Fetal Surveillance

When it comes to "fetal surveillance" the primary objective is to prevent the death of the newborn. Fetal assessment takes place most often during the end of a woman's pregnancy, especially if she goes past her due date. Several techniques are available to assess fetal well being, including non-stress testing, contraction stress testing, biophysical profiles, placental grading by ultrasound techniques and fetal movement counting.

Fetal heart rate testing has evolved over a 30 year period and a debate about the classification of fetal heart rate patterns has lasted that long as well. Fetal heart rate monitoring, using both the non-stress and contraction stress test, was studied for a ten year period. Overall, the chief value of fetal heart rate testing is the ability to identify the normal, healthy baby. The tests are less accurate to identify the sick baby(1).

So, are they of any real clinical significance? What about the exposure of all those normal, healthy babies to ultrasound? It is all really necessary? Can it really prevent a tragic outcome? There are no absolute guarantees in pregnancy and birth and clinical testing should not be so routinely administered and assumed safe and effective.

In a non-stress test, the baby is monitored by ultrasound and fetal heart rate and movements are recorded. This test, unfortunately, has fairly high false positive results. This is due to the fact that babies in utero are often asleep; either in a quiet state or an active state. Another state of being while sleeping in utero is characterized by eye movements only. In an active, awake state the baby is continuously moving; producing constant acceleration and variability on the fetal heart tracings while being monitored. Since babies are in a state of sleep about 70% of the time in utero, false non-reactive results often occur

during non-stress testing. If babies are asleep, there are rarely accelerations or variability. This can lead to a false positive result and an incorrect diagnosis of compromised fetal well being (2). The non-stress test also requires long exposure of the baby to ultrasound.

One alternative to this test is the fetal acoustic stimulation test (AST). This acoustic stimulation test involves a 1 to 2 second sound stimulus placed on the lower pregnant belly. The sound causes the baby in utero to awaken, thus creating heart rate acceleration and variability. If necessary, a second sound stimulus is applied within 10 minutes of the first. Sound-induced accelerations of the baby's heart rate are valid predictors of fetal well being(3).

When standard non-stress testing was compared to acoustic sound stimulation, it was concluded that AST offered a greater advantage over non-stress testing by lowering the incidence of non-reactive tests and testing time(4). The use of this simple test could greatly lessen the need for contraction stress testing, which requires the baby to be monitored electronically by ultrasound while the mother is receiving an oxytocin drip through an I.V. line. The contraction stress test is associated with a higher rate of intervention(5). The need for biophysical profiles would also be less frequent if acoustic stimulation is used.

A biophysical profile is used as an assessment of fetal health and well being, especially in post-dates pregnancies. The goal of the medical management of postmaturity is to avoid neonatal death or stillbirth. But is this truly possible and at what costs to mother and baby?

The biophysical profile evaluates five fetal characteristics: fetal movement, tone, breathing, heart reactivity and amniotic fluid volume. This requires the use of ultrasound to monitor the baby's movements, tone and

breathing, as well as an ultrasonic assessment of amniotic fluid volume. Electronic monitoring of the baby's heart beat is used to heart reactivity.

Overall assessment of fetal well being depends on many variables, including the size of the baby, the amount of amniotic fluid, non-stress testing and the complete biophysical profile. The biophysical profile has only an 18% sensitivity for predicting poor outcomes; the non-stress test only 14% (6). When biophysical profiles are used, there is a slight risk of iatrogenic (caused by medical treatment) prematurity of roughly 1.5% due to intervention for "false" positive test results (7).

With regard to amniotic fluid volume estimation, a problem arises when three of the most frequently used obstetric textbooks define adequate amniotic fluid volume differently (8). It is of utmost importance that precise ultrasound measurements be implemented across the board so that an accurate definition of parameters can be implemented.

Amniotic fluid assessment is considered by the medical profession to be a valuable test to determine fetal well being. Yet, how can this be so when the uterine cavity is irregular in itself and differs from woman to woman? Although three ultrasound techniques are currently used to evaluate amniotic fluid in pregnancy, as follows: maximum vertical pocket, subjective assessment and amniotic fluid index ; amniotic fluid volume is an unreliable predictor of the baby's well being and risk of morbidity(9).

Using ultrasound assessment, both amniotic fluid index and two-dimension amniotic fluid pocket do not reflect actual amniotic fluid volume(10). The assessment of amniotic fluid volume late in pregnancy by these techniques are proven to be poor predictors of adverse neonatal outcome(11).

The reference ranges currently being published for amniotic fluid index