

- The Pregnant Woman with Complications
- Summer 08
- Learning Objectives
- Describe the hemorrhagic conditions of early pregnancy
- Explain disorders of the placenta that may result in hemorrhage during late pregnancy
- Describe the development and management of hypertensive disorders of pregnancy
- Describe Rh incompatibility in terms of etiology, fetal and newborn complications and management
- Describe the effects of pregnancy on glucose metabolism
- Discuss the effects and management of preexisting diabetes during pregnancy.
- Explain the effects and management of gestational diabetes
- Describe management of the pregnant and postpartum woman who has heart disease
- Explain the maternal and fetal effects of hematologic disorders and the required management during pregnancy
  
- Concepts
- Oxygenation/Perfusion
- Comfort/Pain
- Immunity /Infection
- Nutrition/Fluid
- Communication

- Introduction
- Complications in pregnancy may threaten well-being of mother and/or baby
- Two categories
  - Complications as result of pregnancy
  - Complications related to other disorders
- Hemorrhagic Conditions
  - Early pregnancy
    - Spontaneous abortion
    - Ectopic pregnancy
    - Gestational trophoblastic disease
  - Late pregnancy
    - Placenta previa
    - Abruptio placenta
- Hemorrhagic Conditions in Early Pregnancy
- Spontaneous abortion (SAB)
  - Loss of pregnancy before fetus viable i.e. < 500 g or < 20 weeks gestation
  - Spontaneous or induced, this presentation about spontaneous
  - Usually occurs within first 12 weeks of gestation
  - Common cause is fetal abnormalities
  - Other causes include: maternal infection, endocrine disorders, anatomic defects of uterus, cervix

- Six subgroups of SAB

- Threatened
- Inevitable
- Incomplete
- Complete
- Missed
- Recurrent

- Medication Focus

- Oxytocin (Pitocin)

- Synthetic hormone
- In natural form is secreted by posterior pituitary
- Stimulates smooth muscle of uterus to increase force and frequency of contraction
- Normally administer IV on pump
  - Dose - 10-40 units of oxytocin per liter of IV fluid
  - Can also give 10 units/mL IM

- Methylergonovine maleate (Methergine)

- Derived from ergot, a fungus that grows on grains
- Stimulates uterine smooth muscle
- Usually used to control bleeding postpartum, post abortion
- Not suitable for labor induction
- May be administered po, IM, IV
  - IV only in emergency d/t side effect of hypertension
  - IM/po 0.2 mg q tid or qid, monitor BP

- Hemorrhagic Conditions in Early Pregnancy
- Complete abortion
  - All products of conception expelled from uterus
  - Cramping and bleeding slow, cervix closes
  - Woman to rest, call if further bleeding, fever, pain
  - No sex till f/u appointment
- Missed abortion
  - Fetus dies, but is retained
- Management
  - U/S confirms fetal death
  - Major complications
    - Infection
    - DIC (see next slide)
- Disseminated Intravascular Coagulation (DIC)
  - Defect in coagulation
  - May occur if dead fetus retained for long period after 1<sup>st</sup> trimester
    - Also associated with abruption and PIH
  - Develops when clotting factor thromboplastin released into maternal blood stream
    - Causes wide spread clotting in small vessels in body
    - Uses up clotting factors like fibrinogen and platelets
  - Condition further complicated by activation of fibrinolytic system to dissolve clots

- Result is decrease in clotting factors with increase in circulating anticoagulants, leaves blood unable to clot
  - Allows bleeding to occur from any area
- Treatment
  - Deliver fetus and placenta to stop production of thromboplastin
  - Infuse blood, packed RBC, cyro

- Ectopic pregnancy

- Implantation of fertilized ovum outside uterine cavity
  - Usually is in ampulla of fallopian tube
  - Incidence increased over last 20 years d/t
    - Scarring from PID or surgery
    - Assisted reproduction
    - IUD
    - Smoking
    - Douching
- Early symptoms
  - Abd/pelvic pain
  - Vaginal spotting
  - May be mistaken for threatened AB
  - If implanted in tube, rupture occurs about 2-3 weeks after missed menses
- Late symptoms
  - With rupture is sudden, severe pain on one side of abd
  - Hemorrhage occurs, irritates diaphragm, causes in neck and should pain in 50% of women
  - Symptoms of shock develop with little or no visible bleeding

## — Diagnosis

- U/S
- Serum Beta hCG
- Progesterone
- Laparoscopy

## — Management

- Medical
  - May allow tube to be saved
  - Methotrexate
- Surgical
  - May attempt to save tube if not ruptured
  - If ruptured
    - » Goal is control hemorrhage, prevent shock
    - » Tube is removed

## — Nursing care

- Control pain
- Provide psychologic support
  - Often feel anger, grief, guilt, self blame, anxiety about future preg
- Educate woman if methotrexate used
  - Side effect of methotrexate
  - Also avoid folic acid, alcohol
  - Return for f/u in case not work
  - Call if symptoms of rupture occur
  - No sex for 2-3 weeks

- Gestational Trophoblastic Disease (GTD, molar pregnancy, hydatidiform mole)
  - Trophoblasts develop abnormally
    - Proliferation and edema of chorionic villi, form fluid filled grape-like clusters
  - Complication is choriocarcinoma
    - Occurs about 15-20% of time
  - Manifestations
    - High Beta hCG levels
    - Vaginal bleeding
    - Uterus larger than expected for gestation
    - Excessive nausea/vomiting r/t high hCG levels
    - Early development (<24 wks) of preeclampsia
  - Diagnosis
    - U/S
  - Management
    - Evacuate uterus
      - Normally by vacuum, then curettage
      - Tissue sent for evaluation to identify malignant changes
      - Obtain baseline chest x-ray, beta hCG, chemistry panel beforehand
      - Also CBC, assessment of clotting factors, type and crossmatch
  - Management
    - Follow up critical to detect choriocarcinoma
      - Beta hCG levels for one year
      - Avoid pregnancy
    - Malignancy suspected if

