Abstract

The patients investigated under this study have complaints of inability to conception and they were not responding to treatment. Patients with infertility were studied, the peak incidence of infertility was found in between 26-29 years of age group. Hysterosalpingography examination detected tubal and uterine pathology correctly in 26 cases (81.25%) out of 29 cases of complaining of infertility. Of 18 negative cases, 12 cases (80%) are diagnosed correctly as normal by Hysterosalpingography. After laparoscopic examination it was established that three (20%) were false positive and 6 cases were false negative. If a longer series are analyzed, these findings may vary slightly but still it is very useful diagnostic tool for detection of infertility. Hysterosalpingography will give utmost benefit to the patients of our country. In our study we found that Hysterosalpingography is still the best technique for intrauterine and tubal pathology. This study has established the fact that Hysterosalpingography should be the first approach in the diagnosis of infertility which gives valuable information about both uterine cavity and fallopian tubes at low risk and minimal hazards. As a result of our findings, it is our investigation of female infertility due to its potential accuracy and easy performance.

Introduction

Infertility is failure to conceive after one year during which no contraception is used. Human infertility is responsible for a great deal of personal unhappiness leading to marital disharmony often ending in divorce. Infertility is estimated to occur is 10-15% of couple. The prevalence has increased in the last decade or so in large part because of an increase in sexually transmitted diseases resulting in pelvic inflammatory disease and increasing tendency to delay child bearing.

Considerable progress has been made in the understanding of reproductive physiology and in the development of newer and increasingly sophisticated imaging techniques to evaluate infertility. This has resulted in an increasing numbers of couples seeking evaluation of their infertility.

Hysterosalpingography has significant role in assessment of infertility. Hysterosalpingography has been extensively employed in infertility investigations since 1914.

For many years it was thought that infertility was a female problem only but during the last decades it has become increasingly apparent that the male partner in responsible for infertility in a considerable number of cases.

Keywords: Hysterosalpingography, Infertility.

Understanding the reasons for infertility and the development of new techniques for its treatment is one of the fields within medicine which has undergone a dramatic development in the last two decades. It should however be emphasized that successful development of in vitro fertilization, and assisted reproduction technologies could not have taken place without the development of Hysterosalpingography, Ultrasound & Endoscopic techniques.

Hysterosalpingography has for many years been an invaluable procedure for the assessment of tubal patency and tubal and intra-uterine pathology. However it is claimed that hysterosalpingography may be more reliable than laparoscopy.

Hysterosalpingography has been employed for the evaluation of tubal patency and abnormalities, Uterine cavity, configuration, neoplasms dysmenorrhea dysfunctional uterine bleeding fistulas, pelvic pain, entopic pregnancy, adenomyosis.

Any infertility evaluation should begin with a complete history, physical examination of both partners.

The basic underlying causes of infertility are: Male factor, cervical factor, endometrial- uterine factor, tubal factor, peritoneal factor, ovulatory factor.

Tubal factors are believed to be responsible for 25-40% of infertile couples. Evaluation of tubal dysfunction is
of obvious importance in the investigation of female
infertility.6

Study of infertility is getting importance day by day. Various new methods are being applied to evaluate
various causes of infertility.7 Methods including BBT
(basal body temperature), endometrial biopsy, cervical
mucous study, vaginal cytology, serum progesterone.
Serial ultrasonography both per abdominal and
transvaginal and laparoscopy are recommended to
detect ovarian factor.

Hysterosalpingography and laparoscopy are the
important steps for evaluation of tubal and
endometrio-uterine factor.

Sonography is well suited for showing and monitoring
physiologic follicular growth. The process of
ovulation could be identified by sonography, and also
a important guidance procedure in reproductive
techniques such as oocyte collection and gamete
transfer in vitro fertilization programs. Laparoscopy
remains the standard for determining the presence and
extent of pelvic adhesions, and staging of
endometriosis.

It is clear that imaging studies contribute greatly to
the diagnosis and management of infertility in women.
Hysterosalpingography remains the first-line
radiologic examination for most women undergoing
an infertility investigation.4

Hysterosalpingography is important in the diagnostic
evaluation of tubal factors because it provides
information about internal tubal architecture and tubal
patency. Imaging studies contribute greatly to the
diagnosis and management of infertility in women.
Hysterosalpingography remains the first line of
radiological examination for most women undergoing
an infertility investigation. It can show uterine
synechiae, abnormalities of tubal morphology such as,
salpingitis isthmica nodosa or hydrosalpinx and tubal
occlusion.3

Hysterosalpingography is the radiographic delineation
of uterus and the fallopian tubes. Contrast materials
introduced through the cervical os outlines the cavity
of the uterus, lumen of the fallopian tubes and
determines the tubal patency.

