

Is Hysterosalpingography Still Relevant in Workup of Infertility? A Review Article

Olarinoye AO^{1*} and Oguntoyinbo WE²

¹Department of Obstetrics and Gynaecology, University of Ilorin, Ilorin, Kwara State, Nigeria

²Department of Radiology, University of Ilorin, Ilorin, Kwara State, Nigeria

Abstract

The study examined the current role of Hysterosalpingography in the investigation of the infertile couple in view of the increasing use of Laparoscopy in the evaluation and management of infertility. Electronic search of published literature was done using the Pubmed, Cochrane libraries and Google search engine. The search was restricted to English language articles. Hysterosalpingography is a simple method of evaluating fallopian tube patency and cervico-uterine abnormalities. It is virtually non-invasive; and it can be therapeutic. HSG has a high specificity and a high positive predictive value; it also has a low complication rate. It requires less skill acquisition and necessary equipment are readily available. Laparoscopy should be performed in cases of abnormal hysterosalpingogram or persisting infertility in despite of normal HSG and other parameters.

Keywords: Hysterosalpingography; Laparoscopy; Infertility

Introduction

Infertility is a worldwide problem, affecting the total wellbeing of the individuals or couples involved. It is not just a medical problem but also a social one; it has become a public health issue [1]. The incidence of infertility appears to be increasing, its Prevalence is 3.5% to 16% among any population worldwide with an average prevalence or 9% [1,2]. The word sub fertility is now been encouraged as opposed to infertility which appears to indicate a permanent inability to conceive. Infertility is defined as the inability of a couple to achieve conception after one year of frequent and regular unprotected sexual intercourse [3]. It is said to be primary, if the couple have never achieved conception or secondary if there has been previous conception/s. Individuals as well as nations are spending large amounts of money and resources to overcome this problem. Inability to conceive is believed to be caused by the male in 19-57% of cases, by the woman in 30-64% and combined factor 10-60% and unexplained in 8-30% of cases [2-4].

Female causes of infertility may occur on account of ovulation disorders, tubal factors, and cervico-uterine factors. Estimates of the prevalence of ovulatory disorders vary from 21% to 32%, 14% to 26% for tubal disorders and 5% to 6% for endometriosis [4-6]. Tubal and uterine factor are assessed using either Hysterosalpingogram or via laparoscopy and Hysteroscopy.

In the pre-in vitro fertilization era, tubal assessment was performed in infertile patients with a view of surgical correction with microsurgical techniques [7-8]. However with the IVF embryo transfer assisted reproductive techniques, tubal surgery has been undergoing a natural death existing mainly in resource poor settings. IVF –embryo transfer has replaced tubal surgery as treatment of choice for tubal subfertility. Indeed it has become the treatment of last resort for persistent infertility due to any cause [8].

Tubal assessment is still relevant in the prognostic work up of subfertility. Previous studies have shown that bilateral tubal pathology diagnosed at HSG or laparoscopy did affect fertility prospects strongly, whereas unilateral pathology affected future fertility less severely [8-10]. Furthermore, several retrospective studies have shown an impaired outcome of In Vitro Fertilization (IVF) in the presence of hydrosalpinx. It is believed that the fluid exerts a detrimental effect on the endometrium by altering the receptivity or simply by causing a mechanical hindrance for implantation. This study aims at examining the current role of Hysterosalpingography in tubal and pelvic

assessment in the evaluation of infertility in view of the increase use of laparoscopy in investigation and management of the infertile couple.

Laparoscopy in the evaluation of infertility

Laparoscopy is regarded as the most reliable tool and goal standard in diagnosis of pelvic causes and in tubal investigation of subfertility, this is because it visualises morphological abnormalities of the fallopian tubes and pelvis directly [11]. It is generally accepted as the reference standard for determination of the accuracy of other diagnostic tools for tubal pathology [8]. Laparoscopy plus dye hydrotubation or chromopertubation is used to determine tubal patency Laparoscopy it is regarded as a minor surgery, but to the patient no surgery is minor especially in the event of any complication. Moreover with laparoscopy surgical procedures such as fulguration of endometriotic deposits can be immediately performed. Tubal ligation and resection can also be immediately done if hydrosalpinx or other tubal pathologies are detected, thereby increasing the IVF chances of success. Though more expensive than HSG, the possibility of investigation and intervention at the same time leads to reduction in cost and time. Some people have therefore suggested that laparoscopy alone be performed for peritubal workup in infertility.

Laparoscopic complications include those of anaesthesia as well as those arising directly from the procedure, such as from the pneumoperitoneum, viscera and vascular injuries, and these could be major and minor [11,12]. Complications following chromotubation with methylene blue, such as anaphylactic reactions, pulmonary oedema, inflammatory peritonitis and methemoglobinemia have been reported and may be life threatening [13,14]. Incidence of complications of diagnostic laparoscopy is however generally believed to be low, and is directly proportional to the skill and experience of the surgeon.

