

Pre-HSG Microbial Isolates from Endocervical Swabs in Infertile Women in Ilorin, Nigeria

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ABSTRACT

Background: Genital infections contribute significantly to infertility by causing tubal disease in our environment. This can be worsened by any instrumentation of the genital tract such as hysterosalpingography (HSG), which is the most common and affordable investigation by infertile couples for tubal factor. **Materials and Methods:** A prospective study of 53 women who presented for HSG on account of infertility was done in a radio-diagnostic centre In Ilorin, Nigeria. Endo-cervical swabs were taken aseptically prior to standardized HSG in all clients. The swabs were sent for microscopy, culture, and antibiotic sensitivity and the HSG findings of patients were documented. **Results:** The age ranged between 25 and 52 years with a mean of 34.26 + 5.762 years. Both fallopian tubes were patent in 10 patients and blocked in 14 cases. There were 14 cases of unilateral hydrosalpinx and 10 (18.9) bilateral hydrosalpinges. Either pelvic or cervico-uterine cavity adhesions were observed in 35 (66.0%) of the cases. Mild to heavy growth occurred in 67.9% of the cases. Gram stain was positive in 54.7% of cases. The most common organism was *Staphylococcus spp* (28.3%). Forty-five percent of yields were sensitive to more than two antimicrobials. There was statistical significant relationship between the presence of pathogens in the endo-cervix and the frequency of tubal disease ($\chi^2 = 2.71$, $P \leq 0.05$). **Conclusion:** There was a positive or significant statistical relationship between presence of pathogens in the cervix and tubal disease. Pre-HSG endo-cervical swab for microscopy, culture and sensitivity is advisable to prevent genital infections after HSG.

Key words: Endo-cervical swabs; genital tract infection; hysterosalpingogram; infertility; pathogens microbes

Introduction

Genital infections in women play a pivotal role in the development of tubal disease, which results in infertility. Approximately, 35% of women with infertility suffered from postinfectious sequelae affecting the fallopian tubes and/or the surrounding peritoneum.^[1] Genital infections involving the cervix and endometrium may contribute to infertility in other ways; for example, an endo-cervical infection may lead to abnormalities of sperm function and immobilization in the cervix due to the direct effect of the microbes on the sperm and alteration of the

cervical pH. These infections may be symptomatic or even go unnoticed.^[2]

Upper genital infections are often due to Chlamydia trachomatis, gonococcal infections, and mixed infections that cause pelvic inflammatory disease (PID).^[1,2] It is estimated that 10-20% of women with endo-cervical gonorrhoea or chlamydial infections develop salpingitis if untreated, thereby contributing significantly to tubal infertility.^[3]

Upper genital infections following sexually transmitted infections (STIs) with resultant PID are more common in our environment^[4] and others may follow postabortal and postpartum infections.^[5-7]

Tubal patency is usually demonstrable by hysterosalpingography (HSG) as part of evaluation in infertile women. Earlier studies have suggested a higher risk of pelvic infections either from ascending endo-cervical infections or from the reactivation of microorganisms

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persisting in the genital tract after previous ones (infections) such as Chlamydia, following the procedure.^[8,9]

Hence authors have suggested that prophylactic antibiotics should be considered in all sub fertile women before any instrumentation.^[10] A Cochrane review of antibiotic prophylaxis for transcervical procedures in 2010 showed insufficient evidence to accept or reject the routine use of antibiotics in such procedures.^[11] Either to offer prophylactic antibiotics or endo-cervical screening and treat positive cases only, remains debatable.^[12-14]

HSG remains the most common method of ascertaining tubal patency in our environment and perhaps the most common form of uterine instrumentation in infertile women. Although, bacterial isolates before HSG may not represent the actual causative organism of the tubal damage, there is the risk of a new ascending infection if the organism is pathogenic or there is an on-going asymptomatic infection prior to the procedure.^[15]

This study was undertaken to determine the pattern of microbial isolates from endo-cervical swabs taken in infertile women prior to HSG study with the aim of suggesting routine antimicrobial prophylaxis or routine endo-cervical screening before the procedure.

