Patterns of Hysterosalpingographic Findings at a Tertiary Hospital in South-South, Nigeria: AThree-Year Review

Joyce E. Ikubor and Godson U. Eze

ABSTRACT

Introduction: Hysterosalpingography (HSG) is an investigative tool for assessing the morphology of the uterine cavity and more importantly tubal patency in the routine workup of infertile females. This study aimed to highlight the indications for this imaging technique and the patterns of its findings at Delta State University Teaching Hospital, Oghara.

Materials and methods: A cross-sectional review of one hundred and seventy-five reports of women referred to the Radiology department for HSG over a 3-year period; January 2012 - December 2014.

Results: Infertility was by far the most common indication for undergoing an HSG; as seen in 145 (82%) of the women studied. Secondary infertility was the predominant type of infertility accounting for 127 (87.6%) of all cases of infertility for HSG. While nearly half of all HSG records, 79 (45.4%) showed tubal blockage, four-fifths (80.4%) had abnormal-sized uterus.

Conclusion: HSGs done at DELSUTH showed a wide array of findings. Infertility was the most common indication for referral as was the case in many similar studies from developing countries. Tubal blockage and abnormal uterine size were the most common findings and although suspected uterine anomaly was the indication for over a tenth of the referrals, there was no case of congenital anomaly detected among the patients in this three-year review.

Keywords: *Hysterosalpingography, Infertility, Contrast-Imaging, Nigeria*
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INTRODUCTION

The role of HSG as an accurate means of assessing the state of the uterine cavity and tubal patency is well known. It stands out as the main investigative tool for assessing the morphology of the uterine cavity and most importantly tubal patency in the routine workup of female infertility.[1,2] Ultrasonography and magnetic resonance imaging are other cross-sectional imaging modalities used for assessment of the female pelvis, but HSG has the advantage of being cheap and readily available even in resource poor settings. The use of water soluble contrast medium is also relatively safe and readily demonstrates the anatomy and morphology of the uterine cavity and fallopian tubes. The main disadvantage of contrast HSG is exposure to ionizing radiation unlike ultrasonography and magnetic resonance imaging, and the procedure-associated pain.[1] Infertility workup is therefore incomplete without an initial HSG examination especially in poor resource settings contrary to the opinions of a few authors who claim that HSG is outdated.[3] Infertility has remained the commonest and the most current indication for HSG overshadowing other conditions that may necessitate the use of this imaging modality of the female reproductive tract[1,4]. This is not surprising given the high prevalence rates of infertility in both developed and developing countries.[5] Infertility is a global social problem and a major reproductive health burden of Nigerian women, accounting for up to 70% of gynecological consultations in tertiary health institutions.[6]

Most of the hysterosalpingographic studies in the

Nigerian literature have therefore focused on the role of this imaging modality in the investigative work up of infertile patients and have demonstrated tubal and uterine factors as causes of primary and secondary infertility[3,5, 713]. Tubal pathology, specifically tubal blockage is the commonest abnormality on HSG recorded in most of the geopolitical zones of Nigeria as represented by studies done in Abakaliki, Lagos, Yenagoa, Sokoto and Maiduguri[5,7,8,11,13]. Bilateral tubal blockage has been reported as the major tubal pathology in female infertility.[8,9,13] A common recurrence in most of these studies is the combination of tubal and uterine factors in patients unlike in an Iranian study by Mesbahi et al which reported isolated uterine pathology as its major hysterosalpingographic finding.[14]

Other less common indications for this imaging modality include recurrent miscarriage, congenital anomalies, uterine synechiae, uterine fibroids, colo-tubal fistula, utero-vesical fistula, checking the efficacy of tubal sterilization and assessment of the tubes prior to attempted reversal of sterilization.[1,4,8]

The goal of this study was to highlight the indications of this imaging technique and the pattern of findings at Delta State University Teaching Hospital, Oghara over a three-year period as well as to document the common hysterosalpingographic features of women who presented for this examination in the study period with the hope that the information obtained would help guide future reproductive health care delivery and policies - especially in this setting.

