Ectopic pregnancy

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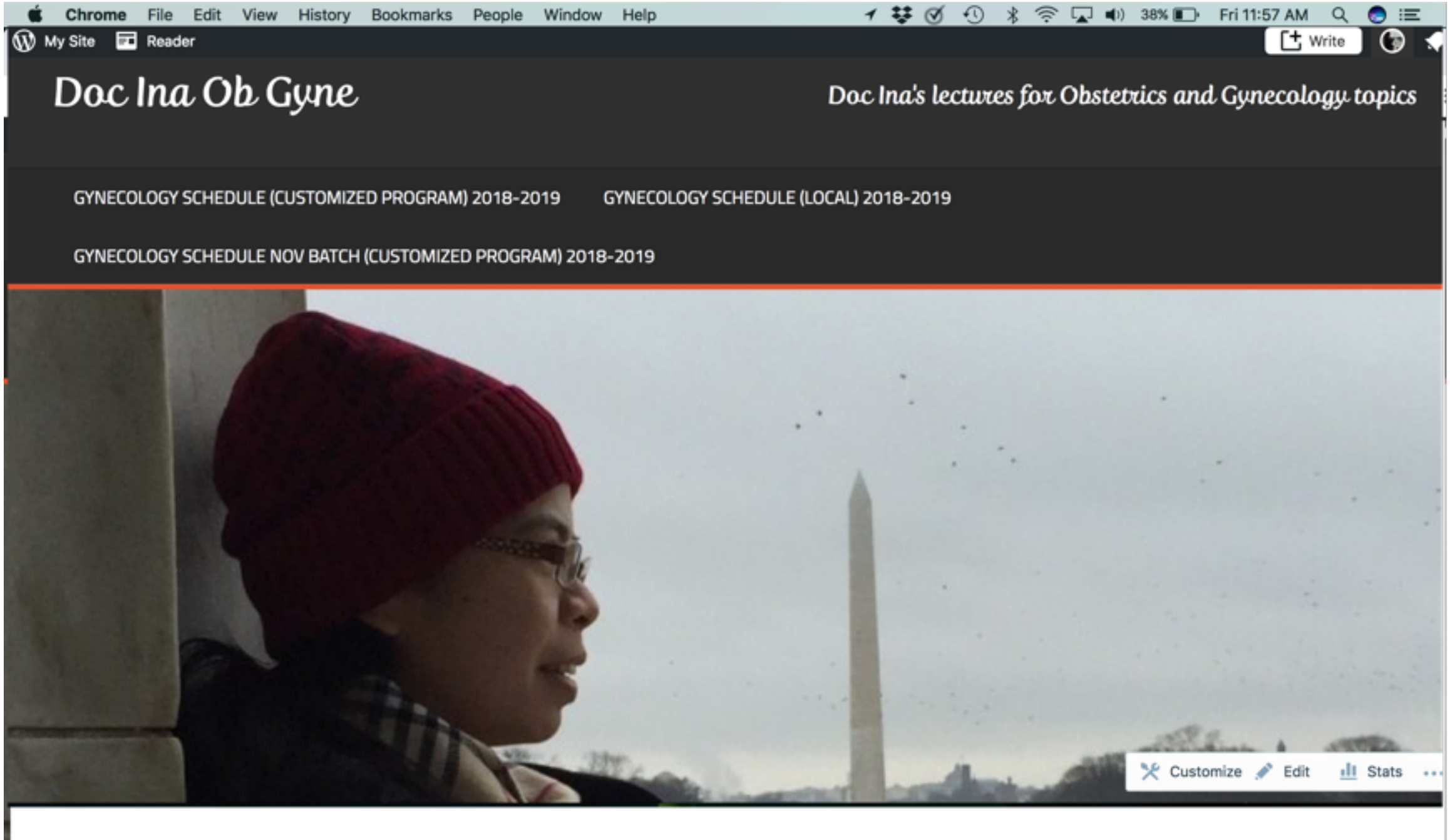
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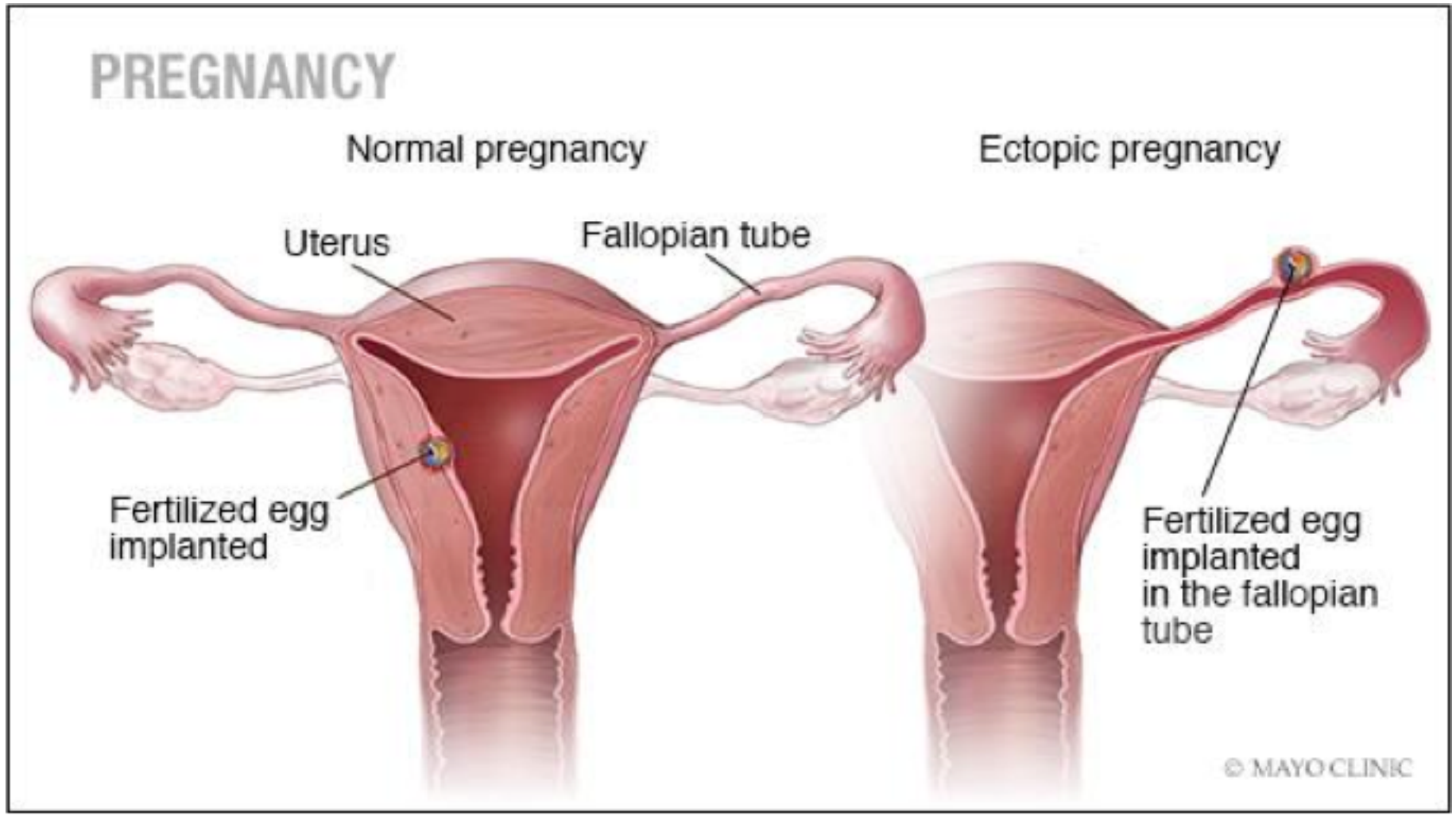
Reference

- Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds).William's Obstetrics 24th edition; 2014; chapter 19 Ectopic Pregnancy

Outline

- Classification
- Risk factors
- Outcomes
- Clinical manifestations
- Diagnosis
- Management
- Other types of non-tubal ectopic pregnancies


