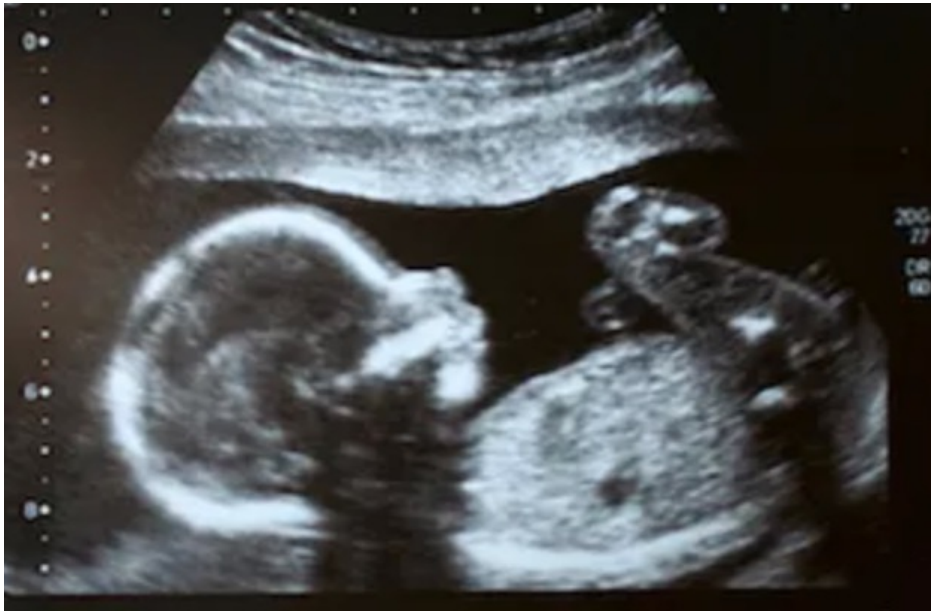
Obstetrical Emergencies



Matt Douglas-Vail, MD

Global Health Emergency Medicine Fellow

October 11, 2022

Global Health Emergency Medicine

Objectives

- Review of obstetrical complications presenting to the emergency department
  - Physiologic changes in pregnancy
  - Vaginal bleeding in pregnancy
  - Complications of delivery
  - Post-partum complications
  - **Ultrasound in pregnant patients

Global Health Emergency Medicine

Physiological changes in pregnancy

- Increased blood volume averaging 50%

  plasma >RBC creating physiological anemia
- ↓SVR ↑CO ↓BP (5-10mmHg) ↑HR (10-15bpm)

  may unmask latent cardiac disease, worsen some and improve others.

  BP begins to revert back mid 2nd trimester
- ↑↑ coagulation factors: increased risk DVT/PE
- ↑renal blood flow
- Platelets usually normal- watch for ↓↓ (HELLP, DIC)

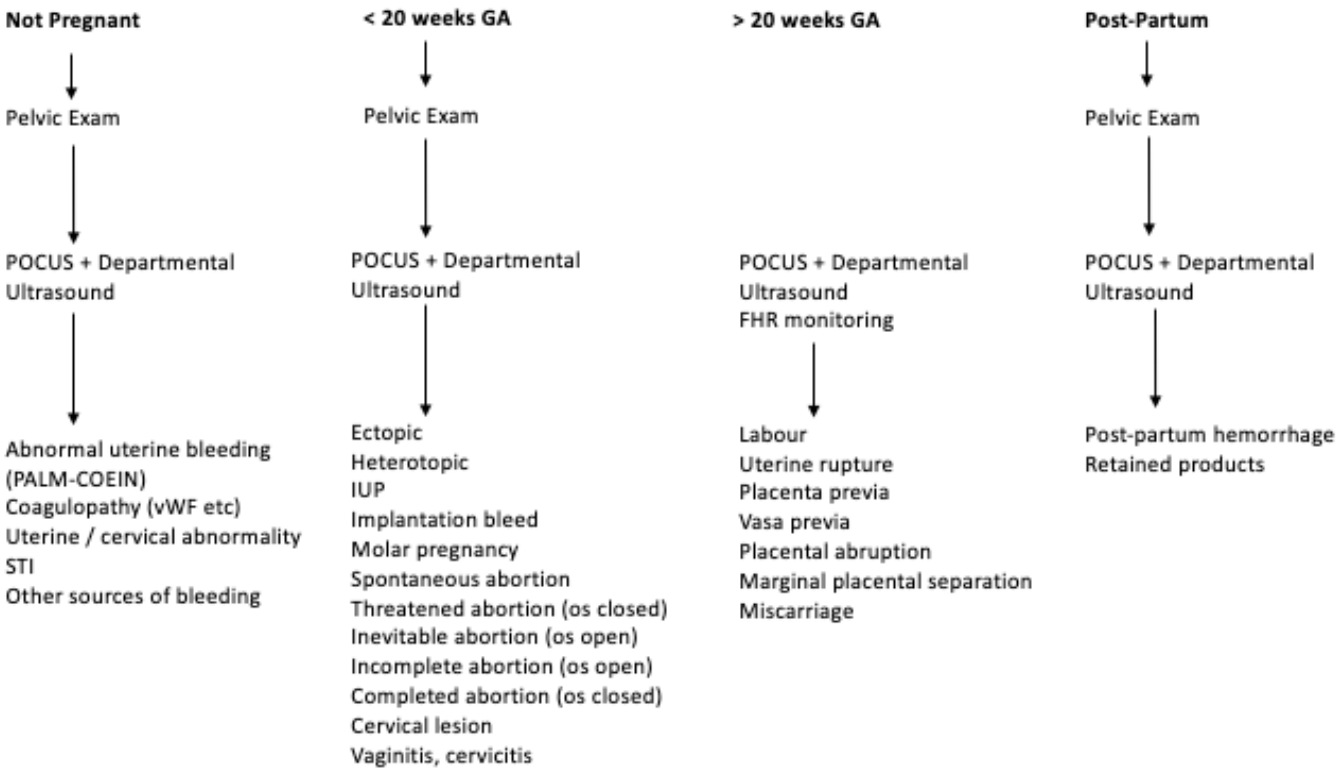
Physiological changes in Pregnancy

Table 1. Physiologic Changes during Pregnancy

System	Changes	Physiologic Impact
Cardiovascular	Increased heart rate and cardiac output Decreased arterial pressure	Masking signs of sepsis Increased hypoperfusion
Hematology	Increased plasma volume Increased factors VII, VIII, IX, X, XII and vWF	Physiologic anemia, less O2 supply to tissues Increased risk of DIC and DVT
Respiratory	Increased tidal volume and minute ventilation Decreased residual volume due to elevated diaphragm	Decreased PaCO2 ("normal" blood gas may be sign of impending respiratory failure) Impaired oxygenation and faster desaturation
Renal	Increased vesicoureteral reflux Increased renal plasma flow and GFR	Delayed identification of renal injury secondary to sepsis Conditions favorable to pyelonephritis
Gastrointestinal	Delayed gastric emptying	Increased risk of aspiration
GU	Decreased vaginal pH	Increased risk of chorioamnionitis

Global Health Emergency Medicine

Vaginal Bleeding in Pregnancy



Global Health Emergency Medicine

Bleeding <20 weeks GA

- Differential is key:
  - Miscarriage/spontaneous abortion
  - **ectopic
  - Molar pregnancy
  - Cervical lesion (malignancy)
  - Coagulopathy
  - Other source (rectal, urinary)

Bleeding <20 weeks GA

< 20 weeks GA

↓

Pelvic Exam

↓

POCUS + Departmental Ultrasound

↓

Ectopic
Heterotopic
IUP
Implantation bleed
Molar pregnancy
Spontaneous abortion
Threatened abortion (os closed)
Inevitable abortion (os open)
Incomplete abortion (os open)
Completed abortion (os closed)
Cervical lesion
Vaginitis, cervicitis

Global Health Emergency Medicine

Risk factors for miscarriage

- Increased age (maternal or parental)
- Increased parity
- History of miscarriage
- History of vaginal bleeding
- Alcohol use
- Comorbidities (diabetes, thyroid, obesity)
- Surgical scars

Categories of miscarriage

- Threatened: internal os closed (35-50%)
  - Inevitable: internal os open
- Incomplete: products of conception visible at os
- Complete: cervix closed

Clinical presentation of miscarriage

- Bleeding
- Pain
- Requires pelvic exam + POCUS
  - Remove clots / products from os

Management of miscarriage

- Complete: expectant (especially <8 weeks GA)
- Incomplete: removal of tissue from os
- Medical: misoprostol
  - Done in consultation with OB/GYN
- Surgical: evacuation, D+C

Risk factors for ectopic pregnancy

- Age (older)
- Previous ectopic
- Previous spontaneous abortion
- IUD
- Smoking
- Prior infection (PID)
- Prior tubal surgery)

Clinical presentation of ectopic

- Delayed menses
- Pain (abdominal, uterine, adnexal)
- Vaginal bleeding
- Shoulder pain / peritoneal signs (referred)
- Shock

