11.0 OBSTETRICS AND DISORDERS OF PREGNANCY / GYNECOLOGY

11.1 Pregnancy, Uncomplicated (L)

Always get a pregnancy test. The risk of pregnancy may be as high as 7% in some populations of patients who deny any chance of pregnancy and who stated they had a normal LMP within the prior 4 weeks.

Fertilization occurs in the tube and then the zygote travels into the uterus. Implantation occurs 72 hours post fertilization. HCG is produced 2-3 days after implantation. HCG detectable 9-11 days post ovulation from the trophoblast.

Urine pregnancy test is accurate with a concentrated urine specimen but may be falsely negative with a very dilute urine so always do a specific gravity on the specimen

\[ \text{Beta Quant} - \text{doubles in} \ 80\% \ \text{of the cases in} \ 48 \text{ hours} - \text{Doubling Time} \]
\[ \text{Beta Quant} < \text{expected} = \text{Failing Pregnancy, Ectopic} \]
\[ \text{Beta Quant} > \text{expected} = \text{Twins, Hydatidiform Mole} \]

Definitions

Gravidity – total number of times a patient has been pregnant
Parity - pregnancies lasting to the point of viability (24 weeks)

Trimesters
- First 1-14 weeks
- Second 15-28 weeks
- Third 28-42 weeks

First ½ of Pregnancy 1-20 weeks Last ½ of Pregnancy 20-40 weeks

Term pregnancy = greater than 37 weeks gestation
Preterm Pregnancy - prior to 37 weeks gestation
Premature pregnancy – prior to 34 weeks gestation

Gestational Age is from the 1st day of the LMP about two weeks longer than time from actual implantation.

Quickening – the sensation of fetal motion usually at 20 weeks
False Labor – Irregular contractions that do not cause dilation of the cervix
Braxton Hicks Contractions – The contractions of False Labor

Pelvic ultrasound
- Double Decidual sac Sign vs Pseudosac (deciduas capsularis and vera)
- Transabdominal ultrasound detects IUP at 5-6 weeks = Quant 6500
- Transvaginal ultrasound detects IUP at 4-5 weeks = Quant 2000
- Fetal cardiac activity at > 6 weeks
Placenta may be low lying prior to 20 weeks gestation normally and does not indicate Placenta Previa.

Physiology of Pregnancy
Nilesh Patel, D.O., FACOEP, Kenneth Doroski, D.O., FACOEP
Obstetrics and the Disorders of Pregnancy

Blood Volume - increases 40-45%
Hemoglobin decreases (normally not < 11)
Cardiac output increases 43%
Appendix is pushed upward
Gastric emptying is delayed
Gall bladder emptying is delayed
pCO2 – decreases to 30 mm Hg
40% increase in Tidal Volume
Respiratory rate is unchanged
Glomerular Filtration Rate increases by 50% past second trimester
There is compression of the ureters and there may be a dilation of the Ureters and Hydronephrosis on US
(Calyces R > L)
Physiologic Leukocytosis (WBC = 12-18)
D Dimer normally elevated

Uterine Size – Relation to Gestational Age
Pelvic Brim – 12 weeks
Half way between pubes and Umbilicus – 16 weeks
Umbilicus 20 weeks
Beyond 20 weeks the gestational age = the length in CM from the pubes to the uterine fundus. (Obesity needs to be taken into consideration)
A uterus 2 finger breaths above the umbilicus is viable (24 week gestation).

During the second half of pregnancy when the patient is supine, the uterus may compress the inferior vena cava thereby decreasing cardiac output. In later pregnancy patients should be placed in the left lateral position or the uterus shifted to the left if the patient must be supine.

Complications in the First ½ of Pregnancy

11.2 Pregnancy, Complicated

11.2.1 Ectopic (H)

A. General Considerations
   1. LEADING CAUSE of 1st trimester maternal death
2. Second leading cause of overall maternal mortality
3. Incidence INCREASING - 70,000 cases/year (0.45% in 1970 to 2% 1992)
4. Mortality is decreasing (It has dropped almost 10 fold from 1970 – 1989)
5. Location - fallopian tubes 99% but can be abdominal, cervical, ovarian

6. Presentation 5-8 weeks after FDLMP
7. Complication - decreased fertility

B. Predisposing Factors
   1. PID - MAJOR CAUSATIVE FACTOR
2. Previous ectopic
3. Tubal sterilization or surgery

ACOEP Emergency Medicine: An Intense Review
Chicago, Illinois
4. IUD
5. Prior reconstructive surgery
6. Assisted reproduction (In vitro fertilization)

C. ED Presentation
   1. Abdominal pain
      A. MOST COMMON SYMPTOM (reported in 90%)
   B. Sudden / sharp / severe / lateralized (in classic cases)
      C. May be bilateral & may present with shoulder pain due to blood irritating the diaphragm
   2. Vaginal bleeding usually following a period of amenorrhea of 4-12 weeks
      A. Incidence -50% - 80%
   B. Classically scant dark bleeding heavy bleeding is more likely in abortion
      C. May have heavy bleeding, may not have missed any periods (15% of cases)
   3. Dizziness/Syncope
      A. UNCOMMON
   4. Hypovolemic shock < 5% of cases (may be bradycardic)

5. Clinical Findings on Physical Exam
   A. Abdominal tenderness
   B. Adnexal tenderness
   C. Adnexal mass
   D. Uterus NOT enlarged on pelvic exam or normal for gestational age
   E. May not have tachycardia even with intraperitoneal blood

D. ED Diagnosis
   1. Pregnancy test
      A. QUALITATIVE Serum is positive
         A bedside urine pregnancy test is between 95%- 100% sensitive; however it can be falsely negative if the urine is dilute. (If you strongly suspect the diagnosis with a negative urine pregnancy test do a serum Quant. Always look at the spec gravity when interpreting a urine HCG)
         Serum qualitative positive > 10 mIU/mL
         Urine qualitative positive > 20 mIU/mL
      B. Detection 2-3 days post implantation (prior to the next expected menstrual period)
   2. Quantitative serum pregnancy test – Discriminatory Zone – The exact level may vary for different institutions but is usually between 1000 – 2000 for Transvaginal US
      A. 1500 mIU/mL = gestational sac should be visualized on transvaginal sonogram and this correlates with a 4-5 week gestation
      B. 6500 mIU/mL = gestational sac should be visualized on transabdominal sonogram and this correlates with a gestation of 5-6 weeks
      C. Beta Quant doubles in most normal pregnancies every 48 hours
      D. Significant comparative findings
         1. Plateauing
      2. Declining
      3. Very low levels
         4. Serial Quant may be helpful in establishing risk for ectopic.
   3. Ultrasound - Role in the Evaluation of Ectopic Pregnancy
      A. Purpose – primarily to determine if a viable IUP is present / May assist the planning of interventional strategies if an ectopic pregnancy is seen
Locate early gestation
Establish gestational age
Assess viability
Still indicated if suspicious and the Quant is below the discriminatory zone
If you suspect Ectopic always obtain the Pelvic ultrasound even if the BHCG is below the discriminatory zone as Ectopic pregnancies can occur with a BHCG of < 500. Quantitative HCG < 1000 quadruples the risk of ectopic and Quantitative HCG of > 1500 occurs in only ½ of patients with ectopic pregnancy

B. Findings on ultrasound
1. Gestational sac implanted in the uterus seen in normal pregnancies
2. Diagnostic findings of ectopic pregnancy
   A. Ectopic fetal heart activity
B. Ectopic fetal pole
   3. Suggestive findings of ectopic
      A. Cul-de-sac fluid WITHOUT IUP
   B. Complex adnexal mass WITHOUT IUP
   4. Indeterminate findings of ectopic
      A. NO IUP without other findings

5. Heterotopic Pregnancy – Concomitant IUP and Ectopic Pregnancy
   A. Frequency – Historically thought to be 1/30,000 now thought to be 1/3000
   B. In vitro Fertilization - may increase frequency to 2.7/1000 – 1/95
   C In vitro Fertilization = IUP on US does not assure the absence of Ectopic

6. Laparoscopy – Diagnostic and also therapeutic
   Diagnostic indications - strong suspicion of ectopic with a nondiagnostic ultrasound

7. D and E – If it is unclear whether ectopic or abortion and the patient does not which to continue the pregnancy
   The presence of Chorionic villi establish an IUP.
   Absence of Chorionic Villi suggest ectopic.
   Chorionic villi float in NSS / blood clots sink in NSS.