PREGNANCY
Normal pregnancy
Ectopic pregnancy
Uterus
Fallopian tube
Fertilized egg implanted
Fertilized egg implanted in the fallopian tube
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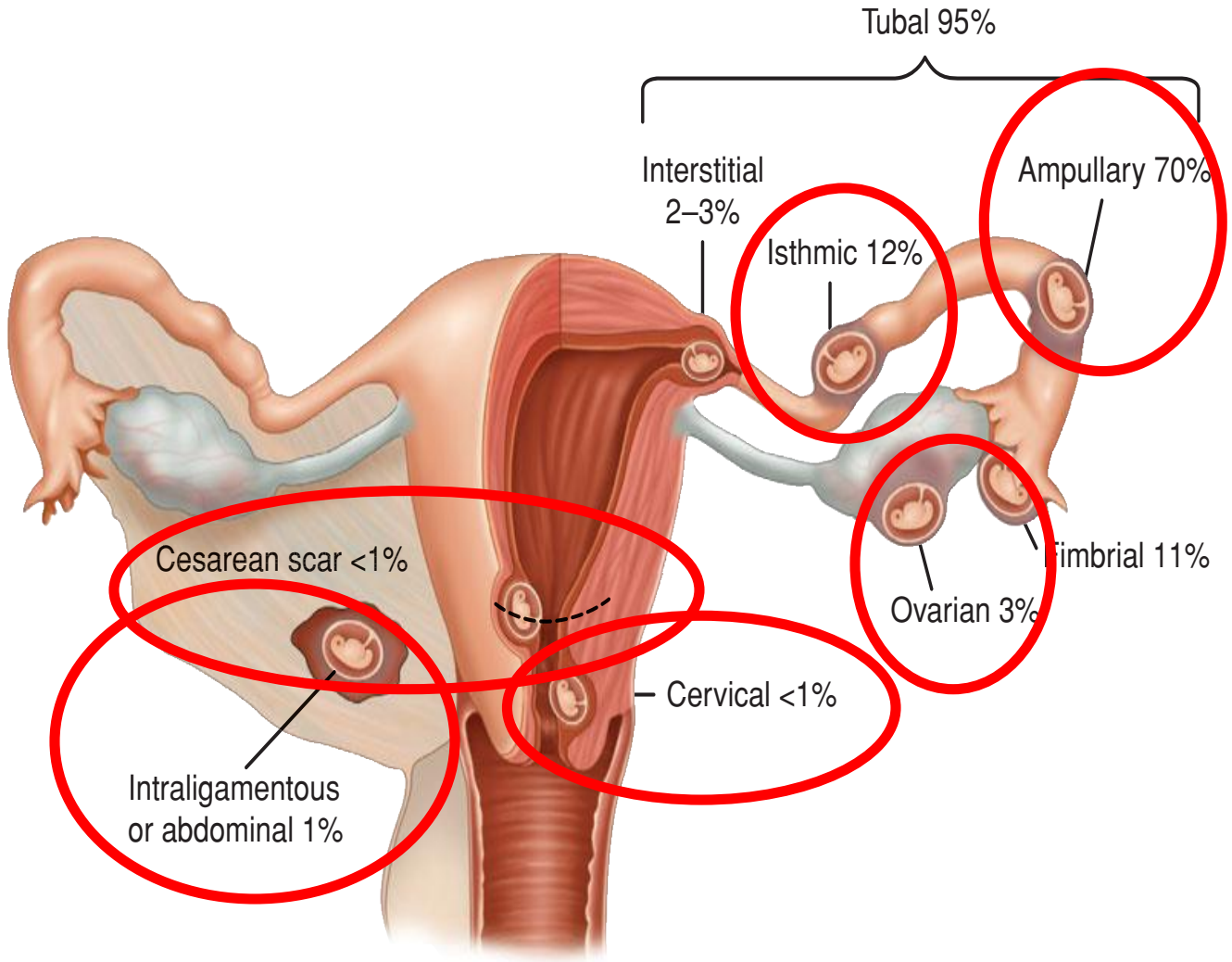
Classification

- ampulla is the most frequent site, followed by the isthmus.
- the remaining 5 percent of nontubal ectopic pregnancies implant in the ovary, peritoneal cavity, cervix, or prior cesarean scar.



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“Heterotopic pregnancy”

- one conceptus with normal uterine implantation coexisting with one conceptus implanted ectopically

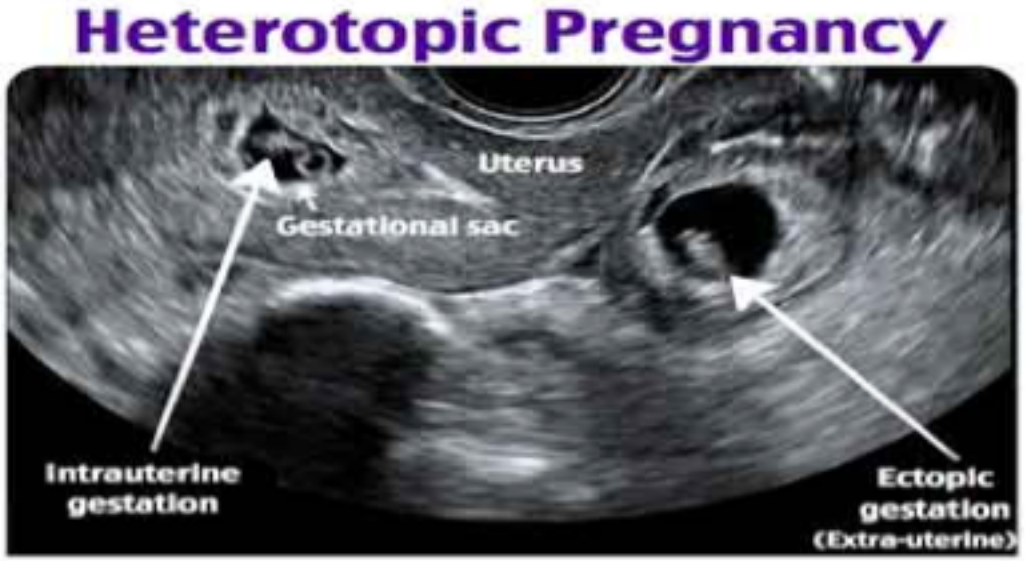

Photo source: https://medicaldialogues.in/wp-content/uploads/2017/02/heterotop pregnancy-1.jpg

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Risk factors

1. Previous Tubal surgery *(eg, salpingostomy for a previous ectopic pregnancy, sterilization, or fertility restoration (tubal reanastomosis)*
2. Previous ectopic pregnancy:

   ***There is a **10% chance for a second ectopic pregnancy** immediately after a first ectopic pregnancy.*
3. Salpingitis/tubal infection
4. peritubal adhesions secondary to salpingitis, appendicitis or endometriosis
5. Assisted reproductive techniques
6. Salpingitis isthmica nodosa : *a condition in which epithelium- lined diverticula extend into a hypertrophied muscularis layer*

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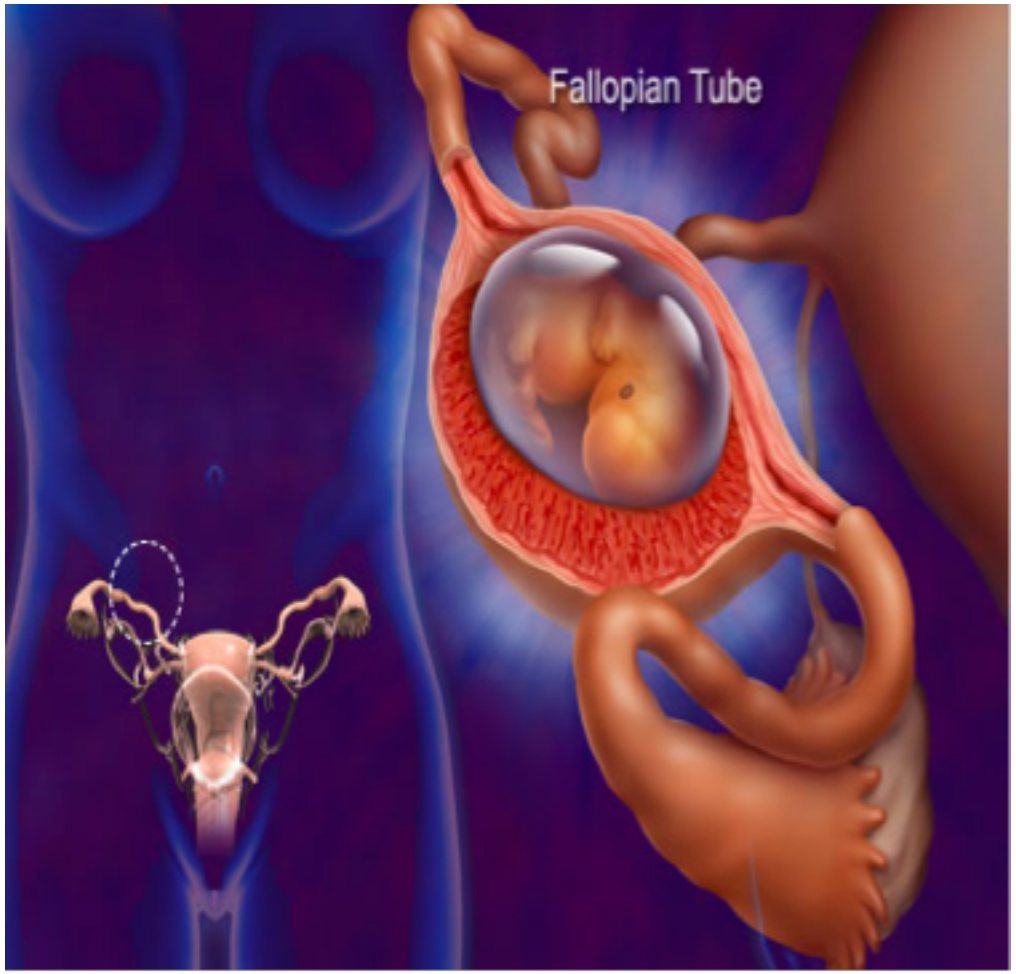
Tubal Pregnancy

because the fallopian tube lacks a submucosal layer, the fertilized ovum promptly burrows through the epithelium.

zygote comes to lie near or within the muscularis, which is invaded in most cases by rapidly proliferating trophoblast.

embryo or fetus in an ectopic pregnancy is often absent or stunted.



