



Evaluation of Tubal Factor in Two Methods of Hysterosalpingography and Laparoscopy in Infertile Women

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Abstract

Background: The prevalence of infertility in the world is increasing, and diagnosis of the cause of infertility help to better and faster treatment.

Objectives: The aim of this study was to evaluate the detection of tubal factor with hysterosalpingography (HSG) and laparoscopic methods in infertile women referred to Ali ibn-e Abitaleb Hospital.

Methods: This descriptive-analytical study was performed on women referred to the infertility clinic of Ali ibn-e Abitaleb Hospital of Zahedan. All patients underwent HSG and laparoscopy on days 6 to 12 of the menstrual cycle. The data were collected using information form and then analyzed by SPSS software.

Results: In this study, 142 infertile women were studied. The mean age of the patients was 30.6 ± 5.8 years old. In this study, HSG was normal and abnormal in 57.7% and 42.3% of the patients, respectively. Moreover, laparoscopy was normal and abnormal in 76.1% and 23.9% of the patients, respectively. There was a relative agreement between the results of HSG and laparoscopy (Kappa: 0.326; $P < 0.001$) so that 67.6% of the patients, who were normal in HSG, were reported normal in laparoscopy and 73.5% of the patients, who were abnormal in HSG, were reported abnormal in laparoscopy.

Conclusions: Overall, the results of this study show that there is a relative agreement between HSG and laparoscopy in defining the tubal factor, but since there is no complete agreement between HSG and laparoscopic results, it is recommended to evaluate infertile patients with these two methods that are considered a complement of each other and not as an alternative.

Keywords: Infertility, Hysterosalpingography, Laparoscopy, Hysterosalpingography

1. Background

Infertility is defined as non-fertility after one year of regular intercourse without the use of any prevention methods. The incidence of infertility has been reported in different studies ranging from 10% to 15%. Infertility can be due to male factor, female factor, mixed or unexplained cause. Of causes of infertility due to the female factor, ovulation disorders are the most common cause (80%) (1, 2). Because of the relatively high prevalence of infertility and the relatively high cost of infertility treatments, early diagnosis and appropriate treatment, based on the cause, are of great importance (3).

Hysterosalpingography (HSG) and laparoscopy are two known methods used to diagnose the cause of infertility (4). Hysterosalpingography is a non-invasive and inexpensive method and is primarily used in the evaluation of infertile women. On the other hand, laparoscopy is a more

invasive, more difficult, and costly but more accurate procedure that requires skill (5).

2. Objectives

The aim of this study was to compare the diagnosis of tubal factor in two methods of HSG and laparoscopy in infertile women.

3. Methods

This is a descriptive-analytical study, which was performed in Ali ibn-e Abitaleb Hospital, Zahedan, Iran, in 2019, in which 142 infertile women referred to the infertility clinic of this hospital were studied. The inclusion criteria were women 18 - 42 years old with infertility history. Moreover, the exclusion criteria were iodine sensitivity, acute pelvic infection disease (PID), and not having

consent to participate in the study. All patients underwent HSG during 6 to 12 days of the menstrual cycle after obtaining written and oral informed consent. All procedures were performed by the same infertility fellowship. The current study was approved by the Ethics Committee of Zahedan University of Medical Sciences. The data were entered into SPSS software version 21, and the correlation between HSG and laparoscopic findings were analyzed using Kappa statistics.

4. Results

In this study, 142 infertile women with the mean age of 30.6 ± 5.8 years old were studied.

Hysterosalpingography (HSG) was normal in 57.7% (82 women) and abnormal in 42.3% (60 women). Of these 60 abnormalities, the most frequent pathology (38.3%) was in the left side of the fallopian tube, and the majority (65%) were in the distal portion. Also, hydrosalpinx was found in 5% of the cases of HSG, and peri-tubal adhesions were observed in 19% of the cases.

Laparoscopy was normal in 76.1% (108 women) and abnormal in 23.9% (34 women). Of the 34 patients with abnormal laparoscopy, the most frequent pathologic finding (38.2%) was bilateral of fallopian tube, and the majority (64.7%) was in the distal portion. Hydrosalpinx was also observed in 4.2% of the cases, and peri-tubal adhesion was seen in 21.1% of the cases.

Kappa test showed that there was low agreement between the results of HSG and laparoscopy (Kappa: 0.326; $P < 0.001$). Moreover, 67.6% of cases that were normal in HSG were reported normal in laparoscopy, and 73.5% of the cases that were abnormal in HSG were also reported abnormal in laparoscopy (Table 1). Furthermore, Kappa test results showed that there was moderate agreement between HSG and laparoscopic results regarding the involved side and location (Kappa: 0.520; $P < 0.001$ for the involved side and Kappa: 0.653; $P < 0.001$ for the involved location) (Tables 2 and 3).

