

Tubal assessment with Hysterosalpingography following routine Intravenous Buscopan: A need to avoid unnecessary radiation and discomfort

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Abstract

Background: The main indication for hysterosalpingography (HSG) is infertility, primarily to assess the fallopian tubes. Its major drawback is tubal spasm, which is preventable by administering intravenous (IV) Buscopan prior to the procedure. This is not routinely done by all practitioners, rather they administer it after the tubes are not demonstrated, which leads to repeats. HSG involves a relatively high radiation dose to the pelvic organs compared to none contrast examinations, so multiple attempts of the procedure and unnecessary radiation exposure should be discouraged.

Objectives: Administer intravenous Buscopan prior to the procedure and assess the fallopian tubes, adverse drug reaction and the number of attempts of the procedure.

Subjects and Methods: A prospective study of 130 women, aged between 19 and 42 years over two years, at 2 radiodiagnostic units. We administered IV Buscopan before the procedure.

Results: We observed HSG abnormalities in 94(72.3%) women and 32(24.6%) showed multiple site involvement. Sixty-one (46.9%) women had abnormalities in the tubes (commonest sites), mainly due to occlusion.

Conclusion: We did our procedures once, thus avoiding additional radiation exposure and discomfort due to repeated examinations in suspected tubal spasm when Buscopan is administered later to relieve it. No serious adverse reaction to Buscopan.

Keywords: Buscopan, Fallopian tubes, Hysterosalpingography, Infertility, Spasm.

I. Introduction

The main indication for Hysterosalpingogram (HSG) is infertility^[1], primarily to evaluate the fallopian tubes^[2]. Tubal occlusion was the commonest abnormality seen during HSG by Khatiet al^[3] and Al subhiet al^[4]. The actual incidence of true positive tubal occlusion during HSG will not be accurate, if precautions like administration intravenous buscopanis not taken to prevent the non-demonstration of the fallopian tubes due to spasm. In a study by Adrian et al, tubal spasm accounted for a high false positive rate of 39% for proximal tubal occlusion^[5].

HSG was first performed in 1910 by Rindfleisch using Bismuth solution^[6]. Over the years, the procedure has undergone modifications in terms of technique, instrumentation and types of contrast medium to improve its diagnostic capability, safety and comfort, while reducing the pain associated with it. Conventional HSG remains the imaging modality of choice to assess the fallopian tubes despite the advances made in various modalities such as a three-dimensional dynamic magnetic resonance hysterosalpingography (3D dMR-HSG) and contrast enhanced hystero-salpingo-sonography^[7]. These two have higher resolution and are non-ionizing.

The status of fallopian tubes has become more important in recent years because of the availability of advanced fertility treatment options for female infertility. For occluded fallopian tubes, the interventional radiologist can carry out a selective salpingography and tubal recanalization, which allow numerous pregnancies that would otherwise have required in vitro fertilization (IVF) or tubal microsurgery.

Suggestions on ways to reduce the false positive rate of tubal occlusion include the administration of 10 or 20 milligram (mg) of intravenous (IV) buscopan if the tubes are not demonstrable and repetition of the examination^[2]. Some researchers gave a time frame to repeat the examination, while some did not. Irrespective of the time given, the patient goes through discomforting process of cannulation and/or contrast injection twice and spends a longer time in the awkward lithotomy position^[3, 5, 8]. Two other workers in the reviewed literature however advised that, buscopan should be given prior to the procedure^[9, 10]. The aim of this

study is to establish the safety of Buscopan and the possibility of a single attempt of HSG, which reduces the procedure time and radiation dose. The HSG findings are also analysed.

II. Subjects and Methods

This is a prospective descriptive study involving all 130 women, aged 19 – 42 years, undergoing routine workup for primary and secondary infertility over a two-year period (September 2013 and September 2015) at the radiology department of Nigerian Navy hospital and a specialist radio-diagnostic centre in south - south, Nigeria. The procedures were scheduled based on the “Ten day rule” between the 6th and 10th day of their menstrual cycle after cessation of menses.

2.1. Inclusion criteria

1. Women referred to the two centres for HSG as part of their infertility work-up.
2. Women already investigated and/or treated for PID.