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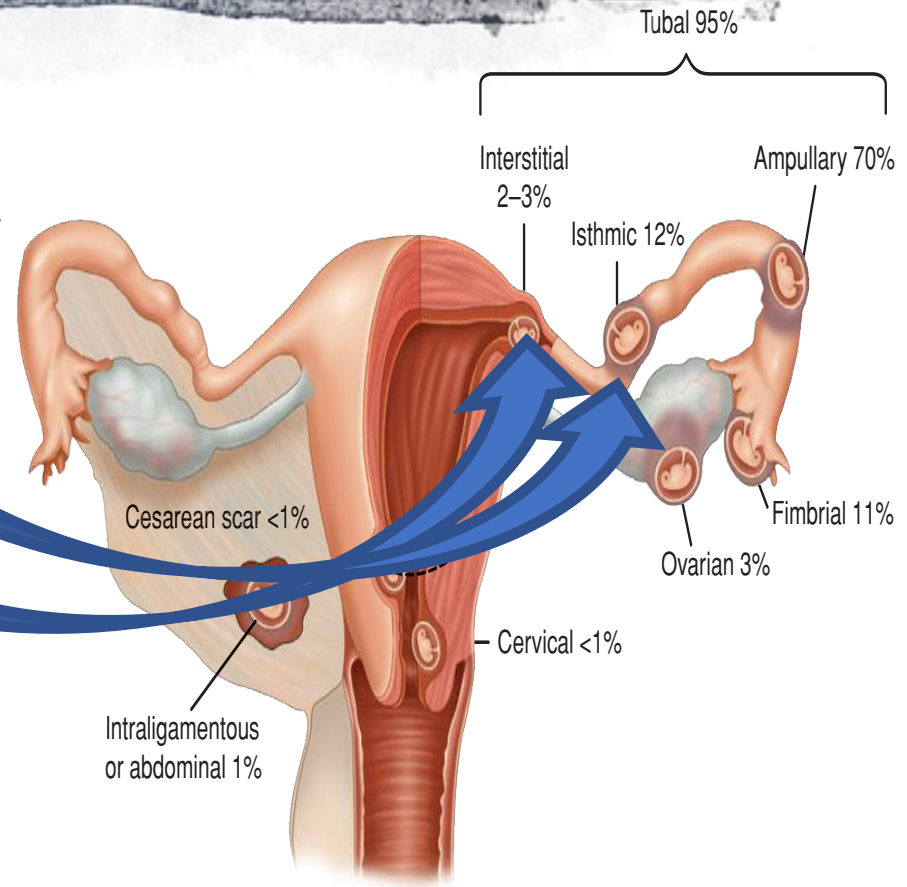
Outcomes

- Ectopic pregnancies may **rupture** and cause massive hemorrhage:
  - *As a rule, if the affected fallopian tube **ruptures in the first few weeks of pregnancy** (approx. 8 wks or less), the ectopic pregnancy is most likely located in **the isthmic portion**, whereas the ampulla is slightly more distensible*
  - *if the fertilized ovum implants within the **interstitial portion**, **rupture usually occurs at a later AOG** (approximately 10-14 weeks AOG)*
- **Tubal abortion**: *ectopic pregnancy may abort out the distal fallopian tube (usually happens in fimbrial and ampullary pregnancies) → hemorrhage may cease and symptoms eventually disappear.*



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Acute versus Chronic ectopic pregnancy

- **acute ectopic pregnancies:** high serum β-hCG level and rapid growth, leading to an immediate diagnosis.
  - higher risk of tubal rupture
- **chronic ectopic pregnancy:** abnormal trophoblast die early, and thus negative or lower, static serum β-hCG levels are found
  - typically rupture late
  - commonly form a complex pelvic mass

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Clinical Manifestations

- **triad** of *delayed menstruation ("missed menses"), pain, and vaginal bleeding or spotting*.
- **If with tubal rupture:** severe lower abdominal and pelvic pain (sharp, stabbing, or tearing) PLUS tenderness on abdominal palpation

  **Symptoms of diaphragmatic irritation, characterized by pain in the neck or shoulder, especially on inspiration, may develop in women with massive hemoperitoneum.*

  *****On internal exam**:(+) cervical motion or wriggling tenderness; (+) tender, boggy mass felt on one side of the uterus ; (+) fullness in the culdesac; (+)uterus may also be slightly enlarged due to hormonal stimulation.*

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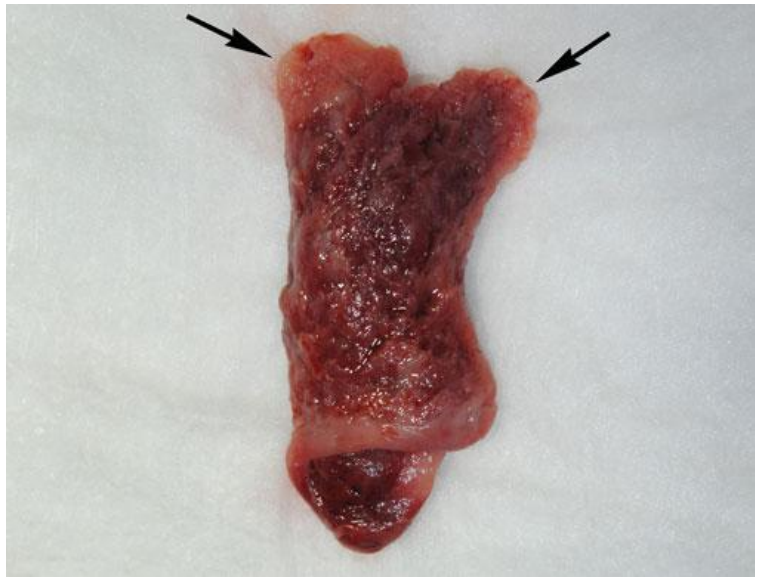

FIGURE 19-3 This decidual cast was passed by a patient with a tubal ectopic pregnancy. The cast mirrors the shape of the endometrial cavity, and each arrow marks the portion of decidua that lined the cornua.

Clinical Manifestations

- in addition to bleeding, women with ectopic tubal pregnancy may pass a **decidual cast,** which is the entire sloughed endometrium that takes the form of the endometrial cavity

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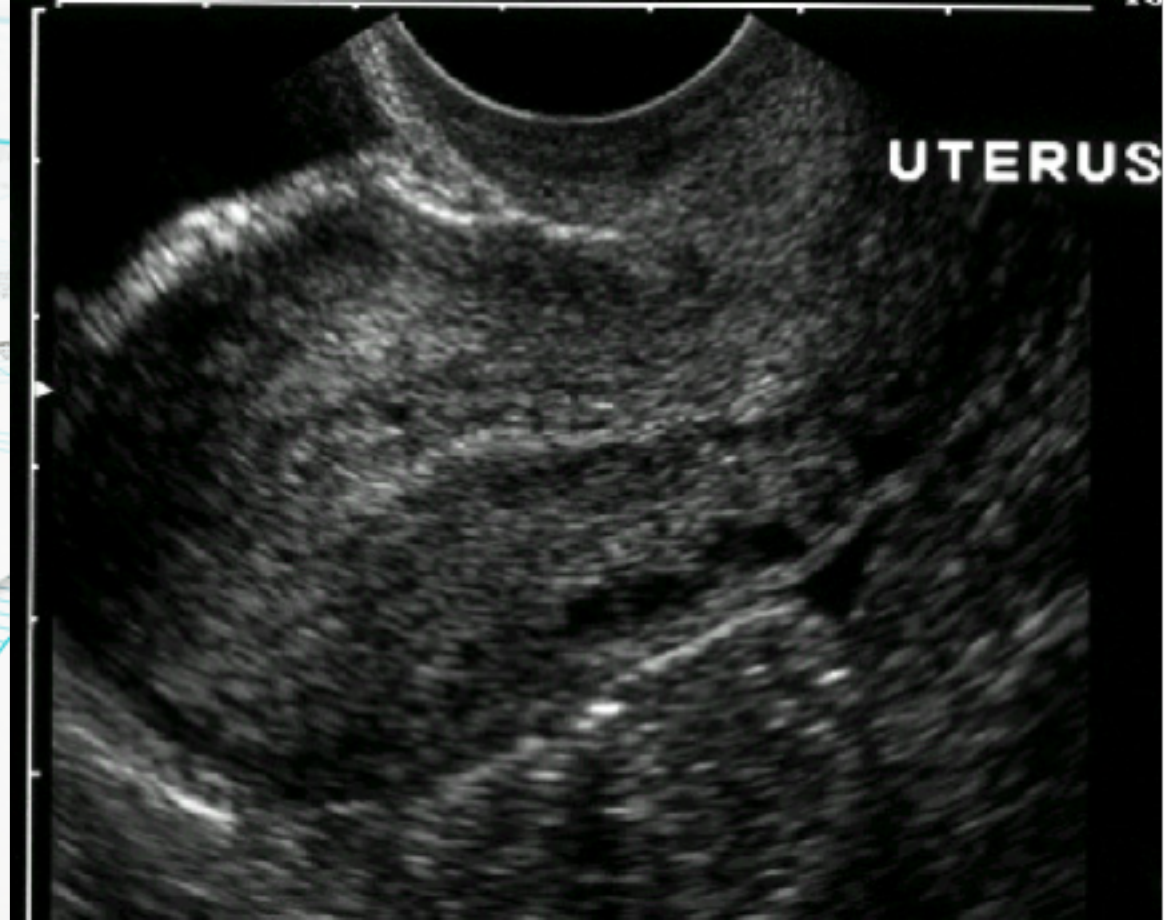
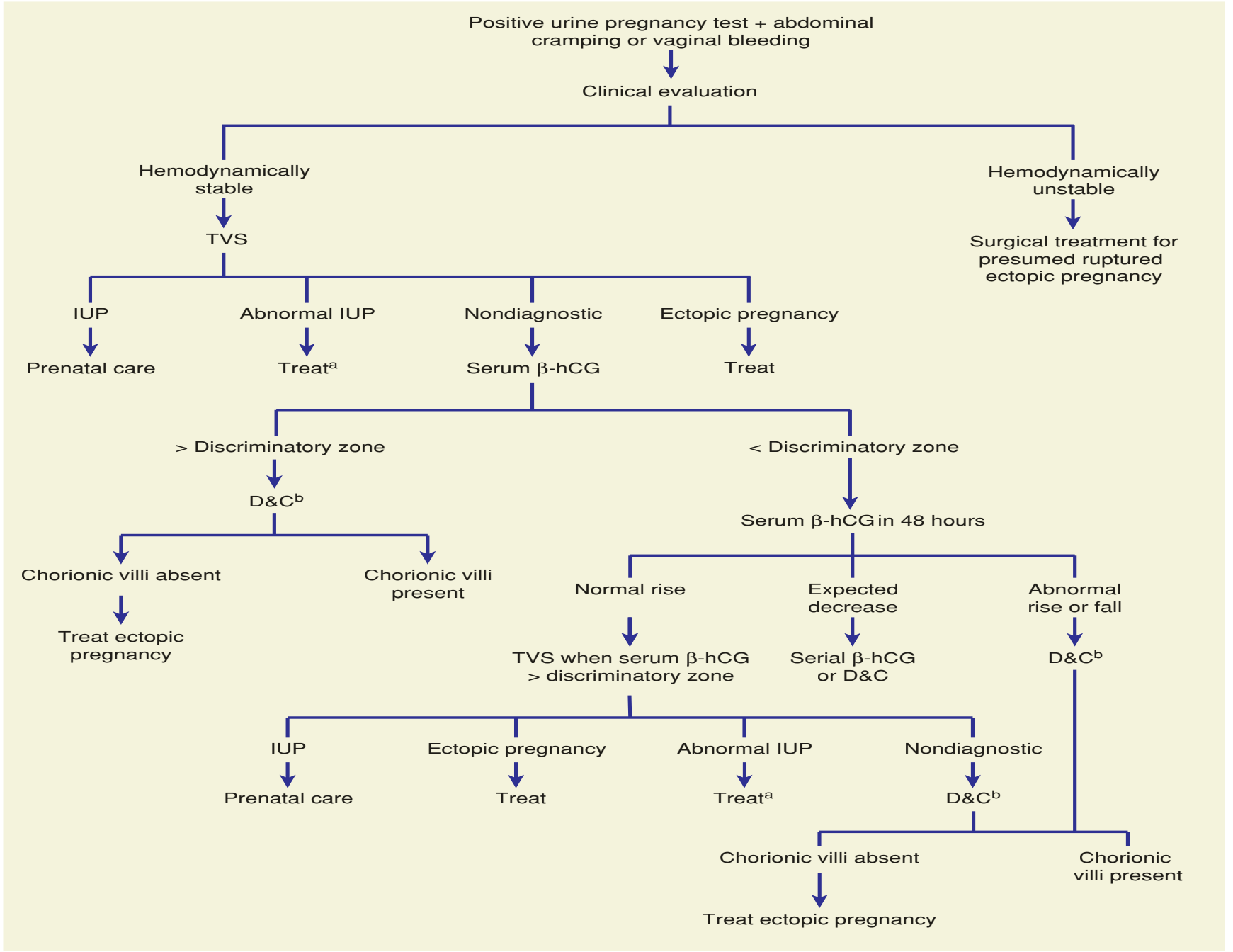