E. Differential Diagnosis
1. Threatened abortion - IUP on ultrasound
2. Ruptured corpus luteum cyst - IUP on ultrasound
   A. Serous fluid on culdocentesis
3. PID
   A. Fever
B. Leukocytosis
C. Negative pregnancy test
   4. Ovarian cyst with torsion - adnexal mass on ultrasound
5. Endometriosis
6. Dysfunctional uterine bleeding

F. ED Management - Medical / Endoscopic / Surgical
1. Assess Hemodynamic Stability
2. Resuscitate patient as needed
3. Urgent / Emergent GYN Consult
4. Asses Rh Status - Rh negative mother should get 50 microgram of Rhogam

I. Laparoscopy – In unruptured ectopic pregnancy where fertility is desired
Salpingostomy preferred over salpingectomy; however it increases failure rate and rate of recurrent Ectopic increases

II. Laparotomy – Unstable patients, patients too difficult for Laparoscopy

III. Methotrexate – 91% success in appropriate cases but failure rate can be up to 36%. (Appropriate in only a small subset of patients)

Beware - large tube size / Higher beta Quant / severe pain, and fetal cardiac activity are associated with higher failure rate. Beta quant > 5000 is associated with 14.3 % failure rate where as Beta quant < 5000 is associated with failure rate of 3.7%

A. Gestation < 4cm sac or < 6 weeks gestation, no FHT, BQuant < 3000
B. Dose - 50mg/m2 IV

C. Results in tubal abortion which can cause:
   1. Pelvic / abdominal pain in 3-7 days (75 % of patients)
      Spotting
      10 % - 36 % failure rate ( HCG should be 0 in 14-21 days)
      Patient must avoid intercourse for 14-21 days as this increases risk of rupture

D. Management of pain after Methotrexate therapy and or Laparoscopy may pose a diagnostic dilemma – is it normal or sign of rupture?
   1. The HCG should be < 20 by the end of the second – third week
   2. Repeat CBC
   3. Pelvic US
   4. Pelvic Exam is associated with rupture
   5. GYN Consult
   6. Failure Rate Methotrexate > Salpingostomy > Salpingectomy

11.2.2 Hyperemesis Gravidarum (M)

A. General Considerations
   1. Nausea and Vomiting are very common in pregnancy < 12 weeks occurring in 60-80%
   2. Hyperemesis Gravidarum is SEVERE Nausea and Vomiting and Characterized by the following:

B. Components of hyperemesis
   1. Dehydration
   2. Weight loss
   3. Lab values showing Ketosis or Hypokalemia

Consequences for those who lose more than 5 % of pre-pregnancy weight is increased risk of intrauterine growth retardation and low birth weight infants.

C. Risk factors
   1. Younger patients
   2. Obese
   3. Nulliparous
   4. Fetal developmental abnormality or intrauterine growth retardation could result. If weight loss is > 5% prepregnancy weight

Differential diagnosis
   A. Pyelonephritis
   B. Molar pregnancy
D. ED Presentation
1. SEVERE N/V
2. Abdominal pain - NOT present (Consider another Diagnosis if abdominal pain)
3. Afebrile
4. UA → ketones / Serum - hypokalemia
5. WBC NOT elevated

E. ED Management
1. IV hydration with 3-5 liters D5 LR or D5 NSS
2. Follow the patient’s progress by checking urinary ketones & correct electrolyte abnormalities
3. Assure they can keep down fluids prior to discharge
4. Parenteral antiemetics
   A. Ondansetron – Zofran   Category B
   B. Trimethobenzamide – Tigan   Category C
   C. Prochlorperazine – Compazine   Category C
   D. Promethazine – Phenergan   Category C
   E. Metoclopramide – Reglan   Category B
5. Admission criteria
   A. Weight loss > 10% prepregnancy weight
   B. Inability to reverse ketosis / electrolyte abnormality
   C. Persistent vomiting
   D. Etiology uncertain
6. Discharge instructions
   A. Patient must be able to manage own fluid intake
   B. Small/frequent feedings
   C. Avoid irritant foods
   Antiemetics
   Home infusion therapy

11.2.3 Abortion – vaginal bleeding in the first ½ of pregnancy with loss of the fetus prior to 20 weeks (H)

A. General Considerations
1. Most common complication of pregnancy
2. Etiology – chromosomal abnormalities with abnormal development of zygote

B. Risk Factors
1. Advanced maternal age
2. Infertility
3. Concurrent medical conditions
4. Exposure to chemical / infectious agents

C. ED Presentation
1. Vaginal bleeding
   A. Initially - spotting
2. Later - heavy with clots
3. Abdominal pain
   A. Usually after bleeding
   B. Midline
   C. “Crampy”
4. Abdominal exam unremarkable
A. Blood in vaginal vault
B. Cervical os by classification

D. ED Management
Hemodynamic stabilization / Assess Cervix / R/O Ectopic / Administer Rhogam if appropriate

2. Lab. Testing
   A. CBC
   B. Type & Rh
   C. Quantitative BHCG
   UA

3. Ultrasound
   A. R/O ectopic
   B. May provide prognostic information of the likelihood of complete abortion

4. Management
   A. Rhogam if mother is Rh negative
   B. OB/GYN consult

5. Discharge instructions
   A. Pelvic rest / (Bed Rest sometimes Recommended – no evidence that it prevents eventual complete abortion)
   B. NO intercourse

C. NO tampon use

E. Prognosis of Vaginal Bleeding in the First half of Pregnancy
   1. 21% of pregnant patients have vaginal bleeding in the first ½ of pregnancy
   2. 57% will go on to miscarry
   3. Of those that miscarry 75% will do so within 8 weeks.
   4. Ultrasound that reveals subchorionic hemorrhage doubles the chance of complete abortion.
   5. Ultrasound that reveals Blighted Ovum – no yolk sac in large gestational sac predicts fetal demise. Gestational Sac > 25 mm without embryo or Gestational sac > 20 mm without yolk sac predict fetal demise
   6. Cardiac Activity on ultrasound the risk of miscarriage 5.5-13.8 % if vaginal bleed some sources say as low as 3.4%

11.2.3 Threatened Abortion (H)

A. General Considerations
   1. Bleeding - variable
2. Cervical Os Closed
3. Cramps – mild / transient
4. Fetal tissue NOT passed
5. Uterus enlarged/consistent with dates
6. Pregnancy test positive
7. Fetus viable

B. ED Management
   1. Lab testing as above (type and RH CBC)
   2. Discharge patient with appropriate follow-up instructions on Pelvic rest which decreases risk of subsequent infection.
   3. Return to ED if symptoms worsen
11.2.3 Inevitable Abortion (H)

General Considerations
1. Bleeding - variable
2. Cervical Os open (readily admits digit)
3. Cramps - moderate
4. Fetal tissue NOT passed

B. ED Management
1. GYN consult re: D&C

11.2.3 Incomplete (H)

A. General Considerations
1. Bleeding heavy (may be excessive)
2. Cervical Os Open
3. Cramps persistent/excessive
4. Some of Fetal tissue has passed
   5. Passage of material that floats in a container of NSS indicate Chorionic Villi (a blood clot will sink to the bottom of NSS) and confirms passage of at least some of the products of conception. Follow up pathology on the specimen should always be obtained to confirm

B. ED Management
1. GYN consult - Evacuation of the Uterus re: D&C
2. Mifepristone – not approved in the US; binds to progesterone receptors causing detachment of the products of conception

11.2.3 Complete Abortion (H)

A. General Considerations
1. Bleeding minimal
2. Cervical Os Closed
3. Cramps minimal
4. Entire contents of uterus expelled

B. ED Management
1. GYN Consult and discharge, counseling.

11.2.3 Septic abortion (Postabortal endometritis) (H)

A. General Considerations
1. Uncommon after spontaneous Abortion
2. Common after induced abortion utilizing
   A. Unsterile catheters

B. Foreign objects
3. Etiology - retained gestational tissue
4. Polymicrobial infection
5. Potential sequelae
   A. Abscess formation
   B. Septic pelvic thrombophlebitis
B. ED Presentation
   1. Fever
2. Cervical discharge
   A. Purulent
   B. Foul-smelling
   C. Hemorrhagic
3. Cervical motion tenderness / Abdominal Tenderness
4. Uterus
   A. Boggy
   B. Tender
   C. Enlarged
5. Adnexal masses
6. Abdominal tenderness

C. ED Management
   1. Routine labs
2. Blood Cultures
3. Ultrasound to assess for retained products
4. IV antibiotics (Amp/sulbactam or Gentamycin plus Clindamycin)
   5. Admission
   6. GYN Consult

11.2.3 Missed Abortion (H)

A. General Considerations
   1. Uterus fails to expel dead fetus / tissue for 4 weeks
2. Cervical Os is closed
3. Uterus
   A. Smaller than expected
   B. Firm
   4. Fetal heart beat is absent
5. Pregnancy test converts to negative
6. Ultrasound findings are diagnostic - Heliotrope

B. ED Management
   1. GYN Consult

Complications in the Second ½ of Pregnancy
   Vaginal Bleeding in the Second ½ of Pregnancy – 1/3 of fetus will have fetal demise
   Abruptio Placenta
   Placenta Previa
   Preterm Labor
   Genital Tract Lesions
   Hypertension
   Pre –ecclampsia
   Ecclampsia
   HELLP

11.2.4 Abruptio placenta (M) - Painful dark red bleeding with a hypertonc Uterus
   (1 % of Pregnancies)

   A. General Considerations
1. Premature separation of normally implanted placenta after 20 weeks gestation
2. CLINICAL DIAGNOSIS – Ultrasound may be normal.
3. Fetal Monitoring – increased uterine tone and signs of fetal distress