Management of stable ectopic

- Formal US – within 48h
- Follow-up BHCG level
- Methotrexate if vitals stable, tubal mass <3.5cm, no fetal cardiac activity, no evidence of rupture

Management of unstable ectopic

- MOVIE
- Blood products
- Call OB
- TXA
- Rhogam 50mcg (if Rh negative)

Molar Pregnancy

- Clinical features:
  - Extreme maternal age
  - Persistent hyperemesis
  - Vaginal bleeding
  - Respiratory distress
  - Uterus large by dates

Complications of molar pregnancy

- Pre-eclampsia/eclampsia
- Respiratory failure (ARDS)
- Hyperemesis gravidarum
- Uterine bleeding
- Trophoblastic disease (systemic invasion)

POCUS in 1st trimester

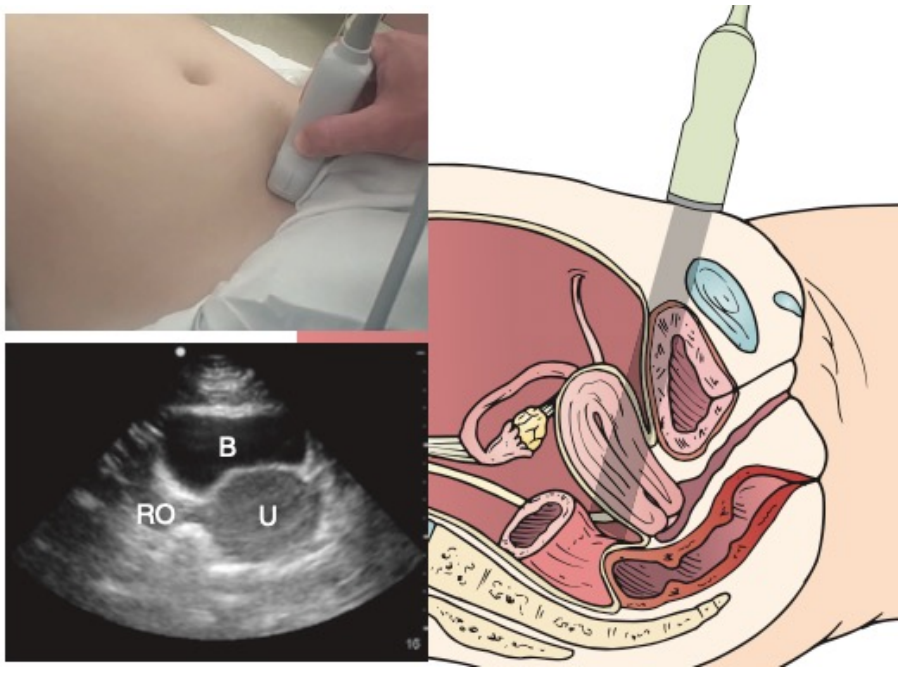
- Indications:
  - Currently viable IUP
  - Non-viable IUP
  - Ectopic pregnancy (empty uterus and BHCG > 3000)

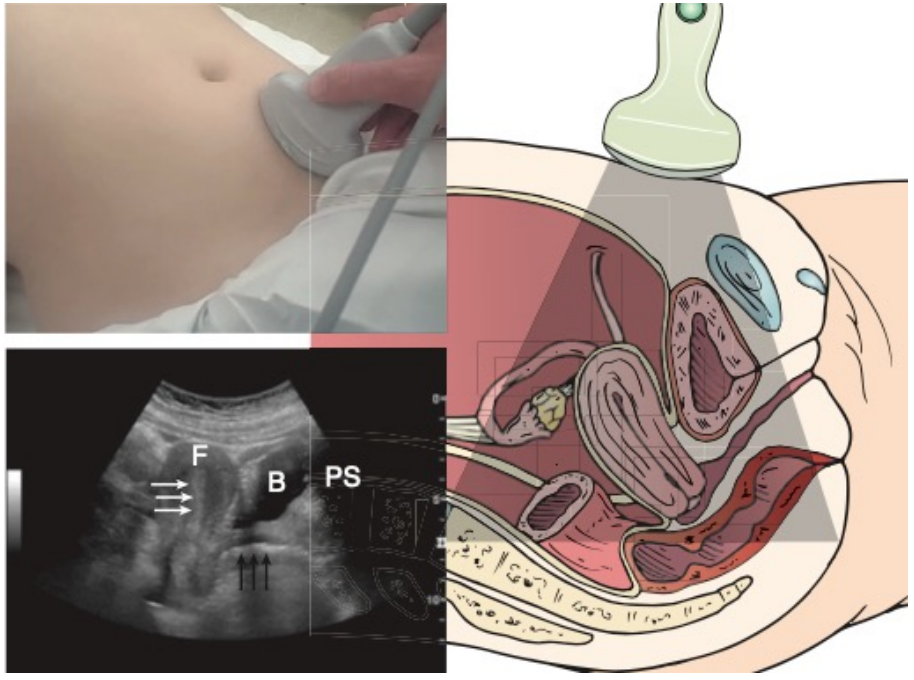
POCUS Findings

- **Confirmed IUP:** intrauterine gestational sac + yolk sac / embryo = discharge home
- **Confirmed IUP non-viable**: gestational sac >25mm without yolk sac or embryo > 7mm without cardiac activity = formal US
- **Pregnancy of unknown location:** intrauterine fluid collection = clinical integration

Image acquisition

- Full bladder
- Curved array on OB preset
- Find bladder-uterine juxtaposition





Normal IUP findings (5)

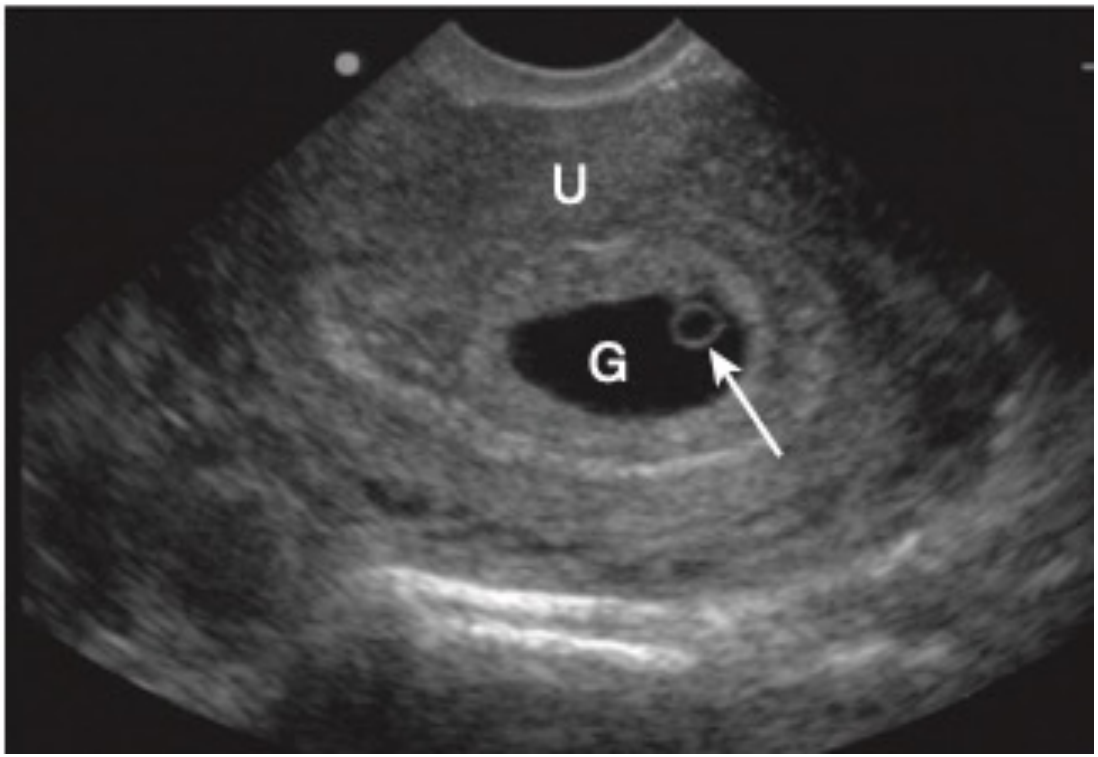
- **Bladder-uterine juxtaposition**
- **Thickening of endometrium**
- **Gestational sac**: anechoic in endometrium
- **Yolk sac** (in gestational sac): perfectly found

or

- **Fetal pole**: discoid mass adjacent to yolk
- **Measure myometrial mantle > 5mm** (anterior)