Materials and Methods

The study design was a prospective study starting from June 2011 to June 2012. It was conducted in a private radiological centre under the supervision of a consultant radiologist. All prospective patients were either self-directed or referred from medical centers in Ilorin. All patients referred for HSG due to primary or secondary infertility were recruited into the study by nonprobability purposive sampling till the sample size of 53 was obtained. The exclusions criteria were: Abnormal uterine/vaginal bleeding less than 5 days before the procedure or on-going menstruation, suspected pregnancy, purulent discharge on inspection of cervix, diagnosed PID in the preceding 6 months and previous history of contrast hypersensitivity. The informed consent of each patient was sought concerning the nature of the study and the likely benefits. The sociodemographic data, type, and duration of infertility were obtained at recruitment. The patients were informed about the procedure, and the outcome of the investigations. The referring doctors were also informed of those women who required treatment. The first step was to give premedication with intramuscular buscopan 10 mg and 10 mg of Diazepam as mild sedative for the very anxious patients. A sterile speculum examination was performed and then an endo-cervical swab was taken aseptically into a transport medium for immediate evaluation in the laboratory (microscopy, culture, and sensitivity). Thereafter, the endo-cervix was prepared aseptically and the HSG study carried out using standard procedures.

The HSG films were reported by the Consultant Radiologist (one of the authors). Patency of the fallopian tubes, presence of fibroids, pelvic adhesions, and hydrosalpinx were documented from the HSG. In addition, the pattern of wet preparation findings, Gram-staining, and amount of growth, culture yield, and sensitivity to antimicrobial agents were determined from the pre-HSG swabs. Statistical analysis was done using the computer software SSPS version 15.

Results

A total of 53 clients were studied; 60.4% had secondary infertility while 39.6% were primarily infertile. Their age range was 25-52 years with a mean of 34 + 5.76 years. The duration of infertility is displayed in Figure 1. Many clients had infertility of at least 2 years (52.8%).

Both fallopian tubes were patent in 12 patients while in 13 cases both tubes were blocked [Table 1]. Fourteen (26.4%) cases had unilateral hydrosalpinx, right tube contributing 4 (7.5%), and left tube 10 (18.9%). Bilateral hydrosalpinges were noted in 10 (18.9%). Either pelvic or cervico-uterine cavity adhesions were observed in 35 (66.0%) of the cases, while 18 (34.0%) patients had no radiographic evidence of adhesions. Cervico-uterine adhesions were seen as marginal irregularities or linear filling defects and pelvic adhesions were represented as forced spillage and pockets of contrast medium within the pelvic cavity. There were 11 patients (20.8%) with demonstrable features of uterine fibroids seen as filling defects or enlargement of the uterine cavity. These patients were sent for further evaluation by pelvic ultrasound scanning. The most common radiological abnormality was pelvic adhesions (as described above) (66%) and followed by hydrosalpinges (45.3%).

The results of the initial wet preparation showed that 69.8% of the clients had only epithelial and pus cells, 15.1% had epithelial, pus, and yeast cells, 11.3% had only epithelial cells, while only two women had no demonstrable cells on wet preparation. The pattern of gram staining on microscopy is

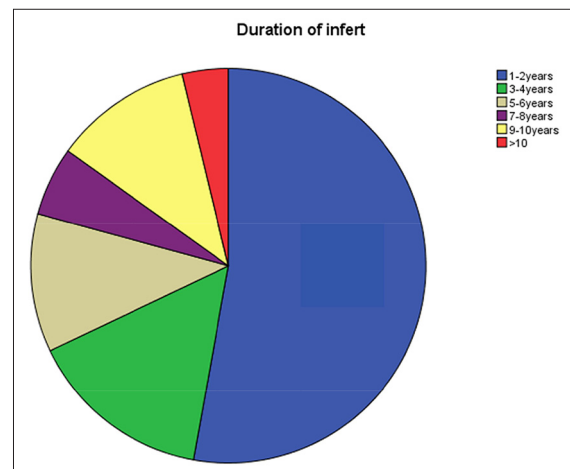


Figure 1: Duration of infertility in the study population

illustrated in Table 2. Gram stain was positive in 54.7% of cases, while there was a mixture of both Gram-positive and-negative organisms in 9.4%. Mild to heavy growth occurred in 67.9% of the cases; while there was no growth in 30.2% of the samples.

