

EVALUATION OF PATTERN OF UTERINE AND CERVICAL ABNORMALITIES POTENTIALLY RESPONSIBLE FOR INFERTILITY IN ZARIA, NIGERIA: HYSTEROSALPINGOGRAPHIC ASSESSMENT.

Ibinaiye PO¹, Lawan RO¹, Polite O², Hamidu HU¹, Igashi B¹.

ABSTRACT

Background: Structural abnormalities are amongst the important causes of female infertility. Hysterosalpingography (HSG) is an invasive but safe method of detecting both cervical and uterine pathologies. **Objectives:** The objective of this study was to determine the relationship between types of uterine and cervical abnormalities and fertility outcome. **Materials and Methods:** A prospective study of 220 consecutive women who underwent hysterosalpingography using ionic water-soluble contrast media (urografin) between 1st December, 2011 and 31st May, 2013, at department of radiology, Ahmadu Bello University Teaching Hospital (ABUTH), Zaria. Clinical notes and radiological findings were analyzed for demographic data and abnormal uterine cavity and cervical canal findings. Abnormal findings were correlated with treatments and fertility outcomes. Fertility outcome in women with normal and abnormal findings were compared. P- Value of less than 0.05 was considered as statistically significant. **Results:** The mean age and duration of infertility were 27.37years \pm 4.50 and 4.48years respectively. Women with secondary infertility were 133 (60.50%) while 87 women (39.5%) suffered from primary infertility. The uterine cavity was normal in 167 (75.9%) of the women while 53 (24.1%) women had uterine cavity abnormalities; among these were 16 (30%) with primary infertility and 37 (70%) with secondary infertility. Cervical canal was normal in 210 (95.5%) of the women while 10 (4.5%) women had abnormalities among whom are 5 (50%) that suffered from primary infertility and 5 (50%) that suffered from secondary infertility. The fertility outcome after one year follow up showed 7 (11.1%) of the 63 patients with abnormal findings (cervical canal and endometrial cavity) got pregnant, while 25 (34.72%) of the 72 patients with normal findings (cervical canal, endometrial cavity, tubal and pelvic peritoneum) got pregnant. The difference noted was statistically significant (p - value = 0.001). High (12: 34.3%) spontaneous pregnancy rate was noted in patient with normal HSG, hormone and semen analyses. **Conclusion:** Fertility outcome among women with uterine cavity and cervical canal abnormalities but with normal hormone and semen analyses was low. The high spontaneous pregnancy rate in patients with normal HSG, hormones and semen analyses may be due to therapeutic effect of HSG.

KEYWORDS : uterine cavity; cervical canal; abnormalities; infertility; HSG.

INTRODUCTION

Infertility is a major global problem and is

Department of ¹Radiology, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria.

²Obstetrics and Gynecology, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria.

Correspondence to:

DR PHILIP O IBINAIYE

Department of Radiology, Ahmadu Bello University Teaching Hospital, Zaria, Nigeria.

Tel:- 08034018427.

eMail:- Pibinaiye@abu.edu.ng

regarded as a social stigma in the Nigerian society, affecting 5 - 15% of couples in developed countries and 10 - 20% of couples in developing countries.^{1,2} Infertility is a failure of a couple of reproductive age to conceive after 12 months or more of regular coitus without the use of contraception.³

Factors from either or both partners may contribute to infertility. Factors in male account for 11.5%, while female factors account for 28.7%-37.8% of causes of infertility.^{4,5} In the female, ovulatory dysfunction account for 40% of causes of infertility, with uterine, tubal and



pelvic pathologies accounting for the remaining 60% of causes.⁵ The uterus contributes about 10% of causes of female infertility. Intra uterine adhesion (Asherman's syndrome) may complicate curettage following pregnancy related disorders. The more common types of fibroid (leiomyoma) that adversely affect reproduction are sub mucous and intra cavitory types. Endometrial polyps, if large enough can affect reproduction.⁶

Congenital uterine anomalies are seen in about 2 to 3 percent of all women and approximately 25% of these will have associated infertility.⁶ The most common congenital defect associated with infertility is septate uterus.⁷ Other uterine factors causing infertility include adenomyosis and endometritis due to tuberculosis.² Hysterosalpingography (HSG) is a diagnostic procedure in which there is radiographic visualization of the endocervical canal, the endometrial cavity and lumina of the fallopian tubes by the injection of radiopaque contrast medium.⁸ Despite the development of other radiological methods e.g. Sono-HSG, computerized tomography (CT) and magnetic resonance imaging (MRI) of visualizing the female reproductive tract, HSG remains the main radiological method used in evaluation of infertile women in developing countries because it is relatively cheap and readily available method of assessing female reproductive tract.⁹ The objective of this study was to determine the relationship between types of uterine and cervical abnormalities and fertility outcome.

