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Briefly Legal: The Fetus as Witness

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Previously, the fetus was considered the perfect patient: it was silent, complained little, and appeared at the very last moment. With modern technology, including the Ultrasound (US), ContinuousCardiotocography (CTG), and Doppler, we have gained unprecedented access to the fetus's anatomy, growth, behavior, and environment. So much so that with a proper interpreter (the mother), the fetus contributes to its own management and occasionally appears as a witness in allegations of medical negligence.

"With modern technology, including the US, CTG, and Doppler, we have gained unprecedented access to the fetus's anatomy, growth, behavior, and environment. So much so that with a proper interpreter (the mother), the fetus contributes to its own management and occasionally appears as a witness in allegations of medical negligence."

In this communication, we deal with the testimony of the fetus regarding its mother's perception of fetal movement.

A series of articles in the Lancet has called for renewed activities to prevent stillbirths. (1) While there is wide variation in the rates of stillbirth and many stillbirths remain unexplained, increased attention has been drawn to those recognizable antecedents such as fetal growth restriction (FGR), and maternal hypertension, where placental dysfunction may play a role in the adverse outcomes. (1) (2) A systematic review of placental pathology in stillbirths has described abnormalities in up to 65% of cases. (3) Furthermore, about 20 - 40% of stillborn babies are reported to have FGR. (4)

It has long been known that maternal perception of reduced fetal movements (RFM) is associated with late stillbirth, FGR, and other obstetrical problems. (5, 6) (7) (8) Women with RFM are more likely than those with normal FM to have induction of labor, instrumental birth, cesarean section (overall and emergency) and less likely to have a planned C.S. (9)

One study of over 1700 women found that 30% of those who had suffered a stillbirth reported significant reduced retal movement (RFM). (7) Other studies suggest that women frequently perceive RFM 2 days prior to the diagnosis of fetal death. (10) Ultrasound scans obtained before cesarean section in fetuses with RFM have fewer fetal movements than controls and are more likely to have umbilical cord gas measurements indicative of acidemia. (11) Similarly, women delivering within one week of an episode of RFM show differences in placental structure and function reminiscent of those seen in FGR and stillbirth. (12) (13)

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Given the co-association of stillbirth to placental dysfunction and FGR, it seems intuitive that improving the management of women complaining of RFM might reduce the risk of stillbirth and other potentially harmful consequences, including HIE and C.P. Indeed, various national governments and organizations have created initiatives focused on the detection and management of reduced fetal movements (RFM). (14)

The maternal perception of fetal movements remains the most common method of assessing fetal activity. Several characteristics impact the mother's perception of F.M.s, including parity, obesity, smoking, and time of day, along with such obstetrical features as anterior placenta and abnormalities of amniotic fluid volume. Women with a history of previous pregnancy loss, assisted conception, and a medical history of psychiatric illness are more likely to report RFM during pregnancy. (9)

In pregnancies complicated by premature rupture of membranes or oligohydramnios, Sivas reported a normal FM frequency but a

reduced FM speed and amplitude, suggesting that low amniotic fluid levels may restrict fetal movement. (2) A large retrospective cohort study from Israel found a statistically significant association between RFM and oligohydramnios. (3) Similarly, polyhydramnios may make FM more challenging to feel.

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Maternal concern about RFM is a common complaint (6-15%) of pregnant patients in the third trimester. (15), (16) FM counting as a formality was initiated in the 1980s by Sadowski using a "count to 10" strategy. Since then, various initiatives have been introduced covering a broad range of hours to days and number of movements. (9) Irrespective of the methodology, there appears to be no threshold of fetal movements below which perinatal morbidity increases, (5) and several reviews and randomized trials found that FM counting using a formal approach had no discernible effect on perinatal mortality and diminished incentives for formal fetal movement counting. (17), (18), (19), (20) It has also been a repeated observation that, at least in some cases, the fetus was already harmed or dead with no option to prevent the adverse outcome. (18) (21) (22)

"It has been suggested that the failure of these initiatives to reduce perinatal mortality is related to both the unproven benefit of diverse management protocols along with a host of problems with the awareness of the patient, the recommendations of health care providers, if any, and how promptly the patients sought assistance, among other problems. (23)"

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"They recommend that maternity healthcare providers advise pregnant women to be aware of their baby's pattern of movements, observe only for changes in the pattern of their FMs (not only reduced FM), and contact their maternity care provider immediately if they perceive a change in that pattern significantly if FM is reduced or have ceased."

Ultimately, there was no evidence forthcoming that a specific threshold of FM performs better than the qualitative maternal perception of RFMs alone (4), and current guidelines from around the globe (24) assert that it is the maternal perception of decreased (altered) FM that is important. They recommend that maternity healthcare providers advise pregnant women to be aware of their baby's pattern of movements, observe only for changes in the pattern of their FMs (not only reduced FM), and contact their maternity care provider immediately if they perceive a change in that pattern significantly if FM is reduced or have ceased.

"Thus, during prenatal care, there is the need for the pregnant women to understand the importance of becoming familiar with the pattern of normal fetal activity, the importance of prompt recognition of alterations in that pattern, whom to contact if she perceives RFM, and if there is a failure of contact to proceed directly to the hospital for surveillance."

Therefore, the pregnant patient must be provided with an explanation of the importance of self-surveillance To provide reasonable prenatal care and when they should be concerned about an alteration in the FM pattern. Thus, during prenatal care, there is the need for the pregnant women to understand the importance of becoming familiar with the pattern of normal fetal activity, the importance of prompt recognition of alterations in that pattern, whom to contact if she perceives RFM, and if there is a failure of contact to proceed directly to the hospital for surveillance. It is further necessary to ensure that this coherent message is reinforced by

staff (midwives, nurses) during antenatal contact by phone or in person. It is also necessary to elaborate on the testing that will be performed in the hospital or clinic in response to the complaint of RFM.

While giving information to women regarding the importance of surveillance of fetal movement is considered a cornerstone of prenatal care, deficiencies in the delivery and implementation of that care are commonplace, well documented in the literature, and often surfacing in allegations of negligent care in medico-legal cases involving stillbirth and infants with subsequent neurological handicap including cerebral palsy (CP).

"The required testing includes both Cardiotocography (CTG) and ultrasound assessments. (5) The CTG is routinely used to ascertain fetal wellbeing (behavior), the presence of contractions, and any fetal response to contractions. Ultrasound measures fetal growth, activity (not behavior), and the fetal environment, including amniotic fluid volume. Both modalities are required for satisfactory surveillance."

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The features of the CTG to be observed include features of fetal heart rate pattern, including the baseline heart rate (FHR), heart rate variability (FHRV), accelerations, and decelerations. In addition, evaluating the presence, pattern, and fetal response to uterine contractions is also essential for insight into the potential for labor or placental abruption (associated with excessive uterine activity).

FHRV is a significant predictor of fetal wellbeing, especially in SGA pregnancies (25) STV normally increases with advancing gestational age with lower rates of increase in and an increased risk of reduced STV and acidemia in FGR fetuses. (26) (27)

A more nuanced understanding of the role of the CTG focuses on fetal behavior and less on the search for severe compromise which will not be missed and for which the benefits of intervention are limited. (6) (7) These involve the importance of the cyclic, recurrent, coupled accelerations arising out of normal FHRV alternating with periods of quiescence in which FHRV is diminished, and decelerations are absent or widely spread. (27) (26) The association of accelerations with fetal movements has been amply demonstrated in fetuses monitored simultaneously by CTG and ultrasound. (28) It must be emphasized that in antepartum testing, the diminution in FHRV precedes the disappearance of accelerations. Thus, an "intermediate" NST would show accelerations, usually isolated and occurring with fetal movement, but the STV is minimal to absent. Further surveillance or intervention is required.

In those with FGR, the baseline rate is often higher (>150) than the statistical range of FHRs at term, up to 150 bpm. This suggests that autonomic dysregulation (abnormal behavior), as reflected in the control of the FHR, even when not acutely distressed, underlies the observed differences in FHR variation between these groups.

"While late decelerations are typically associated with fetal distress, Schifrin et al. demonstrated, with the use of concurrent real-time ultrasonography, that late decelerations occurring in association with an otherwise normal CTG trace with a stable baseline and moderate variability are strongly suggestive of normal fetal breathing movements (29) and normal outcomes."

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The biophysical profile (BPP), initially conceived by Manning et al. in the 1970s, improves surveillance for high-risk babies. (30, 31) Testing consists of searching for fetal activity (body, breathing, and reflex movements (acute variables related to fetal behavior) and amniotic fluid volume (a static variable related to placental nutrition). At the outset, the NST was incorporated in the BPP but is often used without it. (See below)

Despite its widespread application of the BPP, it only characterizes various fetal activities, not as integrated patterns over time, but simply as present or absent. (30), (32) The appreciation of the organization of fetal state changes (accelerations and FHRV) remains the NST with the concurrent assessment of fetal size (growth) and amniotic fluid volume by ultrasound. These various tests, when combined, give insight into the perfusion of central organs, especially the brain, as reflected in normal behavior, as well as the nutritional function of the placenta (the ability to gain weight and maintain hydration - including a normal volume of amniotic fluid). To the extent that there is an acute problem with the respiratory function of the placenta (the delivery of oxygen), this will be reflected in decelerations on the CTG. (33)

Data from Norway from over 3000 women with RFM underscore the importance of ultrasound assessments of fetal size and amniotic fluid volume in these cases. (34) Ultrasound abnormalities, including oligo- and polyhydramnios, were found in 11.6% of scans and often the only abnormality found. In a large cohort of

987 patients, Crimmins et al. found that all biophysical parameters became abnormal in severely FGR fetuses at 34 weeks gestation and considered them a late feature, with normal findings still seen within a week of stillbirth. (31) Similarly, in a large population of women who presented with RFM, Valentin et al. report a poor concordance between perceived movements and abnormal CTG findings, with 84% found to have reassuring CTGs. (35)