- Beta hCG does not fall, or rises after a fall
- If malignancy
  - CT scan to detect spread
  - Chemotherapy treatment of choice
- Nursing Care of Woman with Hemorrhagic Condition in Early Pregnancy
- Nurses monitor condition of client, collaborates with MD for treatment
- Assessment
  - Confirm pregnancy and gestation
  - Determine history and character of bleeding
    - Estimate amount – weigh pads, linen
  - Assess location and severity of pain
  - Assess VS
  - Check lab values
  - Determine Rh factor
- Nursing Diagnosis and Planning
  - Deficient knowledge: diagnostic and therapeutic procedures, S & S of complications and f/u care
- Interventions
  - Provide information about tests, procedures
  - Teaching to prevent infection
  - Teaching signs of infection
  - Emphasize importance of f/u care
- Evaluation
  - Is woman able to verbalize comprehension of diagnostic and therapeutic procedures, S & S of complications and f/u care?
  - Did woman follow plan of care suggested?

- Hemorrhagic Conditions in Late Pregnancy
- Hemorrhagic conditions
  - Late pregnancy
    - Placenta previa
    - Abruptio placenta
- Placenta previa
  - Placenta implants in lower uterus, 3 classifications
    - Marginal or low lying
    - Partial
    - Total
- Three Classifications of Placenta Previa
  - Risk factors
    - Older women
    - Previous C/S
    - Prior suction curettage
    - Previous previa
    - Asian or African descent
    - Smoking
    - Cocaine use
  - Manifestations
    - Painless bleeding after 20 wks when placental villi torn from uterine wall

- Bleeding scanty or profuse, may quit and bleed again later
- May not occur until labor, nurse may interpret as heavy show, pain is from labor, not recognize previa
- No vaginal exams or oxytocin till know position of placenta

#### — Management

- Interventions based on condition of mother, fetus and gestation
- Conservative tx if mom/fetus stable, allows fetal growth and maturity
  - Home or hospital

#### — Home management

- Must be stable with no current bleeding
- Remains on bedrest at home
- Home is reasonable distance from hospital
- Emergency transportation available 24/7

#### — Client education for home care

- Assess vaginal discharge at each void, BM
- Teach kick counts
- Assess uterine activity
- No sex

#### — Inpatient care

- Focused on observing characteristics of bleeding, observing for PTL
- Ready IV access

#### — Conservative management not always possible

- C/S if fetal lungs mature or too much bleeding

- Hemorrhagic Conditions in Late Pregnancy
- Abruptio Placentae
  - Premature separation of normally implanted placenta
  - Bleeding with formation of hematoma on maternal side of placenta
  - Separation increases as hematoma size increases
  - Interferes with fetal oxygenation
  - Both maternal and fetal blood loss can occur
  
  - Dangers
    - Woman
      - Hemorrhage
      - Shock
      - DIC
    - Fetus
      - Anoxia
      - Blood loss
      - Preterm birth
- Risk factors
  - Cocaine use – leading cause
  - Maternal HTN
  - Smoking
  - Short cord
  - Abdominal trauma
  - Previous abruption

## — Manifestations

- Vaginal bleeding – may not accurately reflect blood loss
- Abdominal or low back pain
- Uterine irritability with frequent low intensity contractions
- High uterine resting tone
- Uterine tenderness
- Non-reassuring FHR
- Shock
- Fetal death

## — Manifestations continued

- Bleeding may be concealed or evident according to type abruption
- Three types abruption

## — Management

- Focus on fetal condition and cardiovascular status of mother
- Conservative management only if fetus immature and not in distress
- If fetal compromise or signs of excess bleeding, immediate delivery
  - Invasive monitoring
  - Large bore IV

## — Nursing considerations

- Support woman with information, she feels powerless
- Nurses responsible for continuous monitoring of client and fetus to detect problems early before deterioration of client occurs

- Nursing Care of Woman with Hemorrhagic Condition in Late Pregnancy

- Assessment

- Amount, nature of bleeding
- Pain
- Maternal VS
- Condition of fetus
- Uterine contractions
- Gestational age
- Lab data – H & H, coagulation studies, drug screen
- Emotional response

- Interventions

- Provide emotional support
- Monitor for signs of shock
  - Fetal, maternal tachycardia
  - Normal or slightly decreased BP
  - Increased respiratory rate
  - Cool pale skin and mucous membranes
- Late signs of shock
  - Falling BP
  - Pallor of skin and mucous membranes, cold clammy skin
  - 30 mL or < of urine output/hour
  - Restlessness, agitation, altered mentation
- Consult MD if signs of shock observed
- Act to minimize effects of shock

- Monitor fetus for signs of compromise
- Promote tissue oxygenation
  - Lateral position, HOB flat
  - Restrict maternal movements to lessen O2 demand
  - Help reduce anxiety to decrease O2 requirement
- Collaborate for fluid replacement
  - Large bore IV access
  - Type and cross match
  - Give fluids to maintain 30 mL/hr urine

- Hyperemesis Gravidarum (HG)

- Persistent uncontrollable vomiting
- Associated with
  - Weight loss
  - Dehydration
  - Acidosis from starvation
  - Elevated ketones
  - Alkalosis from loss HCL in gastric fluids
  - Hypokalemia
- Risk factors
  - Caucasian
  - Single
  - Primigravida
  - Multi-fetal pregnancy
  - Psychologic?

