TEST BANK

Neonatal and Pediatric Respiratory Care

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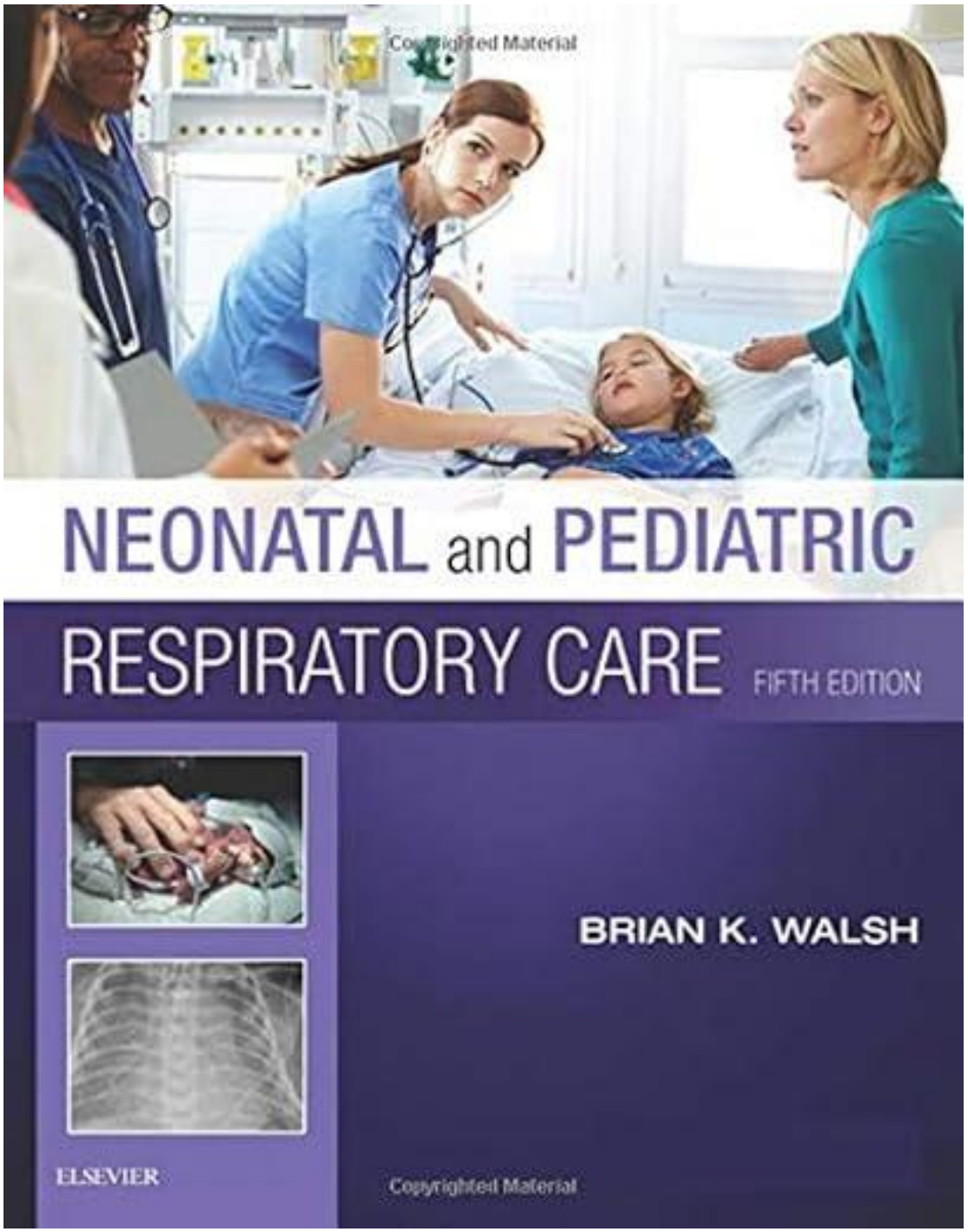
5th Edition



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Chapter 1: Fetal Lung Development
Walsh: Neonatal & Pediatric Respiratory Care 5th Edition Test Bank (2020)

MULTIPLE CHOICE

1. Which of the following phases of human lung development is characterized by the formation of a capillary network around airway passages?
   a. Pseudoglandular
   b. Saccular
   c. Alveolar
   d. Canalicular

