Predictability and Complications of Fetal Blood Sampling

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Predictability

Following the institution of fetal blood sampling in the standard management of labor in patients at high risk, it has become apparent that in certain situations the acid-base state of the fetus is not a reliable index in predicting the condition of the infant at birth (Bowe et al., in press). If Apgar score is plotted against fetal pH (Fig. 1) and the graph is divided into four segments at score 6 and pH 7.2, the instances where fetal acid-base is a reliable indicator of outcome as assessed by the Apgar score lie in Segments B and C; in Segment B are the infants scoring 7 to 10, who have a pH of 7.2 or higher, while Segment C contains infants who are both depressed and acidicotic. Segment A contains those infants who have a relatively normal acid-base state during labor but are depressed at birth, while Segment D contains those infants who are more acidicotic but are yet in vigorous condition at birth. In our series of 355 labors, 7.6% of the infants fell in Segment D, 10.4% in Segment A. Acid-base state of fetuses in these two Segments was not useful in predicting the infant’s condition at birth.

It is entirely reasonable to anticipate exceptions in this regard. Asphyxia, while an important cause of depression at birth, is only one of a number of factors that can lead to depression of the central nervous system.

The values in Segment A have been termed “false normals,” false because the infant is depressed at birth, and normal because his acid-base state falls within the range found in fetuses who are in good condition at birth. The values in Segment D have been termed “false abnormals,” false because the infant is in good condition at birth, and abnormal because the acid-base state is abnormal.

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FALSE NORMALS

There are several factors that may account for low Apgar score in the false normal group:

1. Sedative drugs or anesthetics.
2. Infection.
3. Airway obstruction.
5. Precipitous delivery.
6. Prematurity.
7. Previous episode of asphyxia—recovery of acid-base state but not the responsiveness of the central nervous system.
8. Asphyxial episode between the time of fetal sampling and delivery of the infant.

Maternal medication or anesthesia probably accounts for more “false normal” values than any of the other causes in the above list. The proportion of infants in this category will be influenced by the particular practice of obstetrical anesthesia and analgesia. In those clinics where relatively heavy sedation is employed the relative frequency may be considerable.

Maternal or fetal infection is usually associated with fetal tachycardia. The acid-base state may be entirely normal. It is important that the physician is not lulled into a false sense of security in concluding there is no fetal distress. The longer the fetus remains in an infected environment, the worse is the outcome.