

Comprehensive Maternal (OB) Nursing Study Guide

Table of Contents:

Confirmation of Pregnancy	3
Prenatal Diagnostic Tests	5
Pregnancy Overview	10
Pregnancy Complications	12
Stages of Labor	26
Pain Management During Labor	31
Labor and Delivery Procedures	34
Fetal Monitoring During Labor	38
Labor and Delivery Complications	41
Postpartum	47
Postpartum Complications	52

Confirmation of pregnancy

Presumptive Indications of pregnancy

Amenorrhea

- Absence of menstruation

Nausea & vomiting

- Generally begins between 4-8 weeks gestation

Fatigue

- Fatigue and drowsiness during the first trimester

Urinary frequency

- During the first few weeks of pregnancy caused by hormonal and fluid volume changes
- Late in the third trimester caused by the settling of the fetus in the pelvis

Breast and skin changes

- Begin around 4-6 weeks of gestation
- Includes breast tenderness, tingling, feelings of fullness, and increased size and pigmentation of the areolae

Vaginal and cervical color changes

- Chadwick's sign- dark bluish color of labia, vagina, and cervix
- Caused by increased vascularity of the pelvic organs

Fetal movement

- Not perceived until the second trimester
- Quickening is often noticed at about 16-20 weeks gestation

Probable Indications of pregnancy

Abdominal enlargement

- Slow, gradual uterine growth

Cervical softening

- Goodell's sign- softening of the uterus- is a result of pelvic vasocongestion

Changes in the uterus

- Hegar's sign- lower uterine segment softening
- Ballottement- sudden tapping on the cervix causes the fetus to rise in the amniotic fluid and then rebounds to its original position
- Braxton-Hicks Contractions- irregular, painless contractions. Occurs mostly in third trimester

- Palpation of fetal outline- by the second half of the pregnancy a practitioner should be able to palpate the outline of the fetal body
- Uterine souffle- a soft, blowing sound may be auscultated over the uterus.

Pregnancy test

- Detects hCG which is secreted by the placenta and is present in maternal blood

Positive Indications of Pregnancy

Fetal Heart Sounds

- Can be heard with a stethoscope by 16-20 weeks of gestation
- Electronic doppler may detect as early as 9 weeks
- Ranges from 110-160 bpm during the third semester

Fetal movements felt by examiner

Visualization of the fetus

- Transvaginal ultrasonography as early as 3 weeks gestation

Presumptive vs Probable vs Positive

Presumptive	Amenorrhea Nausea and vomiting Fatigue Urinary frequency Breast and skin changes Vaginal and cervical color changes Fetal movement
Probable	Abdominal enlargement Cervical softening Changes in the uterus Pregnancy test
Positive	Fetal Heart Sounds Fetal movements felt by examiner Visualization of the fetus

Naegele's Rule:

To calculate the estimated due date (EDD), take the date of the last known menstrual cycle and subtract 3 months, add 7 days (and add one year if needed)

Subtract 3 months, add 7 days, add one year if needed

For example, let's say the last known cycle was on August 9, 2020

Month: (August) 8 – 3 months = May (5)

Day: 9 + 7 days = 16

Year: 2020 + 1 year= 2021

EDD= May 16, 2021

GTPAL

Gravidity- number of total pregnancies

Term- number of pregnancies carried to 37 weeks

Preterm- number of pregnancies carried between 20-36 weeks

Abstortion- number of pregnancies lost prior to 20 weeks (spontaneous or elective)

Living- number of living children

A woman who has 3 living children who were all born after 37 weeks and has had 0 miscarriages or abortions would have a GTPAL of

G-3

T-3

P-0

A-0

L-3

Prenatal Diagnostic Tests

Ultrasound

Allows observer to detect fetal heartbeat, fetal breathing activity, and fetal body movement

3-D images can be captured for greater detail

Transvaginal ultrasound during the first trimester

- Gestational age can be configured by measuring the crown-rump length of the embryo

Transabdominal ultrasound during the second and third trimester

- Fetal anatomy is examined to identify any defects

Alpha-fetoprotein screening

Abnormal levels of AFP are associated with serious fetal anomalies

It is a *screening*; therefore additional testing will need to be done to determine the issue

Causes of increased AFP include

- Trisomy 21 (Down Syndrome)
- Anencephaly
- Spina bifida

Offered between 16-18 weeks gestation

Requires a sample of maternal blood

Chorionic Villus Sampling (CVS)

Used to diagnose fetal chromosomal, metabolic, or DNA abnormalities

Performed between 10-13 weeks

Transcervical-

- Flexible catheter is inserted through the cervix and a sample of chorionic villi is aspirated

Transabdominal-

- Needled is inserted through the abdominal and uterine wall to obtain the sample

Patient should rest for several hours after the procedure

Patient should monitor for heavy bleeding or passage of amniotic fluid, tissue, or clots- could indicate miscarriage

Cervical or vaginal infection is a contraindication

Rh sensitization can occur. All unsensitized Rh negative women should be given RhoGAM after the procedure.

Amniocentesis

Aspiration of amniotic fluid from the amniotic sac

Can be performed in the second and third trimester

Second trimester

- Used to examine fetal cells present in amniotic fluid to identify chromosomal or biochemical abnormalities
- Used to diagnose amnionitis

Third trimester

- Used to determine fetal lung maturity and fetal hemolytic disease
- Lecithin/sphingomyelin (L/S) ratio is used to estimate fetal lung maturity
 - o L/S ration greater than 2:1 indicates fetal lung maturity
- Phosphatidylglycerol (PG) and phosphatidylinositol (PI) are also tested to ensure lung maturity

Procedure:

- Patient is positioned in a supine position with a wedge under one buttock.
- Ultrasound used to locate fetus and placenta
- Local anesthetic
- 3-4-inch, 20-21 gauge needle inserted
- Approximately 20 mL is aspirated (first 1-2 mL is discarded to avoid contamination)
- Electronic fetal monitoring for 30-60 minutes after
- Patient can resume normal activities after 24 hours
- RhoGAM for unsensitized Rh negative women

Small risk for infection and fetal death (spontaneous abortion)

Percutaneous umbilical blood sampling (PUBS)

Aspiration of fetal blood from the umbilical cord needed for karyotype

Ultrasound to identify fetus, placenta, and umbilical cord

Needle is inserted through abdomen into uterus and sample is taken

Risks include

- Fetal death

- Infection
- Cord laceration
- Preterm labor
- Premature rupture of membranes

RhoGAM given to unsensitized Rh negative women

Antepartum fetal surveillance

Nonstress Test

Identifies whether an increase in fetal heart rate occurs when the fetus moves. This activity indicates adequate oxygenation

Electronic fetal monitoring is applied for the test

Results are either reactive (reassuring) or nonreactive (nonreassuring)

Reactive (reassuring)	Two fetal heart rate accelerations within a 20-minute period At least 15 beats above baseline
Nonreactive (nonreassuring)	Tracing does not demonstrate characteristics for reactive tracing within 40 minutes or longer

Fetal sleep cycles are a common reason for a lack of fetal movement

Contraction Stress Test

Oxytocin challenge test (OCT)

May be done if NST is nonreactive

Nipple stimulation can be used to stimulate oxytocin release

Late decelerations and loss of variability may indicate fetal hypoxia and fetal acidosis

Contraindications:

- Preterm labor
- Preterm membrane rupture
- Placenta previa
- History of uterine surgery

Procedure:

- External electronic fetal monitoring is applied
- 3 contractions of 40 seconds each within a 10-minute period are needed
- Nipple stimulation of IV low-dose oxytocin can be used

Results:

- Negative (reassuring): no late or variable decelerations
- Positive (nonreassuring): late decelerations follow 50% or more of contractions
- Equivocal-suspicious: intermittent late or significant variable decelerations
- Equivocal-hyperstimulation: fetal heart rate decelerations occur in the presence of excessive contractions
- Unsatisfactory: fewer than 3 contractions within 10 minutes or tracing cannot be interpreted

Biophysical Profile

5 parameters are assessed

- Nonstress test
- Fetal breathing movements
- Fetal tone
- Amniotic fluid volume
- Gross fetal movements

A scoring technique is used to quantify the data

Each parameter contributes 0 or 2 points out of 10 total points

0-worst; 10-perfect

8/10-10/10= reassuring

4/10 or less= nonreassuring

	2 points- present	0 points- absent
Nonstress test	Reactive	Nonreactive
Fetal breathing movement	≥1 episode of rhythmic fetal breathing movement of 30 seconds or more within 30 minutes	Absent fetal breathing movements
Gross body movements	≥3 trunk movements within 30 minutes	≤2 trunk movements in 30 minutes
Fetal tone	≥1 episode of fetal extremity extension with return to flexion; opening and closing hand within 30 minutes	Absence of flexion; extension with return to partial flexion

Amniotic fluid volume	At least one pocket of fluid measuring 2 cm in two planes perpendicular to each other	Amniotic fluid does not meet criteria
-----------------------	---	---------------------------------------

Pregnancy Overview

Cardiovascular System	<ul style="list-style-type: none"> - Heart: <ul style="list-style-type: none"> ○ Mild enlargement ○ Altered heart sounds <ul style="list-style-type: none"> ▪ Systolic murmur ▪ Splitting of first and third sound ○ Increased cardiac output ○ Increased heart rate ○ Increased stroke volume ○ Decreased systemic vascular resistance ○ Supine hypotension - Blood volume: <ul style="list-style-type: none"> ○ Increased blood volume ○ Increased plasma volume ○ Physiologic anemia - Blood components <ul style="list-style-type: none"> ○ Increased leukocytes ○ Increased iron absorption and iron-binding ○ Hypercoagulable state
Reproductive System	<ul style="list-style-type: none"> - Uterus: <ul style="list-style-type: none"> ○ Grows up to 2.6 pounds ○ Houses the baby and placenta - Cervix: <ul style="list-style-type: none"> ○ Chadwick's sign- bluish purple color ○ Goodell's sign- cervical softening - Vagina & vulva: <ul style="list-style-type: none"> ○ Increased vaginal discharge ○ pH= acidic ○ Increased vascularity= increased sexual interest - Ovaries: <ul style="list-style-type: none"> ○ Ovulation stops ○ Secretes progesterone until placenta is developed - Breasts: <ul style="list-style-type: none"> ○ Increased size ○ "stretch marks" (striae gravidarum) may develop ○ Nipples and areolae become darker ○ Colostrum production begins around 12-16 weeks gestation

