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www.nccwebsite.org	Inpatient OB exam :175 questions, 25 pretest questions	Competency Assessment Exams
Pretests	Modules	Continuing education contact hours

Inpatient OB Review/Study Guide

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NCC Exam Information

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NCC Outline

Complications of Pregnancy (29% = 43 questions)
- Maternal Complications Affecting the Fetus and Newborn Maternal Psychological and Environmental Factors
- Preterm Labor
- Multiple Gestation
- Placental Disorders

Fetal Assessment (18% = 27 questions)
- Antenatal Testing
- Electronic Fetal Monitoring
- Non-electronic Fetal Monitoring
- Acid-base Interpretation

Labor and Birth (35% = 53 questions)
- Physiology of Labor Assessment and Management of Labor
- Obstetric and Perioperative Procedures
- Pain Management and Coping Labor
- Obstetric Complications
- Induction and Augmentation

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NCC Outline

Recovery, Postpartum and Newborn Care (15% = 22 questions)
- Recovery and Postpartum Physiology
- Complications Family Dynamics and Discharge Readiness
- Lactation and Infant Nutrition
- Newborn Physiology and Complications

Professional Issues (3% = 5 questions)
- Quality Improvement
- Legal, Ethics, Safety,

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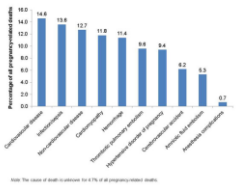

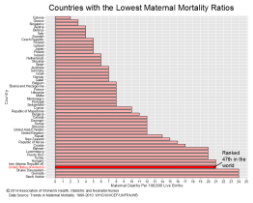

Our Countries Morbidity and Mortality

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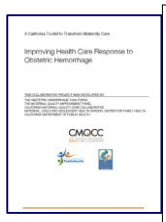
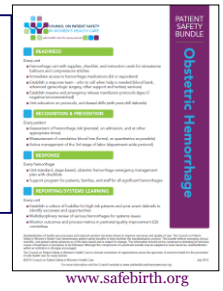
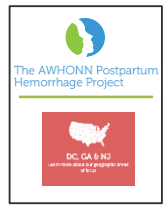
Key OB Hemorrhage QI Toolkits: Full of Resources







www.CMQCC.org

www.safebirth.org

www.awhonn.org

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Introduction

- Hypertensive disorders of pregnancy remain a major health issue for women and their infants in the United States.
- Chronic hypertension is associated with fetal morbidity in the form of growth restriction and maternal morbidity in the form of growth restriction and maternal morbidity manifested as severely. (ACOG,2017)
- It is important for all medical personnel to consider the most updated guidelines when working with patients. This will ensure early and accurate assessments that are critical to diagnosis and appropriate interventions.
- Evidence is clear that preeclampsia is associated with later-life CV disease. (ACOG, 2017)

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Significance and Incidence

- Hypertensive disorders complicate 6% to 8% of all pregnancies, and are the most common medical complication reported during pregnancy.
- Preeclampsia rates of 4-8% are equal to number of women affected by breast cancer annually in the US (Burgeuess, 2015).
- Preeclampsia accounts for about 80% of these cases and chronic hypertension for about 20% (ACOG, 2017).
- Strongest risk factors for preeclampsia are:
  - Primigravida younger than 19 years or older 40 years
  - First pregnancy with a new father
  - History of severe preeclampsia
- Other factors associated with higher-than-normal incidence:
  - Familial history
  - Connective tissue disease such as lupus or rheumatoid arthritis

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Classification of Hypertension in Pregnancy

Gestational hypertension -Hypertension developing after 20 weeks gestation or during the first 24 hours postpartum without proteinuria or other systemic findings

Chronic hypertension - Hypertension that does not resolve by 12 weeks postpartum

Preeclampsia or eclampsia - Hypertension typically developing after 20 weeks gestation with other systemic findings; eclampsia is the occurrence of seizure activity without other identifiable causes

Chronic hypertension - Hypertension diagnosed prior to pregnancy, prior to 20 weeks gestation, or after 12 weeks postpartum

Preeclampsia superimposed - The development of preeclampsia or eclampsia in a woman with preexisting or chronic hypertension

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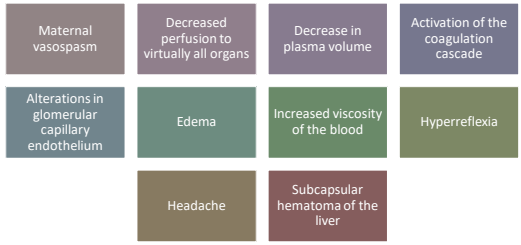

Characteristics of Preeclampsia

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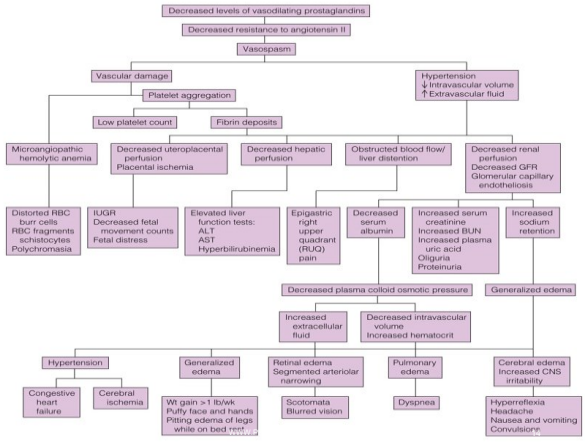

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Severe Features of Preeclampsia

Diagnostic Criteria

- SBP ≥ 160mmHg or higher, or diastolic DBP ≥ 110mmHg or higher (hypertension can be confirmed shortly to facilitate timely antihypertensive therapy)
- Progressive renal insufficiency (serum creatinine > 1.1 mg/dl or doubling) or new development of renal insufficiency in absence of other renal disease
- Thrombocytopenia (platelet count less <100,000)
- Impaired liver function (abnormally elevated blood concentration of liver enzymes)
- New onset cerebral or visual disturbances
- Persistent RUQ pain or epigastric pain unresponsive to medication and not accounted for by alternative diagnosis, or both
- Pulmonary edema

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Eclampsia

DIAGNOSTIC CRITERIA

Diagnosis of PEC

Occurrence of seizures

No other possible etiology for the seizure

SIGNIFICANCE

- Critically ill patient
- At risk for cerebral hemorrhage and aspiration
- Places pregnancy at risk for abruption
- Foley's rule of 13:
  - 13% mortality
  - 13% abruption
  - 13% seize after MgSO4 therapy
  - 13% seize >48 -72 hours postpartum

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Nursing Management of Eclampsia

Call for assistance (rapid response)

Check in:
- OB attending's/fellows/residents
- RN's
- Anesthesia
- Neonatology if indicated

Assess for signs of placental abruption

Maintain airway and oxygenation

Position on side to avoid aspiration

Suction to keep the airway clear

To prevent injury, raise padded side rails

Administer magnesium sulfate

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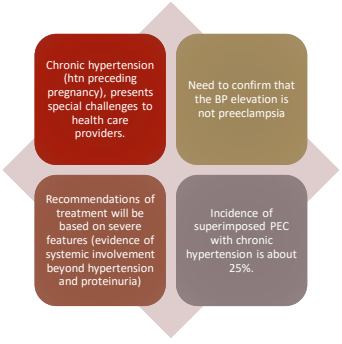
Preeclampsia Superimposed on Chronic Hypertension



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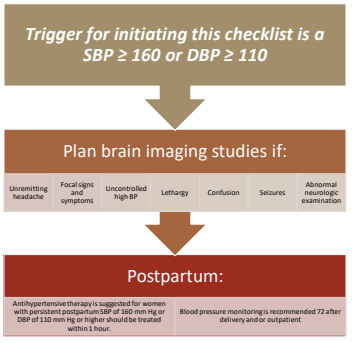
Severe Hypertension in Pregnancy Checklist



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Postpartum Surveillance: Inpatient

Once a hypertensive emergency is treated and the patient is delivered, additional monitoring, follow-up, and education is necessary to prevent additional morbidity.

- Preeclampsia and eclampsia can develop postpartum
- BP should be measured every 4 hours after delivery until stable
- NSAID's may increase BP in some patients and should not be used in women with BP
- Patient should not be discharged until blood pressure is well controlled for at least 24 hours
- BP peaks 2-6 days after delivery so discharge planning should include repeat BP ,measurements as outpatient and a review of the signs and symptoms that should prompt the patient to seek medical care

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Agent	Mechanism of Action	Maternal Side Effects	Dosing
Methyldopa	X-2 receptor agonist	Lethargy, fever, transient increase in liver enzymes	500-3000mg orally 2-3 times a day
Hydralazine	Peripheral vasodilator	Flushing, headache, tachycardia, palpitations, lupus syndrome	5 – 10 mg IV every 20-30 min
Labetalol	Non-selective beta blocker	Bronchospasm, flushing, headache DO NOT USE CHF	200-2400 mg orally 2-3 times a day
Nifedipine	Calcium channel blocker	Orthostatic hypotension, headache, tachycardia, flushing	30-120 mg orally daily

Antihypertensive Agents for Chronic Hypertension

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Vasospastic Process

- Understanding the vasospastic process is critical for appreciating the diagnostic signs and symptoms in hypertensive disorders of pregnancy.
- Intense vasospasm causes injury to the endothelial cells, which make up the lining of arterioles. Several changes occur:
  - Perfused components that could potentially be reduced are blood with its oxygen-carrying capacity and proteins.
- When applying these activities to the blood supply of a body system such as the kidney, the overall result would be as follow:
  - Hypertension within the kidney
  - Reactive vasospasm in arterioles
  - Breakdown in the endothelial lining of the arterioles
  - Hemorrhage

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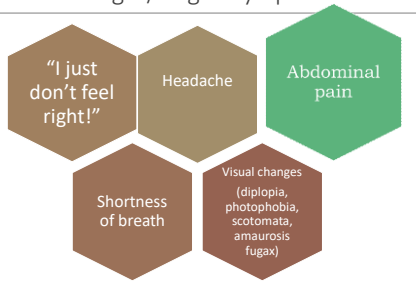
Patients Presenting w/ Vague Symptoms of:



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Primary Goals of treatment

1. To prevent convulsions through use of magnesium sulfate
2. To ensure adequate kidney function
3. To monitor fetal status continuously for signs of uteroplacental insufficiency
4. To stabilize the woman so that vaginal or cesarean birth can be accomplished

A prognostic sign of resolving preeclampsia is
A. evidence of diuresis
B. increasing uric acid levels
C. rapidly decreasing blood pressure

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Later-life Cardiovascular Disease in Women with Prior Preeclampsia

The evidence is now clear that preeclampsia is associated with later-life cardiovascular (CV) disease (ACOG, Hypertension in Pregnancy;Vol.122 No.5, Nov 2013, NFWH, 2016 41(1)) .

This increase ranges from a doubling of risk in all cases to an eightfold to ninefold increase in women with preeclampsia who gave birth before 34 0/7 weeks of gestation.

Recommendation lifestyle modification: maintenance of a healthy weight, increased physical activity, and not smoking

For women with medical history of recurrent preeclampsia: yearly assessment of BP, lipids, fasting blood pressure and BMI

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Diabetes in Pregnancy

PREEXISTING TYPE 1
GESTATIONAL TYPE 2

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Pre-Test Questions

1. For a woman with pregestational type 1 diabetes, insulin requirements will:
   a. Decrease as the fetus produces insulin
   b. Increase sharply during organogensis
   c. Double the prepregnancy dose by term
2. The diabetic effects on a pregnancy result in
   a. Acquired maternal resistance to insulin
   b. Decreased beta cell activity
   c. Decreased maternal plasma insulin concentrations
3. Which of the following groups are at risk to have babies with congenital anomalies if their blood glucose is not in control?
   a. Gestational diabetic mothers
   b. Gestational diabetic and type 2 diabetic mothers
   c. Type 1 and type 2 diabetic mothers

1. A patient with Type 1 diabetes gives birth. What would the postpartum nurse expect the client's insulin requirement's to be in the first 24 hours after delivery?
   a. Drop significantly
   b. Gradually return to normal
   c. Increase slightly
2. A type 1 diabetic is being seen for preconception counseling. What would be the most appropriate education the nurse should teach the client she may experience during the first trimester of pregnancy?
   a. Need for less insulin than she normally injects
   b. An increased risk for hyperglycemic episodes
   c. Signs and symptoms of hydramnios
3. Reversal of the diabetogenic effects of pregnancy occurs with
   a. Birth of infant
   b. Delivery of the placenta
   c. Initiation of breastfeeding

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Epidemiology of Diabetes

According to 2021 CDC report:

- 30.3 million (9.4% population) has diabetes
- 21.0 million are diagnosed
- 96.1 million (47% population) have prediabetes

During pregnancy, 90% all cases of diabetes are women with GDM.

9.2% of pregnant women in US are diagnosed with GDM. (prevalence can range 2%-18%)

Postpartum period 5%-10% of women with GDM are found to have diabetes, usually type 2.

GDM increases chances 35% -60% chance of developing T2DM within 5 years.

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Perinatal Consequences of Diabetes

- The consequences differ depending on the gestational age when glycemic control is poor.
- First trimester
- Second trimester
- Third trimester

** If blood glucose is controlled during conception and throughout the pregnancy, perinatal consequences can be minimal.*

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Pathophysiology

Pregestaional Diabetes

- In theory the cause faulty metabolism in the person with diabetes is one or more of the following:
  - Production of defective insulin
  - Overproduction of insulin antagonist
  - Increased tissue resistance to insulin
  - Underproduction of insulin
  - Inappropriate timing of insulin release

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Physiology of Diabetes

Gestational Diabetes

- Glucose intolerance develops or is first discovered during pregnancy.
- After pregnancy, the diagnostic classification may be changed to type 1, type 2, or impaired fasting glucose.
- The occurrence of gestational diabetes increases the future risk for progression to type 2 diabetes.
- A combination of insulin resistance and diminished insulin secretion.
- HPL and pregnancy hormones are responsible for the increase resistance that is found later in pregnancy as the fetal placental unit

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Normal Glucose Metabolism During Pregnancy

Early in pregnancy, glucose homeostasis is altered by the increases in estrogen and progesterone that cause pancreatic beta-cell hyperplasia, with subsequent increased insulin secretion.

At the end of the 1st trimester, preexisting diabetic patients will often experience hypoglycemia.

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Normal Glucose Metabolism During Pregnancy

- *In 2nd and 3rd trimester,* levels of estrogen, progesterone, human placental lactogen and prolactin increase progressively and cause increasing tissue resistance to insulin action.
- If a patient has preexisting borderline beta-cell reserve, hyperglycemia will result. The following changes are seen:
  - ↑basal insulin level requirements due to insulin resistance.
  - ↑infant glucose utilization.

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50g	100g
Less than 140mg/dL	Fasting 95 mg/dL
	1 hour – 180 mg/dL
	2 hour – 155 mg/dL
	3 hour – 140 mg/dL
ADA: diagnosis and classification	Diabetes Care 2005;28:s37-s42

Testing Protocol

- Women are tested between 24-28 weeks gestation; Earlier screening is done for women with identified risk factors
- 3 days prior to test women should have unrestricted diet consuming at least 150g of carbohydrates per day.
- HbA1C – average BG over 2 to 3 months. Measures the number of glucose molecules attached to hemoglobin. A1C greater than 6% is considered to be an increased risk for infant morbidity and mortality.

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Management of Gestational Diabetes

- Diet/Poor Control
- Exercise
- Blood Tests
  - Home monitoring blood glucose testing
    - Fasting ≥ 95 mg/dL
    - 1 hour ≥180 mg/dL
    - 2hour ≥ 155 mg/dL
    - 3 hour ≥ 140 mg/dL

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Management of Gestational Diabetes ACOG Bulletin Feb 2018

Insulin Therapy

- Persistent failure to maintain BG with diet and exercise may require insulin therapy to provide control of blood glucose.
- In women who decline insulin therapy or who the OB providers believe will be unable to safely administer insulin, or women wo cannot afford insulin, metformin is a reasonable alternative choice.
- Glyburide treatment should not be recommended as 1st choice pharmacologic treatment because, in most studies, it does not yield equivalent outcomes to insulin.

Moved to Level C

- Women with GDM should be counseled regarding the risks and benefits of a scheduled cesarean delivery when the estimated fetal weight is 4500g or more.

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Educational Guidelines for Women with Gestational Diabetes Mellitus

Healthy Eating
- Medical nutrition therapy (MNT)

Being Active
- 30-60 min/day of activity such as brisk walking

Monitoring
- Technique of meter use
- Self-monitoring of blood glucose levels (SMBG), 4 x's times day
- Glycemic goals for pregnancy
- Guidelines for ketones testing

Take medications
- Insulin/oral agent therapy
- Prenatal vitamins
- Medications for other conditions

Problem solving
- Appropriate treatment of hypoglycemia (correct amount and composition of snack)
- When and why to call the healthcare provider

Healthy Coping
- Psychosocial assessment
- Barriers to optimal care

Reducing Risks
- Explanation of abnormal results from prenatal from glucose test
- Role of glucose and insulin transport and effect of placental hormones
- Potential neonatal complications: IUFD, macrosomia, birth trauma, respiratory distress, neonatal metabolic disturbances
- Potential maternal complications: polyhydramnios, hypertensive disorders, C/S

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Influence of Pregnancy on Diabetes

Insulin requirements are altered during pregnancy.

- First trimester—decreased need for insulin
- Second trimester
  - Increased need for insulin
  - Glucose use increases
- Third trimester—additional increases due to placental maturation and hPL production
- Labor—decreased need for insulin
- Postpartum—insulin needs decrease

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Diabetes in Pregnancy: Insulin

Insulin Options Shown to Be Safe During Pregnancy[1]

Name	Type	Onset	Peak Effect	Duration	Recommended Dosing Interval
Aspart	Rapid-acting (bolus)	15 min	60 min	2 hrs	Start of each meal
Lispro	Rapid-acting (bolus)	15 min	60 min	2 hrs	Start of each meal
Regular insulin	Short-acting	60 min	2-4 hrs	6 hrs	60-90 minutes before meal
NPH	Intermediate-acting (basal)	2 hrs	4-6 hrs	8 hrs	Every 8 hours
Detemir	Long-acting (basal)	2 hrs	n/a	12 hrs	Every 12 hours

Following a positive pregnancy test, patients with preexisting diabetes being treated with insulin or oral antihyperglycemic medications should be transitioned to one of the above options[2]

1. Ceriotmo K, Jovanovic L. Clin Chem. 2011;57(2):221-30.
2. Kitzmiller JL, et al. Diabetes Care. 2008;31(5):1060-79.

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Maternal Effects of Diabetes on Pregnancy

- Polyhydramnios; related to fetal anomalies and fetal hyperglycemia
- Preeclampsia/PTL/Vaginitis/DKA
- Increased risk of maternal infection related to hyperglycemia:
  - UTI
  - Chorio
  - Postpartum endometritis
- PPH and subsequent anemia; related to:
  - Birth Trauma from macrocosmic infants
  - Long term anxiety, depression, breastfeeding problems (CMQCC, 2022)

Potential Signs & Symptoms
- **Polydipsia**: Excessive or abnormal thirst
- **Polyphagia:** Excessive eating
- **Polyuria:** The excessive passage of urine

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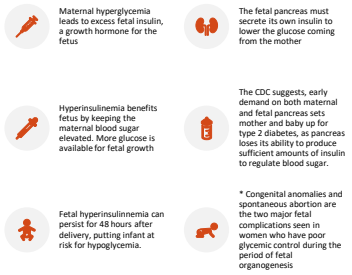
Fetal Effects Resulting from Maternal Plasma of Glucose



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Antepartum Management of Diabetic Woman

Major Goals
- Maintain a physiologic equilibrium of insulin availability and glucose utilization during pregnancy
- To ensure an optimally healthy mother and newborn

Dietary Regulation
- 3 meals 3 snacks

Glucose Monitoring (SMBG)

Insulin Administration

Evaluation of Fetal Status
- Ultrasound
- BPP
- NST

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Intrapartum Management of the Diabetic Woman

Monitor glucose levels
- During labor BG 80-120 mg/dL
- Volume expansion may be necessary glucose-containing solutions should be avoided

Test for fetal well-being
- Fetal movement
- Nonstress testing (NST)

Cesarean indications
- Abnormal fetal status
- Vascular changes

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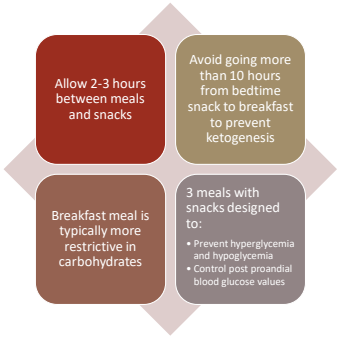

Meal Plan

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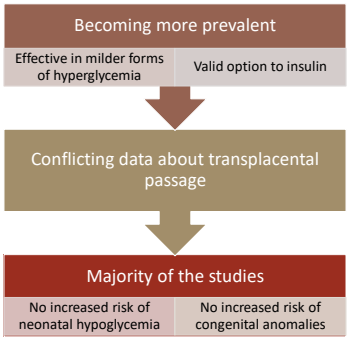

Optional Pharmacologic Therapy Oral Medications: Glyburide

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Optional Pharmacologic Therapy Oral Medication: Metformin

Medication Alert: Neither glyburide nor metformin are approved by ACOG or FDA.

Dosing

- 2nd and 3rd trimester
- 500-1000 mg BID

- Associated with similar outcomes as insulin but significant failure rate
- Reduced maternal weight gain and hypoglycemia
- Probably best suited to achieve glycemic control in normal/slightly overweight women or those with mildly elevated fasting glucose levels
- May be used alone or in combination with other antidiabetic agents.

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Postpartum Issues

- The probability of mother developing type 2 diabetes within 5 years after a pregnancy complicated by gestational diabetes, 50 %.
- Other health risks remain, including cardiovascular disease
- If the mother monitors her blood sugar levels, limits her carbohydrate intake and adds exercise (30 mins 5 days a week) to her daily schedule, she can protect herself and her baby from long term morbidity and mortality.

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Postpartum Management and Breastfeeding

- Oral agents (metformin/glyburide) are found safe during lactation
- Breastfeeding removes glucose from the maternal blood stream to make lactose in the mother's milk.
- Breastfeeding can lower blood glucose enough to cause hypoglycemia
- Women with hyperglycemia will be at greater risk for infections such as mastitis, wound infection and endometritis.

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Cardiac Disease

Leading cause of indirect pregnancy related mortality in the United States. Approximately 10 to 25% of pregnancy related deaths in the US are associated with cardiac disease (Arafeh,2014: AWHONN Perinatal Nursing 4th Edition). Age, sedentary lifestyle, obesity and tobacco use play a contributory role in many of these deaths.

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Pre-Test Questions

1. Which of the following should the nurse recognize as a symptom of cardiac decompensation?
   a. Slow, labored respiration
   b. Swelling of the face
   c. Dry, rasping cough
2. A nurse is caring for a woman with heart disease on the mother/baby unit. Which of the following intervention is most important for this patient in 1st 48 hours?
   a. Limiting sodium intake
   b. Inspecting extremities
   c. Assessing for cardiac decompensation
3. A nurse is caring for a patient with cardiovascular disease who has just delivered. What nursing intervention should the nurse perform when caring for this client?
   a. Assess for dizziness
   b. Perform the Homan's sign
   c. Assess for edema and note any pitting

1. A woman with a history of rheumatic heart disease asks the nurse, "What time during my pregnancy will I most likely experience problems related to my heart problem?
   a. 12 to 16 weeks' gestation
   b. 28 to 32 weeks' gestation
   c. 36 to 40 weeks' gestation
2. When caring for pregnant with cardiac problems, the nurse must be alert for signs and symptoms of cardiac decompensation, which are:
   a. Increased urinary output, tachycardia and dry cough
   b. Shortness of breath, bradycardia, and hypertension
   c. Dyspnea, crackles, and an irregular, weak pulse
3. Advanced maternal age, hypertension, and diabetes are the risk factors associated with which type of cardiac disease in pregnancy?
   a. Acquired
   b. Congenital
   c. Ischemic

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Cardiovascular Changes Pregnancy vs Pregnancy

Measurement	Prepregnancy	Pregnancy
Heart rate	72 (±10 bpm)	+10-20%
Cardiac output	4.3 (±0.9 L/min)	+30% to 50%
Blood volume	5 L	+20% to 50%
Stroke volume	73.3 (±9 mL)	+30%
Systemic vascular resistance	1,530 (±520 dyne/cm/sec)	-20%
Oxygen consumption	250 mL/minute	+20-30%
Sources: Blincoe, 2007; Blackburn, 2007; Harvey, 2007.		

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Normal Pregnancy Symptoms VS. Symptoms Cardiac Disease

PREGNANCY	CARDIAC DISEASE
Fatigue	Decreased ability to perform activities of daily living
Exertional dyspnea (usually limited 3rd trimester)	Severe breathlessness, orthopnea, paroxysmal nocturnal dyspnea, cough or syncope
Irregular or infrequent syncope	Chest pain
Palpations (brief, irregular, and asymptomatic)	Systemic hypotension
Jugular venous distention	Cyanosis, clubbing
Mild tachycardia < 15% rise	Persistent jugular venous distention
Third heart sound	Sinus tachycardia > 15% normal heart rate
Grade II/VI systolic murmur	4th heart sound
Pedal edema	murmurs

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Cardiac Disease

Pathophysiology

Numerous hemodynamic changes occur in all pregnant women. These normal physiologic changes can overstress the woman's cardiovascular system, increasing her risk for problems. Increased cardiac workload and greater myocardial oxygen demand during pregnancy place the woman's cardiovascular system at high risk for morbidity and mortality.

