Role of HSG in diagnosing uterine and tubal factors of sub-fertility

Dr. Shanthi Ethirajan¹, Dr. Nidhi Sharma², Dr K Jayashree Srinivasan³, Dr.Rohini .G³

1. Associate Professor, Department of Obstetrics and Gynecology, Saveetha, Medical College, Saveetha University, Chennai-602105
2. Professor, Department of Obstetrics and Gynecology, Saveetha Medical College, Saveetha University, Chennai-602105
3. Professor, Department of Obstetrics and Gynecology, Saveetha Medical College, Saveetha University, Chennai-602105

ABSTRACT:

Background: Infertility is a common gynaecological condition affecting couples all over the world. Hysterosalpingography (HSG) is a basic, minimally invasive first line investigation in the evaluation of the female. It helps in identifying anatomical defects in the uterine cavity and cervical canal, patency of the fallopian tubes and peritoneal spill. Aim: The aim of the study was to determine the spectrum of abnormalities of uterus and tubes detected by HSG in women attending fertility clinic in Saveetha medical college and hospital. Study design: It is a retrospective observational study conducted at the fertility clinic, Saveetha Medical College. Materials and Methods: The demographic details and x-ray images of HSG of women who have attended fertility clinic between April 2018 and December 2018 and were collected from the medical records department. 102 HSG images were retrieved, studied and analysed. Results: The mean age of the women evaluated was 29.3yrs±SD. The duration of infertility ranged between 1.5 years and 19 years. Of the 100 HSG images 35 were normal, 65 had at least one abnormality, out of which 36 had uterine abnormalities and 60 had abnormal tubes. The uterine abnormalities identified were filling defects (7), endometrial outline abnormalities (22). Among these, the Mullarian abnormalities detected were arcuate (2), septate / bicornuate uterus (5). The tubal pathology seen were tubal block (37), hydrosalphinx (19) and salpingitisisthmica nodosa (3), beaded appearance (1), lead pipe tubes (1), cobble stone (1) and cotton wool appearance (3). Conclusion: Primary infertility was the commonest indication for HSG. Abnormal tubes were the commonest abnormality detected in HSG followed by uterine abnormality indicating tubal factor as a major factor in female infertility.

KEY WORDS: Hysterosalpingography, tubal patency test, tubal factor, infertility.

INTRODUCTION:

Infertility is a common gynaecological condition affecting about 3.9 -16.8 % of couples trying to conceive in India (WHO 2016). The estimated global prevalence is 10-15% . The prevalence is on rise globally due to various reasons. Infertility is defined as inability to conceive after 12 months of unprotected sexual intercourse . The causes of infertility include male factor accounting for 30%, female 30 %, both partners 30% and unexplained in 10%. Evaluation of these couple begin with meticulous history taking followed by clinical examination and investigations for both partners. In males semen analysis forms the basic investigation. In females, the causes are ovarian, tubal, uterine, cervical, peritoneal and unexplained. Tubal factor contributes to 35-40% as a cause of infertility . Imaging plays a key role in evaluation of female factors. Trans-vaginal ultrasound is a standard first line investigation as it is non-invasive. Uterine abnormalities can be detected in most of the cases. However it is of limited value in assessing tubal abnormalities . HSG, SSG (sono-salpingogram), HyCoSy (Hysterosalpingogram Contrast Sonography), MRI and hystero-laporoscopy with chromotubation are the other investigations available for evaluation of uterus and tubes . SSG cannot detect the site of tubal block. HyCoSy and MRI though highly sensitive, specific and accurate in assessing uterine abnormalities when compared to tubes .

HSG can assess both uterine cavity and tubal abnormalities and its patency. The sensitivity and specificity of HSG in assessing tubes are 53% and 87% respectively . But in detecting uterine abnormalities, HSG is considered to have a sensitivity of 60-98% but low specificity of 15-80%. Since HSG has low specificity a negative spill is evaluated through hysterolaparoscopy with chromotubation. HSG that is relatively affordable plays an important frontline investigation modality in a low resource setting. It is considered to be a screening test in choosing patients for diagnostic hystero-laparoscopy with chromo-perturbation .

HSG involves the injection of contrast into the uterus by cannulating the cervix, followed by x-ray imaging. The image is examined for the outline of cervix, uterus and tubes and abnormalities detected. It is a cost effective, non-invasive, out-patient procedure done in the follicular phase of the menstrual cycle.

The purpose of the study was to evaluate the spectrum of abnormalities of uterus and tubes in HSG images among women investigated for infertility at fertility clinic in Saveetha Medical College Hospital.

MATERIALS AND METHODS

The study was a retrospective observational study conducted at the fertility clinic, Saveetha Medical College. The x-ray images of HSG and details of women who had attended fertility clinic between April 2018 and December 2018 were collected from the medical records department. Their demographic details, infertility duration, past obstetric history if any, history of previous pelvic surgery were noted. All the HSG images were studied in detail. 102 HSG images retrieved from the medical records department during the study period. Among the HSG films, two films did not show any image. Hence they were excluded from the study. Hence remaining 100 images were studied.
In a HSG film, the contrast medium will be seen outlining the uterine cavity, cornua, isthmus and ampullary region of the tubes and will show the degree of spillage into the abdominal cavity, indicating the patency of the tubes. Uterine abnormalities can be observed as filling defects or uterine wall outline abnormalities. Normal tube will appear as thin, smooth lines that widen in the ampullary portion. Tubal abnormalities can be observed as occlusion (non-visibility of the portion of tube beyond occlusion), dilatation of the tube or absence of spillage of dye into the abdominal cavity. HSG findings noted were summarised, categorised and analysed in the excel sheet.

