

## An Audit of the Hysterosalpingographic Defects Seen At A Clinic In Enugu, Southeast Nigeria

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### ABSTRACT:

Hysterosalpingography is still commonly used to assess the status of the lumen of female genital tract, especially in developing countries. To audit the indications for and structural defects found on hysterosalpingographs of patients managed in a private hospital. This was retrospective study of 233 hysterosalpingographs done on gynaecological patients seen and evaluated with hysterosalpingogram at private hospital in Enugu, Nigeria over a ten-year period. Information on the patients' demographic data, previous abdominal and pelvic surgeries, indications for hysterosalpingogram, and the status of the cervical, uterine and tubal lumina were abstracted from their clinical notes and radiological reports, and analysed using simple percentages. The mean age of the participants was 32.9 years and their mean parity was 0.2. The main indication for hysterosalpingogram was infertility (97.5%). Structural defects were seen on the cervix (44.3%), uterus (68.0%), right oviduct (67.0%) and left oviduct (75.3%), the most common being tubal blockage. Seventeen of the participants (7.3%) conceived within six months of the procedure without further treatment. Infertility remains the most common indication for hysterosalpingography. The women are usually of low parity and tubal blockage is the most common defect observed. In addition to its use in patient evaluation, hysterosalpingography has some therapeutic effects as some infertile patients conceived after the procedure without further treatment.

**Keywords:** Hysterosalpingography, infertility, structural defects, tubal blockage, Enugu, Nigeria.

Radiological images are made by illuminating the body with short X-ray pulses and placing radiographic films behind it. Areas with higher electron density such as bones absorb most of the X-rays and appear white or radio-opaque on films when developed, while less dense areas like soft tissues appear dark or radio-lucent because they allow most of the X-rays to pass through. Contrast X-ray imaging adopted this principle by using high electron density contrast media, also known as X-ray or radio-opaque dye, to make body cavities white on radiographic films. Hysterosalpingography (HSG) is contrast radiographic imaging of the upper female genital tract that was first performed in 1910, and has since then remained an invaluable tool for the evaluation of the status of the upper genital tract in females (Odita, Akamaguna, 1987, Rindfleisch 1910). Today, it is the most readily available and widely practiced contrast radiological investigation of the female genital tract (Eze Ibekwe 2008; Kiguli-Malwadde, Byanyima, 2004) and in some centres, the number of HSG examinations is said to have increased dramatically over the past few years (Simpson Jnr, Beitia, Mester 2006).

To perform HSG, the cervix is

cannulated to yield a watertight seal, contrast media is then instilled and its flow path followed by obtaining radiographic images of the process (Simpson Jnr, Beitia, Mester, 2006). In this manner, one is able to appreciate the morphology of the cervical canal, uterine cavity, lumina of the fallopian tubes and, finally, demonstrate tubal patency by visualizing peritoneal spillage of the contrast material (Livsey 2001, Rindfleisch 1910). HSG provides morphologic assessment of the endometrial cavity and cervical canal and supplies important information regarding tubal patency (Troiano, McCarthy, 2004).

In developing countries like Nigeria, HSG is still an important initial diagnostic procedure in the assessment of tubal and peritoneal factors leading to infertility (Chavhan, Hira, Rathod *et al*, 2004). It is an invaluable procedure for evaluating the internal architecture of the female genital tract (Chavhan, Hira, Rathod *et al*, 2004; Odita, Akamaguna, 1987), giving very useful information on the status of the cervical canal, uterine cavity, the lumina of the oviducts and presence or absence of peritoneal spillage (Kiguli-Malwadde, Byanyima, 2004; Goynumer, Yetim, Gokcen *et al* 2008;



Poonam, 2007; Agwuna, Anyanwu). It may be attended by certain complications, of which intravasation of contrast (Úbeda, Paraira, Alert, Abuin, 2001) is the most commonly reported.

The aims of this study are to audit the demographic features of gynaecological patients investigated with HSG at a private hospital in Enugu, Nigeria, the indications for the procedure and the defects identified, and to discuss the implications of the findings.