The present study was done to find the value of
Hysterosalpingography for the evaluation of infertility
problems. The specific aim of the study was to establish

the sensitivity and accuracy of Hysterosalpingography
in the detection of causes of infertility.

Considering the cost-effectiveness, minimal hazards
and easy performance, Hysterosalpingography may
be regarded as preliminary procedure for every
women undergone infertility investigation.

The main purpose of this study is to evaluate the role
of Hysterosalpingography for the diagnosis of
infertility and to establish it as the preliminary
procedure for its minimal hazards & easy performance.

Material and Methods
This study was carried out at the Bangladesh Institute
of Research and Rehabilitation of Diabetic Endocrine
and Metabolic Disorders (BIRDEM), Bangabandhu
Sheikh Mujib Medical University (BSMMU) and
Dhaka Medical College Hospital (DMCH). A total
number of 50 patients with complaints of infertility
attending Gynecologist and referred to Radiology and
Imaging Department for Hysterosalpingography. The
selection criteria for the study was patients having the
complaints of both primary and secondary infertility
having age between 18-40 years. The patients who
refused to undergo Hysterosalpingography
examination and investigated directly by laparoscopy
or laparotomy are exclude from the study. The
diagnostic criteria for the study were
Hysterosalpingographic findings and Laparoscopic or
laparotomy findings.

History and Clinical Examination
Thorough history was taken regarding complaints of
infertility. A brief survey of occupational history,
menstrual history, contraceptive history, obstetrical
history, past history of illness in relation to infertility
was made. Findings of other investigations including
routine laboratory investigations were also in
consideration.

Hysterosalpingography
The patients had to undergo Hysterosalpingographic
examination under fluoroscopic control. The test were
performed with in 8-10 days for their menstrual period.
A self retaining Foley’s catheter or Leech-Wilkinson’s
cannula were applied.

Water soluble radiographic contrast medium 75%
urovideo about 10ml. was instilled slowly under
fluoroscopic control. To avoid the uterotubal spasm,
the patients were constantly reassured, instrumentation was gently conducted and a delay of
5 minutes was observed between instrumentation and first radiograph. Though ionic contrast medium is generally used, some special circumstances like asthma and highly sensitive patients, we can use nonionic contrast medium. It causes less peritoneal irritation but its cost is higher than ionic medium.

Analgesia was not routinely used but antispasmatic drugs were administered intravenously in a few patients with tubal spasm. Radiographs are control film in supine position followed by spot A/P film, oblique film (Right and Left). In eight cases lateral films were taken.

Laparotomy or laparoscopic examination were done and reports prepared by gynecologists.

**Data Collection**

Relevant data for each patient were recorded in a predesigned individual data collection sheet.

**Results**

As a whole results of hysterosalpingographic evaluation of infertility is confirmed by review of the reports of laparoscopy or laparotomy findings on all patients. Here 26 (81.25%) cases of true infertility were diagnosed correctly, 3 (20%) patients of without infertility problems were diagnosed wrongly. Again 12 (80%) cases were diagnosed correctly as false infertility or normal; 6 (18.75%) cases wrongly interpreted as normal who has actually causes of infertility.

<table>
<thead>
<tr>
<th>Test Result</th>
<th>True state of patients</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>True Infertility</td>
<td>False Infertility</td>
</tr>
<tr>
<td>Positive</td>
<td>True</td>
<td>False</td>
</tr>
<tr>
<td></td>
<td>26 (81.75%)</td>
<td>3 (20%)</td>
</tr>
<tr>
<td>Negative</td>
<td>False</td>
<td>True</td>
</tr>
<tr>
<td></td>
<td>6 (18.75%)</td>
<td>12 (80%)</td>
</tr>
<tr>
<td>Total</td>
<td>6 (18.75%)</td>
<td>12 (80%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Among the three false positive cases -two cases were identified as cornuel spasm and remaining one may be due to other cases like use of small volume of contrast medium was introduced in to uterine cavity. Among the six false negative cases, two cases not interpretated correctly due to extravasation of dye. Rest of the cases are due to free spillage from a pin point opening of an club shaped tube suggested normal fimbrial function.