- Management
  - May be outpatient – same methods as used to control morning sickness
  - Meds
    - Reglan
    - Phenergan
    - Zofran
  
- Management
  - If other methods unsuccessful
    - IV fluids
    - Electrolyte replacement
    - Feeding tube
    - TPN
  
- Nursing Considerations
  - Assess I & O
  - Rule of thumb – normal urine output = 1 mL/kg/hour
  
- Nursing consideration cont
  - Dehydration associated with
    - Intake < 2000mL/day
    - Decreased urine output
    - Increased urine specific gravity > 1.025
    - Dry skin and mucous membranes
    - Tenting
  - Weigh daily
  - Test for ketones
  - Focus on maintaining nutrition and fluid balance

- Medication Focus
- Promethazine (Phenergan)
  - Antiemetic antihistamine
  - Side effects
    - Dry mouth, drowsiness, urinary retention, blurred vision
  - Use with caution in persons with BPH and glaucoma
  - Route
    - Oral, IM, IV, rectal
    - Not compatible with RL solution
- Ondansetron (Zofran)
  - Serotonin blocking agent
    - Given primarily chemotherapy induced nausea/vomiting
  - Route
    - Oral, IV, IM
  - Side effects
    - Diarrhea, constipation
- Metoclopramide (Reglan)
  - Prokinetic agent
  - Route
    - Oral, IV
  - Side effects more common in children, young adults

- Anxiety, restlessness
- Nursing implications
  - Monitor for dehydration
  - Monitor for constipation
- Hypertension in pregnancy
  - Four categories of hypertensive disorders
    - Preeclampsia
      - Systolic BP of  $\geq 140$  or diastolic  $\geq 90$  after 20 wks of pregnancy
      - Accompanied by proteinuria ( $\geq 0.3$  g in 24 hour specimen or  $\geq 1+$  dipstick)
    - Eclampsia
      - Progression of preeclampsia to include seizures that can not be attributed to other causes
  - Four categories of hypertensive disorders
    - Gestational hypertension
      - BP elevation after 20 wks not accompanied by proteinuria
      - Could progress to preeclampsia or
      - If remains elevated after delivery, is chronic HTN
    - Chronic hypertension
      - Elevated BP prior to pregnancy, either recognized or not
- Preeclampsia (PIH, toxemia)
  - Risk factors
    - Being overweight
    - Diabetes

- Primigravida
  - Over 35 years of age
  - African American
  - Chronic hypertension
  - Renal disease
  - If father previously fathered child with another woman who had PIH
- Pathophysiology
- Result of generalized vasospasm caused by??
    - Usually, despite increase in blood volume, BP does not rise d/t decrease in peripheral vascular resistance and resistance to vasoconstrictors
    - In preeclampsia, peripheral vascular resistance increases d/t sensitivity to vasoconstrictors and decreased sensitivity to vasodilators
    - Placenta produces vasodilators and vasoconstrictors
  - Vasoconstriction narrows vessels
    - Results in damage to endothelial cells of vessel
    - Also in impeded blood flow and increased BP
    - Circulation to all organs decreased
      - » Renal –
        - » Decreased renal flow leads to damage allows protein to leak out
        - » Protein loss allows fluid to shift to interstitial spaces, results in generalized edema and hypovolemia, increased blood viscosity, rise in Hct
  - Decreased circulation to organs
    - Liver
      - » Impairs liver function, leads to edema and hemorrhage of liver
      - » Causes liver enzyme levels to increase, epigastric pain

- Brain
    - » Rupture of capillaries, small cerebral bleeds
    - » Headache, visual disturbances, hyperreflexia
  - Decreased circulation to organs
    - Lungs
      - » Pulmonary capillary leaks, causes pulmonary edema, heart failure, SOB
    - Placenta
      - » Infarctions that increase risk of abruption and DIC
      - » Fetus may have IUGR and hypoxemia
  - PIH dangerous for two reasons
    - Can develop and progress rapidly
    - Early symptoms ignored, blamed on other causes
- Manifestations
  - Increased BP
  - Proteinuria
  - Hyperreflexia suggestive of cerebral irritability secondary to edema
  - Lab – liver, renal dysfunction if PIH severe
  - Possible generalized edema
- Symptoms
  - Continuous headache, drowsiness, mental confusion
    - Indicate poor cerebral perfusion, may precede convulsion
  - Visual disturbances
    - Indicate retinal edema
  - Epigastric pain, upset stomach
    - Indicates distension, possible rupture of liver capsule, precede convulsion
  - Decreased urine output d/t poor perfusion

- May precede kidney failure

- Management

- Preeclampsia categorized as mild or severe based on signs and symptoms (see table pg 633)
- Delivery only treatment
- Home management possible if
  - Preeclampsia mild
  - Woman/fetus stable
  - Responsible to follow plan

- Home Care for Mild Preeclampsia
- Activity restrictions
- Monitoring of fetal activity (kick counts)
- Blood pressure monitoring 2-4 x/day
- Weight measurement
- Urinalysis for protein daily with first specimen of day
- Diet without salt restriction
- Teach signs that indicate condition worsening
- Fetal surveillance
  - BPP, Serial U/S, amniocentesis for lung maturity if < 34 weeks
  - Severe preeclampsia
    - Delivery necessary even if < 34 weeks
    - Managed as inpatient

- Inpatient management for
  - Antepartum
    - Bedrest, minimal stimuli
    - Anticonvulsant med MgSO<sub>4</sub>
    - Antihypertensive meds hydralazine
  - Intrapartum
    - Most seizures occur in labor
    - Keep in lateral position to promote blood flow thru placenta
  - Intrapartum continued
    - Control pain that may aggitate
    - Prefer vaginal delivery d/t risk of C/S
      - » May need to induce with oxytocin
    - Continue MgSO<sub>4</sub>
    - Continuous electronic fetal monitor
  - Postpartum
    - Assess BP, bleeding and for signs of shock, essential d/t hypovolemia of PIH
    - Assess for S & S of PIH fro at least 48 hours
- Management of Eclampsia
  - Eclampsia characterized by seizures
    - Fetus may exhibit non-reassuring pattern during seizure
    - MgSO<sub>4</sub> drug of choice to control
  - Nursing care
    - Auscultate lungs hourly
      - Lasix if develop pulmonary edema
      - Continuous pulse ox
      - O<sub>2</sub>/mask @ 8-10 L/min

