

OBSTETRICS

Uworld Step 2 Tables and Images (Subject)

<https://t.me/UWorldNotesStep2>

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Pregnancy, Childbirth & Puerperium

Disorders of pregnancy, childbirth, and puerperium

ABORTION

Septic abortion

Risk factors	Retained POC from: <ul style="list-style-type: none">• Elective abortion with nonsterile technique• Missed or incomplete abortion (rare)
Clinical presentation	<ul style="list-style-type: none">• Fever, chills, abdominal pain• Sanguinopurulent vaginal discharge• Boggy, tender uterus; dilated cervix• Pelvic ultrasound: retained POC, thick endometrial stripe
Management	<ul style="list-style-type: none">• Intravenous fluids• Broad-spectrum antibiotics• Suction curettage

POC = products of conception.

Spontaneous abortion

Definition	<ul style="list-style-type: none">• Pregnancy loss <20 weeks
Risk factors	<ul style="list-style-type: none">• Advanced maternal age• Previous spontaneous abortion• Substance use disorder
Treatment options	<ul style="list-style-type: none">• Expectant• Medical induction (misoprostol)• Suction curettage if infection or hemodynamic instability
Additional management	<ul style="list-style-type: none">• Rho(D) immunoglobulin• Pathology examination
Complications	<ul style="list-style-type: none">• Hemorrhage• Retained products of conception• Septic abortion• Uterine perforation• Intrauterine adhesions

Abortion types



Missed

- No vaginal bleeding
- Closed cervical os
- No fetal cardiac activity or empty sac



Threatened

- Vaginal bleeding
- Closed cervical os
- Fetal cardiac activity



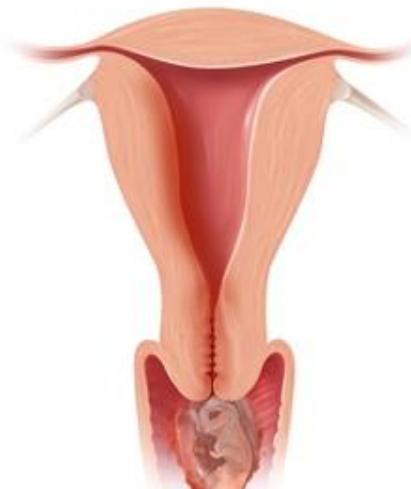
Inevitable

- Vaginal bleeding
- Dilated cervical os
- Products of conception may be seen or felt at or above cervical os



Incomplete

- Vaginal bleeding
- Dilated cervical os
- Some products of conception expelled & some remain



Complete

- Vaginal bleeding
- Closed cervical os
- Products of conception completely expelled

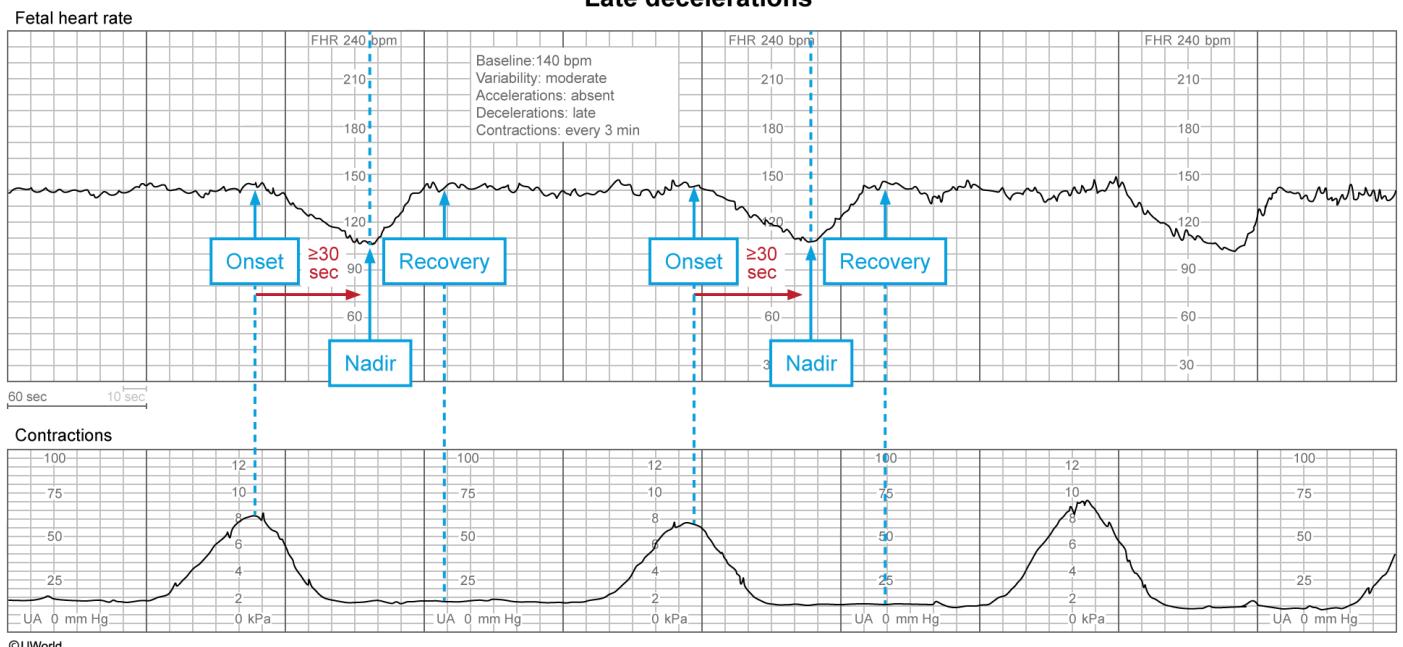
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Abortion types

Acute fatty liver of pregnancy

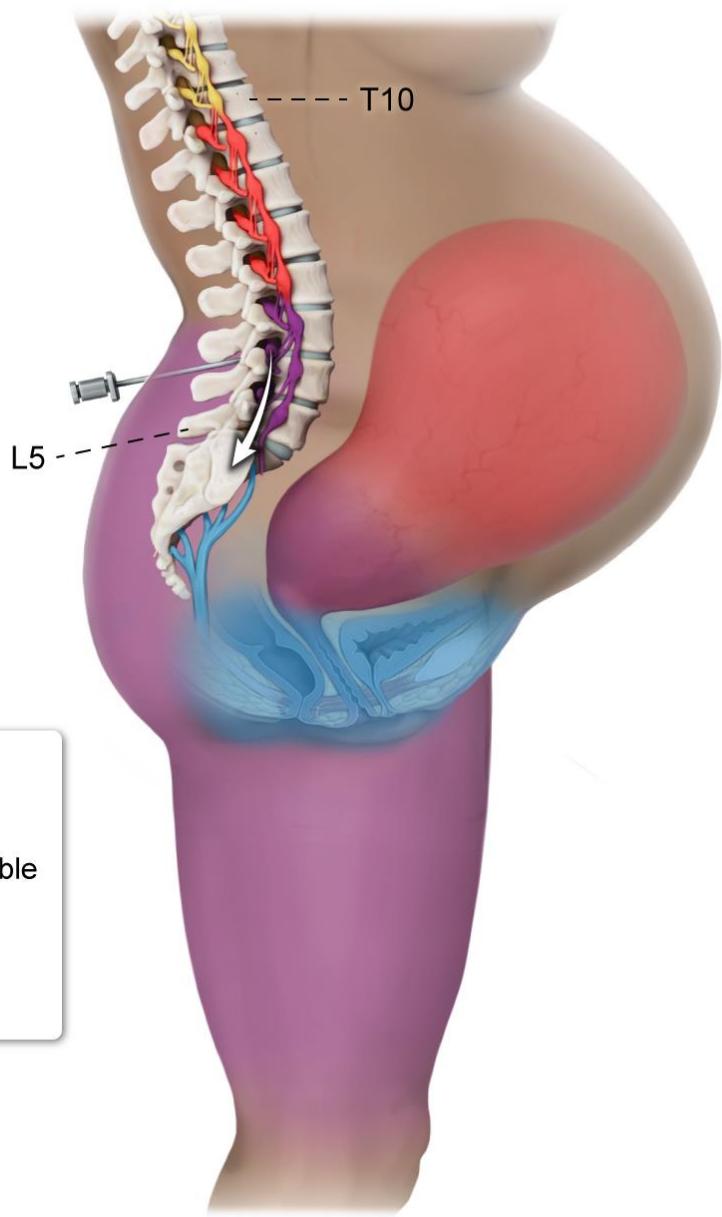
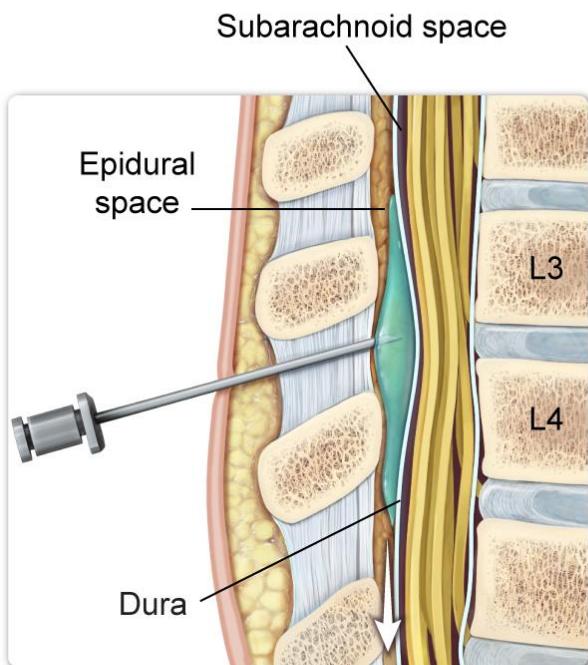
Clinical features	<ul style="list-style-type: none"> • Nausea, vomiting • Right upper quadrant/epigastric pain • Fulminant liver failure
Laboratory findings	<ul style="list-style-type: none"> • Profound hypoglycemia • ↑ Aminotransferases (2-3x normal) • ↑ Bilirubin • Thrombocytopenia • Disseminated intravascular coagulopathy
Management	<ul style="list-style-type: none"> • Immediate delivery

Late decelerations



Late decelerations

Labor epidural analgesia



- T10-L1: blocks pain fibers during first stage of labor
- L2-L5: blocks sympathetic fibers responsible for lower extremity blood vessel tone
- S2-S4: blocks pain fibers during second stage of labor

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Labor epidural analgesia

Abruptio placentae

Definition	<ul style="list-style-type: none"> • Placental detachment from the uterus before fetal delivery
Risk factors	<ul style="list-style-type: none"> • Hypertension, preeclampsia • Abdominal trauma • Prior abruptio placentae • Cocaine & tobacco use
Clinical presentation	<ul style="list-style-type: none"> • Sudden-onset vaginal bleeding • Abdominal or back pain • High-frequency, low-intensity contractions • Rigid, tender uterus
Diagnosis	<ul style="list-style-type: none"> • Clinical • Ultrasound: ± Retroplacental hematoma
Complications	<ul style="list-style-type: none"> • Fetal hypoxia, preterm birth, mortality • Maternal hemorrhage, disseminated intravascular coagulation

Abruptio placentae

Definition	<ul style="list-style-type: none"> • Premature placental separation from uterus
Risk factors	<ul style="list-style-type: none"> • Hypertension, preeclampsia • Abdominal trauma • Cocaine or tobacco use • Prior abruptio placentae
Clinical features	<ul style="list-style-type: none"> • Sudden-onset vaginal bleeding • Abdominal pain • High-frequency contractions • Tender, firm uterus

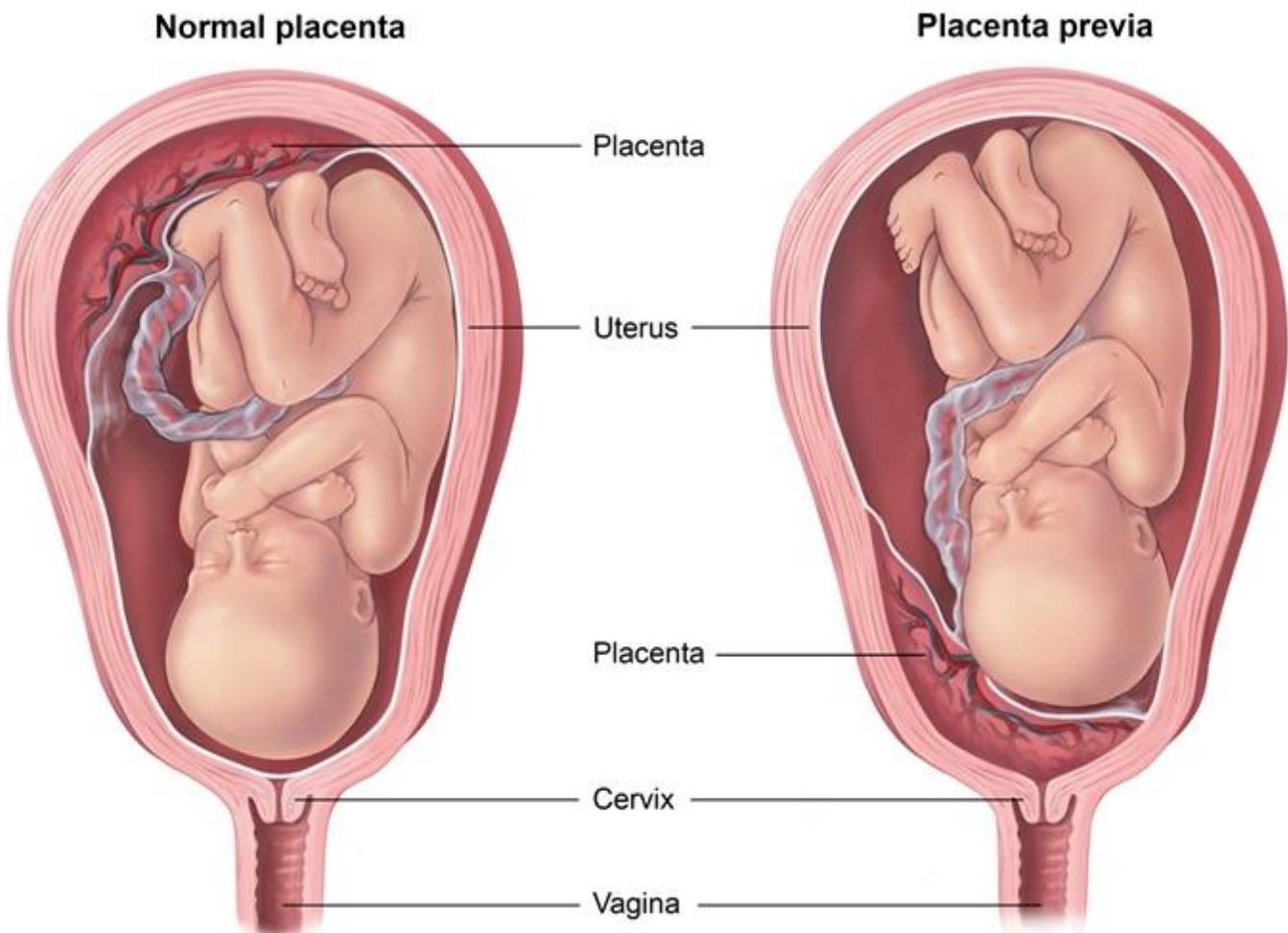
Placenta previa

Risk factors	<ul style="list-style-type: none"> • Prior placenta previa • Prior cesarean delivery • Multiple gestation
Clinical features	<ul style="list-style-type: none"> • Painless vaginal bleeding >20 weeks gestation
Diagnosis	<ul style="list-style-type: none"> • Transabdominal followed by transvaginal sonogram
Management	<ul style="list-style-type: none"> • No intercourse • No digital cervical examination • Inpatient admission for bleeding episodes

Vasa previa

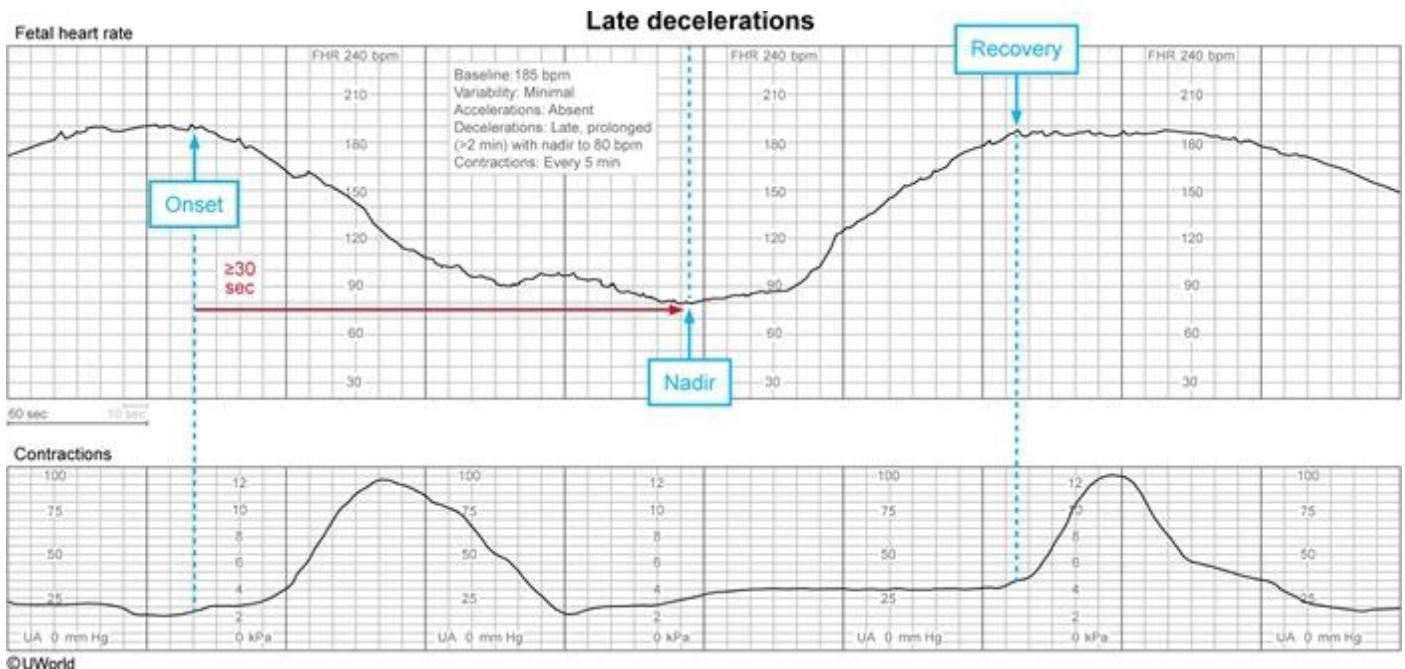
Definition	<ul style="list-style-type: none">Fetal vessels overlying the cervix
Risk factors	<ul style="list-style-type: none">Placenta previaMultiple gestationsIn vitro fertilizationSuccenturiate placental lobe
Clinical presentation	<ul style="list-style-type: none">Painless vaginal bleeding with ROM or contractionsFHR abnormalities (eg, bradycardia, sinusoidal pattern)Fetal exsanguination & demise
Management	<ul style="list-style-type: none">Emergency cesarean delivery

FHR = fetal heart rate; ROM = rupture of membranes.



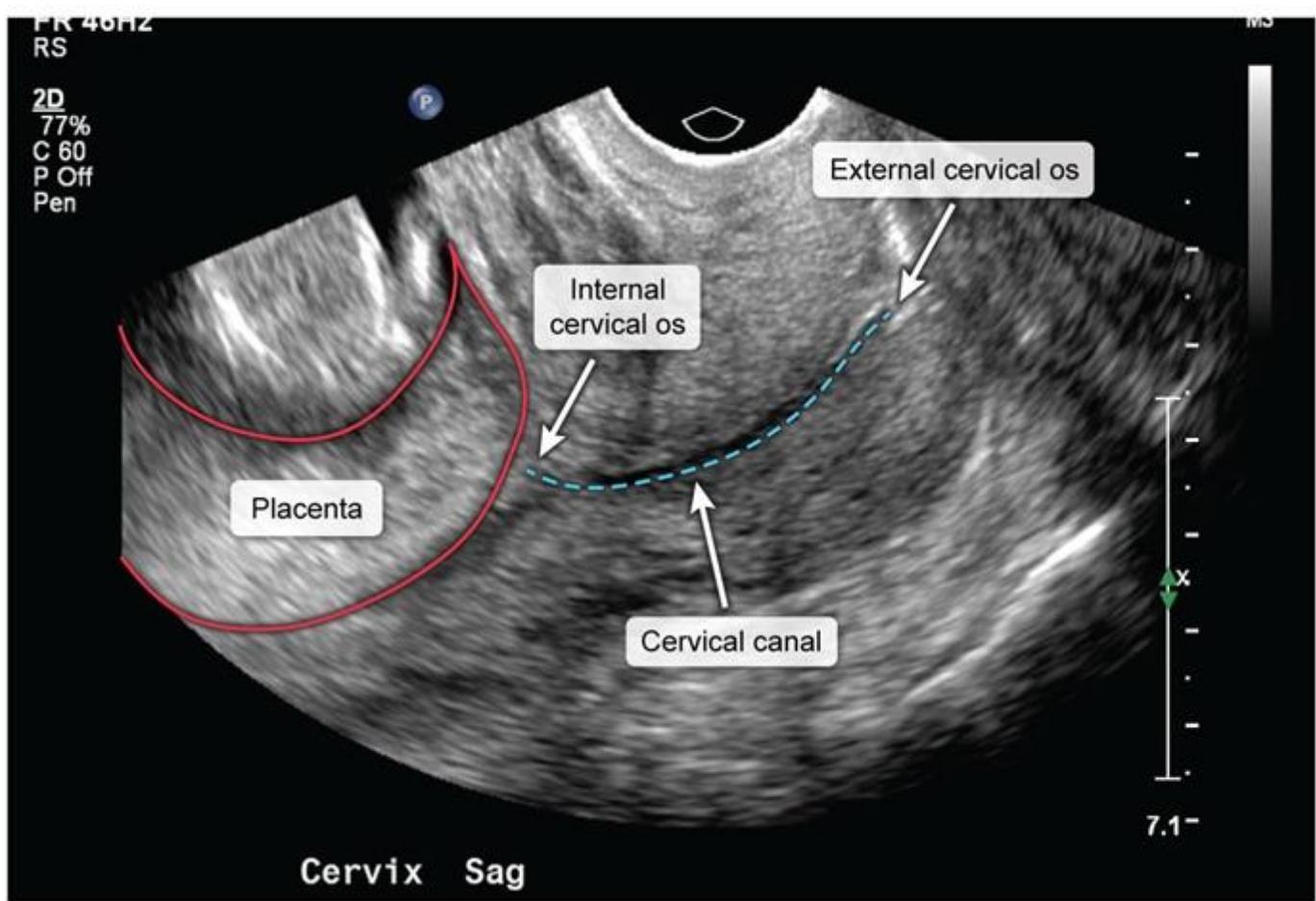
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Placenta previa



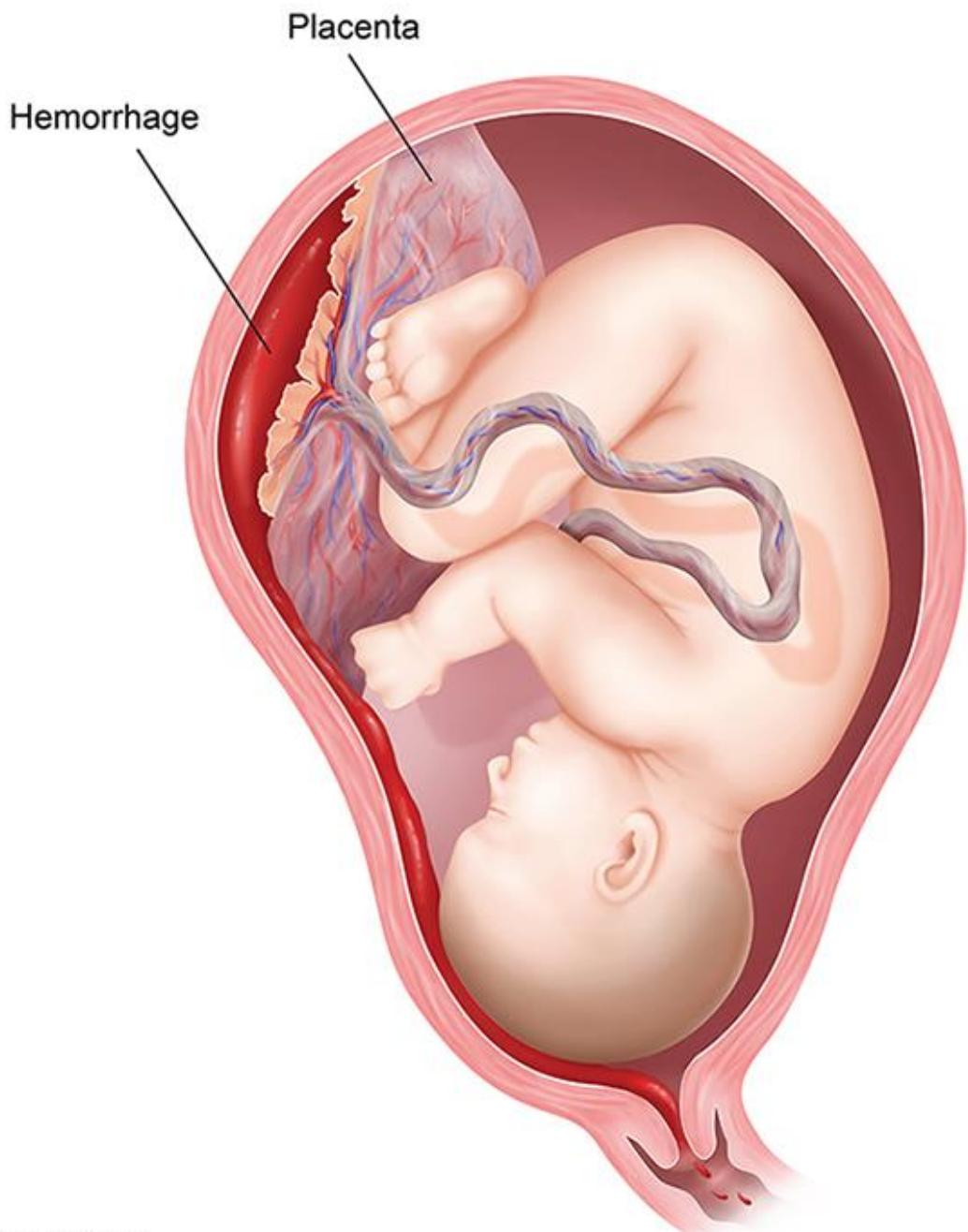
Antepartum bleeding

Complete placenta previa



Complete placenta previa

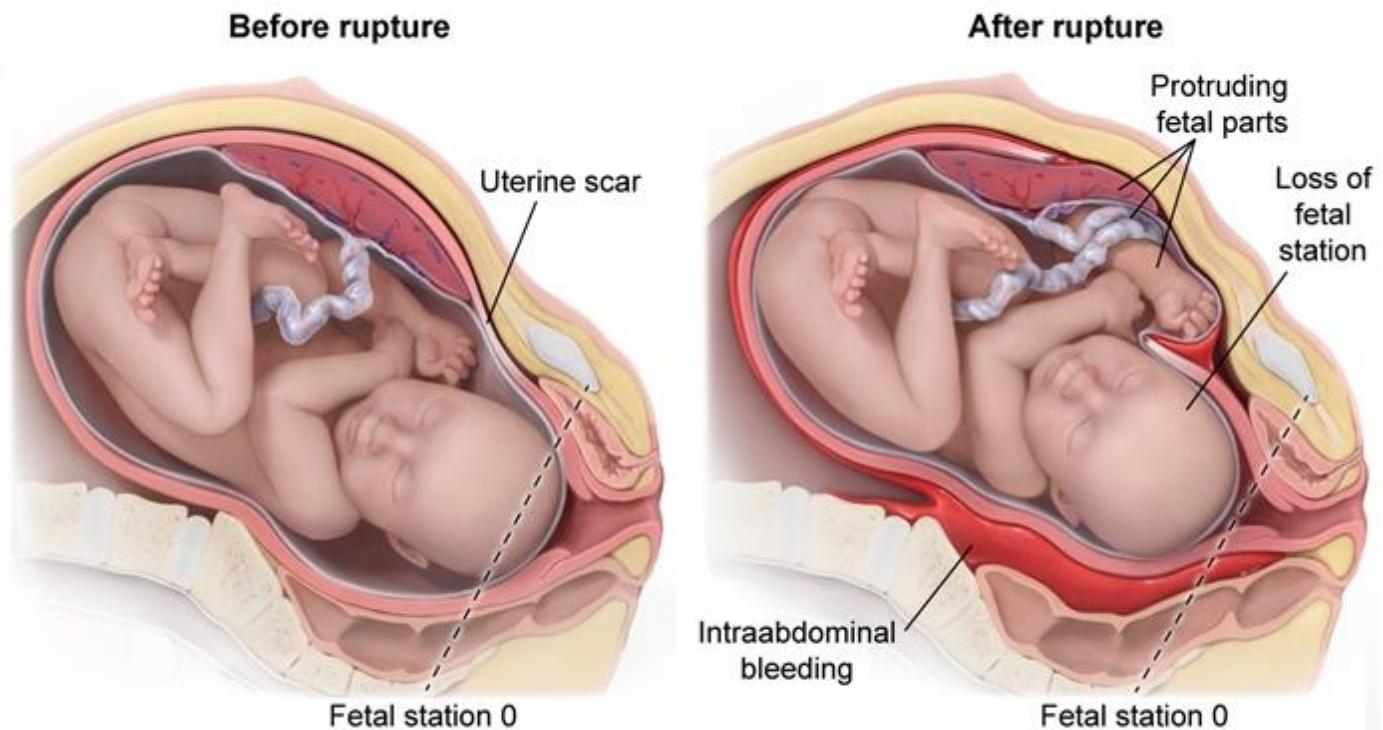
Placental abruption



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Placental abruption

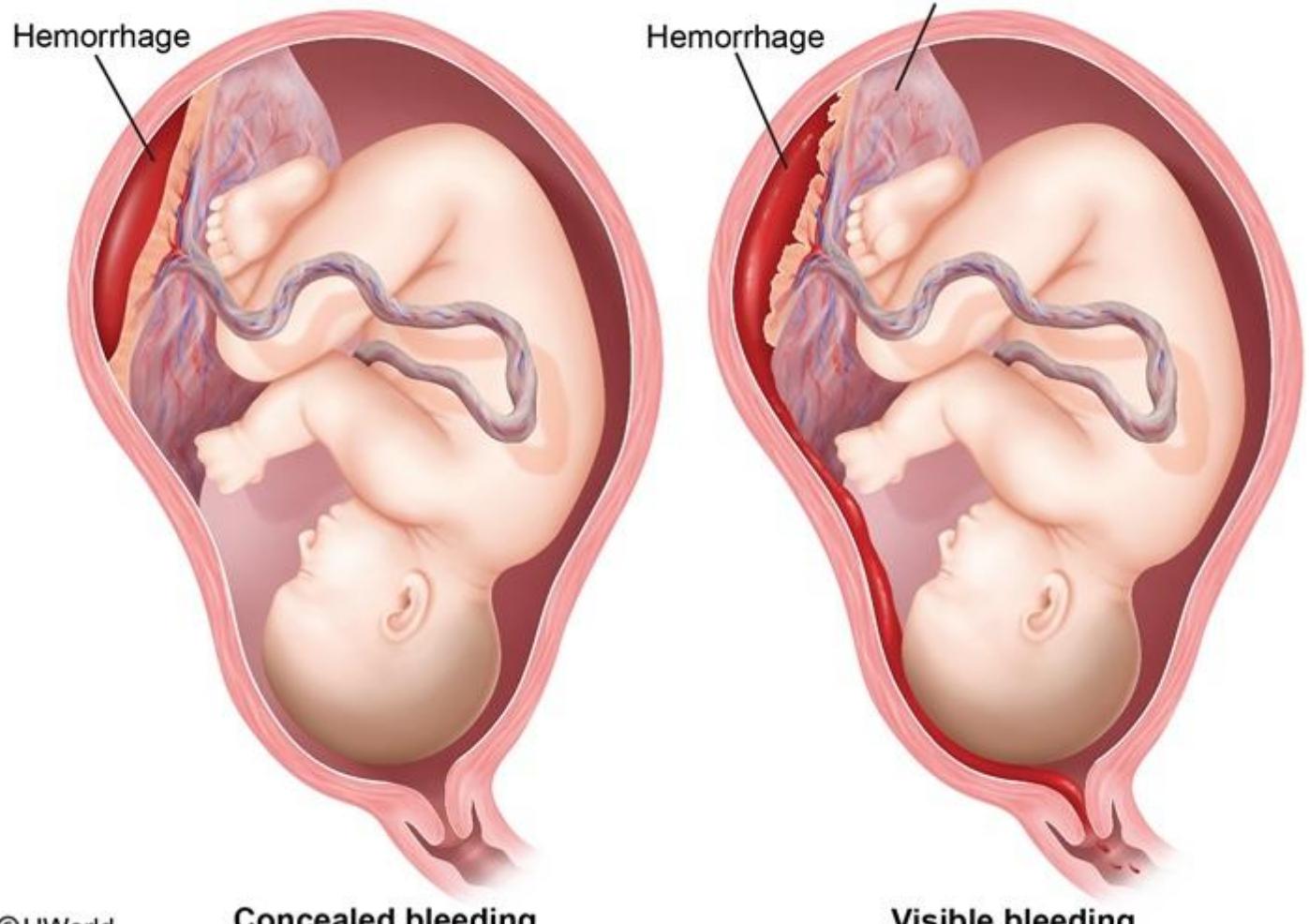
Uterine rupture



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Uterine rupture

Abruptio placentae



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Concealed bleeding

Visible bleeding

Abruptio placentae

ANTEPARTUM FETAL TESTING

Nonstress test

Reactive	<ul style="list-style-type: none">• Baseline of 110-160/min• Moderate variability (6-25/min)• ≥ 2 accelerations in 20 minutes, each peaking $\geq 15/\text{min}$ above baseline & lasting ≥ 15 seconds
Nonreactive	<ul style="list-style-type: none">• Does not meet criteria for reactivity