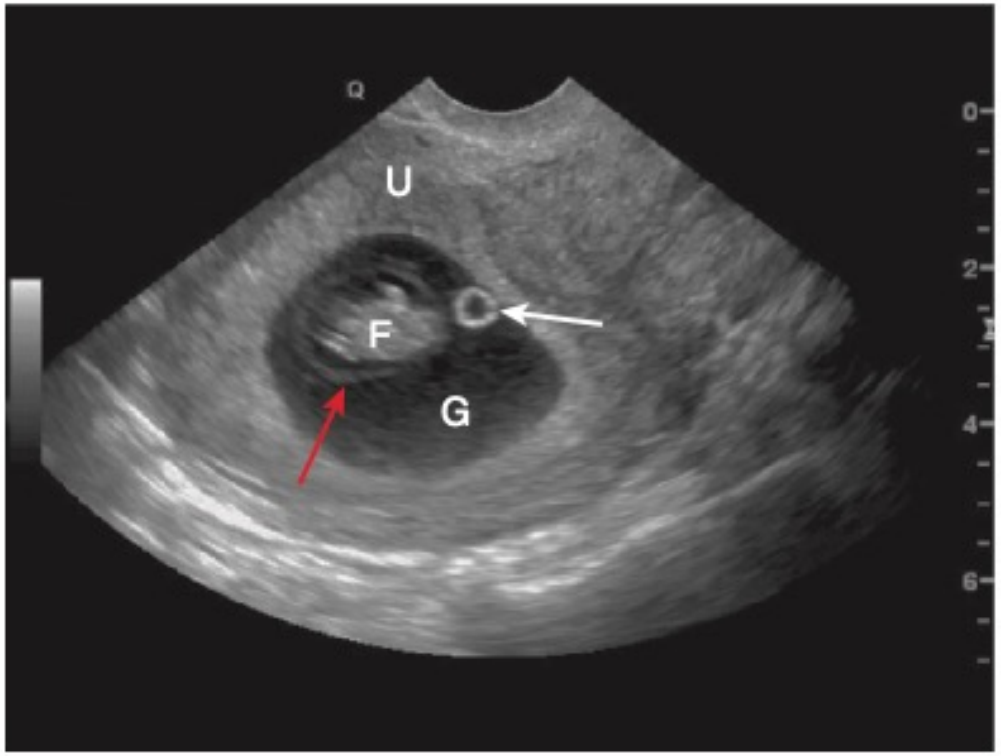
Global Health Emergency Medicine

Normal IUP findings (5)



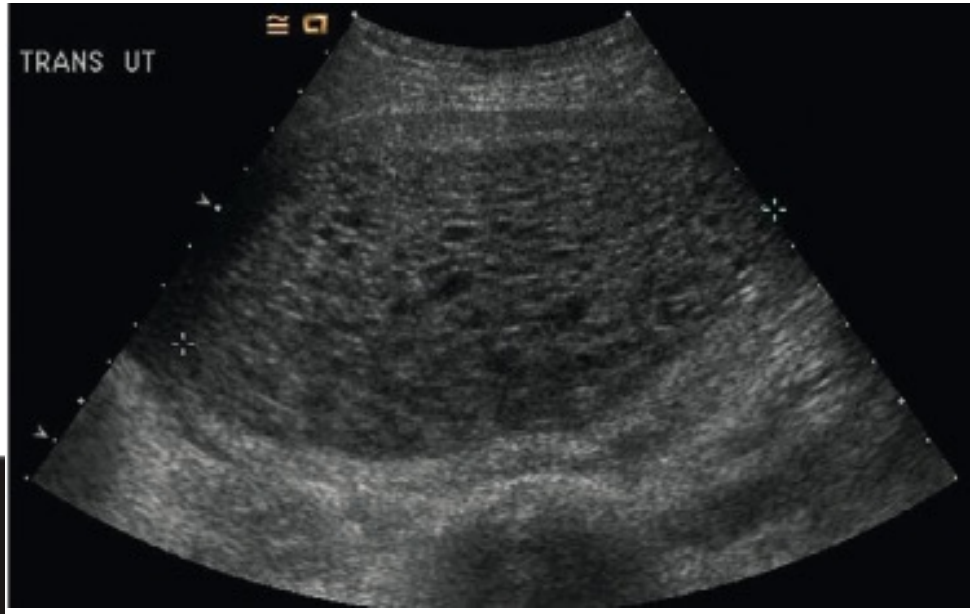
Global Health Emergency Medicine

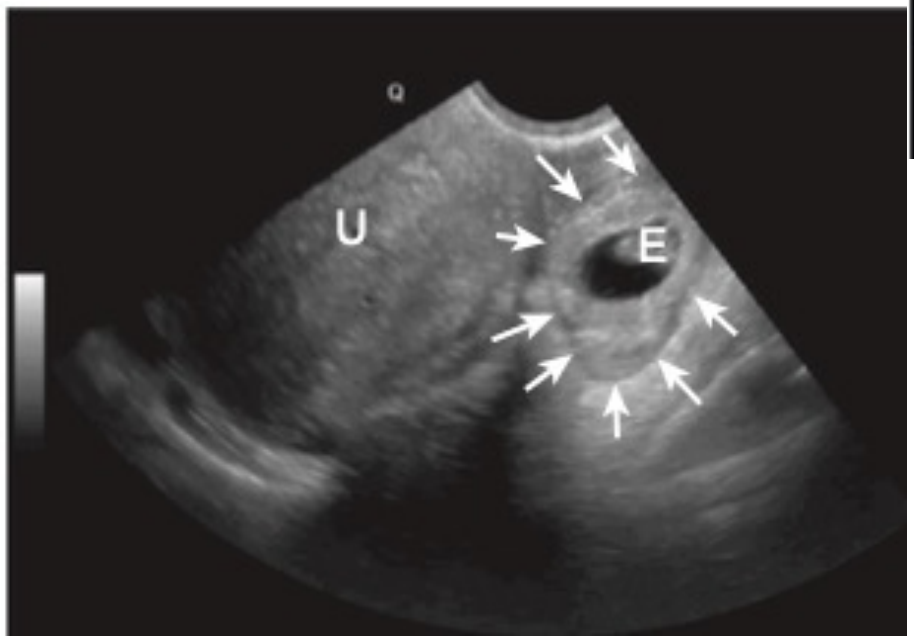
Normal IUP findings (5)



Global Health Emergency Medicine

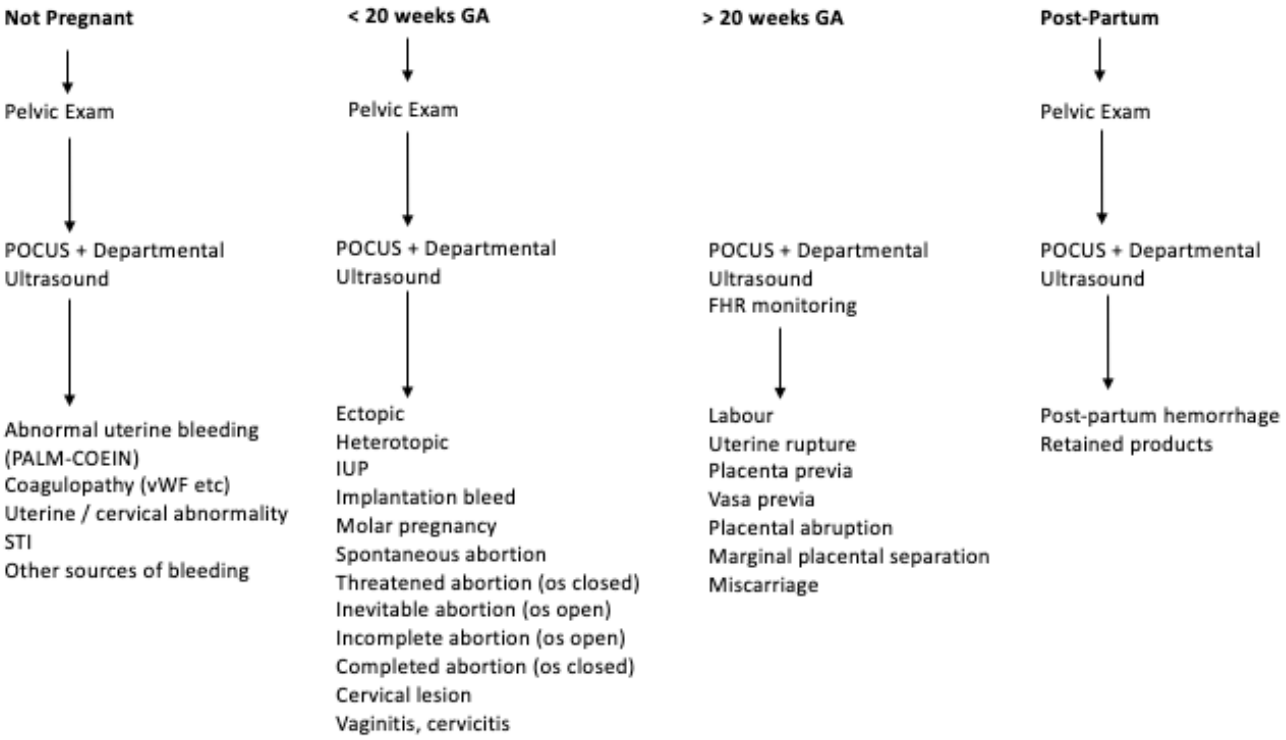
Abnormal findings





Global Health Emergency Medicine

Vaginal bleeding >20 weeks GA



Global Health Emergency Medicine

Bleeding >20 weeks GA

- 33% risk of fetal loss
- Assume placenta previa
- No digital exam
- 20% of women – painless abruption
- Viability = 28 weeks or 1kg
- *maybe 26 weeks at Black Lion

Management of bleeding >20 weeks GA

- Call OB
- Unstable = resuscitation
- Support mother until fetal maturation
- Fetal monitor
- Labs: CBC, coagulation

Placental Abruption

- Separation of the placenta from the uterine wall
  - Small separations can be subclinical
  - Typical Presentation
    - Pain and bleeding (70%)

Placental abruption risk factors

- Trauma
- Hypertension
- Pre-eclampsia
- <20 years old or >35 years old
- Parity > 3
- Smoking
- Thrombophilia
- Prior abruption
- Cocaine / stimulant use

Placental abruption

- Complications
  - Hemorrhagic Shock
  - DIC and multi organ failure
  - Amniotic Fluid Embolus
  - Fetal Demise

- Consider diagnosis in every case of pain/bleeding especially post trauma.

