

Evaluation of the role of the hystrosalpingography in prediction of endometriosis in infertile females

Tamer H. Said^{1*}, Gehan Shehata²

¹Department of Obstetrics and Gynecology, Alexandria University, Alexandria, Egypt

²Medical statistics, High Institute of Health, Alexandria University, Alexandria, Egypt

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***Correspondence:**

Dr. Tamer H. Said,

E-mail: Tamerhanafy74@gmail.com

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ABSTRACT

Background: Hysterosalpingography is the testing the patency of the tubes and the uterine cavity by injecting urographin inside them. The purpose in this study was to evaluate 2 signs in hysterosalpingography (higher position of one or both tubes and S or C shape in the course of one or both tubes) in prediction of endometriosis.

Methods: This was prospective cohort study that was done in El-Shatby Maternity University Hospital, Alexandria University. The study included eighty six infertile women who were assigned to do laparoscopy. Recent hysterosalpingography was done within 3 months period before laparoscopy and comments were done on the position and S or C shape in the course of the tube then laparoscopy was done and document all findings including presence of endometriosis and biopsy was taken from atypical lesions.

Results: All signs show high specificity in prediction of endometriosis although only 2 signs (higher level of left tube and bilateral tubal S or C shape) showed significantly high sensitivity in prediction of endometriosis.

Conclusion: Careful examination of the HSG film and searching for the specific signs of endometriosis is a practical and simple method in prediction of endometriosis. These preliminary data suggest that HSG has a role in prediction of endometriosis.

Keywords: Hysterosalpingography, Tube, Prediction, Endometriosis

INTRODUCTION

Endometriosis is a common gynecological disease characterized by presence of endometrial glands and stroma outside the uterus that primarily affects the women during their reproductive years.¹

The stray endometrial tissue is found most frequently in the pelvis. It could affect the superficial peritoneum or infiltrate deeply into the pelvic organs. The degree of endometriosis can be staged laparoscopically according to the American Society of Reproductive Medicine (ASRM).¹

The diagnosis of endometriosis is usually done by laparoscopy as it is the gold standard in diagnosis and confirmed by histological examination of the excised tissues.^{2,3} It is difficult to estimate the actual prevalence of endometriosis in infertile patients and it was hypothesized to be as high as 50% affecting the peritoneal and tubal factors of infertility.^{5,6} Fallopian tube abnormalities are one of the most common causes of female infertility.⁷ The tubal abnormalities could be diagnosed by hysterosalpingography which include patency, irregularity, peritubal disease and obstruction. The ability of HSG to diagnose the underlying pathology is limited for absence of pathognomonic signs for different pathology.⁸

Prediction of endometriosis using HSG has been tried before but with no clear signs that help in diagnosis until our current time. Lack of definite association between endometriosis and HSG and because of its evident deficiency in prediction capability of endometriosis, the necessity of looking for novel signs in an old procedure to revive its importance and provide a new insight in an traditional investigation.

METHODS

Eighty six women who were planned for laparoscopy were recruited. Inclusion criteria include all women who have history of primary or secondary infertility. All women were in reproductive age group between 19 and 42 years. Written informed consent was taken from every patient. Exclusion criteria include previous laparotomy or laparoscopy, pelvic inflammatory disease, ovarian cysts including endometriotic cysts, patients with pelvic adhesions as diagnosed by ultrasound or magnetic resonance imaging or any contraindication for laparoscopy. All patients had HSG done within 3 months duration before surgery using water soluble contrast media. The HSG was revised once by the same observer anonymously and documented the following signs:

- One tube is higher than the other (specify right or left tube) by drawing a transverse line over the fundus and documented the actual position of both tube.
- Coiling of one or both tubes so that a C or S shapes could be identified, specify which tube.
- Any additional observations were documented include tubal obstruction, out-pouching, hydrosalpinx and peritubal adhesions.

The examination of the HSG was done blindly and in different day of the surgery. Laparoscopy was done by the same surgeon but with different teams in the immediate post menstrual period. Endometriosis was staged at laparoscopy using the revised-American Fertility Society.^{1,9}

Statistics: Sample size calculation; A minimum sample size of 65 achieves 80% power to detect a difference (P0 - P1) of -0.1659 between the null hypothesis that the population proportion is 0.2000 and the alternative hypothesis that the population proportion is 0.3659 using a significance level of 0.05. The sample size calculations of 65 patients as a minimum number taking into considerations that the prevalence of endometriosis is ranged 20-36% with 80% power and 5% level of significance. The sample size calculated is by using the NCSS and PASS program

RESULTS

The study group had a matched age with the mean age was 28.8 years and SD 4.5. Nulliparous patients were 53.5 % and the multiparous patients were 46.5%. Mean

years of infertility 4.9 years SD 2.1. Positive cases of endometriosis were 36 cases (41.9 %) and negative cases for endometriosis were 50 cases (58.1 %). Cases with higher level of the left tube were 40 cases (46.5%) Figure 1. This sign had significant pearson correlation (P was 0.004). Cases with higher level of the right tube, Figure 2, were 5 cases (5.8%). Cases with higher levels of both tubes, Figure 3, were 5 cases (5.8%). Cases with C or S shaped tube were 6 cases (7%). Cases with bilateral C or S shaped tubes Figure 4 were 44 cases (51.2%) and this sign had significant pearson correlation coefficient (P value was 0.005).



Figure 1: HSG film shows higher level of the left Fallopian tube.



Figure 2: HSG film shows higher level of right Fallopian tube.



