

Hysterosalpingography versus Laparoscopy in the Evaluation of Female Infertility in Maiduguri, Nigeria.

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Abstract

Objective: To compare the results of hysterosalpingography and laparoscopic methylene blue test for assessment of tubal patency in patients with infertility.

Subjects and Methods: The case records of 124 patients who underwent both hysterosalpingography and laparoscopy as part of comprehensive infertility work-ups at the University of Maiduguri Teaching Hospital between January 1996 and December 2000, inclusive, were reviewed.

Results: There was a close correlation of both methods in 90.9% of the cases in the diagnosis of tubal patency. There was no statistical difference in the diagnosis of tubal occlusion using both hysterosalpingography and laparoscopy. However, there was a significant difference in the ability to make a diagnosis of peritubal adhesions for which laparoscopy was more useful ($p < 0.001$).

Conclusion: The results suggest that laparoscopy is a superior method in the investigation of tubal patency with a better potential for full appraisal of peritubal adhesions prior to tuboplasty. It is therefore recommended as an essential investigation in patients with infertility.

Key Words: Hysterosalpingography, Laparoscopy, Tubal Patency [Trop J Obstet Gynaecol, 2003, 20: 20-23]

Introduction

Infertility is a major global problem and is regarded as a social stigma in the Nigerian society¹. About two of every five patients attending the gynaecological clinic in our environment complain of infertility^{2,3}. Tubo-peritoneal factor has been shown in Nigeria to be the commonest cause of infertility contributing to as much as 64% in some series^{1,2,3}. This is due to the high prevalence of sexually transmitted infections in many parts of sub-Saharan Africa⁴. Tubal evaluation is therefore a very important aspect of the work-up of an infertile couple.

There are different methods of assessing tubal patency among which are tubal insufflation (Rubin test), hysterosalpingography (HSG), laparoscopy and more recently, sonosalpingography. The current procedure for initial evaluation of uterine and tubal factors is the HSG⁵. The techniques and contrast media have evolved over the years. The current techniques of hysterosalpingography have about a 75% correlation with laparoscopy for accuracy⁵. General, regional, and local anaesthesia are all currently used for laparoscopic procedures⁶.

The purpose of this study is to compare the results testing tubal patency by hysterosalpingography with those of laparoscopy and chromopertubation using 0.5% methylene blue instilled through the cervix and the uterine cavity.

Materials and Methods

The case notes of 124 women who underwent both hysterosalpingography and laparoscopy as part of comprehensive infertility work-up at the University of Maiduguri Teaching Hospital between January 1996 and December 2000 were retrieved from the medical records department for detailed study. The data obtained from the case records included the type and duration of infertility, the age and parity of the patients and the findings at laparoscopy and hysterosalpingography. The data obtained were analysed using the chi-square test and the findings described.

The hysterosalpingography was usually performed about 5 days after menstruation before the expected ovulation date. The patients were given 20mg of hyoscine-N-butylbromide intravenously. A preliminary (antero-posterior) plain film of the pelvis was taken and, under sterile precautions, a Leech-Wilkinson uterine cannula was inserted. About 10-20ml of Urograffin contrast medium was injected into the uterine cavity through the uterine cannula and appropriate films taken, usually one antero-posterior (AP) and two oblique views (left and right). A delayed film was taken about fifteen

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minutes after the uterine cannula had been removed and the patient had been requested to walk around.

The laparoscope available in our centre is the Olympus brand donated by Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO) USA Inc. The laparoscopic procedure was performed using the standard technique as described by Sutton⁷. The laparoscopic procedures were combined with injection of 0.5% methylene blue in physiologic sodium chloride solution via a Wilkinson cannula or a Foley catheter inserted through the cervix⁸. Laparoscopies were performed pre-menstrually, usually on day 21 of the menstrual cycle, thus allowing for a pre-menstrual diagnostic endometrial biopsy to be carried out at the same time to gather presumptive evidence of ovulation and to exclude endometrial disease.

All but three of the laparoscopies were performed under ketamine anaesthesia. The other three were performed under general anaesthesia with endotracheal intubation.

Results

A total of 124 patients had laparoscopy and HSG done as part of comprehensive evaluation of infertility at the University of Maiduguri Teaching Hospital from January 1996 to December 2000. Sixty-one (49.2%) had primary infertility while 63 (50.8%) had secondary infertility. Tubal occlusion was demonstrated at HSG in 94 patients and at laparoscopy in 91 patients.

Table 1

Age Distribution of the Patients and Tubal Patency Test Findings

Age Group (years)	HSG n (%)	Laparoscopy n (%)
16-20	5 (5.3)	4 (4.4)
21-25	19 (20.2)	18 (19.8)
26-30	33 (35.1)	35 (38.5)
31-35	21 (22.4)	19 (20.9)
36-40	6 (6.4)	7 (7.7)
> 40	10 (10.6)	8 (8.8)
Total	94 (100)	91 (100)

χ^2 for linear trend: 0.184; $p = 0.6683$

Table 1 shows the distribution of tubal occlusion by age of the patients. There was no statistically significant trend in the occurrence of tubal occlusion

by age group with either method (χ^2 for linear trend = 0.184, $p = 0.6683$)

Table 2

Duration of Infertility Related to Tubal Patency Test Findings

Duration of Infertility (years)	HSG n (%)	Laparoscopy n (%)
< 1	12 (12.8)	11 (12.1)
1-3	31 (33.0)	29 (31.9)
4-6	23 (24.5)	24 (26.4)
7-9	14 (14.9)	13 (14.3)
10-12	8 (9.9)	9 (9.9)
≥ 13	6 (6.4)	5 (5.5)
Total	94 (100)	91 (100)

χ^2 for linear trend = 0.001; $p = 0.9857$

Table 2 shows the distribution of tubal occlusion by duration of infertility. There was no statistically significant difference between the two methods in the diagnosis of tubal occlusion in relation to the duration of infertility (χ^2 for linear trend = 0.001, $p = 0.9857$).

