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Case Report

Second-degree Atrioventricular (Mobitz 1) Heart Block in a 52-hour-old Newborn: A Very Rare Case Report

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ABSTRACT

Background: Cardiac conduction disorders are rare syndromes in neonates and children. According to the literature atrial septal defect, especially ostium secundum type, is associated with atrioventricular (AV) block. Wenckebach conduction heart block is very rare in a neonate; however, there is a dearth of research on the prevalence of this type of heart block regarding the neonates and pediatrics literature. This disorder has only been addressed earlier in thalassaemia major and dengue fever in Pediatrics. There have been different anatomical and metabolic and genetic etiologies for this condition. Wenckebach block is a gradual delay in sending the electrical signal from the sinoatrial node to the ventricles with each beat until there is a single dropped beat, which could be uneventful or problematic later in life. This study aimed to present a deep investigation of a rare case of congenital Wenckebach conduction heart block.

Case report: The case in this study was a 52-hour-old female neonate who was diagnosed to suffer from Mobitz type 1 or Wenckebach heart block possibly due to a small ostium secundum atrial septal defect. Therefore, it was suggested to provide supportive care and regular follow-up visit.

Conclusion: Precise antenatal care and investigation are required to reduce the morbidity and mortality rate of such condition.

Keywords: Atrial, Atrioventricular block, Case report, Heart septal defect, Newborn, Pediatrics

Introduction

Cardiac conduction disorders are rare syndromes in neonates and children (1, 2). On the basis of several different etiologies, it may occur in a structurally normal heart or in association with concomitant congenital heart disease (CHD). Basically, the pathogenesis is also different, driven by different maternal clinical features. The pathophysiological process is believed to be due to the immune-mediated injury of the conduction system, which occurs as a result of the transplacental passage of maternal anti-SSA/Ro-SSB/La antibodies. Genetic variants in multiple genes have been termed so far in the pathogenesis of hereditary progressive cardiac conduction disorders (3).

Wenckebach block, possible to be as a congenital conduction heart condition, is a gradual delay in sending the electrical signal from the SA node to the ventricles with each beat until there is a single dropped beat. The prevalence of this type of heart block is not clear; moreover, it is a rare disease in neonates and pediatrics. Most affected infants and children have no signs or symptoms of first degree AV block or Wenckebach. (1, 3)

Atrial septal defect (ASD), of potential etiologies for a congenital Wenchebach block, is anatomically characterized by a defective interatrial septum, signifying 30-40% of congenital heart defects (CHDs) and is the third most common kind of CHD. It has been evident that ASD and AV block share a common gene mutation. The cardiac transcription factor NKX2.5 was recognized as the first genetic cause of non-syndromic congenital heart disease and were

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associated with cases of familial ASD and atrioventricular (AV) conduction disturbances, especially in ostium secundum type. (4-6)

Wenckebach is infrequently reported in the medical literature in a newborn (7). To the best knowledge of the researchers, there is no available report of a neonate suffering Wenckebach in the absence of pre-existing documented abnormal immune system, cardiac disease, conduction abnormality, or pacemaker. This study presented a case of a 52-hour-old female neonate with Mobitz type 1 heart block or Wenckebach.

Case report

A 52-hour-old female neonate was admitted to Taleghani Hospital in May 2018 due to grunting, respiratory distress, and cardiac abnormal auscultation. The case was a healthy neonate with no symptoms, who was born to consanguineous parents through repeat C-Section. She was breastfed well after birth and feeling good for 52 h. However, she was transferred to the Central Hospital of Taleghani, Gorgan, Iran, due to respiratory distress.

Her mother's pregnancy was reported normal although no record of regular pregnancy care and ultrasound was available of the mother. The case in this study was an early term delivery, with appropriate for gestational age of 38 weeks, birth weight of 3200gr, and the apgar score of 8, which grew to 9 after 5 min. The slow heart rate persisted and was within the range of 40-55. She was an active, non-febrile, and acyanotic infant with a decent volume, the irregular pulse of 50 per min. There were also no signs of congestive failure.

Cardiovascular examination showed an irregular pulse, fixed splitting of the second heart sound, and an ejection systolic murmur grade 2/6 at the upper left sternal border. Regarding electrocardiogram, she had normal sinus rhythm, mildly right sided deviation of the frontal axis, and evidence of incomplete right bundle branch block (RSR0 pattern in V1-V3) (Figure 1).

Echocardiography was performed and the results revealed nothing special except for small Atrial Septal Defect (ASD) ostium secundum. Her chambers' volume was normal with the left ventricle ejection fraction of 60%. Systemic physical examination was insignificant and no anomaly was diagnosed after precise examination and thoracoabdominopelvic ultrasonography.

Laboratory tests, including electrolytes and immunologic studies of both mother and child, were normal, in particular, no lupus antibodies was positive. Karyotyping was performed with normal chromosomal arrangements.

