

Chapter 22

Complications of Pregnancy

Embryonic Development

- 3 to 8 weeks after fertilization
- Organogenesis—formation of basic functional elements of organ systems
- Critical time in development of all organs and structures
- By end of 8 weeks, all organs are formed
- Exposure of the embryo to teratogens
 - Can cause serious congenital abnormalities

Teratogen

- Any substance or situation that causes a developmental abnormality
- Viruses
- Smoking or exposure of mother to second-hand smoke
 - Child with low birth weight
 - Increased irritability
 - Possible stillbirth

Teratogen (Cont.)

- Alcohol
 - Risk throughout pregnancy
 - Fetal Alcohol syndrome
 - Impairs child's neurological and intellectual development
- Radiation
- Certain medications, including herbal remedies

Development

- Most organs have completed formation.
- Teratogens have less effect on development.
 - Functional impairment can still result.
 - This is particularly true in the central nervous system
- Elementary functions can be observed.
- Fetus gains weight
- Organs such as lungs mature

Pregnancy

- Pregnancy is divided into three trimesters.
 - Approximately 3 months each
- Laboratory diagnosis
 - Presence of human chorionic gonadotropin (hCG) in mother's plasma or urine
- Absolute signs
 - Later in pregnancy
 - Include heartbeat
 - By auscultation or ultrasound

Pregnancy (Cont.)

- Estimated date of delivery (EDD) or estimated date of birth (EDB)
 - Calculated using Nägele's rule
 - For women with longer cycles or irregular cycles—formula must be adjusted
- Gestational age (2 weeks longer than biological age)
 - Length of time since the first day of the last menstrual period (LMP)
 - 280 days (40 weeks)

Pregnancy (Cont.)

- **Gravidity and parity**
 - Woman's history of pregnancy and childbirth
 - **Gravidity**
 - Number of pregnancies
 - **Primigravida**
 - Pregnant for the first time
 - **Parity**
 - Number of pregnancies in which the fetus has reached viability
 - **Multipara**
 - Completed two or more pregnancies with viability

Pregnancy (Cont.)

- Amniocentesis
 - Withdrawal of small amount of amniotic fluid
 - After 14 weeks
 - Fluid checked for chemical contents
 - Cells cultured for chromosome analysis
 - Chorionic villi sampling (CVS)
 - Alternative process
 - Earlier in pregnancy
 - Useful for chromosomal examination
 - Diagnosis in high-risk clients

Hormonal Changes

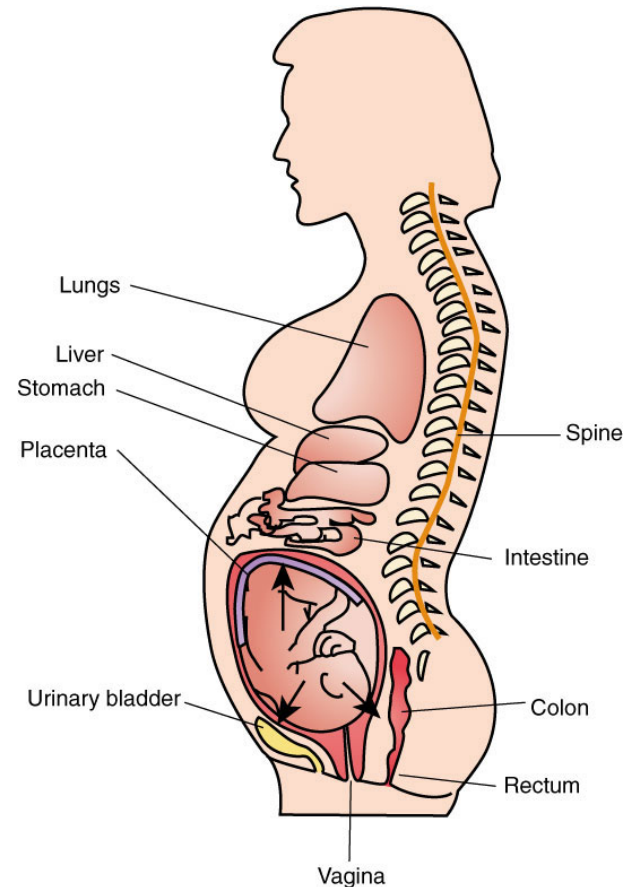
- Estrogen and progesterone blood levels increase.
 - Essential to the development of the uterus
 - Maintenance of pregnancy
 - Preparation for lactation
- Hyperplasia of thyroid
 - Increased thyroxine production
 - Increases mother's metabolism and may be cause of heat intolerance

