CASE REPORT

Transient Foetal Bradycardia in Primary Care: A Diagnostic Dilemma and Navigating Decision.

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Abstract

Transient foetal bradycardia is a rare occurrence during pregnancy, characterised by brief episodes of bradycardia followed by spontaneous resolution. Nevertheless, it is essential to exclude other causes, including sinus bradycardia, atrioventricular block, or auto-immune disease-related conditions. We report a case involving the incidental finding of transient foetal bradycardia in a 37-year-old woman at 20 weeks of gestation. A brief episode of foetal bradycardia was observed during a routine transabdominal ultrasound, with a heart rate of 82 beats per minute (bpm). After a short period of observation, foetal bradycardia recurred. The case was referred to a Maternal Foetal Medicine Specialist (MFM) in the obstetrics and gynecology department, where foetal echocardiography was conducted. The conclusion was that transient foetal bradycardia was likely secondary to prematurity. Repeated transabdominal ultrasound at 28 weeks of gestation revealed spontaneous resolution of foetal bradycardia. This case report highlights the importance of foetal cardiac surveillance during routine antenatal visits. The lack of access to foetal echocardiography makes it challenging to verify the diagnosis in primary care; hence, collaboration with a tertiary centre is essential.

Keywords: *foetal echocardiography; primary care; transient foetal bradycardia.*

Introduction

Foetal arrhythmias constitute roughly 10 to 20% of the cases referred to foetal cardiologists [1]. Foetal bradycardia is one of the causes of foetal arrhythmia, which affects about 1% of pregnancies [1]. Foetal bradycardia is defined as a heart rate of less than 110 bpm [2]. Transient foetal bradycardia is a benign condition commonly observed in the second trimester due to umbilical cord compression or vagal stimulation [3]. However, in certain instances, sustained foetal bradycardia may impose more severe complications due to several causes, such as auto-immune disease, medications, Long QT syndrome, congenital heart block, structural cardiac abnormalities, and others [1, 4].

A portable Doppler or transabdominal ultrasonography are two methods commonly used in primary care to monitor foetal heart rate (FHR). FHR is routinely monitored during each antenatal visit, and additional observation may aid in detecting abnormal FHR. Foetal echocardiography is indicated once a clinical finding of foetal arrhythmia is observed [2, 3]. The incidental discovery of foetal bradycardia, in this case, demonstrates its limitation, as primary care providers are usually not well-trained in foetal echocardiography. Referral to MFM is crucial for in-depth knowledge of the aetiology, prognosis, and treatment. This emphasises the essential role of high-quality antenatal care in ensuring optimal clinical outcomes.

Case presentation

A 37-year-old gravida 2 para 1 at 20 weeks of gestation presented for continuity of care. She has hyperthyroidism, which was well-controlled with carbimazole. There was no family history of congenital heart disease. The transabdominal ultrasounds revealed a 20-week-gestation singleton fetus with an incidental finding of a brief episode of foetal bradycardia of 82 bpm, which lasted less than one minute. The bradycardia resolved spontaneously, leading to the restoration of FHR to its normal state. Nonetheless, a subsequent episode of bradycardia ensued a few minutes later, with a heart rate of 78 bpm. The patient was asymptomatic with normal vital signs.

Given the concerning findings of foetal bradycardia, the case was consulted with a Maternal-Foetal-Medicine Specialist at the general hospital. A comprehensive evaluation was performed the following day, including detailed ultrasound and foetal echocardiography. Foetal echocardiography revealed normal four heart chamber views, no valvular regurgitation, and normal venous flows. No septal defect and foramen ovale were patent. The FHR exhibited transient foetal bradycardia for less than one minute, ranging from 72 to 89 bpm, lasting less than one minute, then reverted to normal. Maternal-Foetal-Medicine Specialist concluded that the transient foetal bradycardia was most likely attributable to prematurity and recommended close observation of the foetal heart rate using ultrasound, follow-up with the primary care team, and conservative management since the foetal echocardiography showed no structural abnormalities. No genetic and auto-antibodies tests were performed. The patient was advised to continue her regular antenatal and foetal monitoring two weekly, and an ultrasound was performed at 24 weeks of gestation, revealing that the fetus still has transient bradycardia of (87 bpm).

During the patient's antenatal visits at the government health clinic at 28 weeks, the foetal heart was observed for ten minutes, no foetal bradycardia was found, and the heart rate was normal. Subsequent transabdominal ultrasound at 32 weeks showed a normal foetal heart rate with no episodes of foetal bradycardia. The patient's antenatal care continued without any further concerns, and at 39 weeks of gestation, she delivered a healthy baby girl weighing 3.2 kg via spontaneous vaginal delivery. The baby was discharged well, with a formal echocardiography appointment, which yielded unremarkable results.