   ANS: D
   The canalicular phase follows the pseudoglandular phase, lasting from approximately 17 weeks to 26 weeks of gestation. This phase is so named because of the appearance of vascular channels, or capillaries, which begin to grow by forming a capillary network around the air passages. During the pseudoglandular stage, which begins at day 52 and extends to week 16 of gestation, the airway system subdivides extensively and the conducting airway system develops, ending with the terminal bronchioles. The saccular stage of development, which takes place from weeks 29 to 36 of gestation, is characterized by the development of sacs that later become alveoli. During the saccular phase, a tremendous increase in the potential gas-exchanging surface area occurs. The distinction between the saccular stage and the alveolar stage is arbitrary. The alveolar stage stretches from 39 weeks of gestation to term. This stage is represented by the establishment of alveoli.

   REF: pp. 3-5

2. Regarding postnatal lung growth, by approximately what age do most of the alveoli that will be present in the lungs for life develop?
   a. 6 months
   b. 1 year
   c. 1.5 years
   d. 2 years

   ANS: C
   Most of the postnatal formation of alveoli in the infant occurs over the first 1.5 years of life. At 2 years of age, the number of alveoli varies substantially among individuals. After 2 years of age, males have more alveoli than do females. After alveolar multiplication ends, the alveoli continue to increase in size until thoracic growth is completed.

   REF: p. 6

3. The respiratory therapist is evaluating a newborn with mild respiratory distress due to tracheal stenosis. During which period of lung development did this problem develop?

a. Embryonal
b. Saccular
c. Canalicular
d. Alveolar

ANS: A
The initial structures of the pulmonary tree develop during the embryonal stage. Errors in development during this time may result in laryngeal, tracheal, or esophageal atresia or stenosis. Pulmonary hypoplasia, an incomplete development of the lungs characterized by an abnormally low number and/or size of bronchopulmonary segments and/or alveoli, can develop during the pseudoglandular phase. If the fetus is born during the canalicular phase (i.e., prematurely), severe respiratory distress can be expected because the inadequately developed airways, along with insufficient and immature surfactant production by alveolar type II cells, gives rise to the constellation of problems known as *infant respiratory distress syndrome*.

REF: p. 6

4. Which of the following mechanisms is (are) responsible for the possible association between oligohydramnios and lung hypoplasia?

I. Abnormal carbohydrate metabolism
II. Mechanical restriction of the chest wall
III. Interference with fetal breathing
IV. Failure to produce fetal lung liquid

a. I and III only
b. II and III only
c. I, II, and IV only
d. II, III, and IV only

ANS: D
Oligohydramnios, a reduced quantity of amniotic fluid present for an extended period of time, with or without renal anomalies, is associated with lung hypoplasia. The mechanisms by which amniotic fluid volume influences lung growth remain unclear. Possible explanations for reduced quantity of amniotic fluid include mechanical restriction of the chest wall, interference with fetal breathing, or failure to produce fetal lung liquid. These clinical and experimental observations possibly point to a common denominator, lung stretch, as being a major growth stimulant.

REF: pp. 6-7

5. What is the purpose of the substance secreted by the type II pneumocyte?
a. To increase the gas exchange surface area
b. To reduce surface tension
c. To maintain lung elasticity
d. To preserve the volume of the amniotic fluid

ANS: B
The primary role of mammalian surfactant is to lower the surface tension within the alveolus, specifically at the air–liquid interface. This allows the delicate structure of the alveolus to expand when filled with air. Without surfactant, the alveolus remains collapsed because of the high surface tension of the moist alveolar surface. Surfactant is composed predominantly of an intricate blend of phospholipids, neutral lipids, and proteins.

REF: p. 8

6. Which of the following tests of the amniotic fluid have been shown to be sensitive indicators of lung maturity?
   a. Levels of prednisone
   b. Levels of epidermal growth factor
   c. Levels of prostaglandins
   d. Levels of phosphatidylglycerol and phosphatidylcholine

ANS: D
Of clinical relevance during late gestation, analysis of amniotic fluid for the concentration of phosphatidylglycerol and phosphatidylcholine has been shown to be a sensitive indicator of the state of fetal lung maturity.