Respiratory System	<ul style="list-style-type: none"> - Increased oxygen consumption - Slight hyperventilation- deeper breaths - Congestion- nasal and sinus stuffiness
Gastrointestinal System	<ul style="list-style-type: none"> - Mouth <ul style="list-style-type: none"> o Gingivitis o Bleeding o Ptyalism- excessive salivation - Esophagus <ul style="list-style-type: none"> o Decreased lower esophageal sphincter tone o Heartburn can occur - Intestines <ul style="list-style-type: none"> o Decreased large intestine motility o Constipation o Hemorrhoids - Gallbladder <ul style="list-style-type: none"> o Increased risk of developing gallstones
Urinary System	<ul style="list-style-type: none"> - Bladder <ul style="list-style-type: none"> o Frequent urination o Stress or urge incontinence o Nocturia - Kidneys & ureters <ul style="list-style-type: none"> o Increased risk of UTIs o Glycosuria o Mild proteinuria
Integumentary System	<ul style="list-style-type: none"> - Skin <ul style="list-style-type: none"> o Increased perspiration o Hyperpigmentation <ul style="list-style-type: none"> ▪ Melasma ▪ Chloasma ▪ Mask of pregnancy ▪ Linea nigra o Palmar erythema - Connective Tissue <ul style="list-style-type: none"> o “stretch marks”- striae gravidarum - Hair <ul style="list-style-type: none"> o Increased hair growth
Musculoskeletal System	<ul style="list-style-type: none"> - Pelvic instability - Lordosis - Backache - Diastasis Recti

Endocrine System	<ul style="list-style-type: none"> - Pituitary <ul style="list-style-type: none"> ○ Oxytocin produced to stimulate milk-ejection reflex - Thyroid <ul style="list-style-type: none"> ○ Increased T4 in early pregnancy (important for fetal brain development) - Pancreas <ul style="list-style-type: none"> ○ Glucose and insulin fluctuations occur ○ Decreased glucose- hypoglycemia may develop ○ Decreased insulin sensitivity ○ Gestational diabetes could occur - Adrenal glands <ul style="list-style-type: none"> ○ Increased cortisol levels ○ Increased aldosterone - Changes in metabolism <ul style="list-style-type: none"> ○ Normal pregnancy weight gain is 25-35 pounds
Immune System	<ul style="list-style-type: none"> - Decreased resistance against some infections

Pregnancy Complications

Abortion

Loss of fetus before 20 weeks; fetus is not considered to be viable if less than 20 weeks gestation or weighs less than 500 g

“Miscarriage” is the term commonly used to describe an unintentional abortion

Usually occurs within the first 12 weeks of pregnancy

6 different classifications of abortion: threatened, inevitable, incomplete, complete, missed, and recurrent

	S/S	Treatment	Nursing Interventions
Threatened	“spotting” or vaginal bleeding in early pregnancy	Pelvic rest	Teach patient to curtail sexual activity until bleeding stops

	Uterine cramping, pelvic pressure, backache		<p>Teach patient to count peripads to assess for amount of blood</p> <p>Teach patient to check for tissue passage or foul-smelling drainage (foul smelling drainage, fever, or uterine tenderness could be signs of an infection)</p>
Inevitable	<p>Rupture of membranes and cervical dilation</p> <p>Back pain</p> <p>Abdominal pain</p>	D&C (dilation and curettage) if tissue remains in uterus	Teach patient about the D&C procedure and what to expect
Incomplete	<p>Not all uterine components and fetus are expelled</p> <p>Severe abdominal cramping and bleeding</p>	<p>IV fluid replacement</p> <p>D&C or D&E (dilation and evacuation)</p> <p>IV Pitocin or IM Methergine to contract the uterus after procedure</p>	Ensure cardiovascular stability- patient is at high risk of hemorrhage .
Complete	All components of pregnancy are expelled	Pelvic rest	<p>Monitor for bleeding, pain, and fever</p> <p>Teach patient to avoid sexual intercourse until follow-up appointment</p>

			Teach patient is advisable to wait at least 3 months before attempting to conceive again
Missed	Fetus dies but is retained in the uterus	D&C If infection is suspected-initiate antibiotic therapy before D&C If disseminated intravascular coagulation (DIC) is developing, then the priority is to deliver the placenta and fetus	Monitor for signs of infection or DIC
Recurrent	3 or more consecutive spontaneous abortions		Assist in completing a full reproductive assessment Teach patients about genetic counseling

If a woman is Rh-negative, **RhoGam** is given within **72 hours of abortion**

Ectopic pregnancy

Implantation of the fertilized ovum in **ANY** site other than the endometrial lining of the uterus.

Most occur in the fallopian tube.

Common causes:

- Pelvic inflammatory disease (PID)
- Intrauterine device for contraception
- Defects in fallopian tubes
- Cigarette smoking
- Vaginal douching

Early manifestations

- Missed menstruation followed by vaginal bleeding- scant to profuse
- Unilateral pelvic pain; sharp abdominal pain
- Referred shoulder pain
- Cul-de-sac mass
- Beta hCG levels are lower than expected for gestation

Acute manifestations (ruptured fallopian tube)

- Cullen's sign- bluish discoloration around umbilicus
- N/V
- Faintness
- Hypovolemic shock can occur due to blood loss

Treatment

- Combat shock/stabilize cardiovascular system
 - Administer blood replacement
 - IV fluid replacement
- Linear salpingectomy- **for unruptured fallopian tube**; removes fertilized egg and leaves the tube open to heal naturally
- Methotrexate- folic acid antagonist that inhibits cell division in the embryo; used prior to rupture
- Salpingectomy- surgically remove **ruptured fallopian tube** (reassure women that they can still have successful pregnancies in the future)

Nursing interventions

- Prevent/ identify and treat hypovolemic shock
- Explain that nausea and vomiting may be experienced with methotrexate
- Teach patient to avoid alcohol and vitamins with folic acid while taking methotrexate
- Teach patient to avoid sexual intercourse until hCG levels are undetectable

Gestational Trophoblastic Disease- Hydatidiform Mole

Trophoblast cells in the uterus develop abnormally. The placenta, but not the fetus, develops grapelike vesicles that can grow large enough to fill the whole uterus

Choriocarcinoma may spread rapidly to vagina, lung, liver, kidney, and brain

Signs/symptoms:

- Vaginal bleeding- dark brown spotting to profuse hemorrhage
- Larger uterus than expected
- Excess N/V
- Early development of preeclampsia
- Diagnosed by ultrasound and levels of hCG (higher than expected)

Treatment:

- D&C and vacuum aspiration of uterine contents (mole)
- Before evacuation
 - Chest imaging
 - CMP
 - Baseline hCG
- After evacuation
 - Curettage
 - IV oxytocin to contract the uterus

Follow-up is extensive for the following year:

- Assess for the development of choriocarcinoma
- Beta hCG levels Q 1-2 weeks until 3 consecutive pre-pregnancy levels; then repeated Q 1-2 months for up to a year
- Chest x-rays
- Placed on oral contraception to prevent a rise in hCG
- If choriocarcinoma develops, then chemotherapy is started

Placenta previa

Placenta implants in the lower uterus

Classified as marginal, partial, or complete

Marginal (low lying)- lower border is more than 3 cm from cervical os

Partial- placenta is within 3 cm of the cervical os but does not completely cover it

Total- placenta covers the cervical os completely

Signs/symptoms:

- Sudden onset of painless uterine bleeding in later half of pregnancy
- Verified by ultrasound
- Copious amounts of bleeding during early labor

Management will vary based on maternal and fetal status

- Some women will be managed in the outpatient setting if they have **no** active bleeding and bed rest can be maintained at the home with the help of family
- Some women will need to be managed in the inpatient setting
- **C-section delivery** for ALL types except low lying due to the risk of bleeding and hemorrhage.
- Unless it is an emergency c-section due to fetal compromise or excessive bleeding in mother, most c-sections can be scheduled when the fetus is **greater than 36 weeks** gestation and has **mature lungs**

Nursing interventions

- Avoid manual vaginal examinations or contraction stimulation
- Teach patient to assess vaginal discharge at every urination and defecation
- Teach patient to count fetal movements daily
- Encourage bed rest
- Assess uterine activity daily
- Teach patient to omit sexual intercourse
- Nonstress test weekly
 - 20 minute strip
 - FHR needs to accelerate
 - Ice cold water is the best method to wake the baby

Abruptio Placenta

Placental abruption- separation of placenta before delivery

Risk factors include maternal HTN, short umbilical cord, trauma, smoking, caffeine, **cocaine**, vascular problems (DM), multigravida status

Fetal vessels are disrupted so fetal bleeding occurs as well

Major danger is **hemorrhage** and **hypovolemic shock**

Signs/symptoms:

5 classic s/s

- **Profuse vaginal bleeding**
- **Abdominal/low back pain- aching/dull**
- **Uterine irritability- quivers on strip; frequent low-intensity contractions**
- **High resting tone- uterus never gets soft**
- **Uterine tenderness**

Nursing interventions

- Prepare patient for C-section immediately
- Combat shock- blood replacement/fluid replacement
- Continue monitoring mom and baby as excessive bleeding and **fetal hypoxia** are major concerns
- Assess for complications of DIC- check PT, PTT, fibrinogen, CBC

Placenta previa vs abruption placenta in a nutshell:

Placenta previa	Abruptio Placenta
PAINLESS vaginal bleeding	Bleeding accompanied by pain
Bright red bleeding	Dark red bleeding
First episode of bleeding is slight then becomes profuse	First episode of bleeding is usually profuse
Signs of blood loss compatible to extent of bleeding	Signs of blood loss out of proportion to visible amount
Uterus soft, non-tender	Uterus board-like, painful; low back pain
Fetal parts palpable; FHR countable and uterus is not hypertonic	Fetal parts non-palpable; FHR non-countable and high uterine resting tone
Blood clotting defect absent	Blood clotting defect (DIC) likely

DIC- Disseminated Intravascular Coagulation

Anticoagulation and procoagulation factors are activated simultaneously

Risk factors include abruption, PIH/HELLP syndrome (impaired liver function impairs clotting), sepsis, anaphylactoid syndrome

Signs/symptoms:

- Bleeding
- Clots
- Bruising everywhere
- Significant drop in blood pressure
- CBC: platelets less than 100,000, increased fibrin degradation products, prolonged PTT and PT, decreased serum fibrinogen

Nursing interventions:

- Assist with delivery of fetus and placenta which is fueling the DIC process
- Administer fluid replacement- IV fluid, blood, and blood products

Hyperemesis Gravidarum

Severe uncontrollable vomiting that begins in the first weeks of pregnancy.