## MATERIALS AND METHODS

This was a retrospective review of 233 HSGs done on the gynaecological patients seen at a private hospital in Enugu, southeast Nigeria from January 2001 to December 2010. Data on the patients' ages, parity, previous miscarriages and abdominal and/or pelvic surgeries, and the indications for HSGs were abstracted from their clinical notes, while data on the status of the cervical canal, uterine cavity and oviducts, abnormalities identified, presence or absence of peritoneal spillage, and complications observed were gotten from the radiological reports. The individual films were again jointly reviewed by a combined team of Radiologist and Gynaecologist for consistency with the radiological reports. All the data obtained were keyed into SPSS version 15 and analysed using simple percentages.

The patients gave individual consent for their radiographs to be used for this study, and ethical approval was obtained for the study.

## RESULTS

The age range of the participants was 24 to 47 years, with a mean of  $32.9 \pm 4.5$  years. Their parity ranged from 0 to 5 with a mean of  $0.2 \pm 0.5$ . Majority (83.7%) was nulliparous. The 38 parous participants (16.3%) had a total of 48 previous deliveries, of which 21 or 43.8% were by Caesarean section. Also, 171 (73.4%) of the participants had a total of 290 previous miscarriages of which 219 or 75.5% were induced (and probably associated with some form of instrumentation) and the others spontaneous. The mean number of miscarriages was  $1.2 \pm 1.1$  (table I). Sixty-seven of the patients (23.1%) had undergone one form (or a combination) of abdominal and/or pelvic surgery (surgeries) in the past,

including appendicectomy (55 or 82.1%), myomectomy (39 or 58.2%), laparotomy for ectopic pregnancy (34.3%), ovarian cystectomy (19.4%), tubal reconstruction (4.5%) and laparotomy for undisclosed indications (4.5%).

Some of the participants had multiple indications for the hysterosalpingogram. Infertility was the most common indication reported in 229 participants (98.3%), of which 191 or 83.4% were cases of secondary infertility. Other indications were uterine fibroids in 43 participants or 18.5%, hypomenorrhoea in 9.0%, post-myomectomy review (3.4%), post-tubal repair (1.3%) and uterovesical fistula (0.4%).

Table II shows the status of the cervical canal, uterine cavity and oviducts. The cervical canal was abnormal in 47.6% of cases and obscured by the cannulae in 12.9%. Abnormality of the uterine cavity was observed in 58.8% of cases, of the right oviduct in 60.9% and of the left oviduct in 70.8%.

The structural defects identified are shown in table III. Some of the films showed multiple defects. Filling defects, the commonest abnormality of the cervical canal, occurred in 13.3% of cases. This was followed by stenosis and narrowing of the canal (12.0%), and elongation and increased tortuosity (9.0%). In the uterine cavity, the commonest defect was cavitory distortion (24.5%), filling defects (15.5%) and enlargement (12.4%). Cornual tubal blockage was identified in 30.9% of the right oviducts and 33.5% of the left, peritubal adhesions in 17.6% of right and 18.0% of left, and hydrosalpinx in 8.6% of right and 11.6% of left respectively.

As shown in table IV, peritoneal spillage of contrast indicating tubal patency was observed in 160 cases (68.7%). Of these, spillage was bilateral in 33.9%, from only the right oviduct in 21.5% and the left in 13.3% (Table IV). The spillage was either free, loculated (restricted) or of mixed variety. The only complication reported in this series was intravasation of contrast which was observed in 39 cases or 16.7%.

Seventeen of the patients or 7.3% conceived within six months of the procedure, without any further fertility assistance.



Table I: Patients with hy, N = 233.