B. ED Presentation
1. Dark red Vaginal Bleeding
   Absent in concealed abruption (20%)
2. Abdominal pain
   A. Mild to severe
C. Radiates → back
3. Firm Hypertonic Uterus
   Increased tone between contractions
4. Fetal Monitoring Reveals increased uterine tone and fetal distress
5. Ultrasound goal - excludes other Diagnoses
6. May be confused with Preterm Labor

C. Risk Factors
1. HYPERTENSION - MOST IMPORTANT
2. Smoking
3. Prior abruption
4. Cocaine
   5. Blunt abdominal trauma (minor trauma 1-2 % risk major trauma up to 60 % risk of abruption) It can present in a delayed fashion - Even minor abdomnal trauma needs Fetal monitoring for at least 6 hours

D. Complications
1. Amniotic Fluid Embolism
2. Thromboplastin released into maternal circulation – DIC - 50% have coagulopathy
   - Thrombocytopenia, Elevated PT, Hypofibrinogenemia, Inc FDP
2. Fetal Death – Abruption is the most common cause or INTRAPARTUM Fetal Death
   3. Maternal Death – Hemorrhage – Abruption causes more maternal complications than any other cause of third trimester bleeding

D. ED Management
1. Hemodynamic Stabilization
2. Labs
   A. Routine CBC and Chemistries (Thrombocytopenia)
   B. Clotting tests (elevated PT)
   C. DIC panel (decreased fibrinogen, increased FDP)
      1. D-dimer
      2. Serum fibrinogen
   3. Prompt Fetal Monitoring – increased uterine tone and fetal distress
   4. Ultrasound – Not sensitive – may not visualize a retroplacental clot. Indicated only to R/O Previa
   5. Stat OB Consult
      A. Immediate Delivery - C Section indicated for severe abruption
      B. Observation for:
         A. Immature fetus
         B. Minimal bleeding
         C. Minimal uterine irritability
11.2.5 Placenta Previa (M) - *Painless Bright Red s Bleeding with a soft Uterus*
(responsible for 20% of cases of vaginal bleeding in last ½ of pregnancy)

A. General Considerations
   1. Placenta implants in lower uterine segment in advance of presenting part
      A. Occurs after 24 weeks Gestation

B. Normal to have low lying placenta at 16 weeks

B. ED Presentation
   1. Bright Red Vaginal bleeding
   2. No Abdominal pain
   3. Soft Nontender Uterus
      *Differentiate from Bloody Show – small bright red blood with mucus at onset of labor*
   4. Bleeding results from pelvic site disruption

PELVIC EXAM MAY CAUSE INCREASING HEMORRHAGE
   A. When you entertain this diagnosis - No Pelvic Exam until previa has been
      excluded by ultrasound
   4. High fetal lies more common - placenta impedes descent

C. Risk Factors
   1. Prior uterine incisions (C-section)
   2. Prior placenta Previa
   3. Multiple gestations

D. Classification
   1. Total
   2. Partial
   3. Marginal
   4. Low lying

E. ED Management
   1. Ultrasound in stable patients is 93% to 98% accurate
      A. Diagnostic procedure of choice
   B. False positive
      1. Over-distended bladder
   2. Focal uterine contractions
      2. Routine labs / Stabilization
   3. Observation indicated for:
      A. Immature fetus
   B. Minimal bleeding
      4. Double-setup vaginal exam in OR
   5. Delivery indicated for:
      A. Mature fetus
   B. Heavy bleeding
   C. C-section usually required

**Hypertension in Pregnancy** – The second most common cause of maternal death during the second ½ of pregnancy / Common cause of Fetal morbidity and Mortality – Intrauterine Growth Retardation / Abruptio Placenta/ Stillbirth

ACOEP Emergency Medicine: An Intense Review
Chicago, Illinois
11.2.6 Toxemia / pregnancy-induced hypertension (SEE 2.8.1)

A. General Considerations of Hypertension in Pregnancy
   1. Most common cause of perinatal morbidity / mortality
      A. Major cause of death in mothers —> intracranial hemorrhage
   2. Fetal Sequelae
      A. Fetal growth retardation (low birth weight infants)

B. Preterm Labor
C. Abruptio placenta
D. Stillbirth

3. Definition of Hypertension in Pregnancy
   A. BP of > 140/90 recorded twice 6 hours apart

B. Classification
   1. Chronic hypertension
   2. Transient (Gestational) hypertension – (mild in second ½ of pregnancy)
   3. Pregnancy Induced Hypertension (PIH)
      A. Pre-eclampsia
      B. Eclampsia

4. Chronic hypertension with superimposed PIH

C. Risk Factors for the Development of Hypertension in Pregnancy
   1. Family history of PIH
   2. African-American heritage
   3. Chronic hypertension
   4. Age > 40
   5. Diabetes
   6. Obesity
   7. Multiple Gestation
   8. Chronic renal disease
   9. Gestational trophoblastic disease (GTD)

D. Evaluatuation and Management or Hypertension in the Pregnant ED patient
   A. Evaluate for Pre-eclampsia, Eclampsia, HELLP Syndrome if excluded
   B. Admission criteria - Blood Pressure > 140/90
   C. Outpatient Methyldopa 250 mg Q 6 H treatment of choice or Labetolol
   No ACE inhibitors or Angiotensin Receptor blockers - teratogenic

11.2.6.1 Pre-eclampsia (H) – Hypertension / Proteinuria with or without Edema

A. General Considerations
   1. Incidence 5% - 10% of pregnancies

2. Hypertension after 20 weeks gestation and up to 4 weeks post partum with
   A. Blood Pressure > 140/90 (2 measurements 6 hours apart)

B. Proteinuria > 300 mg/24 hours
   1. Dipstick - may not correlate with severity
   C. Edema is no longer part of the required diagnostic criteria

B. Pathophysiology
   1. Defect in prostaglandin generation
   2. Increased vascular tone
   3. Diminished plasma volume
4. Utero-placental hypoperfusion - 50% reduction by the time symptoms develop

C. ED Presentation
   1. Swelling
   2. Headache
   3. Change in Vision
   4. Abdominal Pain

D. Evaluation
   1. Mental status exam
   2. Funduscopic exam
      A. Arteriolar spasm
   B. Papilledema
   C. Hemorrhage
   3. Abdominal exam
      A. Hepatic tenderness
   B. Fundal height
      4. Fetal Heart Tones

5. Pelvic exam
   A. Effacement

B. Dilatation
   6. Neurologic exam
      A. Tremulousness
   B. Obtundation
   C. Ankle clonus
   D. Hyperactive reflexes

7. Diagnostic Evaluation
   A. CBC - Thrombocytopenia, Microangiopathic hemolysis
   B. Chemistries – Elevated Liver Enzymes - HELLP
   C. Signs of End organ damage
   D. Ultrasound – Intrauterine Growth Retardation

E. Fetal Monitoring – Fetal Distress (Non-stress test)
F. 24 hour urine protein
   B. ED Presentation (by classification)
      1. Mild Pre-eclampsia
         A. DBP < 100mmHg
      2. Severe Pre-eclampsia – anyone with symptoms or abnormal labs
         A. Headache
   B. Proteinuria < 1+
      2. Severe Pre-eclampsia – anyone with symptoms or abnormal labs
         A. Headache
   B. Visual disturbances
   C. Upper abdominal pain
   D. DBP > 110mmHg or Systolic > 160
   E. Proteinuria > 5 gram/ 24 hours
   F. Intrauterine growth retardation
   G. Oliguria
   H. Increased serum creatinine
   I. Thrombocytopenia
   J. Hyperbilirubinemia
   K. Increased transaminases on liver function studies
   L. Pulmonary edema

C. ED Management
   1. Prompt OB Consult
   2. Left lateral decubitus position
      A. Prevents aortocaval compression
3. Aggressive Blood Pressure Management
   A. BP > 160/110
   B. Reduces incidence of:
      1. Maternal intracranial bleeding
      2. Placental abruption
   C. Hydralazine 2-5mg IV
      1. TREATMENT OF CHOICE
      2. Observe 20 minutes
      3. Repeat if > 130/90
      4. Labetalol 20mg IV another option
      5. No ACE or ARB. Or Diuretics
   D. Continuous FETAL Heart monitoring

4. Seizure Prophylaxis (indicated for SEVERE PREECLAMPSIA)
   A. Magnesium 6G IV over 15 minutes then 2G/hour

D. Delivery Indications
   1. SEVERE PREECLAMPSIA
   2. Mild pre-eclampsia with
      a. Preivable fetus (<23-24 weeks gestation)
b. Fetus > 37 weeks

