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Original Research Article

A retrospective study on hysterosalpingography in tertiary care hospital in Puducherry

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ABSTRACT

Background: Infertility is a health issue worldwide and hysterosalpingography (HSG) is a valuable tool in infertility workup. HSG is used as a modality in investigating both primary and secondary infertility.
Methods: This is a retrospective descriptive study. This study includes 168 women who attended obstetrics and gynecology outpatient department (OPD) of Sri Venkateshwaraa Medical College Hospital and Research Centre, Puducherry, with infertility in 2022-2023. The hysterosalpingogram reports of the patients were collected and analysed.
Results: A total of 154 cases were analysed, out of which 126 cases (81.8%) had normal findings and 28 cases (18.2%) had pathological findings, which include 14 cases (50%) had unilateral cornual block, 7 cases (25%) had unilateral fimbrial block, 2 cases (7.1%) had unilateral fimbrial block and hydrosalpinx, 2 cases (7.1%) had bicornuate uterus, 1 case (3.6%) had synechia, 1 case (3.6%) had unicornuate uterus and 1 case (3.6%) had arcuate morphology.
Conclusions: HSG is an effective first-line radiological screening modality for investigating primary and secondary infertility. However, HSG does not match other imaging modalities like hysterosalpingosonography, laparoscopy, and higher imaging modality like magnetic resonance imaging (MRI). HSG still holds importance in the screening for primary and secondary infertility in tertiary care hospitals in developing countries.

Keywords: Hysterosalphingogram, Infertility, Uterine malformations

INTRODUCTION

Infertility is a health issue worldwide, and hysterosalpingography (HSG) is a valuable tool in infertility workup. Hysterosalpingogram is used as a modality in investigating both primary and secondary infertility. The first HSG was done in 1910.[1] Hysterosalpingography is a radiographic evaluation of the uterine cavity, and fallopian tubes post radio-opaque dye administration. It is done during the first half of the menstrual cycle (day 5 to day 14), follicular phase of the cycle so that the X-ray exposure does not interfere with possible early pregnancy. It is a procedure to help us detect the morphology of the uterine cavity, cervical canal width, contour of the uterine cavity, outline of the tube – cornua, isthmus, and ampullary part, and spillage of dye, which indicates tubal patency. Along with observing the spillage of dye, the degree of free spillage must also be noted.[2]

HSG is a diagnostic procedure with some therapeutic benefits due to the flushing effect. It is avoided in some selected instances, like patients requiring donor insemination, because most of the conceptions happen within the first 6 months of therapy.[3]

HSG helps in detecting abnormalities in the uterus, such as endometrial polyp, adenomyosis, submucous myoma, unicornuate uterus, bicornuate uterus, uterus didelphys, T-shaped uterus, synechiae, endometrial hyperplasia/ carcinoma, and cervical incompetence and abnormalities in fallopian tube such as cornual occlusion, salpingitis isthmica nodosa and hydrosalpinx.[2]

Objectives

Objectives of the study were: to evaluate the spectrum of findings in HSG done at a tertiary care hospital in Puducherry, and to assess if HSG is a good screening first line modality in for diagnosing infertility.

METHODS

Type of study

It was a retrospective descriptive study.

Study area

Patients who had HSG done in the past 1 year (December 2022 to December 2023) in Sri Venkateshwara Medical College Hospital and Research Centre in Puducherry.

Inclusion criteria

All patients who had HSG in the past 1 year (2022-2023) as a diagnostic procedure to diagnose the cause of primary as well as secondary infertility in a tertiary care hospital, Puducherry were included.

Exclusion criteria

All patients whose records are incomplete or unavailable were excluded.

Methodology

All infertility patients attending the Obstetrics and Gynecology Outpatient Department in Sri Venkateshwaraa Medical College Hospital and Research Centre who underwent HSG for evaluation of infertility in the period December 2022 to December 2023 were included in the study. The hysterosaphingogram reports were retrospectively analysed.

Data collection

The reports of HSG of patients who underwent the diagnostic procedure in the past 1 year, 2022-2023, in the tertiary care hospital in Puducherry were taken and analyzed.

RESULTS

Out of the total 168 cases of HSG done in the tertiary care hospital in Puducherry, 12 cases were excluded due to incomplete availability of the radiographs.