Item	frequency (%)
<b>Age</b>	
≤ 24	2 (0.9)
25 - 29	54 (23.2)
30 - 34	104 (44.7)
35 - 39	50 (21.4)
40 - 45	18 (7.7)
≥ 46	5 (2.1)
Range	24 - 47
Mean	32.6 ± 3.7 years
<b>Parity</b>	
0	195 (83.7)
1 - 4	37 (15.9)
5 and above	1 (0.4)
Mean	0.2 ± 0.5
<b>Previous miscarriages</b>	
None	62 (26.6)
1 - 2	137 (58.8)
3 and above	34 (14.6)
Mean	1.2 ± 1.1

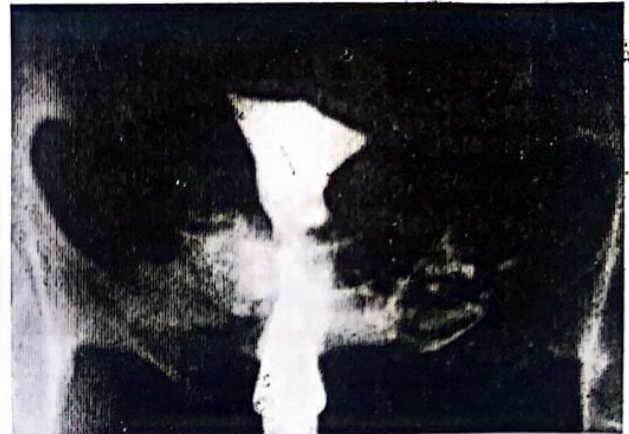


Figure 1: Normal uterine cavity and oviducts with free peritoneal spillage

Table 2: Status of cervical canal, uterine cavity and oviducts at hysterosalpingogram; N = 233

Item	Normal (%)	Abnormal (%)	Obscured/not shown (%)
Cervical canal	92 (39.5)	111 (47.6)	30 (12.9)
Uterine cavity	95 (40.8)	137 (58.8)	1 (0.4)
Right oviduct	91 (39.1)	142 (60.9)	
Left oviduct	68 (29.2)	165 (70.8)	

Table 3: Defects reported at hysterosalpingogram

Defect	Frequency (%)
<b>Cervical canal</b>	
Filling defects	31 (13.3)
Stenosis and narrowing	28 (12.0)
Elongated and tortuous	21 (9.0)
Ragged margin	14 (6.0)
Dilated	13 (5.8)
Distorted and deviated	6 (2.6)
<b>Uterine cavity</b>	
Distortion	57 (24.5)
Filling defects	36 (15.5)
Enlarged	29 (12.4)
Irregular margins	22 (9.4)
Shrunk/narrowed	21 (9.0)
Sideward deviation	17 (7.3)
Congenital abnormality	3 (1.3)
Cavity not opacified	1 (0.4)
<b>Oviducts</b>	
	<b>right</b> <b>left</b>
Cornual blockage	72 (30.9)      78 (33.5)
Perifimbrial adhesion	41 (17.6)      42 (18.0)
Hydrosalpinx	20 (8.6)      27 (11.6)
Distal tubal blockage	15 (6.4)      22 (9.4)

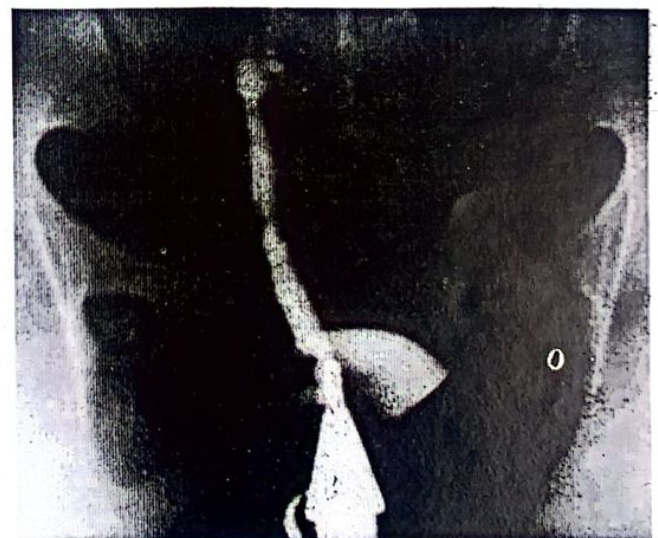


Figure 2: Grossly shrunk and narrowed (the cervical canal and uterine cavity formed one continuous tube) seen in a post-myomectomy hysterosalpingogram. The patient presented with hypomenorrhoea eight months after surgery.



