Correlation between Hysterosalpingography and Laparoscopy/ Dye Test in the Investigation of Tubal Factor Infertility.

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SUMMARY

Context: Tubal factor infertility is common among infertile couples in Nigeria. Clinical evaluation involves studies of uterotubal patency.

Aim: To assess the level of correlation between findings on hysterosalpingography and laparocopy/dye test infertile patients.

Method: A 5-year retrospective review of patients with tubal factor infertility at the University of Benin Teaching Hospital Benin City between 1998 and 2002.

Results: Utero-tubal factor infertility was confirmed in 13.5% of the 1181 infertility cases within the period. The concordance rates between hysterosalpingography and laparoscopic/dye test in demonstrating normal tubes and pelvic adhesions were 35.5% and 38.3% respectively, while in cases of unilateral and bilateral tubal blockage, these were 85.0% and 88.4% respectively.

Conclusion: Management outcome of tubal infertility can be optimized with complementary usage of hysterosalpingography and laparoscopy/dye test in the evaluation of utero tubal pathologies.

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Keywords: concordance, infertility, laparoscopy, hysterosalpingogram, Benin City.

INTRODUCTION

The inability of a couple to achieve pregnancy after twelve months of co habitation as infertility has been defined[1,2] is the most frightening health problem of the African woman[2]. The prevalent rate in sub Saharan Africa is alarmingly high[3] and Nigeria falls within the infertility belt described for Africa.

Infertility could be primary if no conception has ever taken place or secondary if pregnancy had been achieved irrespective of outcome. Documentation shows a differing infertility pattern between the developing countries and developed nations[4] with secondary infertility predominating among couples in the developing countries. Earlier studies have pointed to sexually transmitted diseases/Pelvic inflammatory disease[4,5] unsafe abortion[6] as well as puerperal sepsis, pelvic surgery and other pelvic infections including inflamed appendix[7] as aetiopathogenic factors responsible for the high prevalence.

Optimal management of infertility involves adequate investigation into the male factor, assessment of ovulation, post coital test and demonstration of tubal patency[8]. Laparoscopy/ dye test and hysterosalpingography have been described as gold standards in the evaluation of tubal patency[7]. In a low resource setting as ours, economic considerations impose a limit to the range of investigations a couple could afford to undergo. The cost of hysterosalpingography and/or laparoscopy may be beyond the reach of many infertile couples in Africa, who often have sought and committed huge resources to non-effective management before resort to orthodox medicine.

This study therefore aims at evaluating hysterosalpingography and laparoscopy in terms of correlation between them and clinical diagnosis of tubal factor infertility and as such form a rational basis for tubal patency investigation request.

MATERIALS AND METHODS

Study Background

The University of Benin Teaching Hospital (UBTH) Benin City, Nigeria is a tertiary health institution and serves as a referral centre to the population in Edo State and the neighbouring States of the Nigerian Federation. Since inception in the early 1970s, the Obstetrics & Gynaecological department has remained very functional offering clinical services to a wide range of patients. Infertility patients usually referred from peripheral clinic and hospitals as well as the out patient department of the hospital, are seen in the Gynaecological clinics and the world Heath Organization (WHO) assisted Human Reproduction and Research Programme (HRRP) clinic. These patients are managed strictly according to departmental protocol. This involves in depth clinical history, meticulous physical examination and basic investigations.

Study Design

This is a retrospective review of all patients with tubal infertility managed in the department between January 1st 1998 and December 31st 2002. Case records were retrieved from the HRRP unit and the central records department. Information extracted related to the socio demographic characteristics of the patients and the findings on hysterosalpingography and/or laparoscopy and dye test.

In our centre, hysterosalpingography is typically performed within the first ten days of the woman's menstrual cycle but after cessation of the menstrual flow, when there is no possibility of pregnancy. She is placed in the lithotomy position.

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The vulva and vagina are cleansed with antiseptic solution and sterile drapes are applied. The cervix is exposed using a bivalve speculum and is held grasped with a tenaculum. Contrast media (Urograffin) is then injected through the Leech-Wilkinson's cannula to expel any air within it and prevent air bubble formation within the uterus. The cannula is then inserted as far as the internal os and secured onto the tenaculum. An initial 'scout' film is taken and two milliliter of contrast is injected to outline the uterine cavity. Then 10 -20 ml of the contrast media is injected gently and slowly to outline the fallopian tubes and confirm intraperitoneal spillage. Early and late filling phases' films are taken. Finally, a delayed film is obtained 15 – 30 minutes later.