Table 1. Agreement Amount Between Reported Results in HSG and Laparoscopy

| HSG | Laparoscopy | |
|----------|-------------|-----------|
| | Normal | Abnormal |
| Normal | 73 (67.6) | 9 (26.5) |
| Abnormal | 35 (32) | 25 (73.5) |

5. Discussion

Infertility is defined as non-pregnancy after one year of sexual intercourse without any prevention. Infertility is

Table 2. Frequency Difference of Affected Sides in Two Methods of Laparoscopy and HSG

| HSG | Laparoscopy | | |
|-----------|-------------|----------|-----------|
| | Right | Left | Bilateral |
| Right | 6 (100) | 1 (12.5) | 1 (9.1) |
| Left | 0 | 5 (62.5) | 4 (36.4) |
| Bilateral | 0 | 2 (25) | 6 (54.5) |

Table 3. Frequency Differences on Involved Locations in Two Methods of Laparoscopy and HSG

| HSG | Laparoscopy | |
|----------|-------------|----------|
| | Distal | Proximal |
| Distal | 14 (87.5) | 2 (12.5) |
| Proximal | 2 (22.2) | 7 (77.8) |

one of the most common problems in human societies, according to WHO estimates between 60 and 80 million couples worldwide. One of the most important causes of infertility in women is ovulation problem, tubal factor, and uterine factor. The role of tubal and uterine factors in different studies was 25% - 39% and 5%, respectively. Hysterosalpingography (HSG), laparoscopy, and hysteroscopy are the diagnostic methods available to evaluate the cause of infertility. The aim of this study was to evaluate the diagnosis of tubal factor in two methods of HSG and laparoscopy in infertile patients referred to the infertility clinic of Ali ibn-e Abitaleb Hospital in 2019. In this study, 142 infertile women were studied. The mean age of the patients was 30.6 ± 5.8 years old, and the mean duration of infertility was 5.9 ± 4.1 years. In this study, HSG was normal in 57.7% and abnormal in 42.3% of the 60 identified tubal issues, and the most frequency of pathology was (38.3%) on the left side of the fallopian tube, and the majority (65%) was in the distal portion. Hydrosalpinx and peri-tubal adhesion were reported in 5% and 19% of women, respectively.

In this study, laparoscopy was normal in 76.1% and abnormal in 23.9% of the cases. In addition, the most frequent pathology (38.2%) was in bilateral of fallopian tubes, and the majority (64.7%) was in the distal portion. Laparoscopy was reported that hydrosalpinx was observed in 4.2% of cases, and periorbital adhesions were also seen in 21.1% of the cases. Kappa test was used to evaluate the concordance of the findings reported in HSG and laparoscopy. There was also a desirable and significant agreement between the results of HSG and laparoscopy regarding the involved side and location of the tubal agent. In the study of Barat et al. (5), 154 patients achieved poor HSG and laparoscopic agreement on adhesion around the tube (0.327 kappa statistic). In the diagnosis of tubal adhesion of

primary infertility, the sensitivity and negative predictive value (NPV) of HSG are higher than secondary infertility, but the specificity and positive predictive value (PPV) of HSG are higher in the secondary type. In the diagnosis of tubal adhesion in patients with primary infertility, the rate of convergence of HSG and laparoscopic findings was 0.302 (poor convergence rate) and 0.846 in patients with secondary infertility (good convergence rate). For diagnosis of fallopian tube adhesion, according to Kappa test, the concordance was 0.647 between HSG and laparoscopic findings (good agreement).

For diagnosis of tubal obstruction, sensitivity, specificity, and PPV of HSG in secondary infertility were higher than primary infertility, but NPV of HSG was higher in the primary type. For the diagnosis of tubal obstruction, in patients with primary infertility, there was agreement (Kappa test) between HSG and laparoscopic findings (0.57) (Median convergence) and 0.7 in secondary patients (Good convergence) (5). In the study of Zahiri Sorouri and Faraji (6) in Guilan on 200 infertile women, the sensitivity and specificity of HSG for tubal obstruction and its agreement with laparoscopy were 81%, 60%, and 36%, respectively. The sensitivity and specificity of HSG and its agreement rate with a laparoscopic diagnosis of hydrosalpinx were 23%, 95%, and 23%, respectively. The sensitivity and specificity of HSG in the diagnosis of peritoneal adhesions, endometriosis, and its agreement with laparoscopy were 37%, 79%, and 17%, respectively. They concluded that, in comparison with the gold standard method (laparoscopy), HSG is not an accurate method for the diagnosis of tuboperitoneal pathology (6).

The study of Mehmet Sakar et al. on 82 infertile women showed pathologic findings in 45% of HSG cases and in 66% of laparoscopic cases. Laparoscopy was not performed in 6 of the 35 patients with tubal pathology on HSG. Moreover, HSG sensitivity was 63%, specificity 89%, PPV 92%, and the accuracy was 72%. They conclude that HSG is an economical and preliminary method for the evaluation of endometrial and tubal pathologies, and laparoscopic method is used to examine the outer parts of the fallopian tube, fimbria, endometriosis, adhesions, and other pathologies. Therefore, the two methods do not replace each other and complement each other (7). In the study of Maiti and Lele (8) on 50 patients, it was reported that false positive and false negative for tubal factor in HSG were 25% and 12%, respectively. The sensitivity of HSG was 75%, and its specificity was 88%. They concluded that although HSG is a simple procedure for identifying female genital tract abnormalities, all infertile patients should be further screened because of low sensitivity and specificity of HSG (8).

5.1. Conclusions

Since there is no complete agreement between the results of HSG and laparoscopy, it is recommended that these two methods will be used as complementary rather than alternatives in the evaluation of infertile patients. Further studies with larger sample sizes are also recommended to further investigate this issue.

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Footnotes

Authors' Contribution: Farahnaz Farzaneh drafted the manuscript. Farahnaz Farzaneh and Golbahar Khodabandehshastan conceived the presented idea, developed the theory, and performed the examination. Farahnaz Farzaneh verified the analytical methods and supervised the findings of this work. All authors read and approved the final manuscript.

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