Table 4: Total number of cases with peritoneal spillage of contrast media from oviduct(s) and the types of spillage observed; N = 160

Oviduct	Total spillage (%)	Type of spillage		
		Free (%)	Loculated (%)	Mixed (%)
Bilateral	79 (49.3)	61 (38.1)	17 (10.6)	1 (0.6)
Right	50 (31.2)	32 (20.0)	17 (10.6)	1 (0.6)
Left	31 (19.5)	11 (6.9)	14 (8.8)	6 (3.8)
Total	160 (100.0)	104 (65.0)	48 (30.0)	8 (5.0)

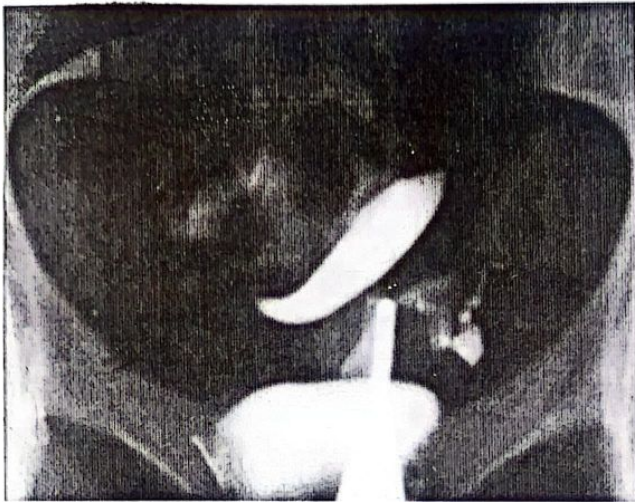


Figure 3: Gross distortion of the uterine cavity by leiomyomata uteri. The left oviduct permitted free spillage of contrast. This patient went ahead to conceive without further reproductive assistance.

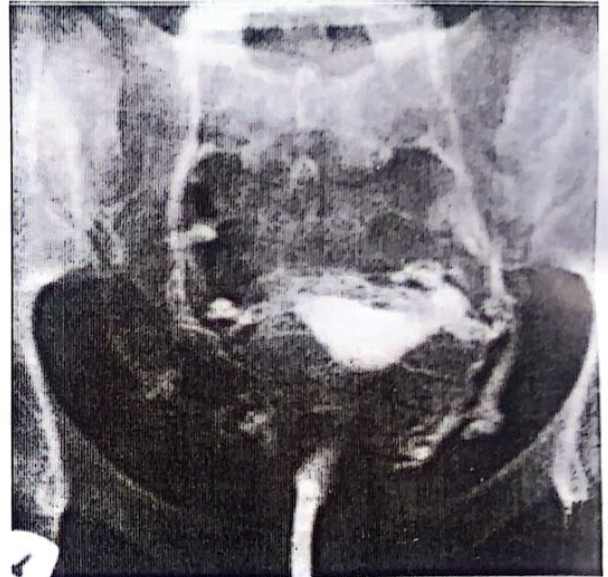


Figure 5: Massive bilateral venous intravasation of contrast media.