Reproductive System Changes

- Increase in size of the uterus
 - Hypertrophy of muscle cells
- Increased vascularity of the cervix and vagina
 - Softening of the tissue
 - More abundant cervical mucus—cervical plug
 - Protection of uterine content
 - More acidic vaginal secretions
 - Deterrent to some infectious organisms
- Breasts enlarge
 - Increased glandular tissue

Sagittal Section of Pregnant Woman: Effects of Expanding Uterus

- Pressure of expanding uterus
 - Can interfere with digestive function
 - Reduces vital capacity
 - Increases pressure on bladder and rectum
 - Changes center of gravity



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Weight Gain and Nutrition

- Average weight gain: 25-30 pounds (11-13 kg)
 - Increased size of uterus and contents
 - Enlarged breasts
 - Additional blood volume
- Increased demand for protein, carbohydrates, fat, vitamins, minerals
- Adequate calcium for bones and teeth
- Increased iron needs as maternal blood volume increases

Extra Weight

- Baby—~8 pounds
- Placenta—2-3 pounds
- Amniotic fluid—2-3 pounds
- Breast tissue—2-3 pounds
- Blood supply—4 pounds
- Stored fat for delivery and breastfeeding—5-9 pounds
- Larger uterus—2-5 pounds
- Total—25-35 pounds
- These numbers are the normal average figures.

Digestive System Changes

- Nausea and vomiting
 - Common in first trimester
 - Not just in the morning
 - Change in eating pattern often reduces discomfort
- Decreased motility in the digestive tract
 - Relaxation of smooth muscle by progesterone
 - Slower emptying of the stomach
 - Reflux of stomach contents (heartburn)
 - Constipation

Musculoskeletal Changes

- Marked postural changes
 - Pelvic joints relax or loosen
 - Hormones prepare for delivery
 - Loss of stability—waddling gait
 - Increased abdominal weight
 - Tendency toward lordosis
 - Balance and coordination may be impaired.
 - Backache caused by these changes

Cardiovascular Changes

- Increased blood volume
 - Both fluid and erythrocytes
 - Increased production of red blood cells for fetus
 - Requires increased iron intake by the mother
- Heart rate may increase slightly
- Blood pressure
 - Frequently drops slightly in first two trimesters
 - Rises to normal levels in last trimester
- Varicose veins
 - Frequently develop during pregnancy

Ectopic Pregnancy

- Tubal pregnancy
- Zygote is implanted outside the uterus
 - Usually in the fallopian tubes
- Spontaneous abortion may follow.
- Embryo may continue to develop.
 - Eventually causes tubal rupture
 - Severe hemorrhage leading to shock
 - Death
 - Considered a surgical emergency

Pregnancy-Induced Hypertension

- Persistently elevated blood pressure
 - $>140/90$ mm Hg
 - Develops after 20 weeks of gestation
 - May lead to stroke or damage to retina
 - Returns to normal after delivery

Pregnancy-Induced Hypertension (Cont.)

- Pre-eclampsia
 - Progressively higher BP
 - Kidney dysfunction, weight gain, generalized edema
 - Complication—HELLP syndrome (*h*emolysis, *e*levated *l*iver enzymes, *l*ow *p*latelets)
- Eclampsia
 - Extremely high blood pressure—seizures or coma
 - High risk of stroke
 - May require cesarean section delivery to reduce maternal risk

Gestational Diabetes Mellitus

- Develops in 2% to 5% of women
- May lead to developmental abnormalities if blood glucose level is high in first trimester
- Newborn is large for gestational age and may experience hypoglycemia after birth
- Glucose levels should be closely monitored in:
 - Women with family history of diabetes
 - Previously high-birth-weight infants

Gestational Diabetes Mellitus (Cont.)

- Dietary management
- Appropriate exercise program
- Insulin may be necessary to reduce the blood glucose level.
 - Oral hypoglycemics are teratogenic and are not used.

Placental Problems

- Placenta previa
 - Placenta is implanted in the lower uterus or over cervical os
 - Placenta may tear at end of pregnancy
 - Bright red bleeding—painless

Placental Problems (Cont.)