Placenta Previa

- Painless bleeding due to implantation over the cervical OS
- Risk Factors
  - Increased maternal age, multiparity, Previous C/S and preterm labour
- Early bleeding episodes tend to be self limited
- Causes Increased risk of bleeding
  - Preterm – term - postpartum

Previa vs abruption

Placenta previa	Placental abruption
Rarely have uterine symptoms U/S excludes diagnosis	Usually have uterine sx Usually pain/bleeding, but 20% won't have U/S not helpful in dx
Painless, BRIGHT red bleeding Uterine irritability Self limited	DARK vag bleeding (70%) Uterine tenderness Abdo pain (concealed hemorrhage) Uterine contractions Late signs= fetal distress, shock, DIC

Definitive Care – OB Gyne

- Abruption
  - Unstable Mom/Baby – Caesarean
  - Stable Mom/Baby – Vaginal/Expectant
- Placenta Previa
  - Conservative management of resolved bleed
    - Planned C/S at 34 wks
  - C/S - Bleeding, Non reassuring FHR
- Antenatal Corticosteroids
  - 23-34 weeks of gestation

POCUS in 2nd and 3rd trimester

- Indications:
  - Gestational age
  - Fetal number
  - Cardiac activity
  - Placental location
  - Amniotic fluid volume

Uterine size and gestational age

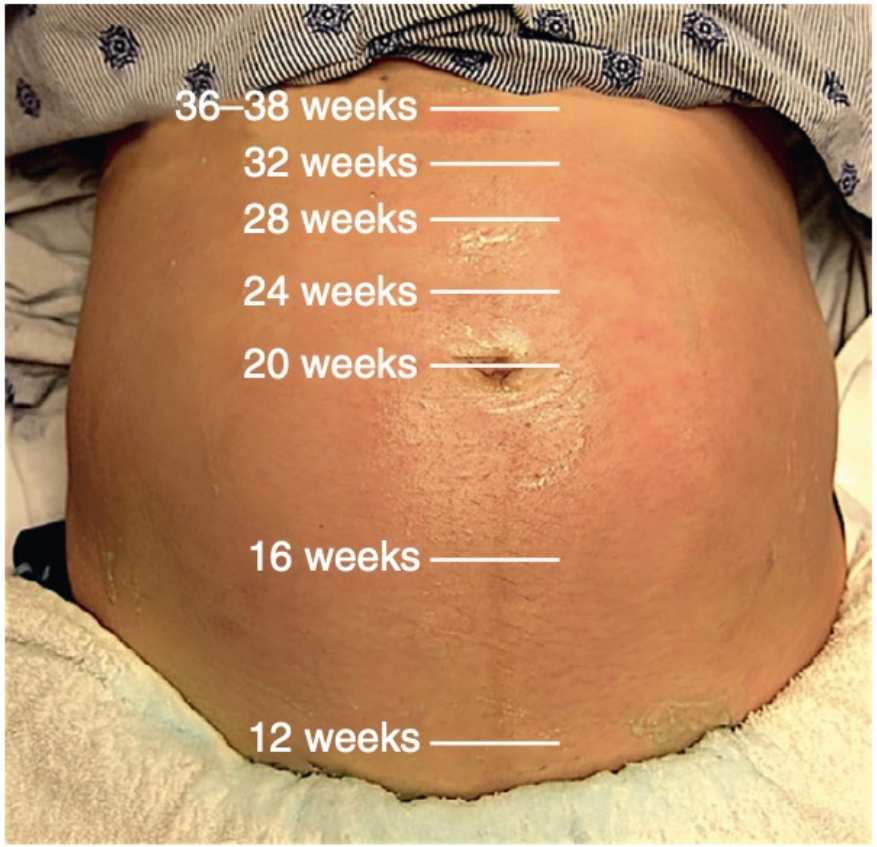


Figure 30.1 Gestational Age. Uterine fundal height from the symphysis pubis can estimate gestational age.

Global Health Emergency Medicine

Fetal lie and presentation

- Helps determine C-section vs vaginal delivery
- Lie = orientation of fetal spine to maternal spine
- Presentation = fetal position closest to pelvic inlet

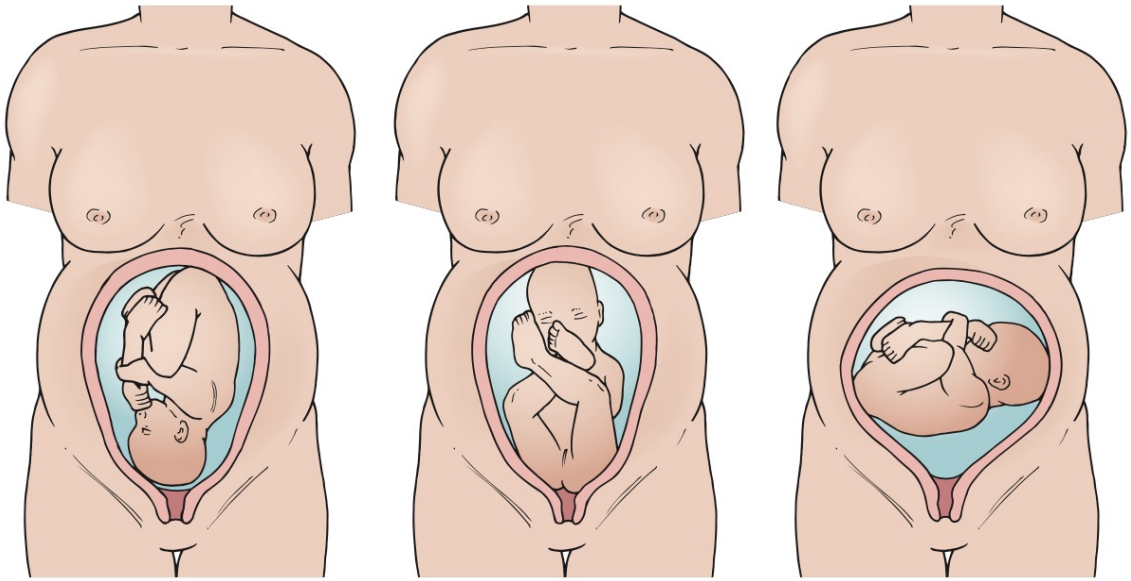
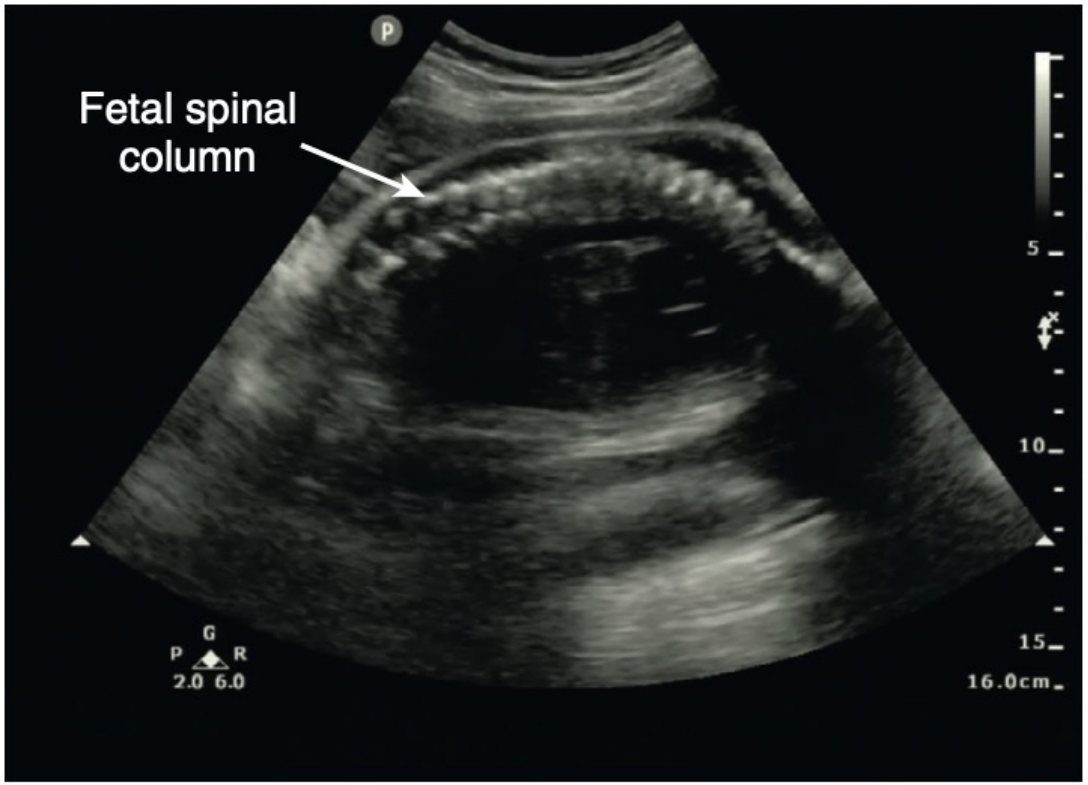


