EVALUATION OF HYSTÉROSALPINGOGRAPHY VERSUS LAPAROSCOPY IN THE DETERMINATION OF TUBAL FACTORS IN FEMALE INFERTILITY: A HOSPITAL BASED COMPARATIVE STUDY.

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Abstract

Objectives: Hysterosalpingography and laparoscopy both are the diagnostic methods for assessment of female infertility. The present study was to compare the evaluation of hysterosalpingography (HSG) versus laparoscopy in determination of tubal factors in female infertility.

Methods: Detailed assessment, physical examination and clinical investigations were performed in all 100 infertile female with age 20 years to 40 years. All patients were advised to perform digital HSG. Patients with an abnormal HSG underwent laparoscopy without delay, whereas in patients with a normal HSG, laparoscopy was performed three months after HSG.

HSG is best scheduled during the 2nd - 5th day interval immediately following the end of menstruation, to minimize risk for infection, avoid interference from intrauterine blood and clot, and to prevent any possibility that the procedure might be performed after conception.

Results: Data was analysed by using IBM SPSS version 23 software. All data was tabulated and percentages were calculated. Mean ± standard deviation was observed.

Conclusions: Diagnostic laparoscopy is the gold standard in diagnosing tubal pathology and other intra-abdominal causes of infertility. Other hand, Hysterosalpingography is a frequently utilized diagnostic tool in the assessment of tubal status and detection of uterine anatomical defects in infertility. Hysterosalpingography and laparoscopy are not alternatives but complimentary investigations. But, inadequacy of hysterosalpingography (HSG) in determining the state of tubal patency, emphasizes the need for laparoscopy. Laparoscopy provides both a panoramic view of the pelvic reproductive anatomy and a magnified view of pelvic organs and peritoneal surfaces.

Keywords: Female infertility, Tubal patency, HSG, Laparoscopy

Introduction

Fertility varies across regions of the world and is estimated to affect 8 to 12 percent of couples worldwide [1]. Total infertility is divided into primary and secondary infertility. Primary infertility is defined as the inability to conceive within one year of unprotected sexual intercourse among women who are 15 to 49 years old and are sexually active and not on contraception. Secondary infertility refers to the inability to conceive following a previous pregnancy [2]. For many couples, infertility and its treatment cause a serious strain on their interpersonal relationship, and cause disturbance in relationships with other people [3].

Primary infertility is one of the most frequent causes of infertility in women. One third of infertility cases are due to anatomical abnormalities of the female reproductive tract [4]. WHO defines infertility as “failure to conceive after having regular, unprotected intercourse for one year [5].

The major factors responsible for infertility can be categorised as “male factors (20-30%), female factors (40-55%), combined male and female factors (10-40%) and unexplained infertility (10-20%). Amongst female factors, tubal factors are responsible for 25-30% of infertility [6]. Hysterosalpingography (HSG), laparoscopy with chromopertubation or both can be used to evaluate tubal patency. Owing to its non-invasive nature and low cost, HSG is widely used as a first-line approach to assess tubal patency and uterine anomalies in routine fertility workup [7,8]. However, laparoscopy with chromopertubation has been the gold standard for investigating tubal patency [8]. An objective of our study was to compare the evaluation of hysterosalpingography versus laparoscopy in determination of tubal factors in female infertility.
Materials & Methods

This present study was conducted in Department of Obstetrics and Gynaecology, ANMCH, Gaya, Bihar, India during a period from February 2019 to December 2019. Attendants of entire subject signed an informed consent approved by institutional ethical committee of ANMCH.

A detail history, clinical examinations and relevant investigations were performed in all patients.

All the 100 patients were enrolled according to inclusion criteria. Inclusion criteria of this study were the patient’s age group 20 to 40 years who were coming for the treatment of infertility and had hormonal investigation within normal limit or hormonal profile became normal after treatment in OPD of department of Obstetrics and Gynaecology in ANMCH, Gaya, Bihar, India.

Exclusion criteria of this study were the patients who had active pelvic inflammatory disease (PID), active cervical or vaginal infection, other medical and surgical disorders (primary amenorrhea, h/o tubal surgery, recanalization surgery etc. and contraindication for laparoscopy or HSG).