Diagnosis of Ectopic pregnancy

Diagnosis of Ectopic Pregnancy



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1. Beta Human Chorionic Gonadotropin (βhCG)

- **discriminatory β-hCG levels (discriminatory zone):** minimum levels of β-hCG above which failure to visualize an intrauterine pregnancy (IUP) indicates that the pregnancy either is not alive or is ectopic.
- an empty uterus with a serum β-hCG concentration ≥ 1500 mIU/mL (**discriminatory zone**) was 100-percent accurate in excluding a live uterine pregnancy.
- Some institutions set their discriminatory threshold higher at ≥ 2000 mIU/mL βhCG
- If the initial β-hCG level exceeds the set discriminatory level and no evidence for a uterine pregnancy is seen with TVS, then the diagnosis is narrowed in most cases to a failed uterine pregnancy, completed abortion, or an ectopic pregnancy.

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1. Beta Human Chorionic Gonadotropin (βhCG)

- If the initial β-hCG level exceeds the set discriminatory level and no evidence for a uterine pregnancy is seen with TVS, then the diagnosis is narrowed in most cases to a failed uterine pregnancy, completed abortion, or an ectopic pregnancy.

- If the initial β-hCG level is below the set discriminatory value, pregnancy location is often not technically discernible with TVS

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Beta Human Chorionic Gonadotropin (βHCG)

- serum and urine pregnancy tests that use enzyme-linked immunosorbent assays (ELISAs) for β-hCG are sensitive to levels of 10 to 20 mIU/ mL and are positive in > 99 percent of ectopic pregnancies

- For cases where pregnancy test is positive, but Transvaginal ultrasound could not detect any intrauterine or extrauterine → the term **Pregnancy of Unknown Location (PUL)** is used until additional clinical information allows determination of pregnancy location.

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1. Beta Human Chorionic Gonadotropin (βhCG)

- For PULs → serial β-hCG level assays are done to identify patterns that indicate either a growing or failing uterine pregnancy.
  - If β-hCG level doubles every 48 hours →VIABLE INTRAUTERINE PREGNANCY
  - if failing intrauterine pregnancy, β-hCG level decline → rates of decline expected approx. 21- 35 %

TABLE 19-1. Expected Minimum Percentage Decline of Initial Serum β-hCG Levels to Subsequently Drawn Values for Nonliving Pregnancies

Initial hCG (mIU/mL)	By day 2: (% decline)	By day 4: (% decline)	By day 7: (% decline)
50	12	26	34
100	16	35	47
300	22	45	62
500	24	50	68
1000	28	55	74
2000	31	60	79
3000	33	63	81
4000	34	64	83
5000	35	66	84

Data from Barnhart, 2004; Chung, 2006.

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1. Beta Human Chorionic Gonadotropin (βhCG)

- In pregnancies without these expected rises or falls in β-hCG levels, distinction between a nonliving intrauterine and an ectopic pregnancy may be aided by repeat β-hCG level evaluation

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1. Beta Human Chorionic Gonadotropin (βhCG)

- If there is a suspicion in a stable patient that a PUL could be a normal pregnancy → continue expectant management with serial β-hCG level assessment to avoid harming an early normal pregnancy.
- If patient history or extruded uterine tissue suggests a completed abortion, then serial β-hCG levels will drop rapidly.

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2. Serum Progesterone

- A serum progesterone value **exceeding 25 ng/mL** excludes ectopic pregnancy
- Serum progesterone values **< 5 ng/mL** suggest either a nonliving uterine pregnancy or an ectopic pregnancy.
- Because in most ectopic pregnancies, progesterone levels range between 10 and 25 ng/mL, the clinical utility is limited (American College of Obstetricians and Gynecologists, 2012).

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3. Transvaginal ultrasound (TVS)

- In ectopic pregnancy, TVS can detect:
  1. Absence of intrauterine gestational sac / fetal pole
  2. Complex adnexal mass or extrauterine GS with “ring of fire” pattern (Placental blood flow within the periphery of the complex adnexal mass)
  3. a trilaminar endometrial pattern
  4. a pseudosac: fluid collection between the endometrial layers and conforms to the cavity shape
  5. a decidual cyst: anechoic area lying within the endometrium but remote from the canal and often at the endometrial-myometrial border
  6. Hemoperitoneum: for ruptured ectopic pregnancy (as 50 mL can be seen in the cul-de-sac using TVS)
     - *For significant hemorrhage, fluid in seen to fill Morison pouch near the liver. (free fluid in this pouch typically is not seen until accumulated blood reaches 400 to 700 mL)*

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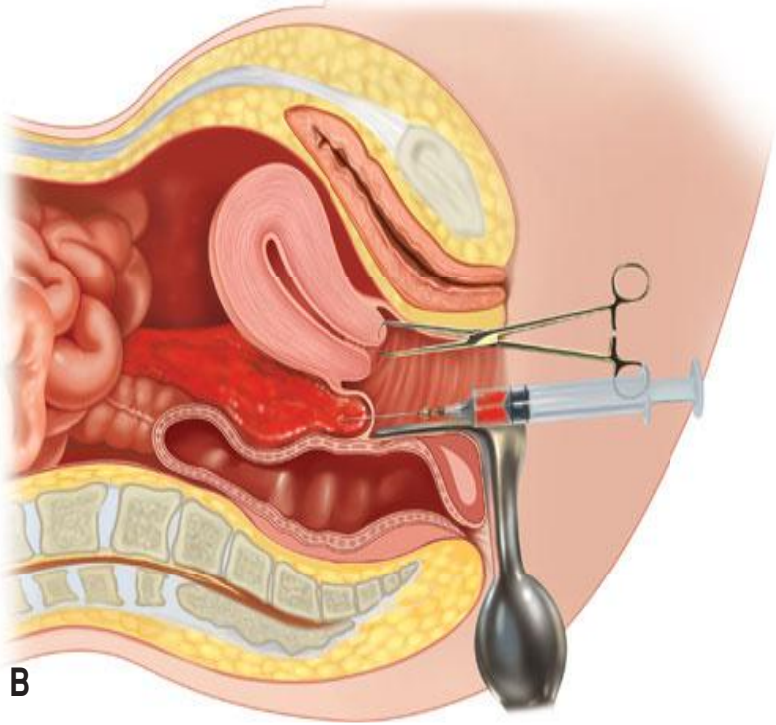
4. Culdocentesis

- simple technique used commonly in the past to identify hemoperitoneum.
- a long 18-gauge needle is inserted through the posterior vaginal fornix into the retrouterine cul-de-sac.
- a failure to aspirate fluid is interpreted only as unsatisfactory entry into the cul-de-sac and does not exclude ectopic pregnancy.
- **Fluid containing fragments of old clots or bloody fluid that does not clot is compatible with the diagnosis of hemoperitoneum**.
- if the blood sample clots, it may have been obtained from an adjacent blood vessel or from a briskly bleeding ectopic pregnancy.