Figure 30.2 Fetal Lie and Presentation. Fetal lie (longitudinal vs. transverse) and fetal presentation (cephalic vs. breech) are shown.

Global Health Emergency Medicine

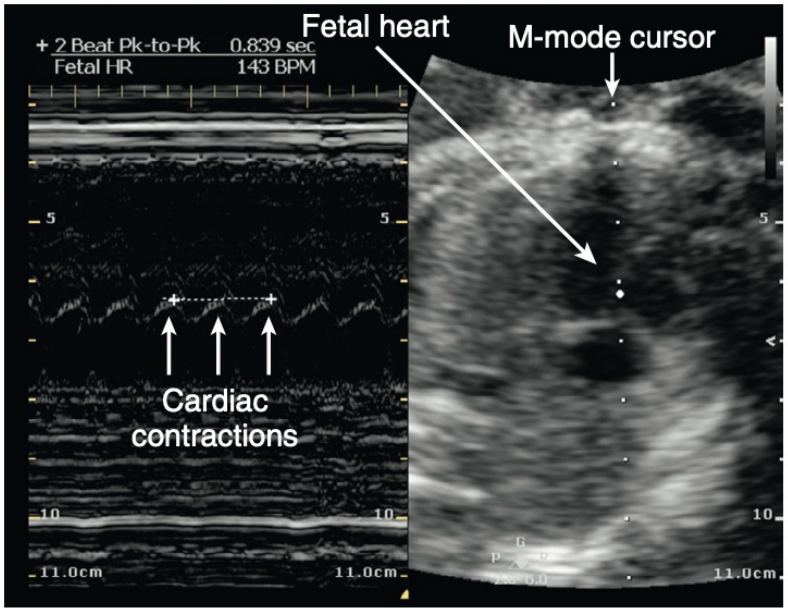
Fetal lie and presentation



Global Health Emergency Medicine

Fetal cardiac activity

- Presence or absence
- Normal = 110-160 beats per minute
- Visual inspect vs M-mode



Global Health Emergency Medicine

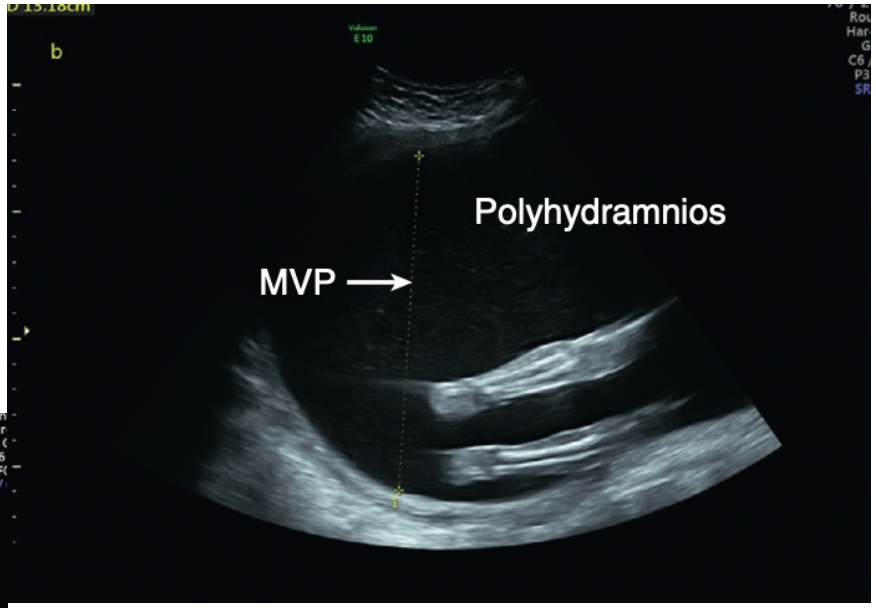
Fetal number

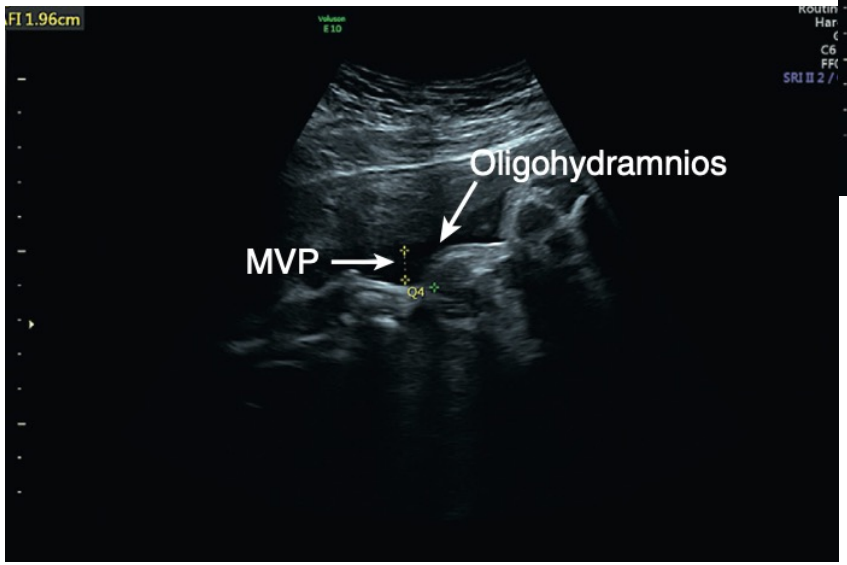
- Scan entire uterine cavity in systematic manner
- Are there multiple gestations?

Amniotic fluid volume

- Most commonly assessed with maximal vertical pocket (MVP)
- Measure single largest vertical pocket of amniotic fluid within uterine cavity (without cord or fetus)
- Transducer saggital – scan entire uterus
- Polyhydramnios = >8cm
- Oligohydramnios = <2cm

Maximal vertical pocket (MVP)