**Table II**

*Distribution of patients according to Age Group. (n=47)*

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-21</td>
<td>3</td>
<td>6.38%</td>
</tr>
<tr>
<td>22-25</td>
<td>10</td>
<td>21.28%</td>
</tr>
<tr>
<td>26-29</td>
<td>14</td>
<td>29.79%</td>
</tr>
<tr>
<td>30-33</td>
<td>8</td>
<td>17.02%</td>
</tr>
<tr>
<td>34-37</td>
<td>7</td>
<td>14.89%</td>
</tr>
<tr>
<td>38-40</td>
<td>5</td>
<td>10.64%</td>
</tr>
</tbody>
</table>

47 selected patients having the complaints of infertility in the age group 18-40 years divided in to 6 groups and tabulated as follows:

about 30% patients were in the age group of 26-29 years, 21% were in the age group of 22-25 years.
Table III
Distribution of Patients depending on types of infertility (n=47)

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Infertility</td>
<td>19</td>
<td>40.43%</td>
</tr>
<tr>
<td>Secondary Infertility</td>
<td>28</td>
<td>59.57%</td>
</tr>
</tbody>
</table>

Of 47 patients, 19 cases present as primary infertility and 28 cases present as secondary infertility.

Fig.-3: Distribution of Patients depending on types of Infertility

Table IV
Distribution of Patients depending on occupation (n=47)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>House-wife</td>
<td>12</td>
<td>25.53%</td>
</tr>
<tr>
<td>Service holder</td>
<td>21</td>
<td>44.68%</td>
</tr>
<tr>
<td>Student</td>
<td>11</td>
<td>23.41%</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>6.38%</td>
</tr>
</tbody>
</table>

Maximum incidence of infertility was found among the service holder (44.68%).

Table V
Distribution of Patients depending on Socioeconomic condition (n=47)

<table>
<thead>
<tr>
<th>Socioeconomic condition</th>
<th>Number of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>8</td>
<td>17.02%</td>
</tr>
<tr>
<td>Average</td>
<td>23</td>
<td>48.94%</td>
</tr>
<tr>
<td>Good</td>
<td>16</td>
<td>34.04%</td>
</tr>
</tbody>
</table>

Low: Not able to buy any medicine from outside the hospital.
Average: Able to buy fifty percent of the prescribed medicines from outside the hospital.
Good: Able to buy all the prescribed medicines from outside the hospital.

In this series, incidence of infertility was higher among average socioeconomic status group (48.94%) followed by good (34.04%) and low (17.02%).

Fig.-4: Distribution of patients depending on Occupation

Fig.-5: Distribution of patients depending on socioeconomic condition
Table VI

Result of Hysterosalpingographic findings. (n=47)

<table>
<thead>
<tr>
<th>Findings</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uterine cavity abnormality</td>
<td>7</td>
<td>14.89%</td>
</tr>
<tr>
<td>Tubal abnormality</td>
<td>18</td>
<td>38.30%</td>
</tr>
<tr>
<td>Uterine and tubal findings</td>
<td>4</td>
<td>8.51%</td>
</tr>
<tr>
<td>Normal findings</td>
<td>18</td>
<td>38.30%</td>
</tr>
</tbody>
</table>

Of the total 47 cases uterine cavity abnormalities were found 14.89% cases, tubal abnormality in 38.30% cases, normal findings were 38.30% cases.

Fig.-6: Result of Hysterosalpingographic findings

Table VII

Distribution of patients according to uterine cavity findings by hysterosalpingograph (n=7).

<table>
<thead>
<tr>
<th>Findings</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Uterine and tubal findings</td>
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<td>8.51%</td>
</tr>
<tr>
<td>Normal findings</td>
<td>18</td>
<td>38.30%</td>
</tr>
</tbody>
</table>

Of 47 cases uterine cavity findings were 14.89% cases. Among the uterine pathology the highest percentage of patients were in congenital anomaly group like uniconrat uterus(28.57%).

Fig.-7: Distribution of patients depending on uterine findings.

Table VIII

Hysterosalpingographic findings in tubal abnormalities (n=18).

<table>
<thead>
<tr>
<th>Findings</th>
<th>No. of cases</th>
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<tr>
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<tr>
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<td>8.51%</td>
</tr>
<tr>
<td>Normal findings</td>
<td>18</td>
<td>38.30%</td>
</tr>
</tbody>
</table>

Discussion

This Prospective study was carried out to determine the diagnostic accuracy of hysterosalpingography for the evaluation of infertility and correlation with laparoscopic findings. During this study out of total fifty patients, forty seven selected patients presenting with the complaints of infertility were studied by hysterosalpingography. Three cases were excluded from the study because two patient refused to undergo hysterosalpingographic examination and the other one was directly investigated with laparoscopy. Most of the patients were managed at Bangladesh Institute of Research and Rehabilitation for Endocrine and Metabolic Disorders (BIRED), Bangabandhu Sheikh Mujib Medical University (BSMMU) and Dhaka Medical College Hospital (DMCH). The patients underwent hysterosalpingography, laparoscopy or lapartomy as independent procedures. The final
diagnosis was made on the basis of laparoscopic or laparotomy findings.