RESULTS:

100 patients’ records were reviewed. The demographic details were as follows. The age of the women under study ranged from 20-44 yrs with a mean age of 29.3yrs+SD. Majority of women (66%) under study belonged to the age group ranging between 25 and 35 years. The duration of infertility ranged between 1.5 years and 19 years. 66% women had primary infertility and 34% had secondary infertility. The mean age of women with primary and secondary infertility was 28.7 and 30.5 years respectively. Among the 34 women with secondary infertility many had history of abortions and few had history of delivery.

Of the 100 HSG images 35 were normal, 65 had at least one abnormality. Of the 65 images that were abnormal 36 had uterine abnormalities and 60 had abnormal tubes. The uterine abnormalities identified were filling defects (7), uterine wall outline abnormalities (22) and abnormal size (6). The Mullarian abnormalities detected were arcuate (2), septate / bicornuate uterus (5) (Figure -1). Filling defect are space occupying lesions detected in the uterine cavity due to polyp, fibroid or intra cavity adhesions. Features suggestive of irregular endometrium (adenomyosis, endometritis, endomyometritis, and genital tuberculosis) were seen in 15 images (Figure - 2). Uterine size was enlarged in 5 images and small in 2 images. Uterus was elongated in one image.

The tubal pathology seen were tubal block (Figure - 3), hydrosalpinx (Figure 4) and salpingitis isthmica nodosa. The tubal block was seen in 37 images, which was unilateral in 23 and bilateral in 14 images. Hydrosalpinx was seen in 19 images, which was unilateral in 11 and bilateral in five images. Salpingitis isthmica nodosa was seen in three images. Delayed spill was seen in three and loculated spill in two images. Other abnormalities of tube were cobble stone (1), cotton wool (3), beaded appearance (1) and lead pipe appearance (1) of the tube. Cervical incompetence was noted in 2 images. Nine images showed intravasation of dye (Figure 5).

Figure -1: Bicornuate / Septate uterus with bilateral corneal block

![Bicornuate / Septate uterus with bilateral corneal block](image-url)
Figure-2: Irregular outline of the uterine cavity.

Figure - 3: Bilateral corneal block with filling defect in the fundal region.

Figure-4: Right side hydrosalphinx with distal block and left side midsegment block

Figure - 5: Intravasation of dye with bilateral midsegment block
DISCUSSION:

Hysterosalpingography, a cost effective, relatively non invasive test is considered to be a first line investigation as well as treatment in a women being evaluated for infertility. It is a screening test to select patients for hystero-laparoscopy with chromopertubation. It also helps to relieve minor tubal blocks due to mucous and blood clots by flushing the tubes. The cervical dilatation by Leech Wilkinsons canula can also help to dilate the cervix and are helpful in cases subfertility due to cervical stenosis.

The majority of women belonged to age group ranging from 25- 35 years with a mean of 29.3 years. This is similar to the population studied by Elsie Kigulie but in contrast to other studies. Women get married at a younger age in India. Primary infertility was more commonly seen than secondary infertility (66% Vs 34%). This is similar to the findings of CO Okafor and Dania Al- Jaroudi et al, but different from the findings of Elsie Kigulie and Chinwe et al. Women with primary infertility were younger than the women presenting with secondary infertility (28.5 Vs 30.5 years).

Among the 100 HSG examined 65 had abnormalities either in the tubes or uterus. Studies by Chinwe et al and CO Okafor showed abnormal HSG in 70.8 % and 70.9% respectively, where as 46.2% and 45% of HSG was observed to be abnormal in studies conducted by Elsie Kigulie and Adrian C et al respectively. In our study, uterine abnormalities was observed in 36 HSG images. The results are higher than the results of Elsie Kigulie but less than the results of other studies where it was 47% to as high as 71%. The uterine abnormalities identified were filling defects (7), endometrial outline abnormalities (22) and abnormal size (6). The results are different from the study done by Chinwe et al, in which uterine filling defects were seen in 31.2% cases, 17.2% with irregular uterine contour 30.8% showed abnormality in uterine size. 7 cases of Mullerian abnormalities were detected which is higher when compared to studies done by Chinwe and Elsie Kigulie. No congenital abnormalities were found in studies done by CO Okafor.

Sixty HSG images showed tubal abnormalities in our study. Tubal block was observed in 37 images among which 23 were unilateral and 14 were bilateral blocks. These results differ from study results of Taimoora Al Subhi et al. Cervical incompetence was observed in two images.

Nine images showed intravasation of dye which is higher than the reference limits. Intravasation is usually seen when there is tubal block which leads to increased intrauterine pressure while insufflation of dye.

CONCLUSION
Primary infertility is the commonest indication for HSG. Our study concludes that tubal pathology is the commonest cause of subfertility in our south Indian population. Aseptic precautions and antibiotic prophylaxis are mandatory to prevent sepsis. This pragmatic approach suggests that HSG is feasible, economical and safe. It has high specificity and sensitivity for diagnosing uterine, tubal and cervical factors of infertility. Despite the availability of SSG, HyCoSy and MRI it is still the first line investigation before diagnosis of unexplained infertility.

**Ethical clearance**- Institutional Human ethical committee was obtained.

**COMPETING INTERESTS**

Authors have declared that no competing interests exist.

**SOURCE OF FUNDING**: NIL

**Acknowledgements**: The authors are thankful to the Department of Fertility Centre, Saveetha Institute of Medical and Technical Sciences for providing the infrastructure and support for conduct of study.

**REFERENCES**