ANTIPHOSPHOLIPID SYNDROME

Diagnostic criteria for antiphospholipid-antibody syndrome

(1 clinical & 1 laboratory criterion must be met)

Clinical	<p>Vascular thrombosis</p> <ul style="list-style-type: none"> • Arterial or venous <p>Pregnancy morbidity</p> <ul style="list-style-type: none"> • ≥3 consecutive, unexplained fetal losses before 10th week • ≥1 unexplained fetal losses after 10th week • ≥1 premature births of normal neonates before 34th week due to preeclampsia, eclampsia, or placental insufficiency
Laboratory	<ul style="list-style-type: none"> • Lupus anticoagulant • Anticardiolipin antibody • Anti-beta-2 glycoprotein antibody I

ASPIRATION PNEUMONIA

Aspiration (chemical) pneumonitis

Risk factors	<ul style="list-style-type: none"> • Gastric reflux (ie, ↓ esophageal sphincter tone) • Delayed gastric emptying • ↑ Intraabdominal pressure • Altered consciousness or sedation (eg, anesthesia) • Endotracheal intubation, nasogastric tube
Pathophysiology	<ul style="list-style-type: none"> • Aspiration of gastric acid with direct tissue injury • Lung parenchymal inflammation
Clinical presentation	<ul style="list-style-type: none"> • Within hours of aspiration event • Acute-onset dyspnea, low-grade fever, hypoxemia • Diffuse crackles on lung examination • Chest x-ray infiltrates (dependent lung segments)
Management	<ul style="list-style-type: none"> • Supportive care (ie, no antibiotics)

ASTHMA

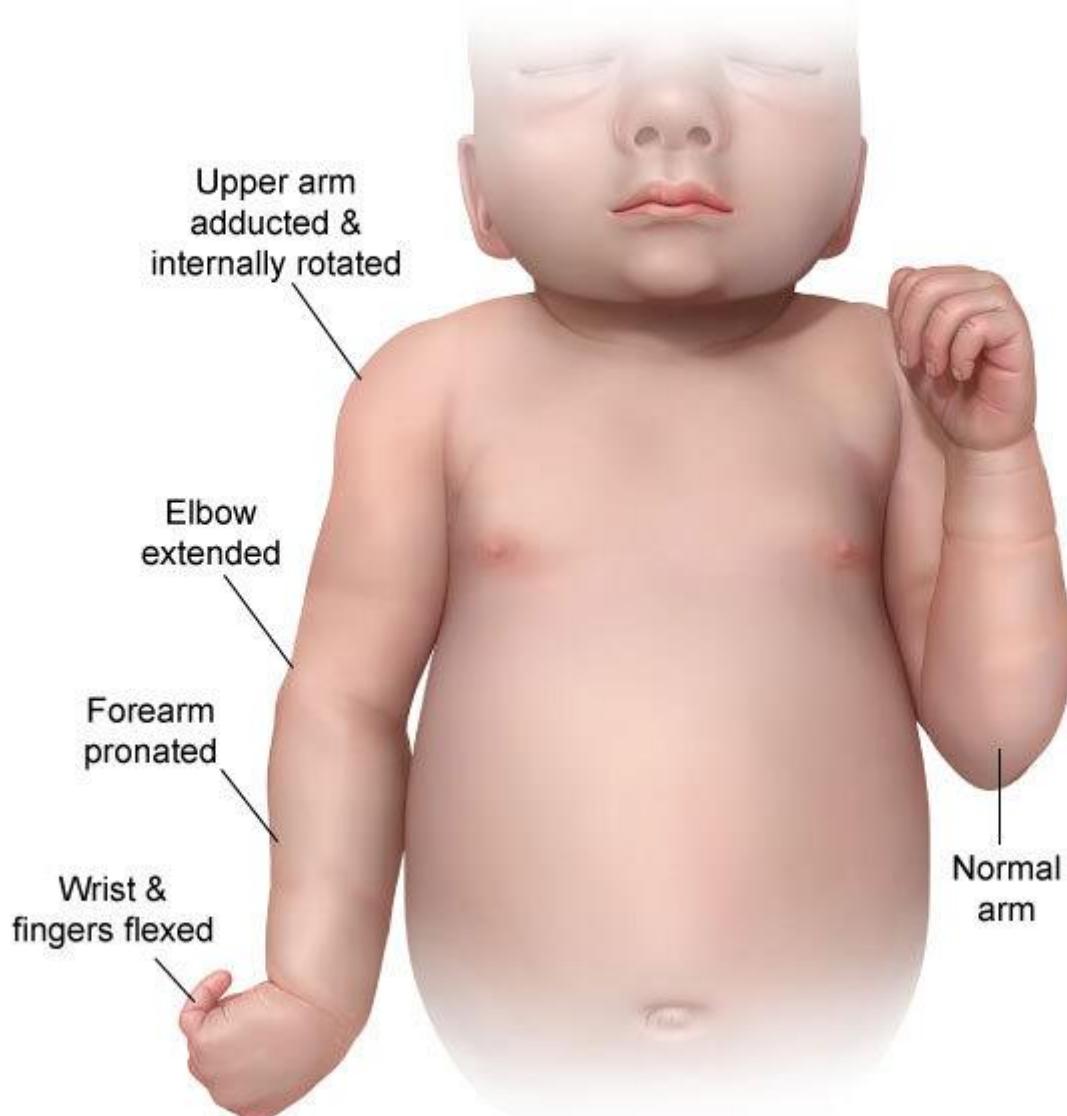
Recognizing medication nonadherence

Suggestive features	<ul style="list-style-type: none"> • Unexpected loss of disease control • Poor understanding of drug indication & schedule • Frequent reports of adverse drug effects
Possible interventions	<ul style="list-style-type: none"> • Review schedule & dosing instructions • Educate patient on purpose & how to take medication • Reduce/consolidate medication list • Increase frequency of follow-up

Complications of shoulder dystocia

Fractured clavicle	<ul style="list-style-type: none"> • Clavicular crepitus/bony irregularity • ↓ Moro reflex due to pain on affected side • Intact biceps & grasp reflexes
Fractured humerus	<ul style="list-style-type: none"> • Upper arm crepitus/bony irregularity • ↓ Moro reflex due to pain on affected side • Intact biceps & grasp reflexes
Erb-Duchenne palsy	<ul style="list-style-type: none"> • ↓ Moro & biceps reflexes on affected side • "Waiter's tip" <ul style="list-style-type: none"> – Extended elbow – Pronated forearm – Flexed wrist & fingers • Intact grasp reflex
Klumpke palsy	<ul style="list-style-type: none"> • "Claw hand" <ul style="list-style-type: none"> – Extended wrist – Hyperextended metacarpophalangeal joints – Flexed interphalangeal joints – Absent grasp reflex • Horner syndrome (ptosis, miosis) • Intact Moro & biceps reflexes
Perinatal asphyxia	<ul style="list-style-type: none"> • Variable presentation depending on duration of hypoxia • Altered mental status (eg, irritability, lethargy), respiratory or feeding difficulties, poor tone, seizure

Erb-Duchenne palsy "Waiter tip"



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Erb-Duchenne palsy

BREASTFEEDING

Breastfeeding contraindications

Maternal	<ul style="list-style-type: none">• Active untreated tuberculosis• HIV infection*• Herpetic breast lesions• Active varicella infection• Chemotherapy or radiation therapy• Active substance use disorder
Infant	<ul style="list-style-type: none">• Galactosemia

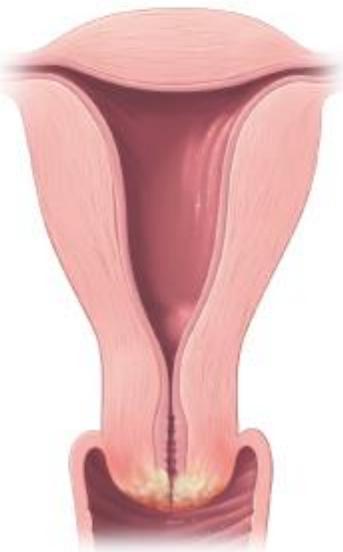
*In developed countries where formula is readily available.

Progression of cervical cancer

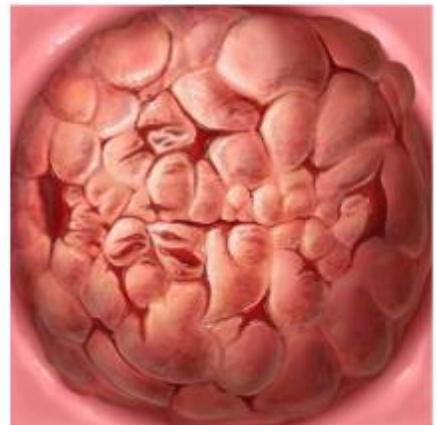
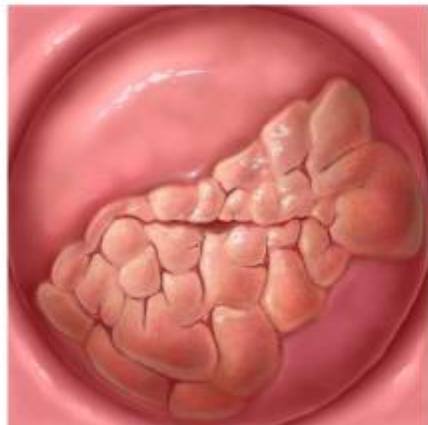
Carcinoma in situ



Early stage



Advanced stage



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Progression of cervical cancer

Intraamniotic infection (chorioamnionitis)

Risk factors	<ul style="list-style-type: none"> Prolonged rupture of membranes (>18 hours) Preterm prelabor rupture of membranes Prolonged labor Internal fetal/uterine monitoring devices Repetitive vaginal examinations Presence of genital tract pathogens
Diagnosis	Maternal fever PLUS ≥1 of the following: <ul style="list-style-type: none"> Fetal tachycardia (>160/min) Maternal leukocytosis Purulent amniotic fluid
Management	<ul style="list-style-type: none"> Broad-spectrum antibiotics Delivery
Complications	<ul style="list-style-type: none"> Maternal: postpartum hemorrhage, endometritis Neonatal: preterm birth, pneumonia, encephalopathy

CLAVICLE FRACTURE

Neonatal displaced clavicular fracture

Risk factors	<ul style="list-style-type: none"> Fetal macrosomia (maternal diabetes mellitus, postterm pregnancy) Instrumental delivery (vacuum or forceps) Shoulder dystocia
Clinical features	<ul style="list-style-type: none"> Crying/pain with passive motion of affected extremity Crepitus over clavicle Asymmetric Moro reflex
Diagnosis	<ul style="list-style-type: none"> X-ray
Treatment	<ul style="list-style-type: none"> Reassurance Gentle handling Analgesics Place affected arm in a long-sleeved garment & pin sleeve to chest with elbow flexed at 90 degrees

Congenital cytomegalovirus

Ultrasound findings	<ul style="list-style-type: none"> • Periventricular calcifications • Ventriculomegaly • Microcephaly • Intrahepatic calcifications • Fetal growth restriction • Hydrops fetalis
Neonatal features	<ul style="list-style-type: none"> • Petechiae • Hepatosplenomegaly • Chorioretinitis • Microcephaly
Long-term sequelae	<ul style="list-style-type: none"> • Sensorineural hearing loss • Seizures • Developmental delay

DERMATOSES OF PREGNANCY

Intrahepatic cholestasis of pregnancy

Clinical features	<ul style="list-style-type: none"> • Development in 3rd trimester • Generalized pruritus • Pruritus worse on hands & feet • No associated rash • Right upper quadrant pain
Laboratory abnormalities	<ul style="list-style-type: none"> • ↑ Total bile acids ($\geq 10 \mu\text{mol/L}$) • ↑ Liver transaminases (typically $<2x$ normal, rarely $>1000 \text{ U/L}$) • \pm ↑ Total & direct bilirubin
Obstetric risks	<ul style="list-style-type: none"> • Intrauterine fetal demise • Preterm delivery • Meconium-stained amniotic fluid • Neonatal respiratory distress syndrome
Management	<ul style="list-style-type: none"> • Ursodeoxycholic acid • Antihistamines • Delivery at 37 weeks gestation



Dermatoses of pregnancy

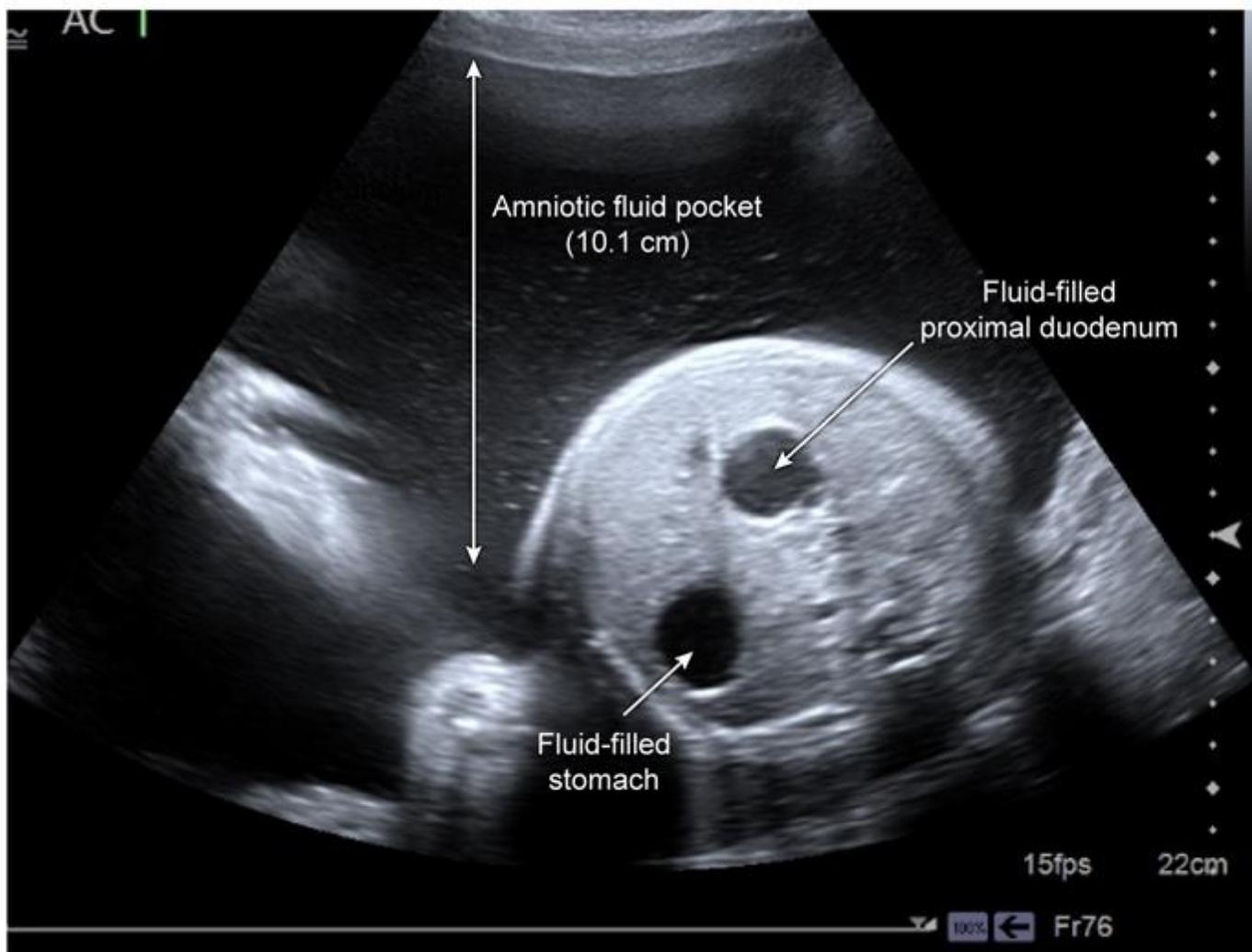
DOWN SYNDROME

Second-trimester quadruple screening

Diagnosis	MSAFP	β -hCG	Estriol	Inhibin A
Trisomy 18	↓	↓	↓	Normal
Trisomy 21	↓	↑	↓	↑
Neural tube or abdominal wall defect	↑	Normal	Normal	Normal

MSAFP = maternal serum α -fetoprotein.

Duodenal atresia



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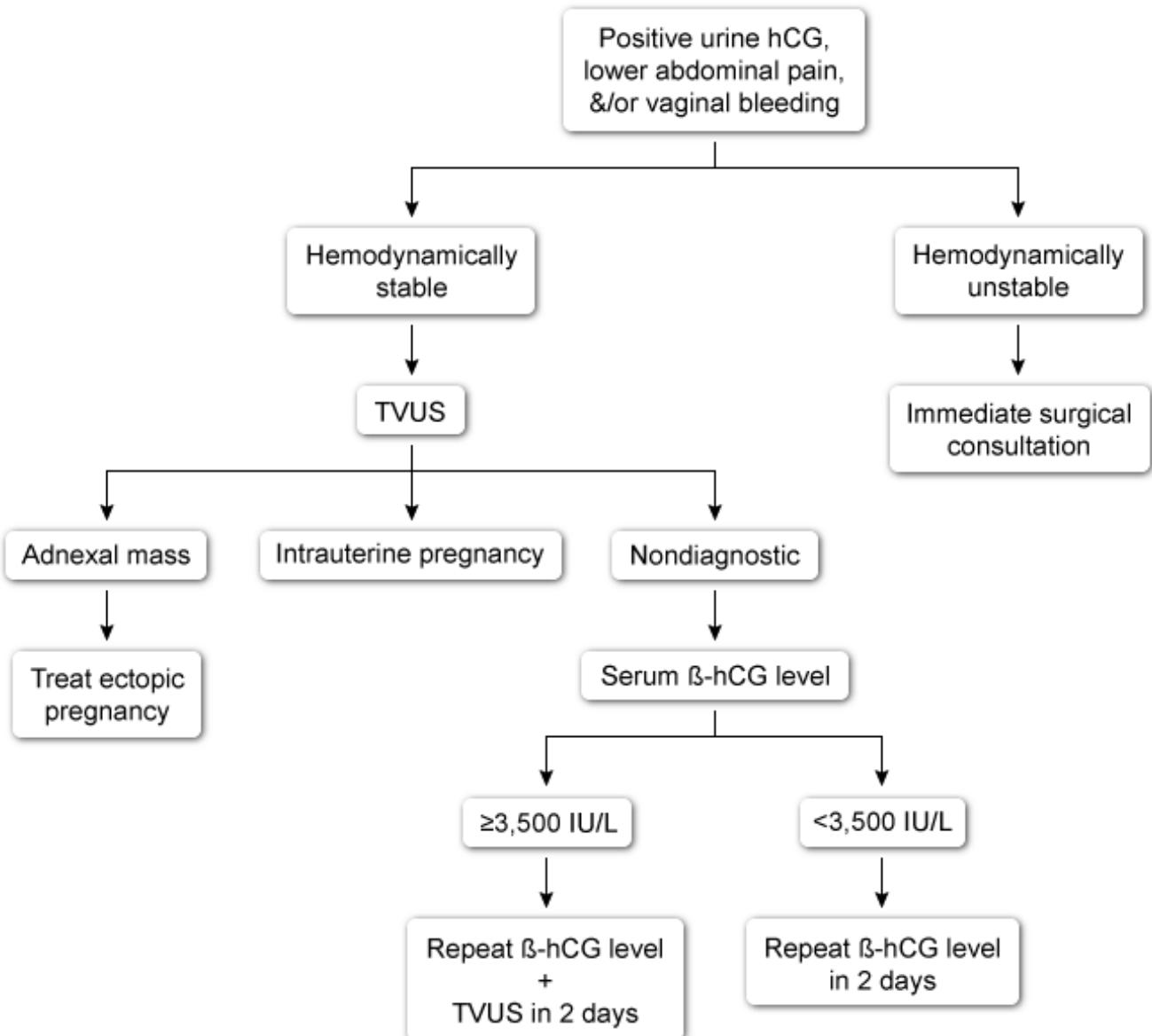
Duodenal atresia

ECTOPIC PREGNANCY

Ectopic pregnancy

Risk factors	<ul style="list-style-type: none">• Previous ectopic pregnancy• Previous pelvic/tubal surgery• Pelvic inflammatory disease
Clinical features	<ul style="list-style-type: none">• Abdominal pain, amenorrhea, vaginal bleeding• Hypovolemic shock in ruptured ectopic pregnancy• Cervical motion, adnexal &/or abdominal tenderness• ± Palpable adnexal mass
Diagnosis	<ul style="list-style-type: none">• Positive hCG• Transvaginal ultrasound revealing adnexal mass, empty uterus
Management	<ul style="list-style-type: none">• Stable: methotrexate• Unstable: surgery

Management of suspected ectopic pregnancy



TVUS = transvaginal ultrasound.

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Management of suspected ectopic pregnancy

Fetal growth restriction

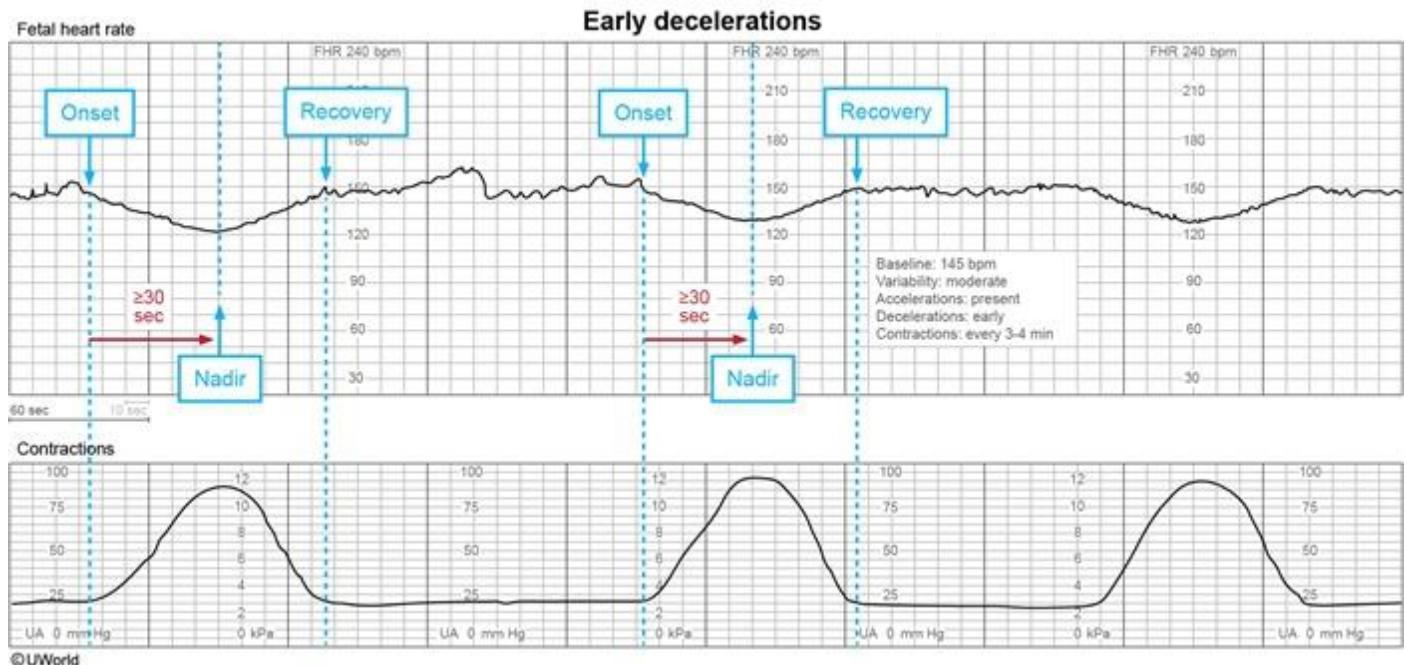
	Symmetric	Asymmetric
Definition	<ul style="list-style-type: none"> Estimated fetal weight <10th percentile or birth weight <3rd percentile for gestational age 	
Onset	<ul style="list-style-type: none"> 1st trimester 	<ul style="list-style-type: none"> 2nd/3rd trimester
Etiology	<ul style="list-style-type: none"> Chromosomal abnormalities Congenital infection 	<ul style="list-style-type: none"> Uteroplacental insufficiency Maternal malnutrition
Clinical features	<ul style="list-style-type: none"> Global growth lag 	<ul style="list-style-type: none"> "Head-sparing" growth lag
Management	<ul style="list-style-type: none"> Monitor/treat complications (eg, hypoglycemia, hypothermia, polycythemia) Hypoglycemia: frequent screening and frequent feedings Hypothermia: skin to skin with mother, examinations in incubator Polycythemia and hypocalcemia: screen if symptoms develop (eg, poor feeding, vomiting, jitteriness) 	

Fetal growth restriction

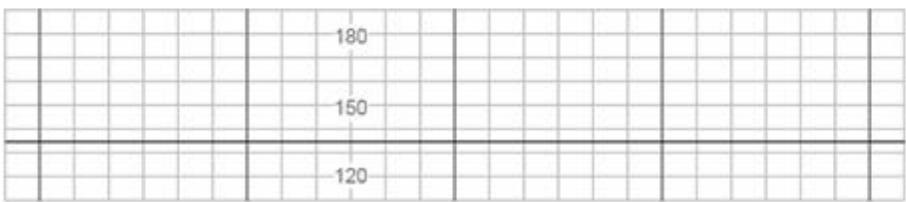
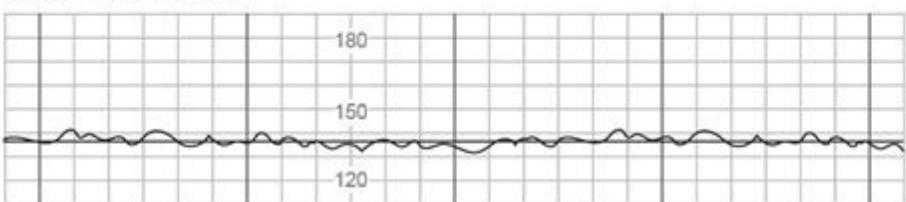
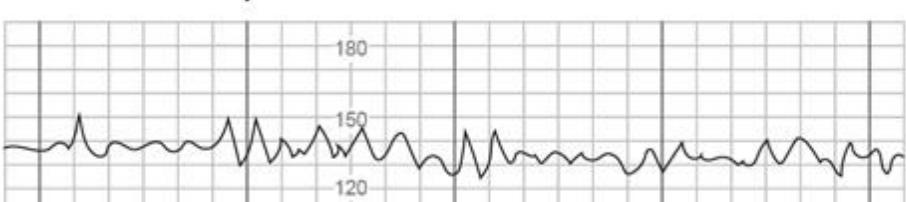
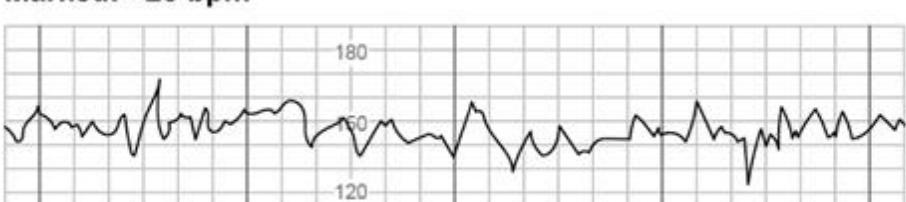
	Symmetric	Asymmetric
Definition	<ul style="list-style-type: none"> Ultrasound estimated fetal weight <10th percentile or birth weight <3rd percentile for gestational age 	
Onset	<ul style="list-style-type: none"> 1st trimester 	<ul style="list-style-type: none"> 2nd/3rd trimester
Etiology	<ul style="list-style-type: none"> Chromosomal abnormalities Congenital infection 	<ul style="list-style-type: none"> Uteroplacental insufficiency Maternal malnutrition
Clinical features	<ul style="list-style-type: none"> Global growth lag 	<ul style="list-style-type: none"> Head-sparing growth lag
Management	<ul style="list-style-type: none"> Weekly biophysical profiles Serial umbilical artery Doppler sonography Serial growth ultrasounds 	

Fetal heart rate tracing patterns

Category I	Requires all the following criteria:
	<ul style="list-style-type: none"> • Baseline 110-160/min • Moderate variability (6-25/min) • No late/variable decelerations • ± Early decelerations • ± Accelerations
Category II	<ul style="list-style-type: none"> • Not category I or III (indeterminate pattern)
Category III	≥1 of the following characteristics:
	<ul style="list-style-type: none"> • Absent variability + recurrent late decelerations • Absent variability + recurrent variable decelerations • Absent variability + bradycardia • Sinusoidal pattern



Fetal heart tracing

Fetal heart rate variability	Clinical significance
Absent: undetectable amplitude	Abnormal or intermediate pattern
	<p>Etiology:</p> <ul style="list-style-type: none"> • CNS depressants (narcotics, alcohol, recreational drugs) • Temporary fetal sleep • Prematurity • Fetal hypoxia
Minimal : ≤5 bpm	
	
Moderate: 6-25 bpm	Normal pattern
	
Marked: >25 bpm	Unclear significance
	

CNS = central nervous system.