— Digitalis to strengthen heart contraction if develops CHF

- Assess urine output hourly
- Assess for ROM, labor, abruption
- Keep on side to prevent aspiration, improve placental circulation
- Pad side rails
- Consider delivery once VS stable

## ● Interventions for Seizures

Preventive measures

- Provide quiet private room and closed door
- Minimize lights and noise
- Group assessments and care
- Avoid startling disruptions
- Restrict visitors

Protecting the woman and fetus

- Remain with the woman
- During the tonic phase, turn the woman on her side
- Note the time and sequence of the convulsion
- After the seizure, insert an airway
- Suction the woman's mouth and nose
- Administer oxygen
- Observe fetal monitor patterns for signs of hypoxia

- Medication Focus
- Magnesium Sulfate (MgSO<sub>4</sub>, mag)
  - Anticonvulsant
    - Used for prevention of seizures and to stop uterine contractions in preterm labor
  - Dose, route
    - Loading dose of 4-6 g mag in 100 mL over 15-20 min
    - Continuous infusion is 2 g/hr
  - Side effects
    - Are result of overdose
    - Flushing, sweating, hypotension, depressed DTR, CNS depression
  - Nursing Implications
    - Monitor BP, Resp rate (at least 12/min), DTR, urine output 30 mL/hr, pulse ox < 95%
    - Observe for serum mag level above therapeutic range of 4-8 mg/dL
    - Calcium gluconate (antidote) given slow IV – 1 g (10 mL of 10%) @ 1 mL/min
- Nursing Care of Woman with Preeclampsia
- Assessment
  - Frequency will depend on severity of disease
    - Weigh daily
    - Check VS, breath sounds
    - Assess location, severity edema

- - Urine output hourly, check protein
  - Check DTR, clonus
  - Question about headaches, visual disturbances, epigastric pain, N/V
- Assessment
  - Assess for mag toxicity
    - Hypotonic reflexes indicate CNS depression
    - Respiratory rate of <12 indicates CNS depression
    - Assess LOC
    - Mag cleared by kidneys, if urine output < 30 mL, then mag can accumulate
    - Assess psychologic status
- Nursing Diagnosis and Planning
  - Mostly collaborative role
- Interventions
  - Initiate preventative measure for seizures already discussed
  - Monitor for signs of impending seizures
  - Prevent seizure related injury
  - Protect woman and fetus during convulsion
  - Provide info and support for family
- Interventions
  - Monitor for signs of mag toxicity as previously discussed
- Evaluation
  - Seizures
    - DTR remain WNL (1+ - 3+)
    - Free of visual disturbances, severe HA, epigastric or RUQ pain

- Woman remains seizure free or injury free if seizure occurs
- Mag toxicity
  - Resp rates > 12/min
  - Serum mag levels in normal range
- HELLP Syndrome
  - *Hemolysis, Elevated Liver enzymes, Low Platelets*
  - Is life threatening disorder usually associated with severe preeclampsia, but can occur independent of it
  - Hemolysis result of RBC passing thru damaged blood vessels
  - Elevated liver enzymes d/t hepatic blood flow obstruction
  - Low platelets from vascular damage caused by vasospasm, platelets aggregate at damage site
  - Prominent symptoms
    - Pain in RUQ, lower chest or epigastric area
    - N/V
    - Severe edema
  - Avoid palpating abdomen
    - Increase in abd pressure could cause rupture of hematoma resulting in internal hemorrhage and shock
  - Treatment
    - Same as for preeclampsia or eclampsia
- Rh Incompatibility
  - Incompatibility only possible with 2 circumstances
    - Expectant mother is Rh neg
    - Fetus is Rh pos

- Father must be Rh pos, recessive trait, incidence 15% in Caucasian
- Only causes harm to fetus, not to mother

- Pathophysiology of Rh incompatibility

- Rh pos people have Rh antigen on RBC
- Rh neg people do not have antigen
- When Rh pos blood enters circulatory system of Rh neg person:
  - Body reacts to foreign substance (antigen) by developing antibodies to destroy it
  - It destroys entire RBC, since antigen part of cell
- In theory, fetal/maternal blood never mix
  - In reality, some does on occasion
  - Causes initiation of above reaction
  - Mixing typically happens at birth, antibodies formed after delivery unless given Rh Immune Globulin
  - Reaction gets worse with every exposure to Rh pos blood
- Implications to fetus/newborn
  - Antibodies in maternal blood cross placenta
    - Attacks and destroys Rh + fetal RBCs
    - Increases bilirubin level (icterus gravis)
      - » Can lead to severe neurologic disease
    - Also leads to rapid production of immature RBCs (erythroblasts)
      - » Can not carry O<sub>2</sub> (Erythroblastosis fetalis)
    - Fetus may become so anemic that generalized fetal edema develops (hydrops fetalis)
      - » Can result in fetal congestive heart failure
- Prenatal assessment and management
  - Blood test to determine blood type and Rh at initial visit
  - Rh neg woman need antibody titer (indirect Coombs test) to determine if sensitized
    - If test negative, will repeat at 28 weeks
      - » If still negative will get Rh Immune Globulin

- » Prevents formation of antibodies
    - » Is repeated after birth if infant Rh pos
  - Prenatal assessment and management cont
    - Testing
      - If antibody titer pos, mom is sensitized
      - Test is repeated frequently to determine if titer stable or rising
        - » If rising fetus in trouble
      - Amniocentesis tests bilirubin level in amniotic fluid
      - U/S can determine cardiac function, edema, ascites, enlarged heart
      - PUBS can measure anemia
    - Treatment
      - Intrauterine transfusion with O - blood
  - Postpartum management
    - If mom Rh neg
      - Umbilical cord blood taken at delivery
        - » Determine baby's blood type, Rh and antibody titer (direct Coombs)
      - Unsensitized, Rh neg moms who give birth to Rh pos babies
        - » Get Rh Immune globulin within 72 hr
          - » It destroys fetal Rh antigens
      - If mom Rh neg and so is baby, then no worries, mate
    - Rh Immune globulin also administered after abortion, CVS, amniocentesis, trauma