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Classification Functional Capacity

The following is a functional classification system based on past and present disability and physical signs:

- Class I: asymptomatic with no limitation of physical activity
- Class II: symptomatic (dyspnea, chest pain) with increased activity
- Class III: symptomatic (fatigue, palpitations) with normal activity
- Class IV: symptomatic at rest or with any physical activity

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Predictors of Cardiac Events

Prior cardiac events before pregnancy

Heart failure

Arrhythmia

New York Association > Class II

Cyanosis

Obstruction left heart

Aortic valve < 1.5 cm

MVP < 2cm

Ejection fraction < 40%

Number of predictors equals risk of cardiac events during pregnancy: 0 = 5%, 1= 27%, >1 = 75%

AWHONN Perinatal Nursing 4th edition, Cardiac Disease 2014

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Assessment

Most common complication of heart disease is CHF

- Edema of varying degree from pedal edema, pitting edema, generalized edema, and pulmonary edema
- Dyspnea on exertion, increasing fatigue, dyspnea at rest, moist cough, rales, cyanosis of nail beds, circumoral cyanosis
- Tachycardia, chest pain, murmurs, irregular pulse

**Note- Assessing the pregnant woman with heart disease for cardiac decompensation is vital because the mother's hemodynamic status determines the health of the* fetus.

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Management

Monitor client and fetal well being more frequently during pregnancy

Teach adequate nutrition for pregnancy; PNV, iron (prevent anemia); monitor signs of infection

Avoid excessive weight gain and emotional stress, which place added stress on cardiac reserves

Diagnostic Procedures

ECC	Electrocardiogram	Cardiac catheterization

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Medication Therapy

In addition to PNV and iron may include:

1. Prophylactic antibiotics for any invasive procedure
2. Cardiac glycosides (digoxin) to increase contractility of the cardiac muscle and slow the heart rate for effective filling
3. Lasix to decrease fluid excess; ensure adequate circulating volume to maintain uteroplacental perfusion. They can reduce amniotic fluid volume and cross the placenta to the fetus.
4. Heparin if anticoagulant is indicated
5. Tocolytics
6. Beta Blockers

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Cardiomyopathy

Is a disease of the heart muscle resulting in failure.

Peripartum cardiomyopathy (PPCM) is defines as cardiac failure with left ventricle ejection fraction <45% occurring in last month or within 5 months of delivery wo/ other identifiable causes.

PPCM cause is unknown linked to: viral disease, autoimmune disorder, inflammatory process, genetic inheritance and excessive levels of prolactin

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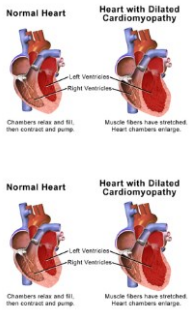

Cardiomyopathy

Approximately 30% of women with PPCM will completely recover, with the remaining 70% left with residual effects of varying severity

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Cardiomyopathy

Risk Factors
- > 30 years
- Multiparity
- Twin pregnancy
- Race/heath equity
- Pregnancy associated hypertension

- **Management**
  - Optimization of cardiac function
  - Pharmacologic treatment: diuretics, beta blockers, vasodilators, and inotropic agents

***Approx 30% of women with PPCM will completely recover, with the remaining 70% left with residual* effects of varying** severity

71

Labor is the most complex period for many pregnant women with cardiac disease.

Need 1:1 ratio, careful monitoring (invasive hemodynamic monitoring should be considered for women with impaired left ventricular function, severe mitral stenosis and pulmonary hypertension)

Non-invasive monitoring should be included O2 sats, BP, HR, R, fluid status, fetal status and ECG monitoring for women susceptible to arrhythmias

Intrapartum Care for Women with Cardiac Disease

72

Increases in Cardiac Output During Labor

LABOR PHASE OR STAGE	INCREASE ABOVE PRE-LABOR VALUES
Latent phase	15%
Active phase	30%
Second stage	45%
Immediately after birth	65%

73

Perinatal Infections

STD'S

MATERNAL INFECTIONS

More than 28.4 million new STD diagnoses are made in the US annually. Healthcare costs for STD's have sky rocked to more than $24 billion annually. (CDC, 2019)

74

Factors Effect of perinatal Infections

- Transmission route and timing
  - Transplacental
  - Ascending
  - Vaginal delivery
  - Postdelivery
- Timing of transmission: the time during gestation at which infection occurs may influence the effects an organism has on newborn.
  - Infections acquired at or near the time of delivery (ascending, birth canal passage, and or postdelivery transmission) will not cause deformities, but may cause neonatal sepsis.

75

Immune System Protection

- Against specific organisms: a woman will make antibodies to specific organisms to which she has been exposed. Antibodies either reduce severity or provide protection against subsequent infections.
  - Primary maternal infection during 1st trimester with organisms that crosses placental could be hazardous situation.
- Passed to the fetus: maternal antibodies cross the placenta during the 3rd trimester, creating some degree of passive immunity for the newborn

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GBS in Pregnancy

In the U.S., GBS is the leading cause of meningitis and sepsis in a newborn's first week of life.

About 25% of pregnant women carry group B strep in the rectum or vagina. Group B strep bacteria may come and go in people's bodies without symptoms.

CDC's guidelines recommend that a pregnant woman be tested for group B strep when she is 35 – 37 wks gestation.

A pregnant woman who tests positive for group B strep and gets antibiotics during labor has only a 1 in 4,000 chance of delivering a baby with group B strep disease, compared to a 1 in 200 chance if she does not get antibiotics during labor.

Any pregnant woman who had a baby with group B strep disease in the past tested. If she had a bladder (urinary tract) infection during this pregnancy caused by group B strep should receive antibiotics during labor

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GBS in Pregnancy

Most early-onset group B strep disease in newborns can be prevented by antibiotics during labor.

The antibiotics used to prevent early-onset group B strep disease in newborns only help during labor — they can't be taken before labor, because the bacteria can grow back quickly.

79

GBS Guideline Changes

Previous Recommendation (2010)	Updated Recommendation (2019)
•Guidelines published by the CDC in 2010, with endorsement from ACOG, AAP, ACNM, AAFP, and ASM	•Guidelines published by ACOG in 2019, with endorsement from AAP, ACNM, AWHONN, and SMFM (reviewed by ASM)
• Planned GBS screening between 35-36+6 weeks (valid for 5 weeks)	•Planned GBS screening between 36-37+6 weeks (valid for 5 weeks)
• PCN 5 million units IV initial dose followed by 2.5-3 million units IV Q 4 hours until delivery	•PCN 5 million units IV initial dose followed by 3 million units IV Q 4 hours until delivery
•For PCN-ALLERGY: No expanded recommendations	•For PCN-ALLERGY: Expanded recommendations: management/treatment including: 1) Note "PCN Allergy" on lab requisition for GBS testing to ensure Clindamycin susceptibility testing is done 2) Consider PCN allergy skin testing (if available and if low or unknown risk of anaphylaxis)
•Standard dose recommendation for Vancomycin in PCN-allergic women with GBS not susceptible to Clindamycin	•Weight-based dosage for Vancomycin 20 mg/kg Q 8 hours (max 2 Grams) in PCN-allergic women with GBS not susceptible to Clindamycin

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Blood Disorders

ANEMIA

THROMBOCYTOPENIA

HEMOLYTIC DISEASE

DIC

84

1. A predisposing factor to disseminated intravascular coagulation is
   a. Chronic hypertension
   b. Fetal death
   c. Placenta previa
2. Which of the following laboratory markers is indicative of disseminated intravascular coagulation?
   a. Bleeding time of 10 minutes
   b. Presence of fibrin spilt products
   c. Thrombocytopenia
3. Tracy presents routine prenatal visit and complains of right lower leg. Her calf is inflamed and warm to touch , a non-invasive diagnostic tool that may be used to determine deep vein thrombosis:
   a. Homan's sign
   b. Doppler ultrasound testing
   c. Measurement of calf size
4. The drug of choice to reverse the effects of anticoagulant therapy is:
   a. Calcium gluconate slow IV push
   b. Protamine sulfate slow IV push
   c. Low molecular weight heparin slow IV push
5. The hematologic changes in pregnancy which predisposes the pregnant woman to deep vein thrombosis is increased
   a. Antithrombin III
   b. Clotting factors
   c. Fibrinolysis
6. In DIC , the coagulation cascade becomes dysregulated as a result of:
   a. Creation of multiple micro thrombi throughout the circulatory system
   b. Extensive lacerations
   c. Hemolysis

85

Iron Deficiency Anemia

Iron deficiency anemia affects 1 in 4 pregnancies and is usually related to an inadequate dietary intake of iron.

Anemia during the early part of pregnancy can increase the likelihood of preterm birth, low birthweight, maternal morbidity & mortality: fatigue, depression and problems breastfeeding (CMCQQ, 2022).

Iron is a mineral that is an essential component of blood and muscle required for the transport of oxygen. Iron-rich blood can carry more oxygen to the organs and tissues, creating a healthy home for your budding baby. Your wee one also depends on you to supply enough iron before their birthday; she will enter the world with a special reserve used to help with brain growth and development. It make take 4-6 months to replace iron stores and normalize serum ferritin.

The risks of hemorrhage (impaired platelet function) and infection during and after birth also are increased.

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Key Principles of Management of Iron Deficiency Anemia

Anemia is an important and modifiable contributor to severe maternal morbidity. It is a risk factor that can lead to low birth weight, preterm birth and perinatal mortality.

Iron deficiency anemia (IDA) disproportionately affects Black and Hispanic American women, which is likely due to the impact of marginalization (ie; food deserts, lack of educational and job opportunities and other social determinants of health in their environments). The prevalence of IDA can be seen as the downstream effect of the ongoing policies and practices of systemic racism and exclusion.

Treatment with intravenous (IV) iron products, typically one gram (gm), can be considered for women with IDA who are not successfully treated with adequate oral iron, or rapid iron repletion is indicated, such as in the third trimester.

Repletion of iron stores after obstetric hemorrhage is an important component of the postpartum hemorrhage treatment plan

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Optimize RBC Mass and Coagulation Status

Correct deficiencies

- Iron – PO or IV Iron Sucrose(Venofer), ferric carboxymaltose + Folate and B12

Cost

- LWW Iron (Dextran) administered over 1-4 hours $275.00
- OB Hemorrhage Toolkit Sample Infusion Order Set https://www.cmqcc.org/content/ob-hemorrhage-toolkit-v30-appendix-j-sample-obstetric-outpatient-intravenous-iron-infusion
- Folic acid: Patient education can be found https://www.health4mom.org/take-folic-acid-to-prevent-birth-defects/
- Vitamin B12

Erythropoietin Therapy in Pregnancy 600u/kg SQ 1-3x's weekly

- Administered to pregnant patients in 3rd trimester to increase RBC mass without any maternal, fetal or neonatal adverse effects
- Should be given in conjunction with iron to support erythropoiesis

CMQCC, 2022

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Folic Acid Deficien

B vitamin is easily destroyed by cooking and 20% is excreted unabsorbed .

It is common in pregnancy, slowly progress

It can prevent neural tube defects in the dev
risk factor contributing to SAB and abruption.

Less than 50 mcg/day usually results in folic acid defici
months.

Pregnancy and lactation increase folic acid metabolism

Maternal effects
- Hemorrhage
- Infections
- Fatigue
- Depression
- Problems breastfeeding

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Folic Acid Deficiency

- Alcohol abuse, suppresses the metabolic effects of folic acid, is most common cause of folic acid deficiency anemia.
- Vitamin supplementation—400 mcg of folic acid daily

Foods high in folic acid

- Asparagus
- Beef liver
- Leafy green vegetables such as collards, broccoli
- Meat, fish, poultry
- Red beans
- Whole wheat bread, wheat germ
- Peanut butter
- Oatmeal
- Mushrooms

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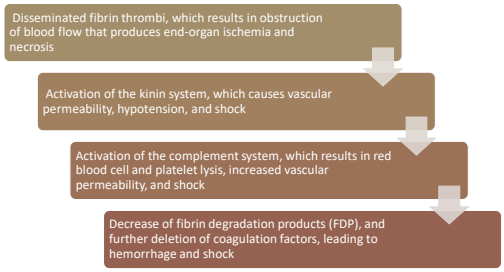
DIC Cascade



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DIC Cascade

- The PT, which reflects extrinsic coagulation, is usually prolonged in DIC
- A falling fibrinogen level is a hallmark sign of DIC and clinically relevant when fibrinogen levels fall below 100 mg/dL
- D-dimer indicates the presence of thrombin (clot formation) and plasmin (clot breakdown).
- D-dimer is thought to be one of the most reliable of common tests available for diagnosis of DIC in the nonobstetric population.
- Both FDPs and D-dimer are present in pregnancy and increase with gestation

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Lab Tests for DIC

Platelet count	Decreased
Fibrinogen	Decreased
Antithrombin	Decreased
Protein C	Decreased
Prothrombin time	Prolonged
Partial thromboplastin time	Prolonged
Fibrin degradation products (fibrin spilt products)	Increased
Prothrombin fragments 1 and 2	Increased
Thrombin-antithrombin complex	Increased

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Acute Fatty Liver

- Acute fatty liver disease in pregnancy (AFLP) is considered an obstetrical emergency.
- It is defined as maternal liver failure and or dysfunction that can lead maternal and fetal complications, including death. AFLP is caused by an autosomally inherited mutation. The mutation causes the accumulation of metabolites, produced by the fetus and placenta, that are toxic to the maternal liver.
- Fatty liver disease of pregnancy is rare, occurring in 5 cases per 100,000 pregnancies. Acute fatty liver disease usually occurs between 30-38 weeks' gestation and confirmation diagnosis is based on signs and symptoms and lab values. The most common sign and symptom is new onset nausea, vomiting and or epigastric pain in the third trimester.

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Acute Fatty Liver: Nursing Considerations

Although AFLP is rare, the high morbidity and mortality warrant close surveillance. Patients in the 3rd trimester should be monitored closely for complaints of nausea, vomiting or epigastric pain.

DIC is a hallmark of this condition occurring in over 50% of cases. The DIC is associated with AFLP due to liver dysfunction. As the condition worsens, PT and PTT becomes elevated due to decreased production of clotting factors by the liver. Fibrinogen also declines due to low production. Low levels of antithrombin may also be associated with increased consumption and DIC. These patients' labs will be monitored closely for liver failure, and coagulopathy deficiencies.

95

Thyroid Disorders

Pregnancy changes thyroid hormones due to an increase in blood flow to the thyroid and to support maternal metabolic changes. Thyroid hormones are essential for fetal central nervous system development especially early in the pregnancy.

Increased vascularity and hyperplasia of the thyroid gland result in increase in thyroid size. Hypothyroidism and hyperthyroidism can adversely affect fetal development because maternal TSH-receptor-blocking antibodies can cross the placenta and cause fetal thyroid dysfunction.

Screening for symptoms of hypo/hyperthyroidism during pregnancy can be challenging because pregnancy can also be associated with heat intolerance, tachycardia, wide pulse pressure, and vomiting (signs that may also be seen with hyperthyroidism). Fatigue, constipation, weight gain and muscle cramps (signs that may also be seen with hypothyroidism).

Poor control during pregnancy can result in preterm labor, fetal loss or thyroid crisis

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Hyperthyroidism

Hyperthyroidism is defined as excessive levels of thyroid hormones in the maternal blood caused by hyperfunctioning of the thyroid gland. Hyperthyroidism occurs in 3.5-15% of all pregnancies. Graves' disease is responsible for 90 – 95% of hyperthyroidism cases in pregnancy. Untreated hyperthyroidism (crisis) can cause preterm delivery and fetal death. Transient postpartum thyroid disorder (PPTD) is seen in 4% to 9% of postpartum women and is thought to have an autoimmune basis.

Signs and symptoms:

Screening for symptoms can be challenging because of pregnancy symptoms such as: Increased heart rate, dizziness, heat intolerance, wide pulse pressure and vomiting

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Hyperthyroidism

Diagnosis:

- Presenting signs and symptoms
- Labs results- decreased TSH level and increased free T4 level and Iodine levels

Maternal complications:

- Compared with controlled maternal hyperthyroidism, inadequately treated maternal hyperthyroidism is associated with a greater risk of preterm delivery, severe preeclampsia, and heart failure with an increase in medically indicated preterm deliveries, low birth weight infants, and possible fetal loss

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Hyperthyroidism

Maternal treatment:

- Pregnant women with overt hyperthyroidism should be treated with antithyroid drugs (thioamides). Either propylthiouracil or methimazole, both thioamides, can be used to treat pregnant women with overt hyperthyroidism.
- The choice of medication is dependent on the trimester of pregnancy, response to prior therapy, and whether the thyrotoxicosis is predominantly T4 or T3. Women should be counseled about the risks and benefits of the two thioamides described in the text that follows, using shared decision making to develop an appropriate treatment plan (ACOG, 2020g).
- Medication must be used cautiously, as many antithyroid drugs can cause birth defects and fetal thyroid problems
  - Use of iodine 131 for treatment of Graves' disease after the first trimester can destroy the fetal thyroid gland, so it is contraindicated during pregnancy .

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Hypothyroidism

- Hypothyroidism is defined as an abnormally low level of thyroid hormones and is caused by underactive thyroid gland
- Thyroid hormone is essential to fetal brain and spinal cord development
- Untreated hypothyroidism has been associated with miscarriage, maternal anemia, and placental abnormalities
- HCG acts as a mild thyroid stimulating hormone

Signs and symptoms:

- Symptoms can also be associated with normal pregnancy changes: fatigue, constipation, hair loss, dry skin, bradycardia

Diagnosis

- Monitoring S/S and labs are essential to diagnosis

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Hypothyroidism

Fetal complications:

- Altered brain development
- Neurocognitive and neurodevelopmental problems later in life

Treatment:

- Supplemental thyroid hormone, Synthroid (levothyroxine) in dosages of 1 to 2 micrograms/kg daily or approximately 100 micrograms daily
- Surveillance of TSH and thyroxine levels is measured at 4-6 weeks intervals

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Pregnancy Risks

- LIFE STYLE (SUBSTANCE ABUSE)
- ALCOHOL
- CAFFEINE
- NICOTINE
- COCAINE
- HEROIN
- METHADONE
- MARIJUANA

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Opiates: Heroin, Codeine, Fentanyl, Morphine, Opium, Methadone, Oxycodone, Meperidine, Buprenorphine, Hydrocodone

Prescriptions for "pain killers" has increased 400% in last decade.

Death usually due to respiratory depression

To prevent maternal withdrawal from opiates, methadone maintenance therapy has been utlized for past 30 years. Intent is to:

- Prevent withdrawal
- Prevent illegal, unsupervised opiate use
- Encourage prenatal care and substance treatment programs
- Decrease criminal activity

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Tobacco

Smoking is a major public health problem and is leading cause preventable death in US. It kills 480,00 people per year. (Awhonn position statement , 2017)

In 2014, 11% pregnant women used tobacco, resulting 300 million in pregnancy complications.

Prevalence- single, Caucasian, low socioeconomic status, concerned about weight gain

Nicotine highly addictive, tar increases risk lung cancer, emphysema, and bronchial disorders. The carbon monoxide increases cardiovascular disease by 25%.

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Tobacco Use in Women's Health

- Exposure to tobacco smoke is one of he most significant threats to public health.
- It increases risk for cancer and harms every organ in the body.
- Exposure to 2nd hand smoke also has adverse effects including: lung dysfunction, acute respiratory infections, recurrent otitis media, bronchitis, pneumonia and SIDS.
- Third hand smoke is the residue from cigarettes and other combustible tobacco products that can be left behind (clothes, furniture, drapery).
- Evidence suggests women and children exposed to 3rd hand smoke are potentially at risk for DNA damage known as carcinogens.

JOGNN(2017) Awhonn Position Statement

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Tobacco

Maternal Complications

Placental abnormalities due to vasoconstriction/ vasospasm
- Abruption
- Previa

Fetal/Newborn Complications

20-30% of low-birth weight infants

PTB and PROM

Infant death and or SIDS

Higher hyperactivity/inattention scores

Childhood asthma

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Cocaine

Cocaine is highly addictive, rapid acting drug that causes acute sympathetic nervous system stimulation resulting in vasoconstriction.

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Maternal Effects of Cocaine Use in Pregnancy

- Tachycardia
- Hypertension
- Cardiac arrhythmias
- Seizures
- Stroke

Pregnancy related adverse outcomes during labor
- PTB
- Abruption
- Fetal compromise
- Hypertensive crises
- Meconium-stained fluid

A woman says she engages in "huffing" to get high. What substance is involved

A. Marijuana
B. Toluene
C. Cocaine

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Methamphetamine: Meth, Speed, Ice, Crystal, Chalk, Black Beauties

Powerful stimulant made from over-the-counter medication.

These drugs are inexpensive, long half-life, increased energy and weight loss.

Short-term Effects

Hypertension

Cardiac arrhythmias

Seizures

Hyperthermia

Long-term Effects

Anxiety and depression

Confusion and memory loss

Insomnia

Weight loss

"Meth mouth"

Violent behavior

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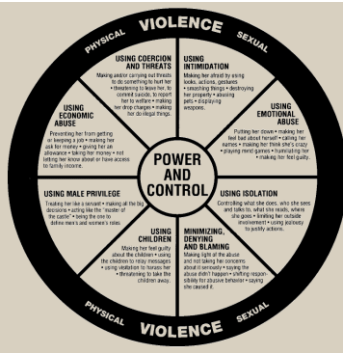
Intimate Partner Violence

- IPV, family violence, battering, and partner or spousal abuse all describe the physical, sexual, or psychological harm caused by:
  - Physical violence
  - Sexual violence
  - Threats of physical or sexual violence
  - Psychological or emotional violence, including economic coercion
- Approximately 1 in 3 women in the United States experience rape, physical violence, and/or stalking by intimate partners during their lifetimes (Smith et al., 2017). An estimated 4.5 million U.S. women alive today at one time were threatened with guns by their intimate partners, and almost 1 million were shot or shot at by intimate partners . Tragically, approximately 50 women in the United States are murdered by intimate partners with firearms every month (U.S. Department of Justice, 2017
- The medical care, mental health services, and lost productivity (e.g., time away from work) cost of IPV was an estimated $5.8 billion in 1995. Updated to 2003 dollars, that's more than $8.3 billion.

112



Substance Abuse and Intimate Partner Violence

- Anyone can be a substance abuser. Routine investigation of possible substance use should be a part of prenatal care for all women.
- Maternal and fetal mortality is high with acute intoxication.
- Risks from drug use are generally same for recreational and hard-core users.

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Labor and Placental Disorders

DYSFUNCTIONAL LABOR

DYSTOCIAS

PROBLEMS ASSOCIATED WITH UMBILICAL CORD

PROBLEMS ASSOCIATED WITH AMNIOTIC FLUID

PLACENTAL PROBLEMS

PRETERM LABOR

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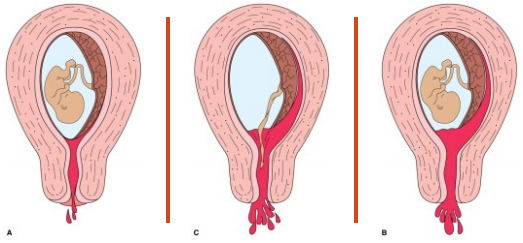

Types of spontaneous abortion. A, Threatened. The cervix is not dilated, and the placenta is still attached to the uterine wall, but some bleeding occurs. B, Imminent. The placenta has separated from the uterine wall, the cervix has dilated, and the amount of bleeding has increased. C, Incomplete. The embryo/fetus has passed out of the uterus; however, the placenta remains.

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Medical Therapy for Spontaneous Abortions

- Ultrasound to detect gestational sac or cardiac activity
- Bed rest
- Intravenous fluids
- Possible blood transfusions
- D&C
- RhoGAM given within 72 hours

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Nursing Management for Spontaneous Abortion

- A D&C is commonly performed to treat inevitable and incomplete miscarriage.
- Outpatient management of first-trimester pregnancy loss may be accomplished with the use of misoprostol intravaginal for up to 2 days.
- If evidence of infection, unstable vital signs, or uncontrollable bleeding exist, a surgical evacuation is performed .
- For late incomplete, inevitable, or missed miscarriages (16 to 20 weeks), prostaglandins may be administered into the amniotic sac or by vaginal suppository to induce or augment labor and cause the products of conception to be expelled.