Laparoscopy and dye test is usually performed about the mid luteal phase of the cycle. The standard procedure as described by Sutton is adapted in our centre under general anaesthesia. Carbon dioxide is employed to create pnemoperitoneum. The dye used is 0.5% Methylene blue in Normal Saline solution and is injected via a Leech-Wilkinson's cannula through the cervix.

The two modes of tubal patency evaluation were comparatively analyzed in terms of their diagnosis of tubal blockage as well as other pelvic abnormalities. Where applicable a test of significance using the chi square was performed with a p-value of < 0.05 taken as significant.

RESULTS

During the five-year period of review, 3,505 new cases were seen in the gynaecological clinics. Of these, 1181 were for infertility, giving an incidence of 33.7%. Utero-tubal factor infertility was confirmed in 159 cases, 13.5% by either hysterosalpingography and/or laparoscopy. A hundred and thirty-six case notes of the 159 (85.6%) were retrieved and constituted the body of this study. One hundred and twenty-two and 109 patients were evaluated using hysterosalpingography and laparoscopy/dye test respectively. Ninety-five had both modalities of evaluation while 14 and 27 patients had laparoscopy/dye test alone and hysterosalpingography alone respectively performed on them.

The hysterosalpingrogram findings are displayed in table 1. Bilateral tubal patency was demonstrated in 12 patients (9.3%), while 66.4% and 23.5% were shown to have bilateral and unilateral tubal blockage respectively. Twenty-eight patients (23.0%) had pelvic adhesions. Uterine abnormalities identified included, intrauterine synechiae in 20 patients (16.4%), Leiomyoma in 19 patients (15.6%), bicornuate uterus in 3 patients (2.5%) and cervical stenosis in 3 patients (2.5%). Similarly, findings on laparoscopy/dye test are shown in table 2. This revealed bilateral tubal patency in 21 subjects (19.3%). Bilateral and unilateral blocked tubes were seen in 64.2% and 16.5% of the patients respectively. Sixty-seven patients (61.5%) had pelvic adhesions while fibroids were noted in 35 patients (32.1%). Three patients (2.5%) had cervical stenosis. Some forms of functional ovarian cysts were present in 26 patients (23.8) and uterine anomaly (bicornuate uterus) was found in 4 patients (3.7%). Endometriosis was diagnosed in a patient (0.8%)

Findings and degree of correlation for the 95 patients who underwent both hysterosalpingography and laparoscopy/ dye test are shown in table 3. Eleven patients who were shown to have bilateral tubal blockage on hysterosalpingography had bilateral free dye spillage on laparoscopy – a concordance of 35.3%. There was a high degree of correlation in demonstration of unilateral and bilateral tubal blockage by both modalities of evaluation, 85.0% and 88.4% respectively. Uterine anomalies (bicornuate uteri) and cervical stenosis were equally diagnosed by both methods. Laparoscopy/dye test revealed more cases of pelvic adhesion 63.4% than hysterosalpingography 24.2%. It was same in the diagnosis of fibroids 29.5% versus 11.6%.

The influence of some of the socio demographic characteristics of the patients on the outcome of the investigations was examined in table 4. No statistical significant differences were demonstrated in terms of patients' ages (p-value 0.984), parity (p-value 0.998), social class (0.654) or duration of infertility (p-value 0.772 respectively).

Table 1: Findings at Hysterosalpingographic evaluation of 122 Patients.

Findings	Number	Percentage (%)
Normal tubes	12	9.8
Unilateral tubal occlusion	29	23.8
Bilateral tubal blockage	81	66.4
Pelvic adhesions	28	23.0
Intrauterine synechiae	20	16.4
Fibroids	19	15.6
Uterine anomaly	3	2.5
Cervical stenosis	3	2.5

Table 2: Findings at the Laparoscopic evaluation of 109 Patients.

Findings	Number	Percentage(%)
Normal tubes	21	19.3
Unilateral tubal occlusion	18	16.5
Bilateral tubal blockage	70	64.2
Pelvic adhesions	67	61.5
Ovarian cyst	26	23.9
Fibroids	35	32.1
Uterine anomaly	4	3.7
Cervical stenosis	3	2.8

Table 3: Correlation between Hysterosalpingographic and Laparoscopic findings on Evaluation of 95 Patients.