- Concurrent Disorders During Pregnancy
- Pregnancy may change course of a pre-existing disease
- Disease and treatment may harm fetus
  - Must include increase surveillance of mother and fetus

- Diabetes Mellitus

- Pathophysiology

- Disorder of CHO metabolism
    - Caused by
      - Insufficient production of insulin
      - Poor utilization of insulin
    - Insulin “carries” glucose from blood into cells
      - If insulin lacking or not utilized well, glucose stays in blood stream
        - » Results in hyperglycemia

- Pathophysiology cont

- Body attempts to dilute glucose
      - Increased thirst (polydipsia)
    - Next fluid from intracellular spaces drawn into vascular bed
      - Causes dehydration at cellular level but excess fluid volume in vascular compartment
      - Kidneys attempt to rid body of fluid and glucose
        - » Causes frequent urination (polyuria) with glucose in urine
    - Without glucose, cells starve, weight loss occurs even if person eats lrg amts

- Pathophysiology cont

- Since body unable to use glucose it
      - Metabolizes protein
        - » Results in negative nitrogen balance
      - Metabolizes fat
        - » Results in build up of ketones
    - Poor control of disease causes damage to small blood vessels in kidneys, eyes and heart

- Effects of pregnancy on metabolism
  - 1-20 weeks gestation
    - Metabolic rates change very little
    - Insulin release in response to glucose rises
      - May result in hypoglycemia, especially if mom has N/V
      - Fosters development and storage of fat
        - » Prepares mom for extra energy used by growing fetus
  - 21 weeks to birth
    - Placenta produces hPL, makes mom insulin resistant so glucose supply for baby
    - For most women, is no problem, pancreas will produce more insulin
      - But if pancreas can't produce, mom hyperglycemic

- Classification of DM

- Type I (insulin dependent, IDDM)
  - Usually children, teens
  - Insulin producing pancreatic cells destroyed
  - Must inject insulin
- Type II (non-insulin dependent, NIDDM)
  - Obesity and increasing age, certain ethnic groups
  - Insulin resistance, pancreas eventually can't produce enough
  - Controlled by diet, exercise, weight reduction, oral meds or insulin
- Gestational DM (GDM)
  - Onset during pregnancy
  - Multifetal pregnancy, obesity, family history of DM, age and certain ethnic groups more increase risk for GDM
  - Increased risk of Type II later in life
  - GDM more likely to reoccur with subsequent pregnancies

- Pre-existing DM

- Maternal effects

- Increased risk for
      - Ketoacidosis
      - Urinary tract infection
      - Hydramnious
      - Difficult labor, shoulder dystocia
      - Cesarean delivery
      - Postpartum hemorrhage

- Fetal effects

- Depends on
      - Timing and severity of maternal hyperglycemia
      - Maternal vascular involvement
    - Congenital malformations
      - Hyperglycemia or ketoacidosis in first trimester can lead to:
        - » SAB
        - » Neural tube defects
        - » Heart defects
      - Risk less if glucose level controlled

- Fetal effects cont

- Fetal size
      - Fetal growth r/t vascular integrity
        - » Glucose and O2 transported to fetus if vascular system ok
          - » Maternal hyperglycemia stimulates insulin production by fetus
          - » Fetus grows & grows & grows
        - » If vascular system impaired

- » Placenta perfusion impaired
- » Results in SGA, IUGR

#### — Neonatal effects

- Hypoglycemia
  - Increased fetal insulin production r/t maternal hyperglycemia
  - Once cord cut, source of glucose gone, level of insulin higher than glucose, *hypoglycemia* develops
- Hyperbilirubinemia
  - Mother with vascular impairment
    - » Fetus responds by producing more RBCs to carry O<sub>2</sub>
    - » Excess RBCs destroyed after birth, releases bilirubin

#### — Neonatal effects cont

- Respiratory distress syndrome
  - Fetal hyperinsulinemia retards production of surfactant

#### — Maternal assessment

- History r/t DM
  - How long had DM
  - Does she monitor BS levels
  - Level of compliance with regimen
  - Can she administer own insulin
  - Coping
  - Need for further education
    - » See DM nurse educator
- Physical exam
  - BP, weight, fundal height watched closely
  - Lab tests
    - » Hgb A1C

## — Fetal surveillance

- Triple marker screening
- U/S and fetal echocardiography @ 20-22 weeks
- Later surveillance goal: to identify markers that suggest things not well in utero
  - Kick counts
  - BPP
  - NST
  - CST

## — Management

- Goals
  - Normalize and maintain blood glucose levels
  - Increase likelihood baby healthy
  - Avoid accelerated impairment of maternal blood vessels and organ damage
- Goals accomplished by team
  - Perinatologist, endocrinologist, dietitian, nurse, obstetrician, neonatologist, pediatrician, mom

## — Management cont

- Preconception care
  - Evaluate for vascular damage
  - Normalize BS
  - Educate client
- Diet
  - 3 meals plus 2 or more snacks
  - Bedtime snack with protein and complex CHO

## — Management cont

- Monitoring of blood glucose

- Self test and record result
  - Controversy as to frequency per day
- Insulin
  - Coverage adjusted during pregnancy as insulin requirements change
    - » Less in first trimester
      - » Less hPL
      - » More N/V
    - » Increases in second and third trimesters
      - » Less N/V, more calories
      - » Increase in hPL
- Management cont
  - Insulin Coverage cont
    - Labor
      - » Tight control to reduce risk of newborn hypoglycemia
        - » Use IV insulin and titrate according to BS
    - Postpartum
      - » Insulin needs decline
  - Timing of delivery
    - Term
    - Amnio for lung maturity if early delivery
- Gestational DM
  - First recognized in pregnancy
  - Risk factors similar to Type II DM
    - BMI > 25
    - Maternal age > 25
    - Previous birth outcome associated with GDM (stillbirth, macrosomia etc)
    - GDM in previous pregnancy