The normal deterioration sequence and the different insights into the fetal condition from the different tests explain this apparent paradox. The antenatal CTG in a reactive NST (as defined here) measures fetal behavior with predictable cyclic changes in FHRV and accelerations. The fetus maintains neurological function in the face of the impaired nutritional function of the placenta (leading to FGR) as measured by fetal growth, amniotic fluid volume, and uterine blood flow. (36) Thus, using only the CTG to evaluate the complaint of RFM is inadequate, and a "normal" reactive test does not explain the patient's complaint. Dismissing the complaint ("your fetus is normal") in the face of a normal CTG without additional surveillance represents substandard care. It also inappropriately permits the patient to regard the RFM as "normal."

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Absent some catastrophic event, e.g., fetal stroke, RFM perceived by the mother will normally appear prior to FHR changes, perhaps in association with the reduction in amniotic fluid volume and prior to all cessation of movement and in the majority of instances, the fetus at the time of the initial visit with a reactive NST is most likely capable of normal outcome.

The benefits of any approach to managing the complaint of RFM are the wide variation in information provided to women and the views held by clinical staff on the subsequent management of RFM has been presented. (37) (38) Various surveys of clinicians in the U.K., for example, found that most would not routinely refer women with RFM for an ultrasound examination. (39) (40) Similarly, confounding many allegations of negligence, there are delays in reporting RFM to providers (contributory negligence), and there are numerous examples of an inadequate response by many providers. Both circumstances increase the risk of adverse outcome to the child and / or increased risk of allegations of negligence related to those outcomes. (41) (42)

Numerous clinical studies attest to the delay in reporting decreased FM In some cases, contractions were misinterpreted as fetal movements. (10) In a case-control study involving 2374 pregnant women, (8) one study found that 25% of women who reported absent FMs waited more than 24 hours before consulting their provider, while 54% of women with RFMs waited longer than 48 hours. Similar results are available for Japan (43) and Canada (44). It is axiomatic that only prompt reporting of perceived RFM combined with timely intervention, where necessary, will prevent adverse consequences, including stillbirth.

"Why do women perceiving RFMs delay notifying the health care provider? She may have received misleading (RFM is normal at the end of pregnancy or before labor) or no information about F.M. during pregnancy. She may be the victim of incorrect information from family, friends, or the internet (45) (44). Pregnant women may not wish to burden health professionals unnecessarily for fear of appearing excessively worried, being dismissed, or not being believed."

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It is a commonplace allegation in both medico-legal encounters and the medical literature that patients were told that the perceived changes in F.M. are inconsequential and require no surveillance. They may be told that the change in activity represents a normal effect of advanced gestational age, crowding, or impending labor. Too often, they have been offered various methods to stimulate F.M.s such as drinking cold, caffeinated, or citrus drinks, light, and noise or lightly stroking or prodding the abdomen should be tried (45) (47) despite evidence to the contrary that these provocations are of any benefit. (49) Ultimately, 30-60% of women do not recall receiving information about F.M. during pregnancy. (44) (50) (9)

These circumstances lead to errors in these cases, including no testing, the manual palpation of fetal movement, or the patient's

(unverified) reporting of at least some renewed activity (it is the documented pattern of activity deemed important). Other failures include: isolated CTG or BPP testing and failed attention to uterine activity. Similarly, it appears below a reasonable standard of care to discharge the patient with only a reactive NST or a normal biophysical profile (BPP) without obtaining and adequately interpreting the complementary surveillance.

The evidence presented advocates that the fetus has a critical role in its antenatal surveillance and lawsuits alleging obstetrical negligence. His behavior is being assessed, and he is being used as his control. It is also clear that we are currently lacking the technology and the awareness to take full advantage of this important marker of wellbeing. (9)

"The complaint of RFM is not a diagnosis but a symptom derived from the mother's perception of the behavior of the fetus. Given the weight of the available statistics, as used in the courtroom, it is reasonable to assume that with prompt reporting, timely and comprehensive investigation, and appropriate intervention, the complaint of RFM (with an abnormal CTG) represents a previously injured fetus, without a reasonable, current allegation of negligence."

The complaint of RFM is not a diagnosis but a symptom derived from the mother's perception of the behavior of the fetus. Given the weight of the available statistics, as used in the courtroom, it is reasonable to assume that with prompt reporting, timely and comprehensive investigation, and appropriate intervention, the complaint of RFM (with an abnormal CTG) represents a previously injured fetus, without a reasonable, current allegation of negligence. As problems of education, misinformation, delay in response, and inadequate surveillance increase, the forensic issue increasingly becomes the failure to provide a reasonable standard of care and culpability for an adverse outcome. Improving awareness of both patients and health professionals about F.M. and RFM has proven effective in minimizing delays in contacting healthcare professionals. It will doubtless improve outcomes, forestall lawsuits and "break the silence." (47).

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