METHODOLOGY

A review of records was done in a cross-sectional study of one hundred and seventy-five reports of women referred to the Radiology department for hysterosalpingography (HSG) over a 3-year period; January, 2012 to December, 2014 at Delta State University Teaching Hospital, Oghara, Nigeria.

To obtain acceptable records for review, poor quality images, inconclusive film series, imaging done without request forms and films with intravasation of contrast media were all excluded. The records were retrieved from Picture Archiving Communication System (PACS); the hospital's computerized image data bank.

A proforma was designed to capture the biodata, indications for the procedure, and the findings from the radiologist's report for each patient. Data extracted using the proforma was subsequently entered into the Statistical Package for Social Sciences (IBM® Inc, Chicago, Il. USA) version 20 data sheet, for analysis. Data extraction, collation and analysis lasted 6 months. Data has been presented as simple frequency tables, cross-tables, bar and pie charts. Means and proportions were calculated, while chi-square test and odds ratio were used to test associations. The level of significance was set at $p < 0.05$.

Ethical Issues: Permission was granted by the hospital administration for use of its data for this work and ethical clearance was obtained from the Hospital Research and Ethics Committee (HREC), DELSUTH, Oghara. All information obtained has been treated with utmost confidentiality. No personal identifiers of patients were published in any form.

RESULTS

One hundred and seventy five (175) HSGs were done during the study period with majority of the patients, 113 (64.6%) aged 30-39 years and a mean age of 33.7 ± 5.1 years. **(Table 1)**

Infertility was by far the most common indication for undergoing an HSG with 145 (82%) infertile women presenting for the examination. Secondary infertility was the predominant type of infertility accounting for 127 (87.6%) of all patients with infertility, while women with primary infertility were 12 (8.3%). Six records (4.1%) were excluded because information on type of infertility was not available. **(Figure 1)** Although HSG was indicated in all the patients, over a third (36%) of the HSGs done revealed no abnormality; While about a third, 36 (32.1%) of all abnormal HSGs had only tubal abnormalities, and a fifth, 23 (20.6%) had only uterine abnormalities. Almost half of all abnormal HSGs, 53 (47.3%) had both uterine and tubal findings. **(Table 1)**

Table 1: Summary of patients by age groups, indications for HSG and findings

Variable	Categories	Frequency (%) N = 175
Age Groups	< 30	36 (20.6)
	30 – 39	113 (64.6)
	= 40	26 (14.9)
		⁇ = 33.7 ± 5.1
Indication for HSG	Infertility	145 (82.9)
	Suspected uterine anomalies	21 (12.0)
	Others*	9 (5.1)
HSG Findings	Normal	63 (36.0)
	Abnormal	112 (64.0)
		n = 112
Female Factors	Uterine only	23 (20.6)
	Tubo-peritoneal only	36 (32.1)
	Both	53 (47.3)

*Others include: recurrent abortions, uterine fibroids, and suspected uterine synechiae

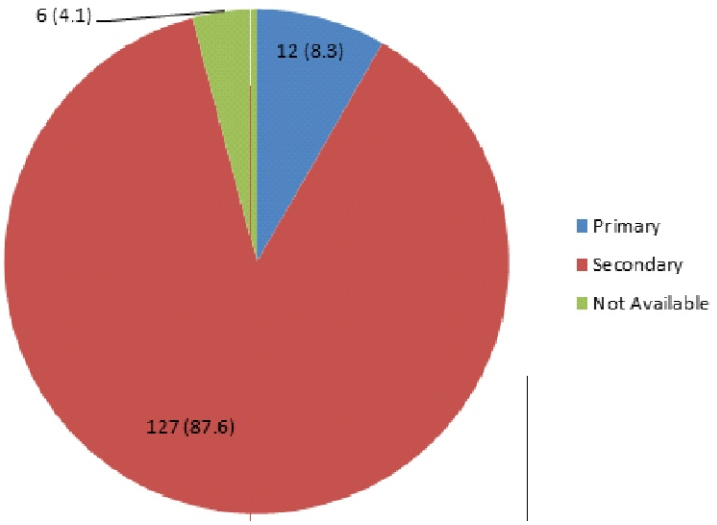


Figure 1: Distribution of types of infertility in patients' HSG reports

Tubal blockage was the commonest tubal pathology and constituted 45.4% of all abnormalities detected on HSG. It was found in 64 (44.1%) of women whose indication was infertility. Bilateral tubal blockage 37 (46.8%) was commoner than unilateral tubal blockage. In unilateral tubal pathology, there was a predominance of right tubal blockage 24 (30.4%) and right hydrosalpinx 8 (44.4%). Loculated spills did not show sidedness.