MATERIALS AND METHODS

The study was carried out at Ahmadu Bello University Teaching Hospital (ABUTH), which is a tertiary health institution located in Shika-Zaria, Kaduna State, Nigeria. The city has a population of 975,153.¹⁰ The hospital provides specialized gynecological services to women in the state and environs. The routine investigations carried out on infertile women at ABUTH include trans-abdominal or trans-vaginal ultrasonography as applicable,

hormonal assay, hysterosalpingography, hysteroscopy, laparoscopy/dye test and their partners semen analysis while post coital test and endometrial biopsy are not done routinely. The study was carried out between 1st December, 2011 and 31st May, 2013 on 220 consecutive women referred from infertility clinics of Ahmadu Bello University teaching Hospital for hysterosalpingography. The women were counseled on the procedure, possible complications and consent obtained from them. Demographic data such as age, parity, and duration of infertility were extracted from the case files using a pro forma. After the HSG, the women were each followed up for a period of one year in the infertility clinic, during which details of therapeutic interventions and fertility outcomes were extracted from their medical records.

Those that were excluded from the study included: women with vaginal discharge, recent history of intra uterine instrumentation, ongoing vaginal bleeding, history of previous salpingectomy, pregnancy and palpable adnexa masses.

Ethical consideration

Prior to the commencement of the study, approval was given by the ethical and research committee of Ahmadu Bello University Teaching Hospital.

DATA ANALYSIS

Data was analyzed using statistical package for social sciences SPSS (version 16 Inc, Chicago, USA) computer software for statistical analysis. Analyses test used in this study was Pearson chi square Statistic. Primary infertility, secondary infertility, normal findings, pattern and prevalence of uterine and cervical abnormalities as demonstrated on HSG among patients with infertility were summarized in figures and percentages (%). Outcome of semen analysis and hormonal assay were summarized in figure and percentages. Also, reproductive outcome in patients with structural abnormalities and normal HSG findings were compared to determine the



effect of HSG findings on fertility outcome. Findings were presented in graphical and tabular forms. All tests of significance were two-tailed, and P- Value of less than 0.05 was considered as statistically significant.

RESULTS

Two hundred and twenty (220) patients with infertility were interviewed and investigated. The age ranged from 18 to 40 years with mean age of 27.37. The duration of infertility ranges from 1 to 8 years with a mean duration of 4.48 years as shown in table 1. Table 1 also shows that women with secondary infertility were 133 (60.5%) while primary infertility were 87 (39.5%). The first aged group of 18-30 years had a high proportion of primary infertile participants (46.4%) while high proportion of secondary infertile patients, 78.8% were in age group 31-40 years. However, there was more secondary infertility in both age groups. Table 2 shows that cervical synechia was the most common cervical canal abnormality, accounting for 3.6% of all the patients, with cervical dilatation as the least finding (0.9%). Table 2 also shows that uterine adhesion (Arsherman syndrome) was the most common uterine cavity abnormality seen, accounting for 11.8% of all patients. Uterine fibroid, seen as filling defects, uterine dilatation and deformity, was seen in 9.5% of the patients (figure 1). Women who had congenital abnormality accounted for 2.8%, with bicornuate uterus (Figure 2) as the commonest and unicornuate and septate uterus the least. Hormonal assay was performed selectively based on clinical presentation of the patients and high index of suspicion for ovulatory dysfunction. Common causes of ovulatory dysfunction were; hyperprolactinemia, hyperthyroidism, polycystic ovarian syndrome and primary ovarian failure. Sex hormones evaluated for ovulatory dysfunction include: serum follicular stimulating hormone (FSH), Luteinizing hormone (LH), Estradiol, Prolactin and Testosterone.

A total of 33 (15%) patients were diagnosed with ovulatory dysfunction; 20 (9.1%) patients

with normal HSG findings and 13 (5.9%) patients with abnormal HSG findings. Of the Patients with normal HSG findings, 9 (4.1%) had hyperprolactinemia, 5 (2.3%) patients with hyperthyroidism, 4 (1.8%) patients with polycystic ovarian syndrome, and 2 (0.9%) patients with primary ovarian failure. While in patients with abnormal HSG findings, 7 (3.2%) patients had hyperprolactinemia, 3 (1.4%) had hyperthyroidism and 3 (1.4%) patients had polycystic ovarian syndrome.