Table 3

Distribution of Tubal Occlusion by Anatomical Site

Occlusion Site	HSG n	Laparoscopy n	p
Cornu	43	42	
Unilateral	15	14	0.88
Bilateral	28	28	
Isthmus	36	35	
Unilateral	10	12	0.55
Bilateral	26	23	
Ampulla	8	8	
Unilateral	3	3	0.70
Bilateral	5	5	
Fimbrial	7	6	
Unilateral	5	4	0.66
Bilateral	2	2	
Peritubal Adhesions ± Occlusion	5 (4%)	50 (40.3%)	< 0.001
Fimbrial Phimosis (with Patent Tubes)	0	1 (1.1%)	0.52

Table 3 shows the distribution of the nature of tubal occlusion by anatomical site. There was a close correlation in the diagnosis of tubal occlusion between the two methods in about 90% of cases; however there was a statistically significant difference in the ability to diagnose peritubal adhesions. Peritubal adhesions could be diagnosed in 4% of patients using HSG and in 40.3% of patients using laparoscopy ($\chi^2 = 52.16, p < 0.001$).

Three patients with demonstrable bilateral cornual occlusion using both methods conceived within five months of diagnosis. These patients however had macroscopically normal tubes with no pelvic adhesions at laparoscopy. There was also good correlation between hysterosalpingography and laparoscopy among 73% of patients with either unilateral or bilateral tubal occlusion.

Discussion

This review has highlighted some of the advantages of laparoscopy and dye test over HSG in the investigation of the tubal factor in infertility studies. The 75.8% and 73.4% frequency of tubal occlusion recorded in this study by HSG and laparoscopy respectively are similar to the 80% found at Ibadan⁹ and 73% reported from Kenya¹⁰, and reflects the high prevalence of pelvic inflammatory disease (PID) following sexually transmitted infections, septic abortion and puerperal sepsis amongst Africans.

The prevalence of tubal occlusion was not significantly different in patients with primary or secondary infertility. There was no clear trend with increasing age with either method. This observation particularly under-scores the importance of tubal patency tests as a matter of routine in the basic infertility work-up regardless of the patient's age and type of infertility. This review also shows that the duration of infertility is not necessarily directly related to the incidence of tubal occlusion as even amongst patients whose duration of infertility was less than a year, tubal occlusion had occurred in as significantly a high proportion as to constitute 12.8% and 12.1% of all the patients with tubal occlusion diagnosed by hysterosalpingography and laparoscopy respectively. In view of the above finding, it is suggested that full evaluation of the infertile couple should commence as soon as they present to the clinic instead of waiting for the conventional one year as contained in the definition of infertility¹¹, more so if there is a history that might suggest an impairment of fertility in either of the partners.

In 3 patients where the HSG revealed bilateral cornual occlusion, the tubes were found to be patent at laparoscopy. This might have resulted from tubal spasm at the time of HSG due to anxiety and apprehension together with inadequate sedation; a finding that had been previously reported^{3, 12, 13}. If tubal spasm occurs, administration of 10mg of glucagon followed by a 5-minute delay before continuing the injection of contrast media results in 80% relief of tubal spasm¹⁴.

In the 3 patients with bilateral cornual occlusion demonstrated by both HSG and laparoscopy who conceived within 5 months of laparoscopy, it was quite possible that tubal spasm during the two procedures resulted in false negative results or that the pressure of the injected solution produced a therapeutic 'flushing' effect resulting in re-canalisation of the tubes with the subsequent occurrence of pregnancy^{3, 13, 14}.

The 90.9% correlation between hysterosalpingography and laparoscopy in excluding tubal occlusion obtained in this study is similar to the 87% correlation previously obtained by Ladipo *et al* in Ibadan¹³. The 3 patients who had their laparoscopies performed under general anaesthesia with endotracheal intubation were patients in whom it was not possible to achieve good muscle relaxation and sedation using ketamine (one patient) and two patients with moderately elevated blood pressure. Of interest in this review was one patient with bilateral tubal patency by HSG but laparoscopy revealed fimbrial phimosis. Moreover, laparoscopy showed that 40.3% of the patients had varying degrees of peritubal adhesions as compared with presumptive diagnosis of pelvic adhesions by HSG in 4% of the patients. Laparoscopy is a useful adjunct to HSG and it demonstrates tubal patency in tubes, which radiologically had shown "fill but no spill". Whereas HSG can detect intrauterine anomalies like intrauterine anatomical defect, leiomyomas and uterine synechiae⁵, laparoscopy will give useful information regarding the position and state of the tubes, and the degree of peritubal adhesions^{15, 16}. This will help in the selection of cases that are likely to benefit from tubal surgery.

Flare up of chronic pelvic inflammatory disease, which usually occurs following HSG⁵ was absent following injection of 0.5% methylene blue through the cervical canal in this review, and is a major advantage of laparoscopy with dye instillation. Major complications of laparoscopy with room air like injury to the major retroperitoneal blood vessels, bowel laceration, subcutaneous emphysema,

gas embolism and subphrenic discomfort⁷ were not encountered in these patients. As laparoscopy can be combined with endometrial biopsy^{2, 5}, it would

appear to have certain advantages over HSG in the investigation of infertility.

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