REF: p. 8

Chapter 2: Fetal Gas Exchange and Circulation
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MULTIPLE CHOICE

1. Which of the following embryonic germ layers gives formation to the respiratory system?
   a. Endoderm
   b. Mesoderm
   c. Ectoderm
   d. Periderm

   ANS: A
   The respiratory system—pharynx, lungs, and epithelial lining of the trachea and lungs—originates in the endoderm. Refer to Box 2-1 in the textbook to see the list of various tissue systems found in the three embryonic layers.

   REF: p. 13

2. What is the function of Wharton's jelly inside the umbilical cord?
   a. To help provide nutrition to the fetus
   b. To prevent the vessels inside the cord from kinking
   c. To help protect the fetus
   d. To regulate the temperature between the fetus and the mother

   ANS: B
   Wharton's jelly, a gelatinous substance inside the umbilical cord, helps protect the vessels of the fetus and may prevent the cord from kinking.

   REF: p. 13

3. Which of the following organs is considered to be the first to form?
   a. Heart
   b. Brain
   c. Lungs
   d. Kidneys

   ANS: A
   The heart is considered to be the first complete organ formed. By 8 weeks of gestation, the normal fetal heart is fully functional, complete with all chambers, valves, and major vessels.

   REF: p. 14

4. A pregnant woman is coming for an early prenatal evaluation and wants to know if she can listen to the baby's heartbeat. How early can the fetal heartbeat be detected?
   a. Day 8
   b. Day 22

c. Day 45
d. Day 60

ANS: B
By day 22 cardiac contractions are detectable and bidirectional tidal blood flow begins.

REF: p. 14

5. Which of the following anatomic structures is a (are) fetal shunt(s)?

I. Foramen ovale
II. Sinus venosus
III. Ductus venosus
IV. Ductus arteriosus

a. III only
b. I, III, and IV only
c. I, II, and IV only
d. II, III, and IV only

ANS: B
Figure 2-6 in the textbook illustrates fetal circulation and the three shunts present in the fetus that close soon after birth. They include (1) the foramen ovale, the opening between the right atrium and the left atrium, which enables oxygenated blood to flow to the left side of the fetal heart; (2) the ductus venosus, which appears continuous with the umbilical vein and shunts 30% to 50% of oxygen-rich blood around the liver; and (3) the ductus arteriosus, which allows most of the pulmonary arterial blood flow to bypass the nonfunctioning fetal lungs and enter the aorta.

REF: p. 17

6. Which of the following events causes cessation of right-to-left shunt through the foramen ovale?

a. Increased levels of PO_2 in the blood of the neonate
b. Decreased levels of PCO_2 in the blood of the newborn
c. Increased systemic vascular resistance
d. Removal of the placenta, causing lowered blood volume returning to the right side of the fetal heart

ANS: C
Once the cord is clamped and the PVR decreases, pressures in the right side of the heart decrease and pressures in the left side increase. Because the foramen ovale flap allows blood to flow only from right to left, it closes when the pressures in the left atrium become greater than those in the right atrium. Closing the foramen ovale further facilitates the increase of blood flow to the lungs during the transitional period and is necessary to maintain normal extrauterine circulation.

REF: p. 18

7. How long after birth should it take for the ductus arteriosus to close completely?
   a. 24 hours
   b. 48 hours
   c. 96 hours
   d. 1 week

   ANS: C
   Because the pressure in the aorta also increases and becomes greater than the pressure in the pulmonary artery, the amount of shunting through the ductus arteriosus decreases. The functional closure of the ductus arteriosus occurs as a result of being exposed to an increased PO_2, a decrease in PVR leading to the reduction in blood pressure within the ductal lumen, a decrease in the local production of prostaglandins, and a reduction in the number of prostaglandin receptors within the tissue of the ductus arteriosus. Normally, constriction of the ductus arteriosus starts to occur at birth, and 20% of the ductus closes within 24 hours, with 80% closed in 48 hours, and 100% by 96 hours after birth.