- History of abnormal GTT
- History of DM in first degree relative
- Member of high risk ethnic group

#### — Testing

- All women should be screened for risk factors for DM at initial visit and tested if indicated
- 1 hour glucose challenge test
  - Done @ 24-28 weeks gestation
  - Ingest 50 g of glucose solution
  - Blood tested in one hour
  - If result 140 or > then need 3 hr GTT

#### — Testing cont

- 3 hr GTT
  - High CHO diet for 3 days before test
  - Then fast from midnight on night before test
  - Fasting level determined
  - Ingest 100 g glucose solution
  - Test blood sugar at 1,2,3 hours later
  - If 2 or more levels elevated, then GDM
    - » Fasting > 95 mg/dL
    - » 1 hour > 180
    - » 2 hour > 155
    - » 3 hour > 140

#### — Maternal, fetal and neonatal effects

- Similar to Type II with exception
  - No fetal abnormalities

#### — Management

- Diet with calorie distribution as discussed with pre-existing DM

- Exercise – significant role
  - Weight control, improve glucose metabolism, cardio/resp benefits
- Monitor glucose levels
  - Helps guide diet, insulin therapy
- Fetal surveillance
  - Like pre-existing DM
- Nursing considerations
  - Effective communication
    - Mother may feel anxiety, denial, fear, anger, and inadequate as well as feel a lack of control when confronted with diagnosis
    - Nurse must actively listen to concerns, allow expression of feelings
    - Praise when BS well maintained
    - Provide sense of control
- Nursing Care of the pregnant woman with diabetes
  - Assessment
    - Knowledge of management plan
    - Knowledge of condition
    - Techniques
    - Diet including cultural influences and preferences
    - Knowledge about potential complications
    - Knowledge of fetal surveillance
- Nursing Care
  - Diagnosis and Planning
    - Risk for ineffective health maintenance r/t knowledge deficit of measure to maintain normal BS levels; S & S and management of hypo and hyperglycemia; and recommended fetal surveillance procedures
    - Outcome - Woman will verbalize a plan for maintaining a normal BS; verbalize a plan for meeting diet recommendations, identify S &

S of hyper & hypoglycemia and management for each; will verbalize knowledge about fetal testing

— Interventions

- Provide accurate information
- Provide consistent support r/t efforts to comply
- Teach how to self administer insulin
- Teach how to self monitor blood sugar
- Instruct on Dietary management
- Teach about S & S of hypo and hyperglycemia and treatments

- Signs and Symptoms of Maternal Hypoglycemia
- Shakiness (tremors)
- Sweating
- Pallor and cold, clammy skin
- Disorientation, irritability
- Headache
- Hunger
- Blurred vision
- Fatigue
- Flushed, hot skin
- Dry mouth, excessive thirst
- Frequent urination
- Rapid, deep respirations

- Odor of acetone on the breath
- Drowsiness
- Headache
- Depressed reflexes

— Nursing Care cont

- Evaluation

- Can mother demonstrate competence in measuring BS?
- Can she describe plan for meeting diet recommendations?
- Can she and her family list the S & S of hypo and hyperglycemia?
- Can they describe how to manage these conditions?
- Can the woman verbalize knowledge of reason for fetal testing and keep appointment?

- Cardiac Disease

- Cardiac function changes in pregnancy d/t change in circulatory volume

- Normal heart handles ok
- Diseased heart may not, could precipitate congestive heart failure (CHF)

- Seeing more women with heart problems reach age of childbearing and becoming pregnant

- Some examples

- Rheumatic heart disease
- Congenital heart disease
- Mitral valve prolapse

- Classifications of heart disease

- I – No compromise, no limitations on activity, asymptomatic

- II – slight compromise, slight limitation of activity, comfortable at rest, but ordinary physical activity causes fatigue, SOB, chest pain
- III – marked compromise and limitation in activity, comfortable at rest but less than ordinary activity causes excessive fatigue, SOB, chest pain
- IV – inability to perform any physical activity without discomfort, symptoms of cardiac insufficiency even at rest.

- Management

- Class I and II

- Risks to mother and fetus small
    - Limit physical activity to remain free of symptoms
    - Avoid excessive weight gain
    - Prevent anemia
    - Prevent infection
    - Assess for congestive heart failure

- Management

- Classes III & IV

- Risks to mother and fetus greatly increased
    - Goal to prevent cardiac decompensation and development of CHF
    - Protect fetus from hypoxia and IUGR
    - Same precautions as for Classes I & II plus:
      - » Bedrest with SCD, anticoagulants

- Signs and Symptoms of Congestive Heart Failure
- Cough (frequent, productive, hemoptysis)
- Progressive dyspnea with exertion
- Orthopnea

- Pitting edema of legs and feet or generalized edema of face, hands, or sacral area
- Heart palpitations
- Progressive fatigue or syncope with exertion
- Moist rales in lower lobes, indicating pulmonary edema

— Nursing considerations

- Antepartal
  - Assess for changes in VS, increasing fatigue, other signs of heart failure
  - Educate client to understand factors that increase workload of heart
  - Help client identify modifications to activity that prevent symptoms
  - Educate to avoid temperature extremes, emotional distress
- Labor
  - Efforts to minimize effects of labor
  - Manage IV fluid administration to prevent overload

— Nursing considerations

- Labor cont
  - Keep client on side with head and shoulders elevated
  - Administer oxygen, monitor pulse ox
  - Keep environment quiet, calm to reduce stress
  - Epidural for pain controversial
  - Monitor for signs of cardiac decompensation
  - Continuous electronic monitor of fetus
  - Vaginal delivery with vacuum or forceps

— Nursing considerations

- Postpartum
  - Can decompensate in pp period

- Assess for circulatory overload
  - » Neck vein distension, bounding pulse, rales
- Assess for infection, hemorrhage or thrombophlebitis that can act together to cause heart failure
- Assess urine output