***Corresponding author:** Adebunmi O Olarinoye, Department of Obstetrics and Gynaecology, University of Ilorin, Ilorin, Kwara State, Nigeria, Tel: +2348033975764; E-mail: adebunmiolarinoye@yahoo.com

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Hysterosalpingography in the evaluation of infertility

Hysterosalpingography involves passage of contrast into the cervix using a special cannula, this is usually done 2 to 3 days after the menstrual bleed has stopped. In this way the uterine cavity, as well as the tubes are outlined and uterine abnormalities as well as tubal abnormalities and patency can be determined. It is the method of choice to diagnose some not so common conditions such as the uterosubvesical fistula and other uterine fistulae that may have a negative impact on conception [15]. It is virtually non-invasive and of lower cost [15]. Complications associated with a hysterosalpingogram include the possibility of an allergic reaction to the dye, cramping pain, bleeding, pelvic infection and uterine perforation, but these are very uncommon. This cramping is generally minor and transient and is well tolerated by the majority of patients [16,17]. However, some patients may experience severe pain, leading to premature termination of the procedure or, rarely, a vasovagal reaction. Finally, there is the potential for irradiation of an early, unsuspected pregnancy. Appropriate timing of the examination and a negative pregnancy test in dubious circumstances should minimize this potential risk [16-18]. Some authors have reported an increase in conception after hysterosalpingography with both water-soluble and oil-based contrast media.

Determining the Relevance of HSG

Electronic search of published literature was done using the Pubmed, Cochrane libraries and Google search engine using the following titles, Hysterosalpingography, fertility, laparoscopy in infertility, Hysterosalpingography versus laparoscopy. The search was restricted to English language articles. Selection criteria of articles included relevance of title to this review, methodology was preferably by randomised control trials of comparative analyses of laparoscopic tubal assessment versus hysterosalpingographic tubal assessment. We have compared in terms of tubal status, sensitivity and specificity, Finding of additional pathologies that may affect fertility- pelvic factors (tubal adhesions, endometriosis) and uterine pathologies (uterine synechia, polyps, septae), cost, patient oriented evidence and disease oriented evidence and possible complications.

Recently, there has been a growing tendency to bypass diagnostic laparoscopy after a normal hysterosalpingogram even in centres where it was once the norm and instead to start direct infertility treatment [intrauterine insemination (IUI) or IVF] for indications such as unexplained infertility, male subfertility and cervical hostility. This is because in the In the pre-in-vitro fertilization (IVF) era, surgical correction of tubal abnormalities was the only available treatment for tubal subfertility but the choice for IVF-embryo transfer does not depend on the detection of morphological abnormalities [11,16]. This more so in patients in which earlier pelvic scans have not detected hydrosalpinx.

In resource poor settings, the necessary equipment even for diagnostic laparoscopy are still lacking. Skills for operative or intervention laparoscopy are still scarce and cost of laparoscopy is still prohibitive and out of reach to most.

Compared with laparoscopy in all the studies, HSG has only moderate sensitivity but relatively high specificity (75%-89.3 %) [16,19,20]. It has a high positive predictive value ranging from 91-93% in most of the studies [19-24]. If an occlusion is detected in HSG, there is a 60% possibility of the tubes to be actually patent, however, when patency is demonstrated in HSG, there is little chance of the tube to be actually occluded. We should keep in mind that both procedures provide more information than the condition of the Fallopian tubes

alone. Whereas HSG provides information on the status of the intrauterine cavity, congenital abnormalities like presence of septae, polyps, submucous fibroids, synechia and adenomyosis. Tubal abnormalities that can be detected include tubal occlusion, salpingitis isthmica nodosum, polyps, hydrosalpinx, and peritubal adhesions [16]. Sensitivity of HSG in detecting peritubal adhesions has been reported to be 34-75% [16,20-24]. Laparoscopy allows inspection of the intra-abdominal cavity, for instance to see if endometriosis is present, peritubal adhesions, hydrosalpinx. The latter has become especially important, since it was recently shown that laparoscopic treatment of endometriosis improves fertility prospects by 13%. Intrauterine abnormalities cannot be directly viewed with laparoscopy alone.

Most studies did not assess the acceptability of either test to the patients, this may be because such patients are usually desperate and ready to go to almost any length to achieve the goal which is conception, however HSG is likely to be more acceptable to patients because it is basically a none surgical investigation, less invasive and cheaper. With the advent of MRI Hysterosalpingography (MR-HSG) 3D dMR-HSG represents a new and promising imaging approach to female infertility causing less pain and avoiding exposure of the ovaries to ionizing radiation. By using a higher viscosity MR-contrast agent it allows not only visualization of uterine cavity and Fallopian tube patency but also direct visualization of fallopian tubes [25].

The complication rate for diagnostic laparoscopy reported in the literature is very low 1.07%, 0.3%, and 0.03% for minor and major complications, and deaths, respectively. In another study, there were 31 (5.1%) minor complications and 14 (2.3%) major complications requiring surgery or transfusion. These rates are five- and sevenfold higher ($p<0.01$) than are reported in retrospective series in the literature. There were also three (0.49%) deaths [25,26].

Conclusion

Hysterosalpingography is a simple method of evaluating fallopian tube patency and uterine abnormalities. Unlike laparoscopy, it does not require hospitalization or anaesthesia. The only potentially significant complication is an adverse reaction to a water soluble contrast medium. It is non-invasive; it readily detects abnormal tubes; and it can be therapeutic. It requires less skill acquisition and necessary equipment are readily available. Laparoscopy should be performed in cases of abnormal hysterosalpingogram or persisting infertility in presence of unexplained infertility or when history or previous examination suggest additional pathologies like endometriosis.

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