Figure 3: HSG film shows higher level of both Fallopian tubes.



Figure 4: HSG film shows bilateral C or S shape of both Fallopian tubes.



Figure 6: Shows S – C shape of the left Fallopian tube (laparoscopic view).



Figure 5: Shows higher position of the left tube (laparoscopic view).

Confirmation of the laparoscopic findings was done included position, shape, patency, presence of S or C shape of the tubes and presence of typical endometriotic lesions Figure 5, 6.

Signs of HSG with its sensitivity, specificity, positive and negative predictive value for prediction of endometriosis are included in Table 1. The correlation between every HSG and prediction of endometriosis were described in Table 2.

Table 1: Comparison between signs in HSG in prediction of endometriosis.

The tested HSG sign	sensitivity	specificity	PPV	NPV	Pearson Chi- Square value	P Value (2-sided)
Lt tube is higher	86.1%	82%	77.5%	89.1%	39.02	0.004*
Rt tube is higher	2.8%	92%	20%	56.8%	1.042	0.307
Both tubes are high	8.3%	96%	60%	59.3%	0.718	0.397
Unilat. S-C tube	11.1%	96%	66.7%	60%	1.631	0.202
Bilat. S-C tubes	75%	66%	61.4%	78.6%	14.08	0.005*

P-Value* = P value is significant
 PPV: Positive Predictive Value
 NPV: Negative Predictive Value

Table 2: Correlation between different HSG signs and presence of endometriosis.

The tested HSG sign	Pearson correlation r value	P Value (2-sided)
Lt tube higher	0.67	0.0005*
Rt tube higher	0.11	0.31
Both tubes higher	0.09	0.4
Unilat S-C Shape	0.13	0.2
Bilat S-C shape	0.4	0.0004*

** Correlation is significant at the 0.01 level (2-tailed)

DISCUSSION

Both hysterosalpingography and laparoscopy are the complementary methods that can give valuable information about the condition of the Fallopian tubes (10). HSG findings regarding the tubal patency and those findings found in laparoscopy are concordant by 65%.^{11,12}

Hysterosalpingography is a valuable screening test for tubal patency and a part of the basic infertility workup. Data demonstrates high specificity of hysterosalpingography for diagnosis of proximal tubal

occlusion or hydrosalpinx and low sensitivity in cases with peritubal adhesions.¹² Careful examination of the contrast material in the HSG could lead to diagnosis of the abnormality.¹³ No previous report about the position or the S-C shape in HSG was found. The abnormal adhesions in the tubes were correlated with the presence of endometriosis as diagnosed by laparoscopy and revealed a sensitivity of 55.5%, a specificity of 75%, a positive predictive value of 77%, and a negative predictive value of 53%. In the presence of clinical pathologic uterosacral ligaments and/or sterility, the specificity of HSG may be 100%, but the sensitivity falls below the 40%.¹⁴

All signs showed high specificity in prediction of endometriosis although only 2 signs (higher level of left tube and bilateral tubal S or C shape) showed also high sensitivity in prediction of endometriosis. These results are in concordant with description of association between certain HSG anomalies and diagnosis of endometriosis.^{15,16}

Previous reports compared between laparoscopy and HSG for the patency or occlusion of the tubes. These studies stated that patency has less false positive than tubal occlusion and no referral to the shape or position of the tubes.^{17,18}

The normal positions of the tubes depend on the relaxing nature of the tube. The tubes during the HSG are prolapsed backward as the patient in the supine position. Any change of the mesosalpinx could change the position of the tubes. The higher level of the left tube is explained by the prevalence of the endometriosis more on the left side of the pelvis and around the sigmoid due to peritoneal scarring.¹⁹ Endometriosis can cause scarring and shortening of the mesosalpinx especially in the distal part of the tube. This shortening could lead to limited mobility of the tubes thus when filmed during HSG, while the patient is lying supine, it appears at higher level than the fundus. On the same time, this shortening makes the mesosalpinx so tight that the tube becomes coiled to fit into its narrow peritoneal covering and this can give the C or S shaped coiling. These signs are considered as a fingerprint of endometriosis and its long term effect on the peritoneal surfaces. This explanation does not depend on the stage of endometriosis as it was found to be associated also with stage 1 and 2 as in stage 3 and 4 the adhesions are very dense and could be diagnosed by ultrasound or other imaging techniques. Moreover, these findings could appear away from the actual endometriotic lesion or adhesions and this particularly is considered as an advantage for possible prediction of subtle and early stages of endometriosis.

In cases of unexplained infertility, investigations should be done earlier even before 1 year if signs of endometriosis are found.²⁰ This observation is more important if the females are older than 35 years especially that HSG is easy and tolerable.^{21,22}

Use of HSG still represents an integral part of the primary workup of infertile females although its importance of the HSG is underestimated in modern gynecological practice. Abnormal results were shown in more than 80 percent of infertile women.^{23,24} Even in patient of normal HSG, endometriosis could be found in half of patients of unexplained infertility.²⁵

The concordance between HSG results and laparoscopy findings is higher in the distal than proximal tubal adhesions or obstruction but no typical HSG findings can be associated with endometriosis.²⁶

The prediction of endometriosis can save a long time, anxiety and unneeded investigations. This prediction can be used in proper counselling and to help in giving more appropriate fertility advices.

CONCLUSIONS

In conclusion, careful examination of the HSG film and searching for the specific signs of endometriosis is a practical and simple method in prediction of endometriosis. These preliminary data suggest that HSG has a role in prediction of endometriosis.

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