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Abruptio Placentae

- Incidence is reported as ranging from 0.3% to 1.6%
- Average rate 1 case per 120 births
- In pregnancies complicated by abruption, approx. 1 out of 420 births are severe enough to threaten fetal viability
- Perinatal mortality is 20%
- Overall, 12% stillbirths are due to abruption

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Types of Abruptio Placentae

Marginal

- Placenta separates at its edges
- Blood passes between fetal membranes and uterine wall
- Blood escapes vaginally

Question: The purpose of ultrasound in a woman with suspected placental abruption

A. amniotic fluid volume assessment

B. confirmation of the diagnosis

C. placental location

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Types of Abruptio Placentae (cont'd)

Central
- Placenta separates centrally
- Blood trapped between placenta and uterine wall
- Concealed bleeding

Complete
- Total separation
- Massive vaginal bleeding

Question: The uterine irritability that occurs with central concealed abruption placenta is attributed to:
A. A drop in fibrinogen levels resulting in uterine tissue hypoxia
B. Blood invading the myometrial tissues between muscle fibers
C. Dehydration associated with hemorrhage and hypovolemia

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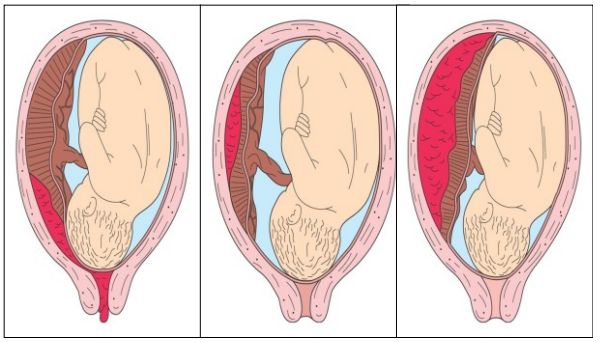

Abruptio placentae. *A*, Marginal abruption with external hemorrhage. *B*, Central abruption with concealed hemorrhage. *C*, Complete separation.

123

Maternal Implications of Placental Abruption

- Maternal hypertension, whether chronic, gestational, or preeclampsia: 5 times more likely to have an abruption
- Cigarette smoking: most preventable risk factor with 90% increase risk of abruption
- Multiparty
- Substance abuse
- Short fetal umbilical cord
- Ruptured uterus from over distention
- Abdominal trauma

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Categories of Placenta Previa

Total- the internal os completely covered

Partial- the internal os is partially covered

Marginal- the edge of the os is covered

Low-lying placenta- implanted in lower segment in proximity to the os

Question: Bright red blood is noted following AROM in a patient with no known risk factors. The FHR becomes abnormal. These are the signs of
A. placenta accreta
B. placenta previa
C. vasa previa

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Placenta Previa

Assessment

- Bright red painless bleeding in second or third trimester

Physical Assessment

- Vaginal bleeding
- Abdominal assessment
- Hemodynamic changes
- Shock
- Fetal heart rate response to maternal bleeding or shock
- Complications associated with placenta previa
- Diagnostic procedures

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Implications of Placenta Previa

- Maternal psychologic stress
- Transverse lie common
- Changes in FHR
- Meconium staining
- Fetal compromise (hypoxia)
- Cesarean birth
- Neonatal anemia

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Nursing Plan for Placenta Previa

- No vaginal exams!
- Monitor maternal pulse and blood pressure
- Continuous external monitoring of FHR and uterine activity - NO internal monitoring
- Establish large-bore IV
  - Rapidly administer crystalloids (Ringer's lactate or NS) to stabilize and increase blood volume
- Monitor urinary output, measure EBL
- Treat patient for alteration in tissue perfusion
  - Oxygen therapy
  - Fluids and blood products
  - Position change
  - Tocolysis

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Nursing Plan for Placenta Previa (cont'd)

Maintain	Maintain large bore IV access - Available whole blood setup
Verify	Verify family's ability to cope with anxiety of unknown outcome
Provide	Provide information and emotional support
Promote	Promote neonatal physiologic adaptation • Resuscitation as needed • Evaluate hemoglobin, cell count, erythrocyte count • Administer oxygen & blood as needed

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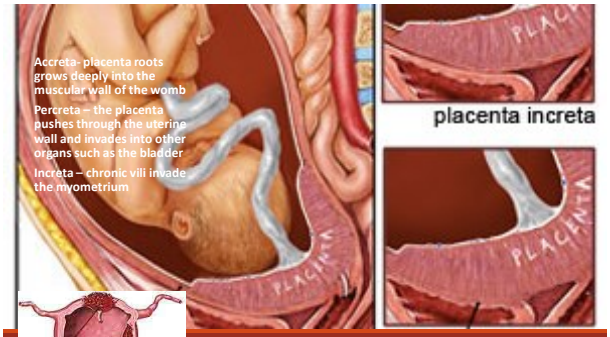

Most significant risk factor for accreta: prior C-section; placenta previa
1 - 11%
2 - 40%
3 - 61%
4+ - 67%

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Vasa Previa/ Velamentous Insertion

Velamentous Cord Insertion

- The umbilical cord inserts into the fetal membranes, then travels between the amnion and the chorion to the placenta.
- The exposed vessels are not protected by Wharton's jelly and are vulnerable to rupture.

Vasa Previa

- Presence of fragile umbilical vessels over the cervical os and lie in front of the presenting part
- Can be from velamentous cord insertion
- Extremely dangerous situation
- Rupture of membranes (ROM) and cervical dilatation can rupture the vessels and exsanguinate the fetus.

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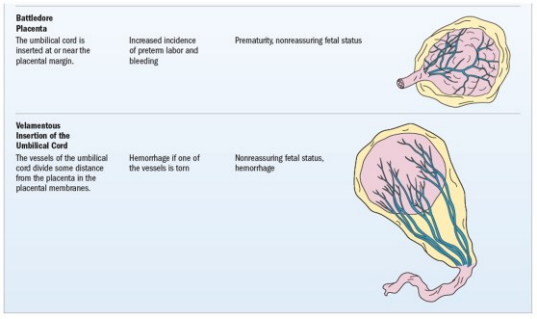

Battledore Placenta The umbilical cord is inserted at or near the placental margin.	Increased incidence of preterm labor and bleeding	Prematurity, nonreassuring fetal status
Velamentous Insertion of the Umbilical Cord The vessels of the umbilical cord divide some distance from the placenta in the placental membranes.	Hemorrhage if one of the vessels is torn	Nonreassuring fetal status, hemorrhage

Placental and Umbilical Cord Variations

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Vasa Previa

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Anaphylactoid Syndrome of Pregnancy

Previously called amniotic fluid embolism

Amniotic fluid or debris enters maternal circulation

A massive anaphylactic reaction is triggered

Occurs in 2 phases:

- Acute Circulatory collapse
- Hemorrhagic phase and DIC

Coma and maternal death

Fetal death if birth not immediate

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Signs and Symptoms

- Unexpected, rapid onset dyspnea
- Cyanosis
- Frothy sputum
- Chest pain
- Tachycardia
- Hypotension
- Mental confusion
- Massive hemorrhage
- Acute onset of circulatory collapse
  - Severe hypoxia
  - Severe hypotension
  - If patient does not die from initial resp insult, needs overcome the severe hemorrhage and coagulopathy that follow

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Nursing Plan

Provide supportive therapies of O2, maintaining cardiac output and organ perfusion and correct DIC

Initiate CPR if indicated

Large bore IV

Observe S/S of shock

Prepare for cesarean if birth has not occurred

Prepare for CVP line insertion

Administer blood

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PolyHydramnios

- Exceeds 2L of fluid between 32 and 36 weeks
- Associated poor outcomes related to: preterm delivery, fetal malpresentation, cord prolapse
- Hydramnios occurs during or before 2nd trimester spontaneously resolves 45% of cases, resulting in normal outcomes.
- Pathogenesis unclear can be assoc with:
  - Rh-sensitized pregnancies, monozygotic multiple pregnancy, and gestational or type 1 diabetes
  - Occurs frequently with gastrointestinal obstructions or atresias

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Assessment Findings: PolyHydramnios

Fundal height disproportionately large for dates

Difficulty palpating fetus and auscultating FHR

Tense, tight abdomen on inspection

Large spaces between fetus and uterine wall on ultrasound

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Oligohydramnios

- Less than 500ml between 32 and 36 weeks
- Common causes
  - Amniotic leakage
  - Abnormalities of fetal kidneys
- Major renal malformations
  - Renal agenesis
  - Dysplastic kidneys
  - Lower urinary tract obstructive lesions
- Oligo that occurs during or before the 2nd trimester; usually associated with poor pregnancy outcomes

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Implications: Oligohydramnios

- Dysfunctional labor with slow progress
- Fetal deformation defects
  - Adhesions
  - Skin and skeletal abnormalities
  - Pulmonary hypoplasia
  - Dysmorphic facies
  - Short umbilical cord
- Umbilical cord compression
- Head compression

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Dystocia

- **Abnormal labor patterns**
  - Prolonged latent phase
  - Protracted active phase dilation
  - Secondary arrest: no change
  - Protracted descent
  - Arrest of descent
  - Failure of descent
  - Precipitous labor

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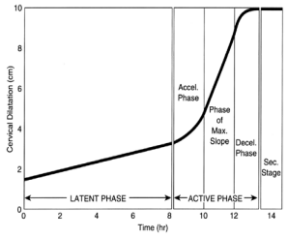
Dystocia

- Long, difficult, or abnormal labor
  - Caused by conditions associated with 5 factors affecting labor
  - Dysfunctional labor
    - Abnormal uterine contractions preventing normal progress of:
      - Cervical dilation
      - Effacement (primary powers)
      - Descent (secondary powers)



145

Dysfunctional Labor Patterns

- Dysfunctional labor patterns occur in both the latent phase (prolonged latent phase) and the active phase. Active phase disorders 2 categories
  1. Progressing too slowly (protraction)
  2. Failing to progress (arrest)
- A prolonged latent phase is longer than 20 hours in the nullipara and 14 hours in the multipara associated : unripe cervix, early sedatives, early anesthesia
- Protracted active phase occurs when dilation is less than 1.2 cm per hour in the nullipara and less than 1.5 multipara.

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Dysfunctional Labor Patterns

- Secondary arrest of the active phase – occurs when cervical dilatation stops in active phase, 2 hours or more of dilatation.
- Deceleration phase longer 3 hours nulipara and 1 hour multipara.
  - Use of sedation or anesthesia
  - Malpositions
  - CPD
  - AROM
- Protracted descent pattern – occurs when rate of descent in active phase < 1.0 cm per hour or <2cm multipara
- Arrest of descent

147

Dysfunctional Labor Patterns

Hypertonic Labor Patterns

- Resting tone of the myometrium increases more than 15 mm Hg.
- Contractions become more frequent intensity stronger than with hypotonic contractions.
- Contractions are painful but ineff… …ting and effacing the cervix (latent … precipitous delivery

When the force isn't with you!

- Complications due to ineffective uterine force can impede the natural course of labor.

148

Hypertonic Contractions

Hypertonic Labor: *What Causes it?*

- The muscle fibers of myometrium don’t repolarize after a contraction, making it ready to accept a new pacemaker stimulus.
- They can occur when more than one pacemaker is stimulating the contractions, unlike the normal single stimulus found in normally occurring contractions.
- Oxytocin can cause hypertonic contractions

WWW.PERINATALPOTPOURRI.COM 149

149

Hypertonic Con

How it’s detected?

- The presence of painful ... e either palpated or obse... nitor.
- These show high resting tone, ... elaxation between c...

What migh ... veal ?

Mom may fir ... and relax with her contractions.

Contractions ... myometrium becomes tender as a r... xation.

WWW.PERINATALPOTPOURRI.COM 150

150

Hypertonic Contractions

What to do?

- Emotional support, promoting rest, analgesia (morphine to relax hypertonicity)
- Comfort measures: change linens, patient gown, darkening lights and decreasing noise and stimulation.

WWW.PERINATALPOTPOURRI.COM 151

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Hypotonic Contractions

Number and frequency of contractions are low

The strength of contractions doesn’t rise above 25 mm Hg

They tend to increase the length of labor, causing maternal exhaustion

WWW.PERINATALPOTPOURRI.COM 152

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Hypotonic Contractions
What Causes it?

- Analgesia has been administered too early (before cervical dilation of 3 to 4 cm)
- Bowel or bladder distention is present, preventing descent or firm engagement
- The uterus is overstretched due to multiple gestation or hydramnios

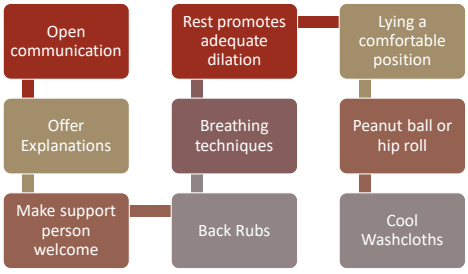
153

Hypotonic Contractions
How is it detected?

- Usually aren't abnormally painful
- Detected by lack of labor progression and cervical dilatation
- Contractions are insufficient to dilate the cervix and wont register as intense on EFM.

154

Helping your patient reduce stress



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Promoting Productive Labor

Glucose Stores	Fluid Replacement
• Labor is work it depletes glucose stores • Mom may need high carbohydrate fluids and lollipops, hard candy to suck on	• Insert IV in mom's nondominant hand • Support mom still with walking, changing positions etc.

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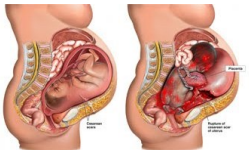

Uterine Rupture

Incidence approx1%. Conditions associated with uterine rupture: uterine scars, induction of labor (excessive uterine stimulation), uterine or fetal anomalies, history placenta percreta or increta

Uterine Rupture: defined as the symptomatic disruption of the layers of the uterus characterized by:

Hemorrhage

Bladder Injury

Uterine damage

Any portion of fetal-placental unit outside uterus

Abnormal fetal tracing

What is first sign/symptom of uterine rupture?

Abnormal fetal heart rate tracing

157

Risk Factors for Uterine Rupture

Pregnancy History

- Type of Scar
  - LTCS vs. classical or T-shape
  - Unknown scar type ??
- Previous history of uterine surgery
- Number of previous cesareans
  - Rate as # of c-sections increase
- Postpartum fever after cesarean
- Delivery interval < 18 months

Current Pregnancy Characteristics

- Macrosomia
- Postdates
- Multiple pregnancy
- Breech and external cephalic version

Induction and Augmentation

- Oxytocin
- Prostaglandin E2 Gel
- Misoprostol

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Preterm Labor and PROM

DEFINITION/RISKS

DIAGNOSIS

MANAGEMENT

FETAL AND NEONATAL COMPLICATIONS

162

Pre-Test Questions

1. Magnesium sulfate acts a tocolytic agent by interfering with
   a. Production of prostaglandin
   b. Release of oxytocin
   c. Availability of calcium
2. Treatment of preterm labor with Indocin should include
   a. Biweekly nonstress test
   b. Daily serum Indomethacin levels
   c. Serial amniotic fluid volume assessments
3. When giving Indocin as a tocolytic agent which statement is most accurate
   a. Is effective when therapy is needed for more than 48 hours
   b. Should be used only if gestational age is <32 weeks
   c. Should be given intravenously to avoid water intoxication

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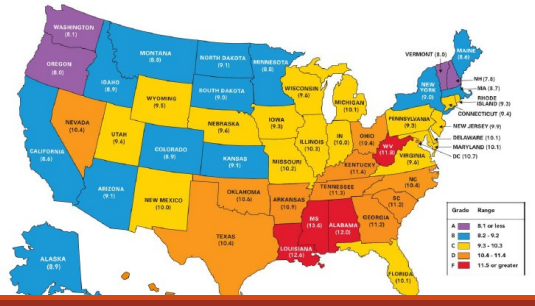
PRETERM BIRTH RATES & GRADES BY STATE



United States Birth Report Card

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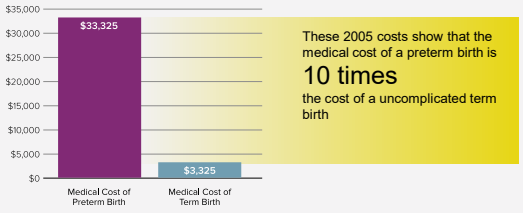
The High Cost of Preterm Birth

The estimated annual societal economic cost of preterm birth in the U.S. was $26.2 billion, or more than $51,000 per premature infant



These 2005 costs show that the medical cost of a preterm birth is

10 times

the cost of a uncomplicated term birth

Behrman RE, et al, eds. Preterm Birth: Causes, Consequences and Prevention. Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes. Washington, DC: National Academies Press; 2007.

166

The Morbidity of Prematurity

Neonatal
- Respiratory distress syndrome (RDS)
- Intraventricular hemorrhage (IVH) & periventricular leukomalacia (PVL)
- Necrotizing enterocolitis (NEC)
- Patent ductus arteriosus (PDA)
- Infection
- Metabolic abnormalities
- Nutritional deficiencies

Short term
- Feeding and growth difficulties
- Infection
- Apnea
- Neurodevelopmental difficulties
- Retinopathy
- Transient dystonia

Long term
- Cerebral palsy
- Sensory deficits
- Special health care needs
- Incomplete catch-up growth
- School difficulties
- Behavioral problems
- Chronic lung disease

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Spontaneous Preterm Births

Clinical presentations
- Preterm labor - 50-60%
- Preterm premature rupture of membranes (PPROM) - 40-50%

Risk factors similar
- PPROM

50% have no risk factors More often smokers, 2nd trimester bleeding, low socioeconomic status/health disparities, health equity

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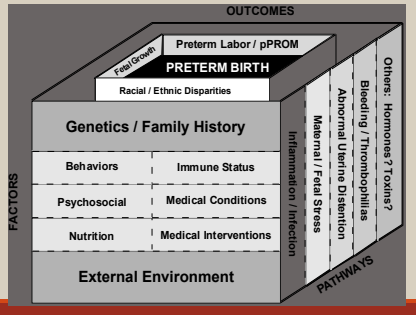
- Maternal age (<18 and >35 years)
- Low socioeconomic status (health disparities, health equity)
- Unmarried
- Genetic contribution
- Environmental influences
- Gene-environment interactions



Complex Interactions in Preterm Birth

Source: Green NS et al., AJOG 2005 ;193:626-35.

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Known Risk Factors for Preterm Birth

Epidemiologic

- history of preterm birth
- unintended pregnancy
- previous fetal or neonatal death
- 3+ spontaneous losses
- assisted reproductive technology (ART)
- genetic predisposition
- folic acid deficiency
- environmental toxins
- low pre-pregnancy weight
- obesity
- anemia
- lack of social support
- tobacco use
- alcohol abuse
- illicit drug use

Source: Iams JD, Creasy RK. Preterm labor and delivery, Chapter 34. In: Maternal-Fetal Medicine: Principles and Practice, 5th ed., 2004.

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Common Risk Factors for Preterm Birth

- ***Multiple gestation***
- **Infection**
- **Stress**
- **Bleeding**
- **Nutrition**
- **Excessive physical activity**
- ***Prior preterm birth***
- **Uterine factors**
  - ***Cervical length***
  - **Contractions**
  - **Anomalies**
  - **Distention**
- **Ancestry and ethnicity(health equity)**

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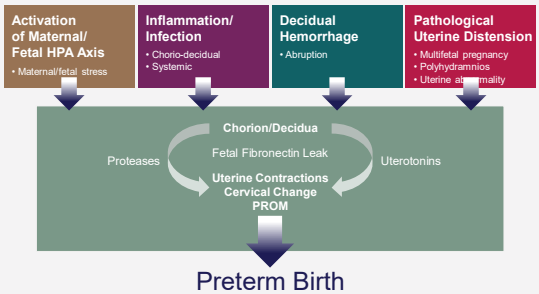
Mechanisms of Preterm Birth



Lockwood CJ, Kuczynski E. Risk stratification and pathological mechanisms in preterm delivery. *Paediatr Perinat Epidemiol.* 2001;15(S2):78-89.

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Pathways to Preterm Birth

- **Inflammation**
  - **Infection - ~40%**
- **Activation of the maternal-fetal hypothalamic–pituitary–adrenal (HPA) Axis**
  - **Stress/Violence - ~30%**
- **Decidual hemorrhage**
  - **Abruption/trauma - ~20%**
- **Uterine distension**
  - **Stretching - ~10%**

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Infections Associated with Preterm Birth

- Sexually transmitted infections
- Bacterial vaginosis
- Genitourinary infections
  - Asymptomatic bacteriuria
  - Pyelonephritis
- Pneumonia
- Peritonitis
- Periodontal disease

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Risk Factors for Decidual Hemorrhage

Placental abruption

- Maternal smoking
- Maternal cocaine use
- Chronic hypertension with superimposed preeclampsia
- Maternal trauma
- IUGR
- Hereditary coagulopathies

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Risk Factors for Abnormal Uterine Distension

- Multifetal pregnancy
- Polyhydramnios
- Structural uterine anomalies
- Mechanical stretching
  - ↑ Myometrial gap junctions
  - Activation of oxytocin receptors
  - Prostaglandin synthesis

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Make accurate diagnosis : FFN/CL — Threatened preterm labor occurs 2% of pregnancies, 80% of these proceed to term (Parry, 2006).

Look for the cause

Assess fetal status: deliver vs. tocolysis

Choose tocolytic

Improve outcome — Transport, steroids, group B strep (GBS), prophylaxis

Preterm Labor Management

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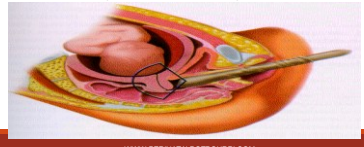
Biomarkers for Risk Assessment

Biochemical
- Fetal fibronectin (fFN)

Biophysical
- Cervical length (by ultrasound)

- More accurately identify women at risk
- Avoid unnecessary treatment and expense



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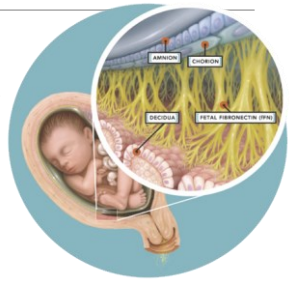
Fetal Fibronectin:
Key Biochemical Marker for Risk Assessment

Adhesive glycoprotein "glue" at the maternal-fetal interface

Presence in cervicovaginal secretions highly associated with risk of preterm delivery



1. Goldenberg, RL, et al. *Obstet Gynecol*. 1996;87:643-648.
2. Peaceman AM, et al. *Am J Obstet Gynecol*. 1997;177:13-18.

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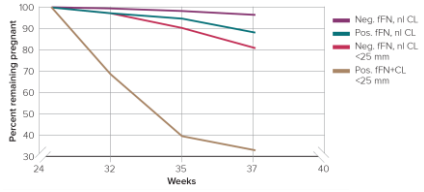
CL and fFN Combined Improve Prediction

Delivery probability profile for nulliparous patients



Majority of patients with a short cervix (<2.5cm) deliver at term

Addition of fFN to patients with a short cervix (22-24 weeks) can help to further stratify risk

Graph adapted from: Goldenberg, RL, et al. The preterm prediction study: the value of new vs standard risk factors in predicting early and all spontaneous preterm births. NICHD MFMU Network. *Am J Public Health*. 1998;88(2):233-8.

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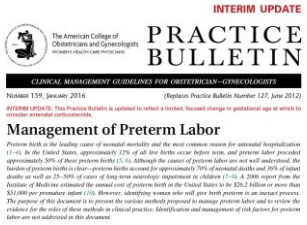

INTERIM UPDATE

The American College of Obstetricians and Gynecologists

PRACTICE BULLETIN

CLINICAL MANAGEMENT GUIDELINES FOR OBSTETRICIAN–GYNECOLOGISTS

Number 159, January 2016 (Replaces Practice Bulletin Number 127, June 2012)

INTERIM UPDATE: This Practice Bulletin is updated to reflect a limited, focused change in gestational age at which to consider antenatal corticosteroids.

Management of Preterm Labor

Preterm birth is the leading cause of neonatal mortality and the most common reason for antenatal hospitalization (1–4). In the United States, approximately 12% of all live births occur before term, and preterm labor preceded approximately 50% of these preterm births (5, 6). Although the causes of preterm labor are not well understood, the burden of preterm births is clear—preterm births account for approximately 70% of neonatal deaths and 36% of infant deaths as well as 25–50% of cases of long-term neurologic impairment in children (7–9). A 2006 report from the Institute of Medicine estimated the annual cost of preterm birth in the United States to be $26.2 billion or more than $51,000 per premature infant (10). However, identifying women who will give birth preterm is an inexact process. The purpose of this document is to present the various methods proposed to manage preterm labor and to review the evidence for the roles of these methods in clinical practice. Identification and management of risk factors for preterm labor are not addressed in this document.

NEW ACOG RECOMENDATIONS

The evidence supports the use of first-line tocolytic treatment with beta-adrenergic receptor agonist therapy, calcium channel blockers, or NSAIDs for short-term prolongation of pregnancy (up to 48 hours) to allow for the administration of antenatal steroids.

Maintenance therapy with tocolytics is ineffective for treating preterm birth and is not recommended for this purpose.

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Predictors of PTB in Symptomatic Patients

- Clinical signs and symptoms, including:
  - Uterine contractions
  - Cramping
  - Bleeding
- Cervical changes
- Presence of fFN
- Cervical length
- Combination of findings

Van Baaren GJ, et al. Predictive value of cervical length measurement and fibronectin testing in threatened preterm labor. *Obstet Gynecol*. 2014;123(6):1185-92. doi:10.1097/AOG.0000000000000229.

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Why This Matters:

Antenatal Corticosteroids Benefit at 24–34 weeks

A review of 21 studies (3885 women and 4269 infants) showed that ACS led to reduction in:	
Neonatal death (NND)	30%
Respiratory distress syndrome (RDS)	35%
Intraventricular hemorrhage (IVH)	50%
Cerebroventricular hemorrhage	50%
Necrotizing enterocolitis (NEC)	55%
NICU admissions	20%
Early systemic infections	50%

Adapted from: Roberts D, et al. Antenatal corticosteroids for accelerating fetal lung maturation of women at risk of preterm birth. *Cochrane Database Syst Rev*. 2006;19(3):CD004454. doi:10.1002/14651858.CD004454.pub2.

