Electronic Fetal Monitoring

Cardiotocography is a form of fetal assessment which simultaneously records fetal heart rate, fetal movements and uterine contractions to investigate hypoxia, or "fetal distress". However, the diagnosis of fetal distress is often unproven. Cesareans are performed in cases of suspected fetal distress, but are they always necessary? The use of cardiotocography has not reduced long term neonatal morbidity or the incidence of cerebral palsy (1) as was hoped. Cardiotocography is considered the "gold standard" of all monitoring techniques for fetal well being.

Cardiotocography is used both prior to and during labor to assess the baby's well being. However, there is not enough evidence to evaluate the use of this test for fetal assessment purposes (2).

Cardiotocography, when used in labor, is most commonly referred to as electronic fetal heart rate monitoring (EFM). It was first invented in the 1950's and was made available to hospitals in the 1960's. It was met with enthusiasm because it was believed to be a saving grace for babies in distress. Monitoring would alert doctors when babies were developing asphyxia so that a timely intervention (usually a cesarean) could be performed to save them. It quickly went from its initial intent to be used only in high risk pregnancies to the norm; used on virtually every laboring woman today. In 1996, 84% of women giving birth in U.S. hospitals were monitored electronically (3).

Nearly 30 years after its introduction, the reliability, validity and efficacy of electronic fetal monitoring is still controversial. EFM has a high false positive rate (4), meaning that babies who are indeed fine are shown to be in distress on the monitor tracings. Yet, when babies are monitored electronically, the risk of cesarean section or operative delivery is significantly increased (5).

When electronically monitored, there is a significantly lower rate of spontaneous vaginal delivery (6). The risk of operative intervention is increased dramatically when EFM is used.

It was originally believed that almost all cases of cerebral palsy and mostly all fetal deaths during labor could be eliminated by the use of electronic fetal monitoring. More recent studies show that only about 10% of all cerebral palsy is caused by asphyxia (7) (8). The remaining cases are caused by developmental defects, such as infections, toxins, etc. The prevalence of cerebral palsy has NOT decreased since electronic fetal monitoring came into practice. (9)

The belief that babies could be saved from death by asphyxia is also not true. Even when continuous monitoring is being used, some episodes of oxygen deprivation, either in labor or immediately prior to delivery, are so severe and occur so rapidly that no intervention can save these babies. Brain damage will occur in ten minutes (10) and no cesarean can be performed that quickly.

The biggest fault when evaluating the effectiveness of EFM seems to lie in the interpretation of the monitor tracings. These interpretations are non-concrete and vary from one person to the next. In three separate studies (11) (12) (13) experienced clinicians were shown the same monitor tracings. When asked to evaluate them, their interpretations varied greatly. There is a great deal of inconsistency found in the interpretation of fetal heart rate patterns by health care professionals (14). There is yet to be a standard readability factor for interpreting monitor strips. This weakens the effectiveness of what electronic fetal monitoring is meant to accomplish.

To lessen the degree of inconsistency, a new test adds the baby's electrocardiogram(ECG) to the EFM picture. The use of cardiotocography (EFM) alone versus cardiotocography plus fetal ECG was recently studied in over 1,000

laboring women. To monitor the babies' ECG, a spiral scalp electrode was used and the on-screen signal was analyzed. It was thought that the addition of the ECG would improve the sensitivity and accuracy of fetal monitoring. Currently, the use of electronic fetal monitoring alone has limitations, and there are difficulties in interpreting the fetal heart tracings. EFM often leads to unnecessary interventions, such as operative vaginal delivery with forceps and/or vacuum extractors and cesarean delivery, which all carry greater risks. The addition of the spiral scalp electrode to monitor the ECG of the baby did not show a significant decrease in operative intervention. There was, in fact, no difference in outcome among the two groups(15).

Another problem with standard electronic fetal monitoring is that some normal behaviors of babies in utero can be associated with irregular heart rate patterns. A baby's behaviors such as sucking and breathing movements may stimulate abnormal patterns. When a baby in utero is sleeping, there is limited reactivity in the heart rate tracings, as well (16).

The reliance that doctors and nurses have placed on electronic monitoring has resulted in a loss of skills that are more personable. Medical personnel no longer have to "attend" a laboring woman by listening to the baby's heart rate with a fetascope; they can rely on a machine to do it for them. They can monitor a laboring woman, or a whole labor floor, from the comfort of a nurses' station. When the machine malfunctions, doctors and nurses no longer have the skills to listen, with their ears, to the baby's heartbeat.

Inadequate training also contributes to the inefficiency of electronic monitoring. Even though EFM has been in use for over 30 years, most ob's received their training on this technology during their residencies. Information taught 10 or more years ago is now hopelessly outdated.