11.2.6.2 Eclampsia (H) - Hypertension / Proteinuria + Seizure or Mental status change

   A. General Considerations
      1. Pre-eclampsia with seizures or coma
   2. Seizures may be focal or generalized
      3. Occur from the 20th week of gestation to 4 weeks postpartum
      4. In one large study 1/3 of cases occurred post partum usually within 48 hours
   B. ED Management identical to pre-eclampsia
      1. Blood pressure control with
         A. Hydralazine
      2. Fetal monitoring
      3. OB consult for STAT delivery
   C. Seizure Management
      1. Magnesium 6G IV over 15 minutes then 2G/hour
         A. Repeat 2G if still seizing
      B. Controls 95% of seizures
      C. Monitor patient for hypermagnesemia (>10mg/dl)
         1. Cardiac monitor → heart block / bradycardia
      2. Deep tendon reflexes disappear
      3. Respiratory depression
      4. Mg is excreted by the kidney so adjust dose in renal failure
         5. CALCIUM GLUCONATE 1G IV (Antidote) for hypermagnesemia

11.2.9 HELLP Syndrome – a variant of Preeclampsia (L)
   A. Hemolysis – usually see schistocytes on peripheral smear
   B. Elevated liver enzymes - AST and ALT usually < 500
   C. Low Platelets - usually <100,000 but be suspicious if < 150,000
   D. Renal function usually normal
E. BP usually elevated but early on can be normal

Complications, Evaluation and Management are the same as with Preeclampsia. Be aware can develop subcapsular liver hematoma

11.2.7 Rh Incompatibility (M)

A. General Considerations
   1. Rh- female exposed to Rh+ blood during pregnancy or delivery
   2. 0.1ml of fetal RBCs sensitizes mother
   3. MORE common at delivery but exposure can occur during Trauma, Abortion or Ectopic pregnancy
   4. Kleihauer-Betke test detects fetal RBCs in maternal circulation but sensitive to > 5 cc of rbc so useful when you suspect large rbc transfusion as in major trauma
   5. Sequelae
      A. Fetal anemia

B. Hydrops
C. Fetal loss

B. Screening indications
   1. Vaginal bleeding in pregnancy
   2. Ectopic pregnancy
   3. Blunt abdominal trauma
   4. Within 72 hours of delivery
   5. Abortion (spontaneous or induced)

C. Dosage Schedule
   1. Gestation < 12 weeks dose = 50ug
      A. Ectopic pregnancy
   2. Gestation > 12 weeks dose = 300ug
      A. Trauma

B. Abortion
C. Amniocentesis
   3. MORE may be required following trauma
      A. 300ug/15 ml Rh+ RBCs

11.2.8 Hydatidiform mole (Gestational Trophoblastic Disease) (L)

A. General Considerations
   Definition - neoplasm of the trophoblastic cells
   1. May be complete with no fetus
   2. May be partial with a deformed nonviable fetus
      3. There is a spectrum from Hydatidiform mole to Invasive Mole to Choriocarcinoma

   Risk Factors - General Incidence 1/2000 pregnancies
      A. Asian descent
      B. Prior GTD (Risk is 1% with one prior molar pregnancy and up to 23% with two prior)
      C. Women < 15 years old or > 35 years old
   Definitive diagnosis by histologic specimen only

B. ED Presentation
   1. Abnormal vaginal bleeding (mimics incomplete abortion) in the first or second trimester
2. Nausea / vomiting severe - (Hyperemesis Gravidarum occurs in 23%)
3. Uterine size larger than expected based on dates
4. Preclampsia may occur prior to 24 weeks gestation
5. HYDROPIC VILLI on vaginal exam (“grapelike” appearance)
6. BHCG - higher than expected based on dates
   7. Ultrasound → “snowstorm pattern” (hyperechoic areas interspersed with hypoechoic areas).

C. ED Management
   1. OB Consult – D & E
      A. Need to follow beta HCG to assure no residual neoplasm and do pathologic analysis of specimen (invasive mole / choriocarcinoma)

Underlying illness

Complications During Pregnancy
Amniotic Fluid Embolism
Mortality 60% - 80%
Presentation – sudden cardiovascular collapse / seizure / hypoxemia / DIC
Treatment – supportive / delivery

DVT and Pulmonary Embolism
Risk increases with pregnancy 5 fold with further increased risk post partum and even more after C section
D Dimer may be physiologically elevated during pregnancy
For suspected PE most now do an initial Venous Doppler though this may not detect Pelvic DVT. If positive treat If negative further studies
Pulmonary Angio CT scan has less radiation to fetus than VQ scan
Heparin and LMWH No Coumadin Rivaroxaban is contraindicated

UTI Asymptomatic Bacteruria should be treated Avoid Bactrim No Flouroquinolones as they are teratogenic
Lower urinary tract infections should be treated with 7 days of therapy
Upper urinary Tract infections require IV antibiotics due to Increased risk of Sepsis
Increased risk of premature labor

11.3 Labor, Uncomplicated (L)

A. First Stage
   1. Time from onset of labor to complete cervical dilation (10cm)
2. Nulliparous women - 8 hours
3. Multiparous women - 5 hours

B. Second Stage
   1. Time from cervical dilation to delivery
2. Nulliparous women - 50 minutes
3. Multiparous women - 20 minutes

C. Third Stage
1. Delivery of baby to delivery of placenta
2. Duration 5-10 minutes for both nulliparous & multiparous women
3. Abnormal if > 30 minutes

11.5 Delivery, Uncomplicated (M)

Effacement – thinning of the Cervix
Cervical dilation 0-10 cm
Station Level of the presenting part relative to the maternal ischial spines -3 to +3
Leopold Maneuver - palpation of the abdomen to determine the presentation of Fetus
Cardinal movements – Engagement / Flexion / Decent / Internal Rotation / Extension / External Rotation

11.5 Presentation (M)

A. General Considerations
   1. Portion of fetus foremost in birth canal
2. Vertex (occiput) - 95% of deliveries
3. Breech - 4% of deliveries
4. Transverse lie - 0.5% of deliveries
5. STERILE vaginal exam

11.5 Position

A. General Considerations
   1. Relation of presenting part of the Fetus to birth canal
2. Reference points
   A. Vertex - occiput
   B. Breech- sacrum
3. Reported as left or right

11.5 Lie

A. Relation of long axis of fetus to mother
   1. Longitudinal 99%
2. Transverse 1%
   3. External Podalic Version – manual transabdominal maneuvers to change fetal lie and presentation

11.5 Episiotomy (L) Should not be Routine Use Modified Ritgen maneuver

A. General Considerations – Limit to Shoulder Dystocia or Breech presentation
   1. Benefits
      A. Limits maternal trauma
   B. Facilitates 2nd stage of labor by reducing perineal resistance
   C. Substitutes incision for laceration
      B. Midline episiotomy
         1. Performed along median raphe of perineum
   2. Extends from introitus to anal sphincter
      A. Less painful
   B. Less bleeding
   C. Easier to repair
   D. Less dyspareunia
   E. Increased risk of anal sphincter laceration
   F. Mediolateral Episiotomy preferred
C. Technique
2. Perform when fetal head distends perineum
3. Local infiltration with lidocaine
4. Blunt surgical scissors

Post Delivery Care
Uterine Massage – It should rapidly involute below the umbilicus and be firm
Oxytocin 20 units in 1000 cc NSS @ 200 cc/hr after delivery of placenta
Methergine 0.2 mg IM

11.4  Labor, Complicated

11.4.1 Premature rupture of membranes (M) (PROM )

A. General Considerations
1. Spontaneous rupture of membranes before onset of labor
   A. Premature Rupture of the Membranes prior to 37 weeks = Preterm PROM
   B. It may occur at any gestational age
2. Incidence < 10% of pregnancies

3. Sequelae
   A. Intrauterine infection
   B. Fetal Infection
   C. Premature Labor
   D. Cord prolapse

B. ED Presentation
1. Sudden gush / trickle of fluid
   A. Clear or turbid
2. Document time of rupture
   C. Prolonged Rupture of the membranes occurs if labor does not start within 18 hours
   D. usually the earlier the gestational age the longer the latency period till the onset of labor

C. ED Management
1. STERILE SPECULUM EXAM – avoid digital vaginal exam
   A. Perineal prep
   B. Decreases risk of ascending infection
2. Nitrazine testing
   A. Amniotic fluid pH = 7.0 - 7.5
   B. Vaginal secretions (normal pH 4.5-5.5) = YELLOW
   C. Drop fluid on Nitrazine paper blue if pH > 6.5
   D. Amniotic fluid = BLUE
   E. Blood, semen, lubricant, Trichomonas, mucus = FALSE POSITIVE
   F. Intermittent leak = FALSE NEGATIVE
3. Ferning
   A. Drop fluid on glass slide
   B. Allow to dry
   C. Arborization (fernlike) appearance on microscopic exam due to high NaCl content of Amniotic Fluid
4. GYN Consult -. Management is based on the Gestational age, fetal maturity at the time of rupture, coincident morbidities, and whether labor ensues and if there is clinical
infection. Consider either Ampicillen or Penicillen plus Erythromycin if preterm PROM without infection

11.4.2 Preterm labor (M)

A. General Considerations
   1. Labor, which begins before 37 weeks gestation
2. Incidence 10% of pregnancies
   3. Associated with perinatal morbidity/mortality – leading cause of perinatal death and disease
   4. Risk Factors
      A. Premature Rupture of Membranes
      B. Low-grade infection – Bacterial Vaginosis / UTI / Trichomoniasis
      C. Abruption
      D. Multiple gestations
      E. Cocaine