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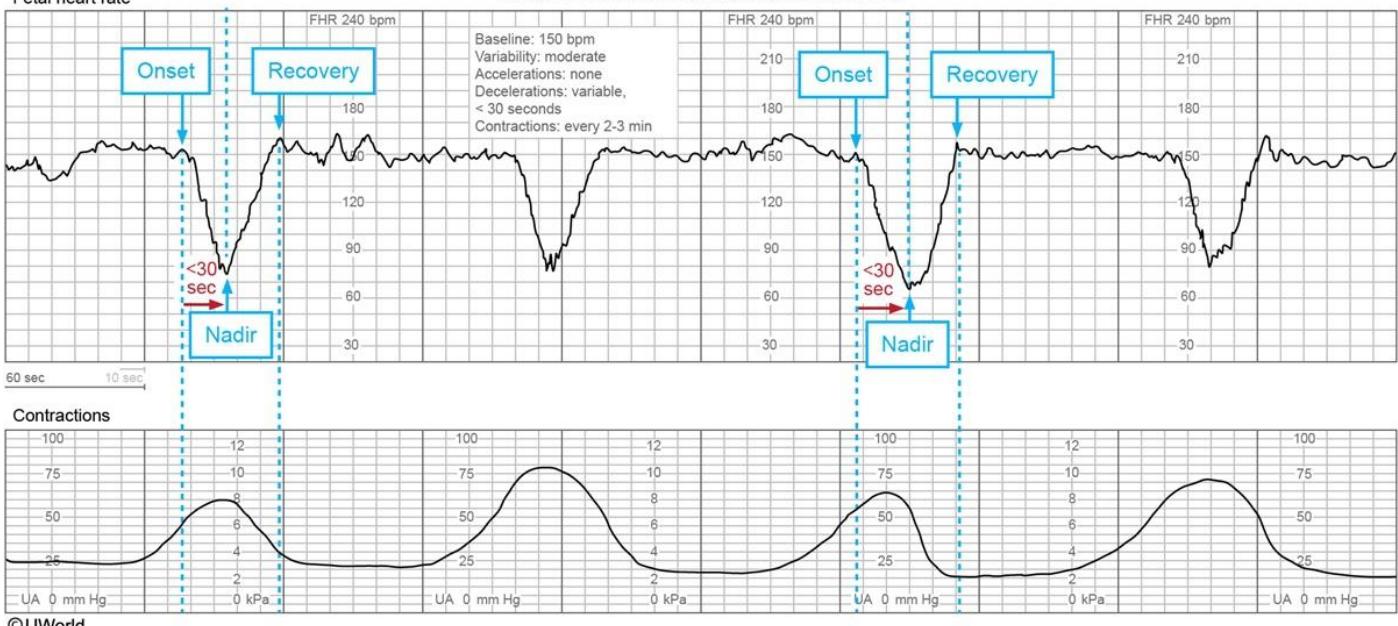
Fetal heart rate variability Clinical significance

Intrapartum fetal heart rate monitoring

<p>Relationship to contraction</p> <ul style="list-style-type: none"> • Symmetric to contraction • Nadir of deceleration corresponds to peak of contraction • Gradual (≥ 30 sec from onset to nadir) <p>Etiology</p> <ul style="list-style-type: none"> • Fetal head compression • Can be normal fetal tracing 	<p>The diagram shows a fetal heart rate tracing with a contraction curve below it. A vertical dashed line marks the 'Onset' of the contraction. A horizontal arrow indicates a time interval of ≥ 30 seconds from the onset to the 'Nadir' (lowest point) of the deceleration. The tracing shows a gradual decline in heart rate starting before the contraction begins, followed by a rapid recovery after the nadir.</p>
<p>Relationship to contraction</p> <ul style="list-style-type: none"> • Delayed compared to contraction • Nadir of deceleration occurs after peak of contraction • Gradual (≥ 30 sec from onset to nadir) <p>Etiology</p> <ul style="list-style-type: none"> • Uteroplacental insufficiency 	<p>The diagram shows a fetal heart rate tracing with a contraction curve below it. A vertical dashed line marks the 'Onset' of the contraction. A horizontal arrow indicates a time interval of ≥ 30 seconds from the onset to the 'Nadir' (lowest point) of the deceleration. The tracing shows a gradual decline in heart rate starting after the contraction begins, followed by a rapid recovery after the nadir.</p>
<p>Relationship to contraction</p> <ul style="list-style-type: none"> • Can be but not necessarily associated with contractions • Abrupt (<30 sec from onset to nadir) • Decrease ≥ 15/min; duration ≥ 15 sec but <2 min <p>Etiology</p> <ul style="list-style-type: none"> • Cord compression • Oligohydramnios • Cord prolapse 	<p>The diagram shows a fetal heart rate tracing with a contraction curve below it. A vertical dashed line marks the 'Onset' of the contraction. A horizontal arrow indicates a time interval of <30 seconds from the onset to the 'Nadir' (lowest point) of the deceleration. The tracing shows an abrupt decline in heart rate starting during the contraction, followed by a rapid recovery after the nadir.</p>

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Intrapartum fetal heart rate monitoring

Recurrent variable decelerations**Fetal heart rate Recurrent variable decelerations****FETAL HYDROPS****Alpha thalassemia**

Genotype	Disorder	Clinical features
1 gene loss ($\alpha\alpha/\alpha-$)	Alpha thalassemia minima	Asymptomatic, silent carrier
2 gene loss ($\alpha\alpha/-/-$) or ($\alpha-/alpha-$)	Alpha thalassemia minor	Mild microcytic anemia
3 gene loss ($\alpha-/--$)	Hemoglobin H disease	Chronic hemolytic anemia
4 gene loss ($--/-/-$)	Hydrops fetalis, hemoglobin Barts	High-output cardiac failure, anasarca, death in utero

Fetal hydrops

Pathogenesis	<ul style="list-style-type: none"> ↑ cardiac output demand causing heart failure ↑ fluid movement into interstitial spaces (third spacing)
Clinical features	<ul style="list-style-type: none"> Pericardial effusion Pleural effusion Ascites Skin edema Placental edema Polyhydramnios
Etiology	<ul style="list-style-type: none"> Immune <ul style="list-style-type: none"> Rh(D) alloimmunization Nonimmune <ul style="list-style-type: none"> Parvovirus B19 infection Fetal aneuploidy Cardiovascular abnormalities Thalassemia (eg, hemoglobin Barts)

FETAL MALPRESENTATION

Breech presentation

Breech types	<ul style="list-style-type: none"> Frank: hips flexed & knees extended (buttock presenting) Complete: hips & knees flexed Incomplete: 1 or both hips not flexed (feet presenting)
Risk factors	<ul style="list-style-type: none"> Advanced maternal age (≥ 35) Multiparity Uterine didelphys, septate uterus Uterine leiomyomas Fetal anomalies (eg, anencephaly) Preterm (< 37 weeks gestation) Oligohydramnios/polyhydramnios Placenta previa
Management	<ul style="list-style-type: none"> External cephalic version Cesarean delivery

Gestational diabetes mellitus

Pathophysiology	<ul style="list-style-type: none"> Human placental lactogen secretion
Screening	<ul style="list-style-type: none"> 24-28 weeks gestation 1-hr 50-g GCT 3-hr 100-g GTT
Management	<ul style="list-style-type: none"> 1st line: diet 2nd line: insulin, glyburide, metformin
Target blood glucose goals	<ul style="list-style-type: none"> Fasting: ≤95 mg/dL 1-hr postprandial: ≤140 mg/dL 2-hr postprandial: ≤120 mg/dL
Postpartum management	<ul style="list-style-type: none"> Fasting glucose at 24-72 hr 2-hr 75-g GTT at 6- to 12-week visit

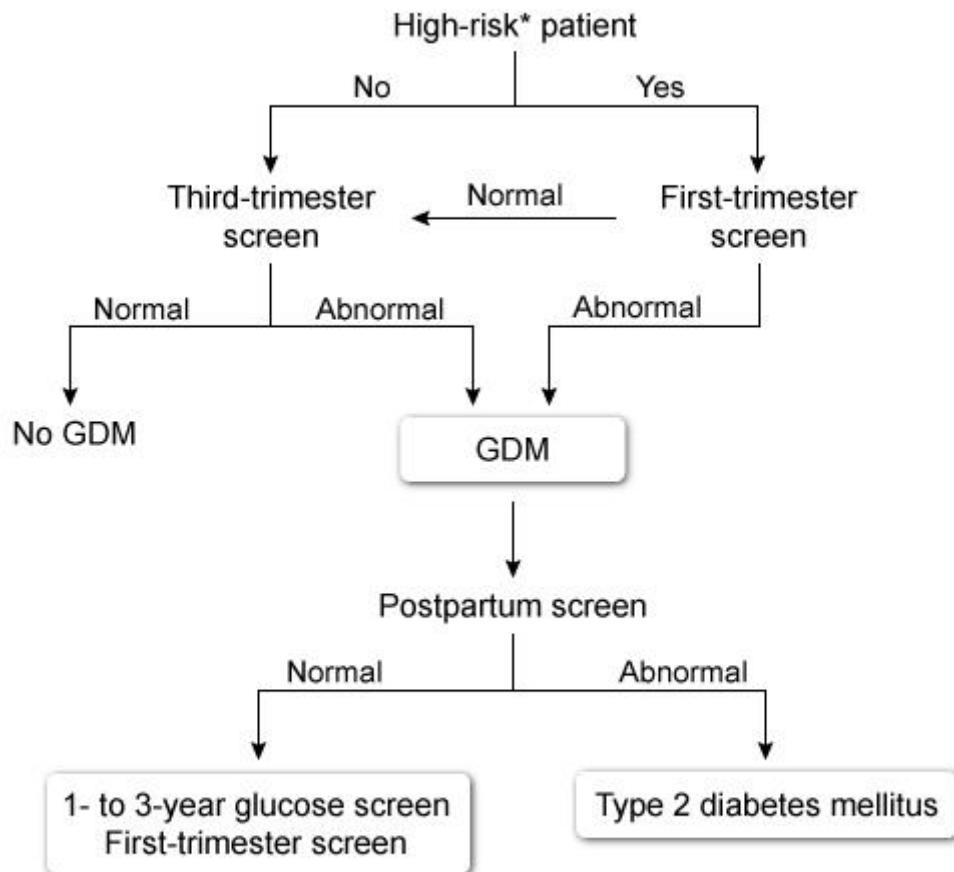
GCT = glucose challenge test; **GTT** = glucose tolerance test.

Routine prenatal laboratory tests

Initial prenatal visit	<ul style="list-style-type: none"> Rh(D) type & antibody screen Hemoglobin/hematocrit, MCV, ferritin HIV, VDRL/RPR, HBsAg, anti-HCV Ab Rubella & varicella immunity Urine culture Urine dipstick for protein Chlamydia PCR (if risk factors are present) Pap test (if screening indicated)
24-28 weeks	<ul style="list-style-type: none"> Hemoglobin/hematocrit Antibody screen if Rh(D)-negative 1-hr 50-g GCT
36-38 weeks	<ul style="list-style-type: none"> Group B <i>Streptococcus</i> rectovaginal culture

anti-HCV Ab = hepatitis C antibody; **GCT** = glucose challenge test; **HBsAg** = hepatitis B surface antigen; **MCV** = mean corpuscular volume; **RPR** = rapid plasma reagent.

Prenatal diabetes screening



*Obesity plus ≥1 of the following: prior GDM, prior macrosomic infant, family history (first degree), polycystic ovary syndrome, age ≥40.

GDM = gestational diabetes mellitus.

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Prenatal diabetes screening

GESTATIONAL TROPHOBLASTIC DISEASE

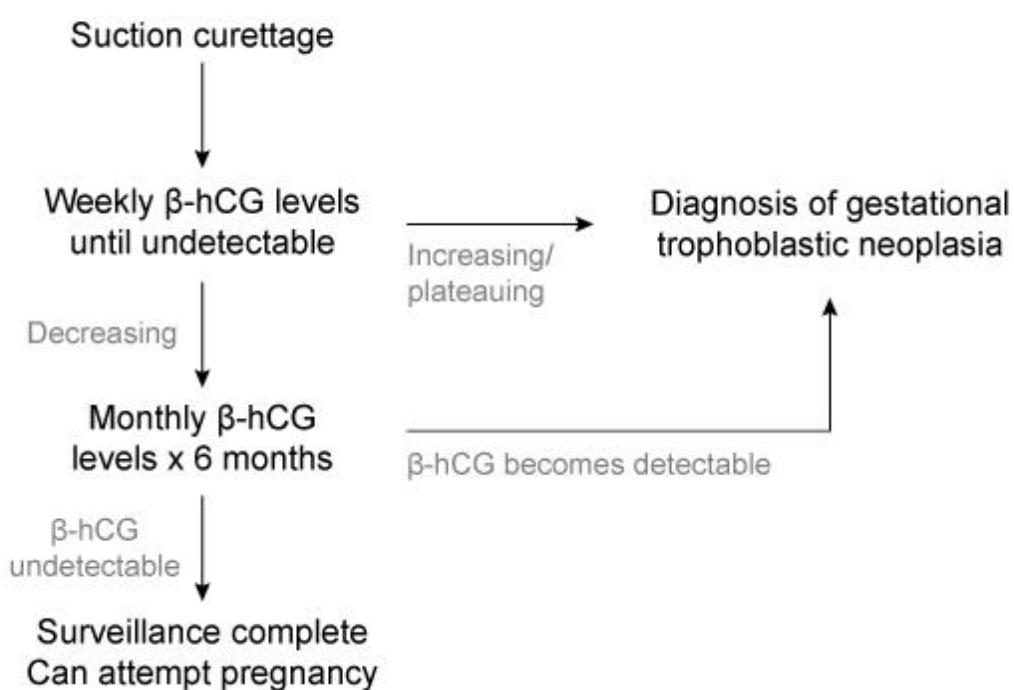
Theca lutein cysts

Presentation	<ul style="list-style-type: none"> • Multilocular • Bilateral • 10-15 cm ovaries
Pathogenesis	<ul style="list-style-type: none"> • Ovarian hyperstimulation due to: <ul style="list-style-type: none"> – Gestational trophoblastic disease – Multifetal gestation – Infertility treatment
Clinical course	<ul style="list-style-type: none"> • Resolve with decreasing β-hCG levels

Hydatidiform mole

Clinical presentation	<ul style="list-style-type: none"> • Abnormal vaginal bleeding ± hydropic tissue • Uterine enlargement > gestational age • Abnormally elevated β-hCG levels • Theca lutein ovarian cysts • Hyperemesis gravidarum • Preeclampsia with severe features • Hyperthyroidism
Risk factors	<ul style="list-style-type: none"> • Extremes of maternal age • History of hydatidiform mole
Diagnosis	<ul style="list-style-type: none"> • "Snowstorm" appearance on ultrasound • Quantitative serum β-hCG • Histologic evaluation of uterine contents
Management	<ul style="list-style-type: none"> • Dilation & suction curettage • Serial serum β-hCG post evacuation • Contraception for 6 months

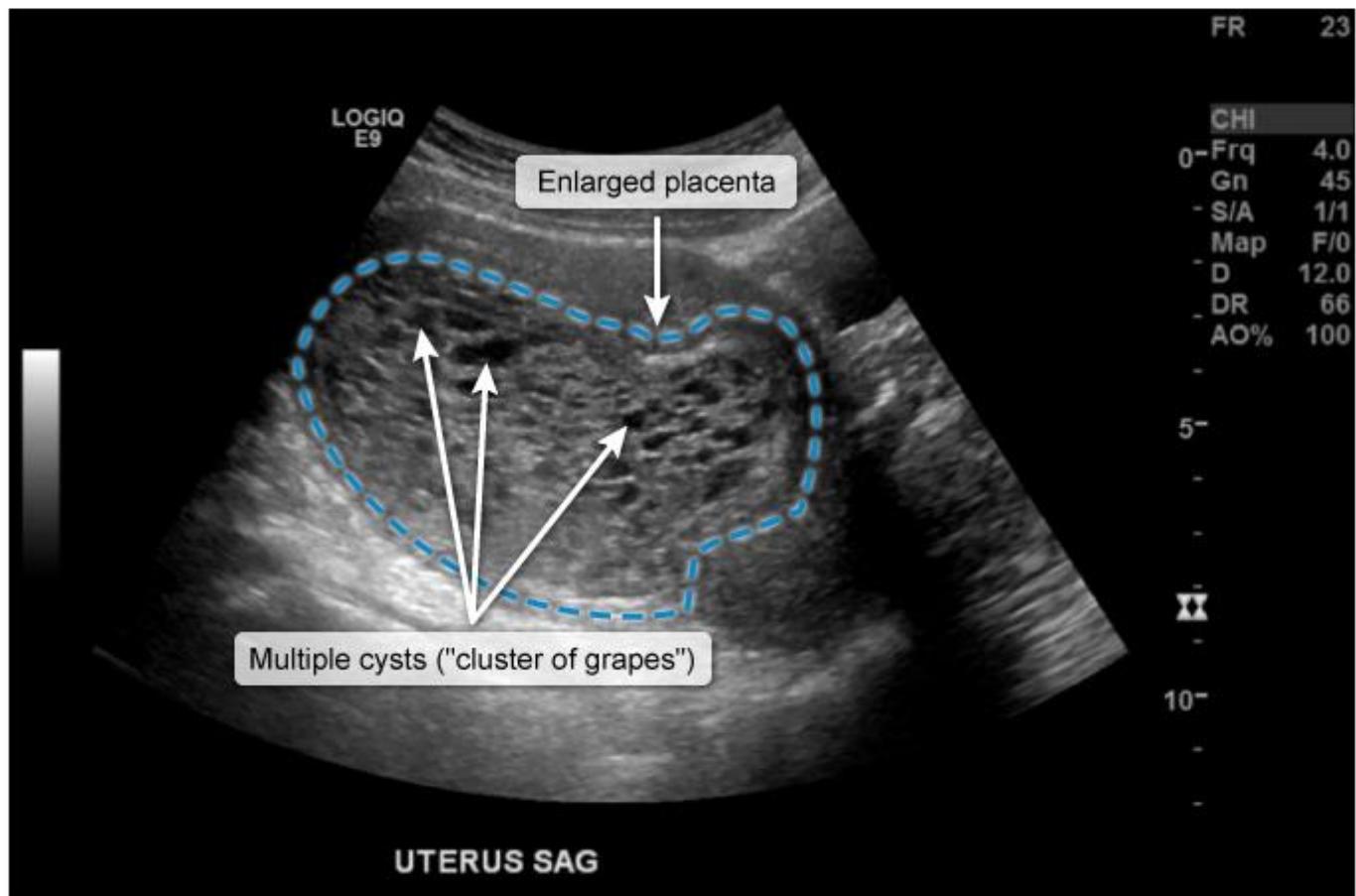
Management of hydatidiform mole



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Management of hydatidiform mole

Complete hydatidiform mole



©UWorld

Complete hydatidiform mole

GLOMERULAR DISORDERS

SLE nephritis in pregnancy

Clinical Presentation	<ul style="list-style-type: none">• Edema• Malar rash• Arthritis• Hematuria
Laboratory findings	<ul style="list-style-type: none">• Nephritic range proteinuria• Urinalysis with RBC & WBC casts• ↓ Complement levels• ↑ ANA titers
Diagnosis	<ul style="list-style-type: none">• Renal biopsy
Obstetric complications	<ul style="list-style-type: none">• Preterm birth• Cesarean delivery• Preeclampsia• Fetal growth restriction• Fetal demise

ANA = antinuclear antibodies; RBC = red blood cells; SLE = systemic lupus erythematosus; WBC = white blood cells.

Preventing neonatal group B *Streptococcus* infection

Antenatal screening	<ul style="list-style-type: none"> • Rectovaginal culture at 36-38 weeks gestation
Indications for intrapartum prophylaxis	<ul style="list-style-type: none"> • GBS bacteriuria or GBS urinary tract infection in current pregnancy (regardless of treatment) • GBS-positive rectovaginal culture in current pregnancy • Unknown GBS status PLUS any of the following: <ul style="list-style-type: none"> – <37 weeks gestation – Intrapartum fever – Rupture of membranes for ≥18 hours • Prior infant with early-onset neonatal GBS infection
Intrapartum prophylaxis	<ul style="list-style-type: none"> • Intravenous penicillin

GBS = group B *Streptococcus*.

HELLP SYNDROME**HELLP syndrome***

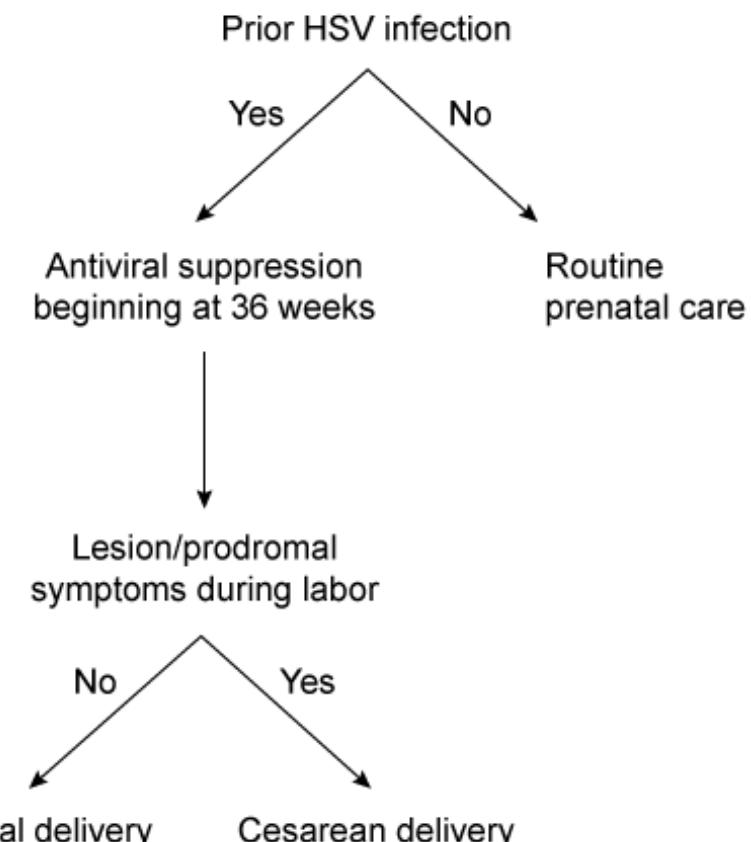
Clinical findings	<ul style="list-style-type: none"> • Nausea/vomiting • Right upper quadrant pain • Headache • Visual changes • Hypertension
Laboratory abnormalities	<ul style="list-style-type: none"> • Microangiopathic hemolytic anemia • Elevated liver enzymes • Thrombocytopenia • ± Proteinuria
Treatment	<ul style="list-style-type: none"> • Delivery • Magnesium sulfate for seizure prophylaxis • Antihypertensives (eg, hydralazine)
Complications	<ul style="list-style-type: none"> • Abruptio placentae • Subcapsular liver hematoma • Acute renal failure • Pulmonary edema • Disseminated intravascular coagulation

*HELLP (**H**emolysis, **E**levated Liver enzymes, **L**ow Platelet count).

Neonatal herpes simplex virus infection

Pathogenesis	<ul style="list-style-type: none"> • Vertical transmission <ul style="list-style-type: none"> – Intrauterine, perinatal, postnatal
Clinical findings	<ul style="list-style-type: none"> • Skin-eye-mouth <ul style="list-style-type: none"> – Mucocutaneous vesicles – Keratoconjunctivitis • CNS <ul style="list-style-type: none"> – Seizures, fever, lethargy – Temporal lobe hemorrhage/edema • Disseminated <ul style="list-style-type: none"> – Sepsis, hepatitis, pneumonia
Diagnosis	<ul style="list-style-type: none"> • Viral surface cultures • HSV PCR (blood, cerebrospinal fluid)
Treatment	<ul style="list-style-type: none"> • Acyclovir

CNS = central nervous system; **HSV** = herpes simplex virus; **PCR** = polymerase chain reaction.

Pregnancy management in patients with HSV

HSV = herpes simplex virus.

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Heparin-induced thrombocytopenia

Clinical features	Heparin exposure ≥5 days & any of the following: <ul style="list-style-type: none"> • Drop in platelet count by >50% • Arterial or venous thrombosis • Necrotic skin lesions at heparin injection site • Anaphylactoid reaction after heparin
Diagnosis	<ul style="list-style-type: none"> • Serotonin release assay
Treatment	<ul style="list-style-type: none"> • Stop all heparin products • Start nonheparin medication

Hyperemesis gravidarum

Risk factors	<ul style="list-style-type: none"> • Hydatidiform mole • Multifetal gestation • History of hyperemesis gravidarum
Clinical features	<ul style="list-style-type: none"> • Severe, persistent vomiting • >5% loss of prepregnancy weight • Dehydration • Orthostatic hypotension
Laboratory abnormalities	<ul style="list-style-type: none"> • Ketonuria • Hypochloremic metabolic alkalosis • Hypokalemia • Hemoconcentration
Treatment	<ul style="list-style-type: none"> • Admission to hospital • Antiemetics & intravenous fluids

Complications of inappropriate pregnancy weight gain

Excessive weight gain	<ul style="list-style-type: none"> • Gestational diabetes mellitus • Fetal macrosomia • Cesarean delivery
Inadequate weight gain	<ul style="list-style-type: none"> • Fetal growth restriction • Preterm delivery

HYPERTHYROIDISM

Thyrotoxicosis with normal or ↑ RAIU	Thyrotoxicosis with ↓ RAIU
<ul style="list-style-type: none"> • Graves disease • Toxic multinodular goiter • Toxic nodule 	<ul style="list-style-type: none"> • Painless (silent) thyroiditis • Subacute (de Quervain) thyroiditis • Amiodarone-induced thyroiditis • Excessive dose (or surreptitious intake) of levothyroxine • Struma ovarii • Iodine-induced • Extensive thyroid cancer metastasis

RAIU = radioactive iodine uptake.

HYPOPITUITARISM

Sheehan syndrome

Pathogenesis	<ul style="list-style-type: none"> • Obstetric hemorrhage complicated by hypotension • Postpartum pituitary infarction
Clinical features	<ul style="list-style-type: none"> • Lactation failure (↓ prolactin) • Amenorrhea, hot flashes, vaginal atrophy (↓ FSH, LH) • Fatigue, bradycardia (↓ TSH) • Anorexia, weight loss, hypotension (↓ ACTH) • Decreased lean body mass (↓ growth hormone)

IUFD

Intrauterine fetal demise

Definition	Fetal death at ≥20 weeks
Diagnosis	Absence of fetal cardiac activity on ultrasound
Management	<p>20-23 weeks</p> <ul style="list-style-type: none"> • Dilation & evacuation <p>OR</p> <ul style="list-style-type: none"> • Vaginal delivery* <p>≥24 weeks</p> <ul style="list-style-type: none"> • Vaginal delivery*
Complication	Coagulopathy after several weeks of fetal retention

*Cesarean delivery by maternal choice if there is a history of classic cesarean/myomectomy

Intrauterine fetal demise

Definition	<ul style="list-style-type: none"> Absent fetal cardiac activity at ≥20 weeks gestation
Risk factors	<ul style="list-style-type: none"> Aneuploidy Fetal or placental anomalies Fetal growth restriction Congenital infection Substance use (eg, tobacco, cocaine) Maternal conditions (eg, hypertension, diabetes mellitus)
Evaluation	<p>Fetal</p> <ul style="list-style-type: none"> Autopsy Gross & microscopic examination of placenta & umbilical cord Karyotype/genetic studies <p>Maternal</p> <ul style="list-style-type: none"> Kleihauer-Betke test Antiphospholipid antibodies Coagulation studies*
Management	<p>20-23 weeks</p> <ul style="list-style-type: none"> Dilation & evacuation OR vaginal delivery** <p>≥24 weeks</p> <ul style="list-style-type: none"> Vaginal delivery**
Complications	Coagulopathy after several weeks of fetal retention

*For history of recurrent pregnancy loss, family or personal history of venous thrombosis, or fetal growth restriction.