104 patients were evaluated for primary infertility, of which 76 patients were under 20-30 years, 27 patients were under 30-40 years and 1 patient was >40 years. 50 patients were evaluated for secondary infertility and 28 patients belong to age group of 20-30 years, 20 patients belong to 20-30 years and 2 patients were >40 years of age (Table 1).

A total of 154 cases were evaluated, out of which 126 cases (81.8%) had normal findings and 28 cases (18.2%) had pathological findings, of which include 14 cases (50%) had unilateral cornual block, 7 cases (25%) had unilateral fimbrial block, 2 cases (7.1%) had a unilateral fimbrial block and hydrosalpinx, 2 cases (7.1%) had a bicornuate uterus, 1 case (3.6%) had synechia, 1 case (3.6%) had unicornuate uterus and 1 case (3.6%) had arcuate morphology (Table 2).

Post HSG, no patients suffered from allergic reactions, anaphylactic reactions, and pelvic inflammatory disease, and these patients were given prophylactic antibiotics and anti-histaminics.

Table 1: Age distribution and type of infertility.

Type of infertility	Age (years) (%)			Total (%)
	20-30	30-40	>40	
Primary infertility	76 (49)	27 (17)	1 (0.6)	104 (67)
Secondary infertility	28 (18)	20 (12)	2 (1)	50 (32)
Total	104 (67)	47 (30)	3 (2)	154 (100)

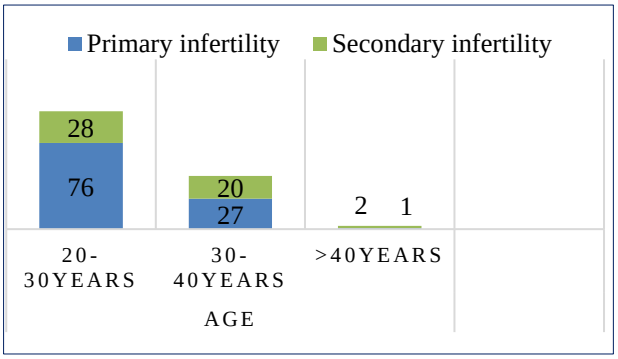

Figure 1: Age distribution with respect to type of infertility.

Table 2: Findings of hysterosalphingogram.

Result of HSG	No. of patients (%)
Normal findings	126 (81)
Unilateral cornual block	14 (9)
Unilateral fimbrial block	7 (11)
Unilateral fimbrial block and hydrosalphinx	2 (1)
Bicornuate uterus	2 (1)
Synechia	1 (0.6)
Unicornuate uterus	1 (0.6)
Arcuate uterus	1 (0.6)
Total	154 (100)

DISCUSSION

HSG is done primarily in diagnosing infertility. Infertility is defined as the inability to conceive for the duration of one year despite having regular unprotected intercourse. Infertility can be primary infertility or secondary infertility. HSG is considered the gold standard for evaluating fallopian tubes in terms of morphology and patency.[4]

Few authors have questioned the efficacy of use of HSG as a diagnostic test as a wide range of positive and negative predictive values has been reported in the literature. A study reported that negative predictive values range from 57.1% to 92.0%, and positive predictive values range from 30.8% to 84.5%.[5] Soares et al have shown that HSG had a 58% sensitivity, 28.6% of positive predictive value for polyp, and 0% sensitivity for endometrial hyperplasia. Sensitivity for uterine malformations and intrauterine adhesions are 44.4% and 75%, respectively.[6]

In a study, a total of 286 cases were taken, out of which 11.19% were primary infertility cases and 88.81% were secondary infertility cases, which were evaluated by HSG. 74.83% had abnormal findings, while 20.28% had normal uterine cavities with uterine filling defects as a common abnormality. Unicornuate and bicornuate uterus were the two congenital anomalies that were noted. Occlusion in the right-side tube was seen in 8.39%, and occlusion on the left-side tube was seen in 9.09%. 7.69% of cases were observed to have right side hydrosalpinx, and 9.79% of cases had in the left side.[7]

Broekhuizen and colleagues have observed that in women who needed donor insemination to achieve pregnancy, hysterosalpingogram had no therapeutic value and had limited diagnostic value.[8] Subsequent laparoscopies in patients who failed to conceive and had normal HSG revealed endometriosis. Phillipsen and Hansen used laparoscopy instead of HSG because they found similar results with both tests in 57% of 168 patients with more than 2 years of infertility.[9]