Findings	HSG		Laparoscopy		Concordance
	n	(%)	n	(%)	(%)
Normal tubes	6	6.3	17	17.9	35.3
Unilateral tubal block	20	21.1	17	17.9	85.0
Bilateral tubal block	69	72.6	61	64.2	88.4
Pelvic adhesions	23	24.2	60	63.2	38.3
Fibroids	11	11.6	28	29.5	39.3
Bicornuate uterus	3	3.2	3	3.2	100.0
Cervical stenosis	2	2.	2	2.1	100.0

Table 4: Socio Demographic Characteristics of Patients with Tubal Occlusion on Hysterosalpingography and Laparocopy/Dye Test.

Parameter	HSG		Laparoscopy		P -value
	N=89	%	N=78	%	
Age (years):					
20-29	27	30.3	22	28.2	
30-39	53	59.6	50	64.1	0.984
≥ 40	9	10.1	6	7.7	
Parity:					
0	48	53.9	43	55.1	
1-2	31	34.8	28	35.9	0.988
3-4	10	11.2	7	9.0	
Social Class:					
I	6	6.7	5	6.4	
II	12	13.5	12	17.7	
III	31	34.8	30	38.5	0.654
IV	28	31.5	21	26.9	
V	12	13.5	10	12.8	
Duration of Infertility (years)					
1 - 5	51	57.3	46	59.0	
6 – 10	30	33.7	24	30.8	
>10	8	9.0	8	10.3	0.772

DISCUSSIONS

As earlier reported from Ibadan Nigeria[9], infertility remained the commonest out patient gynaecological complaints in our study, constituting over a third of all new gynaecological clinic consultations. Using hysterosalpingography and/or laparoscopy/dye test, utero-tubal factors were implicated in 13.5% of the cases, far less than had been reported in other series[6,9,10]. Clinically however, after exclusion of ovulatory dysfunction based on presumptive satisfactory ovulatory biphasic basal body temperature and/or mid luteal Progesterone of at least 5ng/ml and male factor infertility based on satisfactory seminal fluid parameters, tubal infertility was diagnosed in 711 out of the 1181 patients giving an incidence of 60.2%. Of these, only the 159 being studied could afford the cost of hysterosalpingography and/or laparoscopy/dye test. High incidences of tubal factor infertility in Africa have been linked to the high prevalence of pelvic inflammatory disease, unsafe abortion and puerperal sepsis[6,7,9-11]

Hysterosalpingography and diagnostic laparoscopy/ dye test have been regarded as gold standards in the evaluation of tubal factor infertility. In the 122 cases, hysterosalpingography was able to demonstrate tubal patency in 9.8% of them. It also demonstrated other pelvic pathologies including tubal occlusions, fibroids, uterine anomaly and cervical stenosis. In contradistinction to laparoscopy/dye test, it also mirrored intra uterine pathologies revealing the presence of synechiae in 16.4% of the cases, in some of whom tubal patency was demonstrated on laparoscopy/dye test. On the other hand, laparoscopy/dye test revealed same spectrum of pathologies but for the intrauterine lesions. In addition though, it showed a panoramic view of the pelvis and was able to reveal ovarian pathologies and more cases of pelvic adhesions and endometriosis.

Hysterosalpingography over diagnosed both unilateral and bilateral tubal occlusion. In these respects, there was a correlation of 85.0% and 88.4% respectively between it and laparoscopy/dye test.. This finding is in keeping with several other studies[12,13] and the degree of correlation also tallied with earlier studies from Ibadan and Maiduguri centres all in Nigeria[14,] but was higher than that reported Adetoro[15] from Ilorin Nigeria. This disparity has long been attributed to involuntary corneal spasms incident on some patients frequently as result of apprehension and/or pain during hysterosalpingography[14,15] Alfonsin[16] also reported that hysterosalpingography has significant inter observer co efficient of variation and this could account for the discrepancy.

Meanwhile laparoscopy/dye test was able to reveal more pelvic pathologies like adhesions and ovarian cysts. It has been believed to give a definitive diagnostic view of the pelvis as well as the tubes and tubo-ovarian functional integrity[16,17]. Hysterosalpingography however, retains the advantage of diagnosing intra uterine pathology.