- Anemias

- Decline in circulating RBCs
  - Reduces capacity to carry O<sub>2</sub>
- Considered anemic if HGB < 10.5 or 11 g/dL
- One of most common problems in pregnancy
- Includes
  - Iron deficiency
  - Folic acid deficiency
  - Sickle cell

- Iron deficiency anemia

- Signs and symptoms
  - Pallor, fatigue, lethargy, headache, pica
  - Fetal effects
    - Unclear, even if woman anemic, baby get what is needed
  - Management
    - Ferrous sulfate 320 mg 1-3 x/day taken with meals
    - Take with vitamin C
    -

- Folic acid deficiency
  - Essential for cell duplication, growth and RBC formation
  - Fetal effects
    - Increases risk for SAB, abruption of placenta, fetal anomalies especially of neural tube
  - Management
    - Supplement with folic acid 400 mcg daily
    - If previous child with NTD, then 4 mg/day preconception thru 1<sup>st</sup> tri

- Sickle cell anemia
  - Genetic disorder
    - Causes distortion and destruction of RBCs
      - HGB responds to hypoxia, acidosis or dehydration by becoming rod shaped
        - » Causes RBC to assume sickle shape
        - » Causes RBCs to clump together in small blood vessels
  - disease characterized by
    - Chronic anemia
    - Susceptibility to infection
    - Periodic crises (obstruction of vessels)
  - Affects people with ancestors from
    - Africa, South and Central America, Cuba, Saudi Arabia, India, and Mediterranean countries
  - Maternal effects

- Venous stasis, physiologic anemia and increased coagulation factors or normal pregnancy may cause crisis
  - May result in jaundice from RBC destruction
  - Severe pain from infarctions of joints, organs
- Fetal effects
  - If no crises, fetus does well
  - If crisis, fetal death common d/t placental infarction
- Management
  - Symptomatic treatment, try to avoid crises
    - Encourage woman to keep prenatal appointments
    - Educate to maintain hydration, take folic acid, rest periods, good hygiene, adequate diet, prompt treatment of infections
  - Be alert for signs of crisis
    - Pain in abdomen, chest, joints, limbs
  - Provide comfort measures
    - Reposition, good skin care
  - In labor
    - Continuous oxygen, IV fluids
- Infections During Pregnancy
  - May harm mother, fetus or both
    - Infections may be mild, asymptomatic but have catastrophic effects on fetus or newborn
  - Viral infections with most potential for harm include:
    - Cytomegalovirus (CMV)
    - Rubella
    - Varicella-zoster
    - Herpes simplex
    - Hepatitis B
    - HIV

- CMV
  - Herpes family, virtually infects everyone
    - Like herpes, primary infection, then latent infection that lies dormant
      - Primary infection most dangerous to fetus
  - Diagnosis
    - Culture or DNA study
  - Fetal effects
    - If primary infection in first trimester, fetus has 40-50% chance of infection
      - 5-18% symptoms at birth
      - Another 10-15% develop manifestation within 2 years
  - Symptoms
    - Enlarge liver, spleen
    - CNS abnormalities
    - Jaundice
    - Hearing loss
    - IUGR
  - Management
    - No effective therapy
    - Prevention thru
      - Handwashing
      - Monogamous sex
      - CMV free transfusions
  
- Rubella
  - Transmitted by droplet, direct contact with article contaminated with naso-pharyngeal secretions
  - Red maculo-papular rash, begins on face and spreads over body.
  - Incidence declined since vaccine available

— Fetal/neonatal effects

- Greatest risk in first trimester, virus crosses placenta
  - 1/3 end in SAB
  - Deafness, mental retardation, cataracts, cardiac defects, IUGR, microcephaly
  - Newborns may shed virus, may be contagious

— Management

- Prevention thru vaccination
- Rubella titer of 1:8 or > = immunity
- Avoid pregnancy for 4 weeks after vaccine
- Usually vaccinate non-immune women postpartum

● Varicella-Zoster (Chicken pox)

— Herpes virus transmitted by direct contact or via respiratory tract

- Can become latent on nerve ganglia, when reactivates is shingles

— Fetal/neonatal effects

- First trimester, small risk of congenital varicella syndrome, greatest risk 13-20 weeks
  - Limb hypoplasia
  - Cutaneous scars
  - Cataracts
  - Microcephaly
  - IUGR
- If fetus exposed in utero and born before development of maternal antibodies, infant at risk to develop life-threatening varicella infection

— Management

- Vaccine if not pregnant
- If non-immune and exposed, give VZIG, provides passive immunity
- If non-immune and postpartum, give first vaccine at discharge from hospital, second at 6 weeks check up
  - Avoid pregnancy for 1 month

- If infected with either chicken pox or shingles, then in isolation
    - Only immune nurses care for them
  
- Herpes virus 1 & 2
  - Already discussed with STIs
  - Vertical transmission from mother to infant in two ways
    - After ROM, virus ascends from active lesions
    - During birth, fetus comes in contact with infectious genital secretions
    - Highest risk if primary infection
  - Fetal/Neonatal effects
    - Severity depends on system involved
      - Skin lesions, cough, cyanosis, tachypnea, dyspnea, jaundice, seizures or coagulation defects
  - Management
    - Vaginal delivery allowed if no lesions at time of labor
    - C/S recommended if lesions present whether primary or recurrent
      - No fetal scalp electrode if lesions
    - After delivery, good handwashing, avoid direct contact of lesions
    - Breastfeeding ok
  
- Parvovirus B 19 (Erythema infectiosum, fifth disease)
  - Starts with distinctive rash on face
    - Followed by generalized maculo-papular rash, fever, malaise
  - Usually innocuous
  - Fetal/neonatal effects
    - Death from lack of RBCs, fetal anemia, hydrops, heart failure

