

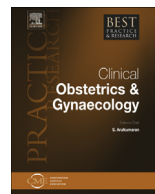


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## Best Practice & Research Clinical Obstetrics and Gynaecology

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### Intrapartum Fetal Surveillance – Multiple Choice Questions for Vol. 30

1. Regarding fetal oxygenation which of the following is/are true?
  - a) The fetus requires oxygen only to maintain cellular aerobic metabolism
  - b) Both glucose and oxygen can be stored allowing later mobilisation if required
  - c) Maternal respiratory complications alone can result in a downstream reduced fetal oxygen supply
  - d) For there to be a significant reduction in the oxygen supply to the baby it usually requires a combined materno-placento-fetal complication
  - e) In the event of utilisation of the anaerobic metabolism pathway, it yields 19 times the production of lactic acid compared to aerobic.
2. Regarding fetal blood supply which of the following is true?
  - a) In the inter-villous space, de-oxygenated blood from the mother's spiral arteries flows around the fetal chorionic villi, which contain oxygenated blood
  - b) The two umbilical veins transport deoxygenated blood and waste products from the fetus to the placenta, while the umbilical artery provides the fetus with oxygenated blood and nutrients from the mother.
  - c) The neonatal acid–base status is best reflected by the umbilical arterial blood
  - d) The venous umbilical blood contents depend on the maternal acid–base status and placental function
  - e) Blood from the placenta passes via the umbilical vein almost unhindered through the ductus venosus
3. Further regarding fetal blood supply which of the following is true?
  - a) The fetal cardiovascular system is designed such that the most highly oxygenated blood is delivered to the myocardium and brain
  - b) Fetal circulatory adaptations are achieved by the presence of intra-cardiac shunts
  - c) Fetal circulatory adaptations are achieved by the presence of extra-cardiac shunts
  - d) The fetal carotid bodies contain baro-receptors for the detection of pressure changes in the fetus
  - e) The fetal heart is equipped with baro and volume receptors which sense changes in the pressure and volume of blood in the heart.
4. Regarding fetal metabolism which of the following is/are true?
  - a) Glycolysis results firstly in the conversion of glucose into pyruvate
  - b) Two ATP molecules are generated after the initial first step of glycolysis
  - c) Citric acid in the presence of oxaloacetate enters the Acetyl coenzyme A cycle.
  - d) The reaction  $\text{CO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{CO}_3 \leftrightarrow \text{H}^+ + \text{HCO}_3^-$  only occurs uni-directionally in the placenta to facilitate  $\text{CO}_2$  elimination

- e) The bicarbonate buffer is the main buffer system in plasma accounting for 35% of the fetal buffering capacity in blood
5. Regarding fetal asphyxia which of the following is/are true?
- Fetal asphyxia almost always occurs as a result of a gradual insufficiency in the umbilical blood flow or insufficient uterine blood flow
  - Occlusion of one or more of the vessels in the umbilical cord impedes the circulation to and from the fetus and during these events both the oxygen content of the fetal blood may decrease and the CO<sub>2</sub> content may increase
  - Excess fetal CO<sub>2</sub> is initially removed by a large increase in fetal respiratory rate
  - Prolonged hypoxia leads to a further increase in CO<sub>2</sub> content and further respiratory acidosis
  - The accumulation of CO<sub>2</sub> can deplete the buffer system causing failure of the ATP-dependent sodium–potassium pump initiating a cascade that leads to cell injury and death.
6. Regarding the causes of intrapartum fetal hypoxia/acidosis, the following statement(s) is/ are true?
- Uterine contractions may decrease placental perfusion and reduce umbilical cord circulation.
  - Aorto-caval compression by the pregnant uterus may cause sudden maternal hypotension.
  - Maternal cardio-respiratory arrest is an irreversible cause of fetal hypoxia/acidosis.
  - Shoulder dystocia may cause umbilical cord compression.
  - Asking the mother not to push during contractions in the second stage of labour may contribute to reducing fetal hypoxia/acidosis.
7. Regarding adverse fetal outcome, the following statement(s) is/are true?
- Fetal hypoxia/acidosis can be diagnosed by documenting a blood lactate concentration exceeding 10 mmol/l in the newborn circulation during the first minutes of life.
  - Low Apgar scores are a hallmark of intrapartum fetal hypoxia/acidosis.
  - Most newborns with metabolic acidosis and decreased 1-minute Apgar scores will die after birth or develop hypoxic-ischemic encephalopathy.
  - Neonatal encephalopathy is caused by intrapartum hypoxia/acidosis and requires the confirmation of metabolic acidosis.
  - The majority of cases of cerebral palsy cases are caused by intrapartum hypoxia/acidosis.
8. A full-term neonate has the following blood results from the umbilical artery, obtained immediately after delivery: pH 6.95, pCO<sub>2</sub> 11 kPa, BDecf 12.3 mmol/l. What is the correct interpretation of this result?
- Normal acid–base status
  - Respiratory acidosis
  - Metabolic acidosis
  - Combined metabolic acidosis with a respiratory component
  - Compensated combined acidosis
9. The same neonate as in question 8 does not breathe and obtains low Apgar scores both at 1 and 5 minutes. After a few minutes of resuscitation the neonate is transferred to NICU. He breathes spontaneously and during close supervision he demonstrates normal tone, sucking reflex and behaviour. He is discharged to his home on the fifth day of his life. The parents are anxious and ask about risk of brain injury. What is the best advice re development and the risk of developing cerebral palsy (CP)?
- He is likely to develop normally and he has no increased risk of CP
  - He is likely to develop normally but there is an increased risk of CP
  - He is likely to have a delayed development but without increased risk of CP
  - He is likely to have a delayed development and an increased risk of CP
  - No firm advice can be given as the outcome is too uncertain

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