Exact causes are unknown

Signs/symptoms:

- Persistent nausea and vomiting
- Weight loss of 5% or more of body weight
- May become severely dehydrated
- Depletion of essential electrolytes- low sodium, potassium, and chloride
- Increased hgb and hct- hemoconcentration

Nursing interventions:

- Reduce severity of nausea and vomiting
- Teach patient that food portions should be small
- Teach patient to eliminate foods with strong odors

- Teach patient that the best foods to eat are lowfat foods and easy to digest carbs such as fruit, bread, cereals, and rice
- Teach patient to sit up right after meals
- Teach patient to drink liquids and soups in between meals as to avoid overdistention of the stomach
- Maintain nutrition and fluid balance
 - Teach patient to eat every 2-3 hours; salt food to replace chloride
 - Administer IV fluids and TPN if ordered
- Provide emotional support
 - Encourage and allow expression of feelings

Hypertensive Disorders

Four categories of hypertensive disorders- gestational hypertension, preeclampsia, eclampsia, chronic hypertension

Gestational Hypertension	Preeclampsia	Eclampsia	Chronic Hypertension
Elevated BP after 20 weeks gestation	>140/90 mm HG after 20 weeks	Progression of preeclampsia	Hypertension was present before pregnancy and is not related to pregnancy
Not accompanied by proteinuria	Accompanied by proteinuria	Accompanied by seizures	

The blood pressure rises due to arteriolar vasospasms and vasoconstriction causing:

- An increase in peripheral resistance
- Fluid forced out of the vessels
- Hemoconcentration

Signs/symptoms:

- High blood pressure
- Proteinuria as a result of glomerular damage

- Increased BUN, creatinine, and uric acid due to decreased renal perfusion
- Weight gain related to fluid retention
- Generalized edema
- Headaches and blurred vision due to cerebral vessel vasoconstriction
- Epigastric pain due to hepatic edema and increased liver enzymes (may have an impending seizure due to the distention and closing off of the liver capsule)
- Hyperreflexia- brisk DTRs
- Clonus
- Vascular constriction and narrowing of small arteries in the retina

The nurse must know the difference between **dependent** edema and **generalized** edema. The patient with pregnancy induced hypertension has generalized edema because fluid is in all tissues

Pre-eclampsia

- 140/90 mm Hg after 20 weeks gestation accompanied by significant proteinuria (greater than 0.3 g)
- Associated with intrauterine growth restriction (IUGR)

Mild	Severe
140/90 mm Hg	160/90 mm Hg
Protein 1+ to 2+	Protein 3+ to 4+
Edema 1+ to lower legs	Edema 3+ to 4+ generalized
1-pound gain in a week	Greater than 2-pound gain in a week
Reflexes 1+ to 2+	Reflexes 3+ to 4+
Visual disturbances absent or minimal	Visual disturbances common

Placenta grading will exceed the normal value (placenta is aging faster than it should)- the nurse will note decelerations in the case of an abnormally old placenta

Home Management of Preeclampsia:

Woman may be allowed to stay at home if she and the fetus are in stable condition and the woman can adhere to the treatment plan.

The treatment plan includes:

- Activity restriction- **full bedrest** is not required- side-lying position to maximize placental blood flow when resting
- Monitor fetal activity- record “kick counts”; should have a minimum of 3 movements in one hour. If no fetal movement is detected in a 4-hour period, physician should be notified
- Check blood pressure 2-4 times per day
- Weigh daily- preferably in the morning
- Dipstick test every morning with first void
- Diet- 70-80 g protein, low salt, no caffeine, no smoking

Inpatient Nursing Care

Women with severe preeclampsia will be monitored in the inpatient facility

- Complete bed rest; quiet environment to prevent overstimulation
- Anticonvulsant medications
 - Magnesium sulfate

Magnesium Sulfate

- Relaxes smooth muscle and reduces vasoconstriction
- CNS depressant
- Therapeutic serum magnesium level: 4-8 mg/dL
- Loading dose is typically 4-6 g and the maintenance dose is titrated and is often 2g/hour

Nursing interventions for Mag Infusion:

- Monitor vital signs closely during IV infusion
 - At risk for **respiratory depression**. If respirations are less than 12, then the HCP should be notified- stop infusion of mag, administer calcium gluconate
- Assess reflexes
 - Infusion will need to be altered or stopped if DTRs are absent or hyper
- Assess for clonus- should be absent
- Measure urinary output. Should be 30 mL/hour or the patient will be at risk of excessive serum magnesium levels

- Urine dipstick for protein
- Measure magnesium level every 6 hours
- Monitor for signs of magnesium toxicity
 - Less than 14 breaths per minute
 - O2 sat less than 95%
 - Absence of DTRs
 - Sweating, flushing
 - Confusion, lethargy, disorientation
 - Hypotension
- Calcium gluconate is the **antidote**
 - Keep at bedside and push 1 mL/min
 - VS every hour

Antihypertensive Medications

- Hydralazine (Apresoline)- vasodilator- increases cardiac output and placental blood flow
- Nifedipine- calcium channel blocker
- Labetalol- beta-adrenergic blocker- can affect the infant so it is rarely used

Eclampsia

Preeclampsia manifestations plus **generalized seizures**

Generalized seizures start with facial twitching, followed by rigidity of the body

Results in fetal bradycardia, loss of variability, or late decelerations

Nursing interventions:

- [Fetal monitoring](#) to assess for signs of fetal compromise
- Place patient in left side-lying position to decrease risk of aspiration and increase maternal and fetal blood flow
- Monitor for contractions
- Pad side rails to reduce injury if a seizure occurs
- Administer magnesium as ordered
- Administer furosemide as ordered in case of pulmonary edema

- Frequent maternal assessment- lung sounds hourly, hourly urine output, ruptured membranes, signs of labor, or abruptio placentae
- Apply oxygen via face mask at 8-10 L/min as needed
- Prepare patient for chest radiography or ABGs to identify aspiration if suspected
- Prepare and assist with delivery of fetus once maternal and fetal vital signs are stable

HELLP Syndrome

Cause is unknown but can result from severe preeclampsia

Life threatening occurrence: mother must be observed in ICU setting

Occurs between 26 and 40 weeks of gestation or after delivery

Hemolysis– erythrocytes are damaged during passage through small blood vessels

EL– elevated liver enzymes because blood flow is obstructed by fibrin deposits; hyperbilirubinemia and jaundice may occur

LP– low platelets due to vascular damage (platelets aggregate at sites of damage), results in systematic thrombocytopenia

Signs/symptoms:

- Pain in RUQ (due to liver involvement), lower chest, or epigastric area
- N/V
- Severe generalized edema
- Low hemoglobin, thrombocytopenia, increased AST (greater than 20) and LDH (greater than 90)

Nursing Interventions:

- Similar to management for **preeclampsia** or **eclampsia**
- DELIVER BABY-despite gestation (if fetus is less than 34 weeks gestation, then a corticosteroid can be used, such as betamethasone, to aid in fetal lung development)
- Administer prescribed blood and blood products, IV fluids
- Bed rest to reduce trauma to the liver

Gestational Diabetes

Identified by a prenatal screening test called the **glucose challenge test (GCT)**. This test is performed between 24-28 weeks.

Women with a fasting glucose level of greater than 126 mg/dL or a nonfasting glucose level of greater than 200 mg/dL are considered to have Gestational Diabetes.

