



Case Report

Total atrioventricular block in pregnancy –Case report

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A B S T R A C T

Introduction and importance: Bradycardia in pregnancy due to total atrioventricular block (TAVB) is a rare occurrence, often asymptomatic and may arise from a congenital disorder. Pacemaker is often required. Cases are few and management is not yet standardised.

Case presentation: A 24-year-old G2P0A1 of 9 months gestation presented with labor pains. She had had history of bradycardia diagnosed since a year prior but had not undergone tests nor received treatments. Her heart rate was 55-60 x/minute, her cardiocography was reassuring and electrocardiogram revealed a TAVB with ventricular escape rhythm. As she had not had a pacemaker, an urgent cardiologist consultation was arranged during which a temporary pacemaker was installed. She underwent a caesarean section with general anaesthesia after which she had an uneventful recovery.

A 38-year-old G2P1A0 of 2 months of gestation presented with slow heart rhythm and a history of asthma to the outpatient clinic. She also had not undergone tests nor received medication. At presentation, her heart rate was 48 x/minute and her ECG revealed a TAVB with junctional escape rhythm. She had a pacemaker installed at 8 months of gestation and subsequently underwent an elective caesarean section at 37 weeks under regional anaesthesia. She had an uneventful recovery afterwards.

Clinical discussion: TAVB in pregnancy requires a concerted effort involving obstetricians, cardiologists, and intensivists. Pacemaker implantation is recommended. Whilst vaginal delivery remains first-choice, caesarean section is indicated under obstetric indications.

Conclusion: Screening, early recognition, risk stratification and thorough planning are required to successfully manage TAVB in pregnancy.

1. Introduction

Bradycardia in pregnancy due to total atrioventricular block is a rare yet serious occurrence [1]. In most cases, it is often asymptomatic but symptomatic cases would require urgent and definitive management [1]. Total atrioventricular block may be a congenital disorder or stem from an acquired pathology [2]. Lack of awareness often delays diagnosis with some patients presenting late during labour [3]. Definitive management requires pacemaker implantation but there has been controversy in the past regarding its necessity [3].

Unfortunately, due to its rarity, only few cases have been described in the literature and guidelines on optimal management have been sparse. As a result, no uniform management recommendations are available and, in some cases, clinicians have had to explore the best form

of management for their patient. In Indonesia, to the best of the authors' knowledge, there have been no case reports so far of bradycardia in pregnancy due to a congenital disorder. This case report wishes to highlight the rare cases, the challenges we had, the lack of experience we encountered and the solutions we undertook using the best clinical evidence available so far.

2. Case descriptions

We report 2 cases of bradycardia in pregnancy due to total atrioventricular block (TAVB). The cases are different and highlights different challenges and the decisions undertaken. This case report has been reported in line with the SCARE Criteria [4].

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2.1. Case 1

A 24-year-old G2P0A1 of 9 months gestation presented to the Accident and Emergency (A&E) department with labour pains. No profuse water discharge was reported by the patient. Active foetal movements were noted. She had been diagnosed with a bradycardia a year prior at another hospital, but no medications were prescribed, and the patient did not attend any follow-ups. She denied any allergies. She reported no history of syncope or shortness of breath. She had undergone echocardiography during which mild pulmonary regurgitation and left ventricular hypertrophy were discovered. After her initial diagnosis, she did not attend routine consultations with her cardiologist. This was an unplanned pregnancy, and she did not consult an obstetrician in preparation of her pregnancy. She did not have any history of other chronic diseases. She had had a miscarriage 6 years prior and underwent curettage. For her current pregnancy, she had undergone prenatal care at a midwife before being referred to an obstetrician.

At presentation, her heart rate was slow at 55-60 x/minute whilst the rest of her vital signs were within normal limits. Her abdominal examination revealed weak uterine contractions and bimanual examination confirmed that she was in the latent phase of the first stage of labour. Foetal wellbeing was confirmed by a reassuring cardiotocography (CTG) trace at admission. Electrocardiogram (ECG) revealed a 3rd degree heart block with ventricular escape rhythm (below) (Fig. 1).

At presentation, she had not had a pacemaker in place and an urgent consultation was arranged with the on-site cardiologist. Despite initial hesitation, she obliged to a temporary pacemaker implantation. After the temporary pacemaker was inserted, her heart rate increased to about 70 x/minute.

The initial plan was for the patient to undergo vaginal delivery. However, the onsite cardiologist expressed concerns and she was scheduled to undergo emergency caesarean section.

The caesarean section was carried out by the attending consultant with general anaesthesia, and she was transferred to a semi-intensive treatment unit post-surgery. She was observed for 24 hours before being transferred to the general obstetric ward. She made an uneventful recovery, and she was discharged 2 days afterwards. She was due for postoperative follow-up at the cardiology clinic but unfortunately, she has not attended yet and unwilling to have a permanent pacemaker installed.

