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Original Research Article

Comparison between hysterosalpingography and laparoscopic chromopertubation for the assessment of tubal patency in infertile women

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ABSTRACT

Background: Infertility is a critical component of reproductive health, and has often been neglected in these efforts. The inability to have children affects men and women across the globe. Infertility can lead to distress and depression, as well as discrimination and ostracism. Hysterosalpingography (HSG) of infertile women is useful for the assessment of structure of uterine cavity, tubes and their patency. However, although a more invasive procedure such as laparoscopy (L/S) which is regarded as the most reliable method in detection of tubal pathologies in infertility.

Methods: This was a Prospective cross sectional study of 50 patients with history of primary or secondary infertility selected from IPD of Jawaharlal Nehru medical College and Acharya Vinobha Bhave Rural Hospital, Tertiary Health Care Centre Located in Sawangi, Wardha, Maharashtra (India). The age group of the patients was between 18 yrs. - 45 yrs. The study population was selected depending upon the total number of patients (fitting the criteria) visiting the IPD of AVBRH Department of Obstetrics and gynecology for a period of 1 years (September 2015 to September 2016). The collected data was compiled and proper statistical formulas were applied to analyze the data collected.

Results: The present study include 50 cases of both primary and secondary infertility of which 29 cases (58%) were primary infertility and 21 cases (42%) were secondary infertility. In this study the 3(6%) cases were found in the age group of <20 years followed by 16 (32%) cases in the age group of 21-25 years, 19(38%) cases were in the age group of 26-30 years while 7(14%) cases were in the age group of 31-35years the age group of 36-40 years 2(14%) and in age group > 40 years is 3(6%). In the present study, based on Kuppuswamy index most (30%) of the women had class IV socio economic status in both primary and secondary infertility. In the present study, there were 6 (28.57%) cases with History of LSCS, 7 cases (33.33%) had FTND, 6(28.57%) cases had history of abortion, and 2(9.52%) had previous ectopic pregnancy. Moderate degree of agreement was found between findings of both tests.

Conclusions: The results suggest that hysterosalpingography is useful as a primary screening procedure, but laparoscopy provides a more accurate assessment of tubal patency in the investigation of infertility.

Keywords: Hysterosalpingography, Laparoscopy, Tubal patency

INTRODUCTION

Infertility is a critical component of reproductive health, and has often been neglected in these efforts.¹ The inability to have children affects men and women across

the globe. Infertility can lead to distress and depression, as well as discrimination and ostracism.^{1,2}

Approximately 15 % of couples are affected by infertility, Common causes of infertility include male

factor (45 %), ovulation disorders (37 %) and tubal damage (18 %). A combination of several factors is found in approximately 20% of all couples worldwide.³

Tubo-peritoneal factors are responsible for about 30-40% of cases of female infertility and hence evaluation of tubal patency represents a key step and a basic investigation in the assessment of infertile women.^{4,5} Tubal occlusion is the most common underlying cause of infertility.^{6,7} In Africa Tubal factor infertility ranges from 42 to 77% in the literature.⁸

Hysterosalpingography (HSG), laparoscopy with chromopertubation or both can be used to evaluate tubal patency. Owing to its noninvasive nature and low cost, HSG is widely used as a first-line approach to assess tubal patency and uterine anomalies in routine fertility workup.^{9,10} However, laparoscopy with chromopertubation has been the gold standard for investigating tubal patency.¹⁰

Hysterosalpingography (HSG) of infertile women is useful for the assessment of structure of uterine cavity, tubes and their patency.¹⁰ However, although a more invasive procedure such as laparoscopy (L/S) which is regarded as the most reliable method in detection of tubal pathologies in infertility.¹⁰

Laparoscopic surgery is performed during the follicular phase. During the laparoscopic observation after the assessment of bilateral ovaries, fallopian tube, uterus and other pelvic structures, tubal patency is evaluated by chromopertubation to detect pelvic adhesions, any existence of endometriosis or presence of other pathologies.⁹

The present study is carried out to enhance our knowledge in regards to role of hysterosalpingography and laparoscopic chromopertubation as a safe, effective, cost effective and accurate tool for the assessment and planning the protocol for management of infertility. Since this study was carried out in a rural set up in India to compare the pathophysiological nature of infertility amongst the rural population as well as for women in the Indian subcontinent.

METHODS

This was a Prospective cross sectional study of 50 patients with history of primary or secondary infertility selected from IPD of Jawaharlal Nehru medical College and Acharya Vinobha Bhave Rural Hospital, Tertiary Health Care Centre Located in Sawangi, Wardha, Maharashtra (India).