- Abruption placentae
 - May occur following motor vehicle accident or spontaneously
 - Premature separation of the placenta from the uterine wall, usually causing bleeding
 - Blood may be trapped between placenta and uterine wall
 - Abdominal pain is common.

Blood-Clotting Problems

- Thromboembolism
 - Blood clots, common after childbirth
 - Usually develop in veins of legs or pelvis
- Thrombophlebitis
 - Clot forms over an inflamed area in the vein wall
- Embolus
 - If a piece of the thrombus breaks away:
 - Will flow with venous blood
 - May result in a pulmonary embolus

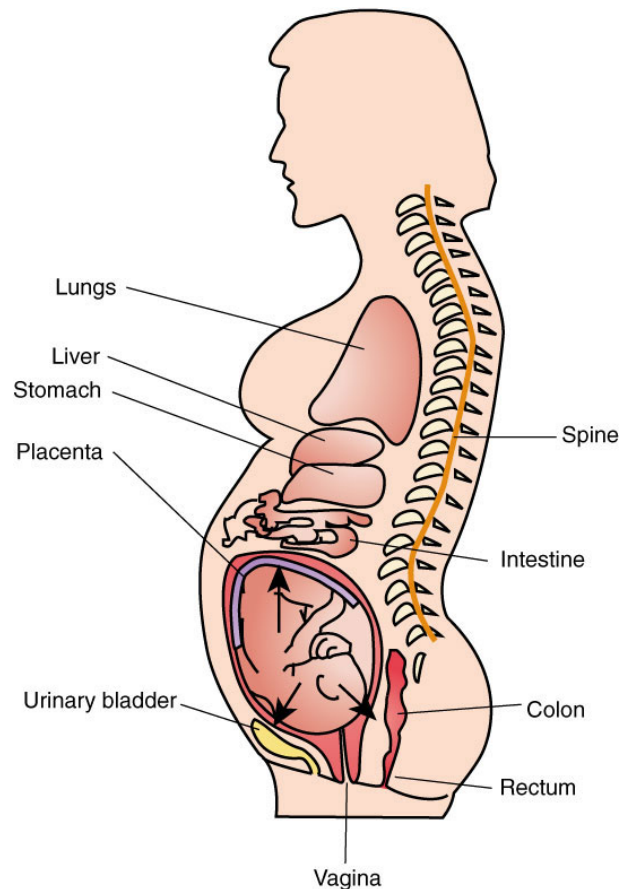
Blood-Clotting Problems (Cont.)

- Disseminated intravascular coagulation
 - Serious complication of other conditions
 - Examples :abruptio placentae, pre-eclampsia
 - Increased activation of clotting mechanisms
 - Results in multiple blood clots throughout circulation
 - Diagnosis confirmed by low serum levels of clotting factors
 - Hemorrhage, shock, and tissue ischemia

Rh Incompatibility

- Results when the mother is Rh-negative and the fetus is Rh-positive
- Usually not a problem during first pregnancy
- Rh-positive blood enters maternal circulation because of placental tears.
- Formation of maternal antibodies to Rh-positive blood
- Subsequent pregnancies—maternal antibodies destroy red blood cells.

Rh Incompatibility (Cont.)



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Rh Incompatibility (Cont.)

- Hemolysis of red blood cells
 - Severe anemia, low hemoglobin
 - Jaundice may be severe.
 - Possible heart failure and death
- Early delivery or intrauterine transfusion may be recommended.
- Exchange transfusion after birth may be required.

Rh Incompatibility (Cont.)

- Prevention

- Prenatal blood testing of woman and, if Rh-negative, of her partner
- Monitoring for Rh antibodies in maternal blood
- Administration of Rh antibodies within 48 hours of delivery or termination of pregnancy to neutralize Rh-positive cells in maternal blood—thus, no immunological memory to Rh-positive cells

Maternal Infection

- The healing uterus and perineal tissues are vulnerable to infection during the postpartum period.
- May lead to septic shock or peritonitis if untreated
- Increased risk of infection:
 - Retained placenta
 - Inadequate hygiene
 - Abortion in nonsterile conditions

Adolescent Pregnancy

- Teenagers have increased nutritional needs to meet demands of their own growth.
- Pregnancy at this time has increased risk of complications.
- Anemia is a common problem.
- Babies born to adolescent mothers frequently weigh less than normal or are preterm.
- Labor and delivery difficult—immature pelvis
- Pregnancy-induced hypertension is common.