A meta-analysis of studies comparing HSG and laparoscopy modalities in determining tubal patency concluded that a negative HSG is not good at ruling out tubal pathology, while a positive tubal spill in HSG will rule out tubal pathology.[10]

In a study, 98 infertile females were evaluated by saline infusion sonography, HSG, and diagnostic hysterolaparoscopy. Saline infusion sonography revealed that 49 patients (50%) had normal tubal findings. The remaining 49 patients (50%) had abnormal tubal findings, out of which 41 cases (42%) had a bilateral tubal block (except the distal end), 3 cases (3%) had a unilateral tubal block (except distal end block), 4 cases (4%) had bilateral distal end block (hydrosalpinx) and unilateral distal end block was seen in 1% of cases. HSG revealed that 51 (52%) cases had abnormal tubal findings in which 45 (46%) cases had bilateral tubal block except for the distal end, 3 (3%) cases had unilateral tubal block except for the distal end, and 3 (3%) cases had bilateral distal end block. Laparoscopy showed that 56 (57%) cases had bilateral patent tubes, 39 cases had bilateral tubal block, 1 (1%) case had right tubal block, 2 (2%) cases had left tubal block.[11]

In a study, tubal patency was evaluated first by saline infusion sonography, which was then compared with HSG and was taken as the gold standard. According to this study, bilateral tubal patency was observed in 65.71% of cases of SIS and 62.85% of cases of HSG. Bilateral tubal blockage was observed in 8.57% of cases in SIS and 5.70% of cases in HSG. Unilateral patency was observed in 25.71%cases in SIS and 31.42% of cases in HSG. SIS had missed diagnosing 2 cases of unilateral patency, which was found in HSG, and one case was observed to have unilateral tubal occlusion in HSG and was diagnosed as bilateral tubal occlusion in SIS. It was observed that HSG was superior to SIS in assessing tubal patency.[12]

Post HSG, pelvic inflammatory disease was assessed in a study with respect to the type of contrast. According to this study, 0.3% of HSGs with oil-based contrast and 0.4% of HSGs done with water-based contrast developed pelvic inflammatory disease.[13]

Hysterosalpingo-contrast sonography (HyCoSy) or hysterosalpingo foam sonography (HyFoSy) preceded by ultrasound and saline infusion sonography has a greater sensitivity and specificity when compared to HSG. They are well tolerated and useful in cases with a risk of iodine allergy and in avoiding radiation exposure.[14] The disadvantage of these procedures is that the contrast material is expensive.

In a study, HyCoSy was used to evaluate tubal patency, which was compared with HSG and laparoscopy. When HyCoSy results were compared to laparoscopic results, sensitivity was 85.2%, specificity was 85.2%, positive predictive value was 71.9%, negative predictive value was 92.9%, and concordance (HyCoSy/LC) was 85.2%. When HyCoSy was compared to HSG, HyCoSy had co-positivity of 66.7%, co-negativity of 81.8% and concordance of 76.1%.[15]

A study evaluated the accuracy of HSG in diagnosis by comparing it with laparoscopy and determined that HSG was highly sensitive in the diagnosis. HSG was helpful in the preliminary examination of obstruction of fallopian tubes. Its advantages over laparoscopy are that it is a minor invasive procedure, has a low cost, and has a low incidence of complications. Its disadvantages over laparoscopy are it is not effective in identifying diseases such as pelvic inflammation, endometriosis, and salpingorrhexis.[16]

Limitations

Our study was conducted in women with infertility who were attending a particular hospital, so the results of our

study are not generalizable as there could be ethnic variance. Different radiologists in the hospital reported the HSG reports, so observer bias couldn't be eliminated.

CONCLUSION

HSG is an effective first line screening radiological modality for investigating primary and secondary infertility. It has good role in determining tubal patency and uterine morphology. Saline infusion sonography, HyCoSy, and HyFoSy are preliminary day care procedures done to evaluate female infertility and have no allergic reactions and no harmful radiation exposure to the patient. However, HSG does not match other imaging modalities like HSG, laparoscopy, and higher imaging modality like MRI. HSG still holds importance in the screening for primary and secondary infertility in tertiary care hospitals in developing countries.

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