   REF: p. 18

Chapter 3: Antenatal Assessment and High Risk Delivery
Test Bank

MULTIPLE CHOICE

1. A pregnant woman has been diagnosed with pregestational diabetes. Which of the following risk factors should the therapist be aware at the time of delivery?
   a. Unexplained abruption placenta
   b. Oligohydramnios
   c. Microcephaly
   d. Fetal malformations

   ANS: C
   Adverse fetal outcomes include unexplained fetal death in the third trimester of pregnancy and major fetal structural malformations. Close surveillance of the maternal metabolism and close fetal biophysical evaluation have significantly decreased the risk of fetal death as well as the necessity of delivering a fetus prematurely because of abnormal test results. The rate of fetal structural malformations in infants born to pregestational diabetic women can be as high as 10% to 15% compared with a rate of 1% to 2% for infants of otherwise normal women. The most frequently encountered defects include malformations of the cardiovascular system, including both the heart and great vessels, and the central nervous system, including the brain and spinal cord. No amount of maternal metabolic surveillance or fetal biophysical assessment after the period of fetal organogenesis will decrease this risk. Therefore, it is recommended strongly that women with diabetes mellitus receive counseling and treatment with the goal of achieving optimal glycemic control before they become pregnant.

   REF: p. 22

2. The respiratory therapist is attending a term labor of a woman diagnosed with gestational diabetes. The baby is very large for gestational age. What other metabolic disturbances should be considered?

   I. Hyperglycemia
   II. Hypocalcemia
   III. Hyperkalemia
   IV. Hypoglycemia
   a. II and IV only
   b. I, II, and III only
   c. I and III only
   d. II, III, and IV only

   ANS: D
   Poor blood sugar control in these women is associated with an increased risk of macrosomia (birth weight greater than 4000 g), traumatic vaginal delivery, preterm delivery, and a small risk of fetal death in some women. After delivery, the infants are at increased risk for metabolic disturbances in the neonatal period; these include hypoglycemia, hypocalcemia, hyperkalemia, hyperbilirubinemia, and idiopathic respiratory distress syndrome.

   REF: p. 22

3. Which of the following microorganisms often affect pregnancy outcome?
   a. Group B *Streptococcus*
   b. *Haemophilus influenzae*
   c. *Mycobacterium tuberculosis*
   d. Hepatitis C virus

   ANS: A
   A number of infectious agents can affect pregnancy outcome. Among the most important in the United States are group B *Streptococcus* (GBS), herpes simplex virus (HSV), human immunodeficiency virus (HIV), and hepatitis B virus (HBV). As many as 10% to 40% of pregnant women are colonized with GBS. Their infants are at risk for death or severe morbidity if they are born prematurely or after prolonged rupture of the fetal membranes.

   REF: p. 23

4. What is generally accepted as a safe limit for alcohol consumption during pregnancy to avoid the development of fetal alcohol syndrome?
   a. One to two 8-ounce drinks per day are considered acceptable.
   b. Four to five 8-ounce drinks per week are considered safe.
   c. Three to four 12-ounce drinks per week are considered reasonable.
   d. *No* safe range of alcohol consumption is deemed safe during pregnancy.

   ANS: D
   Alcohol is a potent **teratogen**, an agent or factor that causes malformation in the fetus. **Fetal alcohol syndrome,** associated with maternal use of alcohol in pregnancy, is characterized by mental retardation and prenatal and postnatal growth restriction, as well as by brain, cardiac, spinal, and craniofacial anomalies. It is usually seen among children of women who consume four to six alcoholic drinks daily throughout pregnancy. However, no safe range of alcohol consumption during pregnancy exists.

   REF: p. 24

5. What is the average birth weight difference between infants born of mothers who smoke and those born of nonsmoking mothers?
   a. Infants born of mothers who smoke tend to be about 200 g lighter than infants born of mothers who do not smoke.
   b. Infants born of mothers who smoke are generally about 400 g lighter than infants born of nonsmoking mothers.
   c. Infants born of mothers who smoke are predisposed to weigh approximately 600 g less than infants born of mothers who do not smoke.
   d. Infants of mothers who smoke are likely to be born about 800 g lighter than those born of mothers who do not smoke.

   ANS: A
   The mean birth weight of infants of women who smoke during pregnancy is about 200 g less than that of infants of nonsmokers.

   REF: p. 24

6. A woman with a long history of smoking is now in the last part of the third trimester of her pregnancy. She is at high risk for which of the following conditions?