Selected Summaries

Cerebral Palsy and Electronic Fetal Monitoring

[Nelson KB, Dambrosia JM, Ting TY, Grether JK. Uncertain value of electronic fetal monitoring in predicting cerebral palsy. N Engl J Med 1996, 334: 613-618].

In this retrospective case control study, 95 singleton infants with birth weight of at least 2500 g who had cerebral palsy (CP) at 3 years of life were compared with 378 randomly chosen control infants. (The California Cerebral Palsy Project involved 1,55,636 surviving children). Seventy eight of the 95 children with cerebral palsy and 300 of the 378 control infants had undergone electronic fetal monitoring (EFM). Twenty one of 78 (26.9%) children with CP and 28 of 300 (9.3%) control infants had abnormal EFM tracings. Multiple late decelerations (MLD) were associated with nearly quadrupling the risk of CP (Odds ratio, 95% CI-3.9, 1.7-9.3) and decreased beat to beat variability (DV) with nearly tripling the risk (2.7, 1.1-5.8). After adjusting for the other risk factors identified in California CP project, (breech, prematurity, meconium, maternal infection and bleeding), the adjusted odds ratio for abnormal EFM tracing in CP group was 2.7 (1.4-5.4); that is, children with CP were 2.7 times more likely to have abnormal EFM tracing than normal controls.

Analyzing from an epidemiological angle, of the 10,791 surviving singleton children more than 2500 g who had EFM abnormalities, 21 had cerebral palsy and the remaining 10,770 children with EFM abnormalities were developmentally normal at 3 years. Hence EFM has a false positive rate of a whoppng 99.8% in predicting future CP *(i.e.,* in only 2 out of 1000 occasions does EFM abnormality predict future CP). In 998 out of 1000 occasions, obstetric intervention based upon EFM abnormalities is unlikely to be helpful to the infant but carry their own inherent risks especially to the maternal health.

Comments

The antecedents for CP are still under active research. Contrary to Little's view that CP resulted from events occurring at or around the process of birth, birth asphyxia as the etiological factor in CP was found in only 3-20% of the affected children(l-3). About 10% of cases of CP occur due to pathological events happening after birth. The antecedents for the remaining 70% cases of CP are still unknown(4). No wonder then, that despite all the technological advances in intrapartum monitoring and interventional obstetrics, the prevalence of CP remains at 1-2 per 1000 term infants over the past 3 decades.

A normal EFM trace predicts a healthy baby accurately and is reassuring whereas an abnormal or even a flat trace identifies an ill fetus in only 50% of cases (in the remaining 50% of cases, it is just a false alarm leading to unnecessary interventions) (5,6). Randomized trials tell the disappointing story of EFM and the only immediate beneficial outcome measure was a reduction in neonatal seizures in the high risk group(5).

Given this background, when the etiology of CP is idiopathic in 70% of cases, it is unrealistic to expect EFM, which does not even accurately predict birth asphyxia, to be a reliable predictor for CP. Children with CP had an almost 3 fold increase in the prevalence of abnormal EFM records when compared with normal controls. This could be due to the fact that some unidentified prenatal factor responsible for CP also results in abnormal EFM tracings. This is in accordance with Freud's observation that the

anomaly of the birth process, rather than being the casual etiological factor, may itself be the consequence of the real prenatal etiology(3,4).

The authors could not get information on the duration of EFM abnormalities before delivery. In experimental studies, it has been found that for hypoxic brain lesions to occur the hypoxia need to have been present for atleast 1-3 hours. Anoxic events like cord prolapse could insult the brain in 10 minutes time(7). May be a prospective randomized trial with subsequent follow up for CP could answer more definitely the value of EFM in predicting CP.

Nevertheless, abnormal EFM tracings could not be utilized as predictor of the future outcome of CP since the sensitivity is 27% and positive predictive value is only 0.14%. Hence, while search is on for an exacting intrapartum monitoring technique, the existing modalities including EFM need to be judiciously used and rigorous controlled trials should be performed before any future modality is accepted for routine use.

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