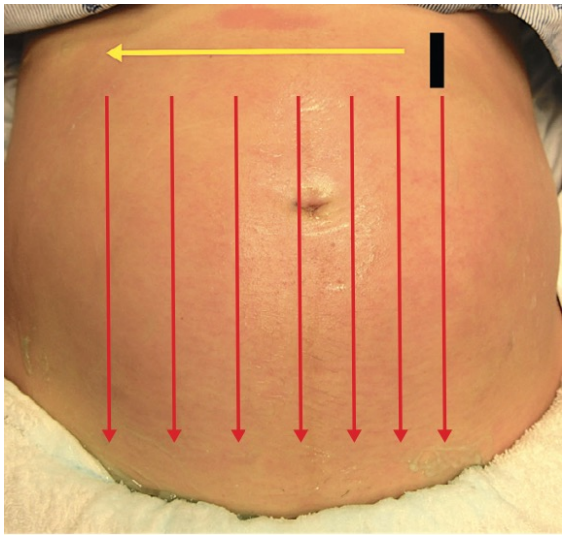




Global Health Emergency Medicine

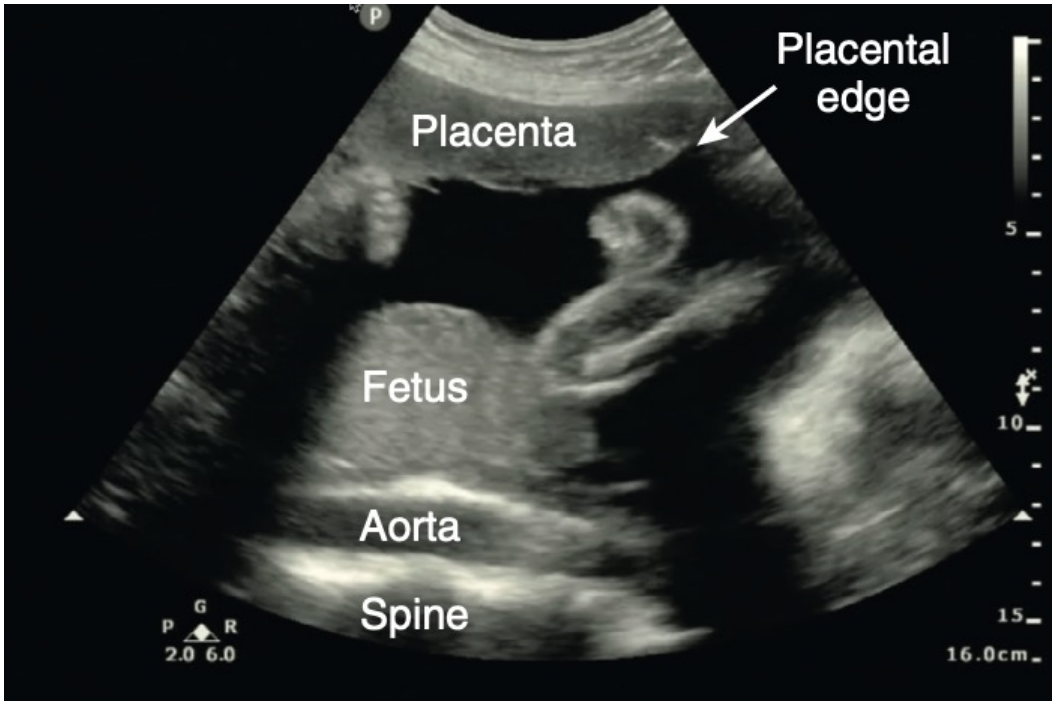
Placental location

- Difficult to do
- In general, use POCUS to rule in abnormalities
- Scan with transducer in saggital from superior to inferior, left to right