B. ED Presentation
   1. Contractions four or more times per hour
2. Abdominal pain or Cramps
3. Vaginal pain
4. Backache
5. Vaginal spotting / bleeding

C. ED Management
   1. Estimate fundal height
2. Fetal heart tones
3. Fetal Monitoring
4. Sterile Speculum Exam
   A. R/O PROM
   B. Testing for GC / Chlamydia / Bacterial Vaginosis / Group B Strep)
   5. Lab studies
      A. UA with culture
7. Bed Rest
8. Hydration

D. Tocolytics Indicated for 24-34 week Gestation but not prior to this
   1. DELAY DELIVERY FOR 48 HOURS to allow steroids to promote lung maturity
   2. Beta sympathomimetics / Magnesium / Ca Channel Blockers
      A. Terbutaline 0.25mg subQ
      B. Yutopar (Ritodrine) 50-100ug/min
      C. Magnesium 4-6G over 15-20 minutes the 2-3 grams per hour
      D. Nicardipine or Nifedipine

E. Glucocorticoids
   1. PROMOTE FETAL LUNG MATURATION
2. Indication - suspicion of labor between 24-34 weeks
3. Betamethazone 12mgIM q 24 hours x 2 doses
4. Decadron 6mg IM q12h x 4 doses

F. Antibiotics – Give in consensus with OB consultant
   1. Ampicillen plus Erythromycin
G. Consider Transfer

**Failure to progress (L)**

11.4.3 Fetal distress (M)

A. General Considerations
   1. Initial concern in pregnant patients
   2. Fetal Heart Rate is best indicator of fetal perfusion and health
   3. Fetal heart tones auscultated
      A. Doppler 10-12 weeks
   B. Fetoscope 18-20 weeks

B. Fetal Heart Rate
   1. Normal 120-160 (may have minute to minute variation)
      A. Early Decelerations - Bradycardia at the onset of a contraction – Physiologic due
to fetal head compression
   2. Frequency of evaluation
      A. 1st stage of labor q 15 minutes
   B. 2nd stage of labor q 5 minutes

B. Indications of fetal distress
   A. Prolonged tachycardia
   B. Prolonged bradycardia
   C. Late decelerations (bradycardia lasting greater than 30 sec after a contraction) –
indicates Uteroplacental Insufficiency
   D. Variable Decelerations – sudden drop in fetal heart rate not related to contractions
– indicative of cord compression

C. ED Management
   1. Left lateral decubitus position
   2. Supplemental O2
   3. GYN consult to expedite delivery

11.4.4 Ruptured Uterus (L)

A. General Considerations
   1. Maternal mortality 10-40%
   2. Fetal mortality 50%
   3. Risk Factors
      A. Prior uterine surgery - Prior C-Section < 1% incidence of uterine rupture
   B. Abdominal trauma
   C. Rare without prior uterine surgery or abnormality

B. ED Presentation
   1. Hypovolemic shock
   2. Abdominal pain sharp or shooting
      A. “Something tore”
   3. Chest pain (diaphragmatic irritation)
   4. Cessation of uterine contractions
   5. Prolonged Fetal Heart Rate Decelerations
   6. Abdominal exam → palpable abnormality
   7. Pelvic exam → loss of station
   8. In mild cases ultrasound may reveal the abnormality or hemoperitoneum
C. ED Management
   1. Stabilization
2. Ultrasound → fetus free-floating in the abdomen or hemoperitoneum
   a. ONLY in stable patient
3. Resuscitation / GYN consult for stat C-section. For complete rupture goal is C section within 30 minutes to prevent fetal loss

11.6 Delivery, Complicated

11.6.1 Presentation (M)

A. Breech Presentation 3-4 % of term pregnancies – The most common abnormal presentation
   1. Risk Factors
      A. Prematurity # 1 (25% pregnancies breech @ 28 weeks 7% Breech @ 32 weeks)
      B. Multiple fetuses (Twins increases likelihood of one being breech to 60 %)
   C. Prior breech

2. Sequelae
   A. Increased fetal morbidity/mortality is 3-4 times greater than vertex presentation
   B. Low birth weight due to prematurity
   C. Higher Incidence of Fetal distress
      D. Prolapsed cord
      E. Head Entrapment

3. ED Management → OB Consultation Stat
   A. Frank and Complete - - may deliver spontaneously – do not pull let delivery happen spontaneously
   Footling or Incomplete Breech should not be delivered Vaginally

B. Face or Brow Presentation
   2. ED Management – can usually be delivered vaginally
      A. Internal rotation of face by bringing chin under pubic symphysis
B. OB Consultation for C Section

C. Transverse lie
   1. Shoulder presentation

2. ED Management
   A. External Podalic Version
B. OB Consultation for C Section

D. Compound presentation
   1. General Considerations
      A. Extremity prolapse next to presenting part
   B. Risk factor - preterm labor
   C. Sequelae → increased perinatal loss
2. ED Management —> LEAVE PROLAPSED EXTREMITY ALONE let labor progress. Trying to push the extremity back up into the birth canal increases complications.

E. Persistent occiput posterior
   1. NO spontaneous rotation (10% of deliveries)

2. ED Management
   A. Spontaneous delivery
   B. Forceps delivery - rotate to occiput anterior
   C. Manual rotation to occiput anterior

F. Persistent occiput transverse
   1. Usually converts spontaneously to anterior

2. ED Management
   A. Manual rotation
   B. Forceps rotation
   C. C-section

11.6.2 Dystocia (M) – Poor Progress of Labor

A. General Considerations
   1. MOST COMMON INDICATION FOR C-SECTION

2. Abnormally slow progress of labor
3. Etiology
   A. Abnormality of expulsive forces (uterine dysfunction)
   B. Abnormality of presentation/position / fetal development
   C. Abnormality of maternal bony pelvis or birth canal

B. Shoulder dystocia The second most common abnormal presentation behind breech
   1. Fetal shoulders impacted in pelvic outlet – Turtle Sign

2. Incidence < 1% of deliveries
3. Sequelae
   A. Increased fetal morbidity/mortality
   B. Increased Maternal hemorrhage

4. ED Management
   A. WIDE episiotomy
   B. McRoberts Maneuver
      Extreme lithotomy position
      Suprapubic pressure to dislodge the anterior shoulder
   C. Wood Corkscrew maneuver
      Rotate the fetus 180 degrees
   D. Do not apply direct traction to the head or fundal pressure on fetus,
   E. OB Consultation for Rotational Maneuvers

11.6.3 Prolapsed cord (M)

A. General Considerations
   1. Incidence < 1% of deliveries There is a 15 % Fetal mortality

2. Cord passes ahead of fetus
3. Cord is compressed by maternal contractions
4. Usually occurs AFTER membranes rupture
5. Diagnoses
   A. Palpation on vaginal exam
   B. Visualization thru introitus

ACOEP Emergency Medicine: An Intense Review
Chicago, Illinois
B. Risk factors
1. Prematurity
2. Premature Rupture of Membranes
3. Breech delivery or other abnormal presentations
4. Multiple pregnancies

C. ED Management
1. Manual pressure on presenting part
2. The mother should be instructed not to push!!!
3. Do Not Stuff the cord back up into the uterus
4. Trendelenberg or knee-chest position
5. Tocolytics (ritodrine or terbutaline)
6. Bladder instillation of 500cc saline
7. Stat C Section if Fetal Heart Beat (Good fetal outcome if C section done within 10 minutes) Time to C section important
8. Vaginal Delivery if no Fetal Heart beat
9. Some advocate that if there is no availability of C section consider attempting to replace the cord into the uterus (Funic Reduction)

12.8 Postpartum Complications

11.7.1 Post Partum Hemorrhage (M)

General Considerations - # 3 cause of pregnancy related death (behind VTE #1 and Hypertension #2)
Primary Postpartum Hemorrhage - Vaginal bleeding < 24 hours post delivery

A. Uterus post partum should be firm globular and below the umbilicus
B. Treatment – massage / pitocin / methergine

Uterine rupture – Described previously
A. Something tore / prior uterine surgery - Surgical repair

Laceration of the lower genital tract
A. Detected on speculum exam - repair

Retained placenta or products of conception
Uterus tends to be larger and boggy feeling
B. Detectable on Ultrasound
C. Crystalloids
D. Oxytocin
E. Tx is D & E

Uterine inversion
A. No uterus palpable on abdominal exam
B. Speculum exam reveals mass in the vaginal vault

Coagulopathy
A. It is not uncommon for Von Willebrands to manifest itself at this time.
B. DIC may occur in with abruption ecclampsia or Amniotic Fluid Embolism
C. Blood in a red top at bedside should clot within 7 minutes.

Management of post partum hemorrhage
Exam (R/O laceration / uterine inversion)
Ultrasound R/O retained tissue
Coags / fibrinogen / Hb
Fluid resuscitation / blood transfusion
Management of coagulopathy
Increase uterine contractility
Secondary Postpartum Hemorrhage Vaginal Bleeding > 24 hours – 6 weeks post partum

Physiologic vaginal bleeding can occur for up to 5 weeks post delivery.

