

## Fetal Scalp Blood Sampling

Fetal scalp blood sampling is done to measure the pH status of the baby's blood and determine whether or not the baby is receiving enough oxygen from the mother. It is suggested in cases where fetal distress is occurring, as shown by the tracings of an electronic fetal monitor.

This procedure requires that the amniotic sac be ruptured by the physician if it has not already broken on its own. For fetal scalp blood samples to be taken, the mother is first cleansed and the presenting part of the baby is determined. A sterile amnioscope is inserted and the presenting part of the baby (usually the head) is visualized with a light source. At the onset of a contraction a single puncture wound is made. When obtaining blood from the baby's scalp, the fontanelles (soft spots) should be avoided. A small incision is made with a lance designed to penetrate to a depth of 2-3 mm. and the incision should not exceed 2 mm. in width. A drop of blood is collected by a capillary tube, which is mixed and analyzed immediately (1). The incision site should be observed carefully until all bleeding has stopped. The baby should continue to be examined after birth until discharge from the hospital, as infection can occur.

The role of fetal blood sampling is limited by many factors (2). It can not be used in women with HIV or hepatitis, as the infection can be transmitted via the open site on the baby's head. It can not be performed easily if the cervix is posterior, or during the early stage of labor, with little dilatation and the baby's head still high. The procedure is subject to error by both the technician and the equipment.

Only the pH level is measured and many factors can affect the pH value, such as the formation of a caput on the baby's scalp, and the pressure exerted by the baby's head to open the cervix during the second stage of labor (3). The

mother's posture during labor, the types of medications used, hyperventilation and uterine contractions can all affect the measured pH value (4) (5).

Fetal scalp blood sampling can reduce the rate of cesarean delivery by allowing women more time if the results from the samples are favorable, showing good oxygenation. The trade-off is the complications associated with the sampling procedure, such as hemorrhage, infection and breakage of the blade used to obtain the blood sample; not to mention the trauma to the baby. Two hemorrhages; one resulting in stillbirth, the other in neonatal death; were reported out of 640 cases (6).

In one documented case (7) an emergency cesarean had to be performed because of continued bleeding from the fetal scalp sampling site, despite the application of pressure. When the baby was delivered, his Apgar scores were low -2- at both one and five minutes after birth. The baby required one stitch to close the wound at the scalp sampling site, as well as a blood transfusion. Although this is an extremely rare occurrence, it caused this baby severe complications.

There was at least one case (8) of a fetal scalp sampling blade that was missing and was noted in two fragments in the baby's scalp, on an X-ray. Due to the difficulty of removal, the fragments were left in. The infant progressed well.

A truly viable and non-invasive alternative to fetal scalp blood sampling is simple stimulation of the baby's head using the fingers. Scalp stimulation can be just as reliable a predictor of fetal well being as the blood sampling technique (9). Scalp stimulation is especially useful if there are non-reassuring heart rate patterns showing up on the monitor tracings. The use of scalp stimulation could reduce the need for blood sampling by as much as 54%. The number rises to 73% when stimulation with the fingers is used to assess fetal heart rate variability before the fetal blood sampling procedure is introduced (10). Scalp stimulation

can also reduce other invasive procedures by its reassurance that the baby is faring well.

Another alternative to fetal scalp sampling is called vibroacoustic stimulation(VAS). Since fetal blood sampling is limited in its absolute ability to diagnose babies at risk, VAS can be used in its place. This test involves using a 3 to 5 second stimulus to awaken the baby using sound and vibrations. Babies who respond with movement after the stimulus do not require further invasive testing. Failure to respond may predict more invasive procedures, such as fetal scalp blood sampling. Vibroacoustic stimulation was found to prevent further intervention due to false abnormal tracings on the electronic monitor, improving the overall outcome of the birth (11).

Studies (12) (13) have questioned the feasibility of the practice of fetal scalp pH sampling due to the difficulties involved in obtaining accurate and timely samples, the economic costs of the equipment and the infrequent correlation between pH alterations and neurologic consequences.

One large obstetrical service virtually eliminated fetal scalp blood sampling over a seven year period. There was no increase in the cesarean rate due to fetal distress and no increases in problems with the newborns (14). The role of fetal blood sampling and its usefulness in determining true fetal stress levels is questioned by these results.

There is little need for fetal scalp blood sampling in the diagnosis and management of presumed fetal distress in labor (15) (16). The doctor is the only one who benefits from this procedure, according to one author, and it should be removed from today's "standards of care". (17)