The age group of the patients was between 18 yrs. - 45 yrs. The study population was selected depending upon the total number of patients (fitting the criteria) visiting the IPD of AVBRH Department of Obstetrics and

Gynecology for a period of 1 years (September 2015 to September 2016).

Inclusion criteria

- Those patients coming for treatment of infertility
- Those patients who are given informed consent.

Exclusion criteria

- Those patients who have not given informed consent
- Women who did not return for laparoscopy evaluation.
- Technical problems related to HSG and women who became pregnant after hysterosalpingography.
- Women with pelvic infection.

As the patient came to the IPD, a detailed history pertaining to infertility and other relevant history was asked and recorded, including the data if patient had previous treatment documents. In this first visit of patient, the couple was explained in detail about the normal physiology and the fertile period.

The female were subjected to clinical examination as well as systemic examination along with local and gynaecological examination. Then they were subjected to certain basic blood investigations, ultrasonography (USG) pelvis and husband's semen analysis; and patient was asked to follow-up with next menstrual cycle. According to the inclusion and exclusion criteria the patients were subjected to Hysterosalpingography and Diagnostic laparoscopy.

Patients selected for Hysterosalpingography and Diagnostic laparoscopic chromopertubation evaluation were admitted in the post menstrual phase. Hysterosalpingography done and after 1 month diagnostic laparoscopic chromopertubation for tubal patency ovarian drilling, adhesiolysis etc. were also done if required. All the data was recorded on a predesigned proforma. The collected data was compiled and proper statistical formulas were applied to analyze the data collected.

Statistical analysis

Statistical analysis was done by using descriptive and inferential statistics using Chi-Square test, binary classification and the software used was SPSS 17.0 version, graph pad prism 5.0 versions and $p < 0.05$ is considered as level of significance.

RESULTS

The present study include 50 cases of both primary and secondary infertility of which 29 cases (58%) were primary infertility and 21 cases (42%) were secondary infertility (Table 1).

Table 1: Distribution of patients according to fertility.

Infertility	No. of patients	%
Primary infertility	29	58.00
Secondary infertility	21	42.00
Total	50	100.00

In this study, the 3 (6%) cases were found in the age group of <20 years followed by 16 (32%) cases in the age group of 21-25 years, 19 (38%) cases were in the age group of 26-30 years while 7 (14%) cases were in the age group of 31-35 years the age group of 36-40 years 2 (4%) and in age group > 40 years is 3 (6%). The Mean Age is: 28.40±6.73 (Table 2).

Table 2: Age wise distribution of patients.

Age (yrs)	No. of patients (N=50)	%
≤ 20 yrs	03	6.00
21-25 yrs	16	32.00
26-30 yrs	19	38.00
31-35 yrs	07	14.00
36-40 yrs	02	4.00
>40 yrs	03	6.00
Total	50	100.00
Mean age	28.40±6.73	

In the present study, based on Kuppaswamy index most (30%) of the women had class IV socio economic status in both primary and secondary infertility (Table 3).

Table 3: Distribution of patients according to socio-economic status.

Socio-economic status	No. of patients (N=50)	%
Lower	10	20.00
Upper lower	15	30.00
Lower middle	13	26.00
Upper middle	10	20.00
Middle	02	4.00
Total	50	100

In the present study, there were 6 (28.57%) cases with History of LSCS, 7 cases (33.33%) had FTND, 6 (28.57%) cases had history of abortion, and 2 (9.52%) had previous ectopic pregnancy (Table 4).

Table 4: Distribution of patients according to obstetric history of secondary infertility patients.

Obstetric history	No. of patients	%
Previous LSCS	06	28.57
Previous FTND	07	33.33
Previous Abortion	06	28.57
Previous Ectopic	02	9.52
Total	21	100

Table 5: Distribution of patients according to tubal patency in hysterosalpingography and laparoscopic chromopertubation.

Tubal Patency	HSG	Laparoscopic chromopertubation
Bilateral Patency	28 (56%)	28 (56%)
Unilateral Patency	08 (16%)	07 (14%)
Bilateral Occlusion	14 (28%)	5 (10%)

Tubal patency test was done by injection of methylene blue dye through the cervix and visualization of spillage of dye in the peritoneal cavity. Chromopertubation in primary and secondary infertility group was done and in primary infertility group it was observed that 28 cases (56%) had B/L patent tubes in Hysterosalpingography, 28 cases (56%) had B/L patent tubes in diagnostic laparoscopic chromopertubation. 8 cases (16%) had unilateral patency in Hysterosalpingography, 7 cases (14%) had unilateral patency in Diagnostic laparoscopic chromopertubation, 14 cases (28%) had B/L occlusion in Hysterosalpingography and 5 cases (10%) had B/L occlusion in Diagnostic laparoscopic chromopertubation (Table 5).

