Miscarriage

First: some notes on HCG

- A glycoprotein produced by the syncytiotrophoblast of the placenta**.**
- Half-life: ~ 24 hours
- Interpretation of level

< 5 IU/mL	Not pregnant
5–25 IU/mL	Indeterminate (repeat test)
> 25 IU/mL	Pregnant

- **In viable early pregnancy hcg level rises by 85% every 48h, then rate slows down.**
- **Serial levels (every 48h) are helpful in differentiation of:**
  - ✓ **Intrauterine viable pregnancy: doubles every 48h**
  - ✓ **Ectopic pregnancy: slow rise or plateau**
  - ✓ **Miscarriage: level falls**
- **HCG ratio = HCG 48h/HCG 0h is helpful in evaluating pregnancy of unknown origin (when pregnancy test is positive but no sac on US)**

hCG ratio	**Interpretation**
> 1.63	Likely viable **Intrauterine Pregnancy**
0.8 – 1.63	Suspicious for **Ectopic Pregnancy**
< 0.8	Likely **Miscarriage**

Second: miscarriage

- Spontaneous loss of a pregnancy at or before 24 weeks, most common in first trimester
- Sx: lower abdominal pain, vaginal bleading
- **Etiology**
- General: inreased maternal and paternal age, obesity, smoking

1st trimester:

- ✓ **Chromosomal abnormalities m/c cause (numerical rather than structural abnormalities)**
- ✓ **Maternal DM, thyroid disease, APL syndrome,** TORCH, medication and toxin

2nd trimester:

- ✓ **Cervical insufficiency and uterine abnormalities (fibroids) are m/c cause**
- ✓ **Plucental abruption,** listeria monocytogens, T. Pallidum

- **Classification**

1. Threatened miscarriage:

   - ✓ Vaginal bleeding and usually no abdominal pain
   - ✓ In the presence of **viable** Intrauterine pregnancy = gestational sac+ yolk sac +/- fetal pole and cardiac activity
   - ✓ **Closed cervical os**

2. Inevitable miscarriage

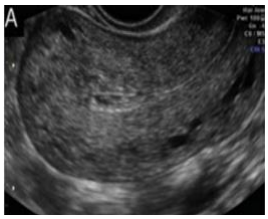
   - ✓ Vaginal bleeding with lower abdominal pain
   - ✓ in the presence of **open cervical os** and **pregnancy associated tissue still present**

3. Incomplete miscarriage

   - ✓ Vaginal bleeding that is ongoing
   - ✓ pregnancy tissue has already been passed but ultrasound showed **retained product of conception** >15 mm in diameter (with or without gestational sac)

4. Complete miscarriage

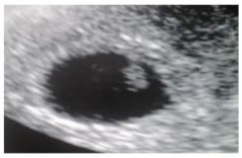
   - ✓ **Cessation of bleeding and a closed cervix** following miscarriage
   - ✓ **Empty uterus** or retained products of conception< 15 mm in diameter
   - ✓ **Falling HCG** where an intrauterine pregnancy was previously confirmed

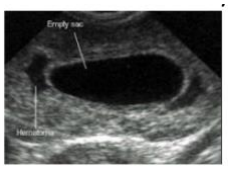


5. Missed miscarriage or early fetal demise

   - ✓ Death of the embryo or fetus before 20 weeks of pregnancy without expulsion of the pregnancy tissue.
   - ✓ **Cervix remains closed**
   - ✓ **No passage of tissue**
   - ✓ Often **minimal or no symptoms**

- ✓ On US: fetus but no heartbeat or a dilated empty gestational sac





- **Treatment**

1. Expectant: Rate of spontaneous resolution in 2 wks is 70% for incomplete miscarriages and 33% for missed, it's harder when gestational sac is intact. Observe for 2 wks then try other means.
2. Medical:

    - ✓ **Misoprostol:** PG analogue. Oral and vaginal preparation. Vaginal preffered. Induces uterine contraction and ripens cervix
    - ✓ **Mefepristone:** anti-progesterone. Causes dicidual breakdown and induces trophoblast separation
    - ✓ Incomplete miscarriage: misoprostol alone usually enough
    - ✓ Missed miscarriage: prime with mefepristone then multiple doses of misoprostol
    - ✓ Bleeding can continue for 3 wks post medical tx

3. Surgical: by vacuum evacuation or D&C.

    - ✓ Indications: infected retained products of coception, hemodynamic instability, heavy bleeding, failure of medical management, suspension of molar pregnancy (gestational trophoblastic disease), patient preference
    - ✓ Complications: **uterine perforation** (do hysteroscopy and laparoscopy), endometritis, Asherman syndrome (endometrial scarring), cervical trauma
    - ✓ Products should be sent for histopathology to exclude an ectopic pregnancy or a gestational trophoblastic disease.
    - ✓ Delay procedure in septic abortion to give Ab

Third: septic abortion

- Infection of the uterus that usually occurs due to illegal non sterile abortion but it also could be a result of spontaneous miscarriage due to infected retained products of conception.
- **Most common mechanism in induced abortion: bacterial ascent from vagina**
- Symptoms are fever, chills, abdominal pain and foul smelling vaginal discharge
- Can cause sepsis and shock, needs immediate antibiotics and evacuation
- Caused by a polymicrobial infection including E coli and other anaerobes

Fourth: Rhesus status

- Anti-D immunoglobulin is given to **Rh-negative women** who may be carrying an **Rh-positive fetus** to **prevent maternal sensitization (Rh isoimmunization)** when **fetal blood enters the maternal circulation (fetomaternal hemorrhage)**.
- Fetomaternal hemorrhage (FMT) becomes more likely **after 12 weeks** of gestation, so Anti-D is routinely given to all non-sensitized Rh-negative women after 12 weeks if miscarriage or bleeding occurs.
- Before 12 weeks, Anti-D is usually not required because significant FMT is uncommon unless certain risk factors are present. Such as:

    - ✓ Heavy or repeated vaginal bleeding
    - ✓ Uterine instrumentation such as: Vacuum Aspiration, D&C

- 250 units before 20 weeks
- 500 units after 20 weeks
- Kleihauer test may be performed to assess the quantity of feto-maternal haemorrhage after 20 weeks

Fifth: multiple miscarriages

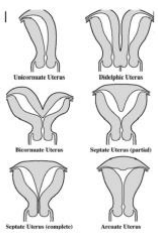
- Loss of **three or more** consecutive pregnancies and affect up to 1% of couples.
- Etiology/risk factors
    - ✓ **Advanced maternal age**
    - ✓ Increasing previous miscarriages (40% if three previous miscarriages)
    - ✓ Smoking, caffeine, alcohol
    - ✓ **Obesity**
    - ✓ Immune mechanism: antithyroid Ab, NK cells

    1st trimester

    - ✓ Endocrine: DM, thyroid disease, **PCOS** (related to insulin resistance and hyperandrogenaemia)
      Treatment if PCOS is the cause? Wt loss, metformin
    - ✓ Genetic: **mostly numerical chromosomal abnormalities**, structural like unbalanced translocation is also possible.
    - ✓ **Antiphospholipid syndrome (see below)**

    2nd trimester

    - ✓ **Uterine abnormalities:** congenital anomaly, fibroid, Asherman syndrome (intrauterine adhesions)
    - ✓ **Cervical insufficiency:** history of second trimester



miscarriage preceded by spontaneous rupture of membrane or painless cervical dilatation
Tx: cerclage after first trimester

- ✓ Bacterial vaginosis in the first trimester is associated with increase risk of miscarriage in second trimester

- **Antiphospholipid syndrome:**

  - ✓ Lupus anticoagulant, Anticardiolipin, Anti b2 glycoprotein -1 antibodies
  - ✓ Diagnostic pregnancy criteria for APS

    1. ≥3 consecutive unexplained miscarriages before 10 weeks
    2. ≥1 unexplained fetal death after 10 weeks
    3. Premature birth before 34 weeks due to severe placental disease

  - ✓ Mechanism of early miscarriage before 10 wks is **thrombosis of placental vessels.**

- Investigations

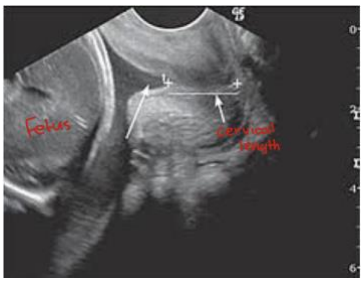
  - ✓ Cytogenetic analysis of product of conception, US, hysterosalpingiogram, insulin resistance, APL antibodies, TFT

- **Management:**

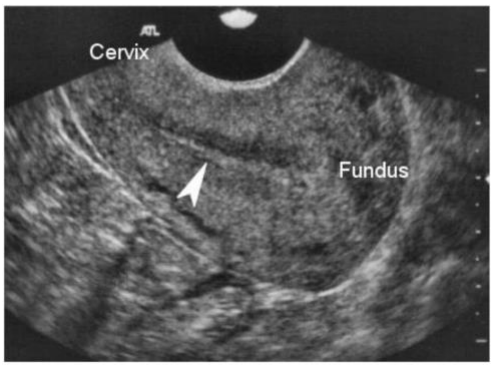
  - ✓ APS: Low dose Aspirin and LMWH
  - ✓ Structural chromosomal abnormalities like unbalanced translocation: genetic counseling, pre-pregnancy genetic diagnosis, IVF
  - ✓ Uterine abnormalities (uterine septate): surgery, hysteroscopic over open
  - ✓ Threatened miscarriage: progesterone?
  - ✓ Cervical incompetence: cervical cerclage

    Cerclage indications:

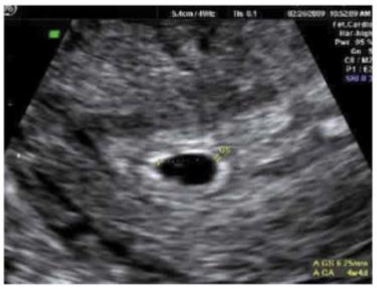
    - **Previous recurrent painless second trimester pregnancy loss**
    - **Short cervix on US (<25mm before 24 wks)**



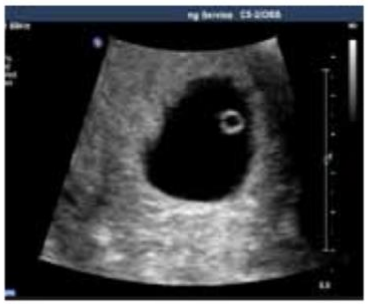
Normal uterus



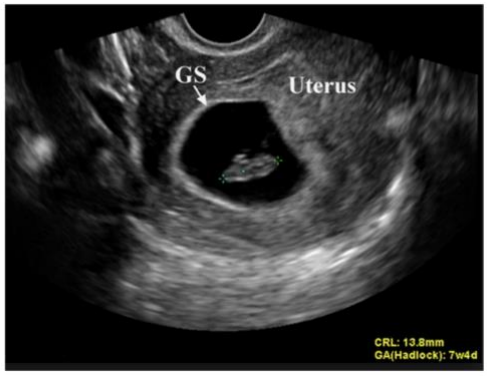
Gestational sac



Yolk sac



Fetal pole



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