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Fetal Well-Being Assessed by Maternal Daily Fetal-Movement Counting

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Normal fetal movements are an indicator of fetal well-being, whereas reduced fetal activity may precede fetal death. In 1960 Bernstine[1] noted that decreased activity may reflect disturbance of placental function and indicate impending demise of the fetus. In 1972 Mathews[2] noted cases in which fetal death was preceded by a period of markedly reduced fetal activity. In 1973 Reinold[3] reported that absence of spontaneous fetal movement places the fetus at high risk. Sadovsky and Yaffe[4] observed that a definite decrease in fetal activity occurs before fetal death from chronic diseases such as toxemia. They considered the decrease in fetal movements to be an "alarm signal" of impending fetal death. Normal fetal activity has been associated with a good outcome and provides reassurance that delivery can be deferred to gain further fetal maturity.[5]

Women report 80 to 90 percent of the fetal movements that are picked up by electronic devices.[6-8] Fetal movements are first felt by women at about the 18th week of pregnancy, increasing to a maximum between 29 and 38 weeks and decreasing slightly just before term.[4] Ehrstrom[6] reported a 12-hour median of 86 fetal movements in the 24th week, 132 in the 32nd week, and 107 in the 40th week. There is a daily rhythm with maximum activity in the evening. Activity is relatively uniform in the morning and afternoon, with approximately seven fetal movements per hour.

An abnormal daily fetal movement count has been a better predictor of impending fetal death than placental lactogen levels or urinary estriol determinations.[5,8,9] A record of fetal activity by a compliant patient has been shown to be a reliable alternative to antepartum fetal heart-rate testing for initial screening of fetal well-being.[10]

Several protocols have been developed and used for maternal counting of fetal movements.[4-6,8-19] Of these protocols, patients have readily accepted and complied with the Cardiff "count-to-ten" system first developed by Pearson.[16] In this system, patients note the time when ten movements have been felt for that day and report for evaluation if there have been fewer than ten movements in 12 hours. This protocol was demonstrated to be efficacious in the study by Liston et al.[18]

Case studies[4,11] have demonstrated a decrease in fetal movements prior to fetal death from

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chronic causes such as toxemia or hypertension. Studies in which women have been followed prospectively without interventions for decreased fetal movements have demonstrated that the fetus with decreasing fetal activity is at risk.[5,14] Prospective studies in which interventions were done for decreasing fetal movements have also demonstrated the significance of the daily fetal-movement count.[6,17-20]

There has been only one large prospective, controlled, randomized trial of formal fetal-movement counting. Neldam[19] studied 2,250 pregnant women in a hospital-based obstetric service. One half were taught to count fetal movements methodically and inform the hospital if they felt decreased fetal activity. Of infants weighing more than 1,500 g, there were eight intrauterine deaths in the control group and no deaths in the maternal monitoring group. Only nine (0.4 percent) in the monitoring group reported a decrease in fetal movements. Five acute cesarean sections and two inductions were performed. One patient later had an elective cesarean section, and one had a spontaneous delivery. The difference in the stillbirth rate in mothers who counted fetal movements and those who were not specifically instructed to do so was statistically significant. Based on the local stillbirth rate, six would have been expected in each group. Neldham[20] recently reported on a continuation of his study involving a total of 3,111 women and again noted a statistically significant reduction in the stillbirth rate in the group of women monitoring fetal movements.

Liston et al[18] studied high-risk women who were performing daily fetal-movement counts. If fewer than ten movements were felt in 12 hours, the patient reported for a "non-stress" test. If the non-stress test was nonreactive, an oxytocin challenge test was performed. In seven of the 11 cases of reported diminished activity, there was evidence of fetal compromise. Appropriate interventions were undertaken and there were no deaths in this series.

Conclusions

The following conclusions seem warranted on the basis of current knowledge. A decrease in fetal

activity may indicate fetal compromise. There is evidence that maternal monitoring of fetal movements can identify fetuses at risk for poor outcomes and that medical interventions can lead to a lowered stillbirth rate. A practical regimen for evaluating a report of decreased fetal movements is performance of a non-stress test, to be followed, if abnormal, by an oxytocin challenge test. The resources necessary to perform these procedures are available to family physicians, but the overall impact of introducing maternal counting of fetal movements into primary care has not been studied.

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