with vaginal discharge, active or recently treated PID (within the past 3 months), suspected pregnancy, recent intrauterine instrumentation or tubal surgery (salpingectomy), active uterine or vaginal bleeding, palpable adnexal mass or tenderness on bimanual examination were excluded from doing HSG. It was conducted by gynaecologist under the supervision of experienced radiographer. Prior to the HSG procedure, patients were thoroughly briefed on the process and possible risks, and written informed consent was obtained. During the examination, patients were placed in a lithotomy position, vaginal speculum was inserted to visualize cervix. No 8 Foley's catheter with stent was inserted inside uterine cavity and balloon of catheter inflated under aseptic techniques. Slow injection of contrast media urografin 76% (sodium amidotrizoate + meglumine amidotrizoate- water-soluble non-ionic contrast medium) was injected slowly into the uterine cavity. First film was taken on visualization of the uterine cavity, the second during early tubal filling and the third after peritoneal spillage. These films were reviewed by the direct visualization of hard copy images and the findings analyzed by experienced radiologists and kept in hospital records.

Data regarding information about the patients and HSG findings were obtained from hospital records and entered in MS-Excel and were analyzed using IBM SPSS Statistics version 22.0.

Results

Total 112 women were included in the study. Age of the patients ranged from 21 to 40 years The mean age of patients was 29 years with maximum (41.07%) of them belonging to the age group of 26- 30 years. 82 (73.21%) had primary infertility while 30 (26.7%) were cases of secondary infertility.

HSG abnormalities were seen in 28 patients (25%). Abnormal HSG finding was more common in primary infertility (78.57 %) than in secondary infertily (21.4%).

Among HSG abnormalities, tubal abnormalities were most common seen in 20 patients (17.85%), uterine abnormalities in 4.46% and both uterine and tubal in (2.6%)

Table 1: Radiographic abnormalities on HSG

HSG Finding	No. of Patients (N=112)	Percentage
Normal (Normal tubes and uterus)	84	75%
Tubal abnormality only	20	17.85%
Uterine abnormality only	5	4.46%
Both Tubal and Uterine abnormality	3	2.67%

Table2. Various types of tubal pathologies in HSG

Tubal pathologies	Number (n=23)	Percentage
Left tube block	11	47.82%
Right tube block	6	26.08%
Bilateral tube block	2	8.69 %
Unilateral hydrosalpinx	3 (rt -1, lt-2)	13.04%
Left peri-tubal adhesion with minimal spillage	1	4.34%

Hence, the most common tubal abnormality detected on HSG was tubal block seen in 82.6% (19/23). Single tubal block in 73.9% and B/L tubal block in 8.6%. one patient with bilateral tubal block had complete uterine synaechia and another had past history of tuberculosis. Possibility of decrease number of bilateral tubal block could be because we have used injectable analgesics before HSG which has avoided tubal spasm. Tubal block was more common in primary infertility seen in 73.68% (14/19) than in secondary infertility 26.31%(5/19).

Table 3. Different types of uterine abnormalities

Uterine abnormalities	Number (n=8)	Frequency
Two uterine cavities (septate/bicornuate)	3	37.5%
Arcuate uterus	2	25%
Complete uterine Synaechia	1	12.5%
Irregular uterine cavity	1	12.5%
T shaped uterine cavity	1	12.5%

Uterine abnormalities seen in 7.14% (8/112). Among all uterine abnormalities, two uterine cavity is most common(37.5%)

Fig. 1 HSG showing normal uterine cavity and B/L patent tubes

Fig.2 showing two uterine cavities with left hydrosalpinx

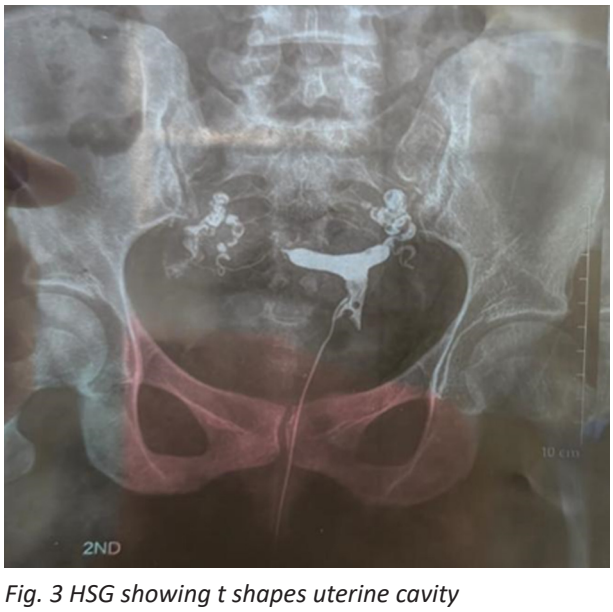

Fig. 3 HSG showing t shapes uterine cavity

Fig. 4 HSG showing two uterine cavity with B/L patent tubes

Fig. 5 HSG showing irregular uterine cavity with left tube block

Discussion

Hysterosalpingography as an essential tool in the evaluation of infertile women, particularly for detecting tubal pathologies and uterine abnormalities. It provides a reliable and relatively non-invasive method for assessing fallopian tube function and can guide subsequent fertility treatments.

