Role Of Laparoscopy In Management Of Ectopic Pregnancy

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Aims And Objectives: 1: To evaluate the role of laparoscopy in the diagnosis and management of ectopic pregnancy. 2: To record the operative findings.

Materials And Methods: This prospective observational study was conducted in the Department of Obstetrics and Gynecology, LD Hospital, an associated hospital of Government Medical College Srinagar in patients of ectopic pregnancy between January 2016 to August 2017. 100 consecutive cases of suspected Ectopic pregnancy that were admitted in our hospital as out-patient or emergency basis were recruited for this study. Hemodynamically stable patients who underwent Laparoscopy were included.

Results: Out of 100 cases of suspected ectopic pregnancy patients 95 were actually ectopic diagnosed on laparoscopy and 5 patients who were suspected to be ectopic by TVS and beta hCG were not ectopic on laparoscopy. 32.6% were ruptured, 58.9% were unruptured and 8.4% tubal abortion. In 72.6% site of ectopic pregnancy was ampullary, 17.9% were infundibular, 8.4% were isthmic and interstitial 1.1%. Salpingectomy was done in 42.1% salpingostomy in 46.3%, and milking in 11.6%. All the hemodynamically stable patients whether ruptured or un ruptured were managed by laparoscopically while as hemodynamically unstable patients were managed by laparotomy.

Conclusion: Laparoscopy permits diagnosis and treatment to be combined in the same procedure and ectopic pregnancies can be diagnosed and treated at an early stage. In fact, laparoscopy is not only suitable for early ectopic pregnancies but it is also safe and feasible in instances where there is tubal rupture and hemoperitonium, provided the patient is not severely compromised hemodynamically. The laparoscopic approach is now the gold standard for the treatment of ectopic pregnancy and safer approach than laparotomy.
INTRODUCTION:
Ectopic pregnancy means implantation of a fertilized ovum outside the endometrial lining of uterus\(^1\). It is one of the major causes of maternal mortality and morbidity during first trimester. The most common type of Ectopic pregnancy is tubal pregnancy which includes 98% of all Ectopic Pregnancies\(^2\). Ectopic pregnancy remains the leading cause of early pregnancy related death in first trimester\(^3\). The incidence of ectopic pregnancy has increased substantially over the past decades with increasing trends of risk and improvements in the diagnostic modalities. Several developments in treatment of ectopic pregnancies have led to remarkable success in mother’s life. Further developments recently have resulted shift in focus from saving mother’s life to additionally saving the woman’s fertility\(^4\).

Traditionally, Ectopic Pregnancy was treated by laparotomy. John Bird, a surgeon in New York, reported the first successful surgical intervention to treat Ectopic Pregnancy in 1759\(^5\). Currently, laparoscopy is gaining popularity in management of Ectopic Pregnancy\(^5\)\(^6\)\(^7\). Laparoscopic Surgery was first reported by Bhuhout et al in 1980 \(^8\). Laparoscopic Surgery has an advantage of shorter operative time, speedy post-operative recovery and lower cost\(^9\). Follow up studies have demonstrated less adhesions while compared to laparotomy.\(^{10}\) However failure to retrieve trophoblastic tissue completely compared to laparotomy has been reported.\(^{11}\) Laparotomy on the other hand is preferred because of better visualization of tissue and increased confidence to control hemostasis\(^{12}\).

Etiology and Risk factor
The Incidences of Ectopic Pregnancies’ is independent of maternal age and ethnic origin. Theoretically anything that impedes migration of the conceptus to the uterine cavity may predispose women to develop an ectopic gestation. The risk factors for developing an ectopic pregnancy are: Previous Tubal Surgery, History of Ectopic Pregnancy, Pelvic Inflammatory Disease, Sexually Transmitted Disease, In-Vitro Diethylstilbestrol Exposure, History of infertility, Anatomical Uterine or tubal abnormality, Previous tubal Ligation, Previous or current intra-uterine device used, Assisted Reproductive Technologies, Current Smoking, Induced Abortion, Progesterone Only Contraceptives.

Diagnosis is based on clinical features, laboratory finding and ultrasound features.
1. **Clinical Features (signs and Symptoms) are:**
   - Amenorrhea
   - Lower Abdominal Pain, Heavy cramping.
   - Uterine Bleeding, Spotting.
   - Pelvic Tenderness.
   - Enlarged Uterus.
   - Adnexal Mass.