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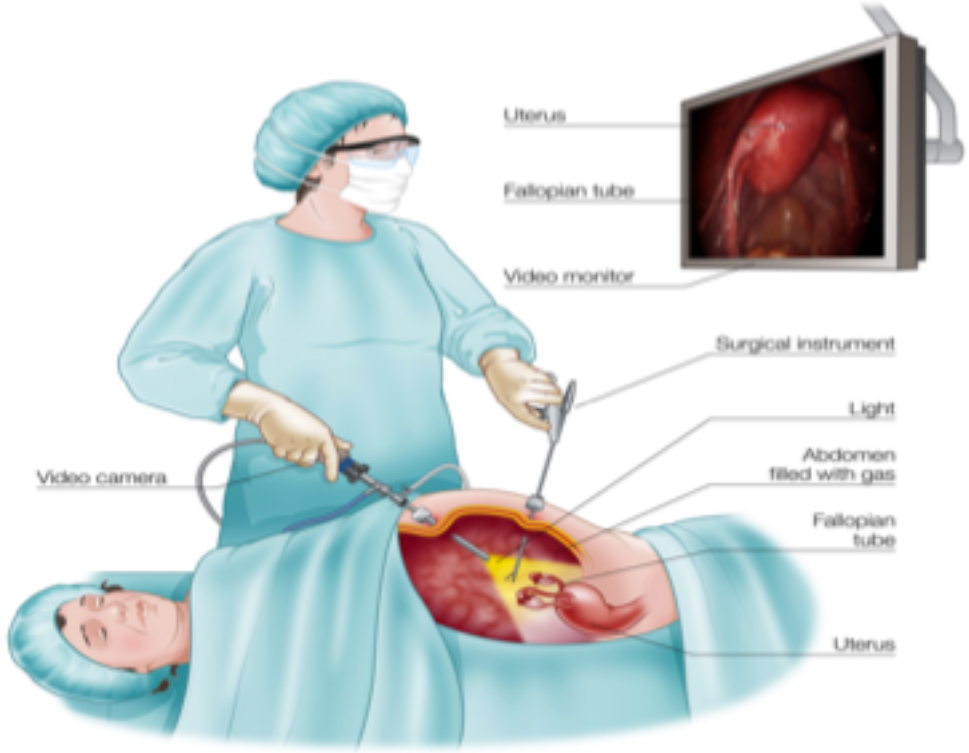
5. Laparoscopy

- Direct visualization of the fallopian tubes and pelvis by laparoscopy offers a reliable diagnosis in most cases of suspected ectopic pregnancy



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Treatment

Medical versus Surgical

Medical Treatment

- **Patients eligible for medical treatment:**
  1. low initial serum β-hCG level (single best prognostic indicator of successful treatment)
  2. small ectopic pregnancy size (< 3.5 cm)
  3. absent fetal cardiac activity.
- Eligible patients may be given **methotrexate (**highly effective against rapidly proliferating tissues such as trophoblast)
  - Toxic to bone marrow, gastrointestinal mucosa, respiratory epithelium, hepatocytes
    - *toxicity to bone marrow can be blunted by early administration of **leucovorin**, which is folinic acid and has activity equivalent to folic acid.*
  - renally excreted.
  - Methotrexate is a potent teratogen, and methotrexate embryopathy is notable for craniofacial and skeletal abnormalities and fetal-growth restriction

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TABLE 19-2. Medical Treatment Protocols for Ectopic Pregnancy

	Single Dose	Multidose
Dosing	One dose; repeat if necessary	Up to four doses of both drugs until serum β-hCG declines by 15%
Medication Dosage		
Methotrexate	50 mg/m^2 BSA (day 1)	1 mg/kg, days 1, 3, 5, and 7
Leucovorin	NA	0.1 mg/kg days 2, 4, 6, and 8
Serum β-hCG level	Days 1 (baseline), 4, and 7	Days 1, 3, 5, and 7
Indication for additional dose	If serum β-hCG level does not decline by 15% from day 4 to day 7 Less than 15% decline during weekly surveillance	If serum β-hCG declines < 15%, give additional dose; repeat serum β-hCG in 48 hours and compare with previous value; maximum four doses
Posttherapy surveillance	Weekly until serum β-hCG undetectable	
	Methotrexate Contraindications	
Sensitivity to MTX Evidence of tubal rupture Breast feeding	Intrauterine pregnancy Hepatic, renal, or hematological dysfunction	Peptic ulcer disease Active pulmonary disease Evidence of immunodeficiency

BSA = body surface area; β-hCG = β-human chorionic gonadotropin; MTX = methotrexate; NA = not applicable.
From American College of Obstetricians and Gynecologists, 2012; Practice Committee of American Society for Reproductive Medicine, 2013.

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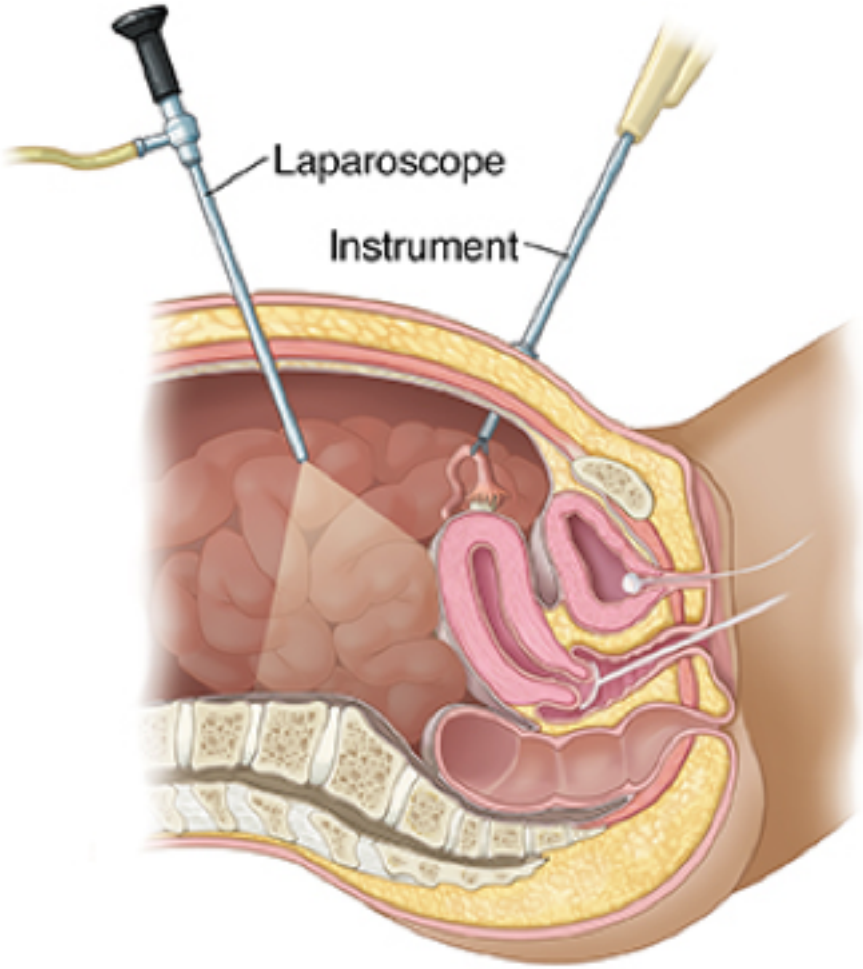
Surgical Management

- Laparoscopy is the preferred surgical treatment for ectopic pregnancy unless a woman is hemodynamically unstable.
- Before surgery, future fertility desires of the patient should be discussed.
- In those desiring permanent sterilization, the unaffected tube can be ligated concurrently with salpingectomy for the affected fallopian tube.