In the present study maximum number of infertile patients (41.07%) belonged to the age group of 26 to 30 years. The finding was similar to study done by Malwadde EK et al[6] and Dutta et al[7], the most common age group in infertility was 26 to 30 years which lies just beyond the maximum fertile stage.

In this study, the average age of women with infertility was 29 years, closely aligning with findings by Arjoki et al[8] in Finland and Abalovich et al[9] in Argentina, both of which reported a mean age of 30 years. Increasing mean age of infertility could be because of late marriages.

Majority of infertile women (73.21%)) were of primary subfertility and 26.7% were of secondary subfertility. This was similar to study conducted Raber et al.[10], Bharti et al.[11] and Farhi et al.[12] who reported 72%, 67.62% and 65% of infertile women had primary subfertility respectively. Women with primary subfertility might be more conscious of not having a child than women of secondary subfertility, thus seeking treatment more often could be the reason of higher prevalence of primary infertility than secondary.

Our study identified HSG abnormalities in 25% infertile women which is lesser than that 59% shown by Eiman Kamal et al. [15] and 65.9% by Santhalia PK[14],83.4% by Malwadde EK et al[6]. We found abnormal HSG finding more common in primary infertility (78.57 %) than in secondary infertily (21.4%. Whereas no significant difference was observed in abnormal HSG findings between the primary (29/46, 63%) and secondary infertility (30/54, 56%) groups ($p > 0.05$) by Eiman Kamal et al. [13] More HSG abnormaliies seen in primary infertility could be because majority of patients(73.1%) seeking infertility treatment were of primary infertility.

Most common HSG abnormalities in present study was tubal abnormalities, seen in 20.5% (23/112) which is comparable to Sinawat et al[15] who reported tubal abnormalities in one fourth of all cases. This finding is lesser than than that reported by Akinola et al.[16] and Malwadde EK et al[6] who reported tubal abnormal findings at HSG in 61.8% and 51.7% respectively. These findings are a reflection of high prevalence rate of pelvic inflammatory diseases in our country.

In this study, tubal blockage emerged as the predominant tubal abnormality identified through HSG, comprising 82.8% (19 out of 23) of the cases. This is comparable with the findings 50% of total by Santhalia PK[14], 43.7% by Botwe et al[17], 38.9% by Malwadde EK et al[6].

Tubal blocks are more commonly in patients with primary (73.68%) than in secondary infertility 26.31% infertility in this study similar to the study done by Santhalia PK[15] where 63.6% in primary infertility and 36.4% in secondary infertility. Whereas Bello et al[5] discovered a greater prevalence

of tubal abnormalities in patients with secondary infertility.

The findings revealed that 73.9% of cases involved a blockage in a single fallopian tube, while bilateral tubal blockages were observed in 8.6% of cases. Bilateral tubal blocks are lesser than that of Eiman Kamal et al[13] and Botwe et al[17] who showed 17% and 20.5% bilateral occlusion. Possibility of decrease number of b/l tubal block in our study could be because we have used injectable analgesics before HSG which has avoided tubal spasm.

Prevalence of left tube block(47.82%) is higher than that of right tube block (26.08%) similar to study done by Botwe et al[17](12.5%for left and 10.6% for right).Whereas study by by Eiman Kamal et al[13] According to reference 16, right-sided tubal blockages were more prevalent than left-sided ones, with rates of 18% and 13% respectively.

In this study, uterine abnormalities seen in 7.14% (8/112) which is similar to 6.2%(255/4108) shown by Aziz MU et al.[18] This finding is more than 4.5% (2/44) found by Santhalia PK[14] and lesser than 32% (368/1140)by Botwe et al[17] and 65% (130/200)by Ahmed19 et al.[19]

Among congenital uterine abnormalities, two uterine cavity (septate uterus later diagnosed by 3D ultrasound) is most common 60% (3/5) in this study. Conversely, research by Aziz MU et al[18] reported the bicornuate uterus as the most prevalent anomaly, with incidences of 64% (164 out of 255 cases).

Conclusion

HSG is an easy, relatively safe and cost effective procedure which can diagnose most structural cause of infertility i.e. uterine and tubal abnormalities. So, invasive procedures like laparoscopy and hysteroscopy are not indicated in patients with normal HSG findings. Hence it can minimize the use of invasive procedures and patients may be managed conservatively.It also increases the probability of conception by opening up flimsy adhesion.

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Conflict of Interest

No any conflict of interest.

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