2. **Laboratory:**
   - Positive Pregnancy Test.
   - Beta-hCG < 6000 mL/ml at 6\(^{th}\) weeks.
   - Less Than 66% increase of β-hCG in 48 hours.
   - Serum Progesterone less than 25 Ng/ml.

3. **Ultra-Sound Imaging**\(^{13}\):
   - Depending upon the institution, Transvaginal Ultra Sonography should detect evidence of an intrauterine pregnancy when β-hCG level is greater than 1500-2000 mIU per ml. When β-hCG level is below 2000 ultrasound diagnosis of Ectopic Pregnancy should be based upon visualization of an adnexal mass rather than absence of intra uterine gestational sac. Transvaginal ultrasound finding may be classified as
     - uterine findings; empty uterus, thickened endometrium, pseudo gestational sac or
     - Extra-uterine findings; live tubal pregnancy, adnexal ring sign, complex adnexal mass, free fluid in pouch of Douglas.

Treatment for Ectopic Pregnancy
1. **Expectant**\(^{14}\):
   Some cases of Ectopic Pregnancy can resolve through spontaneous regression and resolution. Criteria for patient selection for Expectant treatment include: Lack of clinical symptoms, Sonographic adnexal mass less than 4cm with a decreasing tendency without an embryonic heartbeat, Initial serum β-hCG level of less than 1000 mIU per ml and decreasing serial β-hCG levels. However more than 90% of all affected women with Ectopic Pregnancies develop increasing and
endangering symptom that leads to an operative intervention.

2. Medical Treatment\textsuperscript{15}:-
A number of chemotherapeutic agents have been used either systemic or direct local (under sonographic or laparoscopic guidance) as medical management of ectopic pregnancy. The drugs commonly used are; Methotrexate, Potassium Chloride, Prostaglandin (PGF\textsubscript{2α}), Hyperosmolar Glucose or Actinomycin. The best candidate for medical therapy is the women who is asymptomatic, motivated and compliant. The patient must be Hemodynamically stable, Serum β-hCG level should be less than 3000 mIU per ml, Tubal diameter should be less than 4 cm without any fetal cardiac activity, There should be no intra-abdominal hemorrhage. For ease and efficacy, intramuscular Methotrexate administration is used most frequently for ectopic pregnancy resolution, and single dose and multidose Methotrexate protocols are available.

3. Surgical treatment:-
Surgical techniques include: Salpingostomy, Partial Salpingectomy, Salpingectomy, Fimbrial Expression\textsuperscript{16}. These procedures can be done via laparoscopy or laparotomy. Laparoscopy is more safe and reliable approach than laparotomy in all types of unruptured ectopic pregnancy but in cases of ruptured ectopic pregnancy, degree of shock governs the choice of surgical management. There are a number of advantages to the patient with laparoscopic surgery versus open procedure which includes: Reduced Hemorrhage which reduces the chances of needing blood transfusion. Smaller incision which reduces pain and shortens recovery time, as well as resulting in less post-operative scarring, and Less pain hence less medication needed. Although procedure times are usually slightly longer, hospital stay is less and with early discharge from hospital leads to faster return to everyday living.

**AIMS AND OBJECTIVES**
1. To evaluate the role of laparoscopy in the diagnosis and management of ectopic pregnancy.
2. To record the operative findings.

**Materials and Methods**
This prospective observational study was conducted in the Department of Obstetrics and Gynecology, LD Hospital, an associated hospital of Government Medical College Srinagar in patients of ectopic pregnancy between January 2016 to August 2017. 100 consecutive cases of suspected Ectopic pregnancy that were admitted in our hospital as out-patient or emergency basis were recruited for this study. Hemodynamically stable patients who underwent Laparoscopy were included. Complete history, clinical examination, routine blood investigations, β-hCG and ultra-sonography were carried out.

**Inclusion Criteria:**
1: Suspected cases of Ectopic Pregnancy.
2: Hemodynamically stable patients.
3 Patients managed by laparoscopy.

**Exclusion Criteria:**
1: Patients of Ectopic Pregnancy who underwent Laparotomy.
2: Hemodynamically unstable patients.
3.patients managed by conservative and medical methods.

