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Original article

Role of Hysterosalpingography for Evaluation Factors of Female Infertility in Aljouf Saudi Arabia

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Abstract

To assess the pattern of hysterosalpingography (HSG) among infertility women in Saudi Arabia. This is a retrospective study of hysterosalpingography (HSG) findings of diagnosed female infertility who enrolled at the infertility department of Maternity and Children Hospital (MCH), Sakaka, Aljouf Saudi Arabia over a duration of July 2019 to June 2020. We obtained the Data of patients from the Picture Archiving Communication System (PACS) system which includes the presenting baseline character of all patients, and the HSG finding. Analysis of data was performed by SPSS 23.0 version software. A total of three hundred ten diagnosed infertility women data were revised retrospectively from computerized record files. We determine the HSG finding of tubal occlusion and hydrosalpinx in right, left, and bilateral 5.4%,6. 4%, 9%,

5.8%,8%, and 6.1% respectively. Although, the Present study also detected uterine fibroid, uterine adhesion, adenomyosis, and bicornuate uterus at 14.5%,4.5%,4.8%, and 7.4%, respectively. The hysterosalpingography showed no detected abnormality in 27.7% of infertility women. HSG determined that tubal occlusion and hydrosalpinx are mostly the cause of infertility in our study in addition to uterine causes. The left tubal occlusion and hydrosalpinx were higher percentages than the right. While secondary infertility is most common in contrast to primary infertility.

1. Introduction:

Hysterosalpingography is a kind of radiographic procedure that helps to assess the female reproductive tract by their radiograph after applying the radio-opaque medium through the cannula inserted into the cervical canal [1]. However, hysterosalpingography delicacy is an essential key investigation particularly the evaluation of uterine and tubal factors in infertility women. Infertility means the inability the conceive after 12 months of unprotected sexual intercourse [2]. Infertility is the one of most common Gynecological complications in Saudi Arabia. According to the statement from workshops of the European Society for Human Reproduction And Embryology Capri, the primary diagnosis of infertility depend on the mid-luteal phase of the progesterone test, analysis of semen for male and tubal patency test by hysterosalpingography [3]. Assessment of tubal still important evaluation of female infertility. It has been reported that hysterosalpingography is considered a method of radiology and uses a contrast medium to identify the female reproductive tract, while update of imagines for the detection of gynecology disease the HSG is an important method for evaluation of the tubal and uterine cavity, especially in the developing country [4,2]. However, HSG plays an important role in an estimate of the cervix and uterine cavity. It is very important to know the state of the uterine cavity, because some abnormalities in the uterus, fallopian tube and cervix may development of infertility in a woman. Previously, reports

that 50% of cases found uterine abnormality that subsequently may cause the repeated failure of implantation [5]. HSG may also be used to find endometrial polyps that cause abnormality-filling defects in the uterine wall and to detect intrauterine adhesion.

Predominantly hysterosalpingography evaluation of infertility, despite other imaging modalities the HSG remains the greatest method for evaluation of the fallopian tubes [6,7]. Rather than other pelvic pathologies such as congenital, anatomical abnormalities, irregular menstrual cycle, and recurrent miscarriage also investigation by HSG. Conversely, the HSG is a simple, inexpensive, rapid reliable diagnostic tool. Some research preferred HSG superior to laparoscopy and hysteroscopy due to it being available and a nonoperative technique that is mostly used in developing countries [8,9]. There are fewer disadvantages of the procedure HSG such as disconformable, and radiation exposal. In our study, we observed repeated HSG in case of tubal patency and in desired pregnancy, therefore, we performed a retrospective study to focus on that HSG not only for diagnosis reliability, but this method has beneficial effects on the treatment protocol of infertility cases.

2. Material and methods:

This is a retrospective, study of diagnosed female infertility conducted at the infertility department of Maternity and Children Hospital (MCH), over a duration of July 2019 to June 2020. We selected a 350-sample size on basis of a formula using N = deff u2 *P*(1-P) /d2, where deff is the design effect; N is the sample capacity; u, 1.96 when the confidence coefficient is 95%; P, the probability value. A total of three hundred ten diagnosed infertility women were selected randomly in our study who visited the infertility department with a history of infertility for management. We gathered patients related all information and data from the hospital's computerized record files. The inclusion criteria of our study included details of history age, body mass index, duration of marital age, number of children, duration of infertility, and presence of any gynecological disease. As well as all participants were referred radiological department for a hysterosalpingogram and we collected the hysterosalpingogram finding. Any previous history of immune disorder, bleeding disorder, or tumor was excluded from our study.