Figure 2: Profile of abnormal findings on HSG for the year 2012 - 2014

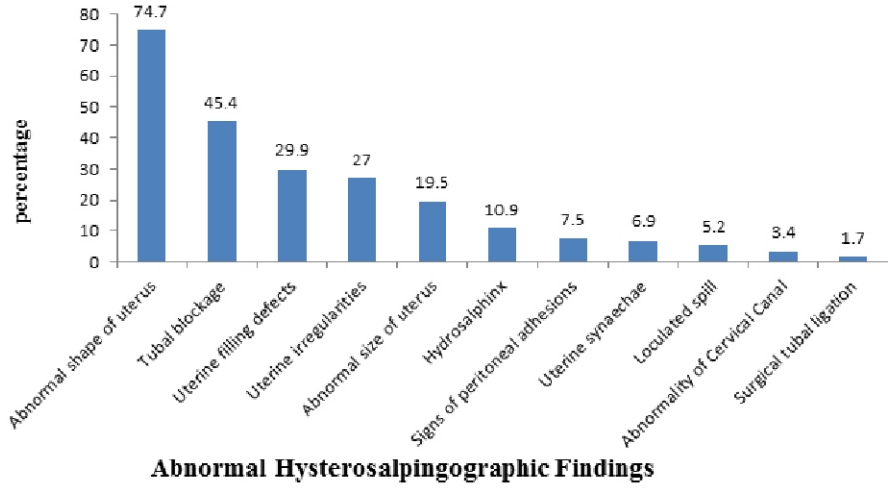


Table 2: Potential risk factors of infertility and associations in HSG reports of DELSUTH patients

Variable		Indication for HSG Frequency (%)		Odds ratio	95% Confidence Interval	
		Infertility n = 145	Other reasons n = 30		lower	upper
Uterine filling defect	**Yes**	37 (71.2)	15 (28.8)	**0.34**	0.14	0.83
	No	108 (87.8)	15 (12.2)			
		$X^2 = 7.134$, $df = 1$, $p = 0.008$				
Age group of patients	**> 35**	45 (83.3)	9 (16.7)	**1.05**	0.42	2.70
	= 35	100 (82.6)	21 (17.4)			
		$X^2 = 0.012$, $df = 1$, $p = 0.911$				
Uterine wall Irregularities	**Yes**	32 (68.1)	15 (31.9)	**0.28**	0.12	0.69
	No	113 (88.3)	15 (15.6)			
		$X^2 = 9.872$, $df = 1$, $p = 0.002$				
Tubal blockage	**Yes**	64 (81.0)	15 (19.0)	**0.79**	0.34	1.86
	No	81 (84.4)	15 (15.6)			
		$X^2 = 0.345$, $df = 1$, $p = 0.557$				
Size of Uterus	**Normal**	25 (73.5)	9 (26.5)	**0.49**	0.18	1.30
	Abnormal*	120 (85.1)	21 (14.9)			
		$X^2 = 2.585$, $df = 1$, $p = 0.108$				
Shape of Uterus	**Normal**	114 (87.7)	16 (12.3)	**3.22**	1.31	7.89
	Abnormal	31 (68.9)	14 (31.1)			
		$X^2 = 8.321$, $df = 1$, $p = 0.004$				
Uterine Synechiae	**Yes**	7 (58.3)	5 (41.7)	**0.25**	0.06	1.01
	No	138 (84.7)	25 (15.3)			
		$X^2 = 5.455$, $df = 1$, $p = 0.020$				
Loculated Spill	**Yes**	9 (90.0)	1 (10.0)	**1.92**	0.23	42.01
	No	136 (82.4)	29 (17.6)			
		$X^2 = 10.525$, $df = 1$, $p = 0.001$§				
Hydrosalpinx	**Yes**	16 (88.9)	2 (11.1)	**1.74**	0.35	11.61
	No	129 (82.2)	28 (17.8)			
		$X^2 = 0.150$, $df = 1$, $p = 0.699$				