Early pregnancy (1-20 weeks)

- Metabolic rates and energy needs change little
- Insulin levels increase
 - Hypoglycemia may occur
- Favor development and storage of fat

Late pregnancy

- Insulin resistance
 - Hyperglycemia may occur
- Gluconeogenesis
 - Fat utilization

Maternal effects:

- HTN, Preeclampsia
- Ketoacidosis>>>maternal and fetal death
- Increased incidence of UTIs
- Hydramnios>>>distended uterus
- Rapid aging of placenta

Fetal effects:

- Early pregnancy>>>spontaneous abortion/major fetal malformations
- Impaired placental perfusion results in fetal growth restriction
- Macrosomia, birth injury related to macrosomia
- 4 major problems for the newborn
 - **Hypoglycemia** because fetal insulin production was accelerated in utero
 - **Hypocalcemia**– less than 7 mg/dL
 - **Hyperbilirubinemia**– excess RBCs are being broken down
 - **Respiratory distress syndrome**– reduced surfactant due to decreased cortisol (due to increased insulin)

Diet modifications:

- 40-45% from carbs
 - 12-20% from protein
 - 40% from fat
 - 1800 calorie diet

Education:

- Patient should monitor their blood glucose 6 times a day
 - Fasting
 - 2 hours after breakfast
 - 1 hour prior to lunch
 - 2 hours after lunch
 - At bedtime
- Patient should keep their blood glucose above 60 but below 100 mg/dL
- If the woman is prescribed insulin, then educate her and her family on how insulin works and how to administer it. The nurse should verify that the patient understands the information and is able to successfully administer the medication
- Teach the patient and her family the signs and symptoms of hypoglycemia and how to correct it if it occurs

Stages of Labor

True Labor vs False Labor

True:

- Regular contractions
- Contractions become stronger, last longer, and occur closer together
- Fetus “engages” and begins to descend

False:

- Contractions are irregular
- Dilation, effacement, and descent do not occur

- Activities, such as walking, relieve feelings of false labor

Maternal responses to the birth process:

Cardiovascular	<ul style="list-style-type: none"> - Increased blood volume - Increase BP - Decreased pulse - Hypotension may occur if positioned supine - <i>Check BP between contractions</i>
Respiratory	<ul style="list-style-type: none"> - Depth and rate increase - Increased risk of hyperventilation - <i>Encourage slow, controlled breathing</i>
Gastrointestinal	<ul style="list-style-type: none"> - Decreased GI motility - Avoid large amounts of glucose due to rebound hypoglycemia in the newborn - Fluids are restricted; <i>ice chips can be offered</i>
Urinary	<ul style="list-style-type: none"> - Decreased bladder sensation - Full bladder can lead to increased discomfort and can inhibit fetal descent - <i>Foley may be inserted</i>
Hematopoietic	<ul style="list-style-type: none"> - Increased blood volume - 500 mL is normal blood loss for a vaginal birth - WBC average: 14,000 to 16,000/mm³ (as high as 25,000 can be normal) - Increased risk for venous thrombosis

Fetal response:

- Placental circulation- maternal blood supply to placenta **stops** during strong contractions
- Fetal protective mechanisms
 - o Fetal hemoglobin
 - o High hematocrit
 - o High cardiac output
- Cardiovascular system- reacts quickly to events during labor; normal fetal heart rate is **110-160 bpm**

- Pulmonary system- fetal lung fluid production decreases and its absorption into lung tissue increases during late pregnancy and labor; thoracic compression during labor aids in expulsion of additional fluid

Mechanisms of labor:

- **Engagement** of the presenting part at ischial spine
- **Descent**
- **Flexion** of the fetal head so the smallest diameter passes through
- **Internal rotation** so largest diameter of head matches largest diameter of the pelvis
- **Extension** of the fetal head at the symphysis pubis
- **External rotation**
- **Expulsion** of the fetal shoulders and body

Stages of Labor:

Stage One	<p>Latent:</p> <ul style="list-style-type: none"> - Dilation 1-4 cm - Contractions: <ul style="list-style-type: none"> o Mild intensity o Occur every 15-30 minutes o 15-30 seconds duration - Mother is eager and talkative <p>Active:</p> <ul style="list-style-type: none"> - Dilation 4-7 cm - Contractions: <ul style="list-style-type: none"> o Moderate intensity o Occur every 3-5 minutes o 30-60 seconds duration - Mother is becoming tired but still excited <p>Transition:</p> <ul style="list-style-type: none"> - Dilation 8-10 cm - Contractions <ul style="list-style-type: none"> o Strong intensity o Occur every 2-3 minutes o 45-90 seconds duration - Mother is anxious
-----------	---

Stage Two	<p>Cervical dilation is complete Crowning occurs Contractions:</p> <ul style="list-style-type: none"> - Strong intensity - Occur every 2-3 minutes - 60-75 seconds duration <p>Mother feels urge to bear down Fetus emerges</p>
Stage Three	<p>Placenta expulsion occurs 5-30 minutes after birth of fetus Cord is cut and clamped Examine placenta to ensure if it is intact and there are no retained parts in the uterus Examine the cord- two arteries and one vein</p>
Stage Four	<p>1-4 hours after delivery Fundus should remain contracted, midline, 1-2 fingerbreadths below the umbilicus Monitor lochia- may be a moderate amount and bright red in color Massage uterus as needed Perform maternal assessments:</p> <ul style="list-style-type: none"> - Q 15 minutes x 1 hr - Q 30 minutes x 1 hr - Q 1 hr x 2 hrs

Contraction Cycle

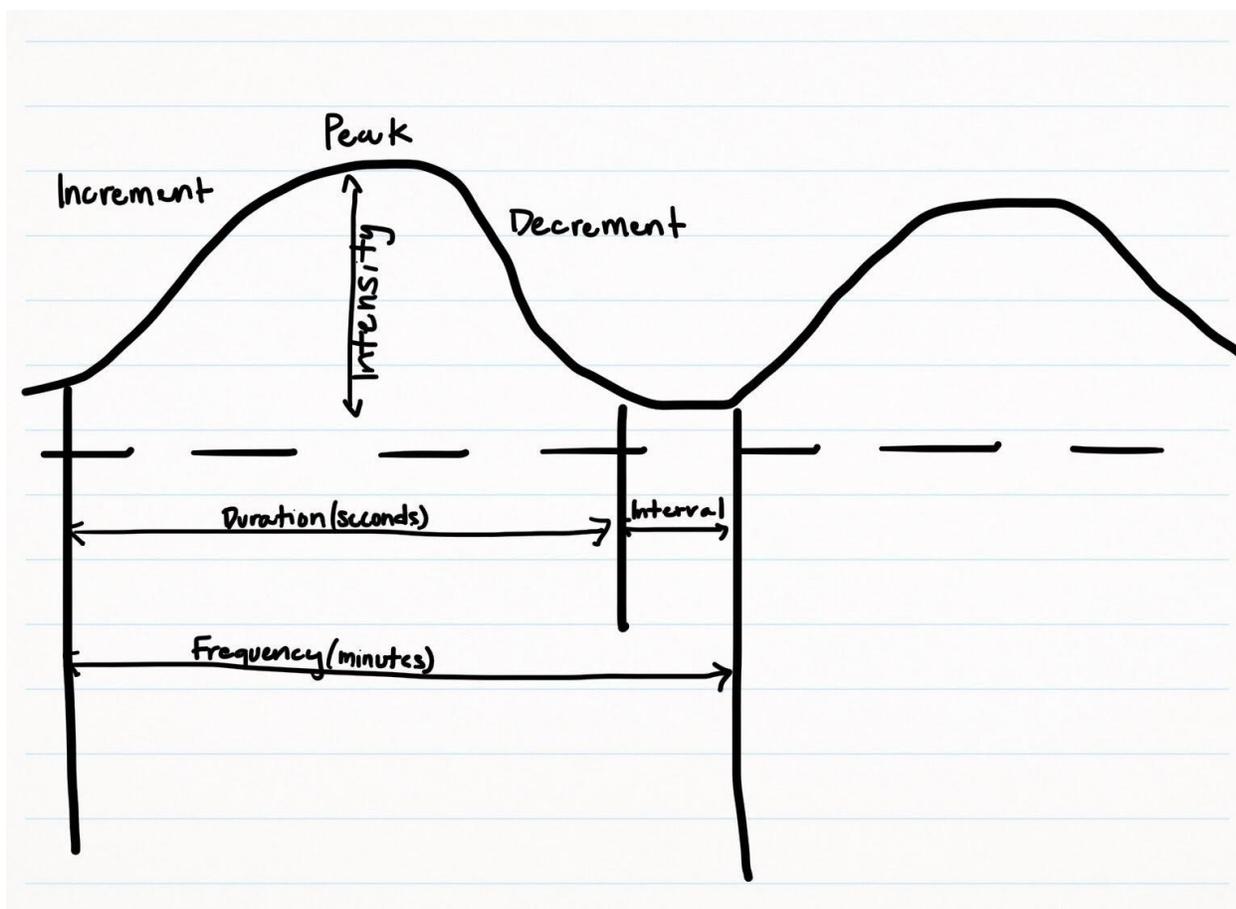
3 phases of the contraction cycle

- Increment
- Peak
- Decrement

Increment- contraction begins in fundus and spreads throughout the uterus

Peak- contraction most intense

Decrement- decreasing intensity as uterus relaxes



The contraction cycle is described in terms of duration, frequency, and intensity.

Duration- length of each contraction; measured in seconds

Frequency- from beginning of one contraction to the beginning of another

Intensity- strength of contractions; described as mild, moderate, or strong

- Mild- tip of the nose
- Moderate- chin
- Strong- forehead

Interval- allows placental blood flow and exchange of oxygen, nutrients, and waste products between maternal and fetal circulation

Nursing Interventions:

Provide encouragement for the mother and the partner, if one is present, throughout the labor process and postpartum period.

Assess for cultural preferences and act accordingly.

Provide comfort measures:

- Dim lighting
- Temperature per the mother's preference
- Comfortable positioning
- Pharmacologic pain relief
- Massage
- Ambulation during early labor

Continually monitor the condition of the mother and the fetus during the labor process. Monitor fetal heart rate and monitor maternal vital signs.

Prepare the sterile table before delivery.

Provide perineal cleansing before delivery.

Observe for maternal hemorrhage after delivery. Monitor the fundus and lochia.

Administer medications such as oxytocin to contract the uterus and control blood loss.

Promote parent-infant attachment.

Provide breastfeeding education for women who choose to breastfeed their babies.

Provide education on how much and how often formula should be given to the infant for women who choose to formula feed.