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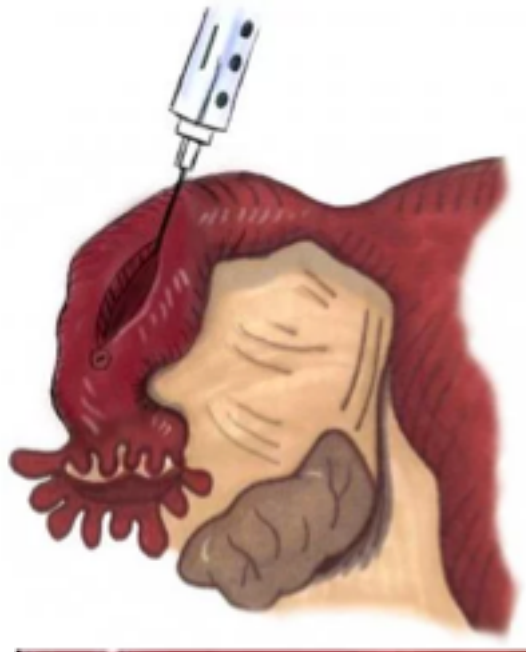
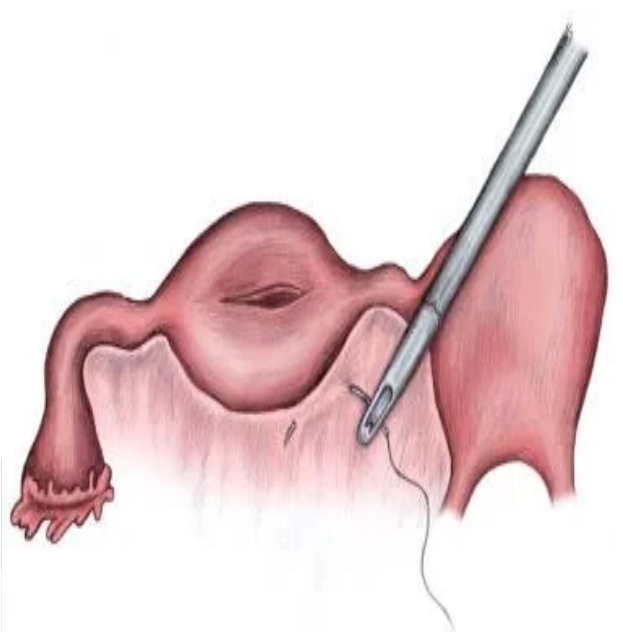
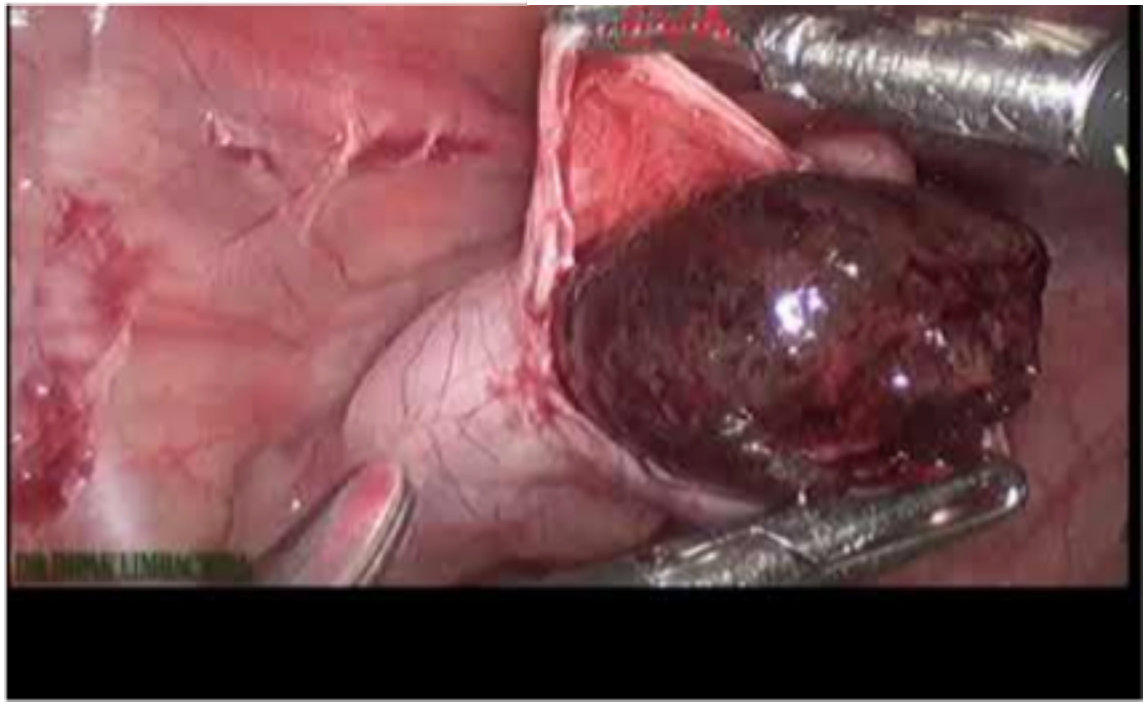
Surgical management

Conservative

- **Salpingostomy**: incision made over the fallopian tube to evacuate the ectopic pregnancy, without suturing it close (heal by secondary intention)
- **Salpingotomy**: incision made over the fallopian tube to evacuate the ectopic pregnancy, and suturing it close after evacuation.
- Preferred for small unruptured ectopic pregnancies (< 2 cm)







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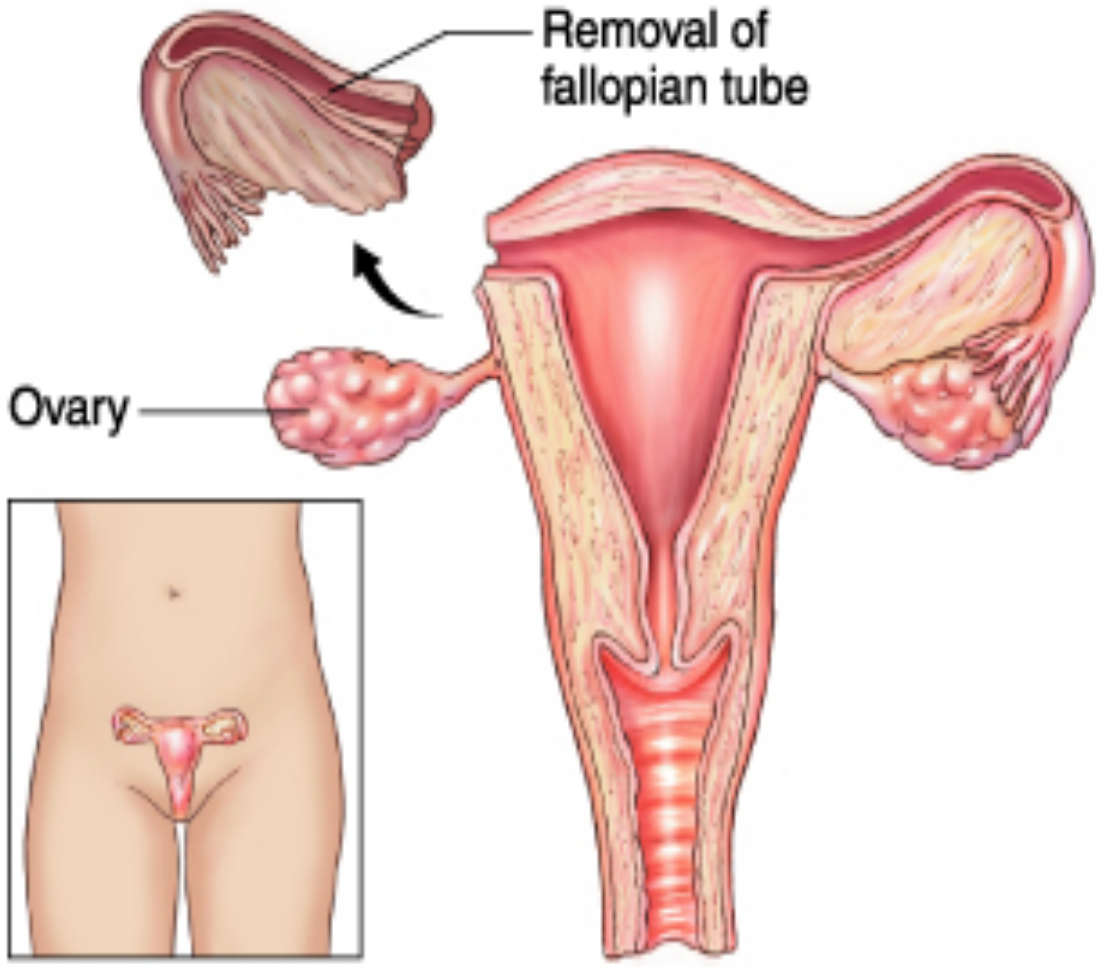
Surgical management

Radical surgery

- Salpingectomy : permanent removal of a fallopian tube
- Preferred for large and/or ruptured ectopic pregnancies
- Partial vs complete



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Expectant Management

- Criteria:
  - tubal ectopic pregnancies only
  - decreasing serial β-hCG levels
  - diameter of the ectopic mass ≤ 3.5 cm
  - no evidence of intraabdominal bleeding or rupture by transvaginal sonography.
- American College of Obstetricians and Gynecologists (2012), 88 percent of ectopic pregnancies will resolve spontaneously if the β-hCG is < 200 mIU/mL.

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IgG anti-D immunoglobulin

- Regardless of location, D-negative women with an ectopic pregnancy who are not sensitized to D-antigen should be given IgG anti-D immunoglobulin (American College of Obstetricians and Gynecologists, 2013).
- In first-trimester pregnancies, a 50-µg or a 300-µg dose is appropriate, whereas a standard 300-µg dose is used for later gestations