*Abnormal sized uterus refers to 'Too Small' or 'Too Large' uterus: proportion of both was equal. §Yates corrected

(Figure 2 & Table 3)

Figure 2 shows that about three-quarters, 84 (74.7%) of all HSGs with abnormal findings had uteri with abnormal shapes. Tubal blockage was found in 45.4%, uterine filling defects 29.9%, uterine irregularities 27.0%, and abnormal sized uterus 19.5%.

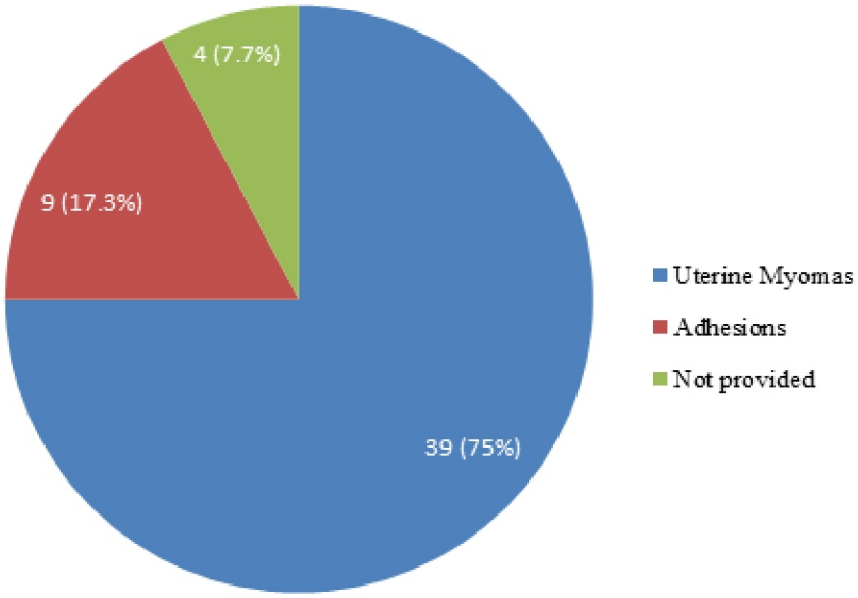
Of the potential predictors of infertility in **Table 2**, the following were statistically significantly different between women whose indication for HSG was infertility and those who had other indications: the shape of the uterus, uterine filling defects, uterine wall irregularity, uterine synechiae, and loculated spill; $p < 0.05$. The odds of infertility in women with normal-shaped uteri was over 3 times that in those with abnormally shaped uteri; OR: 3.44 (CI: 1.31 7.89).

While nearly half of all the HSG records, 79 (45.4%) showed tubal blockage, four-fifths (80.4%) had abnormally sized uterus (too small or too large), and a tenth had hydrosalpinx; but these findings showed no statistically significant association with infertility; $p > 0.05$. Loculated spills, though a small proportion, 10 (5.7%) were statistically significantly more in patients whose indication for performing HSG was infertility; $p = 0.001$. The most common cause of filling defects in this study was uterine myomas, 39 (75%). **(Figure 3)**

Table 3: Distribution of laterality of tubal findings on Hysterosalpingography

Variable	Location of finding Frequency (%)			
	Right-sided	**Left-sided**	**Bilateral**	**Total**
Tubal blockage	24 (30.4)	18 (22.8)	37 (46.8)	79 (100.0)
Hydrosalphinx	8 (44.4)	4 (22.2)	6 (33.3)	18 (100.0)
Loculated Spill	3 (27.2)	4 (36.4)	4 (36.4)	11 (100.0)

Figure 3: Causes of filling defects



DISCUSSION

Among all the patients reviewed over the three-year period, infertility was by far the most common indication (82%) for HSG referrals in DELSUTH, Oghara. This value is similar to that from a study in Zaria by Igashi et al[12] who reported 69.8%. HSG therefore remains an integral investigative tool for female infertility work up in this setting and even in settings where laparoscopy exists for assessing tubal factors.[5,6]