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ning

Society for Maternal-Fetal Medicine

SMFM Statement

smfm.org

Implementation of the use of antenatal corticosteroi in women at

Steroids study into routine clinical practice.

SMFM recommendations

1. In women with a singleton pregnancy between 34 weeks 0 days and 36 weeks 6 days of gestation who are at high risk for preterm birth within the next 7 days (but before 37 weeks of gestation), we recommend treatment with betamethasone (1 doses of 12 mg intramuscularly 24 hours apart).
2. In women with preterm labor symptoms in the late preterm period, we recommend waiting for evidence of preterm labor, such as a cervical dilatation of at least 3 cm or effacement of at least 75%, before treatment with betamethasone.

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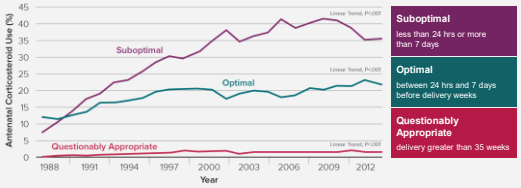
How Are We Doing?

14 year study looking at antenatal steroid timing relative to delivery



23% received optimal timing

34% received suboptimal timing

52% of mothers who received steroids delivered >35 weeks

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Preterm Labor: Choice of Tocolytic Drugs

- Magnesium sulfate
- Calcium channel blocker
  - Nifedipine
- Beta-mimetic
  - Terbutaline
- Prostaglandin inhibitor
  - Indomethacin

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Magnesium Sulfate

Mechanism	Efficacy	Rationale	Safety and side effects	Dose
Calcium antagonist	*Not* confirmed Research is in favor of 48 hours, long enough stabilize until cortosteriods can be given	Safe and familiar	Flushing with IV treatment, blurred vision	4-6 g load, then 2-4 g/hr IV

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Magnesium Sulfate for Neuroprotection

Evidence suggests potential neuroprotection benefit

Decreased severity and risk of cerebral palsy in surviving infants if administered if birth is anticipated before 32 weeks of gestation

one used a 4 g loading dose over 20 minutes with 1 g/hour as maintenance for up to 24 hours with no redosing.

6 g load over 20 to 30 minutes with 2 g/ hour as maintenance, stopped at 12 hours if birth had not occurred, and could be redosed once (Million,K. (2015) Neuroprotection, MCN; Nov/Dec vol 40. no6**)**

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Calcium Channel Blocker
Nifedipine

Mechanism
- Inhibits calcium entry

Efficacy
- Confirmed

Rationale
- Efficacy, rapid effect

Safety and side effects
- Maternal hypotension and headache

Dose
- 10 mg orally x 2, every 6 hr

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Beta-Mimetic
Terbutaline

- **Mechanism**
  - Beta-2 stimulation → ↑ cyclic AMP, ↓ Calcium
- **Efficacy**
  - Delays delivery by 2 to 7 days
- **Rationale**
  - Effective short-term arrest of contractions
- **Safety and side effects**
  - Maternal tachycardia, pulmonary edema, glucose intolerance
- **Dose**
  - Terbutaline 0.25 mg subcutaneously, every 2 hr x 2

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Prostaglandin Synthetase Inhibitor
Indomethacin

Mechanism
Prostaglandin synthetase inhibition

Efficacy
Confirmed

Rationale
Efficacious

Dose
50 mg rectally or 50-100 mg orally, then 25-50 mg orally every 6 hr

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Indomethacin

Maternal Side Effects
- Bronchospasm
- Coagulopathy
- ↓ urine output
- Gastrointestinal bleeding
- Hypertension

Fetal Side Effects
- Closure of ductus
- ↓ fetal urine output
  - Oligohydramnios
- Pulmonary hypertension
- Possible side effects
  - Necrotizing enterocolitis
  - Intraventricular bleed

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Indomethacin Guidelines for Use

Second-line agent

Before 32 weeks

- Much less likely to cause ductal constriction

Limit to 48 hours

Avoid if:

- Asthma or coagulopathy present in pregnant women
- Renal problems in mother or fetus

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Antenatal Steroids: Candidates for Treatment

Risk of preterm birth between 24–34 wks

↓

Increased risk of preterm delivery in next 7–14 days

Preterm labor	Preterm premature rupture of membranes	Bleeding

↓

A candidate for tocolysis = steroid candidate

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ACOG Bulletin

Table 1. Common Tocolytic Agents

Agent or Class	Maternal Side Effects	Fetal or Newborn Adverse Effects	Contraindications
Calcium channel blockers	Dizziness, flushing, and hypotension; suppression of heart rate, contractility, and left ventricular systolic pressure when used with magnesium sulfate; and elevation of hepatic transaminases	No known adverse effects	Hypotension and preload-dependent cardiac lesions, such as aortic insufficiency
Nonsteroidal anti-inflammatory drugs	Nausea, esophageal reflux, gastritis, and emesis; platelet dysfunction is rarely of clinical significance in patients without underlying bleeding disorder	In utero constriction of ductus arteriosus*, oligohydramnios*, necrotizing enterocolitis in preterm newborns, and patent ductus arteriosus in newborn†	Platelet dysfunction or bleeding disorder, hepatic dysfunction, gastrointestinal ulcerative disease, renal dysfunction, and asthma (in women with hypersensitivity to aspirin)
Beta-adrenergic receptor agonists	Tachycardia, hypotension, tremor, palpitations, shortness of breath, chest discomfort, pulmonary edema, hypokalemia, and hyperglycemia	Fetal tachycardia	Tachycardia-sensitive maternal cardiac disease and poorly controlled diabetes mellitus
Magnesium sulfate	Causes flushing, diaphoresis, nausea, loss of deep tendon reflexes, respiratory depression, and cardiac arrest; suppresses heart rate, contractility and left ventricular systolic pressure when used with calcium channel blockers; and produces neuromuscular blockade when used with calcium-channel blockers	Neonatal depression‡	Myasthenia gravis

*Greatest risk associated with use for longer than 48 hours.

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Maternal Weight Gain and Nutrition


HOW MUCH WEIGHT SHOULD I GAIN?

WHAT SHOULD I EAT?


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BMI	Total weight gain
<18.5	28 to 40
18.5 to 24.9	25 to 35
25 to 29.9 Overweight	15 to 25
>30.0 Obesity Class 1 30 – 34.9 Obesity Class II 35 – 39.9 Obesity Class III/Morbidly Obese 40 or greater	11-20

Maternal Healthy Food Choices

- Balance mix whole grains, fruits, vegetables.
- 400 micrograms of folic acid
- Limit intake of total fat to 30% or less of calories
- Avoid processed meats, raw eggs, fish high in mercury

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Maternal Obesity

28-32% of childbearing women in US are obese, (79 million white women, 14 million black Americans and 19.6 million Hispanics)

Morbidly obese make up 7.2% - 8.4% of childbearing women with numbers as high 15% in the minority population (Nodine,Tolsma, 2012).

The highest prevalence in 39 states with obesity prevalence ≥ 25% and 9 states (AL, AK, KY, LA, MS, MO, OK, TN, and WV) with ≥ 30%.

In US, obesity rapidly approaching tobacco as leading cause of preventable death (Simpson, 2014)

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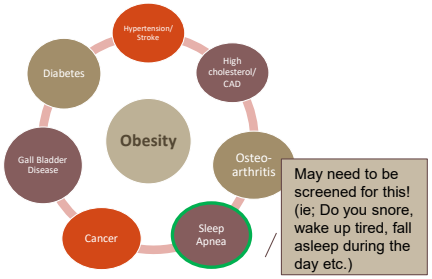
Obesity



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Obesity-Related Peripartum Complications

Problem/Risk	Potential Intervention
Increased respiratory work and myocardial oxygen requirement	Epidural anesthesia , suppl O2, positioning
Difficult IV access	Central venous catheter
Inadequate BP monitoring	Appropriate size cuff
Increased risk general anesthesia	Early epidural
Anticipated difficulty with intubation	Capability awake/fiber optic intubation
Difficulty patient transfers	Bariatric lifts, inflatable mattresses, additional personnel
Prolonged operative time	Combined spinal-epidural anesthesia
Increased risk of hemorrhage	Blood typed crossed for transfusion, meticulous surgical technique
Increased risk of aspiration	Nothing by mouth in labor, sodium citrate with citric acid, metoclopramide
Increased thromboembolic risk	Early ambulation, sequential compression, heparin until fully ambulatory
Increased risk of cesarean delivery	Informed consent, monitoring of labor curve, intervention for labor dystocia
Increased risk shoulder dystocia	Near term sonographic fetal weight, caution with operative delivery

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Management of the Obese Patient

- Pregnant patients are in a hypercoagulable state, obesity can further increase risk of thrombosis by promoting venous stasis, increasing blood viscosity, and promoting activation of the coagulation cascade
- Women with large amounts of thick adipose tissue in the abdominal area may have increased uterine compression and exaggerated vena cava syndrome
- Studies show as little as 11lbs in 2 weeks can improve reproductive function. Caloric restriction alone can improve reproductive health.
- Pregnant women are more prone to gastric reflux, because of hormonal and anatomic changes. The incidence of hiatal hernia is greater, increased abdominal pressure and intragastric volume is also increased with obesity

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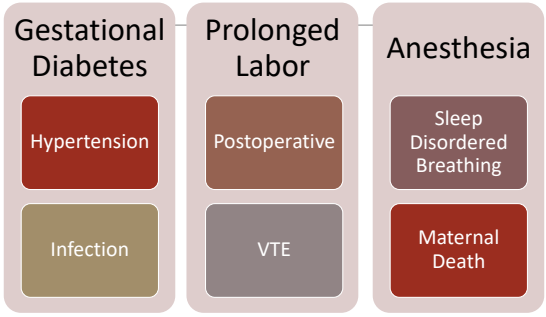
Obesity: Maternal Risk



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Questions

A pregnant client who previously had bariatric surgery will have deficiencies in what specific vitamins?

A. B12, A, and K
B. C and D
C. B6 and E

While providing education on nutrition, the nurse emphasizes that mercury found in founds can lead to neurological damage to the fetus. The nurse knows that the education was successful when the patient states:

A. "I will avoid fish completely "
B. "I will eat fish such as swordfish"
C. "I will eat salmon and sardines"

Salmon and sardines are low in mercury while swordfish contains higher amounts. Fish is nutritious and should not be avoided.

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Labor & Delivery

PHYSIOLOGY OF LABOR
LABOR MANAGEMENT
OBSTETRICAL PROCEDURES
PAIN MANAGEMENT

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Pre-Test Questions

1. The position for pushing during the second stage of labor that can increase the anterior-posterior diameter of the pelvic outlet from 0.5 to 2cm is
   a. Hands and knees
   b. Lithotomy
   c. Squatting
2. During the second stage of labor, the patient feels a strong urge to bear down because of :
   a. Pressure on the sacral and obturator *nerves.*
   b. Pressure on the femoral nerves
   c. Pressure on the perineum, rectum, anus

1. The nurse performs a vaginal examination and determines that the fetus is in a sacrum anterior position. Which conclusion can you draw from this assessment data?
   a. The fetal sacrum is toward the maternal symphysis pubis
   b. The fetal sacrum is toward the maternal sacrum
   c. The fetal face is toward the maternal symphysis pubis
2. Arrange cardinal movements in order for cephalic presentation
   a. Expulsion
   b. External rotation
   c. Flexion
   d. Internal rotation
   e. Restitution

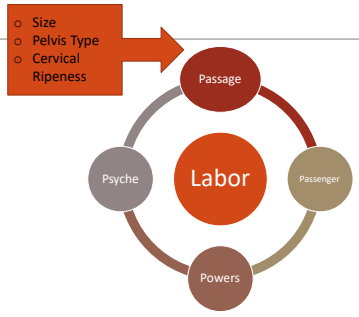
208

Labor and Birth

Birth process is coordinated effort depending on five interrelated factors. Abnormalities in any of five can alter or prevent labor progress, putting mother or baby at risk.

209

The Four P's



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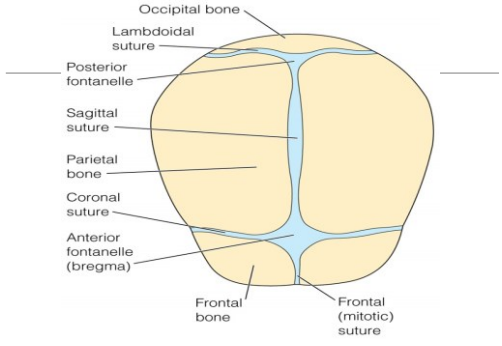


Superior view of the fetal skull.

211

Fetal Position

Engagement—when largest diameter of presenting part reaches or passes through pelvic inlet

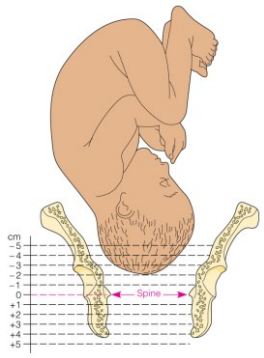
Station—relative position of fetal presenting part above or below line drawn between maternal ischial spines

Position—relationship between fetal presenting part landmark and back, front, or sides of maternal pelvis

Right (R) or left (L) side of the maternal pelvis
Landmark: occiput (O), mentum (M), sacrum (S), or acromion (scapula[Sc]) process (A)
Anterior (A), posterior (P), or transverse (T)

212

Measuring the station of the fetal head while it is descending. In this view the station is 2/2/3.



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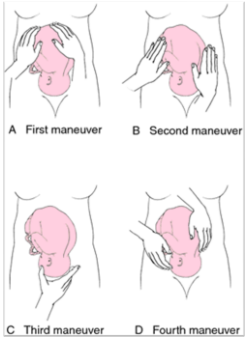
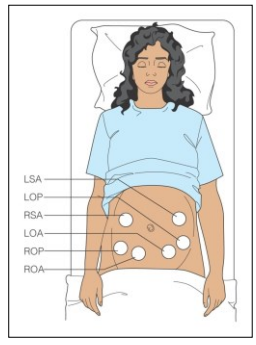


Evaluation fetal Lie, Presentation, and Position using Leopold's

214



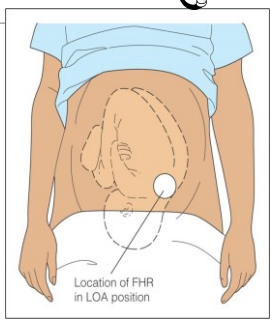
Location of FHR in relation to the more commonly seen fetal positions.

215

Question

Leopold's maneuvers provide accurate information about fetal

A. Presentation
B. Size
C. Station



Location of FHR in relation to the more commonly seen fetal positions.

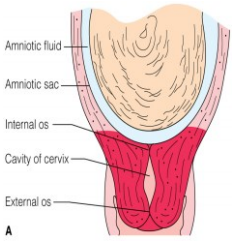
216

Primary Changes of Labor

Effacement—progressive thinning of cervix

Dilation—opening of cervical os to permit fetus through

Descent—progress descent of fetus through maternal pelvis



Effacement of the cervix in the primigravida. There is no cervical effacement or dilatation.

217

Causes of Cervical Effacement

Estrogen

- Stimulates uterine muscle contractions
- Collagen fibers in the cervix are broken down
- Increase in the water content of the cervix
- Physiologic retraction ring
- Upper uterine segment thickens and pulls up
- Lower segment expands and thins out

218

Uterine Contractions

- Phases
  - Increment—building up; this is longest phase
  - Acme—peak
  - Decrement—letting up phase
- Frequency—time from the beginning of one contraction to the beginning of the next
- Duration—time from beginning to end of single contraction
- Intensity—contraction strength at its acme
- Resting tone—pressure in uterus between contractions

219

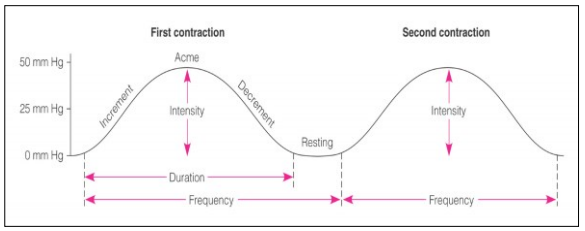


FIGURE 17–10 Characteristics of uterine contractions.

220

Premonitory Signs of Labor

- Lightening—engagement; fetus descends into pelvic inlet
- Braxton Hicks contractions—may increase in frequency and discomfort
- Cervical changes—ripening, effacement, possibly some dilation
- Bloody show—expulsion of mucous plug
- Rupture of membranes—leak in amniotic sac
- Sudden burst of energy—from 24 to 48 hours prior to labor onset
- Weight loss—1 to 3 lbs
- Flu-like symptoms—diarrhea, nausea, indigestion

221

Physiologic Responses to Labor

Maternal Responses

- Heart rate increases by 10 to 20 bpm.
- Cardiac output ↑ by 10% to 15% during 1st stage of labor and by 30% to 50% during the 2nd stage of labor.
- Blood pressure increases by 10 to 30 mm Hg during uterine contractions
- WBC count increases to 25,000 to 30,000 cells/mm^3, perhaps as a result of tissue trauma.
- RR increases and more oxygen is consumed

222

Maternal Physiologic Responses to Labor

- Gastric motility and food absorption decrease, which may increase the risk of nausea and vomiting during the transition stage of labor.
- Gastric emptying and gastric pH decrease, increasing the risk of vomiting with aspiration.
- Temperature rises slightly, possibly due to an increase in muscle activity.
- Muscular aches/cramps occur as a result of the stressed musculoskeletal system.
- Basal metabolic rate increases and blood glucose levels decrease because of the stress of labor.

223

Maternal Responses to Labor

- The woman may state that diarrhea accompanied the onset of labor, or the nurse may palpate the presence of hard or impacted stool in the rectum.

Endocrine Changes

- The onset of labor may be triggered by decreasing levels of progesterone and increasing levels of estrogen, prostaglandins, and oxytocin. Metabolism increases, and blood glucose levels may decrease with the work of labor.

224

Fetal Responses

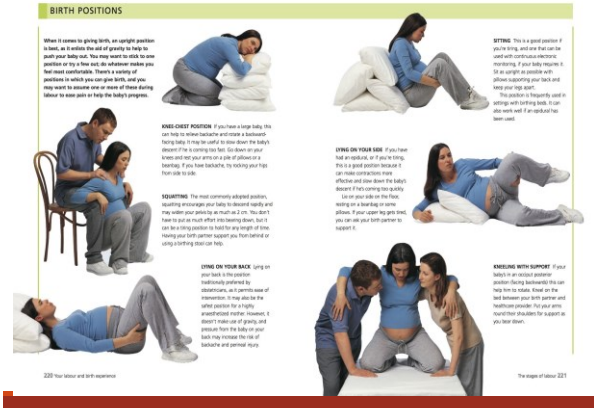
- Periodic FHR accelerations and slight decelerations related to fetal movement, fundal pressure, and uterine contractions
- Decrease in circulation and perfusion to the fetus secondary to uterine contractions (a healthy fetus is able to compensate for this drop)
- Increase in arterial carbon dioxide pressure (PCO_2)
- Decrease in fetal breathing movements throughout labor
- Decrease in fetal oxygen pressure with a decrease in the partial pressure of oxygen (PO_2)

225

Comfort Measures: First Stage

- Frequent position changes
- Hydrotherapy
- Perineal care
- Clear fluids and ice chips
- Birthing balls
- Provide information and support
- Relaxation between contractions
- Distraction
- Effleurage
- Firm pressure on back or sacrum
- Visualization
- Controlled breathing

226



227

Question

When a woman in labor hyperventilates, the underlying physiology is

A. Carbon dioxide depletion
B. Inadequate hydration
C. Poor oxygenation

Coaching women to push with every other or 3rd contraction during the second stage of labor is indicated when the

A. Fetal heart rate is abnormal
B. Labor has been prolonged
C. Uterine contractions are irregular

228

Latent Phase

PHYSIOLOGIC RESPONSES TO LABOR

- Beginning cervical dilatation and effacement
- No evident fetal descent
- Uterine contractions increase in frequency, duration, and intensity
- Contractions are usually mild
- Usually longest phase of labor

PSYCHOLOGICAL ADAPTION'S TO LABOR

Feels able to cope with the discomfort

May be relieved that labor has finally started

Is able to recognize and express feelings of anxiety

229

First Stage of Labor: Active Phase

PSYCHOLOGICAL ADAPTATIONS TO LABOR

Cervical dilatation from 6 to 7 cm

Progressive fetal descent

Contractions more frequent and intensity

PSYCHOLOGICAL ADAPTATIONS TO LABOR

Anxiety increases

Fears loss of control

May have decreased ability to cope

230

First Stage of Labor: Transition

PSYCHOLOGICAL ADAPTATIONS TO LABOR

- Cervical dilatation from 8 to 10 cm
- Progressive fetal descent
- Contractions more frequent and intense

PSYCHOLOGICAL ADAPTATIONS TO LABOR

- May doubt ability to cope
- Apprehensive and irritable
- Terrified of being alone

231

Characteristics of Transition

- Increased bloody show
- Increased anxiety and restlessness
- Hyperventilation
- Increased need for support
- Increased sensitivity to touch
- Shaking and leg cramps
- Generalized discomfort, including low backache

232

Characteristics of Transition (continued)

- Inward focus/ withdrawal from social contact
- Amnesia and fatigue, often sleeping between contractions
- Difficulty understanding directions
- Irritability, anger, and frustration at labor
- GI upset, including nausea/vomiting, hiccupping, belching
- Desire for medication
- Increasing rectal pressure/urge to bear down

233

Second and Third Stages

Second stage begins with dilatation of 10cm and ends at delivery of the fetus.

- Sterile vaginal exams to assess fetal descent
- Assess maternal and fetal status every 5 minutes
- Provide support and information about labor progress
- Assist with pushing
- Assist the physician or CNM with the birth

Third stage is the delivery of the placenta

- Placental separation
- Placental delivery

234

Second Stage of Labor

Full cervical dilation (10cm) and completely effaced (100%)

Assessment: low risk vs. high risk

Second stage has 3 phases

- Latent phase
  - "Laboring down"
- Descent phase
  - Active pushing ; Ferguson reflex
- Transition phase
  - Presenting part is on the perineum

235

Spontaneous vs Directed Bearing Down Efforts

- Spontaneous pushing
  - Ferguson reflex : natural urge to push
  - This will enhance maternal and fetal well-being
  - Less maternal fatigue, fewer forcep or vacuum assisted births, maintains integrity of pelvic floor reducing future risk incontinence, and pelvic floor prolapse.
- Valsalva maneuver
  - Closed-glottis pushing, prolonged breath holding
  - Can cause decrease in cardiac output, inhibits perfusion to the placenta and uterus, fetal hypoxia and increase in perineal tears and lacerations.

236

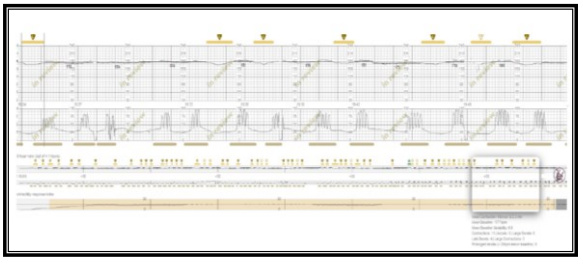
Risks Closed Glottis Pushing

- Maternal, During Labor
  - Increased intrathoracic and abdominal pressure
  - Vasoconstriction, hypotension and decreased CO, which in turn decreases maternal blood flow
  - Increased fatigue
  - Decreased blood flow to uterus
- After Birth
  - Diminished urge to void
  - Decreased bladder capacity
  - Increased symptoms of urge incontinence
  - Increased risk of pelvic organ prolapse
- Fetal
  - Alterations in perfusion, causing acid-base imbalance and heart rate decelerations
  - Tightened pelvic floor muscles, which hamper fetal rotation and descent

Adams & Bianchi, 2003

237

Second Stage



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240

Operative Vaginal Delivery

FORCEPS

- Outlet forceps
- Low forceps
- Midforceps
- Types of forceps
  - Simpson or Elliot
  - Kielland or Tucker-McClane
  - Pieper forceps

INDICATIONS FOR FORCEPS

- Assisted delivery of head in breech delivery
- Face presentation
- Maternal conditions(cardiac, cerebrovascular, or neurologic)
- Cord prolapse in 2nd stage

242

Vacuum-assisted Birth

INDICATIONS

- Prolonged 2nd stage
- Fetal compromise
- Poor pushing effort
- Cardiac, pulmonary, cerebrovascular or neurologic disease

RISKS

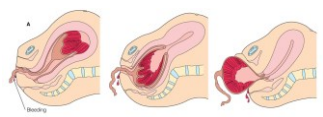
- Cephalohematoma
- Subgaleal hematoma
- Retinal hemorrhage
- Intracranial hemorrhage
- Skull fractures

243

Placental Separation and Expulsion

Indicated by following signs:

- A firmly contracting fundus
- Uterus changes to a globular shape
- A sudden gush dark blood from introitus
- Apparent lengthening of the umbilical cord



244

Third Stage of Labor

- The following signs of separation indicate that the placenta is ready to deliver:
- The uterus rises upward.
- The umbilical cord lengthens.
- A sudden trickle of blood is released from the vaginal opening.
- The uterus changes its shape to globular.
- Spontaneous birth of the placenta occurs in one of two ways: the fetal side (shiny gray side) presenting first (called Schultz's mechanism or more commonly called “shiny Schultz's”) or the maternal side (red raw side) presenting first (termed Duncan's mechanism or “dirty Duncan”).