Discussion

The American College of Obstetrics and Gynecology defines foetal bradycardia as a sustained foetal heart rate of less than 110 bpm for at least 10 minutes [1]. It is categorised into transient and sustained foetal bradycardia and is regularly observed during the first and second trimesters [1, 2]. Transient foetal bradycardia, which typically resolves spontaneously within minutes, is usually a benign condition and is frequently attributed to excessive vagal stimulation [2, 3]. The compression of the mother's abdomen during an ultrasound induces excessive vagal stimulation, resulting in foetal bradycardia, which resolves once the pressure is released [2]. This might indicate one of the possible causes of the incidental finding of foetal bradycardia due to compression during ultrasound. Nonetheless, the presence of foetal bradycardia in primary care might raise concerns and should not be overlooked. Therefore, maintaining a high index of suspicion is necessary as it warrants a diagnostic workup to ensure appropriate management. Primary care plays an instrumental role in overseeing the entire spectrum of care for pregnant women. As part of a comprehensive approach to antenatal care, primary care doctors are tasked with conducting a thorough assessment of medical history, including risk factors for foetal cardiac abnormalities, maternal use of medications known to be associated with a foetal heart defect, or a family history of congenital heart disease.

Sustained foetal bradycardia, on the contrary, indicates an electrophysiological abnormality that may be caused by sinus bradycardia, atrial bigeminy/ trigeminy, Long QT syndrome (LQTS), and complete atrioventricular block (CAVB) [2, 3, 4]. Atrial bigeminy with block premature beats is a benign condition that typically requires no treatment [2]. However, LQTS is a heterogeneous rare genetic disorder characterised by delayed repolarisation of the ventricular cells due to decreased or increased repolarising current, which increases the risk of sudden death and sudden death infant syndrome (SDIS) [5]. Atrioventricular block (AVB) affects 1 in 15,000 to 20,000 live births in a normal heart structure and is often associated with maternal Sjögren's-syndrome-related antibodies [3]. There have also been reports of significant rates of morbidity and mortality (6-20%) in fetuses with CAVB with structural heart disease; thus, it is ideal to rule out CAVB due to its poor prognosis [2, 4]. Inflammation and scarring of the conduction tissue can result in CAVB, which can lead to complications such as foetal hydrops, premature birth, and death [1, 7]. Hence, early detection during antenatal visits is crucial as early treatment may benefit the fetus's outcome [1].

Maternal serologic testing should be evaluated for anti-Ro/La antibodies in sustained foetal bradycardia. If positive, serial echocardiography should be done to monitor the progression of heart block, myocarditis, and signs of hydrops [2, 7]. Approximately 1% of positive autoantibodies in pregnancies will develop CAVB with a structurally normal heart, typically occurs after 18 weeks of gestation, and usually remains asymptomatic [4, 6]. No serologic testing was performed in this case as the patient was asymptomatic. Shared care between primary and tertiary centres was carried out attentively, transient foetal bradycardia was determined to be related to prematurity, with spontaneous resolution noted after eight weeks. In the case of sustained foetal bradycardia without structural abnormalities, serologic testing is recommended due to the 6 to 10% mortality rate if no treatment is received [3].

Foetal arrhythmia is easily detected through portable Daptone and ultrasound, often used in primary care settings. Primary care doctors should exercise increased vigilance in identifying any suspicious abnormalities, as ultrasound serves as the mainstay modality for diagnosing foetal bradycardia [1, 2]. However, diagnosing foetal arrhythmias remains challenging, particularly because there are limitations in

primary care, whereby family medicine specialists typically do not perform foetal echocardiography, as it requires expertise and training in foetal cardiology. However, in the event of any suspicious foetal abnormality, thorough foetal echocardiography and subsequent monitoring are necessary to safeguard the patient's worries about the fetus [6]. While transient foetal bradycardia often resolves spontaneously, the possibility of structural abnormalities must still be investigated. The mainstay tool of foetal heart assessment is foetal echocardiography [2]. Typically, foetal echocardiography is performed by an MFM specialist or pediatric cardiologist with specialized training and experience in evaluating foetal heart [6]. Foetal echocardiography is essential for evaluating cardiac function, and conducting a thorough anatomical cardiac examination [4, 6]. M-mode is commonly utilized in foetal echocardiography to measure atrial and ventricular wall motion, cardiac function, and contraction patterns [1, 6]. A prompt referral to an MFM specialist should be made to obtain a comprehensive targeted ultrasound and further elucidate the aetiology of the arrhythmia [6].

In general, benign arrhythmia normally does not require treatment. Still, a close follow-up is needed while persistent foetal arrhythmia will require in-depth surveillance, and it is recommended a weekly foetal heart rate auscultation by an obstetrician or maternal-foetal specialist until the arrhythmias are resolved [2, 4]. In this scenario, due to the absence of structural abnormalities in the fetus, this case was managed conservatively, where the tertiary centre opted to share care with the primary team, given that foetal heart monitoring can also be performed in a clinical setting. In this case, none of these etiologies were observed, and the fetus does not manifest any signs of hydrops or failure; therefore, no further treatment is needed. These conditions might be due to prematurity or vagal stimulation occurring with compression during ultrasound examination [2]. Foetal bradycardia spontaneously resolved after eight weeks of watchful monitoring. The baby was born term, and she was a healthy baby post-delivery with a normal post-natal echocardiography.