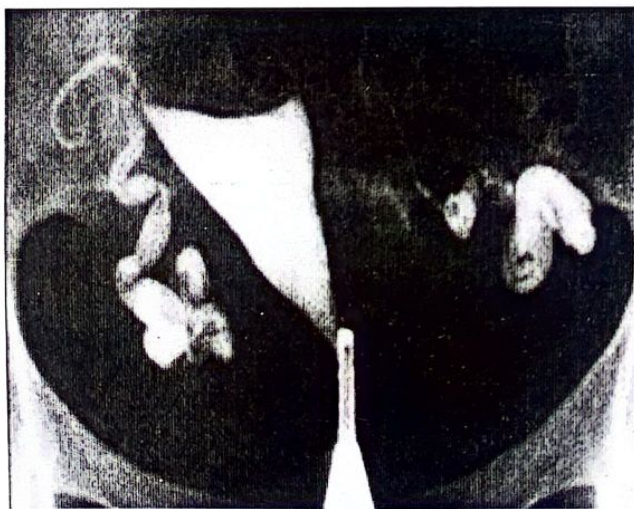


Figure 4: Normal uterine cavity with bilateral hydrosalpinges. A later film from same patient indicated loculated spillage from the right oviduct.

## DISCUSSION

This study corroborates the findings of other studies that show that the main indication for HSG is the assessment of tubal factor in infertility (Kiguli-Malwadde, Byanyima, 2004; Goynumer, Yetim, Gokcen *et al*, 2008). HSG has served as a

reliable method of assessing tubal patency for about ten decades and is still widely used for evaluating the architecture of upper female genital tract lumina, with positive results good at excluding tubal obstruction (Chavhan, Hira, Rathod *et al*, 2004; Swart, Mol, van der Veen *et al*, 1995; Odita, Akamaguna, 1987). It is an acceptable tool for the initial evaluation of tubal factor in both primary and secondary infertility (Dalfó, Úbeda, Úbeda *et al*, 2004) and is useful in the diagnosis of other acquired and congenital anomalies of the uterus (Troiano, McCarthy, 2004). This study also shows that HSG is a useful adjunct in the pre-operative assessment non-parous women or women of low parity who present with uterine fibroids, hypomenorrhoea and uterovesical fistulae, as well as in the post-operative review of such patients after myomectomy or tubal repair (Simpson Jnr, Beitia, Mester, 2006).

The age range, the modal age range and mean age of the participants in this study corroborate the findings of other studies (Imo and Sunday-Adeoye, 2008; Goynumer, Yetim, Gokcen *et al*, 2008; Kiguli-Malwadde and Byanyima, 2004). The poor healthcare seeking attitude.



especially the tendency for infertile couples to delay seeking for orthodox care until they had exhausted other possible options may have contributed to the high mean age. Another possible contributor is the tendency for women to seek career first, a factor that makes them start procreation late.

The overall low mean parity was probably because majority of the patients were nulliparous. However, nulliparity does not preclude previous pregnancies as majority of the participants in this series, some of whom were nulliparous, had had several previous miscarriages, of which most were deliberate terminations. Tubal blockage is one of the major complications in patients who survive the post-abortion sepsis associated with unsafe abortions or pregnancy terminations conducted by quacks in unhygienic environments. Post-abortion pelvic sepsis is a major contributor to tubal factor infertility. Tubal blockage may also occur as a complication of some of the surgical conditions, such as ruptured tubal ectopic pregnancies reported in this study, or result from poor techniques at the surgical management of such conditions. In addition to tubal blockage, some of the surgeries documented in this study, including termination of pregnancies, caesarean sections, myomectomies, ovarian cystectomies, and laparotomies for other indications, also have huge potentials for causing upper genital tract defects, especially if associated with poor techniques (Surapaneni, Silberzweig, 2008; Robinson, Swedarsky Colimon, Isaacson, 2008).

Properly conducted HSG may show normal upper female genital tract (fig. 1) and has great potentials for displaying structural defects (Dalfó, Úbeda, Úbeda *et al*, 2004) as shown in figures 2-5. In this study, cervical canal defects were identified in about 47% of cases, while majority showed uterine cavitory, and right and left tubal defects. The observance in some cases that the cervical canals were obscured by the cannula used in instilling the dye is a factor that could technically reduce the ability of HSG to identify certain cervical luminal defects.