The age group of the patients for this infertility study were between 18-40 years. The patients were arranged in six groups. After analysis of the data it was found that the peak incidence of infertility was in the age group of 26-29 years. This result differs from the study of Moghissi that the peak age group of infertility in USA is in the gate of 35 years. This may be due to late marriage and tendency to delay child bearing in USA, other than in Bangladesh. Another cause for this early age group findings may be due to people come for investigation after 2 to 3 years of unprotected coitus. The girls of our country get married around the age of 20 years.

The trend of infertility among the women under this study increases up to the age group of 26-29 years and the decreased slightly. It looks like a half wave sinusoidal curve having a peak in the middle position. The cause of early age infertility is due to early marriage and expectation of child in the early age group.

Patients who has failed to conceive at all are primary infertility. Secondary infertility is one that occurs after one or more pregnancy and is more amenable to treatment generally. It was found that most of the patients (59.57%) were presented as secondary infertility and remaining 40.43% patients with primary infertility. The ratio of primary to secondary infertility is about 0.67.

The present study shows that about 49% patients came from the average socioeconomic condition. This may be related to nutritional condition. It is claimed that smoking and alcohol consumption has a role in female reproductive failure in affluent society, this differs from our study in that point to generally non consumption of alcohol by women in our country. Also highest infertility was found in the working women due to stress and separation from the family for different working place.

The mechanical causes of female infertility which can be radiologically elucidated, include hydrosalpinges and other tubal obstructions. Peritubal adhesion, leiomyoma, congenital malformations of the uterus and intrauterine adhesion, retroversion of uterus. Hydrosalpinx was found in 56% of the tubal abnormalities. In about 4% of the total investigations Hysterosalpingography was unable to detect the hydrosalpinx because of proximal obstruction of the fallopian tubes. As our result demonstrates, with good technique, high accuracy can be anticipated in the diagnosis of hydrosalpinges. On the other hand in about 11% of total investigations, inappropriate diagnosis was may be due to under filling of the affected tube for technical reasons or corneal spasm. Distal obstruction and hydrosalpinx were differentiated because of some spillage of contrast occurred in distal obstruction and in case of hydrosalpinx spillage caused by pressure separation of fimbriae.

Evaluation of tubal dysfunction is of particular importance in the investigation of female infertility. The only tubal factors responsible for infertility was found to be about 38% which agrees with the study of Arronet.

Among the uterine findings, the most common cause for primary infertility was found as congenital anomaly. Of the various congenital anomalies, unicorne uterus was about 28%. Submucosal leiomyoma was accurately diagnosed.

The overall result of the Hysterosalpingography was correlated with the findings of lapariscopy/ laparotomy. The diagnostic reliability of Hysterosalpingography in terms of sensitivity was 81.25%, accuracy was 80.85% and specificity was 80.00% so, Hysterosalpingography has definite part to play in every infertility investigation, reduces the need for many laparoscopies.

Summary
Forty seven patients with the complaints of infertility were studied during the study period. The patients investigated under this study have complaints of inability to conception and they were not responded to treatment. The peak incidence of infertility was found in between 26-29 years of age group, Hysterosalpingography examination detected tubal and uterine pathology correctly in 26 cases (81.25%) out of 29 cases of complaints of infertility. Of 18 negative cases, 12 cases(80%) and diagnosed correctly as normal by Hysterosalpingography. After an laparoscopic examination it was established that three(20%) were false positive and 6 cases were false negative. If a longer series are analyzed, these findings may vary slightly but still it is a very useful diagnostic tool for detection of infertility. Hystero-
salpingography will give utmost benefit to the patients of our country. In our study we found that Hysterosalpingography is still the best technique for intrauterine and tubal pathology.

Conclusion
This study established the fact that Hysterosalpingography should be the first approach in the diagnosis of infertility which gives valuable information about both uterine cavity and fallopian tubes at low risk and minimal hazard. As a result of our findings, it is our contention that Hysterosalpingography has a proven role in the investigation of female infertility due to its potential accuracy and easy performance.

References:


