



# Clinical Handbook of Obstetrics and Gynecology

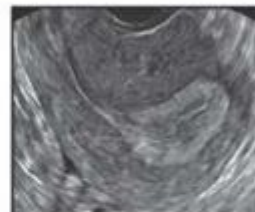
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**Look Inside the Book**

*Foreword*

**Raksha Arora**



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**DEFINITION**

“Any pregnancy, where the fertilized ovum gets implanted and develops in a site other than normal uterine cavity.”

Implantation Sites (Fig. 1)

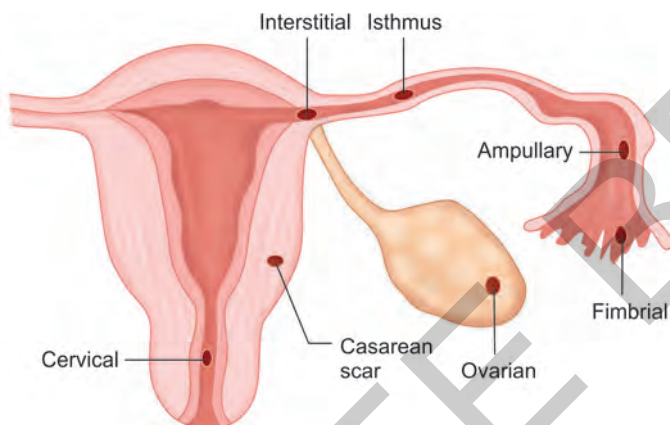


Fig. 1: Various sites of ectopic pregnancy.

**ETIOLOGY**

- Salpingitis and pelvic Inflammatory Disease (PID)—loss of cilia and impairment of muscular peristalsis, narrowing of lumen, peritubal adhesions → kinking and angulation of tube
- Tubal sterilization failure—40%
- Contraceptive failure:
  - Copper-T—4%
  - Progestasert—17%
  - Minipills—10%
  - Norplant—30%
- Tubal reconstructive surgery—four- to fivefold ↑ in incidence of ectopic pregnancy
- ART—4–7%

**RISK FACTORS**

- Previous episode of ectopic pregnancy
- Advanced age >35 years
- Previous history of pelvic surgeries, e.g., tubal reconstructive surgery
- Cigarette smoking > 1 pack/day—5%
- Genital tuberculosis (TB)—6%
- Diethylstilbestrol (DES) exposure in utero—4%.

**EVOLUTION OF ECTOPIC PREGNANCY**

Tubal pregnancy has the ability to rapidly invade the mucosa, feeding from tubal vessels, which become enlarged and engorged. Further leading to distention of tube as it grows.

**Changes that happen in ectopic pregnancy:**

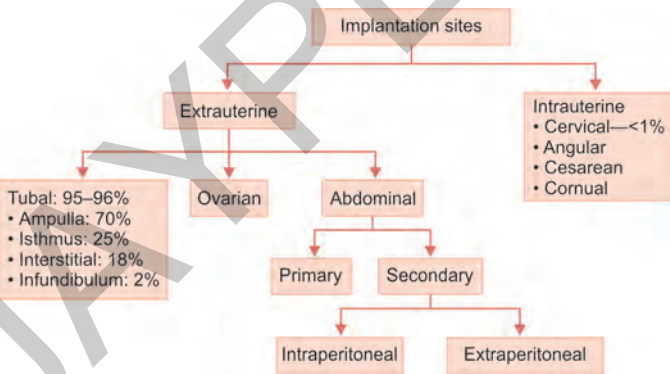
- Implantation—intercolumnar or between mucosal fold
- Minimal muscle hyperplasia and hypertrophy
- Minimal decidual changes
- Pseudocapsule formation
- Trophoblast invasion—erosion of blood vessel

Possible **outcomes of the tubal ectopic pregnancy** are:

- Due to poor blood supply pregnancy is unable to survive leading to:
  - **Tubal abortion:** Common in ampullary pregnancy
  - **Tubal rupture:** Common in isthmic pregnancy—thinnest portion of the tube.
- Isthmic—6–8 weeks; ampullary—8–12 weeks; and interstitial—4 months
- Resorption—rare

**INCIDENCE AND MORTALITY**

- Incidence of ectopic pregnancy in world is 0.25–2%.
- Incidence of ectopic pregnancy in India is 0.91%.
- Recurrence rate is 15% after first, 25% after second ectopic pregnancy.
- Ectopic pregnancy accounts for 3.5–7.1% of maternal deaths in India.



**CLINICAL APPROACH**

Diagnosis can be made by history, clinical examination and investigations.

**History**

History of past pelvic inflammatory disease (PID), tubal surgery, and current contraceptive measures

Acute ruptured ectopic pregnancy	Chronic ectopic pregnancy	Unruptured ectopic
Classical triad in 50% patients: <ul style="list-style-type: none"> <li>Acute pain of varied intensity—95% cases</li> <li>History of amenorrhea—60–80% patients; spotting at the time of menses (some cases)</li> <li>Vaginal bleeding-scanty dark brown</li> <li>Nausea, vomiting, and syncopal attacks can be present.</li> </ul>	Previous attack of acute pain from which she has recovered. <ul style="list-style-type: none"> <li>She may have amenorrhea</li> <li>Vaginal Bleeding</li> <li>Dull aching pain in abdomen</li> <li>Bladder and bowel complaints- dysuria, frequency, urinary retention, and rectal tenesmus</li> </ul>	History of amenorrhea <ul style="list-style-type: none"> <li>Or spotting.</li> <li>Mild pain or discomfort in lower abdomen</li> </ul>

**On Examination**

Examination	Acute ruptured ectopic pregnancy (EP)	Chronic EP	Unruptured EP
General examination:	<ul style="list-style-type: none"> <li>Restless patient; in agony, blanched pale looking</li> <li>Features of shock: Cold clammy skin</li> <li>Tachycardia and hypotension</li> </ul>	<ul style="list-style-type: none"> <li>Looks ill; varying degree of pallor</li> <li>Absent features of shock</li> </ul>	Patient looks stable
Per abdomen examination	Tense, guarding (+), rigidity (+), Tenderness (+) in lower abdomen, and shifting dullness (+)	Tenderness (+) – diffuse, lower abdomen; guarding (+) Mass P/A—irregular, tender may be present	Tenderness (+) in lower abdomen
Per speculum	Minimal bleeding may be present	—	—
Per vaginal Examination	Uterus may be bulky, deviated to opposite side, forniceal tenderness (+), cervical motion tenderness(+), POD may be full, uterus floats as in water	Pale vaginal mucosa; uterus may be normal in size or bulky, ill-defined boggy tender mass may be felt in one of the fornix	Small tender mass may be felt in fornix

**Investigations**

Baseline	CBC, BG and cross matching, LFT, KFT, serology, and coagulation profile
Serum β-hCG	<ul style="list-style-type: none"> <li>Single value— little value</li> <li>Serial β-hCG—when β-hCG level &lt; 2,000 IU/L doubling time help to predict viable versus nonviable pregnancy</li> <li>Rise of β-hCG &lt; 66% in 48 hours—ectopic or nonviable pregnancy</li> <li>Also important to know to plan out the method of management of ectopic pregnancy</li> </ul>
Ultra-sonography: TVS/TAS (Fig. 2)	<b>Trilaminar endometrial pattern:</b> <ul style="list-style-type: none"> <li><b>Pseudogestational sac</b>—located in midline within endometrial cavity, irregular shape, ring sign (+), avascular</li> <li><b>Decidual cast</b> may be seen—anechoic area within endometrium away from canal</li> <li><b>Adnexa</b>—15–30% cases, extrauterine yolk sac/embryo in fallopian tube</li> <li><b>Cul-de-sac</b>—free fluid (+)</li> </ul>
Color Doppler (Fig. 3)	<ul style="list-style-type: none"> <li><b>Ring of fire</b> pattern outside uterine cavity</li> <li><b>Bagel sign</b>—hyperechoic ring around gestational sac in adnexal region</li> <li><b>Blob sign</b>—small inconglomerate mass next to ovary with no evidence of sac or embryo</li> <li><b>Adnexal sac</b> with fetal pole and cardiac activity</li> </ul>
Serum progesterone	<ul style="list-style-type: none"> <li>&lt;15 ng/mL suggestive of ectopic pregnancy</li> <li>&lt;5 ng/mL nonviable pregnancy</li> </ul>
Diagnostic laparoscopy	Gold standard. Hemodynamically stable patients, it can be taken as a therapeutic modality as well
Dilatation and curettage	Identification of decidua without chorionic villi is suggestive of ectopic pregnancy

Culdocentesis	<ul style="list-style-type: none"> <li>Placing a needle through posterior fornix and aspirating contents within the rectouterine POD.</li> <li>High positive predictive value and low NPV</li> </ul>
Other tests	<ul style="list-style-type: none"> <li>PAPPA (pregnancy-associated plasma protein A)—reduced</li> <li>CA-125, AFP—increased.</li> </ul>

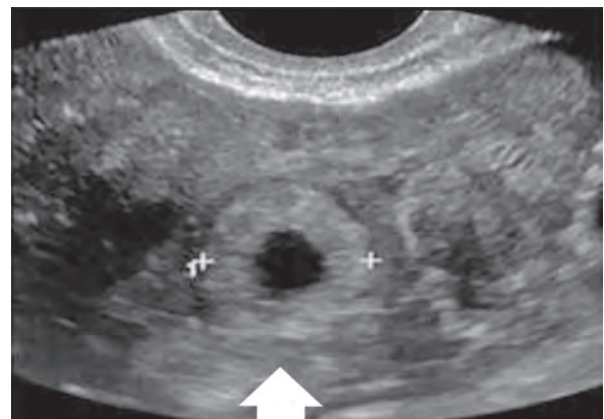


Fig. 2: TVS showing tubal EP (marked by arrow in picture).

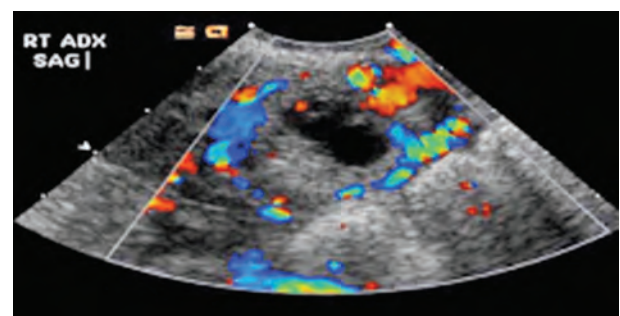
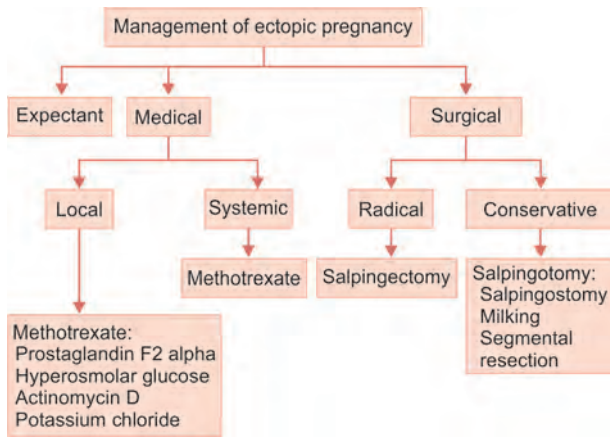


Fig. 3: USG color Doppler of tubal EP.



**STEPS OF MANAGEMENT OF ACUTE RUPTURED ECTOPIC**

**Resuscitation followed by Laparotomy/ Laparoscopy**

- Secure IV line with two large bore cannulae. Start IV crystalloid solution
- Blood sample for hemoglobin, blood grouping and cross matching, and coagulation profile. Foley’s catheterization

Laparotomy	Laparoscopy
<ul style="list-style-type: none"> <li>Principle—quick in and quick out</li> <li>Rapid exploration of abdominal cavity done</li> <li>Salpingectomy is the definitive surgery</li> </ul>	<ul style="list-style-type: none"> <li>Preferred method in hemodynamically stable patients</li> <li>Shorter operating time, less blood loss</li> <li>Followed by similar number of uterine pregnancy</li> </ul>

**Criteria to Decide which Management Modality**

Expectant management		Medical management
<ul style="list-style-type: none"> <li>Hemodynamically stable patients</li> <li>Adnexal mass &lt; 3.5 cm without cardiac activity</li> </ul>	<ul style="list-style-type: none"> <li>*Initial b-hCG &lt; 1,000 IU/L and falling titer</li> <li>No evidence of rupture or bleeding</li> </ul>	<ul style="list-style-type: none"> <li>Initial β-HCG &lt; 5,000 IU/L</li> <li>Rest same as expectant management criteria</li> </ul>

**OUTCOMES OF EXPECTANT VERSUS MEDICAL MANAGEMENT**

- Spontaneous resolution in 72% cases of expectant management while 28% will need surgical management.
- In spontaneous resolution, it may take 4–67 days for the serum β-hCG to return to nonpregnant levels.
- Success rate of expectant management: Up to 60%; medical management: Up to 90%.

**Medical Management**

- Methotrexate:** Folic acid antagonist
  - Mechanism of action:** Inactivates dihydrofolate reductase; interferes with DNA synthesis by inhibiting pyrimidine synthesis leading to trophoblastic cell death.

- Route of administration:** Intramuscular
- Regimens:**

<ul style="list-style-type: none"> <li><b>Single dose:</b> 50 mg/m<sup>2</sup> then repeat b-hCG levels at day 4 and day 7</li> </ul>	<ul style="list-style-type: none"> <li><b>Multiple dose:</b> Mtx 1 g/kg IM on day 1, 3, 5, and 7, leucovorin 0.1 mg/kg IM on day 2, 4, 6, and 8</li> </ul>
<ul style="list-style-type: none"> <li>If difference ≥ 15% repeat weekly till ≤ 5 IU/mL.</li> <li>If difference ≤ 15% between day 4 and 7 repeat dose</li> </ul>	<ul style="list-style-type: none"> <li>If difference ≥ 15% repeat weekly till ≤ 5 IU/mL</li> <li>If no ↓ after 4 doses → consider surgery</li> </ul>

**Adverse effects:** GI symptoms, skin side effects.

**Contraindications:**

- Intrauterine pregnancy
- Immunodeficient states
- Active pulmonary/peptic ulcer disease
- Hepatic/renal dysfunction
- Breastfeeding

**Surgically Administered Medical Treatment**

- Aim:** Trophoblastic destruction without systemic side effects
- Technique:** Using—laparoscopy/USG-guided/fallosopic control
- Substances used:** Methotrexate (Mtx), potassium chloride, mifepristone, PGF2 alpha, hyperosmolar glucose solution, and actinomycin D

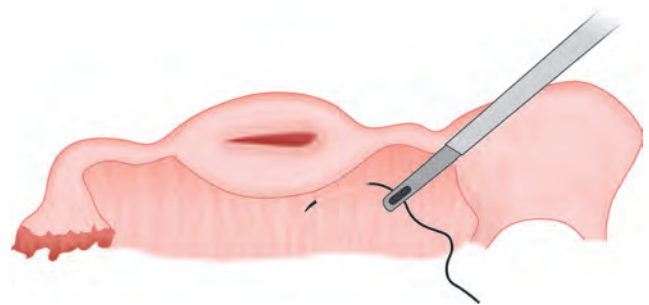
**Surgical Management—Conservative Surgery**

**Indications:**

- Patient desires fertility
- If contralateral tube is damaged/ surgically removed previously
- Hemodynamically stable patient
- Unruptured and <5 cm size

**Methods** of conservative surgery are —given here.

Methods	Procedure
Linear salpingostomy (Fig. 4)	<ul style="list-style-type: none"> <li>&lt;2 cm in ampullary region; unruptured ectopic</li> <li>Linear incision on antimesenteric border and product removed by fingers, scalpel</li> <li>Incision kept open-heals by secondary intention</li> </ul>
Linear salpingotomy	Incision line closed in two layers with 7–0 interrupted Vicryl sutures.
Segmental resection and anastomosis	<ul style="list-style-type: none"> <li>Unruptured isthmic pregnancy</li> <li>End to end anastomosis done</li> </ul>
Milking and fimbrial expression	<ul style="list-style-type: none"> <li>Distal ampullary or infundibular pregnancy</li> <li>Increased risk of persistent ectopic pregnancy</li> </ul>



**Fig. 4:** Salpingostomy.

Chaperon et al. (1993) have described a scoring system as follows:

Fertility reducing factor	Score
Antecedent one ectopic pregnancy	2
Antecedent each further ectopic pregnancy	1
Antecedent adhesiolysis	1
Antecedent tubal microsurgery	2
Antecedent salpingitis	1
Solitary tube	2
Unilateral Adhesions	1
Contralateral Adhesions	1

Conservative surgery is indicated with score 1–4 while radical treatment is performed if score is  $\geq 5$ .

### Persistent Ectopic Pregnancy

It is a complication of conservative surgery when residual trophoblastic continues to survive because of incomplete evacuation of ectopic pregnancy.

- **Diagnosis:** Raised postoperative  $\beta$ -hCG
- **Risk factor:** Early ectopic pregnancy (<6 weeks)/smaller size < 2 cm (incomplete removal). Preoperative high serum  $\beta$ -hCG (>3,000 IU/L) and postoperative day 1 titer is <50% of preoperative level is predictor of persistent ectopic pregnancy.
- **Management:** Asymptomatic—Medical (Mtx + leucovorin)/surgery—Salpingectomy.

### Ovarian Ectopic Pregnancy (Figs. 5 and 6)

- **Incidence:** 1:40,000
- **Specific risk factor:** Endometriosis on ovarian surface
- **Course:** C/F same as tubal ectopic pregnancy; rupture within 2–3 weeks

- Diagnosis—Spiegelberg criteria
- Ipsilateral tube is intact and separate from sac
- Sac at the position of ovary
- Connected to uterus by ovarian ligament
- Ovarian tissue on its wall on HP study

### Abdominal Pregnancy

- **Types**—primary and secondary are two types of abdominal pregnancy. In secondary, conceptus escapes out through a rent from primary site. Secondary is further divided into intraperitoneal and extraperitoneal (broad ligament).
- **Diagnosis and management**

On examination	Studdiford criteria	Management
<ul style="list-style-type: none"> <li>• Abdominal fetal position, easy in palpating fetal parts</li> <li>• Uterus palpated separate from sac</li> <li>• No uterine contraction after oxytocin infusion</li> </ul>	<ul style="list-style-type: none"> <li>• Both tubes and ovaries are normal</li> <li>• Absence of uteroperitoneal fistula</li> <li>• Pregnancy related to peritoneal surface and young enough to rule out possibility of secondary implantation (Fig. 7)</li> </ul>	<ul style="list-style-type: none"> <li>• Urgent laparotomy irrespective of POG.</li> <li>• Ideal to remove entire sac fetus, placenta and membranes</li> <li>• If placenta adhered to vital organs, can be left behind; gets absorbed by aseptic autolysis</li> </ul>