The differences in the findings from both modalities were not influenced by any of the socio demographic characteristics of the studied population as no statistically significant differences between them were demonstrated in those aspects including types and duration of infertility. Even though there appears to be a high degree of correlation between both methods in the diagnosis of tubal occlusion, each retains certain advantages over the other and would therefore be better applied as complementary tests in infertility evaluation.

CONCLUSION

Utero-tubal pathologies contribute significantly to Infertility, which is very prevalent in our society. Outcome of management would be optimized when there is a complementary employment of hysterosalpingography and laparoscopy/dye test in the diagnosis of tubal occlusion as well as other intra pelvic and intra uterine pathologies.

REFERENCES

1. Okpere E. E. Clinical Gynaecology. Benin City, Uniben Press 2005 pp. 135 – 145
2. Onifade A., Adelusi B., Kolawole T. M. Tubal Patency in Infertilty in Ibadan, Nigeria. *Trop J Obstet Gynaecol* 1989; **7:** 19 – 23.
3. World Health Organization (WHO). Infertility: Perspectives on prevention. *Fertil. Steril.* 1987; **47:** 964
4. Belsey M. A. The Epidemiologic aspects of Infertility. In: Holmes K. K., Mardh P. A eds. International Perspectives on neglected sexually transmitted disease. Washington DC, Hemisphere Publishing 1983; 269 – 99.
5. Ojo O. A. The Problem of Infertility in Nigeria. Proceedings of the 6th World Congress on Fertility and Sterility. Tel Aviv 1968. The Israeli Academy of Science and Humanities, Jerusalem, 1970: 128 – 132
6. Okonofua F. E. Induced abortion: a risk for Infertility in Nigerian women. *J Obstet Gynaecol* 1994; **14:** 272 – 6
7. Umeora O. U. J., Mbazor J. O., Okpere E. E. Tubal Factor Infertility in Benin City, Nigeria: Socio demographics of patients and aetiopathogenic factors. *Trop Doctor* 2007; **37:** 92 – 94.
8. Speroff L., Glass R. H., Kase N. G. (eds). Female Infertility. In: Clinical Gynecologic Endocrinology and Infertiltiy. 6th edition. Baltimore, Lippincott Williams and Wilkins 1996; 1013 – 1042.

9. Otolorin E. O., Ojengbede O., Falase A. O. Laparoscopic evaluation of the tuboperitoneal factor in infertile Nigerian women. *Int J Gynecol Obstet* 1987; **25(1):** 47 – 52
10. Cates W., Farley T. M. M., Rowe P. J. Worldwide Patterns of Infertility: Is Africa different? *Lancet* 1985; **No. 8455:** 596 – 598
11. Sciarra J. J. Infertility: a global perspective. The role of pelvic infection. *OBGYN* 1994; **(3):** 12 – 5.
12. El-Minawi M. F., Abdel-Hadi M., Ibrahim A. A., Wahby O. Comparative evaluation of laparoscopy and hysterosalpingography in infertile patients.*Obstetrics and Gynecology* 1978; **51(1):** 29 – 32.
13. Fayez J. A. Mutie G. Schneider PJ. The diagnostic value of hysterosalpingography and hysteroscopy in infertility investigation *Am. J Obstet Gynecol.* 1987; **156(3):** 558 – 60
14. Idrissa I., Ojiyi E. Patterns of Infertility in Northeast Nigeria. *Trop. J. Obstet Gynaecol.* 2003; **21(2):** 12 – 16.
15. Adetoro O. O., Komolafe F., Nzeh D. A. Hysterosalpingography and Laparoscopy in Infertility Management. *Trop J Obstet Gynaecol* 1990; **8(2):** 26 – 28.
16. Alfonsin A. E., Baistrocci A., Horton M., Marconi C. Tubal Infertility. In: Rodriguez-Armas O, Hedon B and Daya S (eds). Infertility and Contraception. London, the Panthenon Publishing Group 1998; pp 37 – 45.
17. Daya S. Definitions and factors affecting fertility. In: Rodriguez-Armas O., Hedon B. and Daya S. (eds). Infertility and Contraception. London, the Panthenon Publishing Group 1998; pp 4 – 10