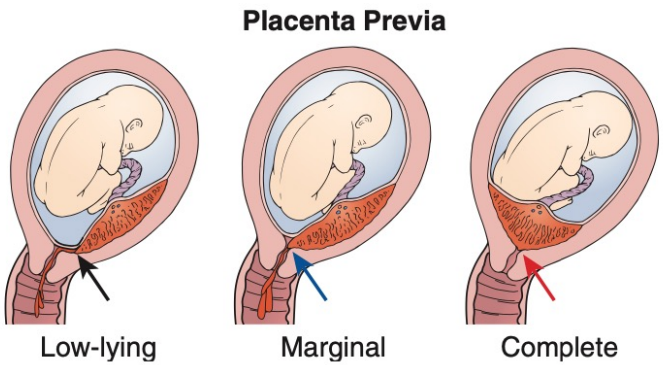
Global Health Emergency Medicine

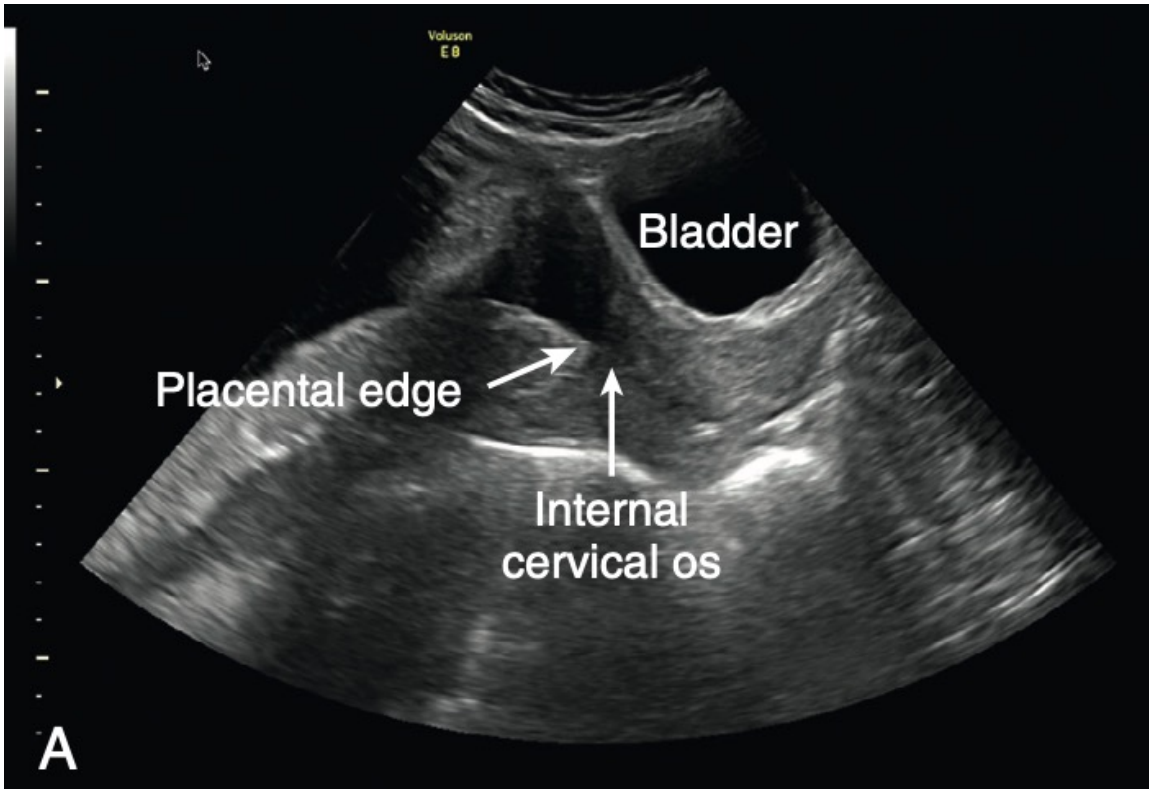
Placental location



Global Health Emergency Medicine

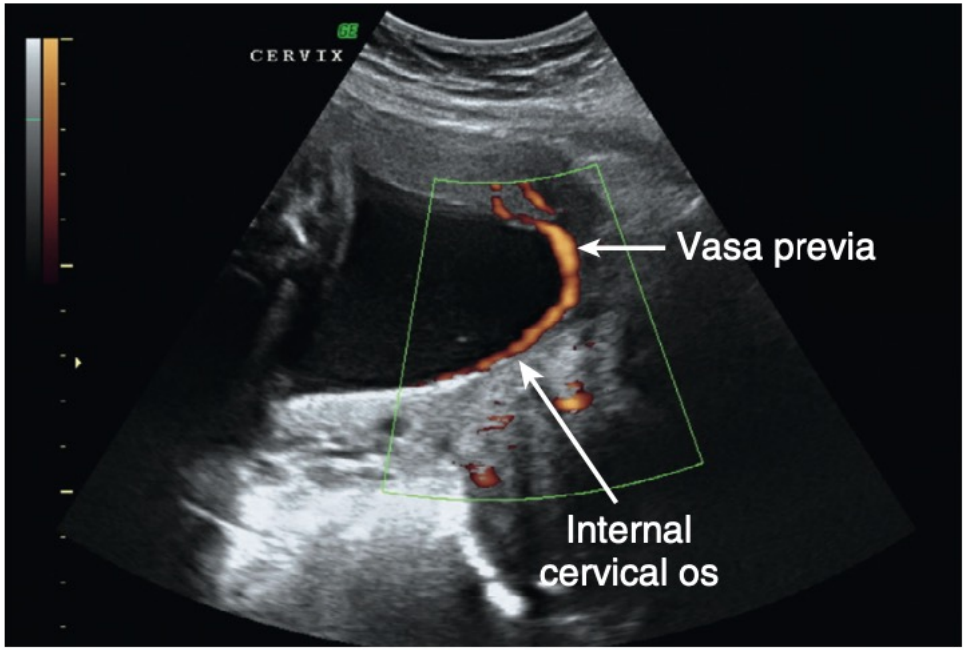
Placenta previa





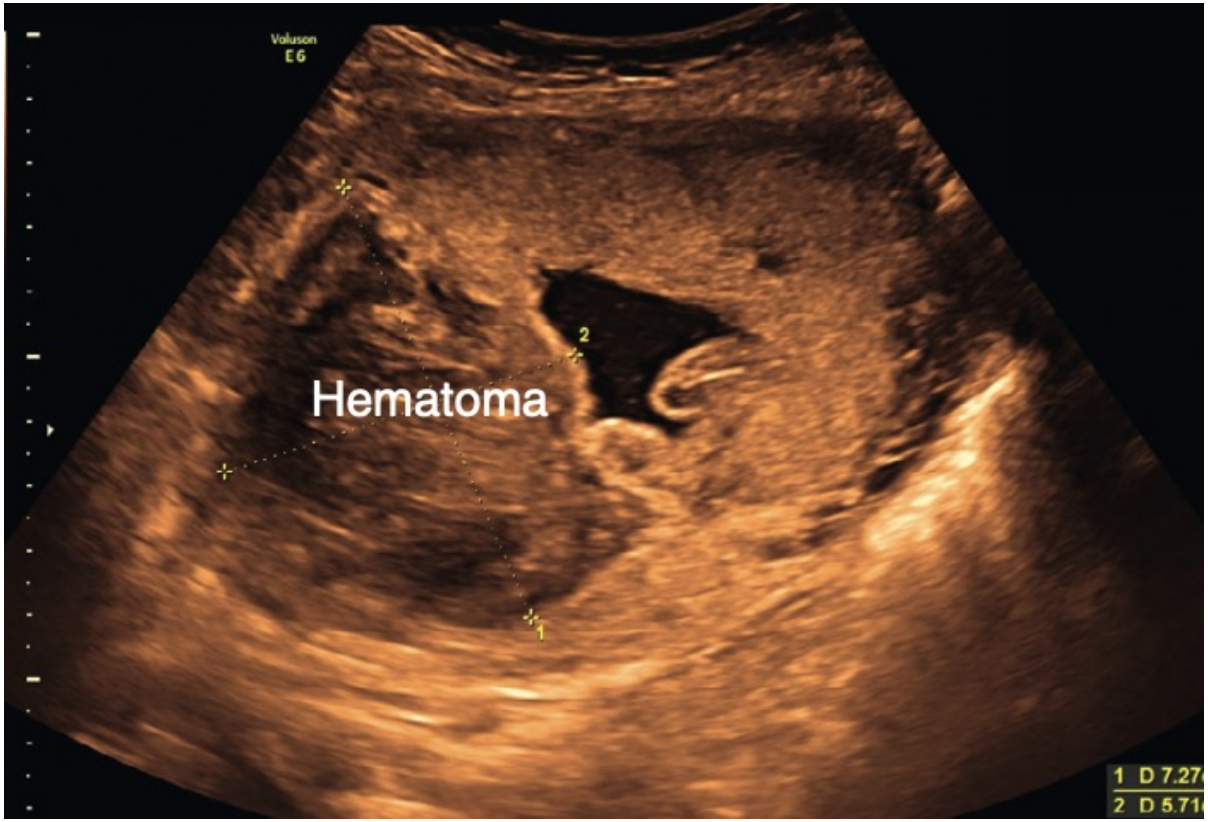
Global Health Emergency Medicine

Vasa previa



Global Health
Emergency Medicine

Placental abruption



Global Health Emergency Medicine

Complications of Delivery

Discussion: What if?

- **What if there is Umbilical Cord Prolapse?**
- **What if there is Nuchal Cord?**
- After the Head Crowns, head appears to retract and delivery is stalled?
- While delivering placenta, severe abdo pain, uterus not palpable?
- At 1 hour post partum 750 cc blood loss, bleeding continues?

Global Health Emergency Medicine

Umbilical Cord Prolapse

- Maybe Occult or Overt
  - Suspect occult if recurrent / persistent decelerations with contraction
- Elevate Presenting part, Trendelenberg/knees to chest, fill bladder with 500cc saline
- C/S

Nuchal Cord

- Check as head is delivered by sliding fingers from one shoulder to the other
- If loose, slip over the head
- Deliver fetus with body close to perineum, body somersault out to minimize traction on cord
- If tight, clamp and cut

Discussion: What if?

- What if there is Umbilical Cord Prolapse?
- What if there is Nuchal Cord?
- **After the Head Crowns, head appears to retract and delivery is stalled?**
- While delivering placenta, severe abdo pain, uterus not palpable?
- At 1 hour post partum 750 cc blood loss, bleeding continues?

Global Health Emergency Medicine

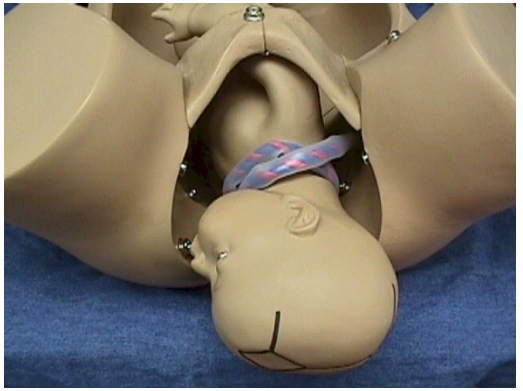
Shoulder Dystocia

- Shoulder dystocia
  - Occurs when shoulders are trying to clear simultaneously
  - Recognition
    - Stalled delivery
    - Turtle Sign

Global Health Emergency Medicine

Shoulder Dystocia - Stepwise

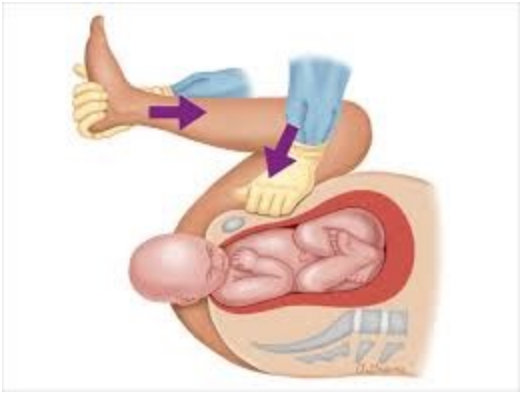
- Call for Help
- Ensure there isn't a nuchal cord
  - Loose – deliver through
  - Tight – Clamp and cut
- Consider Episiotomy

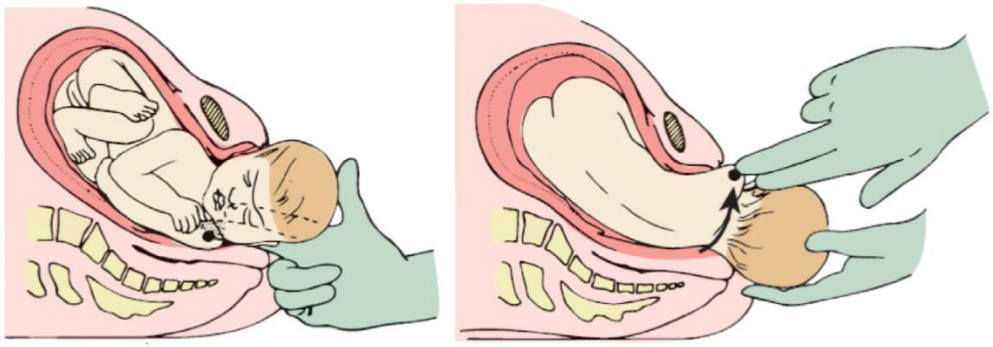


Global Health Emergency Medicine

Shoulder Dystocia Maneuver

- McRobert's Maneuver
  - Knees to the chest
  - Suprapubic pressure & digital
- Rubin's / woods
  - Corkscrew and reverse - Spin the baby 180*

