ANSWERS: CHAPTER 27

MATCHING


IMAGE LABELING

1. fetal heart rate (bpm)
2. acceleration (of fetal heart rate)
3. acceleration (of fetal heart rate)
4. approximately 135
5. 20
6. contraction
7. reduction in adipose tissue, abnormal placental maturation, cardiomegaly
8. abnormal sucking, swallowing, micturation, and reflex activities; abnormal sleep states; decreased tone; decreased gross body movement; decreased breathing movement; abnormal nonstress test
9. decreased urinary output (oligohydramnios); abnormal umbilical artery waveform; increased end-diastolic flow in the MCA; increased cardiac output; abnormal ductus venous waveform; umbilical vein pulsation
10. decreased angiotensin II; abnormal maternal fibronectin/atrial natriuretic factor

MULTIPLE CHOICE

1. c 2. d 3. a 4. b 5. c 6. a 7. c 8. d 9. c 10. b

FILL-IN-THE-BLANK

1. increased
2a. dysfunction
2b. dilatation
3. 18
4a. pre-
4b. post-
5. chromosomal
6a. 18
6b. 17 and 39
7. lower
8a. idiopathic
8b. multifactorial
9a. decreases
9b. femur length

10. biometric
11a. amniotic
11b. maternal
12. increase accuracy
13. AC percentile
14. 30 to 32
15. high-risk
16a. weight
16b. biometry
16c. Doppler
16d. amniotic
17. birth weight
18. 30
19a. tone
19b. movement
20. vibroacoustic stimulation (VAS)

SHORT ANSWER

1. Common measurements of Doppler indices include the pulsatility index (PI), resistive index (RI), and systolic-diastolic (S/D) ratio. The PI is used most often because it is angle independent.

2. Assigned gestational age and the method used to assign this age, estimated fetal weight, birth weight percentile, fetal growth history, AFI, placental grade, BPP score, and Doppler velocimetry.

3. The later a neuroanatomic center develops, the more sensitive it is to the manifestations of acute hypoxia. The area of the fetal brain that regulates fetal tone develops at 7 to 9 weeks, fetal motion at 9 weeks, and fetal breathing motion at 20 to 21 weeks.

4. BPP, weekly or twice weekly; NST/AFI assessment; and Doppler interrogation.

5. Fetal well-being includes a baseline FHR falling between 120 and 160 bpm and absence of any decelerations (decreases in the FHR below baseline). A normal (or reactive) test depends on detection of at least two FHR accelerations above the baseline. Normally, in a 20-minute period the FHR should accelerate by 15 bpm for at least 15 seconds. An abnormal or nonreactive NST is defined by the absence of fetal movements or by FHR accelerations <15 bpm. The presence of spontaneous heart rate decelerations and/or loss of beat-to-beat heart rate variability (a characteristic of normal fetuses) may be associated with poor outcome. A normal or reactive result implies good fetal CNS integrity; that is, absence of asphyxia for 7 days in the preterm and term fetus and for 3 days in the postterm fetus. A nonreactive test correctly predicts fetal death (within 1 week of testing) in only 3% to 29% of cases.
IMAGE EVALUATION/PATHOLOGY

1. Echogenic bowel is visualized in the fetal abdomen. Additional biometric methods have been proposed to aid in the identification of IUGR, beyond the typical measurements. These include the brain’s gyral patterns, the transcerebellar diameter, evidence of decreased adipose deposits, foot length, the imaging of the distal femoral epiphysis or proximal humeral epiphysis, ratios of the HC to the AC or the AC to the FL, amniotic fluid volumes (without PROM), the presence of a grade 3 placenta, echogenic bowel, volumes of intracranial structures, femur volume, and humerus volume.

2. A Doppler study is being performed on the fetal uterine artery. The waveform is normal.

3. Color Doppler and spectral waveform imaging of the umbilical artery shows reversal of diastolic flow. This is an ominous sign of fetal compromise/hypoxia and requires further evaluation of the fetal middle cerebral artery and ductus venosus. The diastolic flow reversal in umbilical arteries signifies severe placental insufficiency and increased placental vascular resistance.

4. A fetal cranium is displayed showing the two middle cerebral arteries that are positioned between the bilateral anterior cerebral and posterior communicating arteries and supply blood to the cerebrum.

5. The images display the fetal abdomen at the level of the liver and vessels. Image A arrow points to the umbilical vein. Image B arrow points to the ductus venosus, which in the fetus shunts approximately half of the blood flow of the umbilical vein directly to the inferior vena cava, which shunts oxygenated blood to the fetal brain.

CASE STUDY

1. This fetus was diagnosed with IUGR at 29 weeks GA. The ultrasound image of the umbilical cord reveals pulsations (arrows). Fetuses demonstrating pulsatile umbilical venous waveforms typically have severe growth retardation and may have congenital anomalies of the heart. Pulsations in umbilical venous flow are known to be a sign of fetal heart failure and asphyxia.

2. Image A is of a normal middle cerebral artery (MCA) with an RI of 0.81 and an S/D ratio of 5.36. This IUGR fetus is uncompromised. Image B displays an increase diastolic component consistent with circulatory redistribution in a compromised fetus (RI 0.61 and S/D ratio of 2.58). The “brain-sparing effect,” also known as circulatory redistribution, is a method of increasing blood flow to the brain, heart, and adrenals, and can be assessed with MCA Doppler studies.