2.1 The procedure of hysterosalpingogram:

The HSG technique was performed in the radiology department by an expert radiologist who also explained the finding results. Usually, all infertility patients were referred by the consultant of the Gynecology department. All patients agreed and gave verbal consent after the detailed explanation of the procedure and assurance of minimizing the complications. Usually, the Day of the procedure is fixed during days 7^{th} to 12 of the menstrual cycle because of preventing intravasation of the contrast medium. The procedure contraindicates if suspected of pregnancy, any bleeding from the uterine or vagina, and as well as a history of allergic reaction with iodin-based contrast reagent. The HSG technique is accomplished by the appliance of fluoroscopy. Initially, the patient was placed in a supine position on the fluoroscopy table for scout film of the pelvis, then instructed patient for the proper position, technical factors, and radiopaque pelvic lesions. However, finally, patients were placed in a lithotomy position. In an aseptic precaution, technique cervix was exposed with help of a speculum and grapes the anterior lip by volselum forceps. The uterine cannula of Leech -Wilkinson inserted into the cervical canal after measurement of the uterine cavity by uterine sound. A water-soluble contrast medium, urografin slowly injected into the uterine cavity by gentle traction on the volsellum and pressure on the cannula. The uterine cavity appearance and tubular patency were evaluated by fluoroscopy. Spot images of early uterine and tubal filling were taken. After 30-minute cleaning of contrast media, a delayed film was taken in the pelvic cavity, particularly if hydrosalpinx was present. For the evaluation of any small abnormality in the uterine cavity, the true anteroposterior projection of the radiograph was obtained. All HSG findings are interpreted following soft copy by direct visualization, checking the unilateral and bilateral spillage of contrast medium entire pelvic cavity, any abnormality of the cervix and uterine cavity such as cervical adhesions, stenosis, fibroid uterus, etc [10,11].

Statistical analysis

All collected data transferred in to excel sheet and analyzed by applying IBM SPESS version 23.0. patients' age were summarized by mean and standard deviation, whereas percentage and frequency were used for demographic character, type of infertility, risk factors, and variable finding of HSG.

3. Results:

A total of three hundred ten infertility women were enrolled in our study, among primary infertility 103 (33.2) and remaining secondary infertility 207 (66.7) with the age range between 18-44years (mean age 38.2 ± 6.3 years.). The referred HSG is highest in the age group 30-34 years and lowest in 18-20 years. The HSG is most commonly preferred in the case of secondary infertility approximately 66.7 % and 33.2% in primary infertility cases as displayed in table1.

Table 1: Baseline characteristics of all study participants.

Variables	**Frequency (%)**
Mean age	38.2 ± 6.3
Mean Duration of infertility	5.5±4.3
Parity	
Nulliparity	118(38)
Primiparity	80(25.8)
Multiparity	91(29.3)
Grand multiparity	21(6.7)
Types of infertility	
Primary infertility	103 (33.2)
Secondary infertility	207 (66.7)

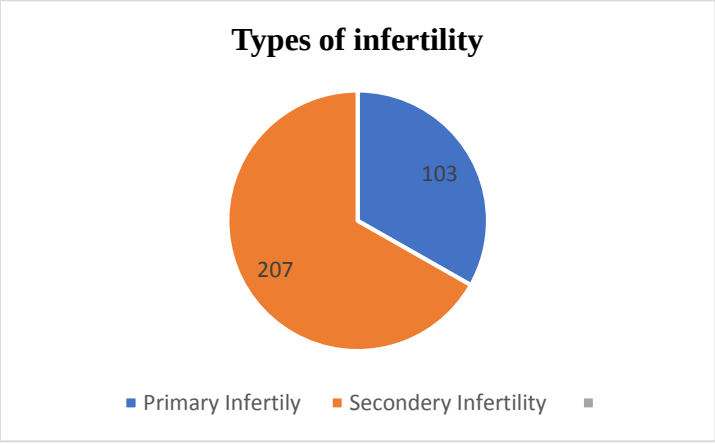

Figure 1: Types of infertility among all participants in the study.

The HSG interpretation showed that the occlusion of the left, right, and both fallopian tubes was 6.4%, 5.4 %, and 9% respectively. Whereas the hydrosalpinx spotted in the left, right, and both fallopian tubes were 8%, 5.8%, and 6.1% respectively. However, the present study also detected uterine pathology by HSG including uterine fibroids at 14.5%, uterine adhesions at 4.5%, adenomyosis at 4.8%, and bicornuate uterus at 7.4%. a total of 86 participants no detected any pathology considered as the normal finding of HSG which was represented in table 2. Our study detected no abnormality seen in a uterine tube and uterine cavity 24%, tubal abnormalities 36.2%, and uterine abnormalities 27.7 % as displayed in table 3 figure 2,3,4,5.

