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Case Report

Fetal Bradyarrhythmia and Abnormal Doppler Velocimetry in A Preterm Fetus: Management in A Resource-Constrained Setting: Case Report

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Abstract

Background: Benign cardiac rhythm abnormalities of short duration have been noted in 2 % of second to third-trimester fetuses. However, their association with abnormal doppler velocimetry is rare. Fetal bradycardia is an ominous sign whose occurrence at preterm gestation adds dilemma to the management of such cases due to additional risks associated with prematurity if the fetus is delivered prematurely, especially in a resource-constrained setting. **Case Presentation**: The fetus of a 29-year-old primipara was found to have an irregular fetal heart rate of 90 beats per minute at 29 weeks of gestation on routine antenatal evaluation. An ultrasound scan confirmed the bradycardia with ectopic beats and an appropriate for gestational age fetus with no cardiac/other structural abnormality or features of hydrops. Doppler velocimetry revealed intermittent absent flow in the umbilical artery and ductus venosus with a reversal of flow in the middle cerebral artery. Following maternal evaluation, she was diagnosed to have gestational diabetes mellitus and had a negative antinuclear antibody test. She had a course of dexamethasone for fetal lung maturation and was commenced on insulin and dietary modification. The fetal heart rate normalised 48 hours after the administration of dexamethasone. A multidisciplinary care approach was instituted with a weekly biophysical profile and fetal doppler studies. The fetal heart irregularity persisted till 36 weeks' gestation and the abnormal doppler parameters completely normalised by 35 weeks' gestation. She was delivered at term of a normal infant with a good APGAR score that weighed 3.2kg. The umbilical cord was noted to be marginally inserted into the placenta but with a normal number of vessels. The neonate had normal electrocardiographic and echocardiographic findings and an uneventful neonatal period. **Conclusion:** Bradyarrhythmia in the preterm fetus even when associated with abnormal doppler velocimetry may resolve spontaneously and not indicate an urgent need for delivery. However, intensive fetal surveillance is warranted to balance the risk of prematurity against perinatal loss.

Keywords: Arrhythmia, Bradycardia, Preterm Fetus, Dexamethasone, Doppler Velocimetry

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Introduction

Benign cardiac rhythm abnormalities of short duration have been noted in 2 % of second to third-trimester fetuses, but their association with abnormal doppler velocimetry is rare.[1] Most fetal arrhythmias are usually benign but some can lead to hydrops and perinatal loss.[2] F0etal bradycardia is an ominous sign whose occurrence at preterm gestation adds dilemma to the management of such cases due to additional risks associated with prematurity if the fetus is delivered prematurely, especially in a resource-constrained setting. Fetal bradycardia is associated with structural heart abnormalities in about half of cases and associated with maternal autoimmune antibodies in the rest.[3] We report a case of sustained bradyarrhythmia in a preterm fetus of a gestational diabetic mother in whom fetal condition improved with administration of dexamethasone for fetal lung maturation, thereby allowing delivery at term.

Case Presentation

A 29-year-old primipara was found to have an irregular fetal heart rate of 90 beats per minute at 29 weeks of gestation on routine antenatal evaluation. An ultrasound scan confirmed the bradycardia with missed beats and an appropriate for gestational age fetus with no cardiac/other structural abnormality or features of hydrops. Doppler velocimetry revealed intermittent absent flow in the umbilical artery, a reversed flow in the middle cerebral artery and intermittent absent flow in the ductus venosus. Following maternal evaluation, she was diagnosed to have gestational diabetes mellitus and had a negative antinuclear antibody test. She had a course of dexamethasone for fetal lung maturation and was commenced on insulin and dietary modification. The fetal heart rate normalized 48 hours after the administration of dexamethasone. A multidisciplinary care approach was instituted with a weekly biophysical profile and the fetal doppler studies.

The fetal heart irregularity persisted till 36 weeks' gestation but the abnormal doppler parameters were completely normalized by 35 weeks' gestation. She was delivered at term of a normal infant with a good APGAR score that weighed 3.2kg. The umbilical cord was noted to be marginally inserted into the placenta but with a normal number of vessels. The neonate had normal electrocardiographic and echocardiographic findings and an uneventful neonatal period.

Discussion

Fetal cardiac arrhythmias are relatively common and account for about 20% of referrals to fetal cardiologist.[1] Suspicion of fetal arrhythmias is usually raised during routine auscultation of fetal heart or during an obstetric scan and detection of an arrhythmia by the obstetrician should prompt rapid referral to a fetal cardiac Centre for further assessment especially if arrhythmia is sustained.[4,5] However, there is a dearth of fetal cardiac canters in low resource setting and thus this fetus could not access this specialist care. Arrhythmias can be diagnosed using ultrasound M-mode and doppler echocardiography.[1] This diagnosis is also challenging in such settings because of paucity of expertise to accurately confirm the type of atrio-ventricular block (AVB).

Sustained bradycardia is most often secondary to a congenital heart block and isolated fetal heart block is highly associated with maternal lupus. Thus, mothers of such infants should be tested for autoantibodies.[4] The common causes of bradyarrhythmia are due to blocked premature atrial contractions and AVB.[6] Persistent fetal bradycardia in the absence of labor or placental pathology is mainly due to AVB.[3] The AVB usually present in a fetus without CHD but exposed to maternal autoantibodies. Other rare risk factors for an AVB include type 2 diabetes mellitus, exposure to maternal medications and some viral infections.[6] However, antinuclear antibody test was negative but blood glucose profile was diagnostic of gestational diabetes in the index mother.

Though transplacental steroid administration has been found not to significantly reduce perinatal deaths in cases of fetal heart block, it significantly increases the downgrade of heart block and thus, it should not be discouraged till more robust evidence is available.[7-9] Most common steroids employed in AVB are daily 4-8mg of oral dexamethasone or 3mg betamethasone.[6] However, the fetal heart rate in this case improved following a single course of intramuscular dexamethasone for fetal lung maturation. This was reassuring and with institution of fetal surveillance, enabled safe pregnancy continuation to term.

The role of doppler indices in conditions like intrauterine growth restriction have been well established and limited evidence exist on their role in arrhythmias. However, these indices could be valuable tools for monitoring wellbeing of fetuses with arrhythmias.[10] While making a diagnosis of arrhythmias and institution of appropriate intervention is crucial before adverse outcome sets in, this is challenging in a resource-constrained setting with limited expertise in diagnosis and management of such cases.

Conclusion

Bradyarrhythmia in the preterm fetus even when associated with abnormal doppler velocimetry may resolve spontaneously and may not indicate an urgent need for delivery. However, intensive fetal surveillance is warranted to balance the risk of prematurity against perinatal loss.

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