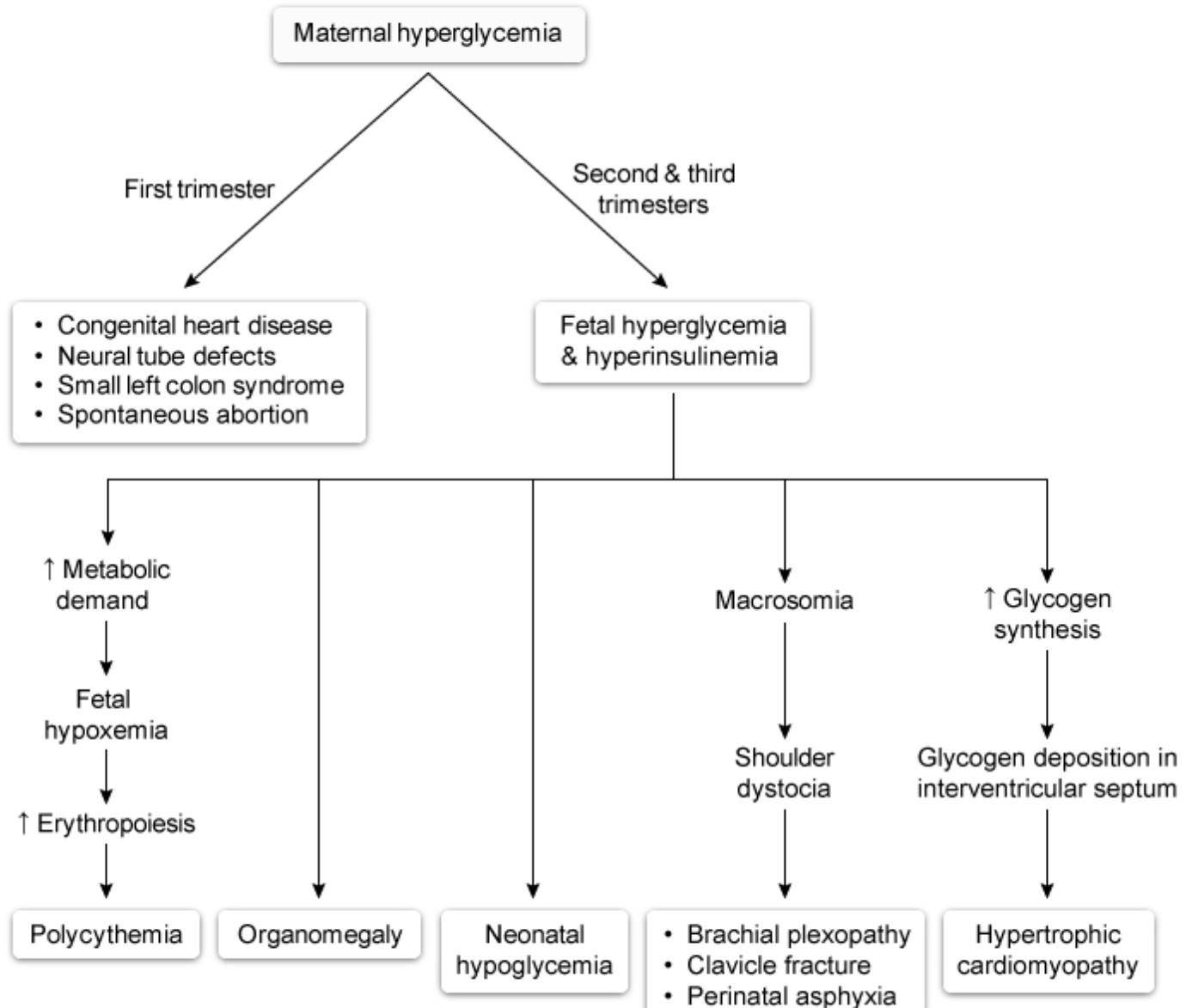
**Cesarean delivery by maternal choice if history of prior classical cesarean/myomectomy.

INCOMPETENT CERVIX

Cervical insufficiency

Risk factors	<ul style="list-style-type: none"> Collagen defects Uterine abnormalities Cervical conization Obstetric injury
Clinical features	<ul style="list-style-type: none"> ≥2 prior painless, 2nd-trimester losses Painless cervical dilation
Management	<ul style="list-style-type: none"> Cerclage placement

Infant of mother with diabetes mellitus: complications



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Infant of mother with diabetes mellitus: complications

Ovarian hyperstimulation syndrome

Pathophysiology	<ul style="list-style-type: none"> ↑ hCG enhances ovarian vascular permeability Acute fluid shift to extravascular space
Clinical features	<ul style="list-style-type: none"> Ascites Respiratory distress Hemoconcentration Hypercoagulability Electrolyte imbalances Multiorgan failure (eg, renal failure) Disseminated intravascular coagulation
Evaluation	<ul style="list-style-type: none"> Fluid balance monitoring Serial CBC, electrolytes Serum hCG Pelvic ultrasound Chest x-ray Echocardiography
Management	<ul style="list-style-type: none"> Correct electrolyte imbalances Paracentesis &/or thoracentesis Thromboembolism prophylaxis

CBC = complete blood count.

LABOR MANAGEMENT

Disorders of the active phase of labor

Diagnosis	Clinical features	Treatment
Protraction	<ul style="list-style-type: none"> Cervical change slower than expected ± Inadequate contractions 	Oxytocin
Arrest	<ul style="list-style-type: none"> No cervical change for ≥4 hours with adequate contractions OR No cervical change for ≥6 hours with inadequate contractions 	Cesarean delivery

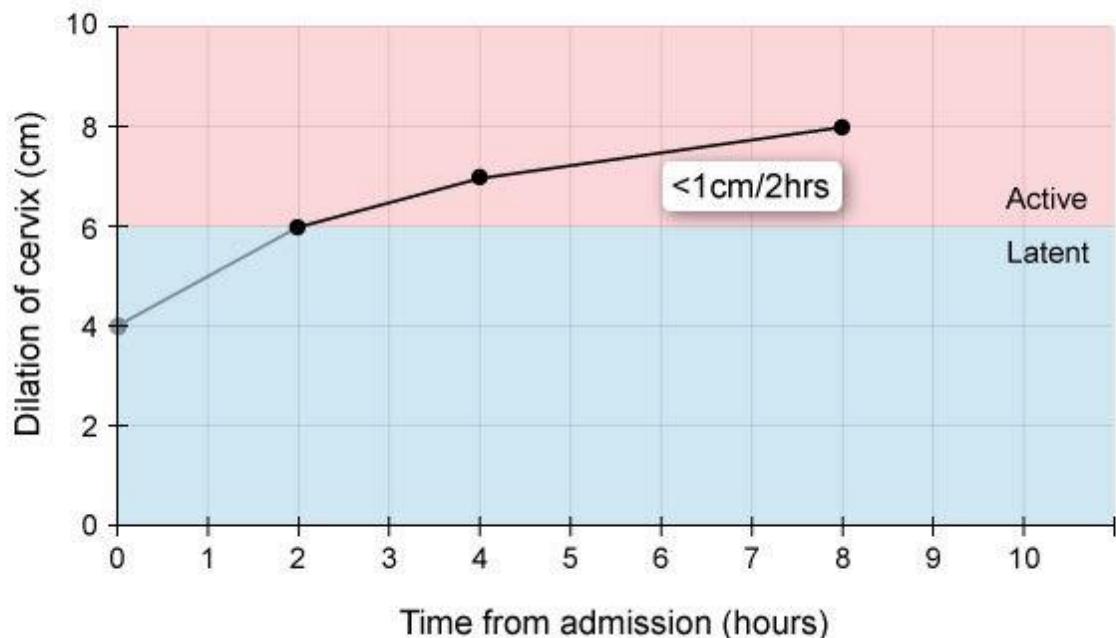
Second stage arrest of labor

Definition	Insufficient fetal descent after pushing for: <ul style="list-style-type: none"> • ≥3 hours if nulliparous • ≥2 hours if multiparous
Risk factors	<ul style="list-style-type: none"> • Maternal obesity • Excessive pregnancy weight gain • Diabetes mellitus
Etiology	<ul style="list-style-type: none"> • Cephalopelvic disproportion • Malposition • Inadequate contractions • Maternal exhaustion
Management	<ul style="list-style-type: none"> • Operative vaginal delivery • Cesarean delivery

Delivery planning for a nonviable fetus

Fetal diagnosis	<ul style="list-style-type: none"> • Acardia • Anencephaly • Bilateral renal agenesis • Holoprosencephaly • Intrauterine fetal demise • Pulmonary hypoplasia • Thanatophoric dwarfism
Obstetric management	<ul style="list-style-type: none"> • Vaginal delivery • No fetal monitoring
Neonatal management	<ul style="list-style-type: none"> • Palliative care if not stillborn

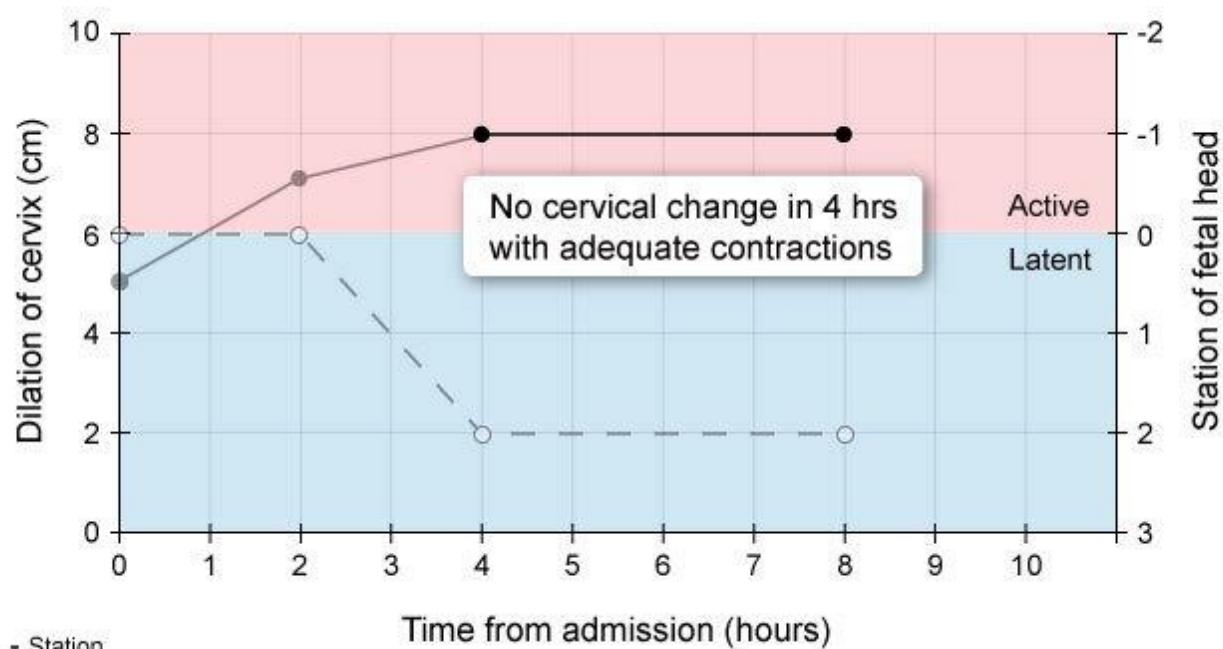
Protracted active phase of labor



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Protracted active phase of labor

Active phase arrest



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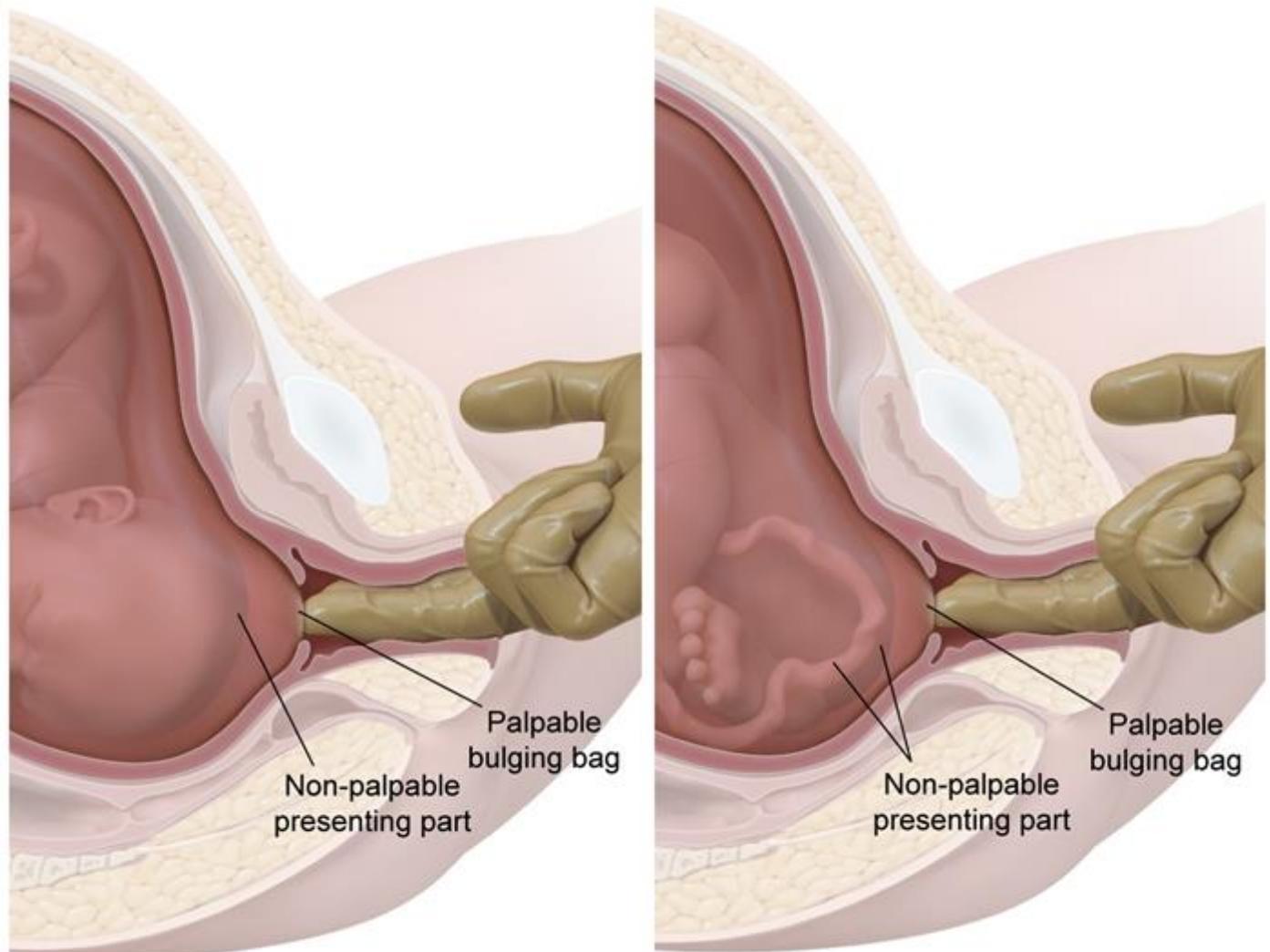
Active phase arrest

Vacuum-assisted vaginal delivery



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Vacuum-assisted vaginal delivery



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Labor management

Listeria monocytogenes

Pathogenesis	<ul style="list-style-type: none"> • Foodborne transmission • Bacterial invasion of intestinal epithelial cells • Transplacental passage to fetus
Clinical features	<ul style="list-style-type: none"> • Febrile gastroenteritis in immunocompetent host • Invasive disease (eg, sepsis, meningitis) in neonates, pregnant women, elderly, immunocompromised
Laboratory findings	<ul style="list-style-type: none"> • Gram-positive rods on culture (eg, stool, blood, CSF)
Treatment	<ul style="list-style-type: none"> • Supportive care for gastroenteritis in normal host • Parenteral antibiotics for invasive disease

CSF = cerebrospinal fluid.

MALIGNANT HYPERTHERMIA

Malignant hyperthermia

Epidemiology	<ul style="list-style-type: none"> • Genetic mutation alters control of intracellular calcium • Triggered by volatile anesthetics, succinylcholine, excessive heat
Manifestations	<ul style="list-style-type: none"> • Masseter muscle/generalized rigidity • Sinus tachycardia • Hypercarbia resistant to increased minute ventilation • Rhabdomyolysis • Hyperkalemia • Hyperthermia (late manifestation)
Treatment	<ul style="list-style-type: none"> • Respiratory/ventilatory support • Immediate cessation of causative anesthetic • Dantrolene

MATERNAL SUBSTANCE ABUSE

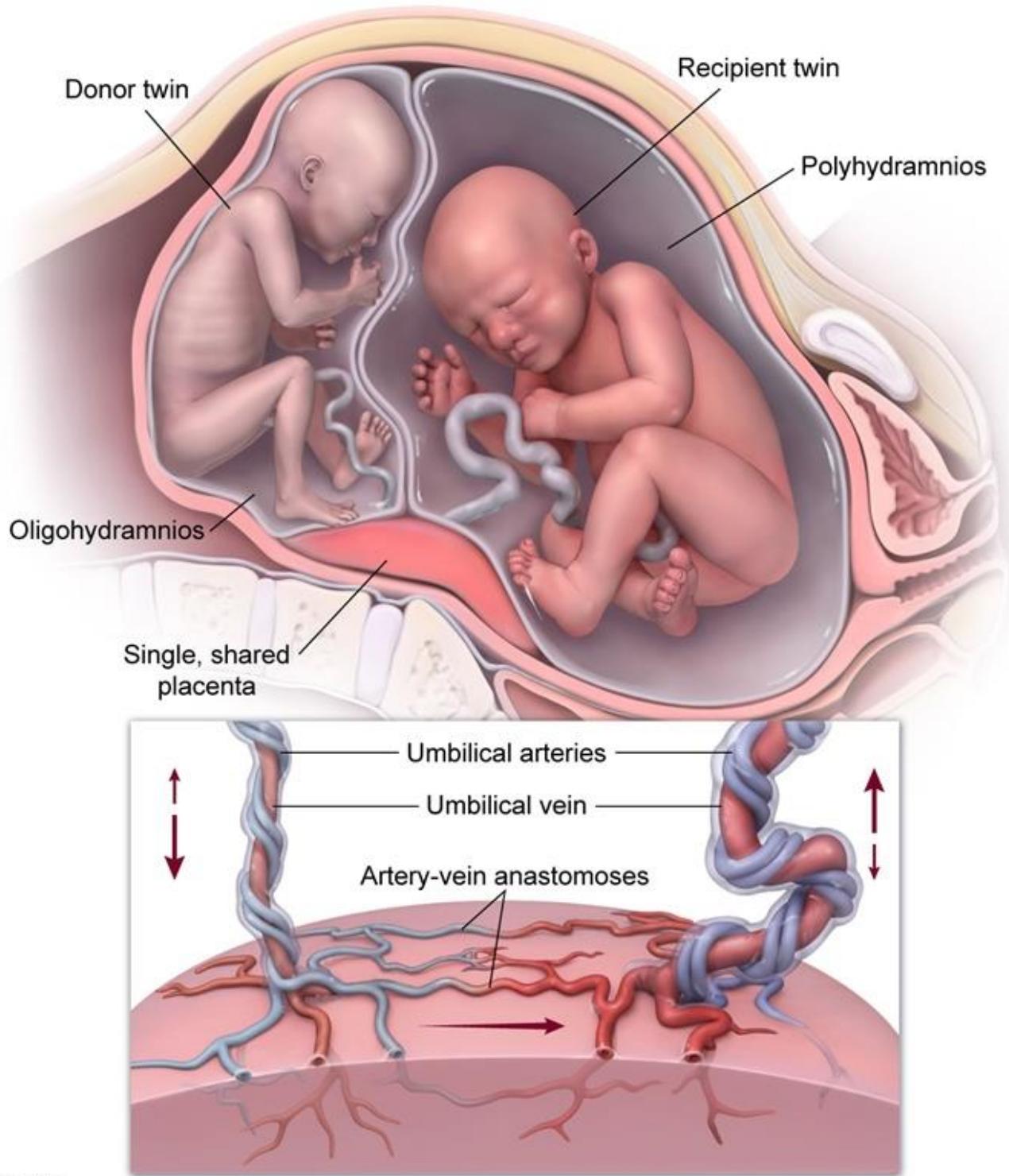
Recreational drug use in pregnancy

Risk factors	<ul style="list-style-type: none"> • Adolescent pregnancy • Late/intermittent prenatal care • Insufficient gestational weight gain
Obstetric complications	<ul style="list-style-type: none"> • Spontaneous abortion • Preterm birth • Preeclampsia • Abruptio placentae • Fetal growth restriction • Intrauterine fetal demise

Twin pregnancy

Types	<ul style="list-style-type: none"> • Monochorionic, monoamniotic <ul style="list-style-type: none"> – 1 placenta, 1 amniotic sac • Monochorionic, diamniotic <ul style="list-style-type: none"> – 1 placenta, 2 amniotic sacs – "T-sign" at intertwin membrane • Dichorionic, diamniotic <ul style="list-style-type: none"> – 2 placentas, 2 amniotic sacs – "Lambda sign" at intertwin membrane
Maternal complications	<ul style="list-style-type: none"> • Hyperemesis gravidarum • Preeclampsia • Gestational diabetes mellitus • Iron-deficiency anemia
Fetal complications	<ul style="list-style-type: none"> • Congenital anomalies • Fetal growth restriction • Preterm delivery • Malpresentation (eg, breech) • Monochorionic twins <ul style="list-style-type: none"> – Twin-twin transfusion syndrome • Monoamniotic twins <ul style="list-style-type: none"> – Conjoined twins – Cord entanglement

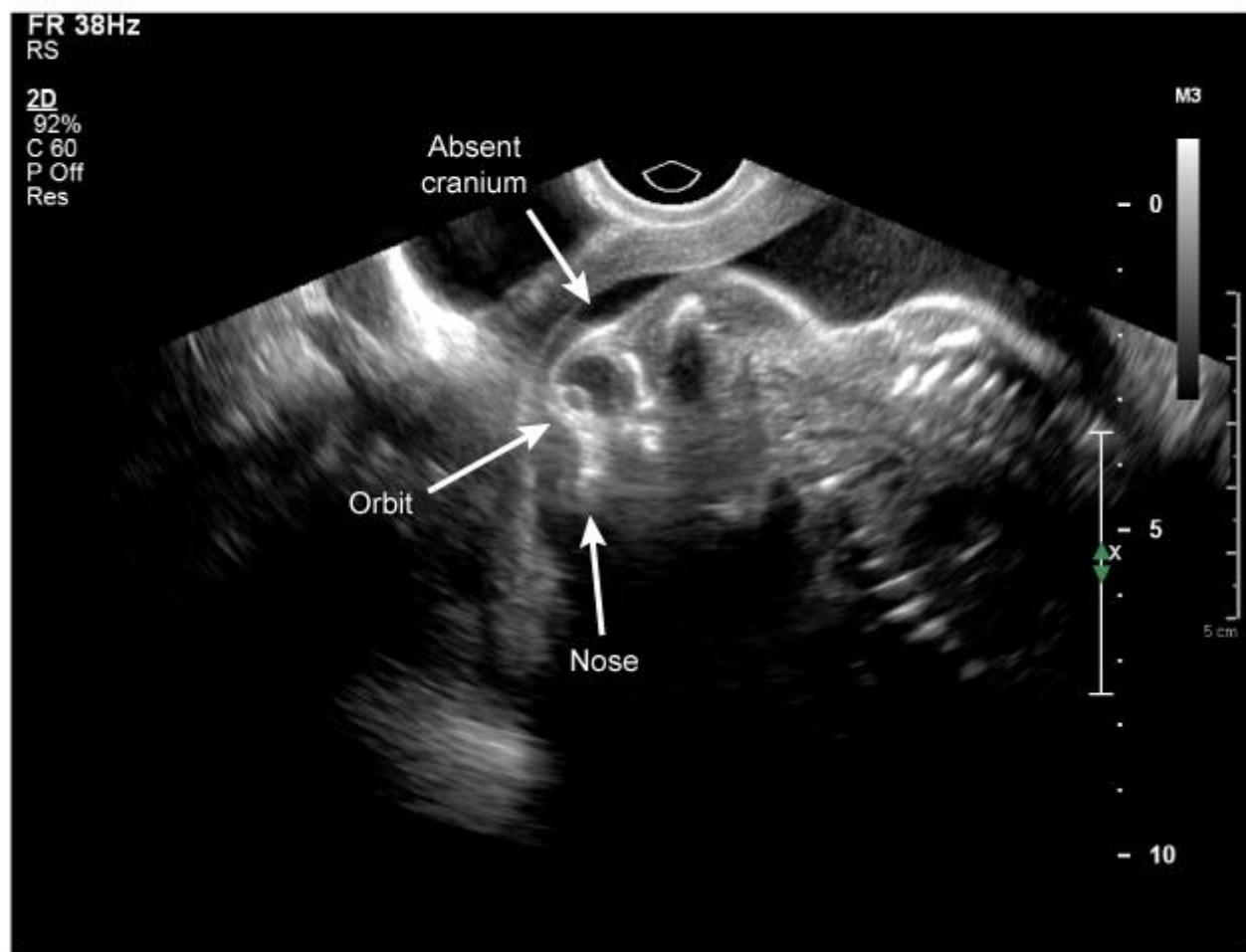
Twin-twin transfusion syndrome (TTTS)



Twin-twin transfusion syndrome (TTTS)

Neural tube defects

Types	<ul style="list-style-type: none"> • Anencephaly • Encephalocele • Spina bifida, myelomeningocele
Risk factors	<ul style="list-style-type: none"> • Low folic acid intake • Methotrexate, antiepileptics • Diabetes mellitus • Prior pregnancy with neural tube defect
Prenatal screening	<ul style="list-style-type: none"> • 2nd-trimester ultrasound • Maternal serum alpha-fetoprotein
Prevention	<ul style="list-style-type: none"> • Average risk: 0.4 mg folic acid daily • High risk: 4 mg folic acid daily

Anencephaly on fetal ultrasound

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Anencephaly on fetal ultrasound

Sickle cell disease in pregnancy

Prenatal care	<ul style="list-style-type: none"> Baseline 24-hr urine for total protein Baseline chemistry panel Serial urine culture Pneumococcal vaccination Folic acid supplement Aspirin Serial fetal growth ultrasound
Obstetric complications	<ul style="list-style-type: none"> Spontaneous abortion Preeclampsia, eclampsia Abruption placentae Antepartum bleeding
Fetal complications	<ul style="list-style-type: none"> Fetal growth restriction Oligohydramnios Preterm birth

Maternal serum α -fetoprotein screening

\uparrow MSAFP	\downarrow MSAFP
<ul style="list-style-type: none"> Open neural tube defects (eg, anencephaly, open spina bifida) Ventral wall defects (eg, omphalocele, gastroschisis) Multiple gestation 	<ul style="list-style-type: none"> Aneuploidies (eg, trisomy 18 & 21)

MSAFP = maternal serum α -fetoprotein.

Type II osteogenesis imperfecta

Pathophysiology	<ul style="list-style-type: none"> Autosomal dominant Type 1 collagen defect
Ultrasound findings	<ul style="list-style-type: none"> Multiple fractures Short femur Hypoplastic thoracic cavity Fetal growth restriction Intrauterine demise
Prognosis	<ul style="list-style-type: none"> Lethal

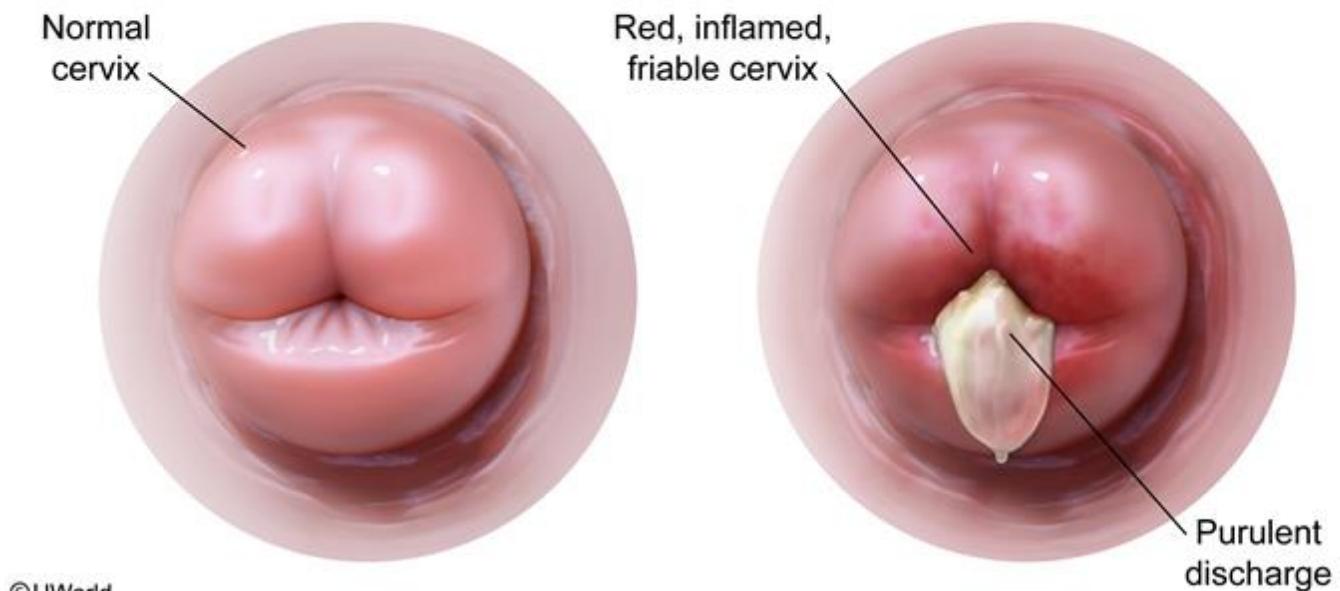
Ovarian torsion

Risk factors	<ul style="list-style-type: none"> • Ovarian mass • Women of reproductive age • Infertility treatment with ovulation induction
Clinical presentation	<ul style="list-style-type: none"> • Sudden-onset unilateral pelvic pain • Nausea & vomiting • ± Palpable adnexal mass
Ultrasound	<ul style="list-style-type: none"> • Adnexal mass with absent Doppler flow to ovary
Treatment	<ul style="list-style-type: none"> • Laparoscopy with detorsion • Ovarian cystectomy • Oophorectomy if necrosis or malignancy

Causes of hyperandrogenism in pregnancy

Diagnosis	Clinical features
Placental aromatase deficiency	<ul style="list-style-type: none"> • No ovarian mass • High maternal & fetal virilization risk • Resolution of maternal symptoms after delivery
Luteoma	<ul style="list-style-type: none"> • Solid, unilateral/bilateral ovarian masses • Moderate maternal virilization risk; high fetal virilization risk • Spontaneous regression of masses after delivery
Theca lutein cyst	<ul style="list-style-type: none"> • Cystic, bilateral ovarian masses • Moderate maternal virilization risk; low fetal virilization risk • Spontaneous regression of masses after delivery
Sertoli-Leydig tumor	<ul style="list-style-type: none"> • Solid unilateral ovarian mass • High maternal & fetal virilization risk • Surgery required (2nd trimester or postpartum)

Cervicitis



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Cervicitis

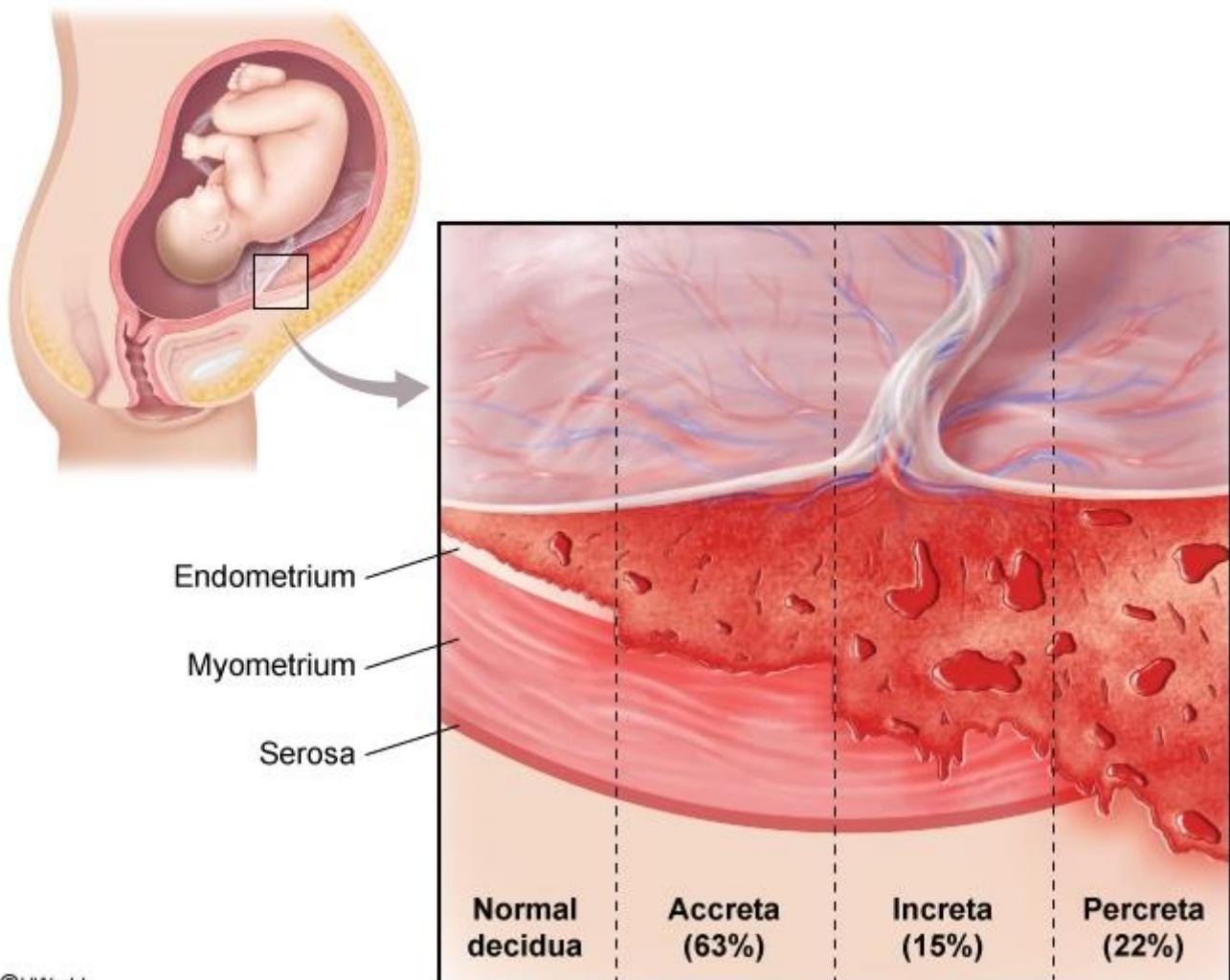
PERIPARTUM CARDIOMYOPATHY

Absolute contraindications to pregnancy

Conditions in which pregnancy is contraindicated	<ul style="list-style-type: none">• Pulmonary arterial hypertension• Peripartum cardiomyopathy with residual LV dysfunction• Heart failure with LVEF <30%• Severe coarctation• Severe mitral stenosis• Severe symptomatic aortic stenosis• Severe aortic dilation (eg, Marfan syndrome)
Management	<ul style="list-style-type: none">• Recommend against pregnancy at preconception counseling visit• If pregnant, discuss abortion; if abortion declined, regular cardiology follow-up

LV = left ventricle; **LVEF** = left ventricular ejection fraction.