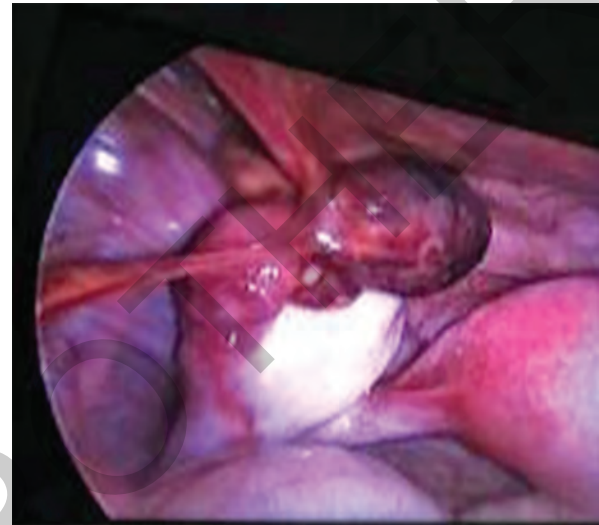
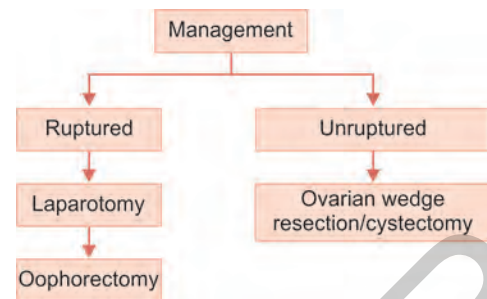


Fig. 5: Laparoscopic view of ovarian EP.



Fig. 6: TVS showing ovarian EP (Marked by arrow).



Fig. 7: Abdominal EP.

## Cervical Pregnancy

Implantation in cervical canal at or below internal os.

- **Incidence:** 1:18,000
- **Diagnosis:**

Clinical Criteria	Ultrasound Criteria	HPE Criteria: Rubin's
<ul style="list-style-type: none"> <li>• Uterine bleeding, no cramping, following amenorrhea</li> <li>• Cervix distended, thin walled, soft consistency</li> <li>• Enlarged uterine fundus may be palpated</li> </ul>	<ul style="list-style-type: none"> <li>• Echo-free uterine cavity/ pseudo-gestational sac</li> <li>• Decidual reaction</li> <li>• Hourglass uterus with ballooned cervical canal</li> <li>• Gestational sac in endocervix</li> </ul>	<ul style="list-style-type: none"> <li>• Cervical glands present opposite to placenta</li> <li>• Placental attachment to cervix must be below entrance of uterine vessels</li> </ul>

Clinical Criteria	Ultrasound Criteria	HPE Criteria: Rubin's
<ul style="list-style-type: none"> <li>• Internal os is closed</li> <li>• External os is partially opened</li> </ul>	<ul style="list-style-type: none"> <li>• Closed internal os</li> <li>• Placental tissue in cervical canal (Fig. 8)</li> </ul>	<ul style="list-style-type: none"> <li>• Fetal element absent from corpus uteri</li> </ul>



Fig. 8: TVS showing cervical EP

- **Management:**
  - **Medical:** Single or combination—methotrexate, actinomycin, potassium chloride, and etoposide
  - **Surgical—Conservative:**

### Cerclage

- Bernstein/Wharton
- Transvaginal ligation of cervical branch of uterine artery
- Angiographic UAEmbolization
- Intracervical injection vasopressin
- Foley's catheter as tamponade
- **Radical**—hysterectomy

## CORNUAL PREGNANCY

Implantation in rudimentary horn of bicornuate uterus.

- **Diagnosis**—rupture between 12 and 20 weeks. Asymmetrical enlargement of uterus
- **Treatment**—affected cornu with pregnancy is removed. Hysterectomy—last resort

## Interstitial Pregnancy (2%)

Ruptures late at 3–4 months.

- **Fatal rupture**—severe bleeding as both uterine and ovarian artery supply.
- **Management:**
  - **Unruptured**—local/IM methotrexate/cornual resection by laparotomy
  - **Rupture**—hysterectomy is indicated.

## Cesarean Scar Ectopic Pregnancy

- **USG**—empty uterine cavity and gestational sac attached low to lower segment cesarean scar
- **Management:**
  - **Medical**—methotrexate
  - **Surgical**—resection and suturing of scar may be done/hysterectomy

## FREQUENTLY ASKED EXAMINATION QUESTIONS

1. Provide definition, risk factors, clinical presentation, and management of acute ruptured tubal ectopic pregnancy.
2. Write short notes:
  - (1) Medical management of ectopic pregnancy and
  - (2) Persistent ectopic pregnancy.

# Clinical Handbook of Obstetrics and Gynecology

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Printed in India

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