Table 6: Other findings on Hysterosalpingography.

Other Findings	No. of patients	%
Shape of the uterus		
Didelphys uterus	1	2
Bicornuate uterus	1	2
Septate uterus	2	4
Cavity of uterus		
Endometrial polyp	2	4.00

The Hysterosalpingography findings in the present study showed 1 case (2%) didelphys uterus, 1 case (2%) of bicornuate uterus, 2 cases (4%) of septate uterus, 2 (4%) cases of endometrial polyp (Table 6).

Table 7: Detection of tubal status at HSG and Laparoscopic chrompertubation.

HSG	Diagnostic Laparoscopy		McNemer chi-square test value	p-value
	Positive	Negative		
Positive	29	1	15.23	0.0001, Significant
Negative	10	10		
Total	39	11		

- McNemer chi-square test value - 15.23, $p < 0.0001$ [Significant]
- Positive Likelihood Ratio = 8.18 [1.25, 53]
- Negative Likelihood Ratio = 0.28 [0.16, 0.50]
- Cohen's Kappa Index Value = 0.505

There was a significant association was found between results of two tests. Hysterosalpingography showed a positive-likelihood ratio value for assessment of tubal status of 8.18%, a negative- likelihood ratio value of 0.28%, Moderate degree of agreement was found between findings of both tests (Table 7).

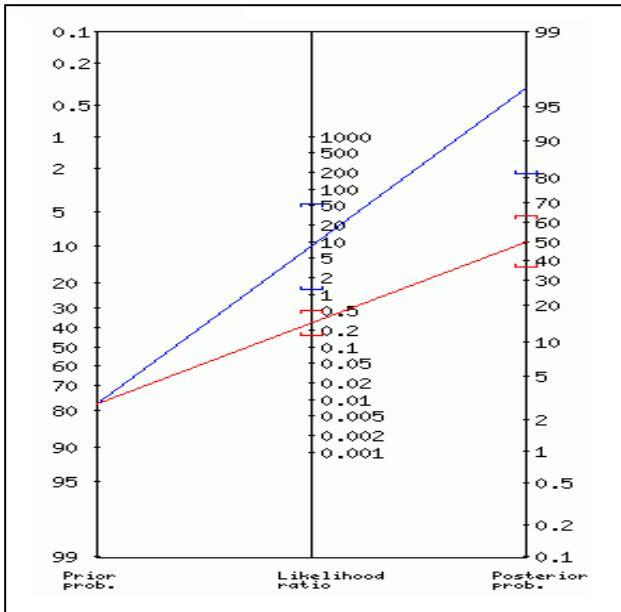


Figure 1: Fagan's nomogram.

DISCUSSION

Intra cavitory pathology like endometrial polyps, uterine septum, bicornuate uterus often results in abnormal uterine bleeding, infertility or both. Congenital anomalies of the female reproductive system are associated with higher rate of infertility. Hysterosalpingography is a safe relatively inexpensive, simple and rapid diagnostic test, when performed properly provides valuable information about tubes, uterus and the cervix.¹¹

World Health Organization studies indicate that laparoscopy identifies tubal patency better than HSG. Nevertheless, both modalities are less than ideal in the accurate identification of tubal status.¹²

In the present study, the commonest age group was 26 to 30 years (38%). Primary infertility was mainly seen in the age group of 21-25 years and secondary infertility in 26-30 years. The mean age of the study population was 28.40 ± 6.73 years. Park J et al, in their study reported with Participant mean age of 32 years (SD: 2.7), with a range between 26 and 41 years.¹³

Our study shows that (28%) Bilateral tubal block was detected in Hysterosalpingography and (10%) in diagnostic laparoscopic chromopertubation. The study by Chakraborti et al (22.7%) and Goynumer G et al (24 %).^{14,15} 156 which shows bilateral tubal block to be the common tubal cause of Infertility.

Previous several studies observed that use of HSG in infertile patients provides additional information regarding tubal patency and can be used as a preselection procedure prior to laparoscopic chromopertubation.¹⁵⁻¹⁷ The finding of the present study was found to be similar with above observations.

The present study indicates that Tubal patency plays a major role for conception in the etiology of infertility and evaluation by laparoscopy along with chromopertubation will give a better idea regarding the cause of the patency and management of the condition.

As this study is done in rural setup patients are not always affordable for diagnostic laparoscopic chromopertubation, so the first line of management remains to be Hysterosalpingography and as it's a non invasive and low cost which should be followed by Diagnostic laparoscopic chromopertubation.

CONCLUSION

The results suggest that hysterosalpingography is useful as a primary screening procedure, but laparoscopy provides a more accurate assessment of tubal patency in the investigation of infertility. In planning of tubal microsurgeries both will be complementary to each other.

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