Placenta accreta



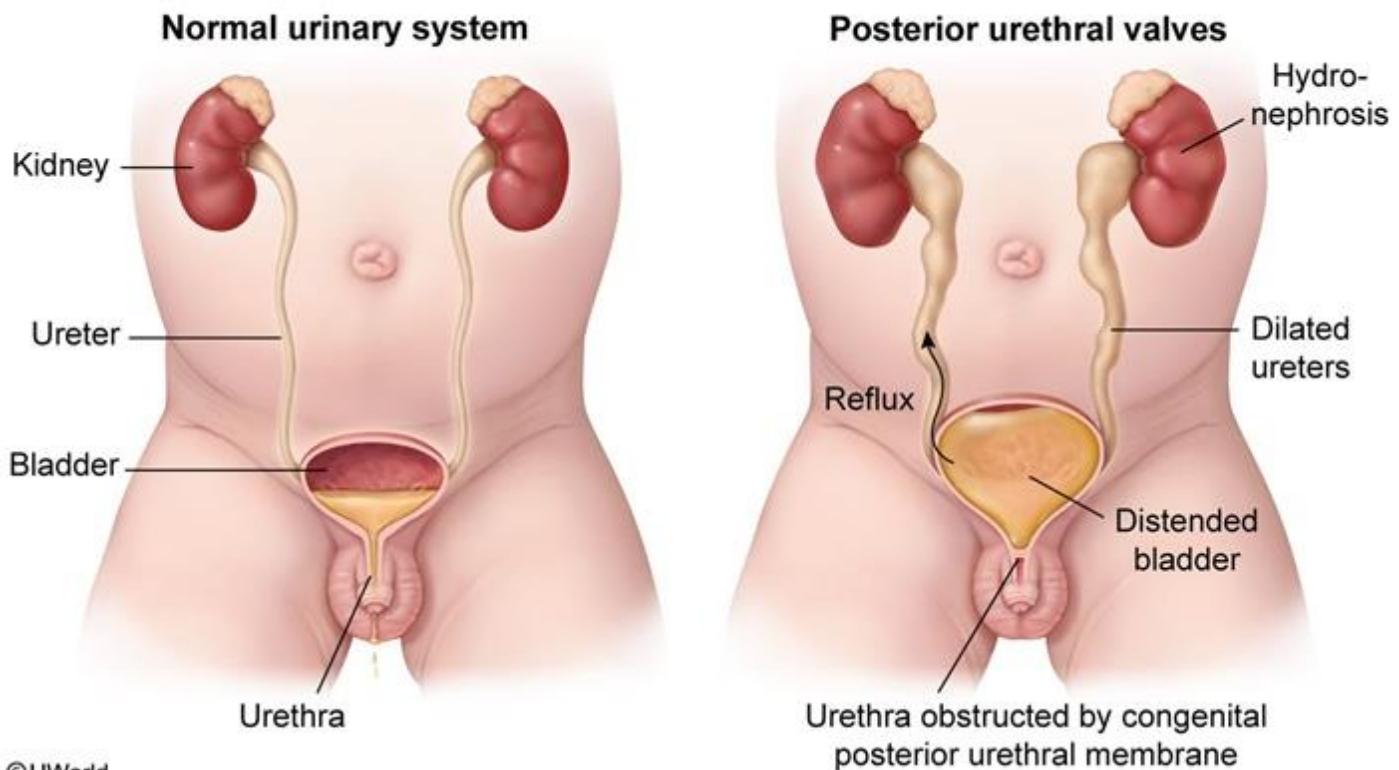
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Placenta accreta

Amniotic fluid index

	Oligohydramnios (AFI <5 cm)	Polyhydramnios (AFI ≥24 cm)
Causes	<ul style="list-style-type: none"> • Preeclampsia • Abruptio placenta • Uteroplacental insufficiency • Renal anomalies • NSAIDs 	<ul style="list-style-type: none"> • Esophageal/duodenal atresia • Anencephaly • Multiple gestation • Congenital infection • Diabetes mellitus
Complications	<ul style="list-style-type: none"> • Meconium aspiration • Preterm delivery • Umbilical cord compression 	<ul style="list-style-type: none"> • Fetal malposition • Umbilical cord prolapse • Preterm labor • Preterm premature rupture of membranes

AFI = amniotic fluid index; **NSAIDs** = nonsteroidal anti-inflammatory drugs.

Posterior urethral valves

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Posterior urethral valves

Postdural puncture headache

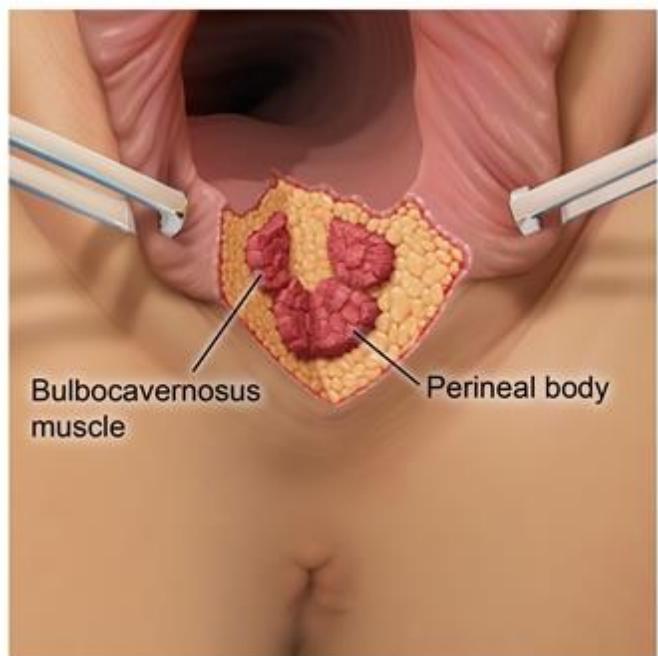
Clinical features	<ul style="list-style-type: none">• After lumbar puncture or neuraxial anesthesia• Positional (worse when upright, improves when supine)• Neck stiffness• Photophobia, diplopia• Hearing loss, tinnitus
Management	<ul style="list-style-type: none">• Typically self-limited• Epidural blood patch

Perineal lacerations

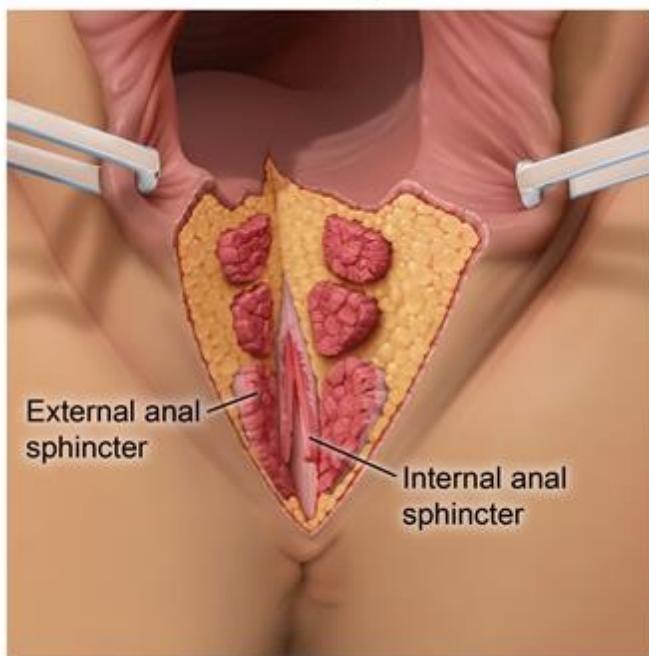
First-degree



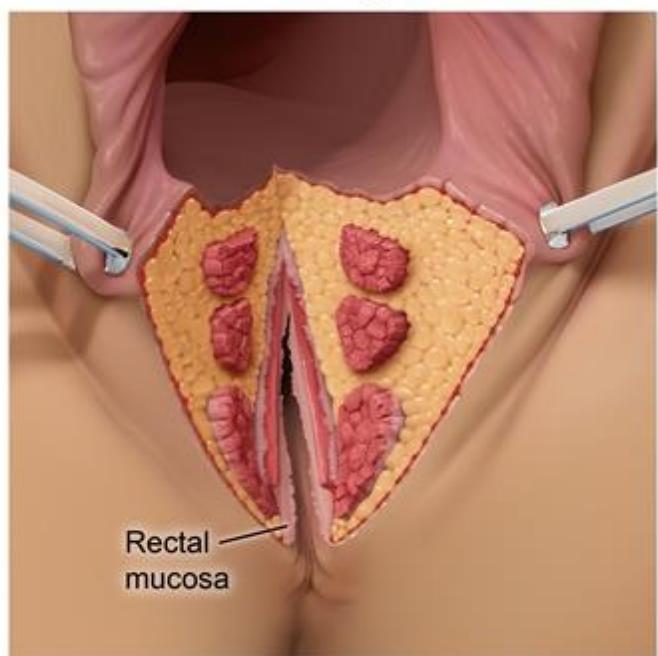
Second-degree



Third-degree



Fourth-degree



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Postpartum complication

POSTPARTUM ENDOMETRITIS

Postpartum endometritis

Risk factors	<ul style="list-style-type: none"> • Cesarean birth • Intraamniotic infection • Group B <i>Streptococcus</i> colonization • Prolonged rupture of membranes • Operative vaginal delivery
Clinical features	<ul style="list-style-type: none"> • Fever >24 hr postpartum • Uterine fundal tenderness • Purulent lochia
Etiology	<ul style="list-style-type: none"> • Polymicrobial infection
Treatment	<ul style="list-style-type: none"> • Clindamycin & gentamicin

POSTPARTUM HEMORRHAGE

Secondary (late) postpartum hemorrhage

Cause	Clinical features	Management
Retained POCs	<ul style="list-style-type: none"> • Heavy bleeding • \pm Uterine atony 	<ul style="list-style-type: none"> • Dilation & curettage
Placental site subinvolution	<ul style="list-style-type: none"> • Heavy bleeding • Uterine atony 	<ul style="list-style-type: none"> • Uterotonics (eg, oxytocin, methylergonovine, carboprost)
Postpartum endometritis	<ul style="list-style-type: none"> • Fever • Uterine tenderness • Purulent lochia 	<ul style="list-style-type: none"> • Broad-spectrum IV antibiotics (eg, clindamycin & gentamicin)

POCs = products of conception; **IV** = intravenous.

Differential diagnosis of postpartum hemorrhage

Diagnosis	Risk factors	Examination	Management
Uterine atony	<ul style="list-style-type: none"> • Prolonged labor • Chorioamnionitis • Uterine overdistension (multiples, fetal macrosomia, polyhydramnios) 	<ul style="list-style-type: none"> • Enlarged, boggy uterus 	<ul style="list-style-type: none"> • Bimanual uterine massage • Uterotonic medications
Retained products of conception	<ul style="list-style-type: none"> • Succenturiate placenta • Manual extraction of placenta • History of previous uterine surgery 	<ul style="list-style-type: none"> • Enlarged, boggy uterus • Placenta missing cotyledons • Retained placental fragments on ultrasound 	<ul style="list-style-type: none"> • Manual extraction
Genital tract trauma	<ul style="list-style-type: none"> • Operative vaginal delivery 	<ul style="list-style-type: none"> • Laceration of cervix or vagina • Enlarging hematoma 	<ul style="list-style-type: none"> • Laceration repair
Inherited coagulopathy	<ul style="list-style-type: none"> • History of abnormal bleeding in patient or family members 	<ul style="list-style-type: none"> • Continued bleeding despite contracted uterus 	<ul style="list-style-type: none"> • Correction of coagulopathy

Disseminated intravascular coagulation

Major causes	<ul style="list-style-type: none"> • Sepsis • Severe traumatic injury • Malignancy • Obstetric complications
Pathophysiology	<ul style="list-style-type: none"> • Procoagulant excessively triggers coagulation cascade → • Formation of fibrin-/platelet-rich thrombi & fibrinolysis → • Bleeding & organ damage (eg, kidneys, lungs)
Laboratory findings	<ul style="list-style-type: none"> • Thrombocytopenia • Prolonged PT & PTT • ↓ Fibrinogen • ↑ D-dimer • Microangiopathic hemolytic anemia (schistocytes)

Postpartum uterine atony

Risk factors	<ul style="list-style-type: none">• Uterine fatigue from prolonged, induced, or precipitous labor• Intraamniotic infection• Uterine overdistension (multiple gestation, macrosomia, polyhydramnios)• Retained placenta• Grand multiparity (≥ 5 prior deliveries)
Clinical features	<ul style="list-style-type: none">• Most common cause of postpartum hemorrhage• Enlarged, soft, boggy, poorly contracted uterus
Interventions	<ul style="list-style-type: none">• Bimanual uterine massage• Correction of bladder distension• High-dose oxytocin, misoprostol• Tranexamic acid• Carboprost, methylergonovine• Intrauterine balloon tamponade• Possible surgical intervention (if atony unresolved)

Differential diagnosis of postpartum hemorrhage

Diagnosis	Risk factors	Examination	Management
Uterine atony	<ul style="list-style-type: none"> Prolonged labor Chorioamnionitis Uterine overdistension (multiples, fetal macrosomia, polyhydramnios) 	<ul style="list-style-type: none"> Enlarged, boggy uterus 	<ul style="list-style-type: none"> Bimanual uterine massage Uterotonic medications
Retained products of conception	<ul style="list-style-type: none"> Succenturiate placenta Manual extraction of placenta History of previous uterine surgery 	<ul style="list-style-type: none"> Enlarged, boggy uterus Placenta missing cotyledons Retained placental fragments on ultrasound 	<ul style="list-style-type: none"> Manual extraction
Genital tract trauma	<ul style="list-style-type: none"> Operative vaginal delivery 	<ul style="list-style-type: none"> Laceration of cervix or vagina Enlarging hematoma 	<ul style="list-style-type: none"> Laceration repair
Inherited coagulopathy	<ul style="list-style-type: none"> History of abnormal bleeding in patient or family members 	<ul style="list-style-type: none"> Continued bleeding despite contracted uterus 	<ul style="list-style-type: none"> Correction of coagulopathy

Placenta accreta

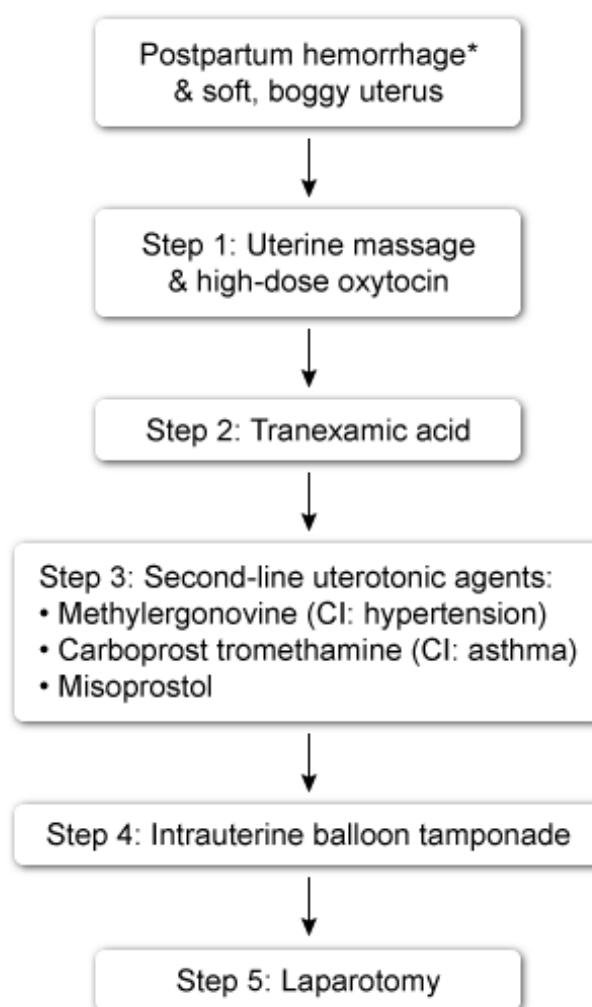
Definition	<ul style="list-style-type: none"> Morbidly adherent placental attachment to the myometrium
Risk factors	<ul style="list-style-type: none"> Placenta previa + prior uterine surgery (eg, cesarean delivery, D&C, myomectomy)
Clinical features	<ul style="list-style-type: none"> Prenatal diagnosis: US with placenta previa, numerous placental lacunae, myometrial thinning Postpartum diagnosis: adherent placenta, postpartum hemorrhage
Management	<ul style="list-style-type: none"> Cesarean hysterectomy with placenta in situ

D&C = dilation & curettage; US = ultrasound.

Vaginal hematoma

Risk factors	<ul style="list-style-type: none">Operative vaginal deliveryInfant ≥ 4000 g (8.8 lb)NulliparityProlonged 2nd stage of labor
Clinical features	<ul style="list-style-type: none">Vaginal massRectal or vaginal pressure\pm hypovolemic shock
Treatment	<ul style="list-style-type: none">Nonexpanding: observationExpanding: embolization, surgery

Management of postpartum hemorrhage due to uterine atony



*Estimated blood loss $\geq 1,000$ mL or bleeding + hypovolemia.

CI = contraindication.

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Management of postpartum hemorrhage due to uterine atony

Biophysical profile*

Component	Normal finding
Nonstress test	Reactive
Amniotic fluid volume	A single deepest vertical pocket $>2 \times 1$ cm is present
Fetal movements	≥ 3 discrete body or limb movements
Fetal tone	≥ 1 episodes of active extension & flexion of an extremity OR opening & closing of a hand
Fetal breathing movements	≥ 1 episodes of breathing lasting ≥ 30 sec

Maximum score = 10: 0 = abnormal, 2 = normal for each component.

*Continuous ultrasound observation for up to 30 min.

Late- & post-term pregnancy

Definition	<ul style="list-style-type: none"> • Late-term: ≥ 41 weeks gestation • Post-term: ≥ 42 weeks gestation
Risk factors	<ul style="list-style-type: none"> • Prior post-term pregnancy • Nulliparity • Obesity • Age ≥ 35 • Fetal anomalies (eg, anencephaly)
Complications	<ul style="list-style-type: none"> • Fetal/neonatal <ul style="list-style-type: none"> – Macrosomia – Dysmaturity syndrome – Oligohydramnios – Demise • Maternal <ul style="list-style-type: none"> – Severe obstetric laceration – Cesarean delivery – Postpartum hemorrhage
Management	<ul style="list-style-type: none"> • Frequent fetal monitoring (eg, nonstress test) • Delivery prior to 43 weeks gestation

Preeclampsia prevention

Definition	<ul style="list-style-type: none"> • New-onset hypertension & proteinuria &/or end-organ damage at >20 weeks gestation
High risk	<ul style="list-style-type: none"> • Prior preeclampsia • Chronic kidney disease • Chronic hypertension • Diabetes mellitus • Multiple gestation • Autoimmune disease
Moderate risk	<ul style="list-style-type: none"> • Obesity • Advanced maternal age • Nulliparity
Prevention	<ul style="list-style-type: none"> • Low-dose aspirin at 12 weeks gestation

Magnesium toxicity

Clinical features	<ul style="list-style-type: none"> • Mild: nausea, flushing, headache, hyporeflexia • Moderate: areflexia, hypocalcemia, somnolence • Severe: respiratory paralysis, cardiac arrest
Treatment	<ul style="list-style-type: none"> • Stop magnesium therapy • Give IV calcium gluconate bolus

Medications to avoid in myasthenia gravis

- Magnesium sulfate
- Fluoroquinolones, aminoglycosides
- Neuromuscular blocking agents
- CNS depressants
- Muscle relaxants
- Calcium channel blockers
- Beta blockers
- Opioids
- Statins

Treatment of preeclampsia

Drug	Indication
Hydralazine IV, labetalol IV or nifedipine PO	Lower blood pressure acutely to decrease stroke risk
Magnesium sulfate IV or IM	Prevent or treat eclamptic seizures

IM = intramuscular; **IV** = intravenous; **PO** = by mouth.

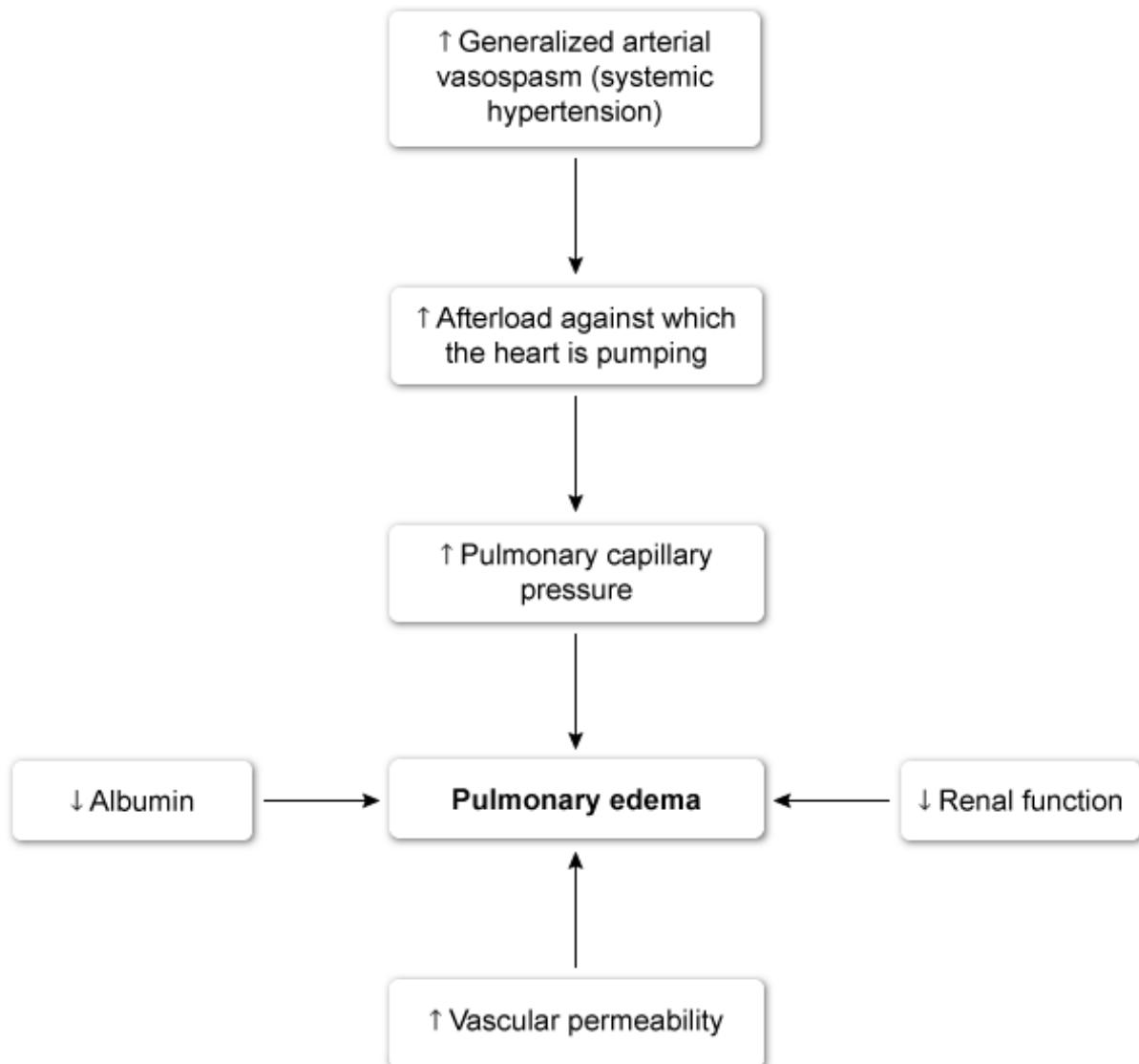
Preeclampsia

Risk factors	<ul style="list-style-type: none"> • Nulliparity • Obesity • Preexisting medical condition (eg, SLE, chronic hypertension) • Multiple gestation • Advanced maternal age
Definition	<ul style="list-style-type: none"> • New-onset hypertension* (SBP \geq140 or DBP \geq90 mm Hg) at \geq20 weeks <p>AND</p> <ul style="list-style-type: none"> • Proteinuria OR signs/symptoms of other end-organ damage
Severe features	<ul style="list-style-type: none"> • Severe-range hypertension (SBP \geq160 or DBP \geq110 mm Hg) • Platelets $<$100,000/mm³ • Creatinine $>$1.1 mg/dL or 2x normal • Elevated transaminases $>$2x upper limit of normal • Pulmonary edema • Vision or cerebral symptoms (eg, headache)
Management	<ul style="list-style-type: none"> • <37 weeks & no severe features: expectant • \geq37 weeks (or \geq34 weeks with severe features): delivery • Severe-range blood pressure: IV labetalol, IV hydralazine, PO nifedipine • Seizure prophylaxis: magnesium sulfate

*On 2 measurements \geq 4 hr apart.

DBP = diastolic blood pressure; **IV** = intravenous; **PO** = by mouth; **SBP** = systolic blood pressure; **SLE** = systemic lupus erythematosus.

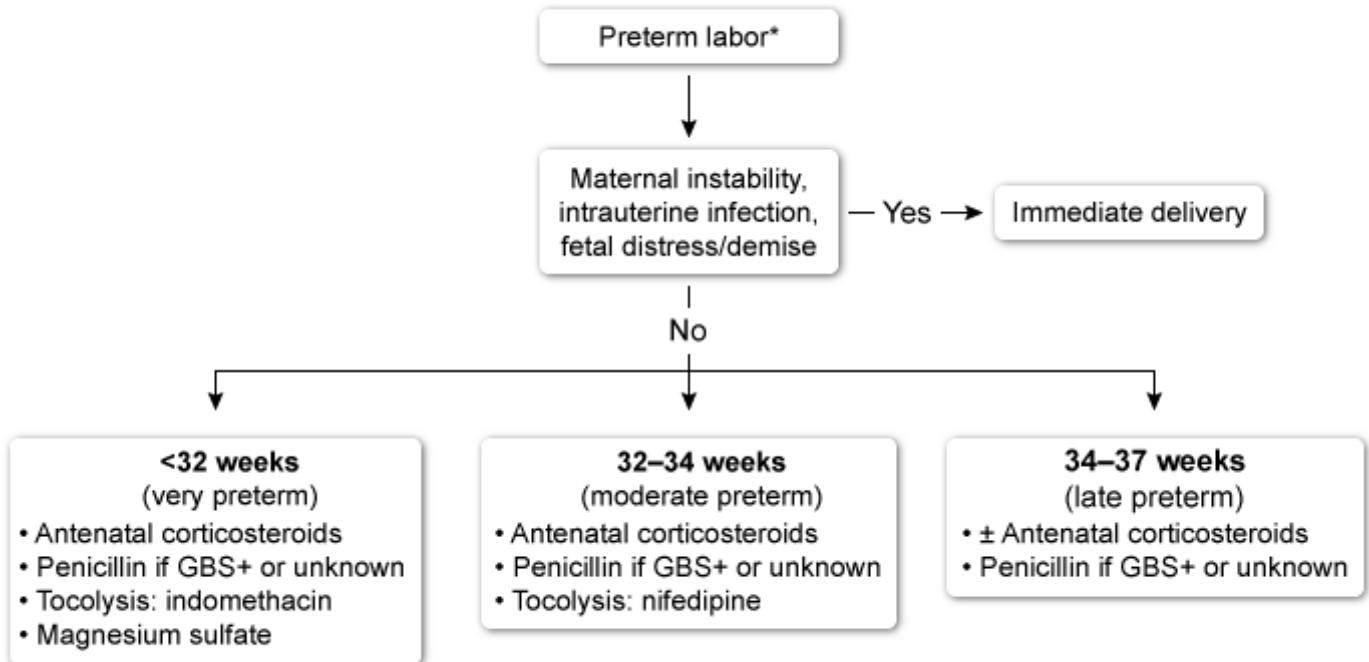
Pathophysiology of pulmonary edema in preeclampsia/eclampsia



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Pathophysiology of pulmonary edema

Preterm labor management



*Preterm labor = regular contractions causing cervical change at <37 weeks gestation with intact membranes.