2.2. Exclusion criteria

1. Previous tubal surgery including salpingectomy for ectopic pregnancy.
2. Women with signs and symptoms of pelvic inflammatory disease.
3. Active vaginal bleeding.

2.3. Technique

As a general guideline for HSG procedure, we obtained an informed consent from the patients. Contraindications to Buscopan such as glaucoma, myasthenia gravis, megacolon and known hypersensitivity to hyoscinebutylbromide or its other components were ruled-out. After emptying the bladder, the patient undress and put on a gown with an open back. The preliminary representative pelvic radiograph was obtained in supine position before the administration of 20mg of IV Buscopan. The patient is then put in the lithotomy position for the procedure. Using aseptic technique, the speculum lubricated with K Y jelly, was inserted into the vagina to locate the cervix, which is cleaned with antiseptic. The cervical lip was held with two pairs of forceps(vulcellum or tenaculum) at 9 and 3 O'clock. The contrast medium used is 15 – 30mls of 76% Urograffin (water soluble, ionic) in 3:2 dilution with normal saline depending on the capacity of the endometrial cavity. The Urograffin was injected slowly through the leech Wilkinson cannula of the appropriate size after air bubbles were expelled. The first representative contrast radiograph was obtained after 5mls of contrast injection to outline the endometrial cavity, the second after injection of another 10 to 15mls to outline a well distended endometrial cavity, the fallopian tubes and early peritoneal spill of contrast. A delayed radiograph demonstrates the pattern of peritoneal spill. Oral analgesics and buscopan were prescribed for a day or two after the procedure and the patients were observed for adverse reaction to Buscopan for 30 minutes before leaving the department. Results of the HSG findings were analysed with simple statistical methods and presented in percentages, tables and figures.

III. Results

The mean age of the 130 women recruited into the study was 32.7 years and most of them were within the 26 – 30 years age group. Fourteen (10.8%) presented with primary infertility and 116(89.2%) with secondary infertility. Fig. 1 shows the distribution of normal and abnormal HSG. Thirty-two (24.6%) women had multiple site pathologies.

Table 1 shows the pathologies at the different sites on HSG with the tubes being the commonest; 61(46.9%) women. These tubal abnormalities were either unilateral or bilateral but in all, the right and the left were involved 49(37.7%) and 45(34.6%) times respectively.

Table 2 shows the distribution of the tubal findings in our study. Single tubal abnormality either occlusion or dilatation (hydrosalpinx) occurred in 27(20.8%) women, while 34(26.1%) had bilateral tubal abnormalities; occlusion, hydrosalpinx or a combination of both. There were 53(40.8%) women with tubal occlusion and 19(14.6%) with hydrosalpinx(unilaterally and bilaterally).

Fig. 2 shows the distribution of tubal occlusion while Fig. 3 shows that of hydrosalpinx. The right tube was occluded (Fig. 4) in 42 (32.3%) women and dilated (Fig. 5) in 12 (9.2%) women, while the left was occluded (Fig. 5) in 40 (30.8%) and dilated (Fig. 6) in 13 (10%) women. Fig 7 shows the image of bilateral tubal occlusion on HSG.

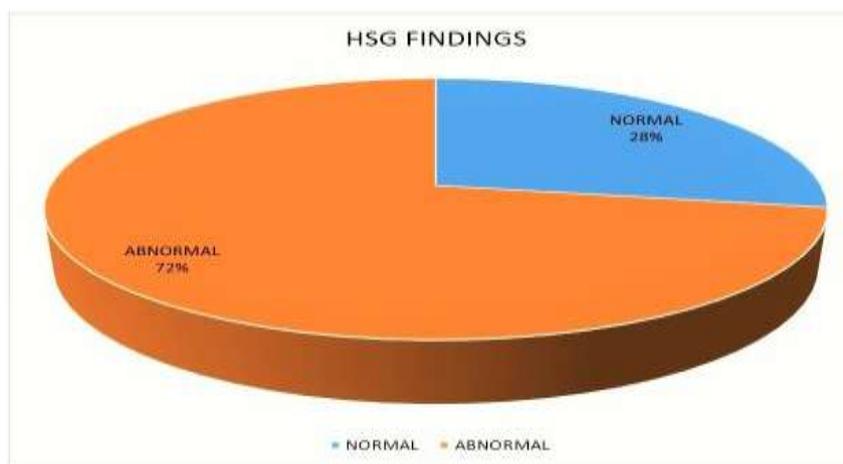


Figure 1. Distribution of normal and abnormal hysterosalpingogram.