Methods

All patients were advised to undergo digital HSG. Patients with an abnormal HSG underwent laparoscopy without delay, whereas in patients with a normal HSG, laparoscopy was performed three months after HSG. HSG is best scheduled during the 2-5-day interval immediately following the end of menstruation, to minimize risk for infection, avoid interference from intrauterine blood and clot, and to prevent any possibility that the procedure might be performed after conception. HSG does not require any specific preparation, although pre-treatment with a NSAID (30-60 minutes before) is helpful to decrease discomfort associated with the procedure. Infectious complications from HSG are relatively uncommon, even in high risk women (1-3%).(15,16) Treatment with antibiotics (doxycycline 100 mg twice daily for 5 days, beginning 1-2 days before HSG) is prudent when tubal disease is highly suspected, and specifically indicated when HSG reveals distal tubal obstruction, because risk for acute salpingitis is increased (approximately 10%) and treatment can prevent clinical infection [9].

HSG was performed by using image intensification fluoroscopy/ X-ray with a limited number of radiographs. The average HSG requires only 20-30 seconds of fluoroscopic/X-ray time with minimal radiation exposure and has very low risk. Usually, only three basic films are required (a scout, one film to document the uterine contours and tubal patency, and a post-evaluation film to detect any areas of contrast loculation). Additional oblique films may be needed when the uterus obscures the tubes, or the uterine cavity appears abnormal. Contrast can be introduced using a common metal “acorn” cannula or via a balloon catheter.

Laparoscopic evaluation was performed using 30 degree laparoscope and pneumoperitoneum achieved by CO2.

Diagnostic laparoscopy is usually performed under general anaesthesia. With few exceptions, a systematic and thorough inspection of the pelvis can accurately define the location and extent of any disease. Examination was done including the uterus, the anterior and posterior cul-de-sacs, the ovarian surfaces and fossae, and the fallopian tubes.

Injection of a dilute blue dye through a cannula attached to the cervix or an intrauterine manipulator permits evaluation of tubal patency (chromotubation). Indigo carmine is preferred over methylene blue, which rarely may induce acute methemoglobinemia, particularly in individuals with glucose-6-phosphate dehydrogenase deficiency. (18,19) As with HSG, slow injection of fluid helps to reduce the incidence of false-negative results. Laparoscopy provides both a panoramic view of the pelvic reproductive anatomy and a magnified view of the uterine, ovarian, tubal, and peritoneal surfaces.

Observations

In this present, a total of 100 female patients with history of primary and secondary infertility were enrolled. Age groups of patients were 20 to 40 years. Mean age group of patients was 26.945± 6.234 years. Most of the patients 70(70%) were belonging in age group of 25 to 36 years.

Table 1: Showing the distribution of stage of infertility

<table>
<thead>
<tr>
<th>Infertility</th>
<th>No. of patients</th>
<th>% of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary infertility</td>
<td>57</td>
<td>57%</td>
</tr>
<tr>
<td>Secondary infertility</td>
<td>43</td>
<td>43%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

In this present study, majorities of patients 57(57%) had primary infertility. Secondary infertility was seen in 43(43%) patients.

Figure 1: Showing period of infertility with percentage of patients.
In this present study, most of the patients 70(70%) had 6 to 10 years of infertility. 22(22%) patients had 1 to 5 years of infertility. And 8(8%) patients had >10 years of period of infertility.

**Table 2:** Showing the spillage of Dye in HSG of patients with infertility.

<table>
<thead>
<tr>
<th>Spillage of Dye in HSG</th>
<th>No. of patients</th>
<th>Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral spillage</td>
<td>24</td>
<td>24%</td>
</tr>
<tr>
<td>Bilateral spillage</td>
<td>46</td>
<td>46%</td>
</tr>
<tr>
<td>Bilateral block</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

In this present study, bilateral spillage was seen in 46(46%) patients under the spillage of dye in hysterosalpingography. Incidence of bilateral block was seen in 30(30%) patients and they had no spillage. Incidence of unilateral spillage of dye in hysterosalpingography was seen in 24(24%).

**Table 3:** Showing the spillage in dye laparoscopy in patients with infertility.

<table>
<thead>
<tr>
<th>Spillage in Dye Laparoscopy</th>
<th>No. of patients</th>
<th>Percentage of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unilateral spillage</td>
<td>24</td>
<td>24%</td>
</tr>
<tr>
<td>Bilateral spillage</td>
<td>47</td>
<td>47%</td>
</tr>
<tr>
<td>Bilateral block</td>
<td>29</td>
<td>29%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

In this present study, bilateral spillage in dye laparoscopy was seen in 47% patients. Bilateral block was seen in 29 % patients and they had no spillage. Incidence of unilateral spillage in dye of laparoscopy was seen in 24(24%).