Table 2: Outcome by hysterosalpingography.

Variable	**Total number= 310(%)**
Pathology of the fallopian tube	
Tubal occlusion	
Right tubal	17 (5.4)
Left tubal	20 (6.4)
Both tubal	28 (9)
Hydrosalpinx	
Right tubal	18 (5.8)
Left tubal	25 (8)
Both tubal	19 (6.1)
Uterine pathology	
Fibroid	45 (14.5)
Uterine adhesions	14 (4.5)
Adenomyosis	15 (4.8)
Bicornuate	23 (7.4)
Normal findings of tubal and uterus	86 (27.7)

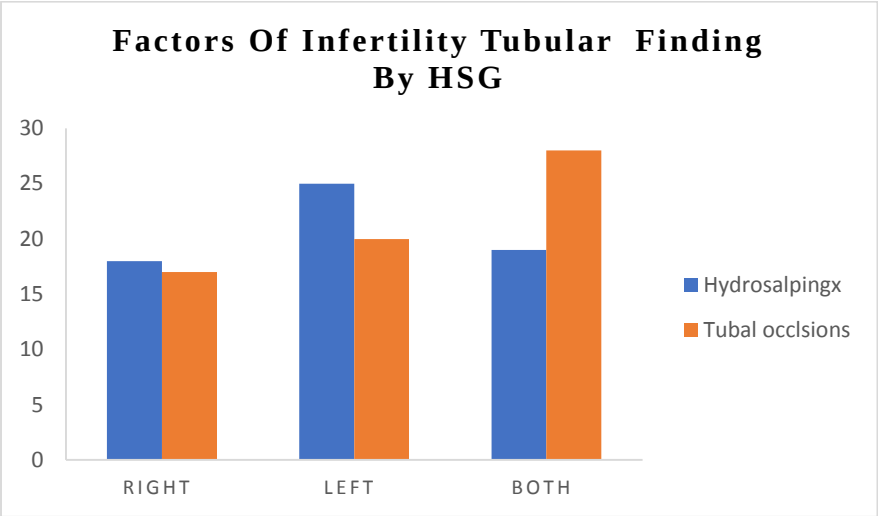

Figure 2: Tubal occlusions and hydrosalpinx and uterine detected by HSG.

Table 3: The Proportions found factors among participants.

Finding	Frequency	Percentage
Normal	86	24.5
Uterine factors	97	27.7
Tubal factors	127	36.2

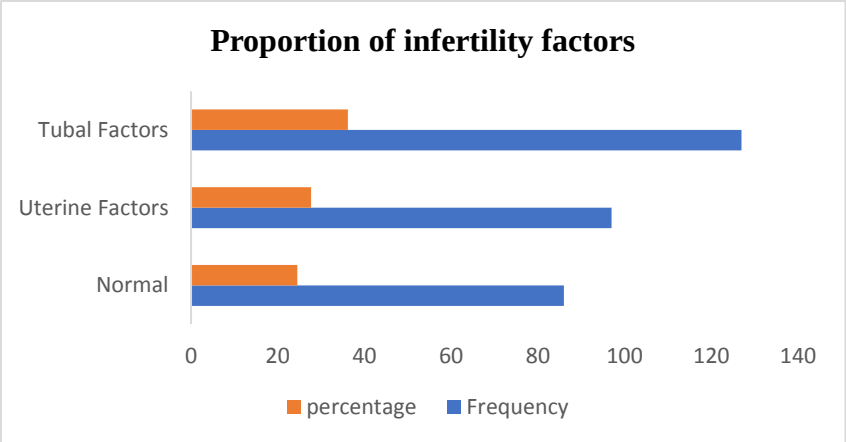

Figure 3: Relation the proportion of factors in infertility women.

Figure 4: The HSG showed (A) Right tubal occlusion. (B) Left tubal occlusion. (C) Uterine fibroid with bilateral tubal occlusion. (D) Right tubular hydrosalpinx. (E) Hydrosalpinx in the left tube. (F) Both tubular hydrosalpinx [10 12].