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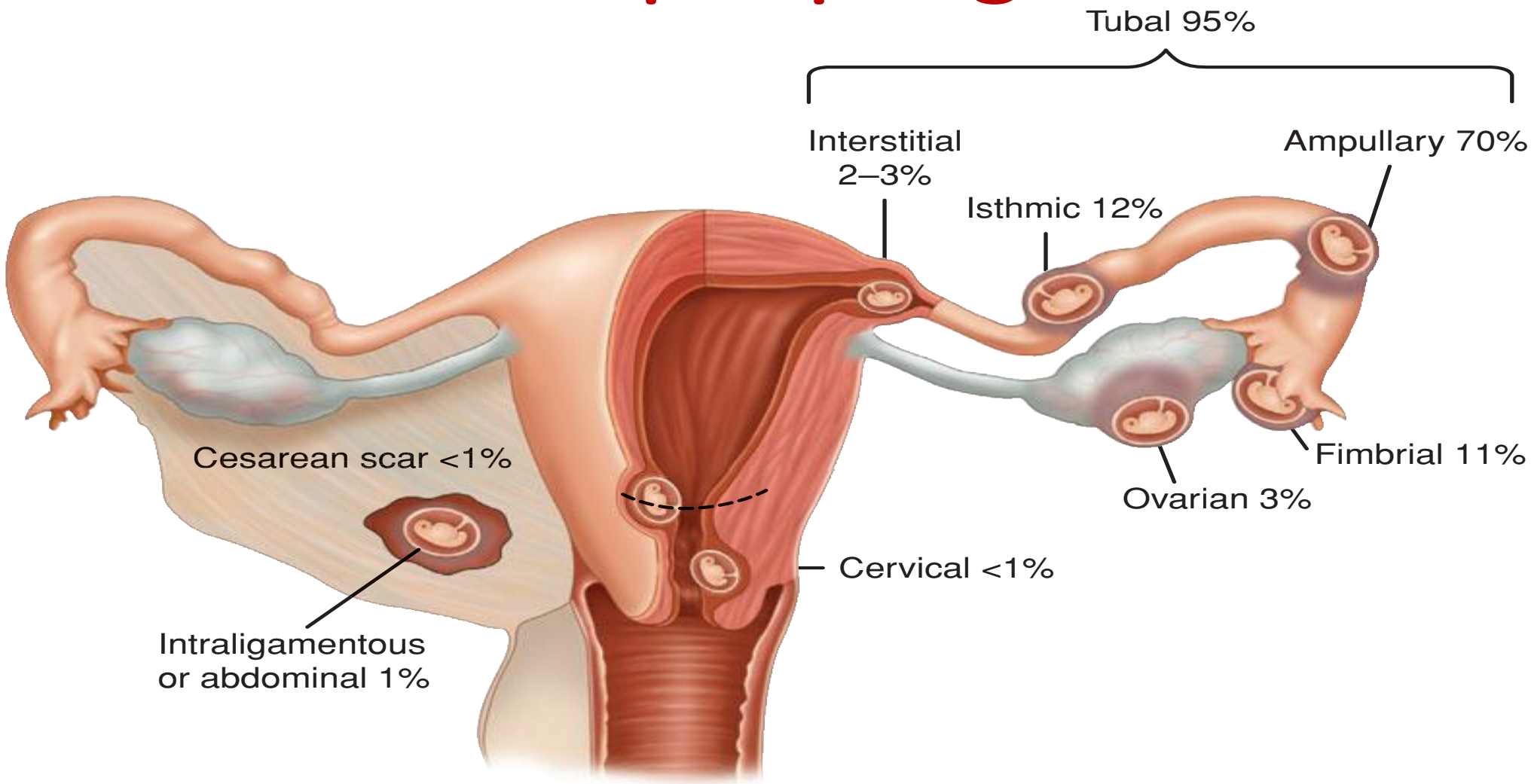
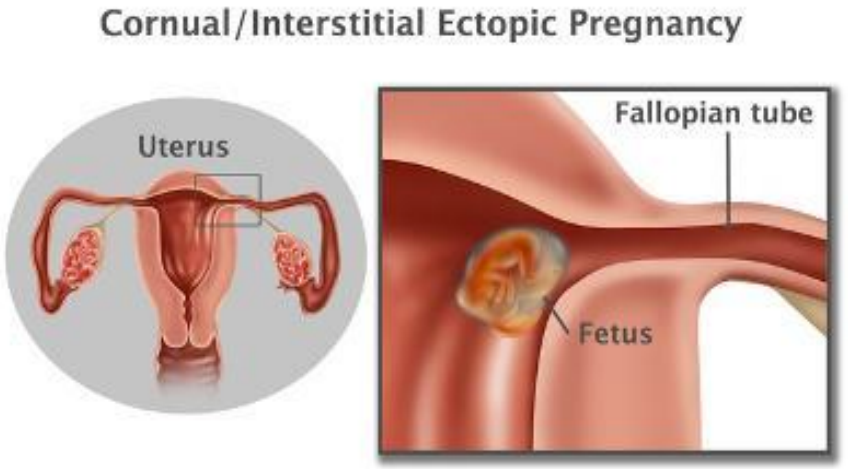
Non-tubal ectopic pregnancies



Interstitial or Cornual pregnancy

- Ectopic pregnancy implant within the proximal tubal segment that lies within the muscular uterine wall
- Undiagnosed interstitial pregnancies usually rupture following 8 to 16 weeks of amenorrhea, which is later than for more distal tubal ectopic pregnancies → due to greater distensibility of the myometrium covering the interstitial fallopian tube segment.
- Because of the proximity of these pregnancies to the uterine and ovarian arteries, there is a risk of severe hemorrhage



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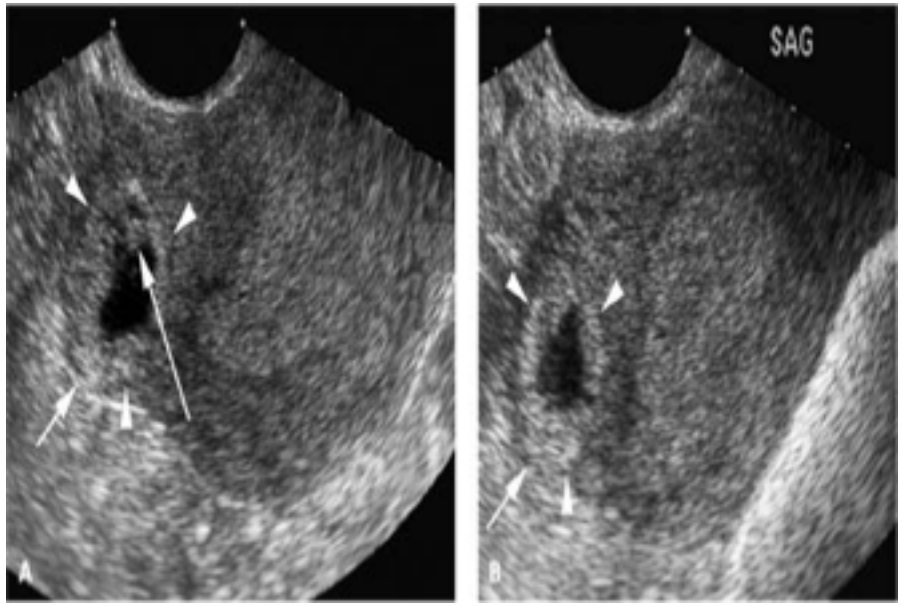
Interstitial or Cornual pregnancy

- Criteria for ultrasound diagnosis:
  1. an empty uterus
  2. a gestational sac seen separate from the endometrium and > 1 cm away from the most lateral edge of the uterine cavity
  3. thin, < 5-mm myometrial mantle surrounding the sac
  4. echogenic line, known as the “interstitial line sign,” extending from the gestational sac to the endometrial cavity



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Interstitial or Cornual pregnancy

- Surgical management with either cornual resection or cornuostomy may be performed via laparotomy or laparoscopy, depending on patient hemodynamic stability and surgeon expertise
- intraoperative intramyometrial vasopressin injection may limit surgical blood loss, and β-hCG levels should be monitored post-operatively to exclude remnant trophoblast.
- Cornual resection removes the gestational sac and surrounding cornual myometrium by means of a wedge excision
- Alternatively, cornuostomy involves incision of the cornua and suction or instrument extraction of the pregnancy.

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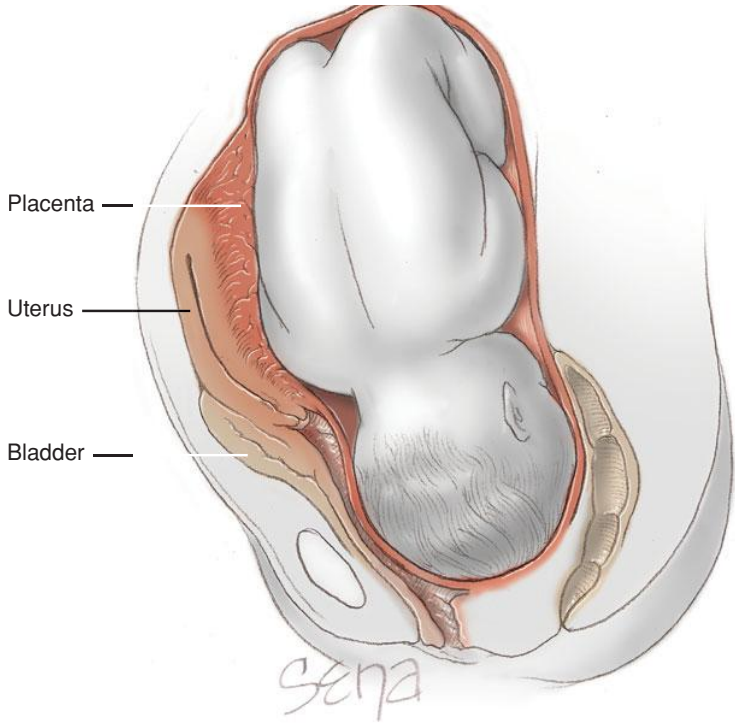

Abdominal Pregnancy

- implantation of ectopic pregnancy in the peritoneal cavity exclusive of tubal, ovarian, or intra-ligamentous implantations.
- Clinically, abnormal fetal positions may be palpated, or the cervix is displaced
- Ultrasound findings:
    1. Oligohydramnios is common but nonspecific.
    2. a fetus seen separate from the uterus or eccentrically positioned within the pelvis;
    3. lack of myometrium between the fetus and the maternal anterior abdominal wall or bladder
    4. extrauterine placental tissue

Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, Casey BM, Sheffield JS (eds).William's Obstetrics 24th edition; 2014; chapter 19 Ectopic Pregnancy

Abdominal Pregnancy

- An abdominal pregnancy can be life-threatening, and management depends on the gestational age at diagnosis.
- most common fetal malformations were limb deficiency and central nervous system anomalies; most common deformations were facial and/or cranial asymmetry and various joint abnormalities.
- Conservative management also carries a maternal risk for sudden and dangerous hemorrhage.

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Abdominal Pregnancy

- Principal surgical objectives involve delivery of the fetus and careful assessment of placental implantation without provoking hemorrhage (surrounding areas will be extremely vascular).
- Placental removal may precipitate torrential hemorrhage because the normal hemostatic mechanism of myometrial contraction to constrict hypertrophied blood vessels is lacking.
- If it is obvious that the placenta can be safely removed or if there is already hemorrhage from its implantation site, then removal begins immediately. When possible, blood vessels supplying the placenta should be ligated first.