Written consent was taken from the patients before procedure. All the surgeries were be performed under general anesthesia. Laparoscopy was performed using three ports or four ports after establishing pneumoperitoneum with high flow Carbon Dioxide insufflators. A 10mm umbilical or supra-umbilical primary port and two 5mm ipsilateral secondary ports were made. Diagnostic laparoscopy was first performed. After confirmation of the diagnosis, monopolar or bipolar coagulation was used for surgical procedure. The type of operation performed depended upon the site and nature of the Ectopic Pregnancy. Linear Salpingostomy was performed by making a linear incision in the antimesenteric border of the affected tube over the tubal valve with point needle monopolar diathermy. The tissue was removed with a forceps, the tube was irrigated using Ringer’s Solution and hemostasis was achieved with Bipolar Diathermy. The tubal incision heals by secondary intention. Laparoscopic salpingectomy was performed by progressive coagulation and cutting of the fallopian tube starting with the fimbrial end and progressing to the proximal isthmic portion of the tube. Milking of the tube was done for the patients with fimbrial Ectopic Pregnancy. The pregnancies were removed from the abdominal cavity via the abdominal port.
Outcome of Interest:

1: Confirmation of diagnosis.
2: Site of Ectopic Pregnancy.
3: Type of Ectopic Pregnancy; Abortion, Ruptured, Unruptured, Organized.
4: Hemoperitoneum present or not.
5: Type of Operation; Linear Salpingostomy, Partial Salpingectomy, Salpingectomy, Milking.

RESULTS:

A total 100 cases of ectopic pregnancy were included in our study with majority of patients from age-group of 24-26 years. Minimum and maximum age for Ectopic Pregnancy was 24 and 36. Mean age at presentation for Ectopic Pregnancy was Mean ± S.D.=28.8±3.28. Patients presented with pain abdomen in 81.1%, spotting in 51.6%, and PV bleeding 26.3%. 69.5% of the patients had no previous abortions, 30.5% patients had 1%-3% of previous abortions and only 11.6% of the patients had previous ectopic pregnancy. Majority of the patients were nulliparas (44.2%) while others were having parity between 1 to 3. On laparoscopy out of the 100 patients, 5 patients with suspected ectopic pregnancy were found not to be ectopic and ampulla was most common site for ectopic pregnancy seen in 72.6% cases as shown in table 1. None of the patients had cornual ectopic pregnancy.

<table>
<thead>
<tr>
<th>Site</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampullary</td>
<td>72.6</td>
</tr>
<tr>
<td>Isthmus</td>
<td>8.4</td>
</tr>
<tr>
<td>Infundibular</td>
<td>17.9</td>
</tr>
<tr>
<td>Interstitial</td>
<td>1.1</td>
</tr>
<tr>
<td>Cornual</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

In our study, 58.9% patients had unruptured ectopic pregnancy, 32.6% had ruptured and 8.4% had tubal abortion. Only 7.4% of the patients had adhesions of tube as depicted in table2. Salpingostomy was the most common procedure (46.3%), Salpingectomy was done in 42.1% while milking in 11.6% patients as shown in table.

<table>
<thead>
<tr>
<th>Type of Ectopic</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruptured</td>
<td>32.6</td>
</tr>
<tr>
<td>Unruptured</td>
<td>58.9</td>
</tr>
<tr>
<td>Tubal Abortion</td>
<td>8.4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Procedure</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salpingectomy</td>
<td>42.1</td>
</tr>
<tr>
<td>Salpingostomy</td>
<td>46.3</td>
</tr>
<tr>
<td>Milking</td>
<td>11.6</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>
In our study, in patients with ruptured ectopic pregnancy salpingectomy was the most common procedure (83.90%) whereas in unruptured ectopic pregnancy Salpingostomy was the most common procedure (75%) as shown in table 4

**DISCUSSION**

The first Ectopic Pregnancy was diagnosed in the 11th century. The first successful surgical intervention to treat an ectopic pregnancy was done by John Bird, a surgeon in New York, in 1759, and it was for the first time in 1883 that Rabert Lawson Tait from Scotland introduced Salpingectomy for the management of ruptured Ectopic Pregnancy. It was much later in 1973, that Shapiro and Aldar described the treatment of ectopic pregnancy by laparoscopy. Since then, there has been tremendous progress in the field of laparoscopy, so much so today it is the standard surgical treatment of ectopic pregnancy. Patients managed laparoscopically have lesser blood loss, less postoperative pain with less need for analgesia, less postoperative adhesions and early recovery in comparison to laparotomy. The benefits of laparoscopy were illustrated in a systematic cochrane database review of 35 randomized trials that compared laparoscopic Salpingostomy with open surgical approach*. Laparoscopic Salpingostomy resulted in significantly shorter operative time (73 vs 88 min), less operative blood loss (79 vs 195 ml), shorter duration of hospital stay (1-2 vs 3-5 days), shorter convalescence time (11 vs 24 days) and thus lower costs. Better availability of blood and blood components, volume expanders, optimal anesthesia care and immediate conversion if necessary to laparotomy helped the gynecologist to perform the laparoscopy safely and save the fallopian tubes in a large percent of cases.