HSG: Hysterosalpingography.

Table 1. Distribution of the sites and pathologies of the abnormal hysterosalpingographic findings (n=94).

S/n	Sites/Pathologies	Frequency (n)	Percentage (%)
1	Cervical canal . Stenosis . Cervicitis	2	2.1
		2	2.1
2	Uterus . Intramural fibroid . Submucous fibroid . Synechiae	8	8.5
		28	29.8
		18	19.2
3	Fallopian tubes: Occlusion and Hydrosalpinx . Right . Left . Bilateral	16	17.0
		11	11.7
		34	36.2
4	Pelvic cavity: Adhesions	10	10.6

Note: 32 women showed multiple sites abnormalities.

Table 2. Distribution of hysterosalpingographic tubal findings.

Findings	Frequency (n)	Percentage (%)
Normal tubes	69	53
Right tubal Occlusion	10	7.7
Right tubal Occlusion and bilateral hydrosalpinges	1	0.8
Right tubal Occlusion and left hydrosalpinx	2	1.5
Left tubal Occlusion	9	6.9
Left tubal Occlusion and bilateral hydrosalpinges	1	0.8
Left tubal Occlusion and left hydrosalpinx	1	0.8
Bilateral tubal Occlusion	23	17.7
Bilateral tubal Occlusion and bilateral hydrosalpinges	4	3.1
Bilateral tubal Occlusion and left hydrosalpinx	2	1.5
Right hydrosalpinx	6	4.6
Left hydrosalpinx	2	1.5

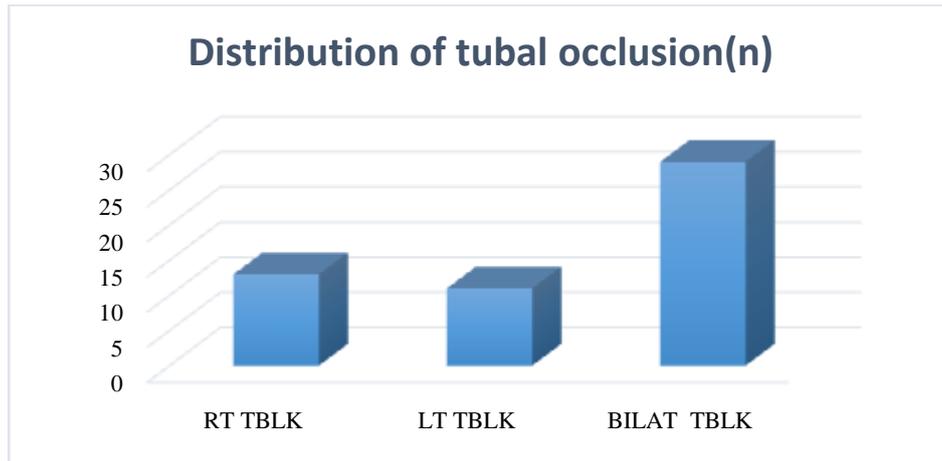


Figure 2. Distribution of tubal occlusion.
TBLK – Tubal blockage (occlusion).