The most common organism was *Staphylococcus spp* (28.3%), followed by coliform bacteria in 15.1%. No pathogen was isolated in 16 (30.2%) clients. *Candida albicans* was isolated in 5 (9.2%) patients. Other microbial isolates are shown in Table 3. Forty-five percent of yields were sensitive to more than two drugs and only three were sensitive to Azithromycin alone. Similarly, Azithromycin was the sensitive agent either alone or with another agent in 13.3% of the culture yields. Multi-drug resistance (≥ 4) was observed in 26.4% of the cultures. Only one culture was resistant to all drugs [Table 4].

Coliform bacteria, *Staphylococcus spp*, and *Candida albicans* were more frequent in cases with blocked tubes than those with patent tubes [Table 5].

Statistically, alternative hypothesis states that there is statistical significant relationship between the presence of pathogens in the endo-cervix and the frequency of tubal disease, $P < 0.05$.

Discussion

The mean age of the infertile women in this study was 34.3 years. This is comparable with the mean age of 34.6 and 30 years in a review of HSG in infertile women at Nnewi^[16] and Abakaliki^[17] south-eastern Nigeria, respectively. In Kampala, Uganda, the mean age of the women studied was 29 years.^[18] The value in this study is much higher than 23.2 years reported by Okpala^[19] *et al.* 15 years ago at Nnewi in South-East Nigeria.

This probably suggests a change in the trend in the age of women presenting for tubal assessment due to infertility in our environment.

Secondary infertility was reported in 52.8% of the clients. This is comparable to findings of other authors^[16-19] in our environment. This is not surprising because 50-80% infertility in sub Saharan Africa usually follows ascending genital infections from complicated abortions and unsupervised deliveries, resulting in tubal pathologies.^[4-7]

The most common radiological abnormality in this study was pelvic/uterine adhesions, whereas hydrosalpinx was the most common abnormality reported in an earlier prospective review in Ilorin over a decade ago.^[20] However, the reported percentage of 45.3% of hydrosalpinx in this study is still higher than the 23.3% reported a decade ago in Ilorin.^[20] This may not directly mean that the incidence of hydrosalpinx is rising in our environment but just a reflection of the

differences in the methodology and the sample sizes of the two studies. Most studies showed that tubal blockage was the most common HSG abnormality among infertile women in Africa.^[17,18,21] Hydrosalpinx with associated thinning of

Table 1: Findings on hysterosalpingograms of the study population

Finding	N	%
Frequency of hydrosalpinx		
Yes	24	45.3
No	29	54.7
Bilateral	10	18.9
Unilateral	14	26.4
Presence of fibroids		
No	11	20.8
Yes	42	79.2
Presence of pelvic adhesions		
Yes	35	66.0
No	13	34.0
Tubal patency		
Patent	24	45.3
None patent	29	54.7
Bilateral patency	12	22.6
Unilateral patency	12	22.6
Tubal blockage		
Bilateral	13	24.5
Unilateral	16	30.1

Table 2: The pattern of gram stain of isolates from endocervical swabs taken before HSG

Organism	Frequency	Percentage
Gram-positive organisms-cocci or bacilli	29	54.7
Gram-negative organisms	2	3.8
Mixed population of microbes	5	9.4
Nil bacterium seen	17	32.1
Total	53	100

HSG – Hysterosalpingography

Table 3: Organisms on culture yield or growth of endo-cervical swabs taken before HSG