Pain Management During Labor

Types of pain during childbirth:

- Visceral- slow and deep, poorly localized; dominates **stage 1** of the birthing process
- Somatic- fast and slow, precisely localized; end of **stage 1** and beginning of **stage 2**

Sources of pain during childbirth

- **Tissue ischemia**- blood supply to the uterus is decreased
- **Cervical dilation**- stretching is painful!
- Pressure and pulling on pelvic structures
- Distention of the vagina and perineum- burning, tearing, splitting

Influences on pain during childbirth

- Intensity of labor- short and intense is usually severely painful
- Cervical readiness- longer labor and greater fatigue if cervix is not ready
- Fetal position- occiput posterior fetal position is unfavorable
- Characteristics of the pelvis- size and shape
- Fatigue- influences ability to tolerate pain
- Intervention by caregivers- IV line causes pain, fetal monitoring equipment, induction or augmentation
- Culture- how the mother perceives, interprets, and responds
- Anxiety and fear- magnify sensitivity to pain
- Previous experiences with pain
- Preparation of childbirth- preexisting expectations
- Support system

Regional	<p>Mother remains awake and is able to participate in her birth experience.</p> <p>Limitations include:</p> <ul style="list-style-type: none"> - Maternal hypotension (<i>administer IV fluids, IV ephedrine to combat hypotension</i>) - Fetal heart rate changes - Respiratory depression - Nausea/vomiting - Pruritus <p>Spinal block:</p> <ul style="list-style-type: none"> - Inserted in subarachnoid lumbar - Relieves uterine and perineal pain - Spinal headache may occur (instruct mother to stay supine) - Decreased BP <p>Epidural block</p> <ul style="list-style-type: none"> - Threaded at L3-L4 - Can be used for vaginal and c-section births - Decreased BP
Opioid analgesics	<p>Demerol Fentanyl Stadol Nubain</p> <p>Observe for respiratory depression in the neonate</p>
Pudendal block	<p>Numbs the lower vagina and part of the perineum Used for vaginal birth or episiotomy</p>
General anesthesia	<p>Used for emergency c-sections or women who refuse or are not a candidate for regional anesthesia Mother is at risk for aspiration of gastric contents</p> <ul style="list-style-type: none"> - NPO, restrict fluids <p>Mother and baby are also at risk for respiratory depression Wedge is placed under mother to avoid vena cava compression</p>
Nonpharmacological techniques	<p>Relaxation Massage Hydrotherapy Mental stimulation Breathing techniques</p> <ul style="list-style-type: none"> - Slow paced breathing - Pattern-paced breathing

Labor & Delivery Procedures

Amniotomy

Rupture of the amniotic sac; often done in conjunction with induction of labor

Enables internal electronic monitoring

Fetus must be at a 0 or plus station

Physician uses an Amnihook to perforate the amniotic sac

Nursing interventions:

- Nurse should monitor for prolapsed umbilical cord, infection, and abruptio placentae after amniotomy
- Before the amniotomy the nurse should assess the fetal heart rate; must be reassuring
- Nurse should place pads and towels under the patient to absorb the amniotic fluid
- Nurse should assess the fetal heart rate for one minute after the amniotomy
- Assess quantity, color, and odor of amniotomy
- Monitor temperature every 2 hours after amniotomy

Induction and augmentation

Indications:

- Fetal compromise
- Premature rupture of membranes
- Chorioamnionitis
- Postterm pregnancy
- Hypertension
- Fetal death

Bishop score is used to predict cervical readiness for labor

Contraindications:

- Placenta previa
- Vasa previa
- Abnormal fetal presentation
- Umbilical cord prolapse
- Uterine surgeries such as classic cesarean

Techniques for induction:

Cervical ripening:

- Prostaglandins (dinoprostone) to ripen cervix
 - o Tachysystole is a major adverse reaction

- Misoprostol- Cytotec- synthetic prostaglandin tablet
- Transcervical catheter- balloon-tipped Foley catheter is inserted into the cervix
- Lamical, Laminaria tents- absorbs water in the cervical canal and gradually expands

Oxytocin (Pitocin) administration:

- Diluted in isotonic solution and given as a secondary infusion (IVPB)
- Oxytocin is started slowly and increased gradually
- Uterine activity and fetal heart rate are closely monitored
- Titrated according to maternal and fetal response
- Fetal heart rate is charted and recorded every 15 minutes during first stage of labor and then every 5 minutes during second stage
- Monitor for non-reassuring fetal heart rate patterns that could indicate tachysystole
 - o Bradycardia
 - o Tachycardia
 - o Late decelerations
 - o Decreased fetal heart rate variability
- Uterine contractions are closely monitored, same frequency as fetal heart rate
- Monitor maternal blood pressure and heart rate every 30 minutes
- If fetal heart rate pattern is non-reassuring or if uterine contractions are hypertonic
 - o Reduce/stop oxytocin
 - o Place woman in a side lying position
 - o Give 8-10 L O2 via face mask
 - o Administer terbutaline to reduce uterine contractions if physician prescribes it
- Record intake and output to monitor for water intoxication.
 - o Headache
 - o Blurred vision
 - o Increased blood pressure and respirations
 - o Behavioral changes

Version

Used to changed fetal presentation

Internal vs External

- External
 - o Used to change fetus from breech, shoulder, or oblique presentation
 - o Nonstress test or biophysical profile should be obtained before version
 - o Ultrasound to confirm gestational age, fetal presentation, and adequacy of amniotic fluid
 - o Should be more than 37 weeks gestation
 - o Woman may be given a tocolytic drug such as terbutaline to relax uterus before version
- Internal
 - o May be used to achieve a vaginal birth for the second twin in a twin gestation

- Unexpected and urgent procedure
- Physician maneuvers the fetus into a longitudinal lie

Operative Vaginal Birth

Use of forceps or vacuum extractor during a vaginal birth to help aid the expulsion efforts

Forceps

Metal instruments with two curved blades with rounded edges that can be locked in the center- the physician applies to the fetal head to gain traction during birth

Vacuum extractor

A cap like suction device

May also be used during a cesarean birth to help pull the baby through the incision

Technique:

- Patient needs to have an empty bladder, ruptured membranes, and complete cervical dilation
- Regional or epidural block for anesthesia

Trauma associated with operative delivery:

- Maternal laceration or hematoma of perineum or vagina
- Infant ecchymosis, lacerations, facial nerve injury, cephalohematoma, intracranial hemorrhage,
- Infant may have a chignon at application site after use of a vacuum extractor

Nursing interventions:

- Monitor fetal heart rate; report a rate of less than 100 bpm
- Monitor mother and baby for trauma
- Monitor for broken skin on the baby's head and ensure the area is kept clean
- Monitor for neurological abnormalities, such as seizures, in the baby

Episiotomy

Incision of the perineum just before birth

May be used for fetal shoulder dystocia, forceps or vacuum extractor assisted births, fetus in occiput posterior position

Nursing interventions:

- Observe area for hematoma and edema

- Educate patient on use of cold applications to the site for 12 hours followed by heat for 12 hours

Cesarean birth

C-section is performed when vaginal birth would compromise the mother, fetus, or both
Gestation should be confirmed to be greater than 39 weeks

Risks:

- Infection
- Hemorrhage
- UTI
- Thrombophlebitis
- Paralytic ileus

An epidural block is used for a scheduled c-section

General anesthesia is used for an emergency c-section in which there is no time to establish an epidural block

Nursing care before c-section:

- Educate patient on the procedure and what to expect
- Provide emotional support for the woman and her family
- Place a wedge under one hip
- Administer the prescribed IV dose of prophylactic antibiotic
- Insert an indwelling urinary catheter
- Clip hair that is present at the planned incision site
- Complete a sterile abdominal skin prep

Nursing care after c-section

- Assess for return of sensation and movement after an epidural block
- Assess for level of consciousness if general anesthesia was used
- Assess the mother per facility protocol or
 - o Q 15 minutes for the first hour
 - o Q 30 minutes for the second hour
 - o Q 1 hour
- Focused assessment of the mother should include
 - o Vital signs
 - o Oxygen saturation
 - o Uterine fundus
 - o Lochia
 - o Urine output
 - o Abdominal dressing
- Provide pain relief as needed via prescribed analgesics

Fetal Monitoring During Labor- Maternal (OB) Nursing

The following are 3 different methods of fetal monitoring:

- **Intermittent auscultation and palpation**
- **External fetal monitoring**
- **Internal fetal monitoring**

Auscultation & palpation	<p>Only appropriate in low-risk women Use of a fetoscope or Doppler ultrasound to auscultate fetal heart rate Requires 1-1 nursing care Mother is free to walk around and change positions as she wants Pressure from device is uncomfortable for some women</p>
Electronic fetal monitoring	<p>Supplies more data about the fetus than auscultation Provides a record that can be printed or stored electronically Easy to identify trends in fetal heart rate and uterine activity Allows for one nurse to observe two laboring women Main disadvantage is reduced mobility for the mother</p> <p>External:</p> <ul style="list-style-type: none"> -Ultrasound transducer- secured on the mother's abdomen with straps -Less accurate than internal devices but are noninvasive -Toco transducer- this device detects changes in uterine activity -Fetal size, abdominal fat thickness, maternal position, and location will all affect the reading obtained -Produces a tracing <p>Internal:</p> <ul style="list-style-type: none"> -Accuracy is the main advantage -Requires ruptured membranes and about 2 cm of cervical dilation -Slightly increased risk for infection -Fetal scalp electrode <ul style="list-style-type: none"> -detects electrical signals from the fetal heart -avoid fetal face, fontanelles, and genitals -Intrauterine pressure catheter <ul style="list-style-type: none"> -measures uterine activity -solid catheter or a hollow, fluid-filled catheter

Normal fetal heart rate: 110-160
Bradycardia <110
Tachycardia >160

The nurse should be mindful of the following mechanisms that **influence heart rate**:

- **Maternal hypertension**– could reduce flow to the placenta
- **Hypertonic contractions**– decrease placental blood flow
- Placental disruptions
- **Compressed or prolapsed cord**

Fetal Heart Rate Patterns

Variable decelerations	<ul style="list-style-type: none"> • Caused by reduced flow through the umbilical cord- cord compression • Shape, duration, and degree of fall below baseline rate are variable- fall and rise in rate is abrupt • <i>Change position of mother, apply O2, discontinue oxytocin, assess mother's VS</i>
Early decelerations	<ul style="list-style-type: none"> • Mirror images of contraction • Return to baseline fetal heart rate by the end of the contraction • Head compression during contractions- increases intracranial pressure • Maternal position changes usually have no effect on pattern • Not associated with fetal compromise
Acceleration	<ul style="list-style-type: none"> • Temporary increases in fetal heart rate; periodic or nonperiodic • Peaks at 15 bpm above the baseline for at least 15 seconds • Associated with fetal movement • Reassuring– baby is moving and is tolerating it • <i>No intervention needed- Nurse should continue supporting optimal oxygenation</i>
Late decelerations	<ul style="list-style-type: none"> • Begins after contraction begins (often near peak) • Reflect possible impaired placental exchange; nonreassuring • <i>Requires nursing intervention to improve blood flow and fetal oxygen supply</i>