Conclusion

In this case, transient foetal bradycardia was observed, which later normalised during the course of pregnancy. Foetal bradycardia is a rare occurrence that may remain undetected if the foetal heart is not adequately examined. Managing foetal bradycardia requires a systematic approach involving ultrasound and echocardiography to establish possible aetiologies. Due to limited access to foetal echocardiography in primary care, referral to a tertiary centre is pivotal to ascertain the aetiology. Additionally, further investigations, such as autoantibody testing, are recommended for cases of sustained foetal bradycardia.

Recommendation

This case report emphasises the importance of foetal heart surveillance in primary care to identify any foetal arrhythmias. This motivates our primary care providers to exercise increased vigilance during routine antenatal ultrasounds, focusing on foetal growth and allocating additional time to observe the foetal heart during daily practice.

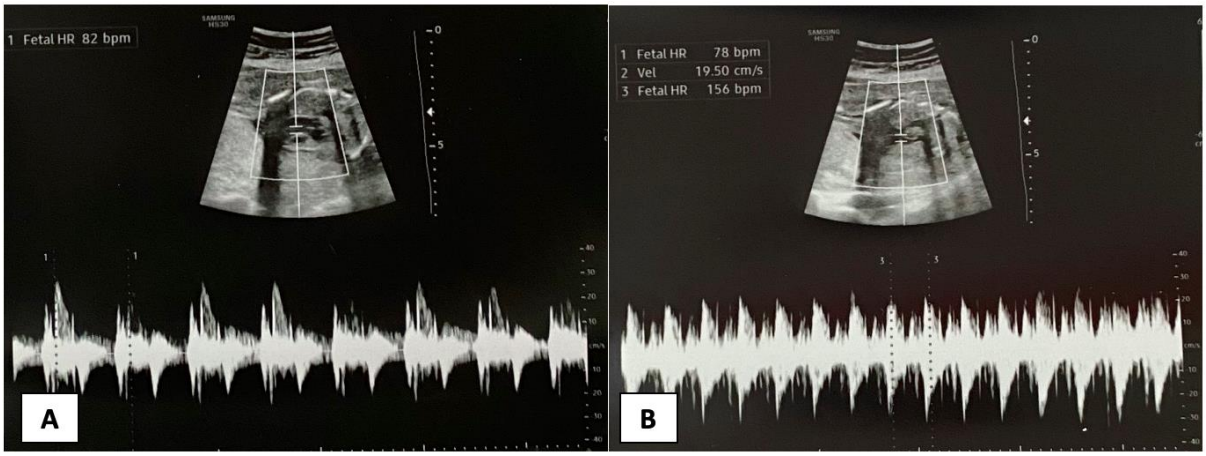

Figure 1. (A) Transabdominal ultrasound showed an incidental finding of fetal bradycardia with a fetal heart rate of 82 beats per minute. (B) Transabdominal ultrasound showed a repeated fetal heart rate of 72 beats per minute, and after 2 minutes of observation, the fetal heart rate reverted to normal with 156 beats per minute.

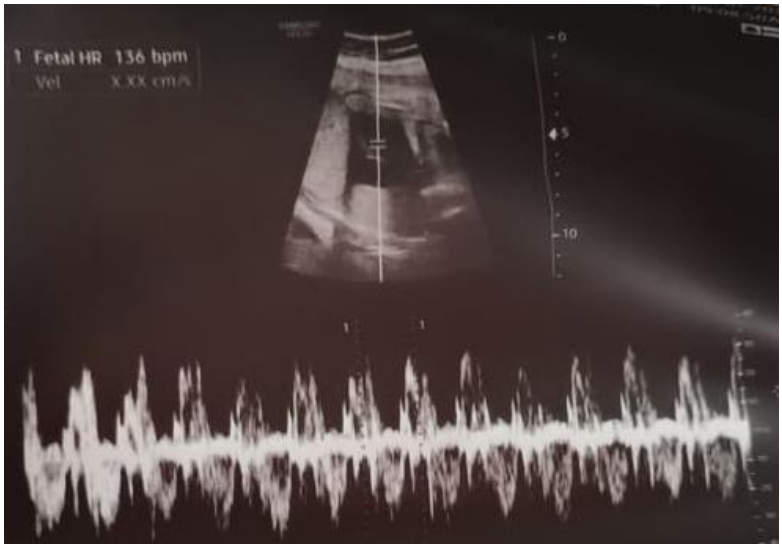

Figure 2. A transabdominal ultrasound done at 28 weeks of gestation showed a normal foetal heart rate with no episodes of foetal bradycardia observed.

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