In this study, secondary infertility was commoner than primary infertility which is consistent with findings of a large number of previous studies.[5,3,713] The high proportion of secondary infertility, 87.6% which was seen in this study could be as a result of pelvic infections from post-abortal sepsis after unsafe abortions, post partum infections and sexually transmitted infections which were associated findings in studies with similarly high proportions in Lagos (84%) and Ilorin (80%).[3,7,9] At variance with findings of this study are higher proportions of primary infertility found in Iran and **Eastern Nepal** by Mesbahi et al and **Santhalia et al** respectively.[14,2] Unlike this study which found no congenital uterine anomalies, both studies reported congenital uterine anomalies and this may have been associated with the higher proportions of primary infertility. Mesbahi et al reported a prevalence of 5% for both arcuate uterus and bicornuate uterus.[14]

About a third (36.0%) of the HSGs reviewed in this study revealed no abnormality which compares with similar studies done in Abakaliki[5] (21.8%) and sokoto[11] (41.7%) respectively. These findings contradict the pervading notion that prospective studies reveal a significantly higher number of normal HSGs than do cross-sectional or retrospective studies.[5]

Tubal blockage was the leading tubal pathology in this study as has been reported by other studies.[5,7,10,2] Bilateral tubal blockage (46.8%) which was more prevalent than unilateral tubal blockage as was also seen in studies at Nnewi, Yenagoa, and Maiduguri.[8,9,13] In contrast to findings of this study, a Zaria study found preponderance of unilateral tubal blockage.[12] Tubal spasm has been misinterpreted as bilateral cornual blockage and laparoscopy has therefore been recommended for cases of bilateral tubal blockage.[5,9,15] The practice at the study site is to routinely administer intramuscular Hyocine Bromide (Buscopan®) 20 mg which is thought to be helpful in preventing spastic tubal occlusion[1] to all patients at the beginning of the procedure. A similar practice was reported by a 2012 study in Switzerland on HSG work up for female infertility,[15] although the drug is given intravenously and only in patients identified with cornual blockage. Among the tubes with unilateral blockage, right sided tubal blockage was the more prevalent as was also seen by Akinola et al in Lagos[7] and Danfulani et al in Sokoto[11] but contrary to the prevalence of left-sided tubal blockage seen by Imo et al in Abakaliki and Bukar et al in Maiduguri.[5,8]

The low prevalence of hydrosalpinx in this study is similar to findings in Lagos by Akinola et al.[7] However, a higher prevalence was seen in the study by Bello[3] in Ilorin in which hydrosalpinx was the commonest tubal abnormality. The higher prevalence of right hydrosalpinx is in agreement with studies done in Ilorin and Abakaliki [4,5,8] but contrasts with studies in Lagos, Sokoto and Nnewi.[7,9,11] The predominance of right sided tubal pathology as seen in this study, has been linked with inflammation of the appendix in previous studies.[5,12]

Almost half of all the abnormal HSGs in this study, 53(47.3%) had both uterine and tubal findings buttressing the fact that most patients with infertility could have multiple factors as the aetiology of female infertility. Similar findings have been documented in studies around Nigeria[8,11,12,] and even in some developed countries[15].

In this study, nearly a fifth of all HSGs had abnormal sized uterus. Abnormal sized uterus may be small sized which could be due to infections or large sized due to myomas.[14] Uterine size has been associated with patient's age and parity.[16] Other uterine abnormalities that were associated with about 20 50% of all abnormal HSGs were abnormal uterine shape and filling

defects. The most common cause of uterine filling defects in this study were uterine myomas, 39 (75%) which is in agreement with previous studies.[12,14,15]

Conclusion

In this three-year review of HSG findings in which infertility was the most common indication for referral, a wide array of findings were seen. Abnormal uterine size and tubal blockage were the most common findings and although suspected uterine anomaly was the indication for over a tenth of the referrals, there was no case of congenital anomaly detected among the patients.

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