In total, 16 (7.3%) cases of hyperprolactinemia, 8 (3.6%) cases of hyperthyroidism, 7 (3.2%) cases of polycystic ovarian syndrome and 2 (0.9%) cases of primary ovarian failure were seen in patients with ovulatory dysfunction. Out of the 220 female patients, 180 male counterparts had semen analysis performed. These provided information on semen parameters. Abnormal semen analysis was seen in 23 males (10.5%); 17 males (7.7%) with normal HSG female counterparts and 6 (2.7%) males with abnormal HSG female counterparts. The distribution of likely cause of infertility among the 220 couples studied showed that abnormal HSG alone was seen in 63 (28.6%) women, ovulatory dysfunction alone was seen in 20 (9.1%) women, male factors (abnormal semen analysis) alone was seen in 17 (7.7%) women, combined factors (patients with various combination of infertility causes) were seen in 19 (8.6%) women. In 35 (15.9%) women, no abnormality was seen on HSG, also the hormones and semen analyses were normal.

Table 3 shows that after one year of follow up, 7 (11.1%) of the 63 patients with abnormal findings (cervical canal and endometrial cavity) got pregnant after blind and hysteroscopic adhesiolysis for cervical and uterine adhesions respectively, while 25 (34.7%) of the 72 patients with normal structural findings (cervical canal, endometrial cavity, tubal and pelvic peritoneum) got pregnant. The difference noted was statistically significant ($p=0.001$).



In total, 32 patients became pregnant. Fifteen were spontaneous (without any therapeutic intervention) pregnancies after HSG, while 17 patients had therapeutic interventions like blind and hysteroscopic adhesiolysis, myomectomy, intrauterine insemination, ovulation induction and timed-intercourse before they conceived. Table 4 shows the distribution of pregnancy occurrence and therapeutic intervention in patient with abnormal HSG findings. Out of 8 patient with cervical adhesion, 1 (12.5%) got pregnant after blind adhesiolysis. Uterine adhesion was found in 26 patients, 2 (7.7%) got pregnant following hysteroscopic adhesiolysis. Uterine fibroid was seen in 21 patients, 3 (14.3%) became pregnant, 1 after myomectomy and 2 were spontaneous pregnancies. A total of 6 congenital uterine abnormalities were seen, of

which 1 (16.7%) became pregnant spontaneously.

Table 4 also shows the distribution of pregnancy occurrence and therapeutic intervention in patient with normal HSG findings. Out of 20 patient with ovulatory dysfunction, 8 (40%) got pregnant (this includes 7 patients with hyperprolactinaemia and 1 polycystic ovarian syndrome) following ovulation induction and timed- intercourse. Male factors were found in 17 patients, in 5 patients with oligospermia (29.4%), their female partners got pregnant following intra uterine insemination. In 35 patients with normal HSG, hormone and semen analysis, 12 (34.3%) became pregnant spontaneously after HSG.

Table 1: Age group and type of infertility

Age group (Years)	Type of infertility		Total (%)
	Primary (%)	Secondary (%)	
18-30	76(46.4)	92(54.8)	168(76.4)
31-40	11(21.2)	41(78.8)	52(23.6)
Total	87(39.5)	133(60.5)	220(100)

Table 2: Uterine and cervical canal findings at HSG

Characteristic	Uterine findings		Cervical canal findings	
	Frequency	(%)	Frequency	(%)
Normal	167	75.9	210	95.5
Adhesion	26	11.8	8	3.6
Fibroid	21	9.5	0	0
Bicornuate UT	4	1.8	0	0
Unicornuate UT	1	0.5	0	0
Septate UT	1	0.5	0	0
Dilatation	0	0	2	0.9
Total	220	100	220	100

UT = Uterus



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Table 3: findings and fertility outcome after one year of follow up

HSG Findings	Pregnant	Not pregnant
Normal	25 (34.72%)	47 (65.27%)
Abnormal	7 (11.1%)	56 (88.9%)

Pearson Chi-square, $\chi^2= 28.32$, $df=1$, p -value = 0.0001.

Table 4: Summary of the distribution of fertility outcome and therapeutic intervention in patients with normal and abnormal HSG findings

Abnormality	Frequency of abnormality	Frequency of pregnancy	%	Therapeutic intervention
Cervical adhesion	8	1	12.5	Blind adhesiolysis
Uterine adhesion	26	2	7.7	Hysteroscopic adhesiolysis
Uterine fibroid	21	3	14.3	1 Myomectomy 2 Spontaneous pregnancies
Congenital uterine abnormality	6	1	16.7	Spontaneous pregnancy
Ovulatory dysfunction	20	8	40	Ovulatory induction and timed- intercourse
Male factors	17	5	29.4	Intra uterine insemination
Women with normal HSG, hormones and semen analyses	35	12	34.3	Spontaneous pregnancies

DISCUSSION

The mean age of participants in this study was 27.37 years; this was similar to the mean age of infertile women in another study by Bello¹¹ in Ilorin, Nigeria. But this value is lower than that of Okafor *et al.*¹² in Nnewi, southeastern Nigeria where the mean age of their study was 32.41. The difference may be due to cultural differences influencing the age at marriage.