GBS = group B Streptococcus.

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Effect of preeclampsia on fetal growth

PRENATAL CARE

External cephalic version

Procedure	<ul style="list-style-type: none">Manual rotation of fetus to cephalic presentationDecreases cesarean delivery rate
Indications	<ul style="list-style-type: none">Breech/transverse presentation≥37 weeks gestation
Absolute contraindications	<ul style="list-style-type: none">Contraindication to vaginal delivery<ul style="list-style-type: none">Prior classical cesarean deliveryPrior extensive uterine myomectomyPlacenta previa
Complications	<ul style="list-style-type: none">Abruption placentaeIntrauterine fetal demise

Preterm labor management

Preterm prelabor rupture of membranes (PPROM)

Definition	<ul style="list-style-type: none"> • Membrane rupture at <37 weeks prior to labor onset
Risk factors	<ul style="list-style-type: none"> • Prior PPROM • Genitourinary infection (eg, ASB, BV) • Antepartum bleeding
Diagnosis	<ul style="list-style-type: none"> • Vaginal pooling or fluid from cervix • Nitrazine-positive (blue) fluid • Ferning on microscopy
Management	<ul style="list-style-type: none"> • <34 weeks (reassuring): latency antibiotics, corticosteroids • <34 weeks (nonreassuring): delivery • ≥34 weeks: delivery
Complications	<ul style="list-style-type: none"> • Preterm labor • Intraamniotic infection • Placental abruption • Umbilical cord prolapse

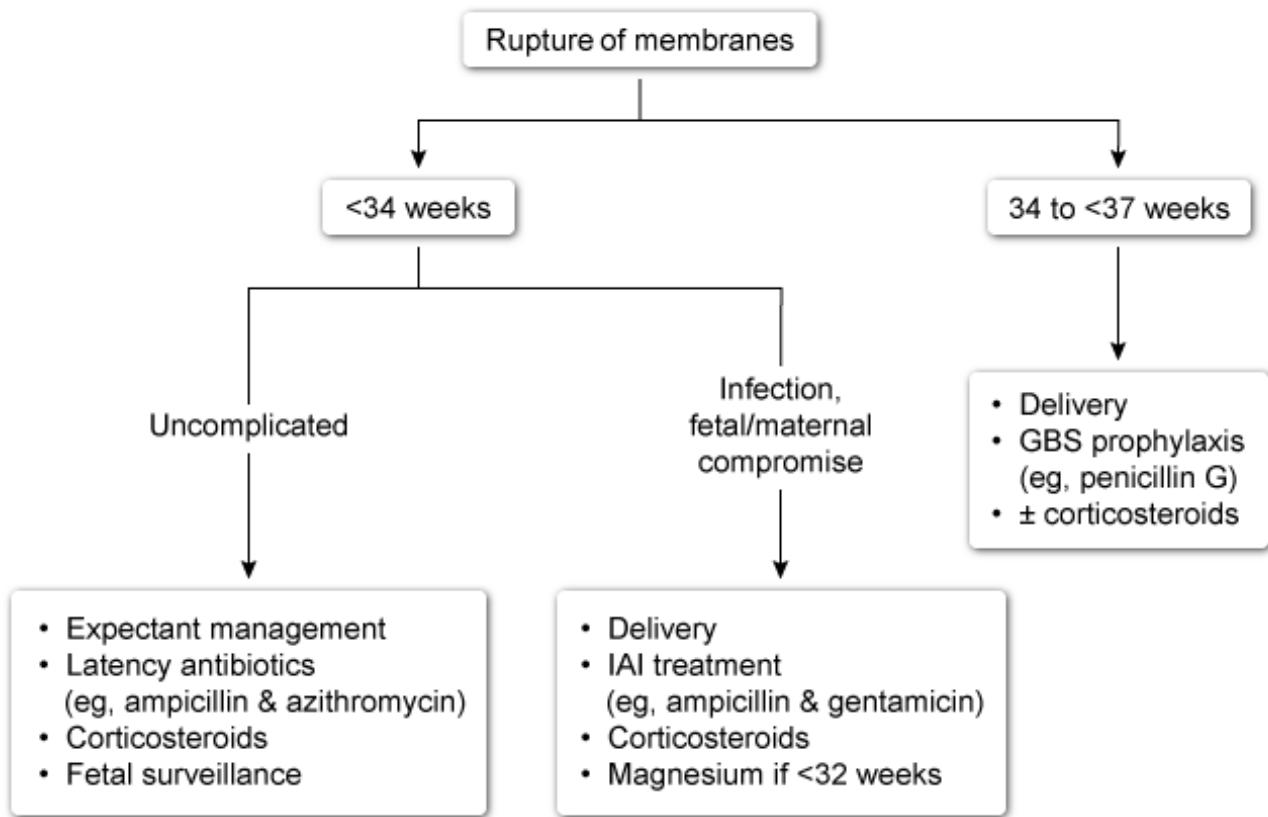
ASB = asymptomatic bacteriuria; **BV** = bacterial vaginosis; **PPROM** = preterm prelabor rupture of membranes.

Short interpregnancy interval

Definition	<ul style="list-style-type: none"> • <6-18 months from delivery to next pregnancy
Complications	<ul style="list-style-type: none"> • Maternal anemia • PPROM • Preterm delivery • Low birth weight

PPROM = preterm prelabor rupture of membranes.

Management of preterm prelabor ROM



GBS = group B streptococcal; IAI = intraamniotic infection; ROM = rupture of membranes.

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Management of preterm prelabor ROM

Hypertensive disorders of pregnancy

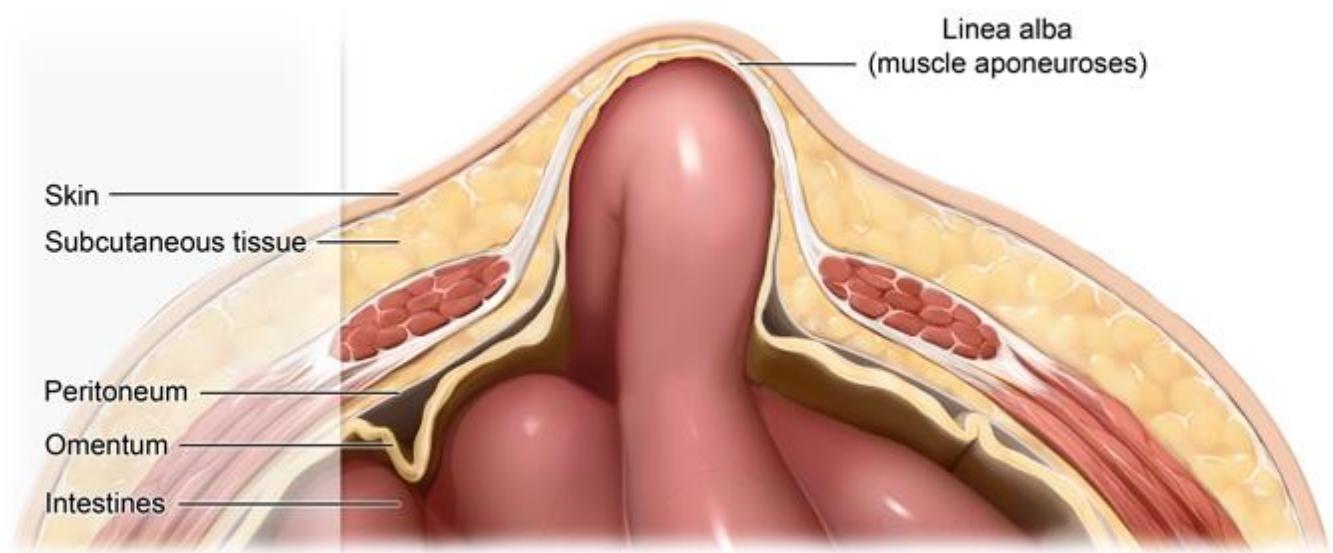
Chronic hypertension	<ul style="list-style-type: none"> Systolic pressure ≥ 140 mm Hg &/or diastolic pressure ≥ 90 mm Hg prior to conception or at <20 weeks gestation
Gestational hypertension	<ul style="list-style-type: none"> New-onset elevated blood pressure at ≥ 20 weeks gestation No proteinuria or signs of end-organ damage
Preeclampsia	<ul style="list-style-type: none"> New-onset elevated blood pressure at ≥ 20 weeks gestation <p>AND</p> <ul style="list-style-type: none"> Proteinuria OR signs of end-organ damage
Eclampsia	<ul style="list-style-type: none"> Preeclampsia <p>AND</p> <ul style="list-style-type: none"> New-onset tonic-clonic seizures
Chronic hypertension with superimposed preeclampsia	<p>Chronic hypertension AND 1 of the following:</p> <ul style="list-style-type: none"> New-onset proteinuria or worsening of existing proteinuria at ≥ 20 weeks gestation Sudden worsening of hypertension Signs of end-organ damage

Obstetric complications of hypertension

Maternal	<ul style="list-style-type: none"> Superimposed preeclampsia Cesarean delivery Abruption placentae Postpartum hemorrhage Maternal mortality
Fetal	<ul style="list-style-type: none"> Fetal growth restriction \pm oligohydramnios Preterm delivery Intrauterine fetal demise Perinatal mortality

Rectovaginal fistula

Risk factors	<ul style="list-style-type: none"> • Pelvic radiation • Obstetric trauma • Pelvic surgery • Colon cancer • Diverticulitis • Crohn disease
Clinical features	<ul style="list-style-type: none"> • Uncontrollable passage of gas &/or feces from the vagina
Diagnostic studies	<ul style="list-style-type: none"> • Physical examination • Fistulography • Magnetic resonance imaging • Endosonography

Rectus abdominis diastasis

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Rectus abdominis diastasis

Indications for prophylactic administration of anti-D immunoglobulin for Rh(D)-negative patients*

-
- At 28-32 weeks gestation
 - <72 hours after delivery of Rh(D)-positive infant
 - <72 hours after spontaneous abortion
 - Ectopic pregnancy
 - Threatened abortion
 - Hydatidiform mole
 - Chorionic villus sampling, amniocentesis
 - Abdominal trauma
 - 2nd- & 3rd-trimester bleeding
 - External cephalic version
-

*Antepartum prophylaxis is not indicated if the father is Rh(D) negative.

SHOULDER DYSTOCIA

Management of shoulder dystocia (BE CALM)

B	Breathe; do not push
E	Elevate legs & flex hips, thighs against abdomen (McRoberts)
C	Call for help
A	Apply suprapubic pressure
L	EnLarge vaginal opening with episiotomy
M	Maneuvers: <ul style="list-style-type: none"> • Deliver posterior arm • Rotate posterior shoulder (Woods screw): apply pressure to anterior aspect of the posterior shoulder • Adduct posterior fetal shoulder (Rubin): apply pressure to the posterior aspect of the posterior shoulder • Mother on hands & knees: "all fours" (Gaskin) • Replace fetal head into pelvis for cesarean delivery (Zavanelli)

Shoulder dystocia

Definition	<ul style="list-style-type: none">Failure of usual obstetric maneuvers to deliver fetal shoulders
Risk factors	<ul style="list-style-type: none">Fetal macrosomiaMaternal obesityExcessive pregnancy weight gainGestational diabetesPostterm pregnancy
Warning signs	<ul style="list-style-type: none">Protracted laborRetraction of fetal head into the perineum after delivery (turtle sign)

SICKLE CELL

Sickle cell disease in pregnancy

Prenatal care	<ul style="list-style-type: none">Baseline 24-hr urine for total proteinBaseline chemistry panelSerial urine culturePneumococcal vaccinationFolic acid supplementAspirinSerial fetal growth ultrasound
Obstetric complications	<ul style="list-style-type: none">Spontaneous abortionPreeclampsia, eclampsiaAbruption placentaeAntepartum bleeding
Fetal complications	<ul style="list-style-type: none">Fetal growth restrictionOligohydramniosPreterm birth

Fetal growth restriction

	Symmetric	Asymmetric
Definition	<ul style="list-style-type: none"> Estimated fetal weight <10th percentile or birth weight <3rd percentile for gestational age 	
Onset	<ul style="list-style-type: none"> 1st trimester 	<ul style="list-style-type: none"> 2nd/3rd trimester
Etiology	<ul style="list-style-type: none"> Chromosomal abnormalities Congenital infection 	<ul style="list-style-type: none"> Uteroplacental insufficiency Maternal malnutrition
Clinical features	<ul style="list-style-type: none"> Global growth lag 	<ul style="list-style-type: none"> "Head-sparing" growth lag
Management	<ul style="list-style-type: none"> Monitor/treat complications (eg, hypoglycemia, hypothermia, polycythemia) Hypoglycemia: frequent screening and frequent feedings Hypothermia: skin to skin with mother, examinations in incubator Polycythemia and hypocalcemia: screen if symptoms develop (eg, poor feeding, vomiting, jitteriness) 	

SYPHILIS

Syphilis manifestations

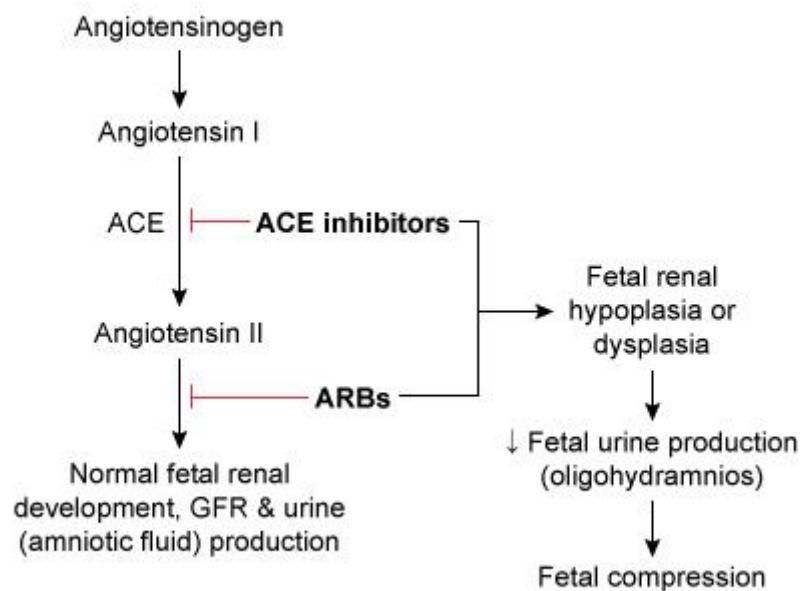
Primary	<ul style="list-style-type: none"> Painless genital ulcer (chancre)
Secondary	<ul style="list-style-type: none"> Diffuse rash (palms & soles) Lymphadenopathy (epitrochlear) Condyloma latum Oral lesions Hepatitis
Latent	<ul style="list-style-type: none"> Asymptomatic
Tertiary	<ul style="list-style-type: none"> CNS (tabes dorsalis, dementia) Cardiovascular (aortic aneurysm/insufficiency) Cutaneous (gummas)

CNS = central nervous system.

High-risk sexually transmitted infection screening in pregnancy

High-risk patients	<ul style="list-style-type: none"> • Age <25 • Prior sexually transmitted infection • High-risk sexual activity (eg, multiple partners, commercial sex work)
Required screening	<ul style="list-style-type: none"> • Performed at initial prenatal visit & 3rd trimester: <ul style="list-style-type: none"> – HIV – Syphilis – Hepatitis B & C viruses – Gonorrhea – <i>Chlamydia</i>

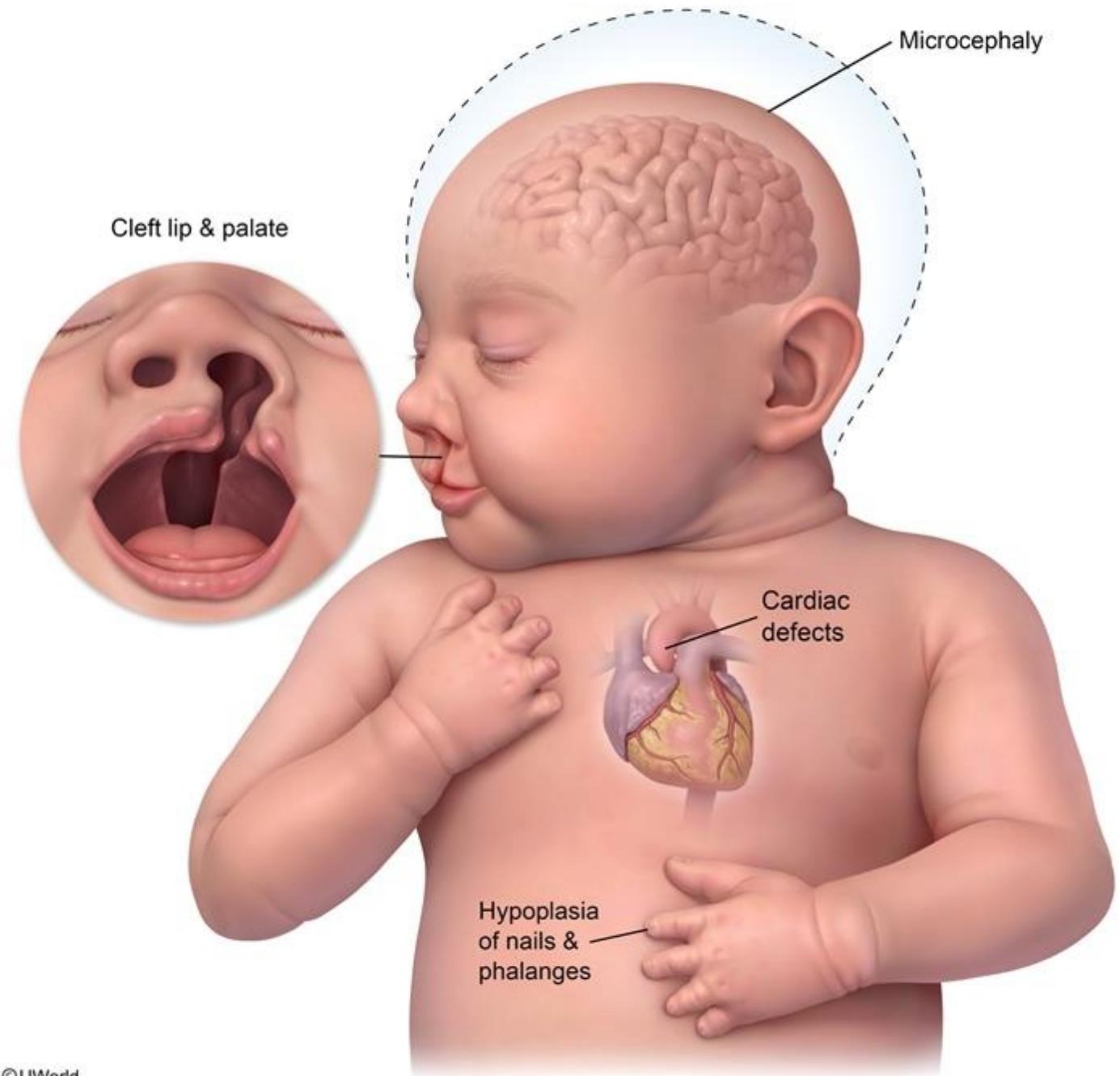
Teratogenic effects of ACE inhibitors and ARBs



ARB = angiotensin II receptor blocker; GFR = glomerular filtration rate. ©UWorld

Teratogenic effects of ACE inhibitors and ARBs

Fetal hydantoin syndrome



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Fetal hydantoin syndrome

Wernicke encephalopathy

Associated conditions	<ul style="list-style-type: none"> • Chronic alcoholism (most common) • Malnutrition (eg, anorexia nervosa) • Hyperemesis gravidarum
Pathophysiology	<ul style="list-style-type: none"> • Thiamine deficiency
Clinical features	<ul style="list-style-type: none"> • Encephalopathy • Oculomotor dysfunction (eg, horizontal nystagmus & bilateral abducens palsy) • Postural & gait ataxia
Treatment	<ul style="list-style-type: none"> • Intravenous thiamine followed by glucose infusion

Septic pelvic thrombophlebitis

Risk factors	<ul style="list-style-type: none"> • Cesarean delivery • Pelvic surgery • Endometritis • Pelvic inflammatory disease • Pregnancy • Malignancy
Pathophysiology	<ul style="list-style-type: none"> • Hypercoagulability • Pelvic venous dilation • Vascular trauma • Infection
Presentation	<ul style="list-style-type: none"> • Fever unresponsive to antibiotics • No localizing signs/symptoms • Negative infectious evaluation • Diagnosis of exclusion
Treatment	<ul style="list-style-type: none"> • Anticoagulation • Broad-spectrum antibiotics

Congenital toxoplasmosis

Maternal risk factors	<ul style="list-style-type: none"> Raw or undercooked meat Unwashed produce (ie, contaminated soil) Handling of cat feces
Clinical features	<ul style="list-style-type: none"> Classic triad: <ul style="list-style-type: none"> Chorioretinitis Diffuse intracranial calcifications Hydrocephalus Microcephaly (brain atrophy) or macrocephaly (severe hydrocephalus) Seizures Nonspecific findings: jaundice, hepatosplenomegaly, rash, growth restriction
Diagnosis	<ul style="list-style-type: none"> <i>Toxoplasma</i> serology or PCR
Treatment	<ul style="list-style-type: none"> Pyrimethamine, sulfadiazine, folic acid

Tuberous sclerosis complex

Pathophysiology	<ul style="list-style-type: none"> Mutation (inherited or de novo) in <i>TSC1</i> or <i>TSC2</i> gene Autosomal dominant
Clinical features	<ul style="list-style-type: none"> Dermatologic <ul style="list-style-type: none"> Ash-leaf spots Angiofibromas of the malar region Shagreen patches Neurologic <ul style="list-style-type: none"> CNS lesions (eg, subependymal tumors) Epilepsy (eg, infantile spasms) Intellectual disability Autism & behavioral disorders (eg, hyperactivity) Cardiovascular: rhabdomyomas Renal: angiomyolipomas
Surveillance	<ul style="list-style-type: none"> Tumor screening <ul style="list-style-type: none"> Regular skin & eye examinations Serial MRI of the brain & kidney Baseline echocardiography & serial ECG Baseline electroencephalography Neuropsychiatric screening

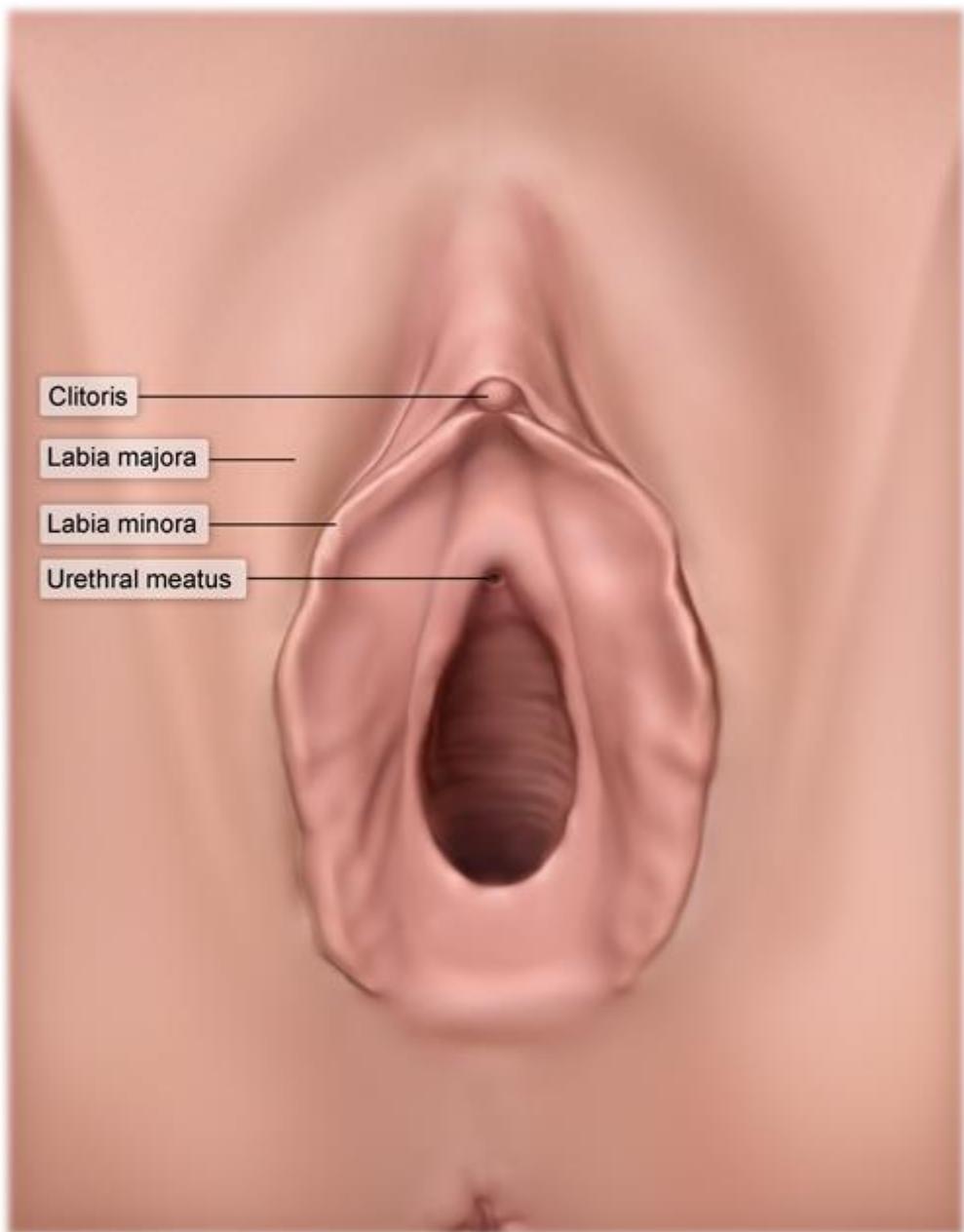
Postpartum urinary retention

Risk factors	<ul style="list-style-type: none"> • Primiparity • Regional neuraxial anesthesia • Operative vaginal delivery • Perineal injury • Cesarean delivery
Clinical features	<ul style="list-style-type: none"> • Small-volume voids or inability to void • Incomplete bladder emptying • Dribbling of urine
Management	<ul style="list-style-type: none"> • Self-limited condition • Intermittent catheterization

Stress urinary incontinence

Physiology	<ul style="list-style-type: none"> • Urethral hypermobility • Intrinsic sphincteric deficiency
Symptoms	<ul style="list-style-type: none"> • Leakage with Valsalva maneuver (eg, coughing, sneezing, laughing, intercourse)
Risk factors	<ul style="list-style-type: none"> • Pregnancy (especially vaginal delivery) • Obesity • Chronic high-impact exercise
Treatment	<ul style="list-style-type: none"> • Pelvic floor muscle (Kegel) exercises • Lifestyle modifications (weight loss) • Continence pessary • Midurethral sling procedure

Vulvar anatomy



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Urinary incontinence

Cystitis & asymptomatic bacteriuria during pregnancy

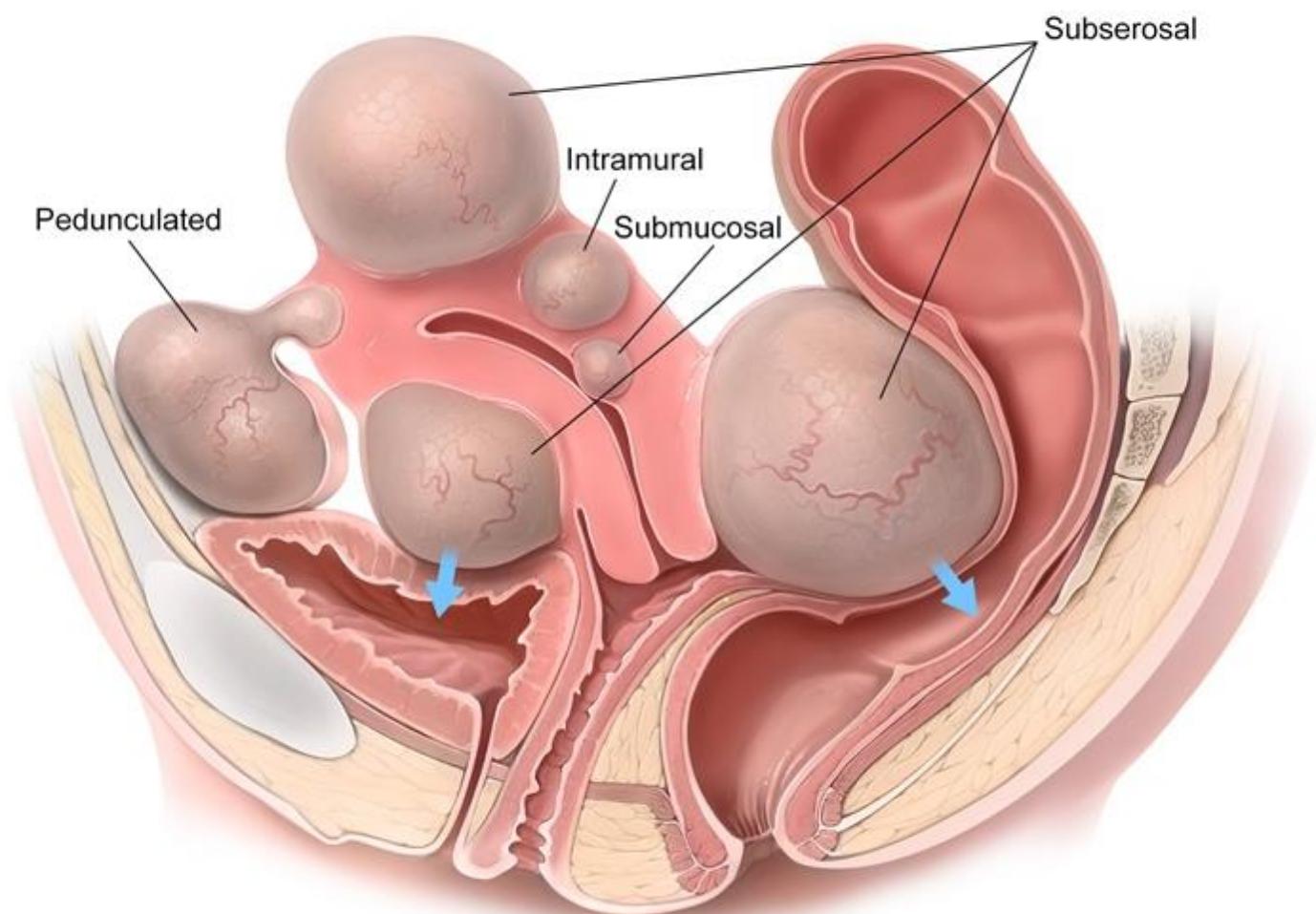
Condition	Clinical features	Management
Asymptomatic bacteriuria	<ul style="list-style-type: none"> Positive urine culture ($\geq 100,000$ colony-forming units/mL) in asymptomatic patient Screening usually done at 12-16 weeks gestation Treatment reduces progression to UTI & complications (eg, preterm birth, low birth weight) 	<ul style="list-style-type: none"> Nitrofurantoin for 5-7 days Amoxicillin or amoxicillin-clavulanate for 3-7 days Fosfomycin as single dose No fluoroquinolones in all trimesters No trimethoprim-sulfamethoxazole in 1st & 3rd trimesters
Acute cystitis	<ul style="list-style-type: none"> Symptomatic patient (eg, dysuria, urgency) with positive urine culture Considered a complicated UTI 	

UTI = urinary tract infection.