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Abdominal Pregnancy

- Some advocate leaving the placenta in place to decrease the chance of immediate life-threatening hemorrhage
  - If left in the abdominal cavity, the placenta commonly becomes infected, with subsequent formation of abscesses, adhesions, intestinal or ureteral obstruction, and wound dehiscence
  - If the placenta is left, its involution may be monitored using sonography and serum β-hCG levels
  - In some cases, and usually depending on its size, placental function rapidly declines, and the placenta is resorbed. However, placental resorption may take years
- If the placenta is left in place, postoperative methotrexate can be used to hasten involution but has been reported to cause accelerated placental destruction with accumulation of necrotic tissue and infection with abscess formation

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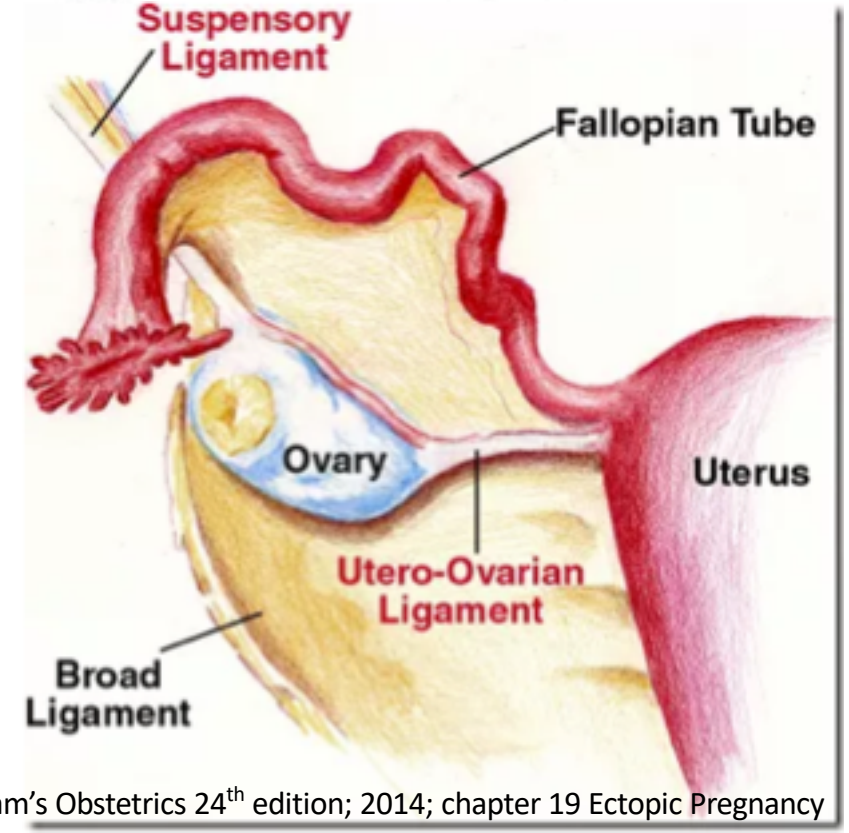
Intraligamentous or broad ligament pregnancy

- When gestational contents are extruded into a space formed between the broad ligament leaves and become an intra-ligamentous or broad ligament pregnancy.

- Clinical findings and management are same as for abdominal pregnancy



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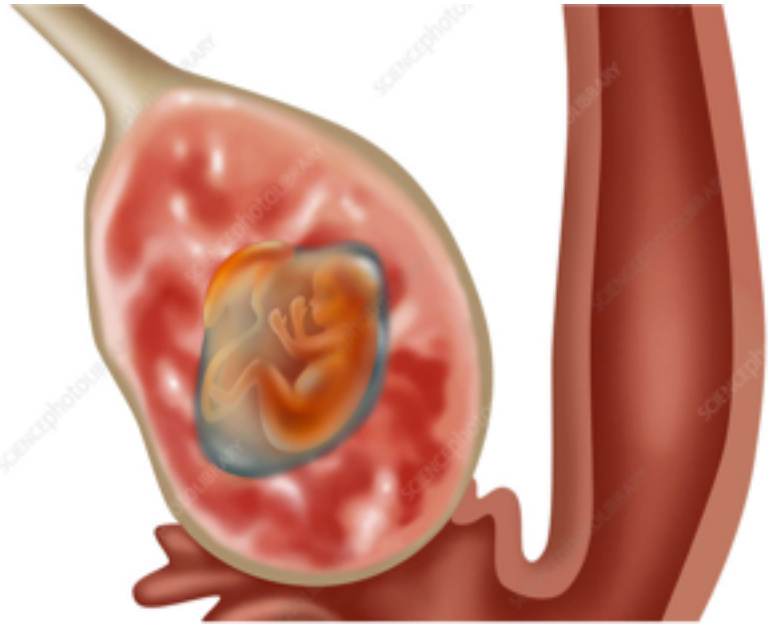
Ovarian pregnancy

- Ectopic implantation of the fertilized egg in the ovary
- four clinical criteria (Spiegelberg criteria):
  (1) the ipsilateral tube is intact and distinct from the ovary;
  (2) the ectopic pregnancy occupies the ovary;
  (3) the ectopic pregnancy is connected by the uteroovarian ligament to the uterus;
  (4) ovarian tissue can be demonstrated histologically amid the placental tissue
- Sonographically, an internal anechoic area is surrounded by a wide echogenic ring, which in turn is surrounded by ovarian cortex



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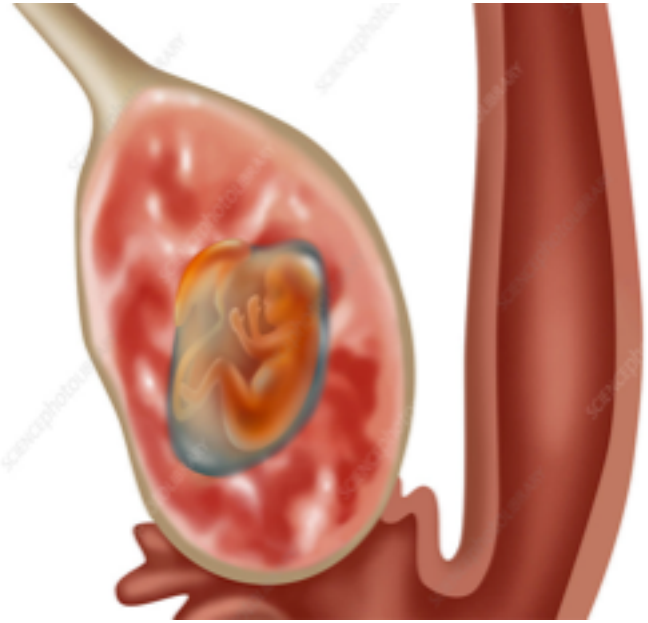
Ovarian pregnancy

- Maybe mistaken as hemorrhagic corpus luteum cyst or a bleeding corpus luteum.
- Management for ovarian pregnancies has been surgical. Small lesions have been managed by ovarian wedge resection or cystectomy, whereas larger lesions require oophorectomy.
- systemic or locally injected methotrexate has been used successfully to treat small unruptured ovarian pregnancies → β-hCG levels should be monitored to exclude remnant trophoblast.



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Cervical pregnancy

- defined by cervical glands noted histologically opposite the placental attachment site and by part or all of the placenta
- Painless vaginal bleeding is reported by 90 percent of women with a cervical pregnancy—a third of these have massive hemorrhage
- As pregnancy progresses, a distended, thin-walled cervix with a partially dilated external os may be evident.
- Above the cervical mass, a slightly enlarged uterine fundus can be felt.
- Identification of cervical pregnancy is based on speculum examination, palpation, and TVS.

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Cervical pregnancy

- Transvaginal sonographic findings may include:
  (1) an hourglass uterine shape and ballooned cervical canal;
  (2) gestational tissue at the level of the cervix (black arrow);
  (3) absent intrauterine gestational tissue (white arrows);
  (4) a portion of the endocervical canal seen interposed between the gestation and the endometrial canal.
- Cervical pregnancy may be treated medically or surgically.
  - Methotrexate has become the first-line therapy in stable women
  - induce fetal death with intracardiac or intrathoracic injec- tion of potassium chloride.
  - Suction curettage
  - hysterectomy may be required with bleed- ing uncontrolled by conservative methods

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CS Scar pregnancy (CSP)

- describes implantation within the myometrium of a prior cesarean delivery scar
- pathogenesis of cesarean scar pregnancy (CSP) has been likened to that for placenta accreta and carries similar risk for serious hemorrhage
- Women with CSP usually present early, and pain and bleeding are common. However, up to 40 percent of women are asymptomatic, and the diagnosis is made during routine sonographic examination

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CS Scar pregnancy (CSP)

- four sonographic criteria:
  1. An empty uterine cavity
  2. An empty cervical canal
  3. an intrauterine mass is seen in the anterior part of the uterine isthmus
  4. Myometrium between the bladder and gestational sac is absent.
- Fertility-preserving options for management include systemic or locally injected methotrexate, either alone or combined with conservative surgery
- Surgeries include visually guided suction curettage or transvaginal aspiration, hysteroscopic removal, or isthmic excision.
- Hysterectomy is done for patients who do not wish to conserve their uterus.

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Summary

- Classification
- Risk factors
- Outcomes
- Clinical manifesations
- Diagnosis
- Management
- Other types of non-tubal ectopic pregnancies

Thank you!

youtube channel: Ina Irabon

www.wordpress.com: Doc Ina OB Gyne