Organisms	Frequency (n)	Percentage
Coliform bacteria	7	13.2
Coliform+Candida	1	1.9
<i>Streptococcus</i> species	1	1.9
<i>Pseudomonas</i> spp	1	1.9
<i>Klebsiella</i> spp	2	3.8
<i>Staphylococcus</i> spp	14	26.4
<i>Staphylococcus</i> + <i>Candida</i>	1	1.9
<i>Escherichia Coli</i>	2	3.8
<i>Candida albicans</i>	3	5.7
Mixed growth or isolates	5	9.2
No pathogen isolated	16	30.2
Total	53	100

HSG – Hysterosalpingography

Table 4: The pattern of drug sensitivity and resistance of culture yield from endo-cervical swabs before HSG

Drug Sensitivity	N	%
Multiple drugs (more than 2 drugs)	24	45.3
No growth	19	35.8
Azithromycin	3	5.7
Gentamicin	2	3.8
Azithromycin+Chloramphenicol	2	3.8
Azithromycin+Gentamicin	1	1.9
Azithromycin+Erythromycin	1	1.9
Nil sensitivity to all drugs	1	1.9
Total	53	100

HSG – Hysterosalpingography

Table 5: Culture yield versus tubal pathology/patency

	Both patent	Tubal disease	Total	%
Coliform bacteria	1	6	7	13.2
Coliform/candida	0	1	1	1.9
Streptococcus	1	0	1	1.9
Pseudomonas	0	1	1	1.9
Klebsiella	1	1	2	3.8
Staphylococcus spp	1	13	14	26.4
Staphy+candida	0	1	1	1.9
Escherichia coli	0	2	2	3.8
Candida albicans	1	2	3	5.7
Mixed growths/isolate	2	3	5	9.2
No pathogens/isolate	3	13	16	30.2
Total	10	43	53	100

Tubal disease – Tubes were diseased (either single or both; partially blocked or completely blocked, with or without hydrosalpinx); isolate - isolates; Staphy – *Staphylococcus* species

adherent fimbriae and destruction of the mucosa^[18] is also a consequence of the prevalent PID, postabortal, and puerperal infections in this part of the world.^[4-7]

Staphylococcus aureus was the most common organism isolated in this study and this is similar to findings of investigators at Ile-Ife among both fertile and infertile women.^[22] Isolation of *Candida spp* was low in this study when compared with the isolates from women at Ile-Ife.^[22] *Candida* is not an organism that is regularly cultured in the endo-cervix but a genital tract commensal. The Ife study cultured both high vaginal and endo-cervical swabs; this partly explains the higher yield of *Candida*, which is a vaginal flora. Moreover, it becomes pathogenic when there is an overgrowth and inflammation. The possibility of contamination by *Candida* cannot be completely ruled out in this study.

The isolation of microbial pathogens in 69.8% of the clients is surprisingly high because the clients were asymptomatic for genital infections. Thus, there is a possibility of iatrogenic ascending genital infection in this environment following HSG and the place of prior endo-cervical culture for microscopy

and sensitivity is supported by this finding. This becomes even more important when the contribution of genital infections to infertility is given uttermost contribution irrespective of clinical symptomatology.

A total of 64.2% of the cultures/growths were sensitive to at least one antimicrobial agent while 45.3% were sensitive to more than two agents. This suggests a high level of resistance to antimicrobial agents in our environment as supported by the 28.3% rate of resistance to > three drugs in this study. Azithromycin had the highest coverage. It may then be advisable to use at least two agents that include Azithromycin in the treatment of cervical infections especially when there is no demonstrable vaginal discharge before uterine instrumentation. There is a paucity of information on this from this environment.

Conclusion

This study suggests the possibility of post-HSG infection due to the presence of pathogenic microbial isolates from endo-cervical swabs in asymptomatic infertile women. HSG is one of the most important investigations in the evaluation of tubal patency in infertility. Therefore it is important to ensure its safety and minimize postprocedural complications like pelvic infections. It is advocated that prophylactic antibiotic treatment should be given before HSG.

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