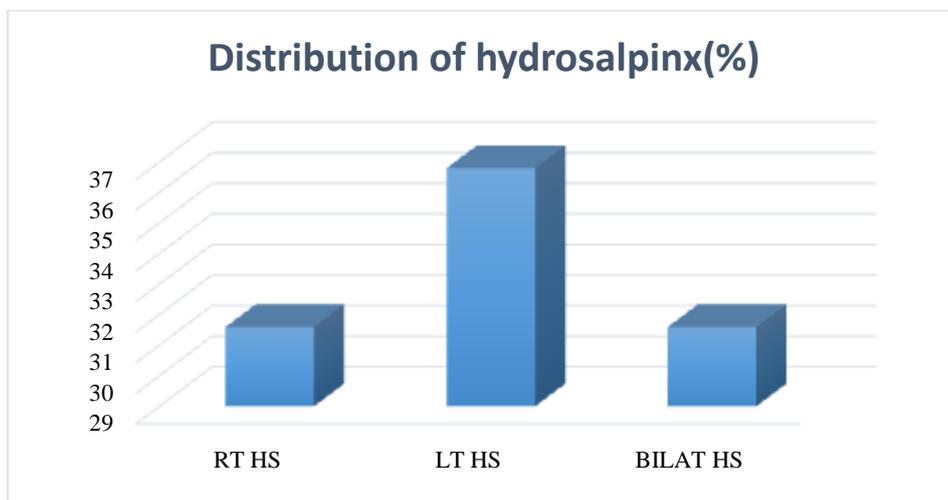


Figure 3. Distribution of hydrosalpinx
HS – Hydrosalpinx.

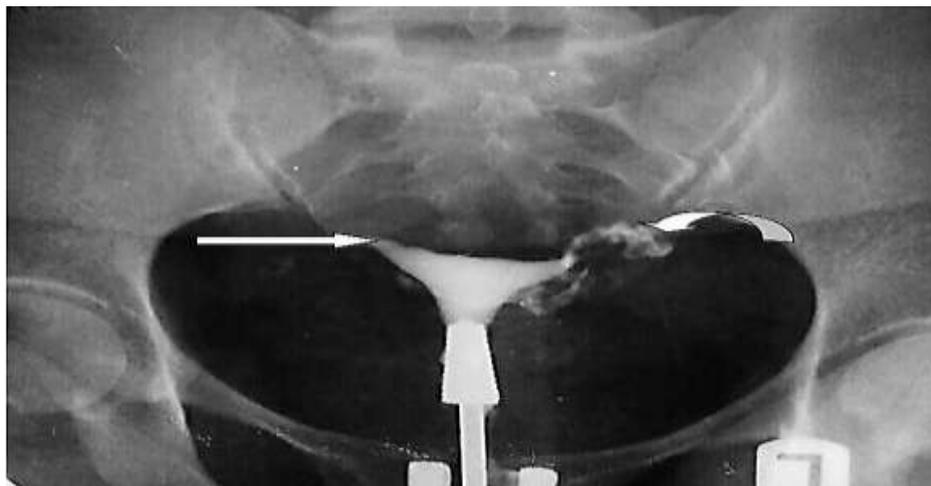


Figure 4. Hysterosalpingogram showing a right tubal occlusion (straight arrow) and a normal left tube (curved arrow).

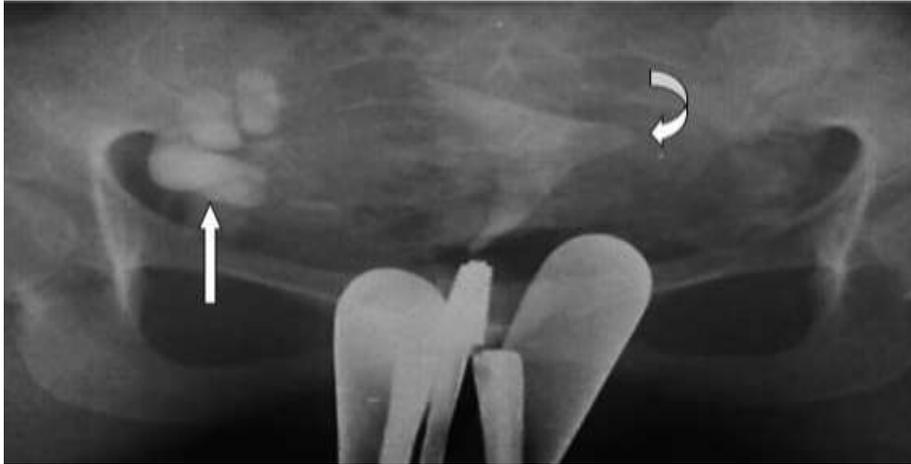


Figure 5.Hysterosalpingogram showing moderate right hydrosalpinx (straight arrow) and a left tubal occlusion (curved arrow).