11.6.4 **Retained placenta (See 12.8.1) (M)**

A. General Considerations
   1. UTERINE ATONY - MOST COMMON CAUSE
      A. Myometrium fails to contract
   B. Uterus soft/boggy
      C. Rx → manual massage Pitocin 20 units in 1000cc NSS @ 200 cc/hr Methergine 0.2 mg IM
   2. Placenta Accreta
      A. Placenta abnormally adherent to uterus
         1. Cleavage plane NOT developed
      B. ATTEMPTS AT REMOVAL CAN CAUSE CATASTROPHIC BLEEDING

11.6.5 **Uterine inversion (M)**

A. General Considerations
   1. Etiology - strong cord traction at delivery with fundally implanted placenta
      A. Placenta accreta - small percent of cases
   B. ED Presentation
      1. Vaginal bleeding
      2. Shock out of Proportion to the apparent Blood Loss
      3. Abdominal exam → uterus NOT palpable
      4. Pelvic exam
         A. Visualization of fundus externally or in the Vaginal Vault
   B. Palpation of fundus near cervical os
   C. ED Management
      1. Rx shock / hemorrhage
      2. Reposition (manual) uterine corpus - Effective in 1/3 of cases
      3. Placenta is left attached till repositioning is complete
      4. Stop Uterotonic agents
      5. Pharmacologic agents to relax the uterus re: Tocolytics may relax the uterus if manual repositioning fails
      6. Oxytocin after repositioning may prevent re-inversion

11.6.6 **Multiple births (M)**

A. General Considerations
   1. HIGHER PERINATAL MORTALITY
   2. Increased incidence of sequelae
      A. Abnormal fetal position is much more common and occurs in 60%
B. Abortion
C. Low birth weight

ACOEP Emergency Medicine: An Intense Review
Chicago, Illinois
D. Malformation

**Emergency Cesarean Section (Perimortem)**

A. Factors predictive of fetal survival – futile if < **24 weeks gestation** or > **20 minutes** of maternal cardiac arrest.

1. **Gestational age** > 24 weeks (fetal weight > 1000g) – Measurement from the pubes to the fundus is at 24 cm or more there is the potential for fetal viability. If the fundus is > two fingerbreaths above the umbilicus the gestation should be > 24 weeks.

2. Interval between maternal death and delivery
   - A. < 5 minutes → best possibility of fetal survival
   - B. There is a single recorded case of intact fetal survival 22 minutes after maternal cardiac arrest
   - E. There is no case reports of live birth beyond 25 minutes

3. Maternal cause of death
   - A. Fetal chances improved if unrelated to chronic hypoxia and the pregnancy was healthy prior to the Cardiac Arrest

4. Fetal status prior to maternal death

5. Quality of maternal resuscitation
   - B. All incisions should be in the vertical plane to avoid major vascular structures

11.7 Postpartum Complications

11.7.2 Endometritis (M) – Fever / Foul Lochia / Tender Boggy Uterus

A. General Considerations
   1. The most Common serious complication of the puerperium
   2. More common after C section (C-Section is the biggest risk factor)
   3. Other Risk Factors – PROM / Multiple digital exams / Multiple Gestation / Young Maternal Age / Low socioeconomic status / Fetal Monitoring
   4. R/O UTI / Respiratory Tract / Mastitis / Thrombophlebitis

B. ED presentation
   1. Fever
   2. Foul lochia
   3. Boggy / tender uterus

C. ED Management - Polymicrobial – Mycoplasma / Chlamydia / Gardnerella
   Mild cases - no C-Section – oral antibiotics – Doxycycline if not breast feeding
   Moderate or greater symptoms or C-Section or comorbidities
   1. Admission

2. IV antibiotics
   - A. Cefoxitin or other Beta Lactam
   - B. Clindamycin and Gentamycin
   - C. Metronidazole plus Ampicillin and Gentamycin

11.7.3 Mastitis (L)

A. Breast Engorgement

ACOEP Emergency Medicine: An Intense Review
Chicago, Illinois
1. Bilateral (usually)
2. Usually occurs 3-5 days postpartum or when breast feeding is discontinued
3. Presentation usually “painful” breasts
4. Sensation of breast fullness
5. AFTER breast feeding discontinued
6. Low-grade fever
7. ED Management
   A. Analgesics
   B. Pump breasts
   C. Breast binding
   D. Ice

   B. Postpartum Lactation Mastitis
   1. Unilateral (but may present with nonfocal symptoms)
   2. Painful
   3. Fever Chills Flu like symptoms
   4. Commonly present during first 2-8 weeks post partum
      A. Early on when just starting breast feeding
      B. Later when teeth develop in infant
   5. Etiology - Staph from oropharynx of neonate
   6. ED Management
      A. Antibiotics (Keflex or Dicloxacillin)
      B. Analgesics
      C. Warm showers / compresses
      D. Expression of milk (Breast Pump)
      E. Supportive bra
      F. MAY continue to breast feed
   C. Breast abscess
      1. Focal fluctuance
   2. Increased tenderness to palpation
   3. ED Management
      A. Incision and Drainage
      B. Antibiotic - Cephalosporin / Clindamycin / Trimethoprim sulfamethoxazole
      C. Stop Breast feeding from that breast

Genital Tract Disorders / Female

Ovarian Disorders –

Ovarian Cyst (L)

Ovarian Cysts are frequently asymptomatic unless there is rupture / hemorrhage / torsion / or large cysts with mass effect

More common in reproductive years due to ovulation
Cyst may be simple cysts - Fluid filled and thin walled
   Follicular Cysts due to formation prior to ovulation > 2.5 cm
   Corpus Leuteum cysts if formed after ovulation > 3.0 cm
Cysts may be complex with septations
   Re Dermoid Cysts / Hemmorhage into cysts (Chocolate cysts)

Dx via Ultrasound
Prognosis – most simple cysts resolve spontaneously within two menstrual cycles. Cysts which are solid multiloculated or > 5 cm need further evaluation. Unilateral simple cysts < 8 cm are usually observed.

Tx – observation for the majority further evaluation for complex.

Polycystic Ovarian Syndrome – Triad of Obesity / Hirsutism / Oligomenorrhea

Ovarian Torsion – ischemia due to twisting of the vascular pedicle (M)

Almost all cases of Ovarian Torsion is associated with a Cyst or Mass or otherwise abnormal ovary though this may not be known prior to the torsion. May be associated with pregnancy or hyperstimulation with invitro fertilization or infertility treatment. There is a dual blood supply to the Ovary from the Ovarian Artery and Uterine Artery. Torsion initial obstructs venous and lymphatic flow then arterial flow and eventually there is venous and arterial thrombosis though decreased flow may be intermittent. May occur after Trauma or Intercourse. Statistically more common on the right. Up to half of patient may have the diagnosis missed at their first visit.

Clinical presentation – usually sudden and severe unilateral but can be intermittent bilateral and not severe. Most commonly woman of child bearing years. May have Nausea. Lab findings are inconsistent.

Adnexal mass and tenderness on exam usually.

Dx – Clinical presentation and Ultrasound with Doppler Flow evaluation. The Ultrasound usually reveals an enlarged ovary, ovarian mass, or large cyst. An ultrasound revealing a normal ovary makes the diagnosis very very unlikely. The Doppler flow may show abnormal venous flow / whirlpool sign / decreased arterial blood flow (Since there is blood flow from the uterine as well as ovarian artery it is rare to have no arterial flow to the ovary. Ct may be suggestive but is far less sensitive.

Treatment – This is a Surgical Emergency. Surgery within 8 hours has good chance of ovarian salvage. Surgery after 24 hours usually results in loss of the ovary.

Ovarian Tumors (L)

Incidence - 1 % - 2 % with no family history.
Risk Factors Family History, infertility, low parity, breast or colon cancer, (BCP decrease risk).
Presentation - peaks 55-65 years old / frequently present late in the disease with nonspecific signs – abdominal pain bloating ascites.
Female presenting to the ED with Ascites is gynecologic malignancy till proven otherwise.
Diagnoses CT Ultrasound no ED paracentesis.
Tx – Surgery / Chemotherapy / Radiation.