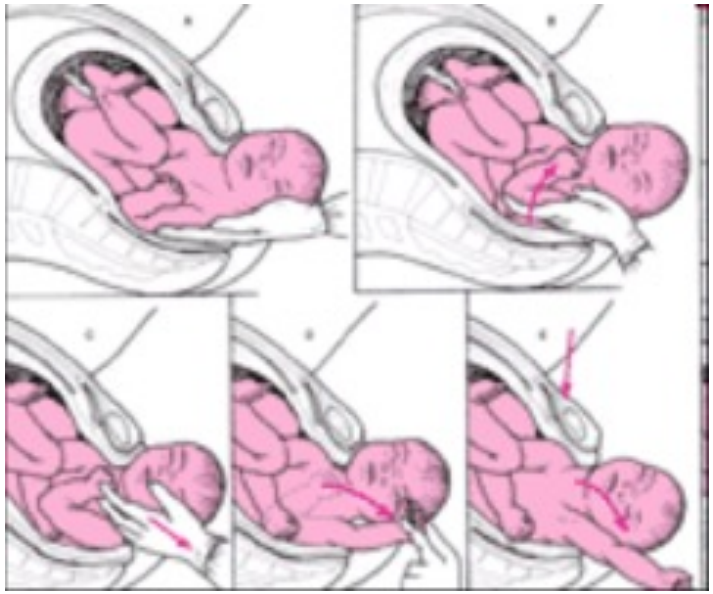




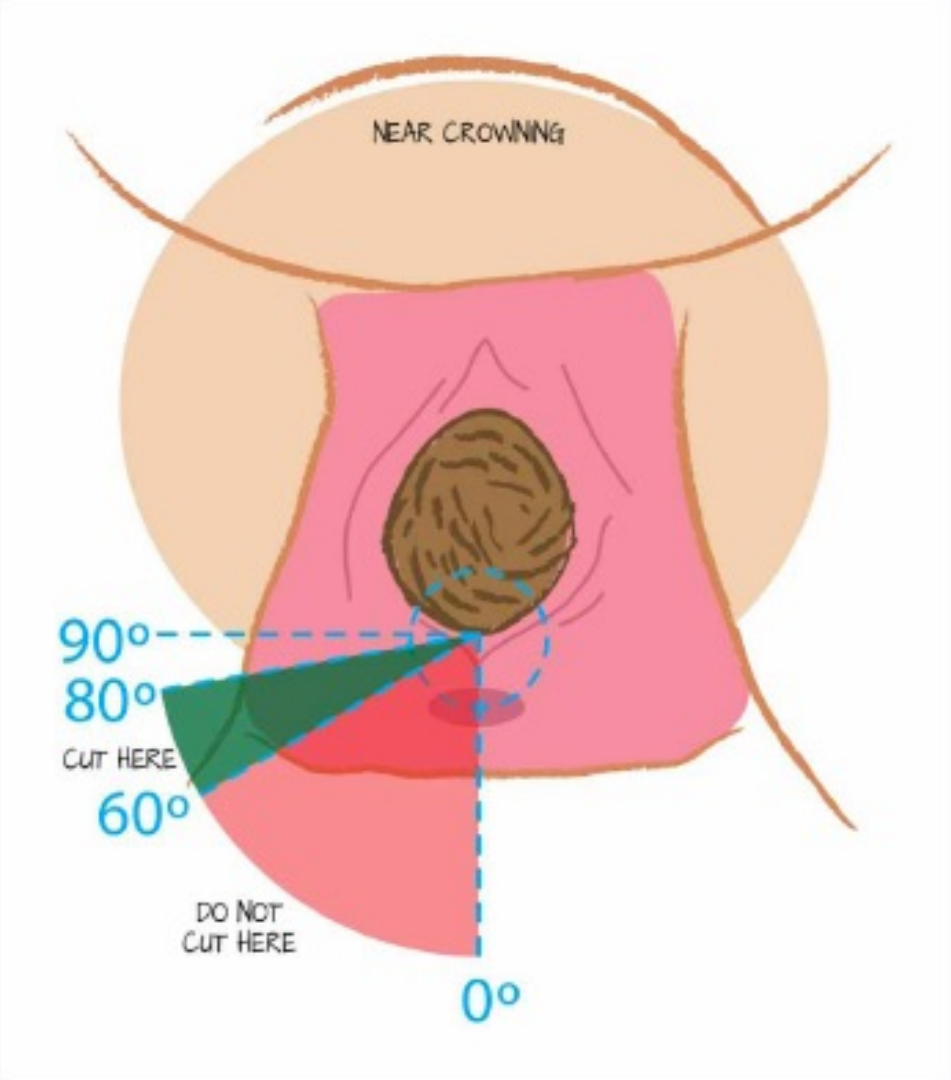
Global Health Emergency Medicine

Shoulder Dystocia

- Delivery of posterior arm
  - Identify shoulder and follow to the elbow
  - Flex it across the chest until the forearm is accessible
  - Pull



Global Health Emergency Medicine



Used with permission of Salus Global Corporation

Global Health
Emergency Medicine

Shoulder Dystocia

- **A**sk for Help
- **L**ift/Hyperflex legs
- **A**nt shoulder disimpaction
- **R**otation by Rubin/Woods
- **M**anual removal of post arm
- **E**pisiostomy
- **R**oll onto all fours

- Don't
  - Pull
  - Push (maternal)
  - Panic
  - Pivot

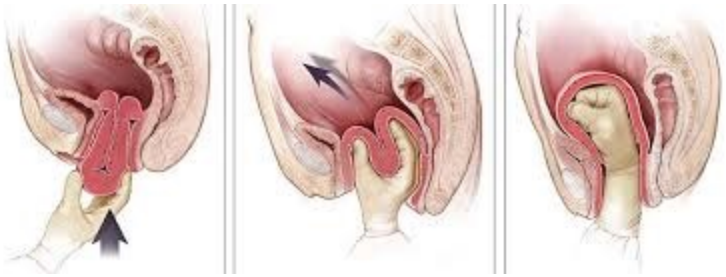
Global Health Emergency Medicine

Discussion: What if?

- What if there is Umbilical Cord Prolapse?
- What if there is Nuchal Cord?
- After the Head Crowns, head appears to retract and delivery is stalled?
- **While delivering placenta, severe abdo pain, uterus not palpable?**
- At 1 hour post partum 750 cc blood loss, bleeding continues?

Uterine Inversion

- Risk Factors (Rare)
  - Forceful cord traction, placenta accreta, Mg Sulfate
- Presentation
  - Sudden pain, unable to palpate uterus, bleeding – Confirm with exam
- Management
  - Uterotonics after
  - OR surgical repair



Global Health Emergency Medicine

Discussion: What if?

- What if there is Umbilical Cord Prolapse?
- What if there is Nuchal Cord?
- After the Head Crowns, head appears to retract and delivery is stalled?
- While delivering placenta, severe abdo pain, uterus not palpable?
- **At 1 hour post partum 750 cc blood loss, bleeding continues?**

Post partum Hemorrhage - PPH

- Most common complication of L&D
  - 5-10 % of all deliveries
  - >500 mL of bleeding post partum
  - May show signs of shock late

- Differential Diagnosis
  - Four Ts – **Tone**, Trauma, Tissue, Thrombin

Uterine Atony - Tone

- Most common cause of serious PPH (70%)
- Occurs due to lack of myometrial contraction
- Risk Factors
  - Overdistension, prolonged labour, use of tocolytics, chorioamnionitis, precipitous labour, preeclampsia, retained products
- Examination
  - Palpable uterus as a boggy mass

Maternal Birth Trauma - Trauma

- Second most common cause of PPH (20%)
- Tears/Lacerations
  - First – Superficial
  - Second – Skin and fascia/muscle
  - Third – Anal sphincter
  - Fourth – Rectal mucosa
- Hematoma – hidden bleeding
  - Blood vessels deep to the tissues
    - OB – expectant management or embolization

Retained Products of Conception - Tissue

- 10% of PPH
- Any placental defect may signify retained products
- Prevent myometrial constriction
- Diagnosis
  - Manual
  - Ultrasound
    - Empty uterus has a high negative predictive value
    - Expanded endometrium/echogenic mass

Coagulopathy - Thrombin

- Previous disorder

- Disseminated intravascular coagulation
  - Abruption, eclampsia, amniotic fluid embolus, postpartum infection, dilution (volume)
  - Diagnosis
    - Hyperfibrinogenemia, thrombocytopenia

Approach to PPH

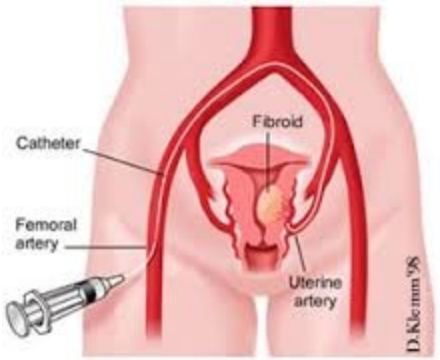
- >500 ml = PPH – call for help
  - Most women have received Oxytocin (10u IM)
- Is the uterus Firm?
  - No – Consider Atony
    - Misoprostol 400mcg SL and Oxytocin infusion
    - Bimanual Fundal Massage
  - Yes – Look for other causes
    - Lacerations – hemostasis
    - Retained products
      - Manual exploration
      - Single dose antibiotics - controversial

Continued PPH

- >1000 mL – Ongoing bleeding or Hemodynamic instability
  - Investigations
    - CBC, DIC investigations (INR/PTT&fibrinogen), Group and screen
  - Consider need for transfusion
    - O negative blood
  - Tranexamic Acid
  - Uterine Packing
    - Gauze or balloon (Foley or Blakemore)
    - Temporizing measure

OB – Definitive management

- Embolization



- Hysterectomy

Global Health Emergency Medicine

Take Home Points – Call OB!

- Dystocia
  - **A**sk for Help
  - **L**ift/Hyperflex legs
  - **A**nt shoulder disimpaction
  - **R**otation by Rubin/Woods
  - **M**anual removal of post arm
  - **E**pisiostomy
  - **R**oll onto all fours

Global Health Emergency Medicine

Take Home Points

Post Partum Hemorrhage

- Four Ts – Tone, Tissue, Trauma, Thrombin
- Resuscitation, Uterotonics, OB

Global Health Emergency Medicine

POCUS: IUP

- **Bladder-uterine juxtaposition**
- **Thickening of endometrium**
- **Gestational sac**: anechoic in endometrium
- **Yolk sac** (in gestational sac): perfectly found

or

- **Fetal pole**: discoid mass adjacent to yolk
- **Measure myometrial mantle > 5mm** (anterior)

Take Home Points – Call OB!

- Bleeding
  - Can’t Miss Previa and Abruption
  - No Pelvic Exam until U/S complete
  - Resuscitation - hemorrhagic shock

Global Health Emergency Medicine

References

- Rosen's Emergency Medicine: Concepts and Clinical Practice (10th edition)
- Tintinalli's Emergency Medicine Manual (8th edition)
- UpToDate

Global Health Emergency Medicine