Figure 6.Hysterosalpingogram showing two endometrial nodular filling defects (stars), mild dilatation of the left fallopian tube distally (straight arrow) and a right peritoneal spill of contrast (curved arrow).



Figure 7. Hysterosalpingogram showing bilateral tubal occlusion (straight arrows)

IV. Discussion

Administration of the IV Buscopan prior to HSG allows a single attempt of the procedure and an early decision on the state of tube, thus avoiding unnecessary additional radiation exposure and discomfort if the procedure was repeated when the tubes are not demonstrated. Occlusion of the fallopian tube(s) are common pathologies seen during HSG. However, the true incidence of tubal occlusion will not be accurate with HSG if tubal spasm is not ruled-out. Buscopan is known to be effective in relieving tubal spasm as demonstrated by Adrian et al who observed tubal patency after its administration in nine cases that previously showed occlusion^[5]. Based on this, we gave intravenous buscopan (20mg) just before the onset of the procedure to reduce the incidence of false positive tubal occlusion due to tubal spasm.

The other precautions taken based on the advice of fellow researchers are prior counselling to allay fears and gentle handling^[9]. We achieved this, using thin clamps on the cervical lip that will not snap when torqued on and the clamps were applied at two opposite sides (9 and 3 o'clock) to properly stabilize the external cervical os for easy sounding of the uterus, cervical cannulation and injection of contrast. We also injected the contrast medium slowly^[11] to reduce or eliminate the irritation of the endometrium.

If we did not give Buscopan initially, we would have extended the procedure time to give it later, inject more contrast medium or re-cannulate the cervix for a repeat in the 46 (35.5%) women in our study who had tubal occlusion without hydrosalpinx. This is in addition to the unknown number in whom the Buscopan had already prevented spasm. These would have led to more ionizing radiation, discomfort and pain.

Our study showed normal HSG findings in 36(27.7%) patients which is similar to the 29.1% and 29.4% observed by Okafor et al^[11] and Bukar et al^[12] respectively. This is higher than the 21.8% observed by Imo and Adeoye^[13] and the 20% by Ibekwe et al^[14], but lower than the 70% observed by VR Shrivastava^[15] and 37.9% by Bacevac and Ganoxic^[16]. We observed that the fallopian tubes are the commonest sites of pathology being involved in 46.9% of the women, which is comparable to the findings by two studies; 43.5% and 44.1%^[11, 17] but lower than two others; 72.1% and 54.6%^[12, 13]. Santosh et al however had a significantly lower rate of tubal abnormalities of 20%^[18]. We observed that the right tube (12.3%) is more frequently involved in pathologies than the left (8.5%).

The incidence of tubal occlusion in our study was high (40.8%) compared to other studies; 28.2%, 28.6% and 32%^[10, 18, 19] probably due to the reported high prevalence of vaginal infection in this environment, which commonly results in chronic pelvic inflammatory disease (PID) if not treated promptly^[20, 21]. The incidence of bilateral tubal pathology (25.4%) in our study is higher than unilateral (15.4%). This observation is similar to that of two studies^[13, 19]. However, four other studies showed a higher incidence of unilateral tubal pathology^[15, 17, 18, 22]. There is a higher incidence of tubal blockage than hydrosalpinx, which is similar to the findings of others^[5, 12, 23]. Igashi et al observed an equal incidence between the two^[17].

V. Conclusion

Our study showed a high burden of the tubal factor, especially occlusion in female infertility. This incidence is likely due to the high rate of vaginal infection in this environment. All our procedures were done once, thus eliminating undesirable additional radiation exposure and discomfort if the examinations were repeated. We prevented an extended or repeated procedure in at least the 46 (35.4%) women who had tubal occlusion without hydrosalpinx. There was no serious adverse reaction to buscopan in any of our patients. We therefore recommend routine intravenous Buscopan for patients prior to HSG, when it is not contra-indicated.

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