245

Fourth Stage of Labor

- 2 hours after delivery of the placenta
- Physiologic readjustment
- Thirsty and hungry
- Shaking
- Bladder is often hypotonic
- Uterus remains contracted
- Decreased systolic/diastolic BP
- Increased pulse pressure
- Tachycardia
- Uterine fundus firm, midline, below umbilicus
- Shaking chills
- Hunger/thirst

246

HELPERR

HELPERR mnemonic is a clinical tool that offers a framework and structure for coping with this emergency.

It also allows Shoulder Dystocia Drills to run more smoothly and have improved cohesiveness.

- **H** Call for help
- **E** Evaluate for episiotomy
- **L** Legs (the McRoberts maneuver)
- **P** Suprapubic pressure
- **E** Enter maneuvers (internal rotation)
- **R** Remove posterior arm
- **R** Roll the patient

Adapted from ALSO ; Advanced life support in obstetrics provider course)

247

LEGS (McRoberts maneuver)

This procedure involves flexing and abducting the maternal hips , positioning the maternal knees toward shoulders.

Nurses and family can assist with maneuvers. However, nurse is responsible for placing legs in proper position.

Safe , least invasive procedure to rotate symphysis pubis and anteriorly dislodge the anterior shoulder.

248

Pressure (Suprapubic)

Hand of the assistant should be placed suprapubically over the fetal anterior shoulder, applying pressure in a CPR style with downward and lateral motion on the posterior aspect of the fetal shoulder.

- Pressure should be applied from side of the mother, with the heel of the assistant's hand moving in a downward lateral motion on the side of impacted shoulder
- The nurse may need to use a step-stool or chair to obtain proper position above the woman and to apply the proper placement and amount of pressure.
- Suprapubic pressure may be needed with McRobert's maneuver to loosen the trapped shoulders and or to assist to sweep the shoulder externally into oblique position in the pelvis.
- Hand placement is important!

249

Pain Management in Labor

PARENTAL OPIOIDS

NITROUS OXIDE

252

Medications Used in Labor

- Opioid Agonist Analgesics
  - Best used in active phase of labor
- Meperidine (Demerol), Hydromorphone, (Dilaudid)
- **ACTION**
  - Opioid agonist analgesics; opioid receptors to decrease transmission of pain impulses
- **INDICATION**
  - Moderate to severe labor pain and postoperative pain after cesarean birth
- **DOSAGE AND ROUTE**
  - *Meperidine:* 25 to 100 mg IM/IV; repeat in 1-3 hr
  - *Hydromorphone:* 1 mg IV every 3 hours as needed; 1 to 2 mg IM, may repeat in 3-6 hr if needed; or 3 to 4 mg, may repeat in 4-6 hours if needed

253

Meperidine: Cont

CONTRAINDICATIONS

- Altered LOC, patient receiving, hypotension, decreased respiratory rate

Side Effects

- CNS and respiratory depression, hypotension, increased cranial pressure (ICP), N/V, tachycardia

Notes

- Decreased use in clinical settings due to the neurobehavioral depression lasting for several days in the fetus

254

Medications for Labor

- Fentanyl citrate (Sublimaze)
- **ACTION**
  - Opioid agonist analgesics that stimulate opioid receptors to decrease the transmission of pain impulses, rapid action with short duration (0.5-1 hr IV; 1-2 hr epidural); fentanyl citrate has less passage across the placenta to the fetus.
- **INDICATION**
- • Because of their short duration of action when given intravenously, they are most commonly administered epidurally or intrathecally, alone or in combination with a local anesthetic agent, to relieve moderate to severe labor pain and postoperative pain after cesarean birth
- **DOSAGE AND ROUTE**
- • *Fentanyl citrate:* 25 to 50 mg IV; 1 to 2 mg with 0.125% bupivacaine at rate of 8 to 10 ml/hr epidurally
- • *Sufentanil citrate:* 1 mg with 0.125% bupivacaine at rate of 10 ml/hr
- **ADVERSE EFFECTS**
- • Dizziness, drowsiness, allergic reactions, rash, pruritus, maternal and fetal/neonatal respiratory depression, nausea and vomiting, urinary retention

255

Butorphanol tartrate (Stadol) Nalbuphine (Nubain)

- **ACTION**
- • Mixed agonist-antagonist analgesics; stimulate opioid receptors and blocks or weakly stimulates mu opioid receptors, resulting in good analgesia but with less respiratory depression and nausea and vomiting when compared with opioid agonist analgesics
- **INDICATION**
- • Moderate to severe labor pain and postoperative pain after cesarean birth
- **DOSAGE AND ROUTE**
- • Butorphanol tartrate: 1 mg (range 0.5 to 2 mg) IV every 1-3 hr as needed; 2 mg (range 1 to 4 mg) IM every 3-4 hr as needed
- • Nalbuphine hydrochloride: 10 mg IV; 10 to 25 mg IM every 3-4 hours as needed

256

Butorphanol (Stadol) Nalbuphine (Nubain)

Nalbuphine

- **Contraindications- head injury**
- **Side Effects- CNS depression, crying, psychological reactions, cramps, dry mouth, bitter taste, dyspepsia, slurred speech**
- **Notes- caution: asthma, renal insufficiency**

Butorphanol

- **Side Effects- depressed CNS, dizziness, headache (HA), N/V, hypotension, depression of fetus**
- **Notes- Use with caution in MI or cardiac disease**

257

Naloxone hydrochloride (Narcan)

Opioid Antagonist

- **Action**
  - Opioid antagonist which blocks both mu and kappa opioid receptors from the effects of opioid agonists

INDICATION

- Reverses opioid-induced respiratory depression in woman or newborn; may be used to reverse pruritus from epidural opioids

DOSAGE AND ROUTE

ADULT

- Opioid overdose: 0.4 to 2 mg IV, may repeat IV at 2- to 3-min intervals up to 10 mg; if IV route unavailable, IM or SC administration may be used
- Postoperative opioid depression: Initial dose 0.1 to 0.2 mg IV at 2- to 3-min intervals up to 3 doses to desired degree of reversal obtained; may repeat dose in 1 to 2 hours if needed

NEWBORN

- Opioid-induced depression: Initial dose is 0.1 mg/kg IV, IM, or SC; may be repeated at 2- to 3-min intervals up to 3 doses until desired degree of reversal obtained

258

Nitrous Oxide

Nitrous oxide inhalation (N2O) also known as “laughing gas” colorless, tasteless, odorless gas that maybe inhaled to provide pain relief, decrease anxiety and feeling of euphoria within 30-60 seconds.

Benefits

- Rapid onset of action
- Quick clearance through exhalation without accumulation in maternal or fetal tissues
- Maternal self administration
- Ability of he woman to remain awake and alert with complete functioning
- No effect on uterine activity

259

Nitrous Oxide

Nitrous oxide can also be used for vacuum or forceps-assisting birth and perineal repair.

Contraindications

- Impaired consciousness
- Acute drug or alcohol intoxication
- Recent trauma
- Pneumothorax

Note: *Nitrous oxide administration does not constitute anesthesia delivery because of the concentrations and intermittent use.*

260

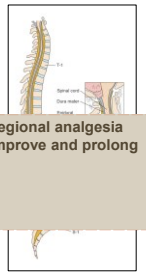
Regional Anesthesia

Temporary and reversible loss of sensation

Prevents initiation and transmission of nerve impulses

Types

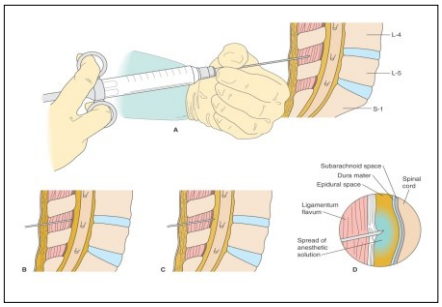
- Epidural
- Spinal
- Combined epidu



A medication used for regional analgesia during labor that may improve and prolong anesthesia is:

a) Bupivacaine
b) Ropivacaine
c) Sufentanil

261



Technique for lumbar epidural block. *A*, Proper position of insertion. *B*, Needle in the ligamentum flavum. *C*, Tip of needle in epidural space. *D*, Force of injection pushing dura away from tip of needle. *Used with permission from Bonica, J. J. (1972). Principles and practice of obstetric analgesia and anesthesia (p. 631). Philedelphia: Davis.*

262

Epidural

ADVANTAGES

- Produces good analgesia
- Woman is fully awake during labor and birth
- Continuous technique allows different blocking for each stage of labor
- Dose of anesthetic agent can be adjusted

DISADVANTAGES

- Marked decreases in BP and delayed compensatory response to supine hypotension syndrome
- Postdural puncture seizures
- Meningitis
- Cardiorespiratory arrest
- Vertigo
- Onset of analgesia may not occur for up to 30 minutes

263

Epidural

The catheter is placed in the epidural space between fourth and fifth lumbar vertebrae.

A test dose is given to determine that the catheter is not in the vein

Injection of epinephrine into an epidural vein causes immediate increased heart rate, palpitations, increased blood pressure, numbness of the tongue, metallic taste, tinnitus, slurred speech, jitteriness, or agitation.

264

Spinal

ADVANTAGES

Immediate onset of anesthesia

Relative ease of administration

Smaller drug volume

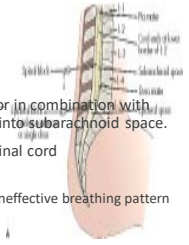
Maternal compartmentalization of the drug

DISADVANTAGES

- High incidence of hypotension
- Greater potential for fetal hypoxia
- Uterine tone is maintained, making intrauterine manipulation difficult
- Short acting

265

Spinal Anesthesia



- Anesthetic solution containing local anesthetic alone or in combination with fentanyl is injected through 4th, 5th lumbar interspace into subarachnoid space.
- Block pain neuropathways that pass from uterus to spinal cord
- Complications
  - Marked hypotension, impaired placental perfusion, and ineffective breathing pattern may occur during spinal anesthesia.
- Advantages
  - Ease of administration, maternal consciousness is maintained, muscular relaxation is achieved
- Disadvantages
  - Hypotension, ineffective breathing pattern, need for operative birth (forceps, vacuum)
  - After birth, incidence of bladder and uterine atony as well as spinal headache

266

Role of the Registered Nurse with Epidural

Revised

Monitor	Monitor the woman's vital signs, level of mobility, level of consciousness, and perception of pain and level.
Monitor	Monitor fetal status
Pause	Pause the infusion to replace empty infusion syringes or infusion bags with new pre-prepared solutions containing same med/concentration
Stop	Stop infusion
Remove	Remove the catheter
Initiate	Initiate emergency therapeutic measures
Communicate	Communicate clinical assessments and changes in patient status

267

Induction & Augmentation

LABOR & BIRTH SECTION (35% = 52 QUESTIONS AVG 8.75 QUESTIONS)

271

AWHONN Position Statement

JOGNN: Non-Medically Indicated Induction and Augmentation of Labor, Sept/Oct 2014

Reserving induction and augmentation of labor for pregnant women with medical indications promotes the best health outcomes for women and infants and is the best use of healthcare resources.

Woman can only make an informed decision about induction or augmentation when they fully understand the medical indications for both, potential harms or benefits associated with pharmacologic, mechanical, alternatives used and or the benefits of waiting for and permitting labor to progress spontaneously

272

Perinatal Hormonal Physiology

Evolved over the millennia to ensure reproductive success.

Hormonal physiology is interrelated, coordinated, and mutually regulated between mom and baby to optimize outcomes for both.

- Example: skin-to-skin contact after birth mutually regulates maternal and newborn oxytocin systems

"Disruption of perinatal hormonal physiology may thus adversely impact not only labor and birth, but also breastfeeding and maternal-infant attachment via biological bonding." (Buckley, 2015)

273

Spontaneous Labor is a Powerful Hormonal Process

Increases in oxytocin and prostaglandin receptors prime the uterus to promote effective contractions in labor.

Increases in brain-based (central) receptors for beta-endorphins prepare endogenous pain-relieving pathways to benefit mom in labor

Image: Shutterstock

274

Benefits of Spontaneous Labor

Spontaneous labor initiates a cascade of hormones during labor and birth that act to:

- Provide natural pain and calm the woman during labor
- Clear fetal lung fluid
- Increase mother-infant attachment after birth
- Expel the placenta
- Warm the mother's skin after birth which helps to warm the infant, and
- Enhance breastfeeding

275

Spontaneous Labor Provides Critical Benefits to Moms and Babies

Elevations in mammary and central oxytocin and prolactin receptors prepare for breastfeeding and maternal-infant biological bonding.

Rising cortisol supports maturation of the fetal lungs and other organs.

Pre-labor preparations in oxytocin and catecholamine systems promote fetal protective processes in labor and optimal newborn transition.

Buckley, 2015

276

Economics Effects of Induction and Augmentation

Two-fold increased risk of cesarean surgery for a woman having her first infant (JOGNN, 2014).

In US, average cost of cesarean birth is 68% more than the cost of an uncomplicated vaginal birth

Women who deliver vaginally are more successful breastfeeding (short-term cost savings for families, long term savings for the health care system

277

AWHONN

The Role of the Nurse

Evidence-based information on induction and augmentation

Maternal and newborn risks associated with induction and augmentation

Benefits of waiting for spontaneous labor

Nurses play a key role in advocating for women who want to wait for labor to progress naturally

They also play an important role in ensuring women have inf needed to make informed decisions regarding labor augment

278

Active Phase of Labor

Latent phase and active phase were coined by Friedman in 1955

The labor curve made major strides in providing evidence-based definitions for both normal and abnormal labor.

Changes in obstetric patient population and practice patterns, these curves are likely to be too stringent for the management of contemporary labor (Millen, et.al, 2014)

279

Medical Indications for Induction

- Abruption
- Chorioamnionitis
- Fetal demise
- Gestational Hypertension, Chronic hypertension
- Preeclampsia/Eclampsia
- PROM
- Post term Pregnancy
- Maternal medical conditions
  - Diabetes, renal disease, chronic pulmonary disease, antiphospholipid syndrome
- AMA
- Fetal compromise
  - Severe growth restriction
  - Isoimmunization
  - Oligohydramnios

280

Bishop Score

Score	Dilation	Effacement	Station	Cervical Consistency
0	Closed	0-30%	-3	Firm
1	1-2 cm	40-50%	-2	Medium
2	3-4 cm	60-70%	-1 or 0	Soft
3	5-6 cm	80%	+1 or +2	Very soft

281

Induction Augmentation

Mechanical
- Mechanical stripping
- Amniotomy
- Foley bulb

Chemical
- Prostaglandin
- Oxytocin

Other Methods
- Walking
- Nipple stimulation

282

Membrane Stripping

Stripping of the membranes: causes increase in the PG activity. Some physicians may also do a form of mechanical dilation of the cervix, which releases prostaglandins.

Study by ACOG showed sweeping the membranes during induction of labor had beneficial effect on labor and delivery of nulliparas with unfavorable cervices who needed cervical priming with PGE.

It also helps to increase spontaneous delivery in patients who are postdates.

283

Membrane Stripping

Digital separation of the chrioamniotic membrane from the wall of the cervix and lower uterine segment by inserting fingers into internal cervical os and rotating finger 360 degrees along the lower uterine segment.

Performed to a partially dilated cervix to hasten onset of labor.

Routine membrane stripping is not recommended

(Simpson, K., 4th edition, Awhonn; Cervical Induction & Augmentation Manual)

284

Amniotomy

Effective method of labor induction for multiparous women with favorable cervix

Risks include cord prolapse, cesarean birth, variable decelerations, intramniotic infection, fetal injury, bleeding from a vasa previa and commitment to labor with an uncertain outcome.

285

Transcervical Balloon Catheters

Requires direct visualization of the cervix and antiseptic technique .

Foley catheter 14-26 French with a 30ml balloon, inserted into extra-amniotic space and then inflated above internal os with 30-80 ml of sterile water.

Effective by causing direct pressure and over stretching the lower uterine segment and cervix, as well as cause prostaglandin release.

The catheter usually falls out when the cervix begins to dilate

286

Prostglandins

Endogenous PG compounds are present in all tissues, and are known to be synthesized in the myometruim, decidua, and fetal membrane during pregnancy. The nomenclature system uses a system of letters and numbers, letter E denotes solubility in ether and F denotes solubility in a phosphate buffer. The number denotes the number of double bonds in the carbon structure of the molecule.

PG exert their action on the uterus and cervix causing cervical ripening, and in higher doses, uterine contractions. Cervical ripening occurs through the effects of the PG's on the water composition of the cervix.

287

Oxytocin

Oxytocin is the most preferred pharmacologic agent for inducing labor when the cervix is favorable or ripe.

Numerous studies have focused on oxytocin inductions. It has been found that low-dose (physiologic) and high-dose (pharmacologic) oxytocin regimens are equally effective in establishing adequate labor patterns.

288

Oxytocin

Advantages

- Potent and easy to titrate
- Has a short half-life
- Inexpensive

Disadvantages

- Antidiuretic effect
- Tacysystole
- Possibility uterine rupture
- With resting tone remains above 20mm Hg, uteroplacental insufficiency and fetal hypoxia can result.

289

Questions

Frequency of uterine contractions will no longer increase when oxytocin is given for more than 5-6 hours because

A. clearance rates increase as the amount of oxytocin increases
B. Oxytocin receptors significantly decrease
C. The half-life of oxytocin is depleted

The main cause of labor onset is:

A. Mechanical
B. Hormonal
C. Pharmological

290

Endogenous Oxytocin

First stage of labor
- Maternal circulating contribution = 2 to 4mU/min

Fetal Contribution
- Secretion similar to 3 mU/min

Combined effects = 5 to 7 mU/min

Second stage of Labor
- Surge of oxytocin at Ferguson's reflex

291

Exogenous Oxytocin

Initial phase (1.5 to 2hrs)
- Uterine contractions will progressively increase in frequency and intensity.

Stable phase
- Any further increase will not cause more frequent normal changes in uterine activity.

Response to long periods of oxytocin
- Receptor site decrease significantly during prolonged oxytocin-induced or augmented labor compared to spontaneous labor.

292

Cervidil

PGE_2 (Cervidil)
- FDA approved in 1995
- 10mg Dinoprostone in controlled release vaginal insert with removable cord.
- Unstable at room temperature (stable up to 3 years when frozen)
- Patient should stay supine for 30 minutes after insertion
- Uterine contractions within 5 to 7 hours
- Removal after 12 hours or onset of labor
- Oxytocin should be delayed for 30 to 60 minutes after removal of insert.
- Manufacturer's product insert indicates use is contraindicated in women with history of prior cesarean birth or uterine scar.
- Cost $165 per insert

(ACOG, 2009)

293

Misoprostol PGE_1

- This prostaglandin less expensive, more stable, and easier to store.
- Not FDA approved for cervical ripening or labor induction (FDA approved for peptic ulcer prevention)
- The 100 mcg tablet is unscored challenging it being uniformly dispersed.
- Initial dose 25 mcg -50mcg of misoprostol should be considered, as initial dose. The frequency should not be more than 3-6 hours (ACOG, 2009).
- Plasma concentration of misoprostol after vaginal administration, peak levels in 1-2 hours and declining slowly to an average of 61% of peak level at 4 hours.

294

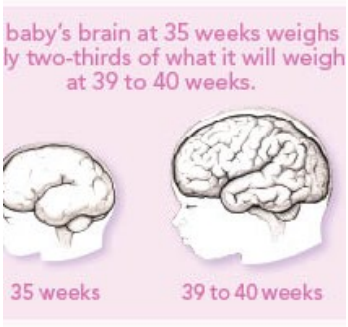
Misoprostol PG_1

The bioavailability is higher w/ intravaginal route than oral routes; the gastrointestinal or hepatic metabolism that occurs with oral routes makes them less effective.

Contraindicated in women with history of cesarean birth or uterine scar.

Continuous monitoring of the FHR and uterine activity is indicated.

295



Timing of Fetal Brain Development

- Cortex volume increases by 50% between 34- and 40-weeks gestation.
- Brain volume increases at rate of 15 mL/week between 29- and 41-weeks gestation.
- A 5-fold increase in myelinated white matter occurs between 35-41 wks gestation.
- Frontal lobes are the last to develop, therefore the most vulnerable.

297

A Tool to Educate Patients

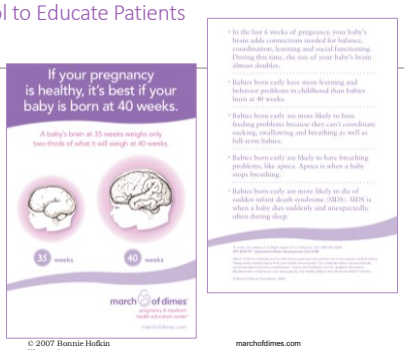


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Illustration

marchofdimes.com

298

Reducing Primary Cesarean Rate

LABOR & BIRTH SECTION (35% = 53 QUESTIONS POSSIBLE AVG 8 QUESTIONS)

300

Why Reduce Cesarean Rates?

Why does reducing the overuse of induction and cesarean matter?

- Fewer mother/baby complications
- Potential for higher patient satisfaction/scores
- Shorter hospital stays
- More efficient use of staff and other resources

CDC/NCHS, 2012

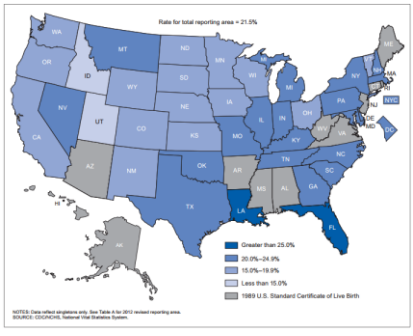
301

October 2015

http://www.safehealthcareforeverywoman.org/downloads/Cesarean-Bundle/Safe-Reduction-of-Primary-Cesarean-Births-Bundle-Final-10-8-15.pdf

302

Primary Cesarean Rates By State, 2012



38 states reporting, Osterman & Martin, 2014

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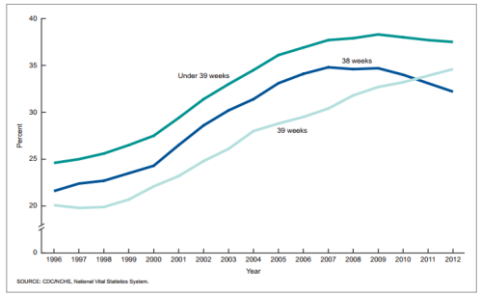
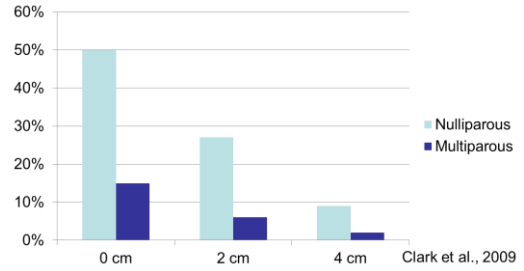
Cesarean Deliveries By Gestational Age: 1996–2012



NCHS, Births (2013). Final Data for 2012. National Vital Statistics Reports, 62 (9).

304

Initial Cervical Dilation and Cesarean Rates

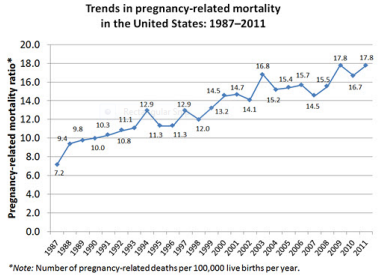


14,955 births at ≥ 37 weeks, 44% planned inductions

305

Harms to Women

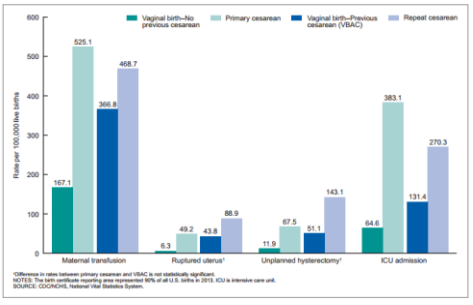
- **Cesarean surgery**
- **Placenta previa**
- **Placenta accreta**
- **Infection**
- **Postpartum hemorrhage**
- **Cardiovascular events**
- **Hospital readmission**



Centers for Disease Control and Prevention Pregnancy Mortality Surveillance System, 2014

306

Maternal Morbidity by Delivery Mode & Previous Cesarean History



Curtin, Gregory, Korst and Sayeedha , 2015

307

Severe Maternal Morbidity

Large increases in severe maternal morbidities from 1998-1999 compared to 2008-2009:

- **75% increase in severe maternal complications** during a hospitalization for birth.
- **114% increase in severe maternal morbidity** during a postpartum hospitalization.