“VEAL CHOP”

Variable decelerations	Cord compression
Early decelerations	Head compression
Accelerations	Ok
Late decelerations	Placental insufficiency

General nursing interventions while monitoring fetal heart rate patterns:

- Identify the cause of the pattern
- Increase placental perfusion- turn mother to left side, administer oxygen, infuse Lactated Ringers
- Tocolytic drug, such as terbutaline, may need to be administered to lessen uterine activity
- Reduce cord compression
- Prepare for c-section if fetal compromise is suggested
- Update and educate the mother and partner
- Communicate nonreassuring signs with the healthcare provider

Labor & Delivery Complications

Dystocia

Any difficult labor or birth

Ineffective Contractions

Hypotonic contractions

- Coordinated but weak
- Infrequent and brief
- Easily indented with fingertip at peak
- Uterine overdistention may be a factor
- Fetal hypoxia **uncommon**
- May need amniotomy or Pitocin infusion (augmentation)

Hypertonic contractions

- Uncoordinated and erratic
- Contractions are painful but ineffective
- Increased resting tone- reduces uterine blood flow, leads to decreased fetal oxygen supply
- Pain relief- epidural analgesia
- Amniotomy if in **active** labor
- Oxytocin should NOT be given as it can increase the uterine resting tone further
- Tocolytic drugs may be ordered- terbutaline
 - o Monitor heart rate (maternal HR should be less than 120 and fetal HR should be less than 160)
- Light sedation may be ordered to help uterus relax
- Increase the rate of IV fluids for hydration

Hypotonic vs Hypertonic

	Hypotonic	Hypertonic
Contractions	Coordinated but weak Easily indented at peak Minimal discomfort	Uncoordinated, irregular Short and poor intensity Painful and cramplike
Uterine Resting Tone	Not elevated	Higher than normal
Phases of Labor	Active After 4 cm dilation	Latent Before 4 cm dilation
Treatment	Amniotomy Augmentation with oxytocin	Light sedation Hydration Tocolytics

Nursing Considerations	Encourage position changes Prepare patient for amniotomy and augmentation if indicated	Side-lying position Promote rest and relaxation Pain relief
------------------------	---	---

Macrosomia

- Infant weighs more than 4000 g at birth
- May cause cephalopelvic disproportion or uterine overdistention

Shoulder Dystocia

- Delayed or difficult birth of the shoulders
- Can occur in a baby of any weight but macrosomia increases risk
- Requires urgent intervention due to compression of the umbilical cord and prevention of respirations in fetus
- Methods to deliver shoulders
 - o McRoberts maneuver- patient flexes knees against abdomen to straighten the pelvic curve
 - o Suprapubic pressure- pushes the fetal anterior shoulder downward
 - Fundal pressure should NOT be used

Abnormal presentation or position

Occiput posterior

- Might require vacuum assistance or the use of forceps
- Mother may feel intense back and leg pain
- Encourage the mother to change positions- hands & knee, side-lying, the lunge, squatting, leaning forward
- Encourage the use of a birthing ball
- Vacuum extractor or forceps may be used to help with rotation and descent of the head
- C-section may be needed if none of the mentioned interventions are successful

Breech

- Can cause a compressed umbilical cord
- Possible external cephalic version may be attempted
- Likely a c-section

Transverse

- C-section

Precipitate labor

- Rapid birth within 3 hours of labor onset
- Mothers experience abrupt onset of intense contractions
- Fetal injury may include hypoxia and nerve damage
- Maternal injury may include uterine rupture, cervical lacerations, hematoma of the vagina or vulva
- Primary goal is promotion of fetal oxygenation and maternal comfort
 - o Mother should remain in side-lying position
 - o Administer O2
 - o Maintain blood volume via IV fluids
 - o Stop oxytocin if previously infusing
 - o Administer prescribed tocolytics

Premature Rupture of Membranes:

Rupture of amniotic sac before onset of true labor

Possible causes

- Infection
- Chorioamnionitis
- Incompetent cervix
- Overdistention of uterus

Increased risk of maternal and fetal infection

Treatment

- Depends on gestation and presence of infection
- Studies are done to determine fetal lung maturity
- pH test/fern test to verify rupture of membranes
- Induction of labor if at or near term
- Induction may be delayed 24 hours if cervix is unfavorable
- C-section may be needed
- Maternal antibiotics- ampicillin, erythromycin, amoxicillin, or azithromycin

Pre-term labor

From 20 weeks to the end of 37 weeks

Signs/symptoms:

- Contractions may not be felt
- Cramps
- Low backache
- Pelvic pressure
- Increased vaginal discharge
- Sense of “just feeling bad”

Goal is to stop uterine activity before cervical dilation of 3 cm

Identify and treat any existing issues such as infection or dehydration

Maternal corticosteroids are administered to help speed fetal lung maturity- **betamethasone** or **dexamethasone**

Tocolytics may be administered:

Magnesium sulfate

- Ensure urine output of 30 mL/hour
- DTR are present
- 12 resp./min
- Check heart and lung sounds with hourly vital signs
- Calcium gluconate at the bedside as an antidote

Nifedipine

(calcium antagonist)- Reduces muscular contraction

- May experience orthostatic hypotension
- Nurse should report a pulse greater than 120 bpm

Indomethacin

(prostaglandin synthesis inhibitor)

- Nurse should monitor for nausea, heartburn, vomiting, and rash
- Observe for abnormal bleeding
- Can reduce the amount of amniotic fluid

Terbutaline

(beta-adrenergic)

- Monitor maternal BP as it may decrease
- Check apical heart rate before every dose- tachycardia may develop

- Monitor for s/s
 - o Wide pulse pressure
 - o Dysrhythmias
 - o Chest pain
 - o Pulmonary edema
 - o Headache, tremors, restlessness
- If pulse is greater than 120 bpm and lungs sound “wet” HCP should be notified as medication should likely be stopped

Nursing interventions

- Promote fetal oxygenation and maternal comfort
- Place woman in side-lying position
- Administer O2
- No oxytocin; tocolytic may be ordered (tocolytics will likely be successful if the mother is less than 5 cm dilated, less than 50% effaced, and is not experiencing vaginal bleeding)
- Assess history, perform fetal assessment
- Encourage mother to void every 1-2 hours
- Encourage adequate intake of fluids to ensure hydration

Post-term labor

- Extends past 42 weeks
- Placental maturity results in decreased fetal oxygenation
- Fetal risks include asphyxia, hypoglycemia, RDS
- Induction of labor may be used if the cervix is favorable

Prolapsed Umbilical Cord

Risk factors include

- Fetus at high station
- Breech presentation
- Very small fetus
- Transverse lie
- Hydramnios

Signs/symptoms:

- Umbilical cord may be visible at the vaginal opening
- Nurse or practitioner may be able to palpate the cord upon vaginal examination

Nursing interventions:

- Priority action is to relieve compression on the umbilical cord
 - o Elevate the presenting part that is lying on the cord by applying finger pressure with a gloved hand
 - o Place the client into extreme Trendelenburg's or modified Sims' position or a knee-chest position
- Administer oxygen, 8-10 L/minute via face mask
- Monitor fetal heart rate and assess the fetus for hypoxia
- Prepare to start IV fluids or increase the rate of administration of an existing solution
- Prepare for immediate birth- typically c-section
- Apply a warm, sterile, saline-soaked towel to the visible cord to prevent drying and to maintain blood flow

Uterine rupture

Risk factors include

- Previous classical c-section
- Uterine trauma
- High parity

Signs/symptoms:

- Patient reports “ripping”, “tearing”, or sharp pain
- Abdominal pain or tenderness
- Manifestations of hypovolemic shock- tachypnea, hypotension, pallor
- Signs of fetal compromise- late decelerations, reduced variability, absent fetal heart sounds
- Palpation of fetus outside of uterus

Nursing interventions

- Administer prescribed IV fluids
- Administer blood product if prescribed
- Prepare client for C-section and possible hysterectomy
- Monitor for signs of hemorrhage after birth that may indicate uterine rupture has occurred

Amniotic fluid embolism/Anaphylactoid Syndrome

Occurs when amniotic fluid is pulled into maternal circulation and carried to the lungs
Often a fatal complication; some survivors will experience neurological deficits

Signs/symptoms

- Sudden chest pain
- Respiratory distress
 - o Restlessness
 - o SOB
 - o Dyspnea
 - o Pulmonary edema
 - o Cyanosis
- Circulatory collapse
 - o Tachycardia
 - o Hypotension
 - o Shock
 - o Cardiac arrest

Nursing interventions

- Administer oxygen via mask at 8-10 L/min
 - o Patient may need mechanical ventilation
- Perform cardiopulmonary resuscitation if necessary
- Administer prescribed blood components
- Prepare patient for an emergency c-section

Postpartum

Cardiovascular system

- Increased maternal cardiac output
- Excess fluid is excreted
- Temperature at 100.4 degrees can be considered normal within 8 hours
- Increased risk for **thrombophlebitis**

Endocrine system

- Skin pigmentation returns to nonpregnant state- lightening of linea nigra and areola
- Resumption of ovulation and menstruation; breastfeeding may delay the return of ovulation and menses

- Vaginal dryness in breastfeeding mothers

Vagina and perineum

- It takes 6-10 weeks for the vagina to return to its original size and contour
- An episiotomy takes about 2 weeks to heal
- Perineal trauma and hemorrhoids cause discomfort and can interfere with activity and bowel elimination