Several of the films audited showed multiple structural defects. Filling defects was the most common cervical abnormality observed, followed by stenosis and narrowing of the canal, and elongation and increased tortuosity. Filling defects may be due to synechiae resulting from overzealous curettage associated with poor skills at pregnancy termination, while stenosis and narrowing of the canal, and elongation and increased tortuosity may develop as a result of postoperative fibrosis. The film shown in figure 2 displays a grossly shrunken and narrowed upper

genital tract lumen, with the cervical canal and uterine cavity forming one continuous tube, in a patient who presented with hypomenorrhoea eight months post-myomectomy. Distortion of the uterine cavity, filling defects in the cavity and enlargement of the cavity were the most common uterine luminal defects observed in this series. Uterine cavitory filling defects, enlargement and distortion were observed in the presence of fibroids, especially the submucosal type, (fig. 3), in some post-myomectomy cases and in some cases with previous history of pregnancy termination. So, although the primary aim of these surgical procedures is to heal, it must be remembered that they may be associated with long term complications that may grossly hamper the patients' reproductive ability.

A positive HSG result is good at ruling in tubal obstruction, but a negative result may not rule out a disease (Swart, Mol, van der Veen *et al*, 1995). The tubal abnormalities seen in this study included uni- and bi-lateral blockages, evidence of peritubal adhesions and uni- and bi-lateral hydrosalpingies (fig. 4). It is noteworthy that when bilateral free peritoneal spillage of contrast media is associated with normal cervical and uterine cavitory structure (fig. 1), this is indicative of normal upper female genital tract with patent tubes and often connotes good reproductive potentials. Some patients go on to achieve normal pregnancies, labour and vaginal deliveries despite the presence of gross uterine distortion at HSG, as was the case with figure 3 who has been able to achieve two life births. And, that several of the participants in this study achieved normal pregnancy within a few months of the procedure without further fertility assistance, supports the observation that HSG may be followed by enhanced fertility in some cases of infertility (Yun Lee, 2004).

Intravasation of contrast media (Úbeda, Paraira, Alert, Abuin, 2001) as shown in figure 5 was the only HSG-associated complication observed in this study. The causes include recent uterine surgery, increased intrauterine pressure due to blocked tubes or excessive injection pressure. It may also occur in a normal person. If it occurs following the use of oil-soluble contrast, the procedure should be discontinued if the intravasation is noticed early, to forestall the development of oil embolism. Other complications that may result from HSG include pelvic infection, pelvic pain or discomfort, contrast and air embolism and hypersensitivity to contrast media (Agwuna, Anyanwu, 2006).

HSG has remained a useful tool for assessing the internal architecture of the upper



female genital tract for decades. And although infertility has remained the primary and is still its main indication, other indications such as the assessment of women presenting with uterine fibroids, hypomenorrhoea, uterovesical fistulae, mullerian abnormalities, and post-surgical review of patients who underwent myomectomy and tubal repair, have been documented elsewhere (Eze, Ibekwe, 2008; Kiguli-Malwadde, Byanyima, 2004; Troiano, McCarthy, 2004; Odita, Akamaguna, 1987) and featured in this study. Most of these conditions tend to be present in infertile females. Majority of the women needing HSG are in their fourth decade of life, often of very low parity and tended to have some previous or ongoing condition that could result in upper genital defect. HSG is a highly specific test (Skakya, 2009) and has been found invaluable in the detection of numerous forms of anatomical defects of upper genital tract lumina. Its specificity is so good that when HSG result is positive, tubal blockage (Swart, Mol, van der Veen *et al*, 1995) and other anatomical defects of the upper genital tract lumina may be excluded in majority of cases. And although HSG lacks the sensitivity of hysteroscopy (Shakya, 2009), it is more readily available in Nigeria and more cost effective (Agwuna, Anyanwu, 2006), and in a few of the infertile women, may actually lead to fertility enhancement, hence HSG still has a place in the evaluation of women presenting with primary and secondary infertility, and other pathologies with potentials for causing defects in the lumina of upper female genital tract.

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