Callaghan et al., 2012

308

Increased Neonatal Morbidity Elective Delivery and CD

- Increased rates of NICU admissions for impaired respiratory function for elective delivery before 39 weeks (Clark et al., 2009)
- Risk of laceration with CD
- Risks of respiratory morbidity (CD, no labor)
- Lower rates of immediate skin-to-skin contact
- More breastfeeding difficulties

309

Costs Associated with Cesareans

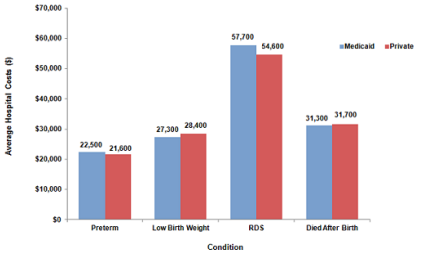
Table 11: Average Total Maternal-Newborn Health Care Charges and Payments for Vaginal or Cesarean Births among Commercial and Medicaid Beneficiaries, 2010

	Total	Vaginal Childbirth	Cesarean Childbirth
Commercial			
Provider Charges	$37,340	$32,093	$51,125
Allowed Paid Amount	$21,001	$18,329	$27,866
Medicaid			
Provider Charges	$35,481	$29,800	$50,373
Allowed Paid Amount	$10,350	$9,131	$13,590

Truven Health Analytics, 2013

310

Costs Associated with Inductions



Average hospital costs for select conditions among live hospital births by insurance category for 2011

- Lower nurse to patient ratio
- Cost associated with medical interventions
- Longer hospital stays and readmissions
- Higher NICU admissions

Kowlessar, Jiang, & Steiner, 2013

311

Recommendations for Practice

- Apply standardized approaches to care during labor that promote labor progress and prevent dysfunctional labor.
  - Movement and positioning
  - Physical comfort measures, including pain management
  - Physiologic second stage practices
  - Emotional support
  - Education about what to expect and advocacy for women's preferences

312

Recommendations for Practice
Positioning with the Peanut Ball

- Use a peanut ball to encourage labor progress for women who are in bed, especially with epidurals
- Research findings:
  - Decreased first and second stage labor
  - Lower CD incidence (significant)

Tussey et al., 2015, Roth et al., 2015

313

Benefits of Spontaneous Labor

Benefits of Spontaneous Labor for the Fetus

- Enters labor with mature vital organs (lungs, brain, liver) at term
- Fetal lung fluid clearance with onset of spontaneous labor
- Improved placental perfusion without tachysystole associated with oxytocin

Benefits of Spontaneous Labor for the Woman

- More effective contractions/less tachysystole so easier to tolerate
- Freedom of movement facilitated
- Physiologic blood loss (less PPH)
- Adrenaline surge at birth energizes mom
- Psychological benefits of knowing you went into labor on your own

Benefits of Spontaneous Labor for the Mom & Baby

- Spontaneous labor process facilitates newborn transition and early breastfeeding
- Faster recovery for mom (fewer cesareans) improves all aspects of first weeks and months postpartum for mom, baby and family

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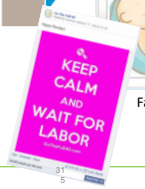
Interactive Engagement Zone

GoTheFull40.com

Facebook Champions Group



Facebook.com/GoTheFull40

315

Electronic Fetal Monitoring

FETAL ASSESSMENT SECTION (18% = 27 QUESTIONS)

ADJUNCT FETAL SURVEILLANCE METHODS

ANTENATAL TESTING

FETAL ACID BASE

316

Clinical findings used to determine Gestational Age

Menstrual History
- LMP/ EDC

Quickening History
- Subjective Sign
- Perception can vary

Fetal Heart Tones
- Can be detected at 10-12 weeks

Uterine Size and Fundal Height
- Fundal height may recede during last 4 weeks of pregnancy when the fetus drops.

317

Fetal Well-being

How is fetal well being assessed?
- Kick Counts
- Non-stress Test (NST)
- Contraction Stress Test (CST)
- Biophysical Profile (BPP)
  - Modified Biophysical Profile

318

Kick Counts

- Maternal perception of normal fetal movement has long been recognized as a reliable indicator of fetal well-being.
- The women's perception of a decrease in fetal movement should supersede any particular policy or guideline.
- Decrease in fetal movement in response to hypoxia has been shown true in various studies.
- If in utero death occurs typically there will be decrease in fetal movement 1 to 2 days and then complete cessation of movement for another 1 to 2 days . During this time the baseline may remain the same.

319

Kick Counts

Interpretation

Normal
- A min 10 movements in less than 2 hours

Abnormal
- Fewer than 10 movements in 2 hours or
- A decrease in total number of movements, or a significant increase in length of time required to reach required movements.

Implications
- Normal: Routine testing
- Abnormal: Patient should be seen immediately for further antenatal testing.

320

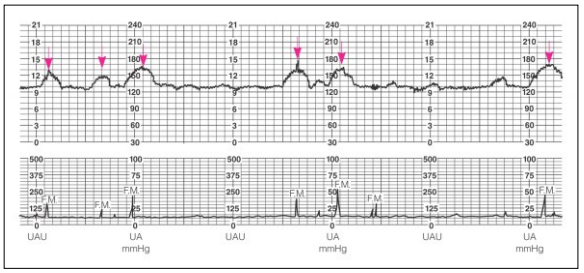
Non-stress Test (NST)

NST's based on premise that the heart rate of a fetus that is not acidotic or neurologically depressed will temporarily accelerate with fetal movement.

Vibroacoustic stimulation may elicit FHR accelerations that are valid in the prediction of fetal well-being.

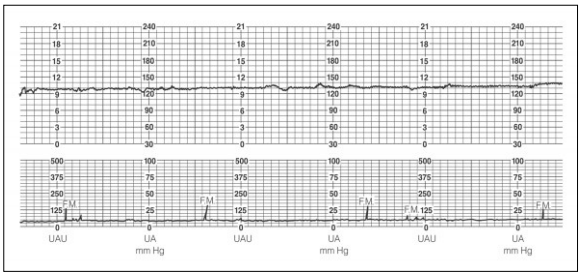
Such stimulation offers advantage of safely reducing the frequency of nonreactive NST's by 40% and overall testing time by almost 7 minutes. (ACOG, 2014)

321



Example of a reactive nonstress test (NST). Accelerations of 15 beats per minute lasting 15 seconds with each fetal movement (FM). Top of strip shows FHR; bottom of strip shows uterine activity tracing. Note that FHR increases (above the baseline) at least 15 beats and remains at that rate for at least 15 seconds before returning to the former baseline.

322



Example of a nonreactive NST. There are no accelerations of FHR with FM. Baseline FHR is 130 beats per minute. The tracing of uterine activity is on the bottom of the strip.

323

Non-stress Test (NST)

- 20 minute observation of the baby on the Electronic fetal monitor. Baseline fetal heart rate is established along with maternal pulse.
- *"Reactive":* NST defined by 2 accelerations in a 20 minute period, each 15X15, before 32 weeks 10 x 10.
- *"Nonreacitve"* NST defined by baby that doesn't demonstrate at least 2 accels in 20 minutes. Testing can be done twice for total of 40 minutes.

324

Contraction Stress Test

CST is based on the response of the FHR to uterine contractions (ACOG, 2014) .

Contractions are stimulated either through nipple stimulation or the administration of oxytocin.

Adequate uterine contraction pattern is present at least 3 each contractions, 40 seconds each 10 minute period.

Nipple stimulation is successful in inducing an adequate contraction pattern.

CST is interpreted according to the presence or absence of late decelerations

325

CST

Negative: no late or significant variables decelerations

Positive: late decelerations after 50% or more of contractions (even if the contraction frequency is fewer than 3 in 10 minutes)

Equivocal-suspicious: intermittent late decelerations or significant variable decelerations

Equivocal: FHR decelerations that occur in the presence of contractions more frequent than every 2 minutes or longer than 90 seconds

Unsatisfactory: fewer than 3 contractions in 10 minutes or an uninterpretable tracing

ACOG, No. 145, July 2014 Antepartum Fetal Surveillance

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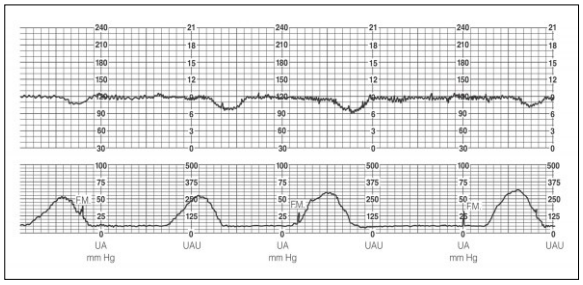
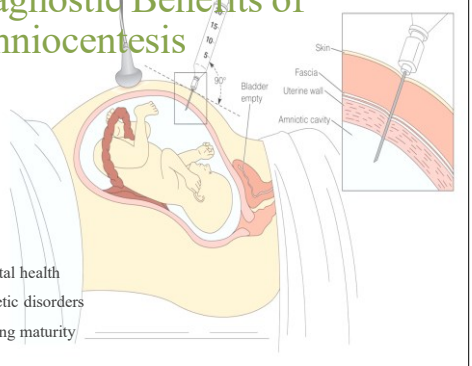


Example of a positive contraction stress test (CST). Repetitive late decelerations occur with each contraction. Note that there are no accelerations of FHR with three fetal movements (FM). The baseline FHR is 120 beats per minute. Uterine contractions (bottom half of the strip) occurred four times in 12 minutes.

327

Diagnostic Benefits of Amniocentesis



Evaluates fetal health

Detects genetic disorders

Evaluates lung maturity

328

Evaluating Amniotic Fluid

Purpose of amniotic fluid testing
- Evaluates health status of fetus

Quadruple test
- Evaluates AFP level
- Evaluates hCG level
- Evaluates UE3 level
- Evaluates inhibin-A
- Mostly used to screen
  - Down syndrome (trisomy 21)
  - Trisomy 18
  - Neural tube defects

329

Evaluation of Lung Maturity

L/S ratio 2:1
- Achieved by 35 weeks
- Risk of RDS is very low

Question: A biochemical marker of fetal lung maturity is
A. Appearance of phosphatidylglycerol
B. Increasing phosphatidylinositol
C. Sphingomyelin peak

330

Lecithin – to Spingomyelin (L:S ratio)

331

Chorionic Villus Sampling (CVS)

Performed between 10 and 12 weeks

Advantages
- Early diagnosis
- Quick results

Disadvantages
- Does not detect neural tube defects

332

Questions

Nuchal translucency testing would be of most benefit to a couple who had a history of

A. preterm delivery one year ago
B. Repeated spontaneous abortions in the second trimester
C. Trisomy 18 in the family

A series of ultrasound scans after the 20th week show that the fetal head is growing normally but the abdominal circumference is lower than expected. This may indicate?

A. Down syndrome
B. Neural tube defect
C. Placental insufficiency

333

Biophysical Profile (BPP)

The fetal well-being evaluated 5 different categories:

- NST
- Amniotic Fluid volume
- Fetal Movement
- Fetal Muscle Tone
- Fetal Respirations

Modified BPP

NST and AFI to assess fetal well-being

334

The Biophysical Profile

Component	Abnormal = 0 points	Normal = 2 points
Non-stress test	Abnormal (nonreactive)	Normal (reactive)
Amniotic Fluid Index (AFI)	No fluid pockets or 1 pocket less than 2cm AFI ≤ 5 cm	1 or more fluid pockets of at least 2 cm AFI > 5cm or at least one pocket > 2cm
Body movements	1 or 2 separate trunk or limb movements in 30 minutes	3 or more separate trunk or limb movements in 30 minutes
Muscle tone	No movements, slow extension with return to partial flexion, or limb movement in full extension	1 or more episodes of extremity extension with return to flexion , or opening or closing of a hand.
Fetal breathing movements	No breathing movements or no episode lasting 30 seconds or longer in 30 minutes of observation	

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Biophysical Profile (BPP)

- Based on fetal behavior and neurological development:
  - **Fetal tone**: begins about 7.5 – 8 weeks
  - **Fetal movement** : begins about 9 weeks
  - **Fetal breathing**:
    - Becomes regular 20-21 weeks gestation
    - Is observed about 30% of the time (sleep/wake cycles)
  - **Fetal accelerations and decelerations**:
    - Becomes functional end of 2nd trimester/early 3rd trimester, the ability to accelerate, decelerate

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Amniotic Fluid Volume Index (AFI)

- AFI evaluates quantity of amniotic fluid.
- Amniotic fluid is the result of fetal urine production. Adequate placental blood flow usually promotes adequate fetal renal blood flow and therefore adequate urine output. Thus amniotic fluid volume reflects long-term uteroplacental function.
- **Procedure** – scan 4 quadrants of abdomen. Measure one pocket of fluid in each quadrant. The pockets that are selected are free of fetal small parts. The centimeters of each measurements are added together.
- **Interpretation**
  - Normal (at term): 6.8 – 19.6 cm
  - Cut-off values for oligo and poly vary based on EGA

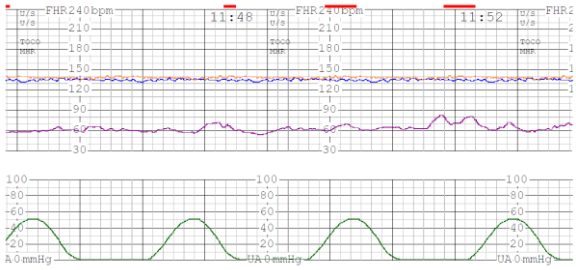
337

AFV/ AFI

Procedure	Qualitative AFV
Scan 4 quadrants of abdomen. Measure one pocket of fluid in each quadrant.	1 or more pockets of fluid measuring ≥ 2 cm in vertical axis
The pockets that are selected are free of fetal small parts/cord.	Either no pockets or largest pocket <2 cm in vertical axis
The centimeters of each measurements are added together.	

338

Patient desires additional dose of stadol….

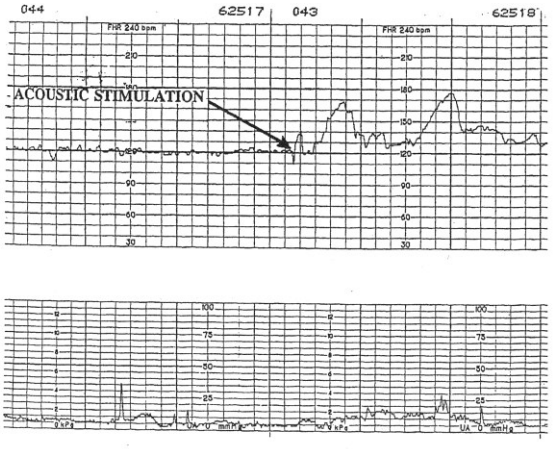


339

Scalp Stimulation

- Many studies show fetal heart rate acceleration in response to scalp stimulation were highly predictive of normal fetal scalp pH.
- Procedure
  - Digital pressure and stroking of the fetal scalp for 15 seconds during a vaginal exam
- Interpretations

340



341

INTERMITTENT AUSCULTATION

CONTINUOUS ELECTRONIC FETAL MONITORING

Intrapartum Fetal Monitoring

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Fetal Monitoring

Intermittent Auscultation

Normal

Abnormal

Management

FHR is auscultated during and for 30 seconds after the contraction.

- Advantages
- Disadvantages

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Awhonn Fetal Heart Rate Auscultation, 3rd Ed

Routine use of EFM has been linked to increases in operative vaginal birth and cesarean birth rates without an accompanying decrease in perinatal mortality or the incidence of childhood morbidity (Wisner, Holschuh, 2018).

- The increasing rates of C/S increases maternal morbidity and mortality, such as an immediate risk of hemorrhage or a delayed risk of morbidly adherent placenta in future pregnancies (awhonn, 2018).

Increasing the availability and use of IA for fetal surveillance in labor in women with low-risk pregnancies is recommended .

348

Awhonn
Fetal Heart Rate Auscultation, 3rd Ed

Increased use of IA is a strategy in the CMQCC toolkit for support vaginal birth and reduce primary cesareans (AWHONN, DEC 2018).

The rapid increase in the rate of EFM use initially exceeded the pace at which the effectiveness of the new technology could be gauged. The first clinical trials to compare EFM to IA in low-risk births showed no significant benefit to the technology (awhonn, DEC:2018).

Moderate variability, only assessed by EFM, has been considered a reliable indicator of the absence of fetal metabolic acidemia at the time it is observed (awhonn, 2018).

349

Intrinsic Factors that Affect the Fetal Heart Rate

FHR Control mechanisms

- Brainstem – a normal FHR pattern reflects an intact, oxygenated brainstem, autonomic nervous system, and heart.
- Baroreceptors and Chemoreceptors
- Anaerobic Metabolism
  - Metabolic acidosis and lactate
  - Lactic acid
- Fetal Circulation and the Redistribution of Blood
  - Shunting

350

Chemoreceptors/Baroreceptors

CHEMORECEPTORS

Sense chemical changes

Responses will be decreased with low volume and vasoconstriction

BARORECEPTORS

- Sense changes in vessel wall diameter
- Rise in BP related vagal stimulation
  - Reflex bradycardia
  - ↓ myocardial contractility (output)
- Fall in BP related sympathetic response
  - ↓ FHR

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Factors Influencing FHR Control

PARASYMPATHETIC

Originates in medulla oblongata

Stimulation releases acetylcholine

Decrease FHR

Slow, gradual decrease FHR with increase gestational age

SYMPATHETIC

Stimulation releases catecholamine

Catecholamines can also cause fetal vasoconstriction & hypertension

↑ FHR

Modulates baseline FHR with parasympathetic

352

Extrinsic Factors

- External environment
- Maternal lungs
- Maternal blood
- Maternal heart
- Maternal Vasculature
- Uterus
- Placenta
  - Placenta structure
  - Placental blood flow
  - Placenta in the oxygen pathway

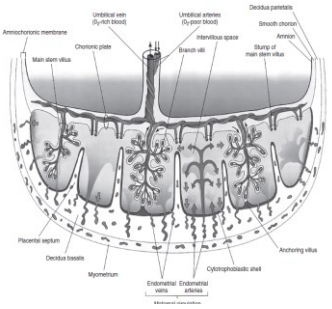
353

Maternal Uteroplacental Circulation

Uterine perfusion accounts for 10-15% of maternal cardiac output or 700-800 cc per minute.

Most blood is located in the intervillous space of the placenta surrounding the chronic villi.

Collapse or destruction of the intervillous space due to placental abruption, infarction, thrombosis or infection



354

Acid-Base Balance

- When the maternal-uterine-placental exchange system is interrupted, potential exists for fetal acidosis, which can lead to permanent damage or death.
- The body and all living cells are sensitive changes in acidity and alkalinity. An alteration of the pH of blood affects the functioning of the cells. Blood has buffers to keep pH constant.
- Alkalosis and acidosis can cause permanent damage to organs or progress to a fatal condition if not quickly restored.

355

Fetal Acid Base

- Lactic acid is major end product of anaerobic metabolism and is produced when the demand of muscles for oxygen during work exceeds the supply.
- When lactic acid accumulates, need for oxygen increases.
- The normal fetal metabolic process begins as glucose broken down into lactic acid. It is then converted into CO2 and H20. Carbon dioxide is waste product that is disposed. This is the process of how fetus produces energy.
- Interruption of blood flow to the uterus, across the placenta, or through umbilical cord, fetal acid base imbalance could occur.
- Fetal hypoxemia (decreased oxygen content in the blood) if this occurs it can lead to, hypoxia (decreased O2 in the tissues).
- Build up of lactic acid can cause acidemia (blood), and increase concentration tissues (acidosis).

356

Understanding Acid-Base

- Acidemia- the buildup of acid in the blood.
- Acidosis- the buildup in the tissues (reduced pH).
- Base deficit- amount of base used in attempt to normalize the pH, the more base used to normalize the pH, the larger the number becomes and the greater the deficit.
- Hypoxemia- reduction of oxygen in the blood.
- Hypoxia- reduction of O2 in the tissues
- pH- a representation of the H ion concentration
- Pco2-quantity of CO2 in the blood
- PO2 the quantity of O2 in the blood

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Normal and Abnormal Umbilical Cord Blood Acid-Base Values

	Normal Values	Metabolic Acidemia	Respiratory Acidemia
pH	≥ 7.10	< 7.10	< 7.10
Po2 (mm Hg)	≥ > 20	< 20	variable
PCO2 (mm Hg)	< 60	< 60	> 60
Bicarbonate (mEq/L)	> 22	< 22	≥ 22
Base deficit	≤ 12	> 12	< 12
Base excess	≥ - 12	< - 12	> - 12

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Cord Gas Intpretation

Cord Interpretation	Normal	Respiratory	Metabolic	Mixed Acidemia
pH	> 7.10	▼	▼	▼
PaO2	> 20 mmHg	Variable	▼	▼
PaCO2	< 60 mmHg	▲	No change	▲
HCO3 (bicarbonate)	> 22 mEq/L	No change	▼	▼
Basic Excess	> -12 mEq/L	No change	▼	▼
Basic Deficit	< 12 mEq/L	No Change	▲	▲

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Fetal Acid Base

METABOLIC ACIDOSIS

PH <7.10, O2 LOW, ≥12 BD

- Oxygen supply that is decreased over time, which leads to increase in lactic acid.
- O2 reserves are totally depleted
- The buffer base becomes depleted causing pH to fall as fetus becomes hypoxic.
- Cardiac output decreases greatly
- Brain O2 consumption decreases

RESPIRATORY ACIDOSIS

PH <7.10, CO2 HIGH, BD HIGH

- There is not a production or accumulation lactic acid.
- Respiratory acidosis occurs quickly and has potential for rapid recovery.
- Resolves quickly with PPV
  - Or intrauterine resuscitation
- Fetus with respiratory acidosis may have rise in FHR baseline, decrease or loss of accels and variability.

360

Question

- A cord blood gas represents respiratory acidosis when the
  - A. Base excess is high
  - B. PCO2 is high
  - C. PO2 is low

361

Pattern Recognition, Interpretation and Intervention

BASELINE FETAL HEART RATE
FETAL HEART PATTERNS
INTERVENTION/MANAGEMENT

363

AWHONN FHM Position Statement

The Role of the Nurse

Implementation of customary interventions in response to FHM data and clinical assessment is within the scope of practice of the RN.

Policies should support RN's making decisions regarding fetal monitoring practice, intervening **independently** when appropriate to maternal and/or fetal condition, and identifying appropriate mechanisms to use if there is a difference of opinion regarding interpretation of fetal monitoring data or a woman's plan of care.

364

AWHONN 2024 FHM Position Statement

Effective communication and collaboration among health care professionals are central to providing quality care and optimizing patient outcomes.

Policies, procedures, protocols, and practice guidelines that promote collegiality among health care professionals should be used in every facility.

AWHONN Fetal Heart Monitoring PROGRAM

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Awhonn Position Statement FHM, April 2024 Assess & Document

Using IA	Latent Phase < 4 cm	Latent Phase 4-5 cm	Active Phase >= 6cm	Second Stage (Passive fetal descent)	Second Stage (Active Pushing)
Low Risk without Oxytocin	Insufficient evidence to make a recommendation	Every 15-30 minutes	Every 15-30 minutes	Every 15 minutes	Every 5 – 15 minutes

AWHONN
PROMOTING THE HEALTH OF WOMEN AND NEWBORNS

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Awhonn Position Statement, April 2024, Assess ONLY

	Latent Phase > 4cm	Latent Phase 4-5 cm	Active Phase >= 6 cm	Second Stage (passive fetal descent)	Second Stage (active pushing)
Low Risk wo/ oxytocin	Insufficient evidence to make a recommendation Frequency at the discretion of the midwife or physician	Every 30 minutes	Every 30 minutes	Every 30 minutes	Every 15 minutes
High risk with risk factors	Every 15 minutes with oxytocin; every 30 minutes without	Every 15 minutes	Every 15 minutes	Every 15 minutes	Every 5 minutes

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AWHONN Position Statement

AWHONN Fetal Heart Monitoring PROGRAM

Fetal Heart Monitoring Education

Ongoing and periodic validation of knowledge and competence .

Awhonn urges each facility to establish and ensure availability of educational programs

Education should include: physiologic basis for interpretation, implications for support and interprofessional communication strategies.

(2024) AWHONN, JOGNN April

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Baseline Variability

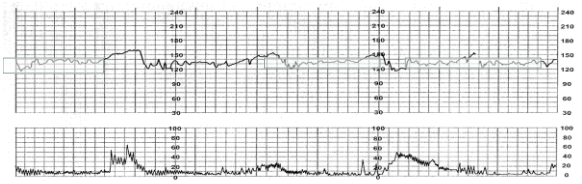
- There are four basic classes of FHR variability:
  - Absent
  - Minimal
  - Moderate
  - Marked
- They are classified based on visual quantification of the peak amplitude fluctuations of the FHR above and below the established baseline FHR.