Pyelonephritis in pregnancy

Risk factors	<ul style="list-style-type: none"> Asymptomatic bacteriuria Diabetes mellitus Age <20
Common pathogens	<ul style="list-style-type: none"> <i>Escherichia coli</i> (most common) <i>Klebsiella</i> <i>Enterobacter</i> Group B <i>Streptococcus</i>
Complications	<ul style="list-style-type: none"> Preterm labor Low birth weight Acute respiratory distress syndrome
Treatment	<ul style="list-style-type: none"> Intravenous antibiotics Supportive therapy

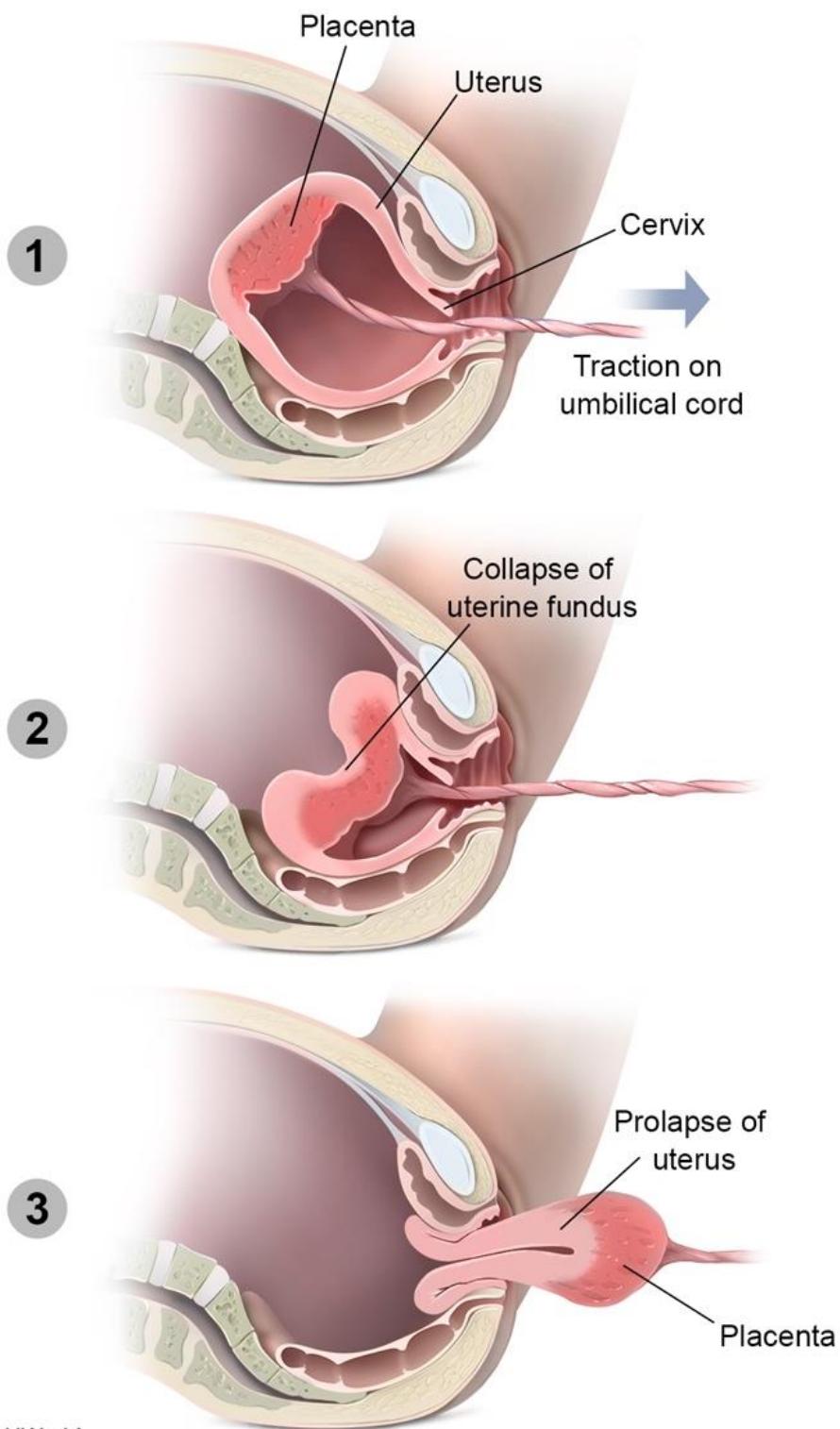
Uterine fibroids



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Uterine fibroids

Uterine inversion

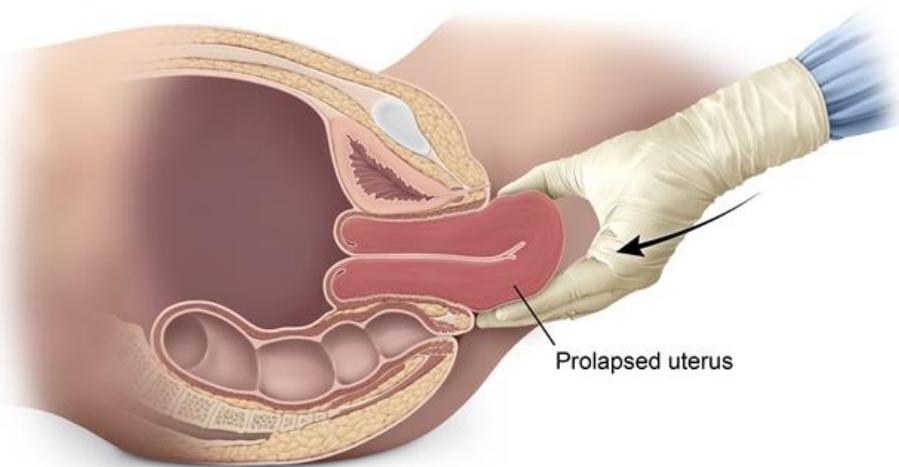


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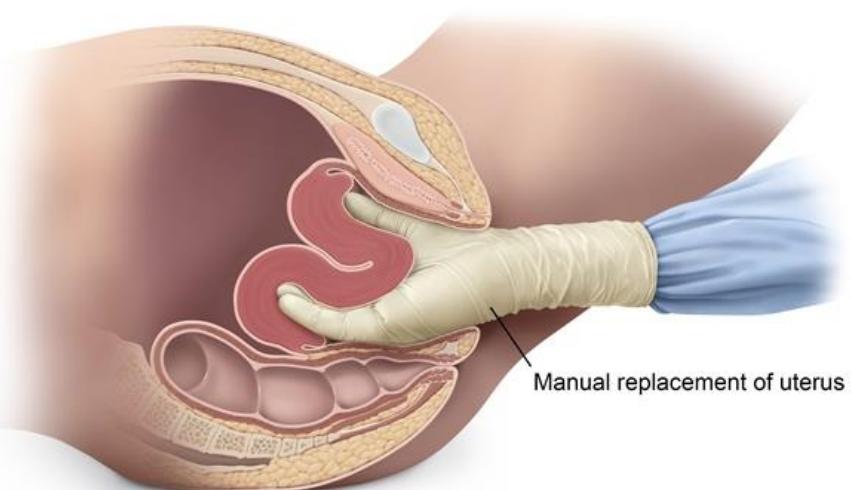
Uterine inversion

Manual reduction of uterine inversion

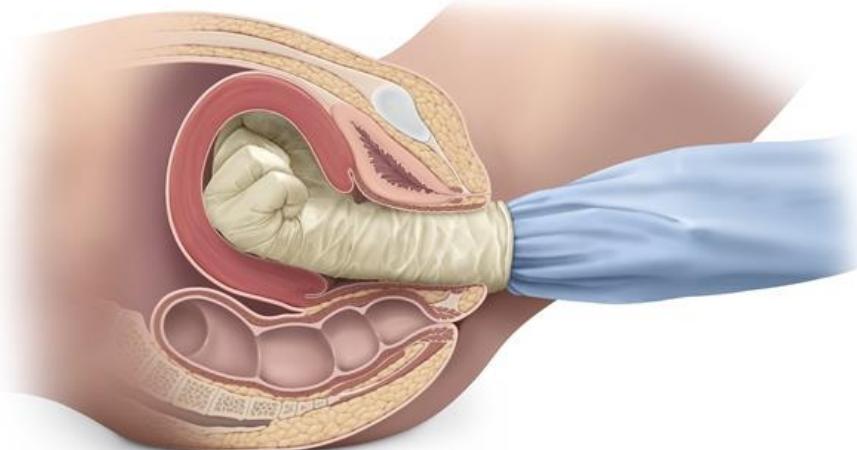
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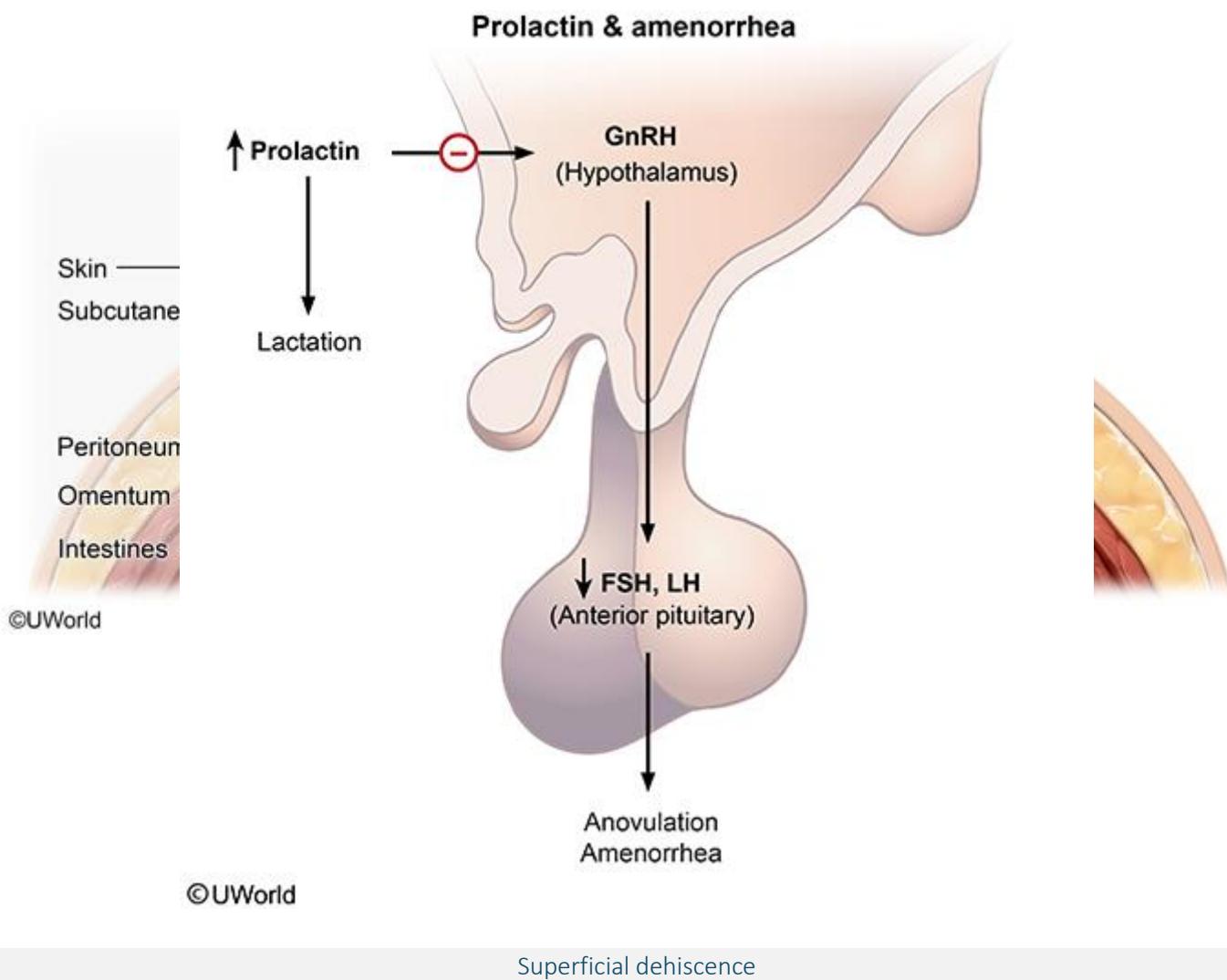
Manual reduction of uterine inversion

Uterine surgical history & vaginal birth

Surgery	Trial of labor contraindicated?
Low transverse cesarean delivery (horizontal incision)	No
Classical cesarean delivery (vertical incision)	Yes
Abdominal myomectomy with uterine cavity entry	Yes
Abdominal myomectomy without uterine cavity entry	No

Uterine rupture

Risk factors	<ul style="list-style-type: none"> • Prior uterine surgery (eg, cesarean delivery, myomectomy) • Induction of labor/prolonged labor • Congenital uterine anomalies • Fetal macrosomia
Clinical presentation	<ul style="list-style-type: none"> • Vaginal bleeding • Intraabdominal bleeding (hypotension, tachycardia) • Fetal heart decelerations • Loss of fetal station • Palpable fetal parts on abdominal examination • Loss of intrauterine pressure
Management	<ul style="list-style-type: none"> • Laparotomy for delivery & uterine repair



Normal pregnancy, childbirth, and puerperium

AMENORRHEA

Intrauterine adhesions

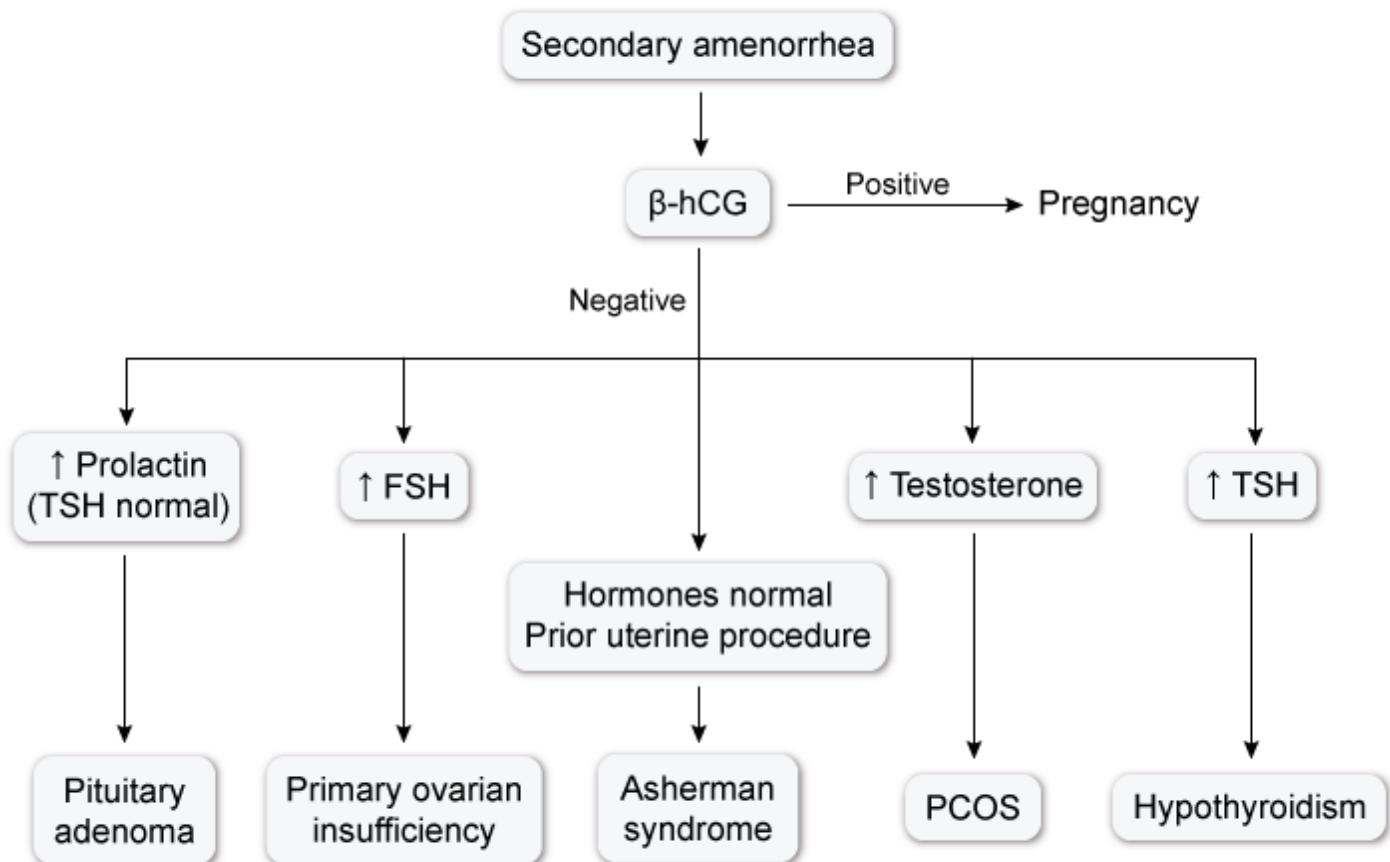
Risk factors	<ul style="list-style-type: none"> • Infection (eg, septic abortion, endometritis) • Intrauterine surgery (eg, curettage, myomectomy)
Clinical features	<ul style="list-style-type: none"> • Abnormal uterine bleeding • Amenorrhea • Infertility • Cyclic pelvic pain • Recurrent pregnancy loss
Evaluation	<ul style="list-style-type: none"> • Hysteroscopy

Prolactin & amenorrhea

Common problems related to lactation

Diagnosis	Clinical features
Engorgement	Bilateral, symmetric fullness, tenderness & warmth
Nipple injury	Abrasion, bruising, cracking &/or blistering from poor latch
Plugged duct	Focal tenderness & firmness &/or erythema; no fever
Galactocele	Subareolar, mobile, well-circumscribed, nontender mass; no fever
Mastitis	Tenderness/erythema + fever
Abscess	Symptoms of mastitis + fluctuant mass

Secondary amenorrhea evaluation

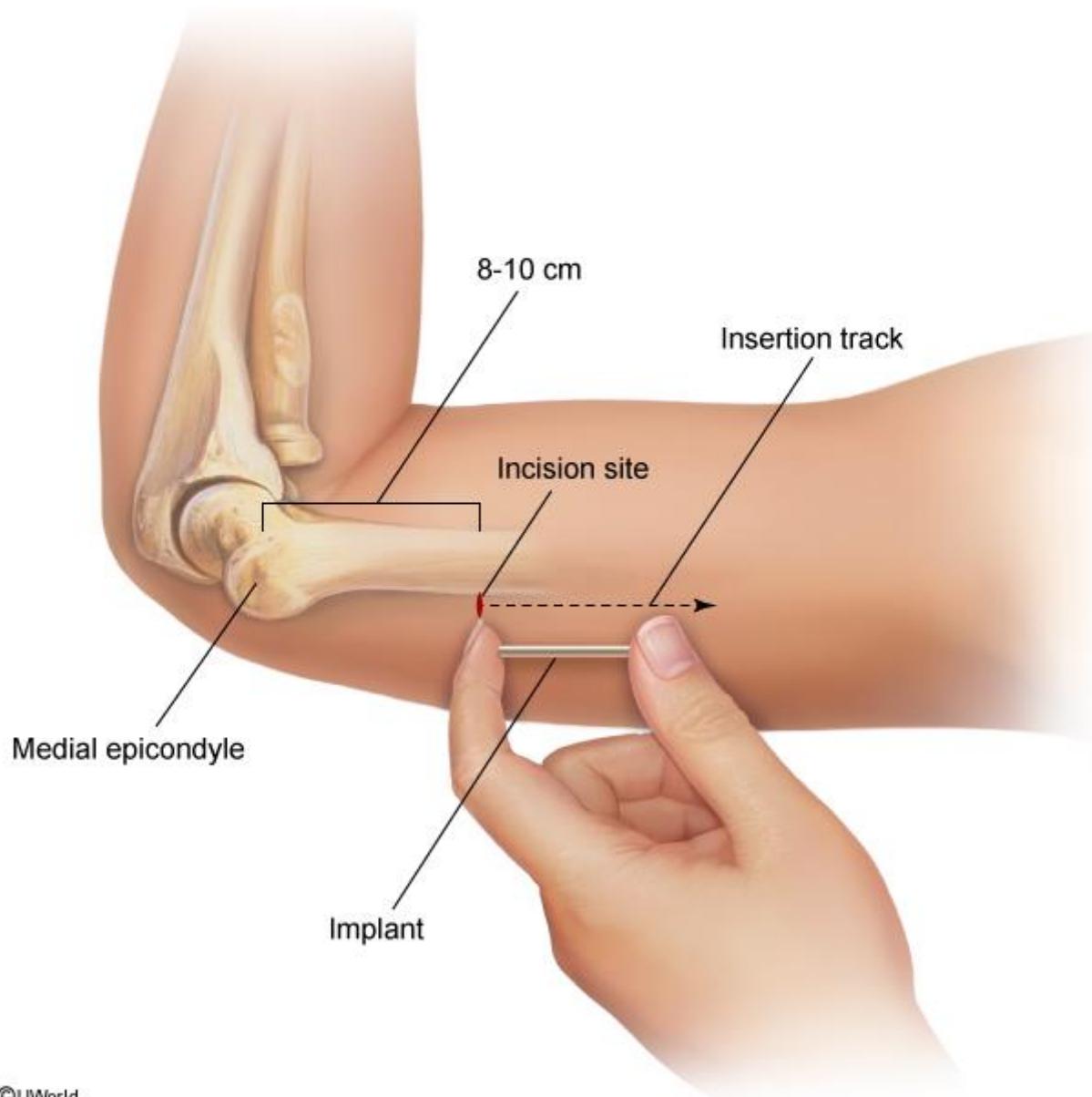


PCOS = polycystic ovary syndrome.

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Secondary amenorrhea evaluation

Subdermal progestin implant



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Subdermal progestin implant

ETHICAL PRINCIPLES IN HEALTHCARE

Risks of multiple gestation pregnancy

Maternal complications	<ul style="list-style-type: none">• Hyperemesis gravidarum• Iron-deficiency anemia• Preeclampsia, eclampsia• Gestational diabetes mellitus• Cesarean delivery• Postpartum hemorrhage
Fetal complications	<ul style="list-style-type: none">• Preterm delivery• Fetal growth restriction• Congenital anomalies

Antepartum fetal surveillance

Test	Description	Normal result	Abnormal result
Nonstress test	External fetal heart rate monitoring for 20-40 minutes	<ul style="list-style-type: none"> • Reactive: ≥2 accelerations • 2 points 	<ul style="list-style-type: none"> • Nonreactive: <2 accelerations • Recurrent variable or late decelerations • 0 points
Biophysical profile	<ul style="list-style-type: none"> • Nonstress test plus ultrasound assessment of the following: <ul style="list-style-type: none"> – Amniotic fluid volume – Fetal breathing movement – Fetal movement – Fetal tone • 2 points per category if normal • 0 points if abnormal (maximum 10/10) 	8 or 10 points	<ul style="list-style-type: none"> • Equivocal: 6 points • Abnormal: 0, 2, or 4 points • Oligohydramnios
Contraction stress test	External fetal heart rate monitoring during spontaneous or induced (eg, oxytocin, nipple stimulation) uterine contractions	No late or recurrent variable decelerations	Late decelerations with >50% of contractions
Doppler sonography of the umbilical artery	Evaluation of umbilical artery flow in fetal intrauterine growth restriction only	High-velocity diastolic flow in umbilical artery	Decreased, absent, or reversed end-diastolic flow

Baseline fetal heart rate

Fetal tachycardia (>160/min)	<ul style="list-style-type: none"> • Maternal fever (eg, intraamniotic infection) • Medication side effect (eg, beta agonists) • Fetal hyperthyroidism • Fetal tachyarrhythmia
Fetal bradycardia (<110/min)	<ul style="list-style-type: none"> • Maternal hypothermia • Medication side effect (eg, beta blockers) • Fetal hypothyroidism • Fetal heart block (eg, anti-Ro/SSA, anti-La/SSB)

HIV

HIV management during pregnancy

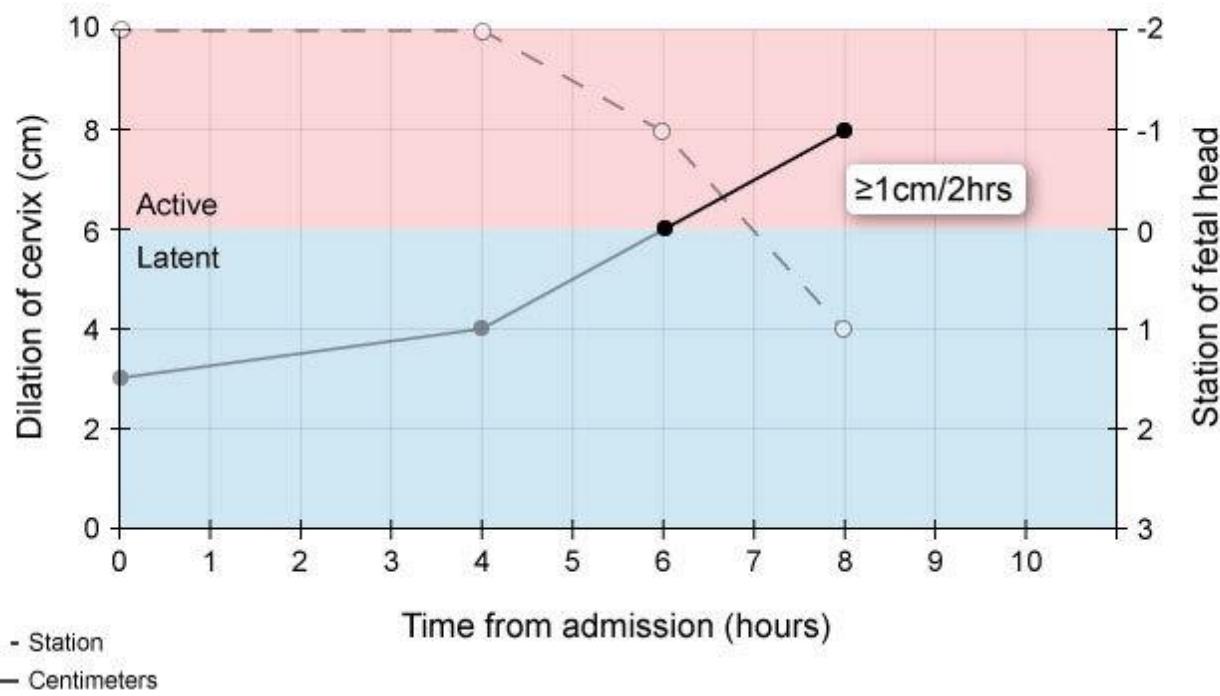
Antepartum	<ul style="list-style-type: none"> • HIV RNA viral load at initial visit, every 2-4 weeks after initiation or change of therapy, monthly until undetectable, then every 3 months • CD4 cell count every 3-6 months • Resistance testing if not previously performed • ART initiation as early as possible • Avoid amniocentesis unless viral load $\leq 1,000$ copies/mL
Intrapartum	<ul style="list-style-type: none"> • Avoid artificial ROM, fetal scalp electrode, operative vaginal delivery • Viral load $\leq 1,000$ copies/mL: ART + vaginal delivery • Viral load $> 1,000$ copies/mL: ART + zidovudine + cesarean delivery
Postpartum	<ul style="list-style-type: none"> • Mother: continue ART • Infant (maternal viral load $\leq 1,000$ copies/mL): zidovudine • Infant (maternal viral load $> 1,000$ copies/mL): multidrug ART

ART = antiretroviral therapy; **ROM** = rupture of membranes.

Vaccines during pregnancy

Recommended	<ul style="list-style-type: none"> • Tdap • Inactivated influenza • Rho(D) immunoglobulin
Indicated for high-risk patients	<ul style="list-style-type: none"> • Hepatitis B • Hepatitis A • Pneumococcus • <i>Haemophilus influenzae</i> • Meningococcus • Varicella-zoster immunoglobulin
Contraindicated	<ul style="list-style-type: none"> • HPV • MMR • Live attenuated influenza • Varicella

HPV = human papillomavirus; **MMR** = measles-mumps-rubella; **Tdap** = tetanus toxoid-reduced diphtheria toxoid-acellular pertussis.