- Risk highest if mother infected prior to 20 weeks gestation
- Management
  - No treatment
- Hepatitis B
  - Transmitted by blood, saliva, vaginal secretions, semen, breast milk
  - Crosses placenta
  - Prevalent in African, Asians, Southeast Asian immigrants, Native Americans, Eskimos and IVDU
  - Fetal/neonatal effects
    - Prematurity, LBW, neonatal death
    - If mom had hep B during pregnancy or is chronic carrier of hep B, fetus at risk for acute infection at birth
      - They likely to become carriers as well (and infectious)
  - Management
    - Prevention: safe sex, universal precautions, vaccines
    - Screen all pregnant women, offer vaccine
    - Newborn chronic infection usually prevented by giving HBIG, then vaccine
    - Bathe newborn prior to any skin sticks
- Human Immunodeficiency Virus
  - Transmitted by infected mother to infant (vertical transfer)
    - Varies with severity of maternal infection
    - Varies with time and severity in which virus transmitted to infant
  - Pathophysiology
    - HIV enters genetic makeup into genetic makeup of cell
      - Cell can't perform usual job properly

- Resulting cell produces more viruses which invade more cells
  - Eventually leads to immunodeficiency by effect on CD4 lymphocytes
- Number of CD4 cells fall
  - Immune response inadequate
    - Opportunistic diseases occur
- Stages of HIV
  - Acute – flu like symptoms, seroconversion (HIV+)
  - Asymptomatic – no clinical problems, lasts about 11 years, low level viral replication, CD4 loss (HIV +)
  - Transitional – characterized by immune dysfunction (AIDS)
  - Late – characterized by infections and cancers that mainly occur in persons with immune dysfunction (AIDS)
- Fetal/Neonatal effects
  - Transmission
    - Decreased to < 2% with use of anti-retrovirals during pregnancy
    - C/S prior to ROM
    - Avoid breastfeeding
  - Infected newborn often asymptomatic, but appear over first year
    - Enlarged liver, spleen, lymph nodes
    - Persistent thrush, failure to thrive, extensive cradle cap
    - Prompt treatment with anti-retrovirals slow disease progress
- Management
  - Maternal treatment in pregnancy with zidovudine (ZVD, AZT, Retrovir)
    - 100 mg 5 x/day initiated between 14-34 weeks gestation
  - In labor
    - give IV with loading dose of 2 mg/kg, then continuous infusion of 1 mg/kg/hour
  - Newborn
  - 2 mg/kg q 6 hours for 6 weeks, begin 8-12 hours after birth

- Medication Focus

- Zidovudine

- Classification: antiviral

- Dose – already discussed

- Side effects

- Headache
- Malaise
- N/V, dyspepsia
- Constipation/abd cramps
- Asthenia
- Musculoskeletal pain
- Chills
- Fatigue, insomnia
- Neuropathy

- Nursing considerations

- Protect from light
- Do not mix with blood products or protein solutions
- Take with or without food
- Take during night hours as well
- Assess for S & S of anemia
- Record I & O
- Avoid giving acetaminophen

- Nursing considerations

- Anticipatory grief r/t possible death of mother, newborn
- Provide support

- Loss of control, loss of support and love, social isolation, concern about infants HIV status common stressors

- Encourage nutritious diet, proper rest and activity

- Non-viral infections

- Toxoplasmosis

- Caused by protozoan
    - Transmitted thru
      - Undercooked meat
      - Cat feces
      - Across placental barrier to fetus if mother acquires infection during pregnancy
    - Fetal/neonatal effects
      - Severity r/t timing during pregnancy
      - Most severe in first trimester
        - » Hydrocephaly, microcephaly

- Toxoplasmosis cont

- Management

- Cook meat completely
    - Avoid touching mucous membranes while handling raw meat
    - Wash all utensils and surfaces contaminated with raw meat
    - Wash hands thoroughly after handling raw meat
    - Wash fruits and vegetables before consuming
    - Avoid contact with materials contaminated with cat feces
    - Treat with sulfonamides

- Group B streptococcus (GBS)
  - Leading cause of life-threatening perinatal infections
    - Bacteria resides in rectum, vagina, cervix and urethra
  - Fetal/neonatal effects
    - Early onset GBS
      - Occurs within 7 days
      - Is majority of cases
      - Characterized by pneumonia, sepsis
      - Mortality rate 5-20%
    - Late onset after 7 days
      - Characterized by meningitis
  - Management
    - ID carriers with cultures between 35-37 weeks gestation
    - Treat positives with penicillin
    - No treatment if having planned C/S unless ROM
    - If GBS status unknown, management based on risk (ROM > 18 hours, maternal temp > 100.4 F or gestation < 37 weeks)
    - GBS+ or history of infant with GBS in past, treat in labor
  
- Impact of UTI, STIs and vaginal infections on pregnancy
  - Syphilis
    - Crosses placenta, results in
      - SAB, stillbirth, premature labor, congenital syphilis (enlarged liver, spleen, skin lesions, rashes, pneumonia)
    - Treatment penicillin
  - Gonorrhea
    - Results in
      - Premature ROM

- Preterm labor
  - Vertical transmission at birth may cause eye infection
- Treatment ceftriaxone
- Chlamydia
  - Pregnancy effects
    - Premature ROM
    - Premature labor
    - Chorioamnionitis
  - Infected during birth
    - Eye infection
    - Pneumonitis
  - Treatment of mom with erythromycin or ampicillin
  - Treat eyes with erythromycin ophthalmic ointment
- Trichomoniasis
  - Associated with premature ROM and PP endometritis
  - Treat with metronidazole
- HPV
  - Associated with development of epithelial tumors on mucous membranes of larynx in children
  - Treatment not recommended in pregnancy with chemical, cryo or cauterization ok
- Yeast
  - Thrush in newborn
  - Treated with nystatin
- BV
  - Associated with PP endometritis , preterm birth
  - Treatment oral or vaginal gel of metronidazole or clindamycin vaginal cream
- Pyelonephritis
  - Risk of preterm labor and delivery
  - Treatment antibiotic