369

Moderate Variability

Presence of moderate variability is highly correlated with absence of significant metabolic acidosis

The presence of FHR accelerations (whether spontaneous or elicited) or moderate FHR variability or both are highly predictive of normal fetal acid-base status (ACOG, 2010)



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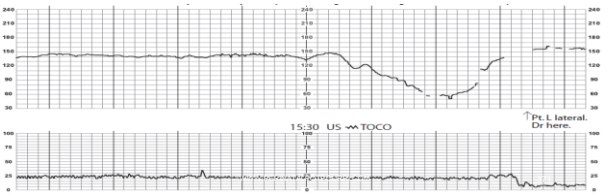
Minimal Variability

- May be cause for concern, could signify the presence of fetal hypoxia/acidosis.
- Any event causing diminished blood flow to the placenta depriving the fetus of oxygen, which can lead to tissue hypoxia and metabolic acidosis
- If minimal variability is suspected due to decreased fetal oxygenation , then maternal repositioning, administration of oxygen, or IV fluid bolus may be considered (ACOG, 2010)



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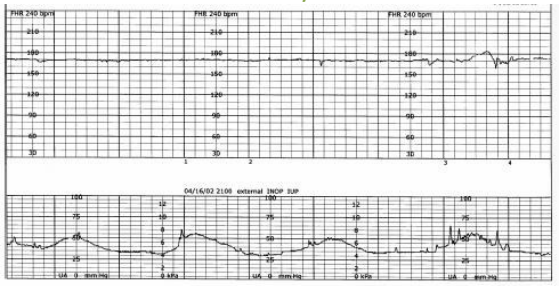
Absent Variability



372

Minimal or Absent Variability

Hypoxic causes (with metabolic acidosis)	Nonhypoxic causes
Possible etiology: uteroplacental insufficiency, cord compression	
Cord prolapse/compression	Prematurity
Maternal hypotension	Fetal sleep cycles
Uterine hyperstimulation (tachsystole)	Medication effect (narcotics)
Abruptio placentae	Fetal anomaly (congenital)
Tachycardia	Tachycardia
Dysrhythmias	Dysrhythmias
	Preexisting neurologic injury

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Minimal or Absent Variability

Goal of Intervention	Rationale
Determine cause	Increases chances of improving oxygenation status
Lateral positioning	Improve maternal circulation and perfusion to placenta; improve blood flow through the umbilical cord
IV fluid bolus	Increase maternal cardiac output and uterine perfusion
Administer oxygen 8-10 L/min by mask	Increase maternal oxygen carrying capacity to improve fetal oxygenation
Discontinue any labor stimulant	Improve uterine blood flow
Assess maternal vital signs	Determine accurately maternal hemodynamic status
Palpate uterus	Palpation is effective in determining tachysystole
Consider internal monitoring	More accurate assessment
Communicate and Document	Clinician should assess, charge nurse needs to plan staffing and provide expertise and assistance

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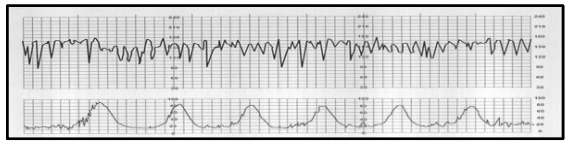
Marked Variability



Fluctuations greater than 25 bpm.

It could be a sign of a mildly hypoxemic or compromised fetus.

Usually observed in the intrapartum period during the 2nd stage, sign of fetal activity.

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Marked Variability

Hypoxic Causes	Nonhypoxic Causes
Cord prolapse/compression	Fetal activity
Maternal hypotension	Fetal stimulation
Tachysystole	
Abruptio Placentae	
Goal of Intervention : Improve uteroplacental blood flow and perfusion through the umbilical cord	Rationale: Improving the amount and quality of blood flow to the fetus will assist with attempts at recovery
Intrauterine resuscitation techniques	Improve maternal circulation, blood flow and oxygen carrying capacity.
Communicate with healthcare providers and personnel in charge, and document in medical record	Care provider should assess condition, examine FHR strips, charge nurse will need to plan staffing accordingly and medical record should reflect assessments and interventions.

376

Baseline 110-160 BPM

The mean FHR rounded to increments 5 BPM during a 10-minute segment, excluding:

- Periodic or episodic changes
- Periods of marked variability
- Segments that differ by > 25 bpm

The 3 key elements of EFM patterns are:

1. Baseline rate
2. The variability reflects oxygenation of CNS and placental/fetal reserve
3. Presence or absence of decelerations
   1. Shape and timing indicates mechanism of insult
   2. Late decelerations indicate decrease in blood flow through the placenta due to acute or chronic changes

377

Baseline Fetal Heart Rate (FHR)

- In any 10-minute window the minimum baseline duration must be at least 2 minutes otherwise the baseline for that period is described as indeterminate.
- If baseline is indeterminate, it is acceptable to refer to the previous ten-minute segment for determination of the baseline FHR.

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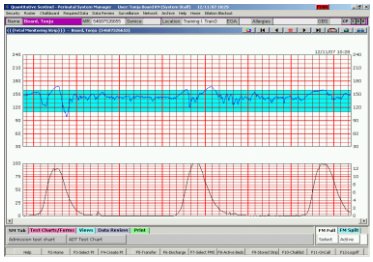


Imaginary line drawn through middle of variability complexes.

378

Bradycardia (less than 110 bpm)

- Less than 110 bpm that last more than 10 mins
- If variability is moderate with bradycardia, it can be considered benign or normal.
- Bradycardia with minimal or absent variability or prolonged decelerations or both do not resolve, then prompt delivery is recommended (AWHONN, ACOG 2010) .

379

Bradycardia

Causes

- Fetal hypoxia
- Cord compression
- Maternal hypotension
- Tachysytole
- Abruptio placenta
- Uterine rupture
- Second stage of labor
- Hypoglycemia
- Hypothermia
- Medications
- Structural defects
- AV dissociation (heart block)

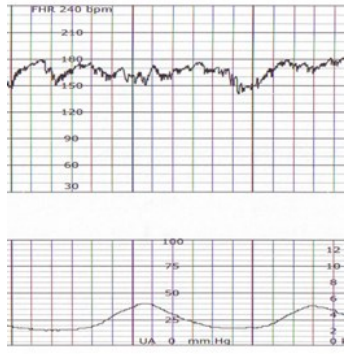
Interventions

- Determine accuracy
- Lateral positioning
- Administer oxygen
- Vaginal examination
- IV fluid bolus
- Determine urgency
- Modified pushing
- Variability
- Discontinue labor stimulant

380

Tachycardia (> 160 bpm)

- Watch for gradual increases in the FHR that occur overtime.
- Further assessment of accelerations, decels, variability is warranted.
- Treatment for a category II tracing with tachycardia should be directed to the underlying cause



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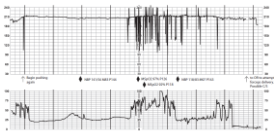
Tachycardia



- Progressive disruption of fetal oxygenation as with fetal tachycardia, can lead to metabolic acidemia.
- Prompt consideration should be given to locate possible reasons for the increase in FHR.
- Potential Causes
  - Maternal Fever
  - Infection
  - Fetal anemia
  - Hyperthyroidism
  - Drugs
    - Caffeine
    - Cocaine

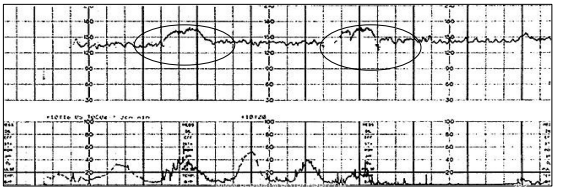
382

Accelerations

Visually apparent increase in the FHR from baseline (ACOG, 2005)

Over 32 weeks gestation accels are defined as 15 beats above baseline for 15 secs

Before 32 weeks defined as acme 10 bpm above lasting 10 sec



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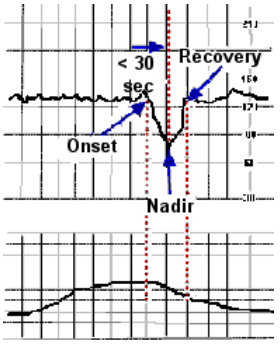

Variable Decels

- Characteristics of variable decelerations
  - Variable shape, onset, offset, depth (amplitude)
- Characteristics of normal tracing with variable deceleration
- Characteristics of abnormal tracing with variable deceleration
  - Interventions for variable decelerations

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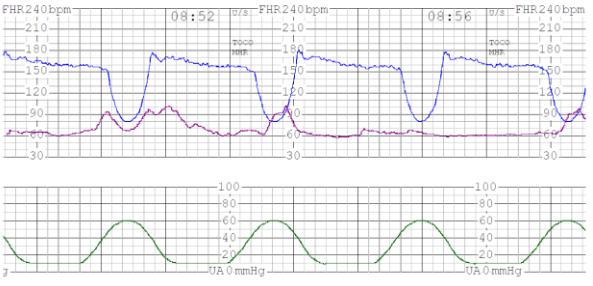

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Early Deceleration

- Associated with uterine contraction , a visually apparent, gradual (onset to nadir 30 sec or more) decrease in FHR with return baseline
- Vagal stimulation (unrelated to hypoxia)
- Pressure of the head against the cervix during contractions

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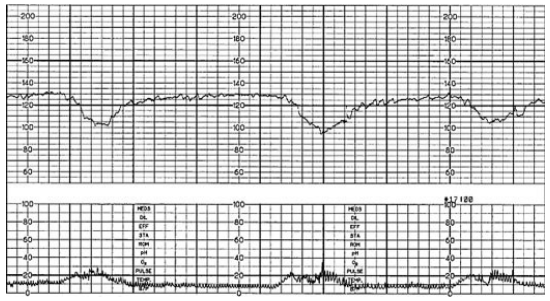
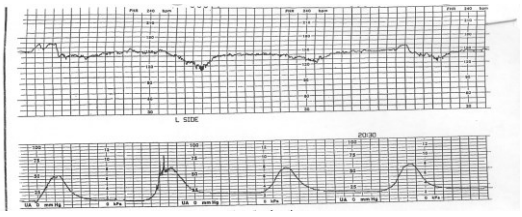


387

Late Decelerations

Onset, nadir, and recovery of the deceleration occur after the beginning, peak, and end of the contraction, respectively (ACOG, Vol 114:1, July 2009, 2010)

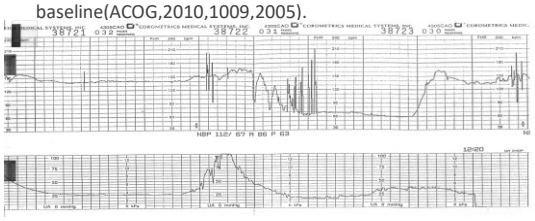


388

Prolonged Deceleration

Visually apparent decrease in the FHR below the baseline (ACOG, 2010,2009,2005).

Deceleration is 15 bpm or more, lasting 2 min or more but less than 10 minutes from onset to return to baseline(ACOG,2010,1009,2005).



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Prolonged Decelerations

Causes

- Isolated cord compression
- Maternal hypotension
- Vagal stimulation
- Vigorous scalp stimulation
- Increased uterine activity
- Abruptio placenta
- Uterine rupture
- Cord prolapse, short cords, and true knots
- Maternal seizure activity

Interventions

- Change position
- Administer oxygen
- IV hydration
- Discontinue oxytocin
- Perform vaginal examination to rule out prolapsed cord.
- Administer uterine relaxants
- Notify provider
- Prepare for delivery

390

Fetal Heart Rate Categories

Category I requires ALL of the following	Category II	Category III requires AT LEAST ONE of the following
Baseline – 110-160 bpm	*Includes all FHR tracings that are not included in Category I or III*	*Absent variability with recurrent late decelerations*
Variability – Moderate		*Absent variability with recurrent variable decelerations*
Late decelerations absent		*Absent variability with bradycardia*
Variable decelerations absent		*Sinusoidal pattern for at least 20 minutes*
Prolonged decelerations absent		

So how many Categories do you need to actually KNOW?

391

Liability Issues in Intrapartum Care (3% = 5 questions)

Components of Malpractice
- Medical malpractice
- Negligence

Standard of Care
- Where are they found?

Key Elements of a suit
- Duty to the patient
- Breach of that duty
- Injury to the patient
- Casual link between the breach and the patient's injury

396

Key Terms

- **Duty**: The patient is owed a specific duty or standard of care; For example, a triage nurse and a pregnant patient presents and is expected to be evaluated under your care, and/or any patient assigned during a scheduled shift.
- **Breach of duty**: There was a failure to meet the required standard of care. The standard of care is then defined as standards of care in nursing are guidelines that provide a foundation as to how a nurse should act, and what they should and should not do in their professional capacity
- **Proximate cause**: A direct causal relationship exists between the breach of duty and the harm or injury to the patient. For example, the nurse may have taken care of the patient for one of her multiple triage visits during her pregnancy. There is a casual relationship between the patients care across multiple admissions.
- **Harm or injury**: Actual harm or injury occurred to the woman, fetus, or neonate because of the breach of duty

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General Areas of Nursing Management Cited in Legal Cases

- Improper medication administration
- Failure to assess mother for side effects of medication or intervention
- Improper use of equipment or availability of equipment
- Poor or inadequate communication and or collaboration
- Failure to act as patient advocate and initiate chain of command
- Failure to follow provider orders
- Failure to verify informed consent
- Verbal and telephone orders
- Timely or inaccurate assessment
- Lack of knowledge and clinical competency

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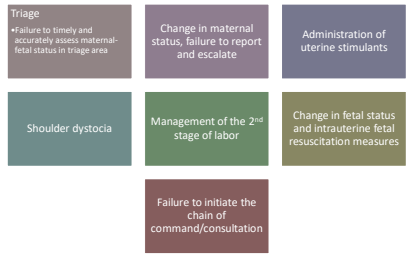
Legal Issues Unique to Intrapartum Care



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Legal Issues Unique to Intrapartum Care

- Operative vaginal birth
  - Verification of informed consent
  - Verification of fetal station
  - Requesting appropriate personnel to attend birth
  - Maternal positioning
- Anticipation of neonatal compromise
- Timing of cesarean birth
  - **Emergent**-immediate threat to life of mother/fetus-Category 1
  - **Indicated**- not immediate threat to lie of mother or fetus-Category 2
  - **Scheduled**- scheduled- Category 3

400

EFM: Documentation Mnemonic

Letter Description	
C	Concise Critical thinking Chart near the time that the events occurred
L	Logical and objective and without bias
E	Explicit, direct, always use standardized terminology Express discomfort and offer alternatives
A	Accurate, truthful
R	Responses: document patient's response to interventions and response to escalation requests, continue with reasoning and ratification

401

EFM/FHR Documentation

- **Uterine activity**
  - Resting tone, frequency, duration, and intensity
- **Baseline FHR**
- **FHR** changes noted over time
- **Variability:** present or absent
- **Accelerations**: absent or present
- **Decelerations**: present or absent and descriptive patterns
  - Recurrent or intermittent
  - Follow institution/unit policy on documenting details
  - Details of hand-off, reporting to a healthcare provider to validate invertentions or ongoing monitoring

402

EFM: Chain of Command

Chain of command

- Check your institutions policy on chain of command and be sure it is followed
- Document what is communicated with healthcare provider, their responses and follow-up expected communication, outcomes or interventions

Communication

- SBAR, Respectful care, conflict resolution, patient education, plan of care, disclosure, informed consent/respectfully declining
- Collaboration
  - Providers and institutions need to use evidence-based care, appropriate follow-up and evaluation
  - Patient should be included in the plan of care and adjustments made as needed

403

Strategies to Avoid Malpractice Claims

1. Review institutional policies, guidelines and protocols ensure they are current and utilize evidence-based practice
2. Perform only skills within your scope of practice
3. Stay current in OB and with technological advances by attending continuing education conferences, seminars and in-services
4. BE A PATIENT ADVOCATE AND USE CHAIN OF COMMAND
5. Document using standard terminology

404

Strategies to Avoid Malpractice Claims

1. Get to know your patients
2. Don't make excuses
3. Report near-miss situations and be proactive to search for solutions to fix the issue before injury occurs.
4. Establish culture that supports asking for help, information or clarification
5. Golden Rule – treat others the way we would want our own family treated.

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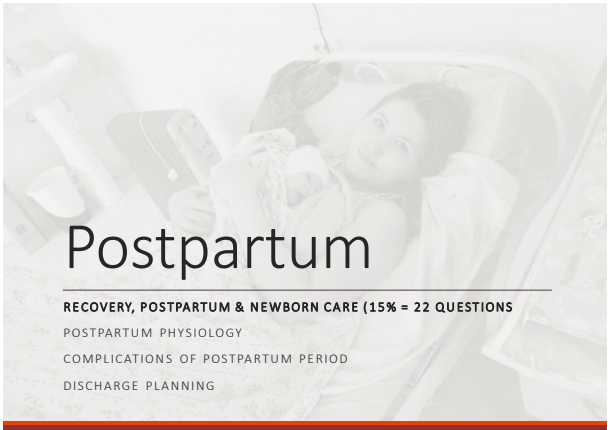

Postpartum

RECOVERY, POSTPARTUM & NEWBORN CARE (15% = 22 QUESTIONS

POSTPARTUM PHYSIOLOGY

COMPLICATIONS OF POSTPARTUM PERIOD

DISCHARGE PLANNING

407

Postpartum Period

- Critical transition period for woman, newborn, and family physiologically and psychologically
- Puerperium: period after delivery of placenta, lasting for 6 weeks
- Possible definition: changes in all aspects of mother's life that occur during the first year following birth of child
- Maternal physiologic and psychological changes
- Mother and family adjustment to new family member

408

Maternal Physiologic Adaptations

Reproductive system

- Uterus
- Lochia
  - Rubra
  - Serosa
  - Alba
- Cervix
- Vagina
- Perineum

The hypoestrogenic state in the postpartum period is responsible for

A. atrophy of vaginal mucosa
B. erythematous and edematous introitus
C. increased vaginal mucus production

409

Postpartum Physical Adaptation's

Involution of
Immediately a
placenta, the
the midline an
between the sy
umbilicus. Ab
birth, the func
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then decrease
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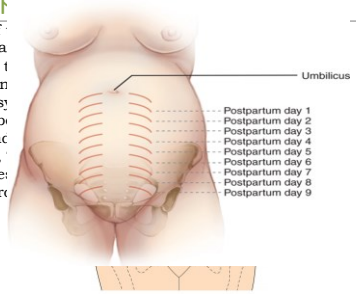

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Ovulation and Menstruation/Lactation

- Return of ovulation and menstruation varies for each postpartum woman
  - Menstruation returns between 6 and 10 weeks after birth in nonlactating mother - Ovulation returns within 6 months
  - Return of ovulation and menstruation in breastfeeding mother is prolonged related to length of time breastfeeding continues
- Breasts begin milk production - milk production is a result of interplay of maternal hormones

412

Cardiovascular System Adaptations

Blood volume and cardiac output

Hematocrit level

Pulse rate and blood pressure

Coagulation factors

Red blood cell production

413

Vital Signs and Blood Values

Decreased blood volume - bradycardia rates of 50 to 70 beats per minute occur during first 6 to 10 days

White blood cell count often elevated after delivery, activation of clotting factors predispose to thrombus formation - hemostatic system reaches non-pregnant state in 3 to 4 weeks

Risk of thromboembolism lasts 6 weeks

414

Gastrointestinal Changes

Gastrointestinal motility might remained decreased, leading to possible constipation

Normal bowel elimination resumes 2 to 3 days post delivery

Average weight loss is 12pounds at time of delivery; another 5lbs is lost during first few weeks with diuresis

415

Urinary System Changes

Post delivery edema of bladder, urethra, and urinary meatus is common because of delivery trauma

Kidney function

- Mild proteinuria might persist in early postpartum
- Normal function returns by 4 weeks after delivery

416

Endocrine System

- Placental hormones
  - HCG levels are nonexistent at end of the first postpartum week
  - HPL is undetectable within1day after birth
  - Progesterone levels are undetectable by 3 days after childbirth (Ricci, 2009).
  - Estrogen lowest level week after birth; lactating women levels continue to be decreases until feeding frequency changes
- Pituitary hormones
  - Prolactin levels rise significantly during the 1st 2 weeks and rapidly decline to prepregnant levels in the absence of breastfeeding.
  - FSH and LH are absent during the 1st few weeks of the postpartum period.

417

Respiratory System Changes

Respirations usually remain within normal adult range16-24 bpm

Anatomic changes resolve quickly; relieving discomforts such as SOB, rib cage aches

Tidal volume, minute volume, vital capacity, and functional residual capacity return to prepregnant values, typically within 1 to 3 weeks of birth (Ricci, 2009).

418

Musculoskeletal System Changes

Abdominal musculature

- Muscles relaxed because of stretching during pregnancy
- Separation of the rectus muscle, can be resolved by 6 weeks with gentle exercise
- Joints stabilize again after 6 to 8 weeks postpartum

419

Integumentary System Changes

Hyperpigmentation gradually disappears after delivery

Diaphoresis is common, especially at night for the first few week

- Can become profuse at times
- Is a mechanism to reduce fluids retained during pregnancy

420

Lactation

Engorgement : Breastfeeding

- Process of swelling of the breast tissue due to an increase in blood and lymph supply as a precursor to lactation
- Frequent emptying, warm showers and compresses before feeding, cold compresses between feedings, if breast feeding

Engorgement: Bottle Feeding

- Tight supportive bra, ice, avoidance of breast stimulation

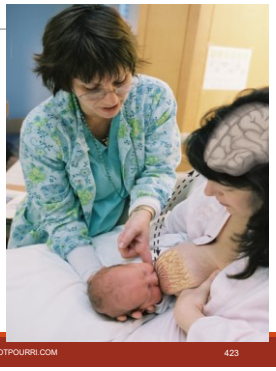
422

Lactation

Secretion of milk by the breasts

Result of interaction of progesterone, estrogen, prolactin, and oxytocin

Typically appearing 3 days after childbirth



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Stages of Human Milk

- Lactogenesis 1
  - Colostrum is available to the infant at delivery and remains available for up to 5 days PP.
  - Thick and yellow
  - Volume varies from 2 to 20ml per feeding
  - Higher in protein and lower in fat and sugar than mature breast milk.
- Lactogenesis II
  - Onset copius milk secretion
  - Transitional milk
  - Mature milk
    - Foremilk
    - Hindmilk
- Lactogenesis III
- Maintenance of lactation is dependent on effective removal of milk from the breast.
- The longer the milk stays in the breast, the slower milk production becomes

424

Urinary System Adaptations

Voiding sensation: affected by:

- Perineal lacerations
- Generalized swelling and bruising of the perineum and tissues surrounding the urinary meatus
- Hematomas
- Decreased bladder tone due to regional anesthesia
- Diminished sensation of bladder pressure due to swelling, poor bladder tone, and numbing effects of regional anesthesia used during labor

Diuresis:

- Large amounts fluids in labor
- Antidiuretic effect of oxytocin
- Build-up of extra fluids during pregnancy

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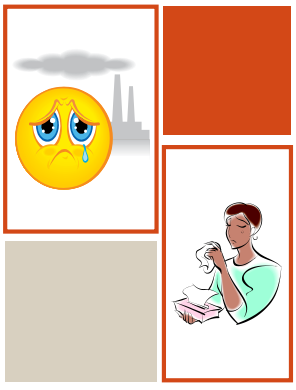
Postpartum Psychologic Adaptions: Reva Rubin's Phases

Taking-in Phase: the time immediately after birth when the client needs sleep, depends on others to meet her needs, and relives the events of the birth process

Taking-hold Phase: the second phase of maternal adaptation, characterized by dependent and independent maternal behavior

Letting-Go Phase: the third phase of maternal adaptation, occurring later in the postpartum period as the woman reestablishes relationships with other people\

428



Postpartum Blues

- Transient period of depression
  - Occurs first few days after delivery
  - Mother may experience tearfulness, anorexia, difficulty sleeping, feeling of letdown
- Usually **resolves** in 10 to 14 days (may peak 4th or 5th day)
- Caused by:
  - Changing hormone levels
  - Psychologic adjustments
  - Unsupportive environment
  - Insecurity
  - Fatigue
  - Discomfort
  - Overstimulation

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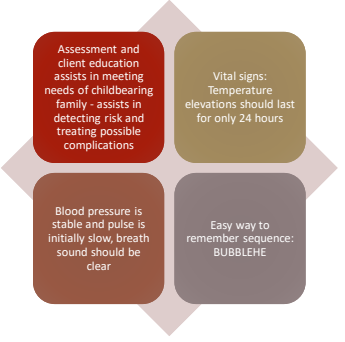
Assessment



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Postpartum Family at Risk

Common Complications	RISK FACTORS
Hemorrhage	Overdistention of uterus due to large baby, multiple gestation, multiparity
Infection	Rapid or prolonged labor
Thromboembolic disease	Oxytocin induction of labor
Postpartum psychiatric disorders	Precipitous induction of labor
	Precipitous delivery, cesarean section
	PROM
	Urinary catheterization

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Nursing Assessment

Assess	Check	Examine
Assess fundus for signs of bogginess : • note height, tone, and position of fundus	Check vital signs, note • ↑ Temp • ↑ RR • ↑ HR • ↓ blood pressure • Symptomshock	Examine perineal pads - Note • Amount • Color and odor • Consistency • presence and size

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Signs and Symptoms

- Following signs and symptoms should be assessed for various postpartum complications
  - Hemorrhage: Vaginal bleeding, hemoglobin hematocrit, and CBC results
  - Infection: Fever, purulent discharge from vagina or incision, erythema at incision site, increased WBCs, burning during urination, redness/pain in breast about fourth postpartum week
  - Note Homan's sign, pain, tenderness, swelling in lower extremities
  - Depression: Overwhelming sadness, low self-esteem, lack of desire to care for child

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Preventive Measures

Assess	Monitor
Assess fundus for bogginess - if boggy, perform fundal massage •Monitor hemoglobin and hematocrit - assess for signs of anemia and avoid traumatic procedures •Assess perineal pads for excessive bleeding - check for clots	Monitor for bladder distension, encourage mother to void frequently - catheterize if necessary

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Risk Factors for Postpartum Infection

- Operative procedure (forceps, cesarean birth, vacuum extraction)
- History of diabetes, including gestational-onset diabetes
- Prolonged labor (more than 24 hours)
- Use of indwelling urinary catheter
- Anemia (hemoglobin less than 10.5 mg/dL)
- Multiple vaginal examinations during labor
- Prolonged rupture of membranes (more than 24 hours)
- Manual extraction of placenta
- Compromised immune system (HIV positive)

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Risk Factors for Postpartum Hemorrhage

- Precipitous labor (less than 3 hours)
- Uterine atony
- Placenta previa or abruptio placentae
- Labor induction or augmentation
- Operative procedures (vacuum extraction, forceps, cesarean birth)
- Retained placental fragments
- Prolonged third stage of labor (more than 30 minutes)
- Multiparity, more than three births closely spaced
- Uterine overdistention (large infant, twins, hydramnios

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Postpartum Family at Risk

Uterine Atony

- Lack of uterine muscle tone - caused by conditions that overdistended uterus and affect uterine contractibility, and medication
- Perform fundal massage and check for clots (if contracted)

Administer uterine stimulants as ordered to monitor for side effects

Retained Placental Pieces

- Commonly occurs when fundus is massaged prior to spontaneous placental separation
- Suspect if client is bleeding with firm fundus and no laceration
- Inspect fundus thoroughly after its delivery

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ORDER

ORDER	
O = Oxygenate	Supplemental oxygenation is essential to prevent tissue hypoxia
R = Restore	Restoration of intravascular volume is an initial goal of fluid resuscitation
D = Drug therapy	Initial management PPH Oxytocin 20 units in 1000ml. 2nd line Methergine IM to produce sustained uterine contractions
E = evaluate	Following initial stabilization of cardiovascular status and oxygenation. Full nursing assessment at appropriate intervals
R = Remedy the underlying cause	Successful management ways heavily on identifying the underlying problem.