The mean duration of infertility was 4.48 years which is similar to previous study done in Nigeria.¹¹ The mean duration of infertility is reported lower in previous studies conducted in India.¹³ Most of the patients in this study had 4 to 8 years of infertility with majority of these patients, showing significant number of abnormalities (74%). This long duration could be attributed to lack of awareness of the



importance of early treatment among the infertile couple⁵. The presence of enormous local traditional healing practices and religious believes could be an important contributory factor for the delay in presentation to health facilities.¹⁴

In this study more patients had secondary infertility than those with primary infertility, which is similar to previous studies.^{15,16} However this differs from other studies where it was found that primary infertility was commoner.^{13,17,18} This higher rate of patients with secondary infertility compared to the primary infertility can be used as a crude indicator of the possible effects of pelvic inflammatory disease, post abortal sepsis and puerperal sepsis in our setting.^{12,19}

From this study, cervical canal abnormalities accounted for 4.5% of all the patients, with cervical synechia being the commonest (3.9%). This is similar to the findings of Ibekwe *et al*²⁰ in Ebonyi, south eastern Nigeria. Cervical adhesion may be due to previous instrumentation, obstetric accidents or infection.²⁰

Congenital uterine abnormalities which are due to Mullerian ducts abnormalities during the early weeks of gestation, accounted for 2.5% of the abnormalities detected on HSG in this study. This is lower than 3.7% reported by Bukar *et al*.²¹ in Maiduguri, but higher than 1.4% reported by Sanfilippo *et al*.²² The most common congenital uterine abnormality in our study was bicornuate uterus (1.8%). This is in agreement with the findings of Bukar *et al*.²¹ Uterine synechia, (11.8%) was the most commonly acquired uterine pathology detected on HSG followed by uterine fibroid (9.5%). This is similar to the finding of Bukar *et al*.²¹ but contrast with that of Mgbor²³ who found uterine fibroid as the leading uterine pathology. The high incidence of uterine synechia may be due to postpartum endometritis or overzealous curettage following abortion. The widespread use of

manual vacuum aspiration for evacuation of the uterus is expected to lower the incidence of uterine synechia and consequently the contribution of uterine synechia to infertility in our environment.²¹ Evaluation of female infertile patients is incomplete without hormonal assay for ovulatory dysfunction. The commonest cause of ovulatory dysfunction in this study was hyperprolactinemia (7.3%). This differs from the report of Ajibola *et al*²⁴ in Abuja, Nigeria which shows that polycystic ovarian syndrome is the commonest cause of ovulatory dysfunction. The reason for this difference is not known.

The fertility outcome after one year follow up showed 7 (11.1%) of the 63 patients with abnormal findings (cervical canal and endometrial cavity) got pregnant, while 25 (34.72%) of the 72 patients with normal findings (cervical canal, endometrial cavity, tubal and pelvic peritoneum) got pregnant. The difference noted was statistically significant. This is different from the findings in the work of Schankath *et al*,²⁵ in Switzerland, where they observed a higher pregnancy rate in patients with pathological HSG. The poor fertility outcomes associated with patients with structural abnormalities in this study are multifactorial. This includes lack of appropriate expertise necessary for infertility management, non-availability of advance equipment required for proper management of infertility and financial constrain on the part of the patients.⁵

Among the 32 patients that conceived, 15 had spontaneous pregnancies after HSG; while 17 patients had therapeutic interventions (adhesiolysis, myomectomy, ovulatory induction, timed-intercourse, and intrauterine insemination) before they conceived. High pregnancy rate noted in patients without therapeutic intervention may be due to the therapeutic effect of HSG. It is a known and undisputable fact that hysterosalpingography also has therapeutic value. Following hysterosalpingography, certain mild uterine



adhesion and partial tubal occlusion are lysed and hitherto infertile women have conceived months after HSG without any other gynecological intervention.¹⁶

at HSG was low. The high spontaneous pregnancy rate in patients with normal HSG and hormone and semen analysis may be due to therapeutic effect of HSG. ■

Conclusion: Fertility outcome in patients with uterine cavity and cervical canal abnormalities

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