Vagina and Vulva

Vaginal Foreign Bodies (L)

Not infrequent in children or adolescents – most frequently toilet paper may be a cause of persistent vaginal discharge and irritation.
Adults - most frequently Tampon or sponge contraceptive.
May be associated with Vaginal discharge if in > 48 hours.
Treatment is FB removal.
Imperforate Hymen – presents at menarche (L)
- Symptoms: cyclic abdominal pain, failure to menstruate, abdominal mass or urinary retention
- May be associated with vaginal anorectal urethral or spinal abnormalities
- Exam: bulging shiny blue or purple mass in the genital area (Hematocolpos)
- Treatment: Surgical

Uterine Disorders

11.8.3.1 Endometriosis (L)
- Incidence: Common cause of cyclic abdominal pain in childbearing females
- Due to retrograde menstruation with seeding
- Endometrial Glands located most commonly on Ovaries and Pelvic peritoneum but may be anywhere in the abdomen. When endometrial glands are within the uterine wall they are Adenomyoma
- Pain usually cyclic at the time of menstruation but may become chronic with pelvic adhesions
- May cause infertility
- Ultrasound may show endometriomas
- Definitive diagnosis based on direct visualization during laparoscopy
- Treatment: Pain management with NSAID and referral for Hormonal therapies

11.8.3.2 Dysfunctional Uterine Bleeding (M)
- Menarche ave age 12.5 / Menopause Ave age 51
- Normal menstrual cycle is 21-35 days
- Normal Menstrual Flow 2-7 days
- Normal Menstrual quantity 25cc- 60cc
- Menorrhagia - regular bleeding with heavy flow or long duration
- Metorrhagia – irregular bleeding
- Menometorrhagia – Excessive irregular vaginal bleeding
- Normal Menstrual Cycle 28 days – Menstrual / Follicular / Ovulatory / Luteal phase
- Menstrual phase is vaginal bleeding due to endometrial sloughing usually lasts 4 days and the menstrual flow is 25cc – 60 cc (Days1-4)
- Follicular Phase - Ovarian follicles mature for ovulation with increasing estrogen production which stimulates endometrial proliferation and thickening (Days 5-14)
- Ovulatory Phase - release of a mature oocyte
- Luteal Phase: The residual follicular capsule forms the corpus leutum which secretes estrogen and progesterone which maintains the endometrium receptive to implantation.(Days 15-28).
- In the absence of fertilization and implantation the corpus leutum involutes and the Estrogen and progesterone level drop and this causes constriction of the spiral arteries with menstrual sloughing
- Dysfunctional Uterine Bleeding is a diagnosis of exclusion in females of child bearing years after pregnancy, anatomic, and systemic causes have been excluded
  - Anovulatory – Most common etiology - due to a disruption of the normal hypothalamic pituitary ovarian axis where there is no ovulation.
  - Ovulatory - Less common

Anovulatory cycles Presentation – amenorrhea followed by Menorrhagia – usually painless
- Pelvic Ultrasound may be helpful in excluding certain anatomic causes and also determining if it is due to low estrogen (Endometrium<4 mm) or increased estrogen (thickened endometrium)
Etiology in adolescence - immature hypothalamic pituitary ovarian axis – there is estrogen without ovulation and thus no increasing progesterone

Treatment Oral contraceptives if significant bleeding may facilitate establishment of an ovulatory cycle

Persistent light bleeding associated with anovulation
Treatment – Progesterone only

Resuscitation as indicated, Rarely need Emergent D & E

The job of the Emergency Physician in stable patients is should focus on appropriate referral and not initiating a long term treatment plan

11.8.3.3 Tumors of the Uterus (L)

**Uterine Fibroids - Leiomyomas** - benign muscle cell tumors
May be Subserosal, Submucosal, Intramural, or pedunculated
Most common – 50 % African American 25 % White females
Increase in size during menopause and early in pregnancy
Presentation up to 30 % may cause pain and bleeding
Diagnosis – mass on Physical Bimanual exam / Ultrasound
May cause severe pain if they degenerate loose blood supply or are subserosal pedunculated and have torsion at the pedicle
Treatment – NSAIDS / medroxyprogestrone / Surgical removal / Arteriolar embolization
High rate of recurrence

**Uterine Adenomyosis** – endometrial glands grow into the myometrium
Present as bleeding and pain treated symptomatically rarely surgically

**Uterine Cancer**
Most commonly post menopausal (age 58) Adenocarcinoma
Presents as post menopausal bleeding
Treatment Surgery  Radiation Chemotherpay

11.8.3.4 – Uterine Prolapse (L)
Most common after Age 50
Due to weakened muscles of the pelvic floor- pregnancy
Diagnosis - Physical exam
Four Stages
Treatment
- Mild cases Kegel exercises
- Pessary
- Estrogen Replacement therapy
- Surgery

Cervix

11.8.4.1 Cervicitis (L)
Inflammation of the Cervix most commonly due to Chlamydia Trachomatis, Neisseria Gonorrhea, Herpes genitalis or Human Papilloma virus
Frequently can be asymptomatic (75 % of Chlamydia)
When symptomatic can have nonspecific complaints abdominal or genital pain vaginal bleeding vaginal discharge or lesions (Herpes and HPV)
Chlamydia and Neisseria are frequent co-infections
Complications include Pelvic inflammatory Disease (up to 40% of untreated Chlamydia 20% Neisseria) & Cervical Cancer (HPV)

Diagnosis – Nucleic Acid Amplification Test – cervical swab better than urine specimen
   Reserve culture for resistance, or forensic, or suspected child sexual abuse

Refer or test for HIV

Treatment – Recommend liberal treatment from the ED since follow up and compliance is poor. Recommend treatment for both Chlamydia and Neisseria. Recommend single treatment doses in the ED when at all possible due to issues with compliance
   Fluoroquinolones  not recommended for GC since April 2007

Gonorrhea – Ceftriaxone 125 mg IM
   Chlamydia - Azithromycin 1 gram PO (Doxycycline 100 mg BID for 7 days)
   Herpes - Acyclovir 200 mg 5 times a day 7-10 days
   Trichomonas – Metronidazole 2 grams PO

No sexual activity for 7 days after treatment is completed
   Sexual partners within past 60 days need treatment no sexual activity till partner treated

11.8.4.2 Tumors –Cancer of Cervix (L)
   Ave age 50 s’
   Risk Factors Human Papilloma Virus, Early Coitus with multiple partners
   In a HIV positive patient is an AIDS defining illness
   Presentation most frequently post menopausal vaginal bleeding
   Treatment Surgery / Radiation
   With recurrence may have DVT and or Ureteral Obstruction

Infectious Disorders

11.8.5.1 Bartholin Abscess (M)
   Infection of a Bartholin gland – frequently a mixed infection (can have Chlamydia and or GC)
   Cysts is a painless lump / Abscess is painful
   Symptoms  - swelling and pain lower lateral vagina redness and fluctuance
   Treatment I & D – on the mucosal surface just lateral to the hymenal ring
   Iodoform gauze packing, penrose drain or Word catheter will prevent recurrence
   Sitz baths
   Word Catheter 10 french 2.5 cm long catheter with 5 cc balloon – leave in 4-6 weeks
   Marsupialization - suturing skin to wall of the cyst
   Antibiotics only for concurrent cervical infections or complicating cellulitis

11.8.5.2 Pelvic Inflammatory Disease (H)
   An ascending infection infection from the cervix and vagina
   Etiology - Chlamydia Trachomatis and Neisseria gonorrhoea are the etiologic agents in most however it frequently may progress to polymicrobial as the infection progresses
   (Mycoplasma, Hemophilus, Strep, Gardnerella, Ureoplasma, anaerobes) Chlamydia is the most commonly identified bacteria. Usualy due to STD. In rare cases PID may be present without sexual contact
   Up to 20% - 40% of untreated cervicitis will progress to PID
   Infection may progress from the uterus and tubes to the peritoneum and involve the hepatic capsule (FitzHugh-Curtis Syndrome)
   Risk factors – Young age / multiple sexual partners / active menstruation / IUD
   Pregnancy decreases the risk of PID due to thickened cervical mucus plug but it can occur
first trimester
Complications – Tuboovarian Abscess, Ectopic pregnancy, Tubal infertility, Chronic Pelvic pain.
Presentation – Usually Lower Abdominal Pain in a sexually active female usually with Vaginal Discharge. May have fever (Commonly presents 3-5 days after menstruation)
Diagnostic Testing – Leukocytosis, Elevated sedimentation rate and Elevated C reactive protein increase specificity however are not necessary to make the diagnosis. Asses pregnancy test. Blood cultures not indicated. Diagnostic testing for GC Chlamydia as well as RPR and HIV testing.
The absence of leukocytes in saline prep of the vaginal secretions makes the diagnosis unlikely.
Pelvic Ultrasonography - indicated particularly in toxic appearing patients or significant unilateral signs to asses for tubo-ovarian abscess or pelvic abscess (complex adnexal mass with multiple internal echos)
Endometrial biopsy may confirm the diagnosis
Laparoscopy – it’s sensitive and specific but invasive,
Diagnosis – should be based on clinical findings and not laboratory results due to a lack of a sensitive and specific test. Due to complications if undiagnosed use low threshold for treatment - CDC Criteria for Diagnosis and treatment - Lower abdominal pain in a sexually active female with Cervical or Uterine or Adnexal tenderness without another clear cause.
Treatment – There is no improved efficacy in Oral vs IV antibiotics. Antibiotics should cover all possible organisms Neisseria, Chlamydia, Streptococci, Gram negative organisms and Anaerobes. Treat for 14 days
IUD should be removed after antibiotics have been initiated
Admission – Pregnant, surgical abdomen cannot be ruled out, Toxicity, Vomiting, Tuboovarian Abscess, IUD, Failure to improve in 48 hours with oral treatment
Inpatient – Cefoxitin and Doxycycline / Clindamycin and Gentamycin
Outpatient – Ceftriaxone 250 mg IM times one with Probenecid plus Doxycycline with or without Metronidazole
Partners must be treated (within 60 days of symptoms) Education on barrier protection