In all our cases, including the ruptured ectopic cases, the haemoperitoneum was managed by suction with a 5mm/10mm suction cannula. In our study of 100 cases, 95 cases were confirmed as ectopic pregnancy by laparoscopy and all these cases were managed laparoscopically without conversion to laparotomy and it was possible to conserve the tube in 57.9% of cases. In our study, the decision for salpingectomy was taken intra-operatively. The factors that contributed to the salpingectomy are recurrent ectopic pregnancy in the same tube, a severely damaged tube, a large tubal pregnancy of ≥ 5cm and women who have completed their family.

The results of the current study show that the mean age of the Ectopic Pregnancy of the study group was 28 years. In the study conducted by Junu Shrestha and Rachana Saha (2011) and PN Yen et al (1997) and Samsad Jahan et al (2014), mean age of the patients with ectopic pregnancy was 28 years which is comparable to our studies. Majority of the patients (44.20%) were nulliparas. The most common clinical presentation was pain abdomen followed by spotting and vaginal bleeding which is correlated with the study conducted by Wafaa M. Fageeh (2008) in which the most common presentation of ectopic pregnancy was pain abdomen (69.2%) followed by vaginal bleeding (25%). Majority of the patients had no previous abortions. Only 11.6% patients had previous Ectopic Pregnancy.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Ruptured</th>
<th>Unruptured</th>
<th>Tubal Abortion</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%age</td>
<td>No.</td>
<td>%age</td>
</tr>
<tr>
<td>Salpingectomy</td>
<td>26</td>
<td>83.9</td>
<td>14</td>
</tr>
<tr>
<td>Salpingostomy</td>
<td>2</td>
<td>6.5</td>
<td>42</td>
</tr>
<tr>
<td>Milking</td>
<td>3</td>
<td>9.7</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>100.0</td>
<td>56</td>
</tr>
</tbody>
</table>

Chi-square = 104.9; P-Value < 0.001 (statistically significant)
With reference to the operative findings different types and sites of Ectopic Pregnancy were also reviewed. Among the study patients majority presented as unruptured Ectopic. The site of Ectopic pregnancy in majority of the patients was ampullary (72.6%) followed by Infundibular (17.9%) followed by Isthmus (8.4%) followed by Interstitial (1.1%), which is comparable to the study conducted by Rajita S. Jani et al (2014) in which the most common site of ectopic pregnancy was Ampulla. Conservative surgeries with Salpingostomy was performed in majority of the patients (46.3%) followed by Salpingectomy followed by Milking which is correlated with the study of Gajewska M. et al (2008) in which Salpingectomy was performed in 53.5% of the cases while Salpingostomy in 35% cases. The patients with ruptured Ectopic Pregnancy, Salpingectomy was the common procedure while those with unruptured Ectopic Pregnancy Salpingostomy was the common procedure.

Massive haemoperitonium is not a contraindication for laparoscopic management of ectopic pregnancy. Postoperatively, the patient can be discharged within 24 hours. With adequate experience in laparoscopy i.e. with an experienced laparoscopic surgeon and with proper instruments, most if not all of the patients with ectopic pregnancy can be treated successfully by laparoscopy, whatever the gestational size, location, number of gestation or the presence of tubal rupture.

**CONCLUSION:**

Laparoscopy permits diagnosis and treatment to be combined in the same procedure and ectopic pregnancies can be diagnosed and treated at an early stage. In fact, laparoscopy is not only suitable for early ectopic pregnancies but it is also safe and feasible in instances where there is tubal rupture and haemoperitonium, provided the patient is not severely compromised haemodynamically. The laparoscopic approach is now the gold standard for the treatment of ectopic pregnancy more reliable and safe approach than laparotomy.

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