Risk for postpartum hemorrhage

- Grand multiparity
- Over distension of the uterus
- Rapid, precipitous, or prolonged labor
- Retained placenta
- Placenta previa or abruptio placenta
- Medications (tocolytics, oxytocin)
- C-section
- Vacuum extraction
- Coagulation defects

Risk for postpartum infection

- C-section
- Vacuum extraction
- Forceps
- Multiple cervical examinations
- Prolonged labor
- Prolonged rupture of membranes
- Manual extraction of the placenta
- Diabetes
- Catheterization

Focused postpartum assessment-

- VS, orthostatic hypotension, bradycardia, tachycardia may indicate hemorrhage
- BUBBLE- breasts, uterus, bowels, bladder, lochia, episiotomy

BUBBLE

(Breasts, Uterus, Bowels Bladder, Lochia, Episiotomy)

Breasts:

- Breastfeeding mothers may experience engorgement during feedings once their milk comes in.
- Nonbreastfeeding mothers will experience swollen, engorged breasts until their milk dries up.
- Assess for signs of mastitis- warmth, tenderness, and redness of the breast; fever

Uterus:

- Involution of the uterus occurs after delivery.
- The uterus will be at or near the level of the umbilicus following birth.
- Assess the uterus and determine if it is **boggy or firm**. If the uterus is boggy, then the uterus should be gently massaged until it is firm. It is vital that the uterus does not remain in a boggy state as hemorrhage could occur.
- The nurse should ask the patient to empty their bladder before palpation of the uterus.
- Involution can be evaluated by measuring the descent of the fundus- about 1 cm per day.
- The fundus should no longer be palpable after around 9 days
- Afterpains, or intermittent uterine contractions, cause discomfort for many women. Breastfeeding women may notice these pains during breastfeeding sessions.

Bowels:

- Constipation may occur. A stool softener may be used to help prevent constipation.
- Many women fear the first bowel movement after birth.
- Hemorrhoids may be present from before birth or from the birthing process.
- Bowel sounds should be assessed in patients who have had a c-section. Assess bowel sounds and ask patients to notify nursing staff when they pass gas.
- The first bowel movement should occur around 2-3 days after birth.

Bladder:

- Urinary retention may result from increased bladder capacity and a decreased sense to fluid pressure.
- UTIs can occur if urinary retention is prolonged.
- The distended bladder displaces the uterus and can interfere with uterine contraction and cause excessive bleeding.
- Stress incontinence may occur.
- Within one month kidney function should return.
- Signs of a distended bladder:
 - location of fundus above baseline level
 - fundus is displaced from midline
 - excessive lochia
 - bladder discomfort

- bulge of bladder above symphysis
- frequent voiding of less than 150 mL

Lochia:

Lochia is vaginal discharge that occurs after birth. It is described as **rubra**, **serosa**, or **alba**. The following table identifies the characteristics of each type of lochia and how long it approximately lasts.

Rubra	Dark red 3-4 days
Serosa	Pinkish brown 4-10 days
Alba	Whitish yellow 10-28 days

- Assess the amount, type, and odor.
- Foul odor suggests endometrial infection. Absence of lochia may also indicate infection.
- The amount of lochia is defined as being **scant**, **light**, **moderate**, or **heavy**.
 - **Scant:** <2.5 cm
 - **Light:** 2.5-10 cm
 - **Moderate:** 10-15 cm
 - **Heavy:** saturated pat in 1 hour
- Instruct the patient to use sanitary pads and not tampons.
- Educate the patient on how to monitor lochia and what to report to the staff (foul odor, heavy drainage).

Episiotomy:

- Assess the status of the episiotomy site. The initialism REEDA can be used to remember the things to assess- redness, edema, ecchymosis, discharge, approximation.
- **Redness**
- **Edema**
- **Ecchymosis**
- **Discharge, drainage**
- **Approximation**
- The nurse can also use these principles to assess any vaginal lacerations that may be present.

Patient Education

Breastfeeding:

- Avoid soap on nipples as it will remove natural lubrication

- Keep nipples dry in between feedings
- Wear a good supporting bra
- Nursing pads can be inserted if nipples are leaking
- Ice packs can be used **in between feedings** to ease discomfort from engorgement
- Warm soaks or a warm shower can be used **before feedings**

Nonbreastfeeding:

- Wear tight fitting bra
- Avoid stimulating breasts
- Cabbage leaves can be placed over the breasts to help ease engorgement discomfort

Care of Cesarean incision:

- It is ok to shower with adhesive strips
- There should not be any drainage.
- Monitor for s/s of infection- warmth, redness, swelling at the incision; fever
- Know when to call the provider- infection, dehiscence

Perineal care

- Clean perineal area with water bottle, perineal wipes
- Patient can wear peripads with mesh panties
- Ice packs can be used for the first 24 hours to reduce swelling
- After 24 hours, warm sitz baths can be utilized
- Sexual intercourse should be postponed until preferably 4-6 weeks postpartum
- Analgesic spray can be used for patients who had an episiotomy or perineal laceration

Nutrition

- Obtain adequate nutrition, avoid severe calorie restrictions,
- Lactating women need to consume 500 calorie/day over the recommended pre-pregnant requirements due to increased energy requirements for milk production
- Lactating women need to drink a minimum of 2 liters of fluid/day
- Women should eat nutritious foods to help their body recover from the demands of delivery as well as any incisions or lacerations that may have occurred

Musculoskeletal system

- The mother may experience muscle fatigue and aches for the first 1-2 days after childbirth
- Diastasis recti, the separation of abdominal muscles, may be present and take about 6 weeks for the abdominal wall to return to normal. Some women may continue to have diastasis recti after this period of time and may need to perform abdominal exercises to help close the separation

Postpartum blues

- “Baby blues” is a mild depression that affects about 70-80% of mothers
- The “baby blues” should not last longer than 2 weeks. The mother should contact her physician if the sad feelings last for longer than 2 weeks.
- Mothers may experience insomnia, irritability, fatigue, anxiety, and mood instability
- Must be distinguished from postpartum depression or postpartum psychoses

Postpartum Complications

Post-partum hemorrhage

More than 500 mL of blood loss after vaginal birth

More than 1000 mL of blood loss after a c-section

Most commonly caused by uterine atony

Uterine atony

Uterus does not contract leading to a soft or boggy fundus

Trauma to birth canal, hematoma, retained placenta, abnormal coagulation, DIC, placenta previa, placenta accreta

Risk factors included overdistended uterus, multiparity, precipitate or prolonged labor, augmentation with oxytocin

Signs/symptoms:

- Uterine fundus difficult to locate
- Soft or “boggy” fundus
- Uterus becomes firm when massaged, but becomes boggy when massage stops
- Fundus above expected level
- Excessive lochia (saturates pad in one hour)- bright red

- Excessive clots
- Slow trickle of blood or large quantities/gushes of blood

Nursing interventions:

- Massage uterus if not firm
- Express clots
- ****Do not push on uterus if it is not firm. Excess pressure on a boggy uterus can cause an inverted fundus and result in massive hemorrhage and shock****
- Assess for a distended bladder. Assist patient with urination- may require a foley catheter
- Administer prescribed medications that help contract uterus
 - o Methylergometrine (Methergine) IM- DO NOT give to patient with hypertension
 - o IV oxytocin (Pitocin)
 - o Carborprost Tromethamine IM
- Bimanual compression if fundal massage and medications do not work
- Administer prescribed Lactated Ringers, blood, or blood products to prevent hypovolemic shock or hypovolemia
- Nurse may need to assist with insertion of balloon into uterus, insertion of uterine packing, prepare patient for laparotomy to identify source of bleeding, prepare patient for uterine compression sutures, or prepare patient for a hysterectomy as a last resort.

Trauma of the birth canal

Vaginal, cervical, or perineal lacerations; hematomas

May be associated with precipitous birth, macrosomia, use of vacuum extractor or forceps

- If fundus is firm and bleeding is still occurring, then birth canal lacerations should be suspected

Hematomas- discolored bulging mass; causes deep, severe, unrelieved pain and feelings of pressure

- If fundus is firm and lochia is within normal limits, then hematoma should be suspected. Patient may also have an increase heart rate and decreased blood pressure with a hematoma

Treatment- surgical repair of laceration or hematoma

Nursing interventions

- Assess an episiotomy for extension into a third- or fourth-degree laceration
- Assess firmness of fundus
- Evaluate amount lochia
- Use ice packs to treat small hematomas

- Encourage sitz baths and frequent perineal hygiene

Retained placenta

Failure of placental delivery within 60 minutes of the fetus

May be caused by adherence of placenta to uterine wall

- Placenta accreta- abnormally adherent; may cause immediate or delayed hemorrhage
- Placenta increta- placenta penetrates the uterine muscle itself
- Placenta percreta- penetrates all the way through the uterus

Nursing interventions

- Monitor the uterus for fundal height, consistency, and position
- Monitor lochia for color, amount, consistency, and odor
- Provide oxygen at 2-3 L/min per nasal cannula
- Administer oxytocin as prescribed to expel retained fragments of the placenta
- Monitor for hemorrhage and shock
- Assist with manual removal of placenta
- Prepare patient for surgical removal of placenta if manual removal is unsuccessful
- Prepare patient for hysterectomy as a last resort

Thromboembolic disease

Most common thromboembolic disorders

- Superficial venous thrombophlebitis (SVT)
- Deep vein thrombosis (DVT)
- Pulmonary embolism (PE)

Superficial venous thrombosis

Signs/symptoms:

- Swelling of affected extremity
- Redness
- Tenderness
- Warmth

Nursing interventions

- Administer analgesics for discomfort

- Promote rest and elevate the lower extremity if affected
- Apply elastic support/support hose
- Apply heat to promote healing
- Teach patient that there is no need for anticoagulants but that they may be given an anti-inflammatory
- Teach patient to avoid standing for long periods of time after recovery

Deep Venous Thrombosis

Signs/symptoms:

- Erythema
- Warmth
- Enlarged hardened vein
- Unilateral leg pain/swelling
- Calf tenderness
- Swelling