11.8.5.2.1 Tuboovarian Abscess (H) – suspect in unilateral symptoms diagnosed by ultrasonography or Laparoscopy. Must include anaerobic coverage. Requires IV antibiotics. Most do not require drainage

11.8.5.2.2 FitzHugh-Curtis Syndrome (L) – Perihepatitis inflammation of the liver capsule with the development of adhesions to the anterior abdominal wall
Presentation RUQ pain days to weeks after Pelvic inflammatory disease. May be due to Gonorrhea or Chlamydia. Normal transaminases and GB US

11.8.5.3 Vulvovaginitis (M) – Inflammation of Vaginal Tissues
During Childbearing years estrogen causes the development of thick vaginal epithelium with glycogen that in the normal flora of lactobacillus and corynebactrium produces lactic and acetic acid and a physiologic vaginal pH of 4.0-4.5. Alkalinity during menstruation or semen increase likelihood of infection

All of the infectious agents causing vaginitis can be present in asymptomatic patients

Bacterial Vaginosis – the most common infectious vaginitis.
Increased Gardnerella Vaginalis and Mycoplasma Hominis overgrowth replacing lactobacillus creates pH > 4.5
Discharge is usually thin and grayish white may have “fishy” odor

Diagnosis requires at least three of the below (Amsel Criteria)
Discharge
Clue Cells on Saline prep (epithelial cells coated with bacteria)
P pH > 4.5
Positive whiff test (KOH plus discharge = Fishy odor)

(There are commercial bedside tests where secretions are put on a card and assessment for pH > 4.7 and presence of trimethylamine)

Complications increased risk of PID and if pregnant preterm labor and PROM
Treatment - Metronidazole orally 500 mg BID for 7 days (even if pregnant) Metronidazole Gel BID for 5 days or Clindamycin cream daily for 7 days
Sexual partners do not require treatment

**Candida Vaginitis**
Overgrowth of *Candida Albicans* upsetting normal balance of Vaginal Flora
Increased with antibiotics / DM /
Vaginitis frequently is very pruritic
Diagnosis
- Cottage Cheese (not malodorous) vaginal discharge
- Severe pruritus - most common and specific symptom
- Normal Vaginal pH 4.0-4.5
- Hypha - with two drops of 10% KOH that lyses epithelial cells making the Hyphae more visible
Treatment – Azoles more effective than nystatin. One Fluconazole 150 mg PO or topical Azoles (Cream or vaginal tablet) are equally effective. In pregnant patients - topical Azoles only. Complicated, severe, or recurrent infections or susceptible host require longer courses of treatment
Sexual partners do not require treatment

**Trichomonas Vaginitis** - almost always an STD
Caused by Trichomonas Vaginalis a motile pear shaped flagellated protozoan
Presentation - classically frothy malodorous yellow discharge with pain and pruritis a “Strawberry Cervix”
Diagnosis –
- “Hanging drop”- Swab in NSS on slide reveals pear shaped flagellated Trichomonads
- pH of Vagina is > 4.5

There is a bedside rapid antigen detection test
Complications if pregnant include PROM and Preterm delivery
Increased risk of PID
Treatment – Metronidazole 2 gram single dose or 500 mg BID 7 day regimen
Pregnant patients should be treated with Metronidazole 500 mg BID for 7 days
Metronidazole gel is not recommended as it’s not as efficacious as oral therapy

Sexual partners need treatment. Efficacy improves if partner is treated. No sexual relations till both partners have completed treatment. No alcohol till 72 hours after treatment has been completed due to disulfiram like reaction

**Appearance**
- Bacterial Vaginosis: Thin grey
- Candidiasis: White Cottage Cheese
- Trichomonas: Frothy Yellow

ACOEP Emergency Medicine: An Intense Review
Chicago, Illinois
**Genital Herpes**
Sexually transmitted – even during asymptomatic periods
Most cases are HSV 2 but can be HSV 1 (HSV 1 tends to be milder with less recurrence)
It tends to be recurrent and is managed not cured
First episode is the longest and worst
Vesicles and ulcers are very painful. The initial outbreak tends to be associated with
systemic symptoms and adenopathy and can even have aseptic meningitis. Duration of
the initial attack is about 2-3 weeks with about 3 weeks of viral shedding. Recurrences
tend to last much shorter and have only mild local symptoms and have shorter duration of
viral shedding (3 days)
Diagnosis
  - Typical symptoms and Physical Findings – grouped vesicles on erythematous base
  - Herpes Culture (taken from the base of an ulcer) recommended by CDC
  - Tzanck smear on scrapings from an ulcer stained with Wright or Giemsa stain
    reveals multinucleate giant cells is not currently recommended
Complications – Pneumonia Encephalitis Hepatitis
In pregnant patients near delivery may results in severe neonatal infections. Acyclovir
does not appear to cause major birth defects
Treatment – Acyclovir / Famcyclovir / Valcyclovir decrease pain, constitutional symptoms,
and shorten the course and shorten viral shedding
Severe episodes or complications may require IV Acyclovir
Treat initial episodes  7-10 days at Higher doses
Treat recurrences  5 days at lower doses
Suppressive therapy for patients with 6 recurrences or more per year

**Contact Vulvovaginitis** – contact with douches feminine hygiene products
  - Treatment is topical steroids and avoidance

**Atrophic Vaginitis**
Common during menarche / pregnancy / lactation / menopause
  - Lack of estrogen causes thinning of the mucosa with pH of 5.5 – 7.0
  - Treatment during menopause is topical estrogen

**Enterobius Vermicularis** – Pinworms – may migrate from the anus to the vagina in
children
  - Severe pruritis esp at night
  - Scotch tape test
  - Treatment Mebendazole 100 mg one dose repeat in two weeks

11.8.5.4 Urethritis (L)
Classically divided into Gonococcal and Non Gonococcal
UA revealing > 10 wbc / hpf or Positive Leukocyte esterase
Chlamydia Trachomatis is the most common cause of nongonococcal urethritis Other
etiologies are Trichomonas Vaginalis / Ureaplasma Urealyticum / Mycoplasma
Genitalum.

Treatment should be for both
  Gonococcal – Ceftriaxone 125 mg IM
  Chlamydia - Azythromycin 1 gm PO
  Trichomonas – Metronidazole 2 gm PO
Sexual partners need to be treated
Recurrent infections - consider reinfection due to untreated partner.

**Sexual Assault (M)**

Nearly 1 % of all violent crimes however it’s thought that only 1 out of 3 is reported
In most sexual assaults the victim knows the assailant
Toludine Blue dye can be used to detect small vulvar lacerations unapparent to the naked
eye especially when using the magnification of a colposcope. Most commonly injuries are to
the posterior fourchette. Do this prior to any speculum exam
Evidenciary exam is performed if the assault has been within 72 hours
Maintain a chain of evidence
Woods lamp exam may reveal semen stains
Urine for drug testing in cases of suspected drug facilitated sexual assault
Sexual Assault Evidence Collection kit is commonly used
Sexual Assault Nurse Examiner Program
Labs - Preg test / Alcohol / Toxicology / possible specific toxicology -date rape drugs may
need to be specifically tested for Rohypnol or GHB. Alcohol is the most commonly used date
rape drug
Treatment

**Pregnancy prophylaxis** should be given within 72 hours but may be given up to 5 days. The
shorter the time interval from assault to treatment the more effective the pregnancy prevention
(risk of pregnancy ranges from 2 % to 30 % depending on when in the cycle the assault occurred
Yutzpe method 2 Ovral stat and then 2 in twelve hours with an aniemetic one hour prior has
largely been replaced by
Plan B (Levonorgestrel) one stat and then another in 12 hours less Nausea and vomiting
more efficacious OTC since 2007

**Sexually Transmitted Disease prophylaxis**
Recommend Treatment to prevent Gonorrhea, Chlamydia, Tichomonas, and Hepatitis B.
Pretreatment testing is not indicated
Ceftriaxone 125 mg / Azithromycin 1 gram / Metronidazole 2 gram / Hepatitis B Vaccine in
the unimmunized with scheduled follow up for two additional doses Hepatitis B
immunoglobulin not recommended

**HIV Counseling**
Risk of contracting HIV depends on multiple factors and most of the time the HIV status of the
assailant is not known. The risk of contracting an infection from an HIV positive individual
after one episode of receptive vaginal intercourse is estimated approximately 0.1% - 0.2%
however anal intercourse and trauma increases that risk. An assailant with a known high
viral load or if the assailant come from a high prevalence population where the underlying
prevalence of HIV is > 30 % the risk also increases. Current recommendations – If post
exposure prophylaxis if started should be within 72 hours. Any evidence comes form the
healthcare worker exposure literature. Repeat HIV testing in 6 weeks 3 months and 6 months
Vaginal Sexual Assault without injury or bleeding by an assailant of unknown HIV status in a low prevalence population does not recommend HIV prophylaxis.

Anal Sexual Assault or Assault with Injury or bleeding esp by a known HIV positive patient or someone from a high prevalence population recommend HIV prophylaxis.