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Blood Estimation Table

Blood volume loss	BP (systolic)	Pulse	Signs & symptoms	Degree of shock
500–1000 ml (10–15%)	Normal	Normal	Palpitation, dizziness	Compensated
1000–1500 ml (15–25%)	Slight fall (80–100 mm Hg)	> 100	Weakness, tachycardia, sweating	Mild
1500–2000 ml (25–30%)	Moderate fall (70–80 mm Hg)	> 120	Restlessness, pallor, oliguria	Moderate
2000–3000 ml (35–45%)	Marked fall (50–70 mm Hg)	> 140	Collapse, air hunger,	Severe

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Uterotonic Agents for PPH

Drug	Dose	Route	Frequency	Side Effects	Contraindications
Pitocin Oxytocin 10 units/ml	10-40 units per 1000ml	IV	Continuous	Nausea, vomiting, hyponatremia ("water intoxication") with prolonged IV admin. ↓ BP and ↑ HR with high doses, esp IV push	Hypersensitivity to drug
Methergine (Methylergonovine) 0.2mg/ml	0.2 mg	IM	Q 2-4 hours If no response after 1st dose, it is unlikely that additional doses will benefit	Nausea, vomiting Severe hypertension, esp. with rapid administration or in patients with HTN or PH	Hypertension, preeclampsia, Heart disease Hypersensitivity to drug Caution if multiple doses of ephedrine have been used, may exaggerate hypertensive response w/possible cerebral hemorrhage
Hemabate (15 – methyl PG F2a) 250 mcg/ml	250 mcg	IM	Q 15-90 min Not to exceed 8 doses/24hours	Nausea, vomiting, Diarrhea Fever (transient), Headache Chills, shivering Hypertension Bronchospasm	Caution in women with hepatic disease, asthma, hypertension, active cardiac or pulmonary disease
CytotecR (misoprostol) 100 or 200 mcg tablets	800 – 1000mcg	PO, PR, per vaginally	Depends on route and dosage	Nausea, vomiting, diarrhea Shivering, Fever (transient) Headache	Rare Known allergy to prostaglandin Hypersensitivity to drug

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TXA: Tranexamic Acid

The World Health Organization (WHO) recommends early use of intravenous tranexamic acid (TXA) within 3 hours of birth in addition to standard care for women with clinically diagnosed postpartum hemorrhage (PPH) following vaginal birth or caesarean section.

Administration of TXA should be a part of the standard PPH treatment and be administered as soon as possible after onset of bleeding and within 3 hours of birth.

TXA for PPH treatment should not be initiated more than 3 hours after birth.

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TXA: Tranexamic Acid

TXA should be used in all cases of PPH, regardless of whether the bleeding is due to genital tract trauma or other causes.

TXA should be administered at a fixed dose of 1 g in 10 mL (100 mg/mL) IV at 1 mL per minute (i.e., administered over 10 minutes), with a second dose of 1 g IV if bleeding continues after 30 minutes.

TXA should be administered via an IV route only for treatment of PPH. Research on other routes of TXA administration is a priority.

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TXA: Tranexamic Acid

Contraindications for TXA in PPH: should NOT be used in women…

- With a clear contraindication to anti-fibrinolytic therapy, including TXA (e.g. a known thromboembolic event during pregnancy, history of coagulopathy, active intravascular clotting, or known hypersensitivity to TXA)

General Side Effects:

- Any signs and symptoms of a thromboembolic event

RARE:

- Blurry vision or changes in vision

Confusion

Dizziness or lightheadedness

Numbness of the hands

Pain, redness, or swelling in the arm or leg

Sudden shortness of breath or troubled breathing

Convulsions or seizures

Chest pain

Increased heart rate

- **Other generalized (still RARE) side effects include:**
  - Anxiety
  - Increased thirst
  - Cough
  - Loss of appetite
  - Sudden change in urinary frequency

444

TXA: Tranexamic Acid

Other generalized (still RARE) side effects include:

- Anxiety
- Increased thirst
- Cough
- Loss of appetite
- Sudden change in urinary frequency

Symptoms of Overdose:

- Diarrhea
- Muscle twitching or jerking
- Rash

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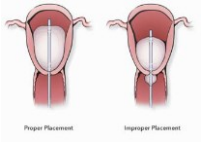

Balloon Tamponade

The process for using the intra-uterine balloon is as follows:

Insert the end of the balloon through the cervix into the uterine cavity, ensuring the balloon is completely inside the uterus

Inflate the balloon with sufficient volume of warm sterile saline (approx 250–500 ml)

The uterus should now be firm with minimal blood loss

Commence broad spectrum antibiotic cover

Continue or commence oxytocin infusion

If bleeding is not controlled, remove the balloon and attempt further management options.

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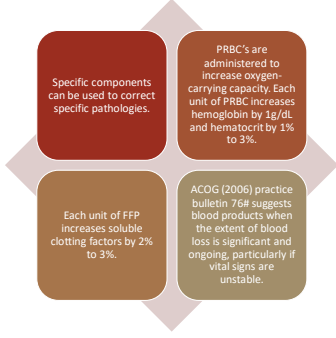

Blood Component Therapy

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Blood Component Therapy

Purpose of transfusion of blood products is to replace coagulation factors and red-cells for oxygen-carrying capacity, not for volume replacement.

Administration of blood transfusions are not without risks; HCV transmission was high from blood administration before 1992. Blood transfusion from an anti-HCV positive donor results in more than 80% chance of infectivity.

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Blood Alternative Therapies

Cell Salvage	**Reduces blood loss: blood is recovered during surgery, washed, filtered in continuous process and returned to the patient.**
Hemodilution	Reduces blood loss: During surgery blood is removed, replaced with nonblood volume expanders. Thus blood remaining is diluting making larger volume . End of surgery the diverted blood is returned.
Heart-Lung Machine	Maintains circulation: Blood is diverted to an artificial heart-lung machine where it is oxygenated and directed back to patient.
Dialysis	Functions as an organ: Blood circulates through machine, filters, cleans and returns it to the patient
Plasmapheresis	Treats illness
Labeling or tagging	Diagnosis or treat illness
Platelet Gel; Autologous (from your own blood)	Seal wounds, reduces bleeding

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Cultural Considerations

Blood transfusions and Jehovah's Witnesses

Ethical Dilemma

Jehovah's Witness want good medical and surgical treatment, just without the use of blood.

All types of surgeries are being performed successfully without blood : open heart operations, brain surgery, total hip and knee replacements and removal of cancerous organs.

Understanding the biblical command

Acts 15:20 "That they abstain from pollutions of idols and from fornication, and from things strangled and from blood" (Holy Bible, King James Version).

Acts 15:29 "That ye abstain from meats offered to idols, and from blood….from which if ye keep yourselves, you shall do well"

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Thromboembolic Conditions

Inflammation of blood vessel lining

Three most common types

- Superficial thrombosis
- Deep vein thrombosis
- Pulmonary embolism

Pathophysiology

- Venous stasis – in the lower extremities resulting from compression of the inferior vena cava and pelvic veins, develops approx 25 to 6 weeks PP.
- Injury to innermost layer of blood vessel
- Hypercoagulation – pregnancy is normally a hypercoagulable state with increased fibrin generation and coagulation factors II, VII and X.

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Thromboembolic Conditions

Nursing Assessment
- Risk factors
- Signs and symptoms

Dependent edema, tachycardia, tachypnea, dyspnea, unilateral leg pain, low grade fever or edema

Nursing Management
- Prevention
- Adequate circulation: NSAIDs, bed rest, antiembolism stockings, anticoagulant therapy (heparin); emergency measures for pulmonary embolism
- Education

•Unfractionated heparin can be resumed following a vaginal delivery within 4 to 6 hours and 12 hours after cesarean. If the patient is switched to Coumadin, there must be an overlap with heparin for the first 4 to 5 days.
•Warfarin is safe during breastfeeding

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ADAPTATION TO EXTRAUTERINE

ASSESSMENT

RESUSCITATION

PATHOPHYSIOLOGY: INITIAL ASSESSMENT/NURSING INTERVENTIONS

GASTROINTESTINAL DISORDERS

BIRTH INJURIES/TRAUMA

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Newborn

Section: Postpartum & Newborn Care (15% = 7 questions – PP and Lactation)

Physiologic Adaptations

Respiratory system
- Initiation of breathing : Oxygenation of the fetus occurs through transplacental gas exchange.
- Chemical factors
- Mechanical factors: respirations in the newborn are stimulated by chest compression during vaginal birth
- Thermal factors: the newborn enters extrauterine environment , temperature is significantly lower. Temperature stimulates receptors in the skin resulting in stimulation of the respiratory center in the medulla.
- Sensory factors : handling of the infant, suctioning, drying by the nurses

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Physiologic Adaptations

- Transition from Fetal to Neonatal Respiration

Change at Birth	Result
The baby breathes. The umbilical cord is clamped, separating the placenta from the baby.	The newborn uses the lungs, instead of the placenta, for gas exchange.
Fluid in the alveoli is absorbed.	Air replaces fluid in the alveoli. Oxygen moves from the alveoli into the pulmonary blood vessels and CO^2 moves into the alveoli to be exhaled.
Air in the alveoli causes blood vessels in the lung to dilate.	Pulmonary blood flow increases and the ductus arteriosus gradually constricts.

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Physiologic Adaptations

- Cardiovascular system
  - Heart rate and sounds
- Blood volume: varies depends on placental transfer. The average 85 ml/kg of body weight. Immediately after birth total blood volume 300ml, but can increase depending on time attached to placenta (could be up 100ml more).
  - Early cord clamping – reduces the mean blood volume
  - Late cord clamping – expands blood volume, from placental transfusion this increases respiratory rate, increase heart size and higher systolic BP, and increased respiratory rate. Blood volume increases by 50% with delayed cord clamping
  - Placental vessels have 75 to 125 mL of blood at term
  - Blood can transfer to newborn by holding newborn below levels of placenta and delay clamping of cord

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Physiologic Adaptations

Hematopoietic system

Red blood cells

- Fetal circulation is less efficient at oxygen exchange than the lungs, the fetus needs additional RBC's for transport of oxygen in utero.
- At birth the average levels of RBC's, H &H are higher than the adult.
  - Hemoglobin - 14-20 g/dL
  - Hematocrit – 43% -63%
  - WBC – 10,000 -30,000/mm^3
  - Blood volume- 82.3 ml/kg with early cord clamping and 92.6ml on 3rd day with delayed cord clamping

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Physiologic Adaptations

Thermogenic system

- Thermoregulation
- Heat loss
- Thermogenesis
- Cold stress
- Hyperthermia
  - Excess heat production related to sepsis or to a decrease heat loss.
  - Serious overheating in the newborn can cause cerebral damage from dehydration or even heat stroke and death.

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Question

The primary method in which the newborn produces heat in response to cold stress is

A. Biochemical thermogenesis
B. Shivering
C. Voluntary muscle activity

With neonatal resuscitation, initial response to adequate ventilation is improvement in

A. Apgar score
B. Color
C. Heart rate

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Mechanisms of Heat Loss

Concept #1: Heat is lost on a gradient from warmer to cooler. The larger the gradient, the faster heat is lost.

Concept #2: Heat loss is faster when there is more than one mechanism of heat loss present.

If not protected from heat loss, the infant's body temperature may drop as quickly as 0.2 to 1°C per minute.

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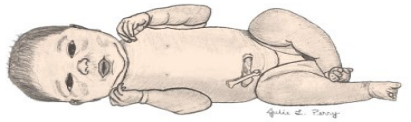

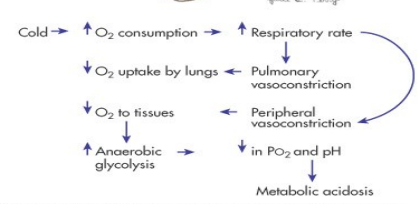

Fig. 25-3 Effects of cold stress. When an infant is stressed by cold, oxygen consumption increases and pulmonary and peripheral vasoconstriction occur, thereby decreasing oxygen uptake by the lungs and oxygen delivery to the tissues; anaerobic glycolysis increases; and there is a decrease in PO_2 and pH, leading to metabolic acidosis.

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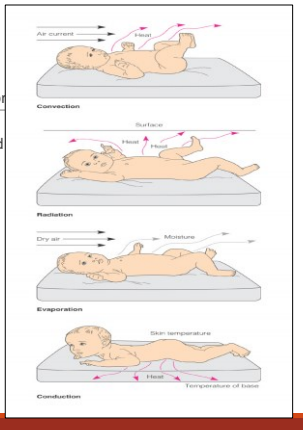
Heat Loss

- Evaporation: liquid is converted to vapor
- Convection : flow of heat from body surface to cool ambient air. Nursery and newborns are wrapped to protect from the cold
- Radiation: loss of heat from body surface to a cooler solid surface
- Conduction: loss of heat from body surface to cooler surfaces in direct contact.



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Conduction

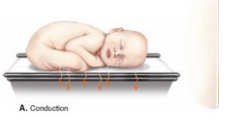
Conductive heat loss involves the transfer of heat between two solid objects that are in contact with each other.

Pre-warm objects before they come in contact with the infant.

Provide insulation between the infant's body and the cooler surface.

Clothing and hats serve as good insulators

If the infant is very preterm, place a chemical thermal mattress underneath the infant



465

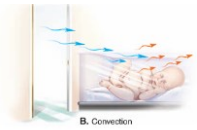
Convection

Heat loss occurs when the infant's body heat is swept away by air currents.

Keep warmer sides up and incubator portholes closed.

If preterm infant will be born, especially if the infant is less than or equal to 28 weeks gestation.

Cover the preterm infant with a piece of food grade plastic.



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Evaporation

Heat loss occurs when moisture on the skin surface or respiratory tract mucosa is converted into vapor.

Quickly dry the infant after delivery or bathing with pre-warmed blankets or towels immediately remove any wet or damp linens.

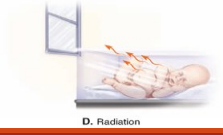
467

Radiation

Heat loss is the transfer of heat between solid surfaces that are not in contact with each other.

What can you do?

- Move the infant away from cold windows or walls.
- Use thermal shades over windows
- Cover the incubator to insulate it from a cold wall or window.
- Use a doubles walled incubator to provide a warmer internal surface closet to the infant.



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Physiologic Adaptations

Immune system

- Immunity
- Risk for infection

Integumentary system

- Caput succedaneum
- Cephalhematoma
- Subgaleal hemorrhage
- Desquamation : peeling of the skin, seen in postmature fetus.

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TABLE 27–3 Comparison of Cephalhematoma and Caput Succedaneum

Cephalhematoma

- Collection of blood between cranial (usually parietal) bone and periosteal membrane
- Does not cross suture lines
- Does not increase in size with crying
- Appears on first and second day
- Disappears after 2 to 3 weeks or may take months

Caput Succedaneum

- Collection of fluid, edematous swelling of the scalp
- Crosses suture lines
- Present at birth or shortly thereafter
- Reabsorbed within 12 hours or a few days after birth

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Caput succedaneum is a collection of fluid (serum) under the scalp.

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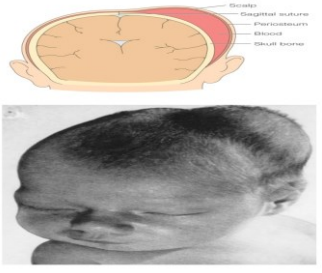
Newborn with a large cephalohematoma should be further observed for

A. Alteration in the sleep/wake cycle
B. Diminished sucking reflex
C. Jaundice



Cephalhematoma is a collection of blood between the surface of a cranial bone and the periosteal membrane. This is a cephalhematoma over the left parietal bone.

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Gestational Age Assessment

Two parts

- External physical characteristics
- Neurologic characteristics

Maternal conditions, such as preeclampsia, diabetes, and maternal analgesics and anesthesia may impact certain components of gestational assessment

Question: In neonatal assessment, the scarf sign evaluates

A. Behavioral patterns elicited by the brazelton scale
B. Resistance and flexion in the arm
C. Tone and mobility of the head

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Observable characteristics of newborn should be evaluated while not disturbing baby

Gestational assessment tools examine the following physical characteristics

- Skin
- Lanugo
- Sole (planar) creases
- Breast tissue
- Ear form and cartilage distribution

Assessment of Physical Maturity Characteristics

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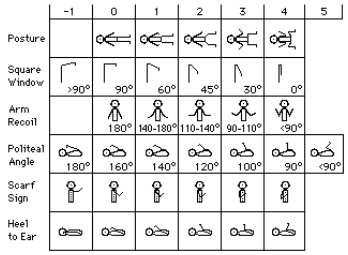

Gestational Age Assessment

- Two parts
  - External physical characteristics
  - Neurologic characteristics
- Maternal conditions, such as preeclampsia, diabetes, and maternal analgesics and anesthesia may impact certain components of gestational assessment

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Sign	Score							Sign score
	-1	0	1	2	3	4	5	
Skin	Sticky, friable, transparent	Gelatinous, red, translucent	Smooth pink, visible veins	Superficial peeling and/or rash, few veins	Cracking, pale areas, rare veins	Parchment, deep cracking, no vessels	Leathery, cracked, wrinkled	
Lanugo	None	Sparse	Abundant	Thinning	Bald areas	Mostly bald		
Plantar surface	Heel-toe 40-50 mm: -1 <40 mm: -2	>50 mm No crease	Faint red marks	Anterior transverse crease only	Creases over anterior two-thirds	Creases over entire sole		
Breast	Imperceptible	Barely perceptible	Flat areola No bud	Stippled areola 1-2 mm bud	Raised areola 3-4 mm bud	Full areola 5-10 mm bud		
Eye/ear	Lids fused. Loosely: -1 Tightly: -2	Lids open. Pinna flat; stays folded	Sl. Curved pinna; soft; slow recoil	Well-curved pinna; soft but ready to recoil	Formed and firm; instant recoil	Thick cartilage; ear stiff		
Genitals (male)	Scrotum flat; smooth	Scrotum empty; faint rugae	Testes in upper canal; rare rugae	Testes descending; few rugae	Testes down; good rugae	Testes pendulous; deep rugae		
Genitals (female)	Clitoris prominent and labia flat	Prominent clitoris and small labia minora	Prominent clitoris and enlarging minora	Majora and minora equally prominent	Majora large, minora small	Majora cover clitoris and minora		
							Total physical maturity score	

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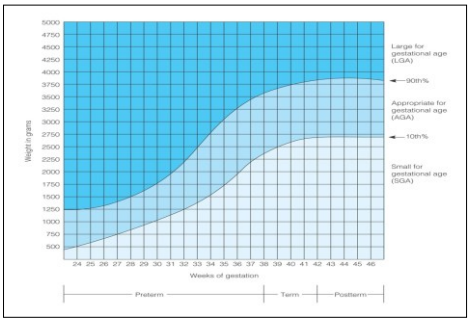

Classification of newborns by birth weight and gestational age. The nurse places the newborn's birth weight and gestational age on the graph and classifies the newborn as large for gestational age (LGA),appropriate for gestational age (AGA), or small for gestational age (SGA).

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TABLE 27–2 Newborn Measurements

Weight
- Average: 3405 g (7 lb, 8 oz)
- Range: 2500–4000 g (5 lb, 8 oz–8 lb, 13 oz)
- Weight is influenced by racial origin and maternal age and size
- Physiologic weight loss: 5%–10% for term newborns, up to 15% for preterm newborns
- Growth: 198 g (7 oz) per week for first 6 months

Length
- Average: 50 cm (20 in.)
- Range: 48–52 cm (18–22 in.)
- Growth: 2.5 cm (1 in.) per month for first 6 months

Head Circumference
- 32–37 cm (12.5–14.5 in.)
- Approximately 2 cm larger than chest circumference

Chest Circumference
- Average: 32 cm (12.5 in.)
- Range: 30–35 cm (12–14 in.)

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Head and Abdomen

Newborn infant should have a head that appears large for its body

Head circumference range is 32 to 37 cm (12.3 to 14.5 in)

Newborn has prominent abdomen, sloping shoulders, narrow hips, rounded chest - chest is approximately 2 cm larger than chest circumference

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Condition of the Newborn

Apgar scores

Any resuscitation effort

Vital signs

Voiding

Passage of meconium

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APGAR SCORE
for assessing newborns

CRITERIA	0	1	2
Color	Pale or blue	Pink body, blue extremities	Pink body and extremities
Heart Rate	Absent	Less than 100 beats per minute	Greater than 100 beats per minute
Respiration	Absent	Slow and irregular	Good breathing with crying
Reflex Response	Absent	Grimace or noticeable facial movement	Coughs, sneezes or pulls away
Muscle Tone	Absent	Some flexion of extremities.	Active and spontaneous movement of limbs

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Infant Bathing

Bathing Procedure

- Bathe the infant according to facility protocols
  - A. Sponge-bathing:
    1. Place the infant on a soft surface
    2. Keep the infant wrapped in a towel
    3. Gently expose one body part at a time for cleansing and rinsing.
  - B. Tub (immersion):
    1. Fill the tub with water deep enough to keep the infant's shoulders covered.
    2. Hold the infant firmly under the buttocks and the back of the neck and gently lower her or his body, except head and neck, into the water.
    3. Wash in the infant's face first with warm water and clean cloth
    4. Wash the rest of the body from the top down
    5. Gently rinse the infant

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Infant Bathing

Step One

- Provide the first infant bath after cardiorespiratory and thermal stability has been achieved and according to facility protocols.
- Ideally, the first bath should occur between **6 and 24 hours of age.**

At birth, the skin of newborns enters a process of adaptation.

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AWHONN Newborn Skin Care Guidelines 4th ed 2018

First Bath

Despite global variation in the timing of the first bath, the primary goal is maintaining thermoregulation of the infant.

Infants who are cold stressed can experience an increased metabolic rate and an increased use of glucose and oxygen which can lead to hypoglycemia and hypoxemia (Brogan & Rapkin, 2017: II-3)

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Step TWO Leave vernix on the skin. If contaminated with blood, meconium, or other intrauterine debris, gently remove the contaminate, but do not vigorously scrub to remove all vernix.	**Leaving vernix on the skin allows for earlier newborn skin acidification and aids in temperature stability (Colwell, 2015:II). The WHO guidelines for newborn care specify that vernix on the newborn's skin should be retained and not removed for at least 6 hours (WHO, 2015 III;** **An RCT of 130 infants whose gestational age ranged from 32 to 41 weeks showed that those infants with vernix retention had significantly higher skin hydration and lower skin pH 24 hours after birth.**
Step THREE Keep the bath time as short as possible	Some clinicians suggest limiting the bath to 5 minutes to prevent cold stress (Çaka & Gözen, 2017: I and skin irritation (Blume-Peytavi et al., 2009: III).
Step FOUR Use appropriate rewarming measures after bathing, including skin-to-skin contact.	A nonrandomized trial including 96 mother–baby couplets showed that immediate skin-to-skin contact after immersion bathing successfully rewarmed the stable healthy newborn (George et al., 2015: II-1).

Infant Bathing

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Stabilization of the Transitioning Newborn

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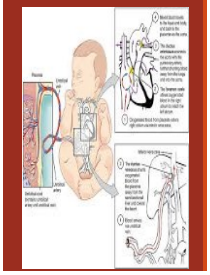
Signs of Newborn Transition



Pulse: 120-160
- During sleep: low as 80 bpm
- During crying: up to 180 bpm

Respirations: 30-60 bpm

Temperature:
- Axillary: 36.5 – 37C/ 97.5 – 98.6
- Skin: 36-36.5/ 96.8 – 97.7

Blood Pressure: 80-60/45 – 40 mm Hg @ birth, 100/50 mm Hg at day 10

BG: greater than or equal to 40mg

Hematocrit: <65 – 70% central venous sample

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The Depressed Newborn

Primary apnea	Secondary apnea
HR > 100	HR <100
Apgars 4-7	Apgar 0-3
pH > 7.0	pH < 7.0 (frequently)
Reflexes intact	Responds to stimulation , blow-by oxygen, bag-mask ventilation
Responds to stimulation, blow by oxygen, bag-mask ventilation	

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References

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