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Prediction of adverse perinatal outcome using antenatal umbilical cord coiling index

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Purpose: To evaluate the abnormal antenatal umbilical cord coiling index (UCI) obtained during routine second trimester fetal anatomic survey as a predictor of adverse perinatal outcome.

Method and materials: This prospective observational study was carried out on 150 consecutive women with uncomplicated, singleton pregnancy that had a routine second-trimester fetal morphology scan. The antenatal UCI was calculated as a reciprocal value of the distance between a pair of coils measured from inner edge of an arterial wall to the outer edge of the next. The coiling index was categorized as hypocoiled, normocoiled and hypercoiled. The abnormal umbilical cord coiling index was correlated with the following pregnancy outcomes: (1) small for gestational age (SFA) neonates, (2) mode of delivery, (3) presence of meconium-stained amniotic fluid (MSAF), (4) Apgar scores at 1 minute, and (5) intrauterine deaths (IUDs). Statistical analysis was done using z- test and P-values < 0.05 was considered statistically significant.

Results: Out of 150 patients, only 120 patients were included in final evaluation as they had all the data and adequate ultrasound images to meet the inclusion criteria. Hypercoiling was associated significantly with interventional delivery ($z=2.9$; $P<0.05$) and presence of MSAF ($z=2.1$; $P<0.05$). Hypocoiling was associated significantly with IUDs ($z=3.2$; $P<0.05$). Hypocoiling was also associated with higher prevalence of SFA neonates, presence of MSAF, and low Apgar scores at 1 minute, but the association between them were not statistically significant.

Conclusion: Abnormal umbilical cord coiling index is associated with higher prevalence of interventional delivery, presence of MSAF, IUDs, SFA neonates, and low Apgar score at 1 minute. Thus abnormal umbilical cord coiling index can be used as promising prognostic marker for predicting adverse perinatal outcome. Further studies are needed to test this hypothesis.