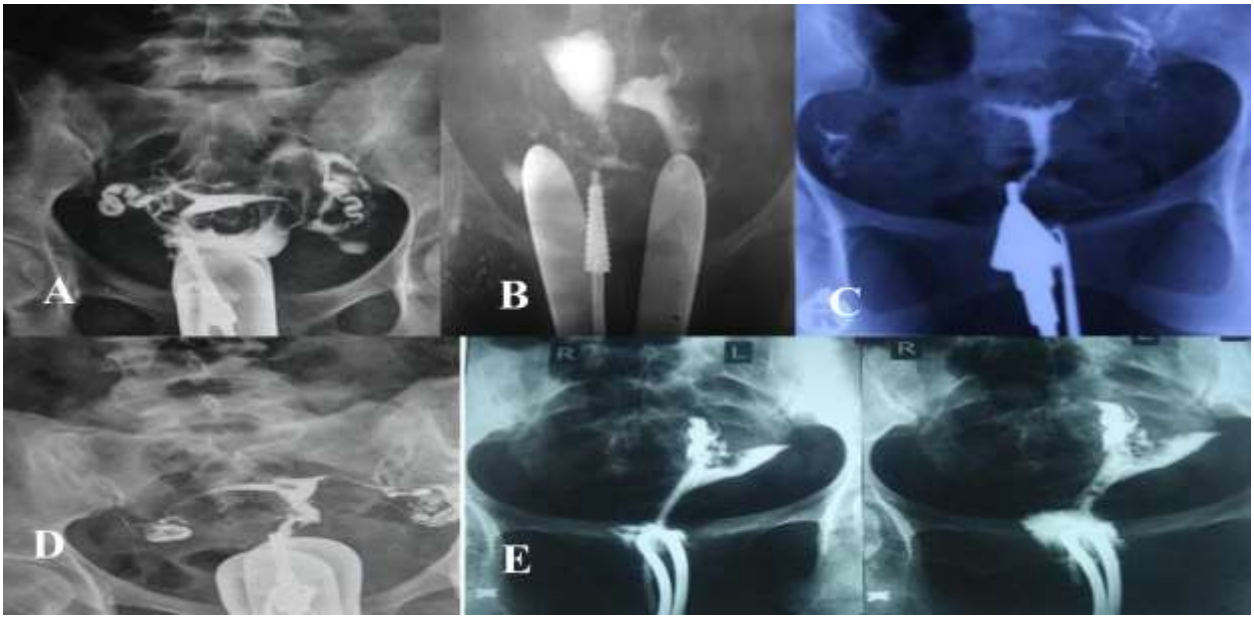

Figure 5: The HSG showed (A) Normal findings. (B) IUA in the cervical canal with left peritubal adhesion. (C) Adenomyosis. (D) Intrauterine adhesions (IUA). (E) Bi-cornuate uterine cavity and bilateral corneal block [10,13,14,15].

4. Discussion:

Hysterosalpingography is a method of radiology that seeks the radiograph of the reproductive tract by using a radiocontrast medium inserted into the cervical canal by a cannula. HSG is considered advanced technology and a successful method for assessing the fallopian tube and uterine cavity who has a history of infertility. besides, the widely variable use of HSG due to noninvasive and inexpensive methods comparatively to other methods. HSG procedure is easily adoptable or handled and accurately delicate the imaging finding. Several studies preferred the evaluation of the uterine cavity and tubal by HSG [13]16. The present study reviewed a total of three hundred ten infertility women and our results detected a mean age of 38.2 ± 6.3 years old all were referred to the radiology department for HSG. It has been reported that HSG has mostly done between the age of 25 to 30 years [14]17. Our results find that right, left, and both tubal occlusions were 5.4%,4%, and 9% by HSG respectively. Conversely, similarly reported 18.7 and 4.5% have been seen in a different study [15]18. However, previous evidence about the pathology of the bilateral tubes is around 9-11% [16]19. While significantly more tubal obstruction on the right side is at 8.8% versus the left at 7.6% [16]19. The present study found uterine pathologies such as uterine fibroid1 at 4.5%, adenomyosis at 7.4%, and uterine adhesion at 4.5% by HSG. However, it is a concern that the hysterosalpingography procedure is commonly preferred because of modern development and enhancement of the expanding acceptance of reproductive medicine. However, HSG is considered a key technique for detection of the any abnormality in the tubal and uterine cavity including congenital anomalies, tubal occlusion, hydrosalpinx, uterine polys, as well intrauterine adhesions. Indeed, our study demonstrates the HSG in all participants and the finding indicates the accurate causes or factors of infertility. we have some limitations, firstly we have taken support about the images from reviewing the published paper due to our technical error, though we took all HSG images but not well visualization and inappropriate to set this study. Secondly, we have collected available data from one hospital. In the future, we plan to expand our research to more than one hospital and arrange more HSG images.

5. Conclusion:

Hysterosalpingography is a necessary tool for the evaluation of infertility factors and performed a significant component in the determination of diseases that influence the

female reproductive tract. According to our study, the disease of the fallopian tube is the main cause of infertility in women.

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