Normal labor progression

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Normal labor progression

Neonatal complications of diabetes during pregnancy

Pathogenesis	<ul style="list-style-type: none"> • Maternal hyperglycemia → fetal hyperglycemia → β-cell hyperplasia & hyperinsulinemia • ↑ Fetal fat & glycogen stores • ↑ Fetal metabolic demand
Associated risks	<ul style="list-style-type: none"> • Prematurity • Congenital anomalies (eg, caudal regression syndrome) • Macrosomia & associated complications (eg, brachial plexus injury, clavicle fracture) • Respiratory distress syndrome • Hypertrophic cardiomyopathy
Laboratory findings	<ul style="list-style-type: none"> • Hypoglycemia • Polycythemia, low iron • Hypocalcemia & hypomagnesemia • Hyperbilirubinemia

Meralgia paresthetica

Etiology	Compression of lateral femoral cutaneous nerve at inguinal ligament due to: <ul style="list-style-type: none"> • Tight clothing • Injury during local surgery • Seat belt injury (eg, motor vehicle collision)
Risk factors	<ul style="list-style-type: none"> • Obesity with heavy panniculus • Diabetes • Pregnancy
Symptoms/signs	<ul style="list-style-type: none"> • Paresthesia & decreased sensation at lateral thigh • No motor deficits
Treatment	<ul style="list-style-type: none"> • Avoid tight garments • Weight loss • Anticonvulsants (eg, gabapentin) or nerve block

Management of migraines in pregnancy

Nonpharmacologic therapy:
rest, hydration, heat

↓
Acetaminophen

↓
*Antiemetics (eg, promethazine),
codeine, caffeine/butalbital

↓
**Nonsteroidal anti-inflammatory
drugs (eg, naproxen)

↓
Opioids (eg, oxycodone)

*Can be used in conjunction with acetaminophen.

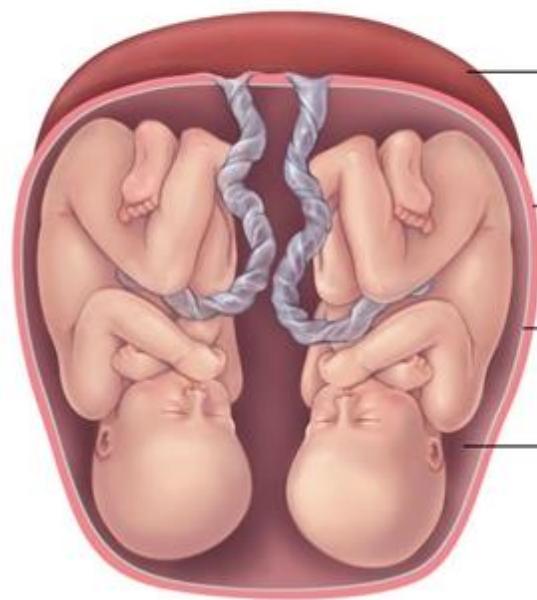
**2nd trimester only.

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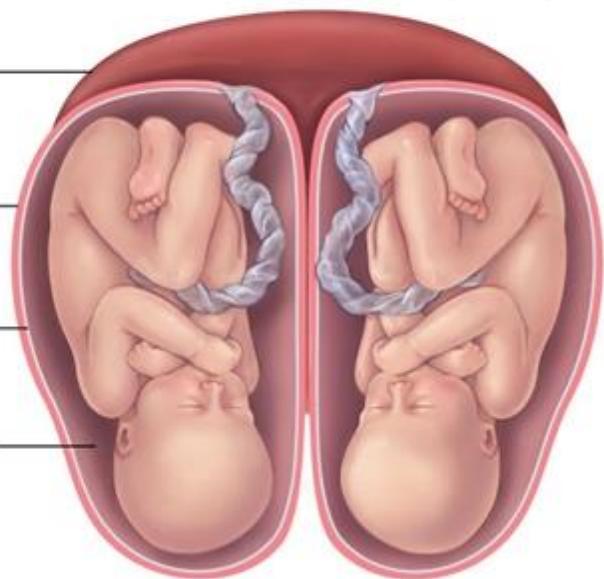
Management of migraines in pregnancy

Various types of twin placentation

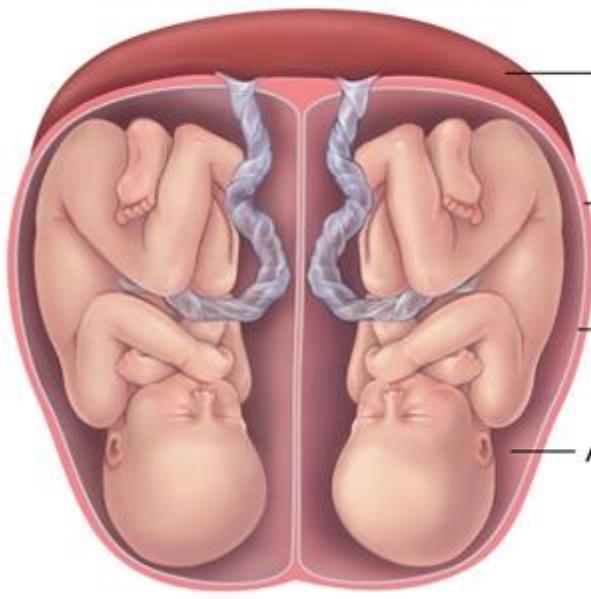
Monochorionic monoamniotic



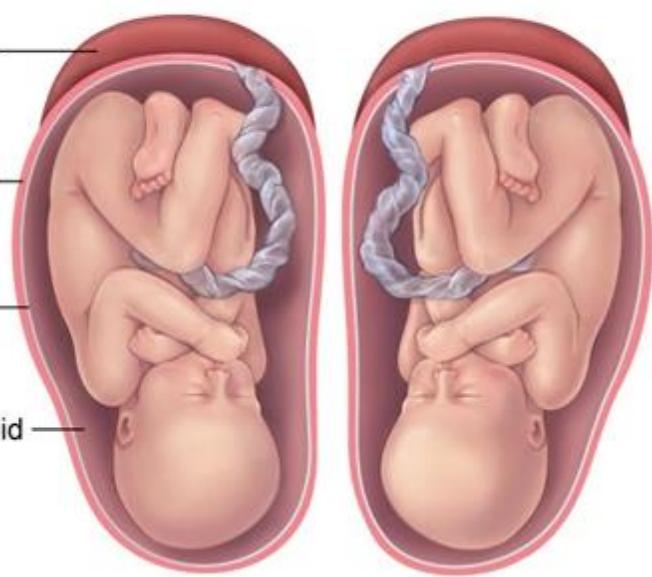
Dichorionic diamniotic (fused)



Monochorionic diamniotic



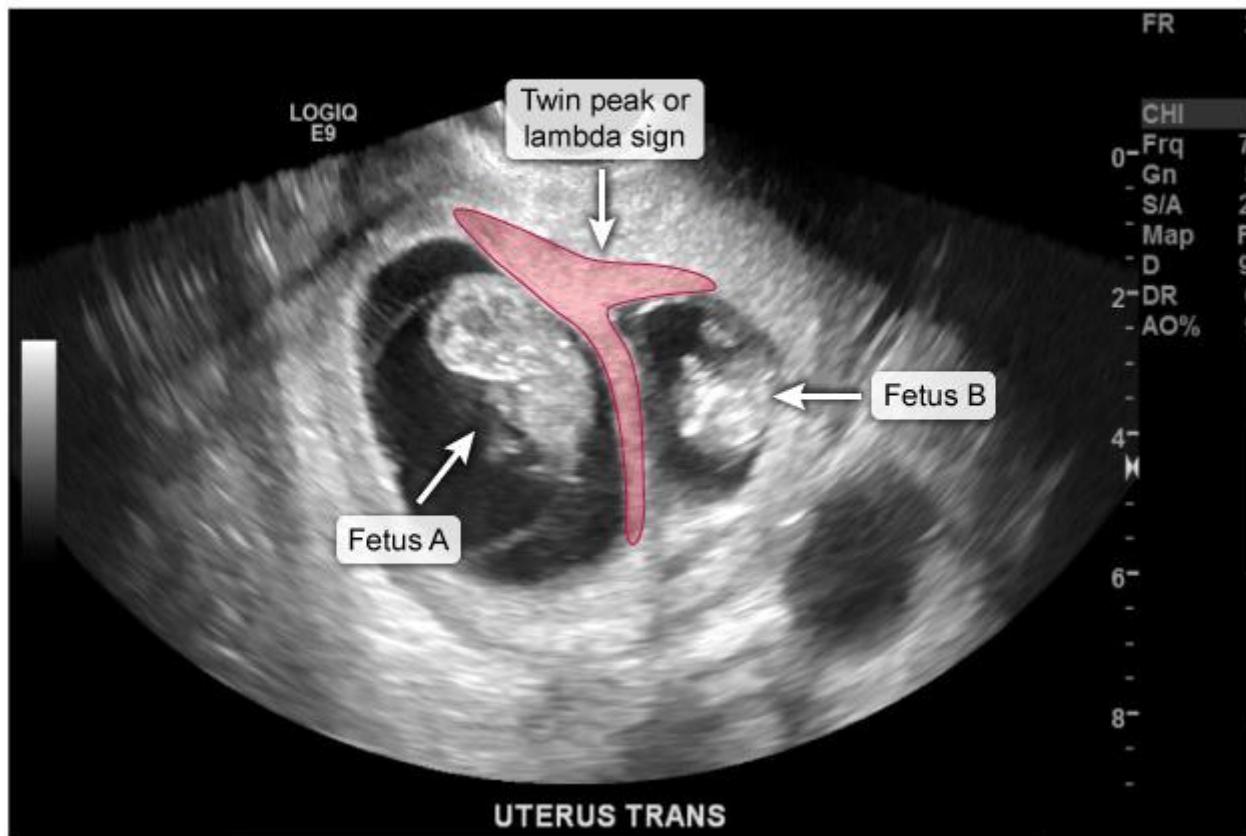
Dichorionic diamniotic



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Various types of twin placentation

Dichorionic-diamniotic twin gestation with twin peak/lambda sign



Dichorionic-diamniotic twin gestation with twin peak/lambda sign

NEONATAL EVALUATION

Routine newborn resuscitation

Conditions	<ul style="list-style-type: none">• Term gestation AND• Breathing or crying AND• Appropriate tone
Steps	<ul style="list-style-type: none">• Dry and stimulate• Clear airway (ie, suction oropharynx) as needed• Provide warmth (eg, skin-to-skin)

Pubic symphysis diastasis

Risk factors	<ul style="list-style-type: none"> • Fetal macrosomia • Multiparity • Precipitous labor • Operative vaginal delivery
Presentation	<ul style="list-style-type: none"> • Difficulty ambulating • Radiating suprapubic pain • Pubic symphysis tenderness • Intact neurologic examination
Management	<ul style="list-style-type: none"> • Conservative • Nonsteroidal anti-inflammatory drugs • Physical therapy • Pelvic support

Postpartum period

Normal findings	<ul style="list-style-type: none"> • Transient rigors/chills • Peripheral edema • Lochia rubra • Uterine contraction & involution • Breast engorgement
Routine care	<ul style="list-style-type: none"> • Rooming-in/lactation support • Serial examination for uterine atony/bleeding • Perineal care • Voiding trial • Pain management

Normal postpartum lochia

	Expected duration	Description
Lochia rubra	• Birth to 3-4 days postpartum	• Dark or bright red (blood); odor similar to that of menstrual blood; occasional small clots; quantity decreasing each day
Lochia serosa	• 4th postpartum day to 10th or 14th postpartum day	• Serosanguineous (pink); brownish (old blood); quantity gradually decreasing in amount
Lochia alba	• 11th postpartum day to 6 weeks postpartum	• White/yellow; creamy; light quantity

Lochia may increase in quantity after breastfeeding (suckling releases oxytocin & causes uterus to contract) & 7-14 days postpartum, when scabbing on the placental site sloughs off (heavier bleeding for <2 hr); lochia may also feel increased after lying down & then standing (due to blood pooling in vagina).

NORMAL PREGNANCY

Physiologic changes of pregnancy

Cardiovascular	<ul style="list-style-type: none"> • ↑ Blood volume (plasma > RBC mass) • ↓ Systemic vascular resistance • ↑ Heart rate & cardiac output
Pulmonary	<ul style="list-style-type: none"> • ↑ Central respiratory drive (hyperventilation) • ↓ PaCO₂ (respiratory alkalosis), ↑ PaO₂
Renal	<ul style="list-style-type: none"> • ↑ Renal blood flow & urine output • ↑ GFR, ↓ BUN & serum creatinine • ↑ HCO₃⁻ excretion (metabolic compensation) • ↓ Serum Na⁺ concentration (↑ ADH secretion)
Hematologic	<ul style="list-style-type: none"> • ↑ Prothrombotic coagulation factors • ↓ Hemoglobin concentration (dilutional anemia)

ADH = antidiuretic hormone; **BUN** = blood urea nitrogen; **GFR** = glomerular filtration rate; **RBC** = red blood cell.

Low back pain during pregnancy

Etiology	<ul style="list-style-type: none"> Enlarged uterus → exaggerated lordosis Joint/ligament laxity from ↑ progesterone/relaxin Weak abdominal muscles → decreased lumbar support
Risk factors	<ul style="list-style-type: none"> Excessive weight gain Chronic back pain Back pain in prior pregnancy Multiparity
Imaging	<ul style="list-style-type: none"> Not indicated
Management	<ul style="list-style-type: none"> Behavioral modifications Heating pads Analgesics

Maternal cardiopulmonary adaptations to pregnancy

Maternal adaptations	<ul style="list-style-type: none"> Cardiac <ul style="list-style-type: none"> ↑ Cardiac output ↑ Plasma volume ↓ Systemic vascular resistance Respiratory <ul style="list-style-type: none"> ↑ Tidal volume ↓ Functional residual capacity (elevation of diaphragm)
Clinical manifestations	<ul style="list-style-type: none"> Peripheral edema ↓ Blood pressure ↑ Heart rate Systolic ejection murmur Dyspnea

Visual assessment of melanoma

ABCDE criteria (≥1-2 is suspicious)	<ul style="list-style-type: none"> Asymmetry Border irregularity Color variation (within lesion or compared to other lesions) Diameter ≥6 mm Evolving appearance over time
7-point checklist (≥1 major or ≥3 minor is suspicious)	<ul style="list-style-type: none"> Major criteria: change in size, shape, or color Minor criteria: size ≥7 mm, local inflammation, crusting/bleeding, sensory symptoms
Ugly duckling sign	<ul style="list-style-type: none"> One lesion is significantly different from others on the patient

Weight gain in pregnancy

Prepregnancy BMI (kg/m ²)	Ideal weight gain	Complications
<18.5	28-40 lb (12.7-18 kg)	Inadequate weight gain • Low birth weight • Preterm delivery Excessive weight gain • Gestational diabetes mellitus • Fetal macrosomia • Cesarean delivery
18.5-24.9	25-35 lb (11.4-15.9 kg)	
25-29.9	15-25 lb (6.8-11.4 kg)	
≥30	11-20 lb (5-9 kg)	

Renal & urinary changes in normal pregnancy

Physiologic changes	<ul style="list-style-type: none"> ↑ Renal blood flow ↑ Glomerular filtration rate ↑ Renal basement membrane permeability
Laboratory findings	<ul style="list-style-type: none"> ↓ Serum BUN ↓ Serum creatinine ↑ Renal protein excretion

BUN = blood urea nitrogen.

PRENATAL CARE

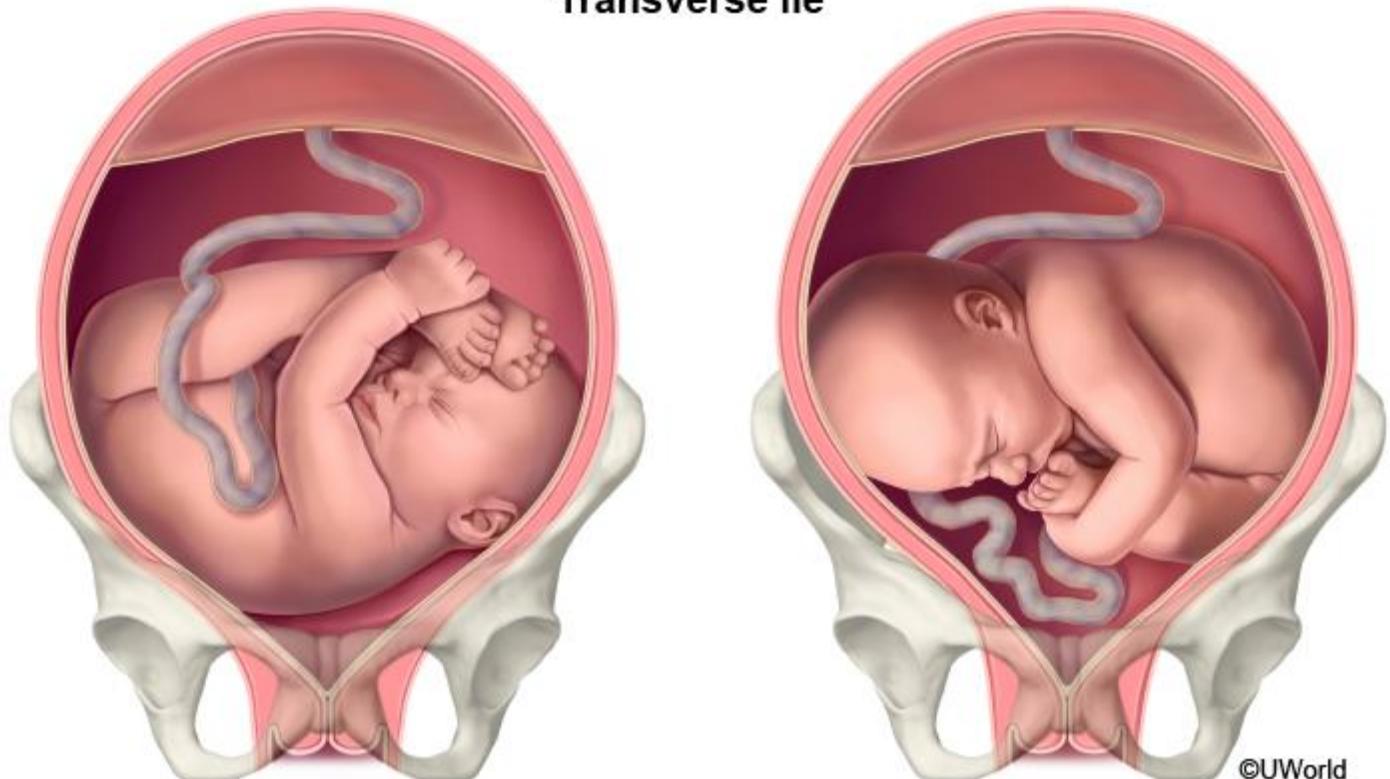
Pregnancy & exercise

Absolute contraindications	<ul style="list-style-type: none"> Amniotic fluid leak Cervical insufficiency Multiple gestation Placenta abruption or previa Premature labor Preeclampsia/gestational hypertension Severe heart or lung disease
Unsafe activities	<ul style="list-style-type: none"> Contact sports (eg, basketball, ice hockey, soccer) High fall risk (eg, downhill skiing, gymnastics, horseback riding) Scuba diving Hot yoga

Cell-free fetal DNA testing

Indications	<ul style="list-style-type: none"> • Maternal age ≥35 • Abnormal maternal serum screening test • Sonographic findings associated with fetal aneuploidy • Prior pregnancy with fetal aneuploidy • Parental-balanced robertsonian translocation
Applications	<ul style="list-style-type: none"> • Screening for trisomy 21, 18, 13 & sex chromosome aneuploidies • Fetal sex determination

Transverse lie

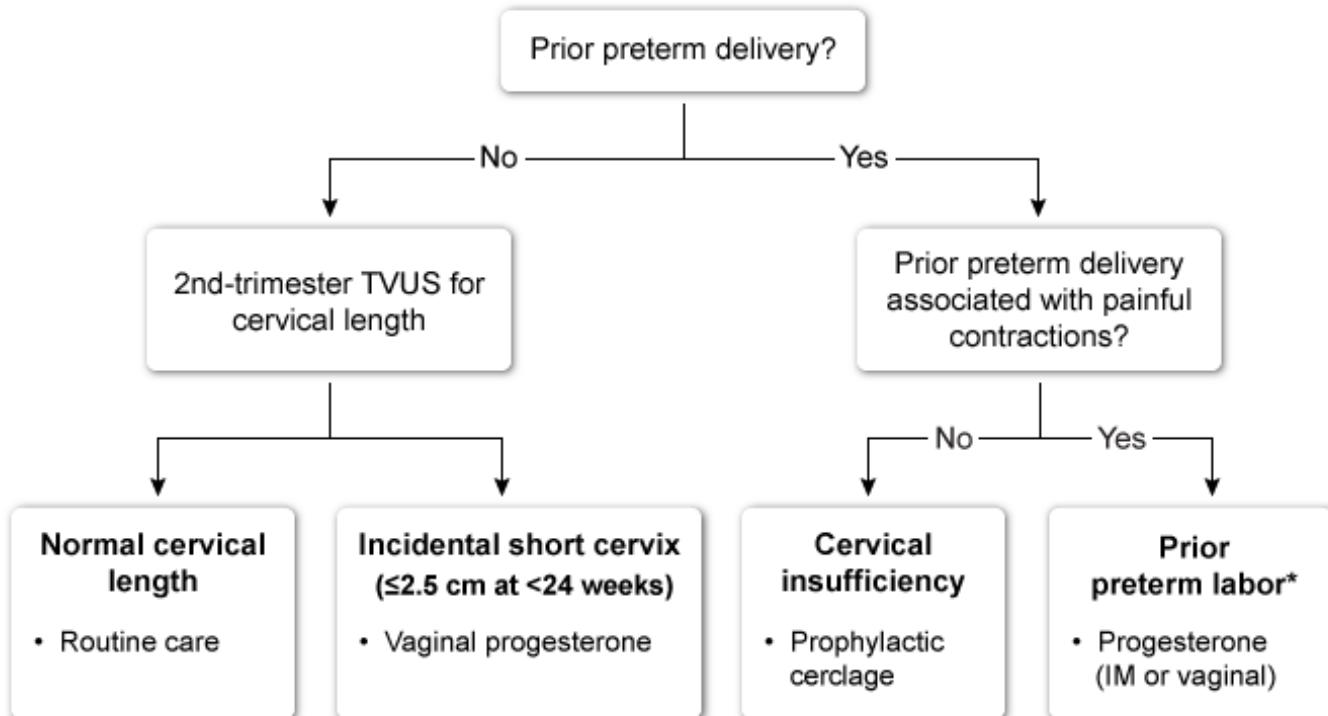


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Ultrasound assessment of gestational age

Ultrasound parameter	Gestational age (weeks)	Accuracy (days)
Gestational sac diameter	4.5-6	±5-7
Crown-rump length	7-10	±3
	11-14	±5
Biparietal diameter, head circumference, femur length	14-20	±7
	21-30	±14
	>30	±21-28

Preterm birth prevention



*Preterm labor = regular contractions causing cervical change at <37 weeks gestation with intact membranes.

IM = intramuscular; TVUS = transvaginal ultrasound.

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Preterm birth prevention

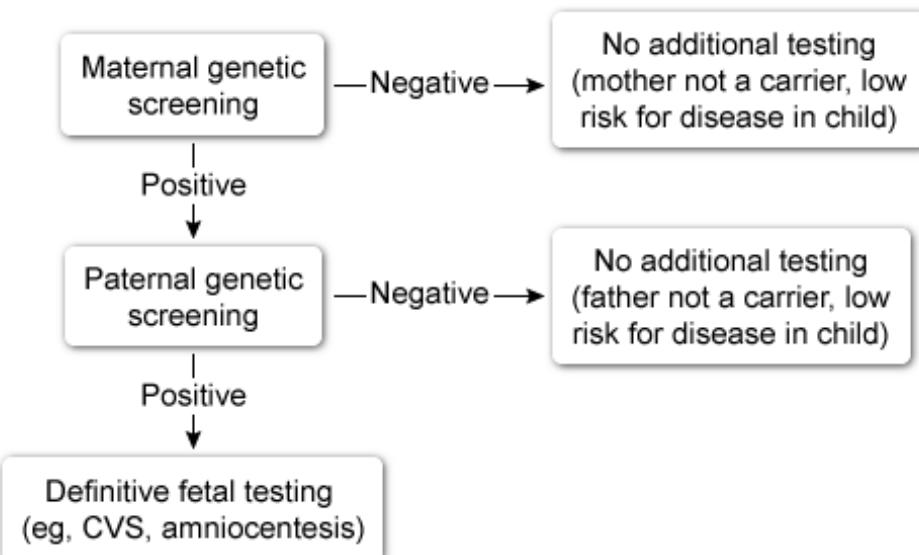
SYPHILIS

Syphilis in pregnancy

Screening	<ul style="list-style-type: none"> Universal at first prenatal visit Third trimester & delivery (if high risk)
Serologic tests	<ul style="list-style-type: none"> Nontreponemal (RPR, VDRL) Treponemal (FTA-ABS)
Treatment	<ul style="list-style-type: none"> Intramuscular penicillin G benzathine
Pregnancy effects	<ul style="list-style-type: none"> Intrauterine fetal demise Preterm labor
Fetal effects	<ul style="list-style-type: none"> Hepatic (hepatomegaly, jaundice) Hematologic (hemolytic anemia, ↓ platelets) Musculoskeletal (long bone abnormalities) Failure to thrive

FTA-ABS = fluorescent treponemal antibody-absorption; RPR = rapid plasma reagent .

Prenatal screening algorithm for autosomal recessive diseases



CVS: Chorionic villus sampling.

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Prenatal screening algorithm for autosomal

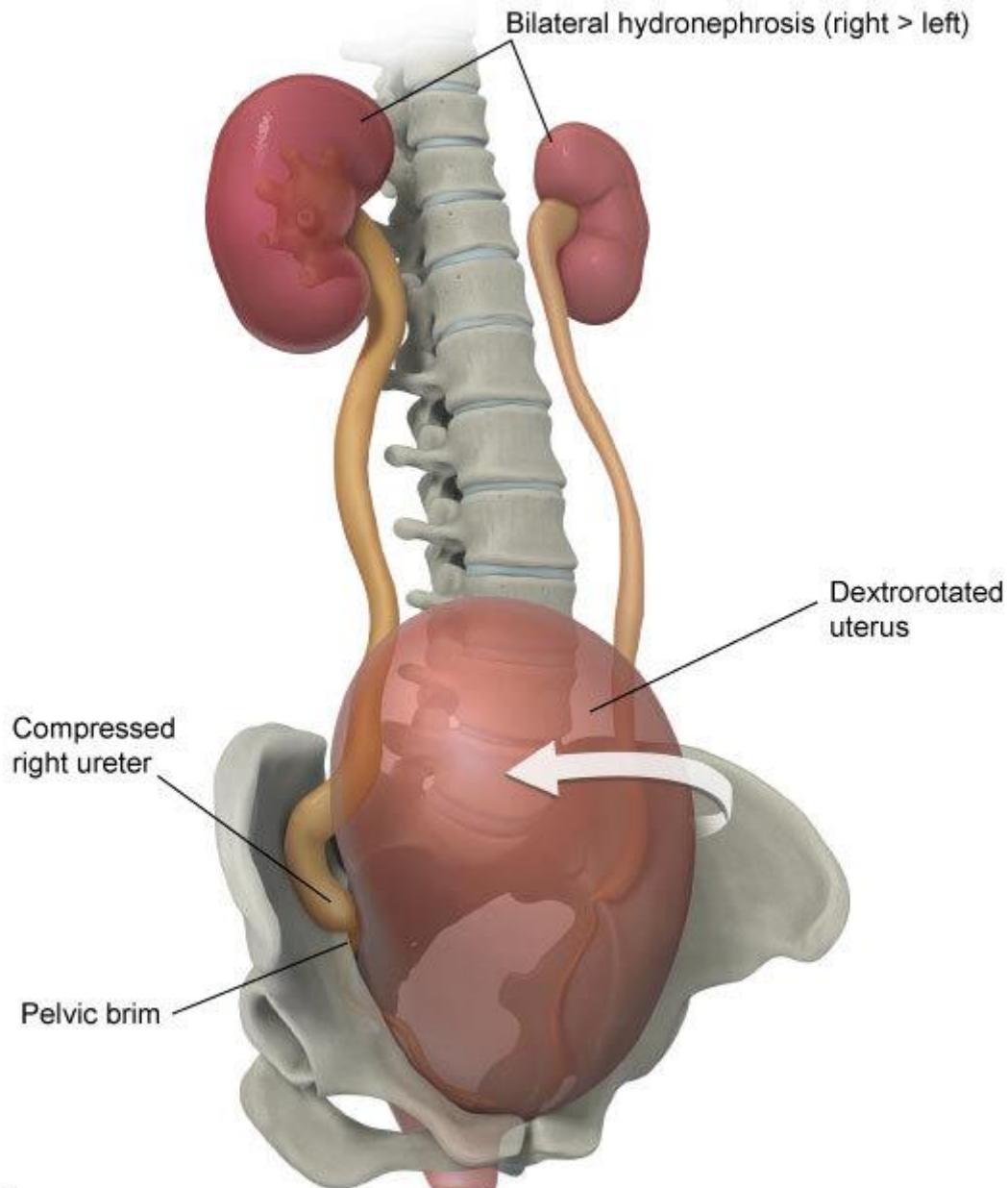
THROMBOCYTOPENIA

Thrombocytopenia in pregnancy

Gestational	<ul style="list-style-type: none">Isolated, mild ($100,000\text{-}150,000/\text{mm}^3$)AsymptomaticDiagnosis of exclusion
Preeclampsia with severe features/ HELLP syndrome	<ul style="list-style-type: none">Moderate to severe ($<100,000/\text{mm}^3$)Hypertension \pm headache/scotomata$\pm \uparrow$ Creatinine, \uparrow AST & ALT
Immune-mediated thrombocytopenia (ITP)	<ul style="list-style-type: none">Isolated, moderate to severe ($<100,000/\text{mm}^3$)Asymptomatic or mucosal bleeding/bruisingNormal PT, aPTT
Thrombotic thrombocytopenic purpura (TTP)	<ul style="list-style-type: none">Severe ($<30,000/\text{mm}^3$)Neurologic symptoms (e.g., confusion, seizure), fever, abdominal pain, petechiaeNormal PT, aPTT
Disseminated intravascular coagulopathy (DIC)	<ul style="list-style-type: none">Moderate to severe ($<100,000/\text{mm}^3$)Bleeding (e.g., oozing intravenous sites) \pm thrombosis\uparrow PT, \uparrow aPTT, \downarrow fibrinogen

ALT = alanine aminotransferase; aPTT = activated PTT; AST = aspartate aminotransferase; HELLP = Hemolysis, Elevated Liver enzymes, & Low Platelets.

Physiologic hydronephrosis of pregnancy



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Physiologic hydronephrosis of pregnancy