**Discussions**

Imaging techniques i.e. transvaginal ultrasound and hysterosalpingography (HSG) are commonly used for the evaluation of female pelvic organs followed by endoscopy if required in developing countries. HSG is the most commonly used technique for the evaluation of uterine cavity i.e. anatomical abnormalities, intrauterine space occupying lesions, intrauterine adhesion and tubes i.e. tubal blockage [10]. HSG has the advantage of being an outpatient department (OPD) procedure. It does not require any anaesthesia for the procedure but there are disadvantages like radiation exposure, exposure to iodinated contrast media and the discomfort to the patient [11].

Laparoscopy allows exact evaluation and treatment of tubal factor infertility and helps in deciding optimal management for an infertile patient but it requires anaesthesia and is a major operative procedure which is generally not acceptable to patients [11].

In this present study, a total of 100 female patients of age 20 years to 40 years with history of primary and secondary infertility were included. Primary infertility was mostly 57(57%) seen. Most of the patients 70(70%) were belonging in age group of 25 to 36 years. Mean age of patients was 26.945± 6.234 years.

Many studies have associated morphological abnormalities with fertility outcome in patients who underwent microsurgical correction for tubal occlusion (Strandell et al., 1995) [12]. So far, only one study has assessed the significance of findings at laparoscopy in patients evaluated for subfertility. Nordersko¨ld and Ahlgren (1983) [13] reported on 433 subfertile women who had laparoscopy. The presence of adhesions reduced fertility prospects on the same order as unilateral tubal occlusion, with relative risks of 0.74 (95% CI 0.57–0.98) and 0.73 (95% CI 0.39–1.4) respectively.

In this present study, majorities of patients 70(70%) had duration of infertility 6 to 10 years. 22(22%) patients had duration of infertility 1 to 5 years. Least number of patients 8(8%) patients had >10 years of period of infertility.

Bilateral spillage of dye in hysterosalpingography was seen in most of the patients 46(46%). Bilateral block in hysterosalpingography was seen in 30(30%) patients and they had no spillage. Incidence of unilateral spillage of dye in hysterosalpingography was seen in 24(24%).

In study conducted by Shokeir et al. 12.3 % women had significant lesion on hysteroscopy with normal laparoscopic findings [14].

Volpi E, et al. [15] evaluated the role of transvaginal sonosalpingography in the evaluation of tubal patency. It is a new technique to test tubal patency under transvaginal sonosalpingography control. Lachlan deCrespigny RK [16] conducted infertility investigation through saline infusion sonohyster salpingography.

In this present study, bilateral spillage of dye in laparoscopy was seen in most of the patients 47(47%). Bilateral block was seen in 29 % patients and they had no spillage. Incidence of unilateral spillage of dye in laparoscopy was seen in 24(24%).

According to the Preuththipan S. et al [17] the accuracy of HSG for detecting intrauterine pathology in infertile women varies with the nature of the abnormality. Donnez J. et al [18] study showed Myomas can be identified in 20-40% of all reproductive aged women. Mol BW. et al [19] study showed HSG may reveal bilateral tubal patency (60 - 75%) or unilateral (15 - 25%) or bilateral (15 - 25%) tubal occlusion. Both false-negative (obstructions that are not real) and false-positive results (patency that is not real) occur, the former being much more common than the latter.

In a study from Trivandrum, India, laparoscopy in infertility revealed significant pelvic pathology in 26.8% cases [20]. An another study from developing countries showed equal
prevalence of pelvic adhesion and tubal pathology that was 40% in primary infertility [21].

Conclusions
Diagnostic laparoscopy is the gold standard in diagnosing tubal pathology and other intra-abdominal causes of infertility. On the other hand, hysterosalpingography is a frequently utilized diagnostic tool in the assessment of tubal status and detection of intrauterine anatomical defects in infertility. Hysterosalpingography and laparoscopy are not alternatives but complimentary investigations. But, inadequacy of hysterosalpingography (HSG) in determining the state of tubal patency, emphasizes the need for laparoscopy. Laparoscopy provides both a panoramic view of the pelvic reproductive anatomy and a magnified view of pelvic organs and peritoneal surfaces.

References