The infant received standard supportive care with tight cardiac monitoring and discharged with the acceptable general condition, followed by regular intervals. Her family was also examined for the history of cardiac anomalies and they were given essential advice about future possible pregnancies.

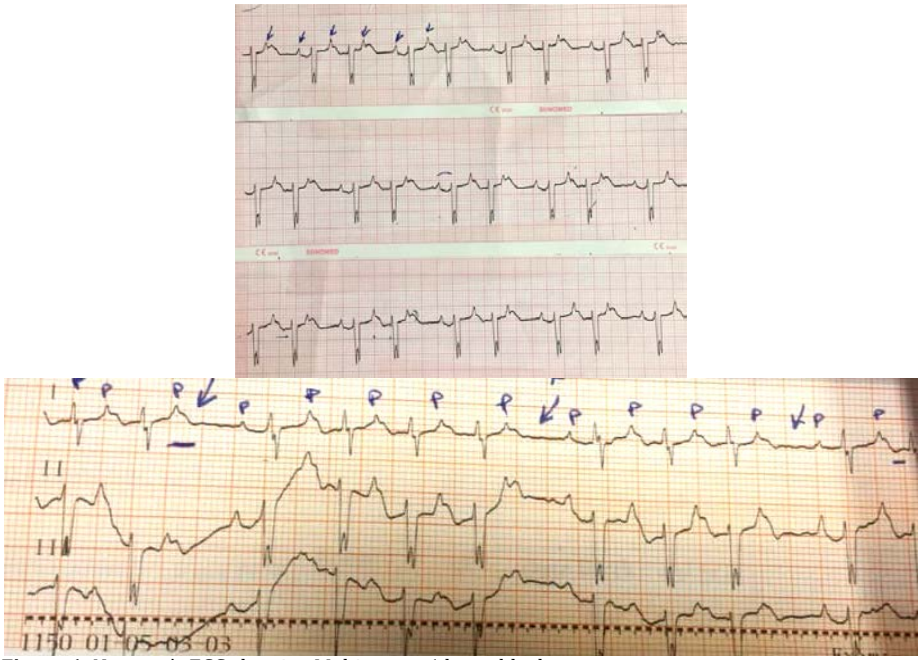

Figure 1. Neonate's ECG showing Mobitz type 1 heart block

Discussion

This study was an investigation of a rare case of 52-hour-old female neonate suffering from Mobitz type 1 heart block probably due to a small ostium secundum atrial septal defect through precise examination of the neonate and her mother. The infant received standard supportive care with meticulous cardiac monitoring and was discharged in an acceptable general condition.

Although the AV block may be due to maternal antibodies, structural heart disease, or other overt causes, the case in our study was detected with none of these possible etiologies. There is a dearth of research regarding the etiology and the clinical course of such patients with ostensibly idiopathic heart block. The first large-scale study was conducted by Baruteau et al. in a French nationwide cohort. The obtained results of the search for heritability of pediatric idiopathic heart block revealed a high degree of inheritance and a strong genetic background in the pathogenesis of congenital and childhood non-immune isolated AV block (8,9). As a result, familial screening should be considered, even in patients where the disorder appears to be sporadic and idiopathic (3).

The AV heart block can be derived from a wide variety of causes, including surgical or catheterization-induced trauma, coronary artery disease, acute or chronic infectious processes, myocarditis, hypersensitivity cardiomyopathy, and metabolic abnormalities or hypothyroidism, infiltrative conditions, or pathological neurocardiogenic mechanism (10). The incidence of catheterization-induced heart block was lately estimated at 2.2 %, with a high rate of recovery similar to the course postsurgical heart block (11). Some interventional procedures, such as device closure of perimembranous VSD and catheter ablation of AV nodal reentrant tachycardia or parahissian accessory pathways, could impose a risk of permanent heart block (12-14). Children with underlying ASD, the cause of Mobitz 1 heart block, can be treated and become free of symptoms gradually as they grow. Therefore, it is recommended to perform precise follow-up procedures and benefit from supportive therapy (3).

As mentioned above, based on the available data about the etiologies of Wenckebach, it can be inferred that ASD was the only factor in the investigated case leading to AV Mobitz 1 heart block. The reason is that neither electrolyte imbalance nor immunologic or structural anomaly was noticed in her; moreover, she had no syndromic appearance.

Conclusion

Rare, congenital, and childhood AV block are a significant treatable cause of morbidity and mortality. The treatment is often supportive and no confirmed need of implanting once maker in future of life has been reported. There is a need to conduct more investigations, especially with regards to the antenatal detection, treatment of congenital AV block, and genetic approach. It is obvious that as new insights are gleaned, management strategies continue to progress. In spite of many different etiologies, each with specific management and distinct outcomes, these patients can do well with a careful and considered approach to the diagnostic assessment and management strategy. Future studies could look for the new etiologies which have not been investigated so far. Familial screening in those cases with the unknown origin as well as high-risk pregnancies is highly recommended.

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Conflicts of interests

Authors declare no conflicts of interest.

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