Treatment

- Prophylactic heparin for high risk women during pregnancy
 - o Discontinued during labor and delivery and resumed 6-12 hours after an uncomplicated birth
- IV heparin or SQ low molecular weight heparin (LMHP) can be used to treat a DVT
- Warfarin is contraindicated during pregnancy due to its teratogenic effects but can be used after birth for women who develop a DVT. Warfarin is safe for lactating mothers.
 - o Patient will stay on warfarin for at least 6 weeks

Nursing interventions

- Promote prevention by encouraging fluids, leg exercises every 1-2 hours, early ambulation. Teach the patient how to apply graduate compression stockings and encourage the use of sequential compression stockings when in bed.
- Administer prescribed anticoagulants and teach patient about administered medications
- Check PT, PTT, and INR lab values
- Apply antiembolic hose when ambulation is allowed
- Encourage bed rest
- Assess affected area frequently
 - o Check peripheral pulses
 - o Measure leg circumferences
- Monitor for signs of pulmonary embolism which women who have a DVT are at high risk of developing

Pulmonary Embolism

Signs/symptoms:

- Dyspnea
- Chest pain
- Tachypnea
- Apprehension; impending doom
- Cough
- Tachycardia
- Decreased oxygen saturation

Treatment:

- Goal of treatment is to dissolve clot
 - o Heparin/warfarin therapy
 - o Embolectomy
 - o Thrombolytic drugs

Nursing interventions

- o Frequently monitor respiratory status- monitor for air hunger, dyspnea, tachycardia, pallor, cyanosis
- o Administer oxygen 8-10 L/min via face mask
- o Position mother on her side
- o Administer narcotic analgesics as prescribed to relieve apprehension
- o Administer continuous IV heparin
- o Teach patient that they will be on oral anticoagulant therapy for 6 months
- o Encourage bed rest, keep HOB elevated

Post-partum (puerperal) infections

Bacterial infection after childbirth

Temp >100.4 within 2-10 days after childbirth

C-section is a major predisposing factor

Risk factors include c-section, prolonged labor, prolonged rupture of membranes, poor hygiene, infrequent voiding, excessive vaginal exams, etc

Endometritis

Most infections are polymicrobial

Typically occurs within 36 hours of delivery

Signs/symptoms:

- Fever of 100.4 or greater
- Chills
- Malaise
- Abdominal pain and cramping
- Uterine tenderness
- Purulent, foul-smelling drainage
- Leukocytosis

Treatment:

- Prophylactic antibiotics for all women having a c-section
- IV antibiotics
 - o Broad spectrum- cephalosporins, clindamycin + gentamicin, ampicillin + aminoglycosides, metronidazole + penicillin

Nursing interventions:

- Assess vital signs every 2 hours while fever is present and every 4 hours once afebrile
- Administer prescribed antipyretics and analgesics when indicated
- Administer IV fluids or encourage consumption of fluids to ensure hydration
- Position patient in Fowler's position to help gravity keep drainage going

Wound Infection

- Surgical incisions
- Episiotomies
- Lacerations

Signs/symptoms:

- Edema
- Warmth
- Redness
- Tenderness
- Pain

Treatment:

- Incision and drainage (I&D) may be needed
 - o Obtain culture from drainage
- Analgesics for discomfort

Urinary Tract Infections (UTI)

Signs/symptoms:

- Dysuria
- Urgency
- Frequency
- Suprapubic pain
- Low grade fever
- Possible pyelonephritis- chills, N/V, flank pain

Treatment:

- Oral or IV antibiotics
- Fluid intake 2500-3000 mL/ day to ensure adequate hydration

Nursing interventions

- Obtain either a random or clean-catch urine sample
- Administer prescribed antibiotics
- Teach the client proper perineal hygiene
- Encourage the patient to increase her fluid intake to 3000 mL/day to dilute bacteria and flush her bladder
- Recommend that the patient drink cranberry and prune juice to promote urine acidification
- Teach patient to avoid grapefruit and soft drinks as they change the pH of urine to alkaline

Mastitis

Infection of the breast

Usually affects one breast; 2-4 weeks after birth

Signs/symptoms

- Painful or tender, localized hard mass, and reddened area usually on one breast
- Chills
- Fatigue
- Flu-like symptoms
- Enlarged axillary lymph nodes

Treatment:

- May turn into an abscess if left untreated
- Antibiotics for 10-14 days
- Analgesics for pain relief

Nursing interventions

- Teach patients about prevention
 - o Thoroughly wash hands prior to breastfeeding
 - o Maintain cleanliness of breasts with frequent changes of breast pads
 - o Encourage allowing nipples to air-dry
 - o Avoid nipple trauma and milk stasis
- Encourage using ice packs or warm packs on affected breasts for discomfort
- Instruct the patient to begin breastfeeding from the unaffected breast first to initiate the letdown reflex in the affected breast
- Encourage the patient to wear a well-fitting bra
- Administer prescribed antibiotics; teach patient about importance of taking prescribed antibiotics until all pills have been taken
- Encourage patient to drink 2500-3000 mL of fluid per day

Affective Disorders

Postpartum mothers are at increased risk for mood disorders including postpartum blues, depression, and psychoses

Defined as a disturbance in thought processes, affect, and function

Postpartum blues

- "Baby blues" is a mild depression that affects about 70-80% of mothers
- The "baby blues" should not last longer than 2 weeks. The mother should contact her physician if the sad feelings last for longer than 2 weeks.
- Mothers may experience insomnia, irritability, fatigue, anxiety, and mood instability
- Must be distinguished from postpartum depression or postpartum psychoses

Postpartum Depression

Depression begins any time after childbirth and lasts at least 2 weeks

Signs/symptoms:

- Persistent depressed mood
- Loss of interest in normal activities
- Unable to feel pleasure or love

- Feels inept at being a mother
- Anxiety
- Loss of self
- Generalized fatigue

Treatment:

Combination of psychotherapy, social support, and medication

SSRIs and tricyclic antidepressants

- May take up to 4 weeks to see improvement

Electroconvulsive therapy may be needed for suicidal women

Postpartum Psychosis

Classified as depressed or manic

Psychiatric emergency that often requires hospitalization

Signs/symptoms:

- Agitation
- Irritability
- Disorientation
- Delusions or hallucinations

Treatment:

- Hospitalization
- Medications
- Referral to specialist for psychiatric care

Index

- Abortion- 12
- Abruptio placentae- 17
- Accelerations- 39
- Affective disorders - 59
- Alpha-fetoprotein screening- 6
- Amniocentesis- 6
- Amniotic fluid embolism/anaphylactoid syndrome- 46
- Amniotomy- 34
- Antepartum fetal surveillance- 8
- Biophysical profile- 9
- Breech presentation- 42
- BUBBLE assessment- 49
- Cardiovascular changes in pregnancy- 10
- Cesarean birth- 37
- Chorionic villus samplings (CVS)- 6
- Complete abortion- 13
- Confirmation of pregnancy- 3
- Contraction cycle- 29
- Contraction stress test- 8
- Deep venous thrombosis- 55
- DIC- 19
- Dystocia- 41
- Early decelerations- 39
- Eclampsia- 23
- Ectopic pregnancy- 14
- Endocrine changes in pregnancy- 11
- Endometritis- 56
- Episiotomy- 36
- External fetal monitoring- 38
- External version- 35
- Fetal heart rate patterns- 39
- Fetal monitoring during labor- 38
- Fetal response to the birth process- 27
- Forceps- 36
- Gastrointestinal changes in pregnancy- 11
- General anesthesia- 33
- Gestational Diabetes- 24
- Gestational hypertension- 20
- Gestational Trophoblastic Disease- Hydatidiform mole- 16
- GTPAL- 5
- HELLP syndrome- 24
- Hyperemesis gravidarum- 19
- Hypertensive disorders- 20
- Hypertonic contractions- 41
- Hypotonic contractions- 41
- Immune system changes in pregnancy- 12
- Incomplete abortion- 13
- Induction and augmentation- 34

Inevitable abortion- 13
Integumentary changes in pregnancy- 11
Internal fetal monitoring- 38
Internal version- 35
Labor and delivery complications- 40
Labor and delivery procedures- 34
Late decelerations- 39
Macrosomia- 42
Magnesium sulfate infusion- 22
Mastitis- 58
Maternal response to the birth process- 27
Missed abortion- 14
Musculoskeletal changes in pregnancy- 11
Naegele's rule- 4
Nonstress test- 8
Occiput posterior- 42
Opioid analgesics during labor- 33
Oxytocin- 35
Pain management during labor- 31
Percutaneous umbilical blood sampling- 7
Placenta previa- 17
Positive indications of pregnancy- 4
Postpartum- 47
Postpartum blues- 59
Postpartum complications- 52
Postpartum depression- 59
Postpartum hemorrhage- 52
Postpartum infection- 56
Postpartum psychosis- 60
Post-term labor- 45
Precipitate labor- 43
Pre-eclampsia- 21
Pregnancy complications- 12
Pregnancy overview- 10
Premature rupture of membranes- 43
Prenatal diagnostic tests- 5
Presumptive indications of pregnancy- 3
Pre-term labor- 44
Probable indications of pregnancy- 3
Prolapsed umbilical cord- 45
Prostaglandins- 34
Pudendal block- 33
Pulmonary embolism- 56
Recurrent abortion- 14
Regional block- 33
Reproductive changes in pregnancy- 10
Respiratory changes in pregnancy- 10
Retained placenta- 54
Shoulder dystocia- 42
Stage four of labor- 29
Stage one of labor- 28
Stage three of labor- 29
Stage two of labor- 29
Stages of labor- 26
Superficial venous thrombosis- 54
Threatened abortion- 12

Thromboembolic disease- 54

Ultrasound- 5

Urinary changes in pregnancy- 11

Uterine atony- 52

Uterine rupture- 46

UTI- 58

Vacuum extractor- 36

Variable decelerations- 39

VEAL CHOP- 40