2.2. Case 2

A 38-year-old G2P1A0 of 2 months gestation presented to the outpatient obstetrics clinic having complained of a bradycardia and a history of asthma. She had previously given birth to a 21-year-old male

through vaginal delivery. Despite knowing her bradycardia, she had not received medications nor undergone further tests. She denied having any other history of chronic diseases nor allergies.

At presentation, the heart rate was slow at 48 x/minute but her other vital signs were within normal limits. An outpatient consultation with a cardiologist was arranged and a diagnosis of symptomatic bradycardia due to atrioventricular (AV) nodal dysfunction was made. She was referred to undergo echocardiography and the findings were dilated right atrium and ventricle, left ventricular hypertrophy and mild regurgitations in all cardiac valves. Her ECG revealed complete AV heart block with junctional escape rhythm.

She underwent routine antenatal care and USG at the outpatient clinic but began showing symptoms of dyspnoea on exertion around her 5th month of gestation. As she presented to a regional hospital, she was then referred to a tertiary hospital in Semarang to undergo pacemaker implantation. She had a pacemaker installed at 8 months gestation, after which she made a good recovery and was referred to our facility. She continued her routine antenatal care and the final USG confirmed a foetus in breech lie. She was scheduled to undergo a caesarean section at 37 weeks. She underwent a caesarean section under regional anaesthesia by the attending consultant. After surgery, she was transferred to the general obstetric ward, and she was discharged 3 days after surgery following an uneventful recovery.

3. Discussion

Bradyarrhythmia among female of reproductive age is rare, even rarer is bradyarrhythmia in pregnancy [1]. It is estimated that the prevalence of bradyarrhythmia is in 1/20,000 women of reproductive age [1]. However, this figure may also be an estimation as the true prevalence remains unknown. In this case, the bradyarrhythmia is caused by TAVB. There are various etiologies to TAVB in pregnancy [2]. The most common is congenital TAVB, in which patients are born with a disconnected cardiac electric conduction system with no communication between the sinoatrial (SA) node and the AV node [2] (Fig. 2). Other causes are often acquired including ischemic heart diseases, drug toxicity, nodal ablation, electrolyte imbalance and post-operative heart blocks due to past cardiac surgeries [2]. Systemic diseases such as amyloidosis, sarcoidosis and systemic lupus erythematosus (SLE) may also cause TAVB [2]. The two cases in this report had congenital TAVB as they had no history toward acquired TAVB.

Thus far, the recommendation is to implant pacemakers among those showing signs and symptoms of heart failure. However, it is among those asymptomatic that the recommendations are less strong and ambiguous. The controversy arises from the requirement for generator replacement, exposure to teratogenic fluoroscopic materials prior to pacemaker

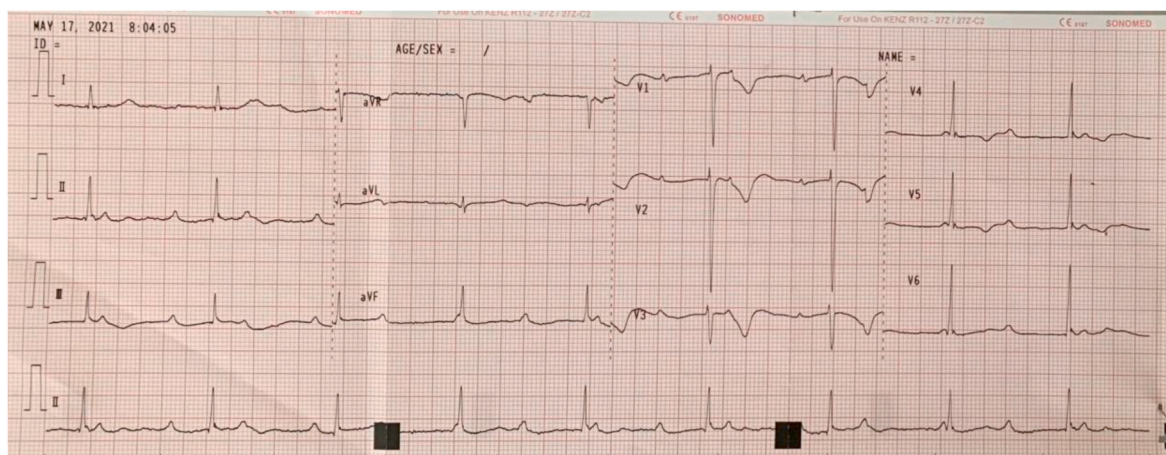


Fig. 1. Original ECG of Patient 1 showing Complete Atrioventricular Block with heart rate of 53 bpm.

A-V BLOCK, THIRD DEGREE

Impulses originate at AV-node and proceed to ventricles

Atrial and ventricular activities are not synchronous

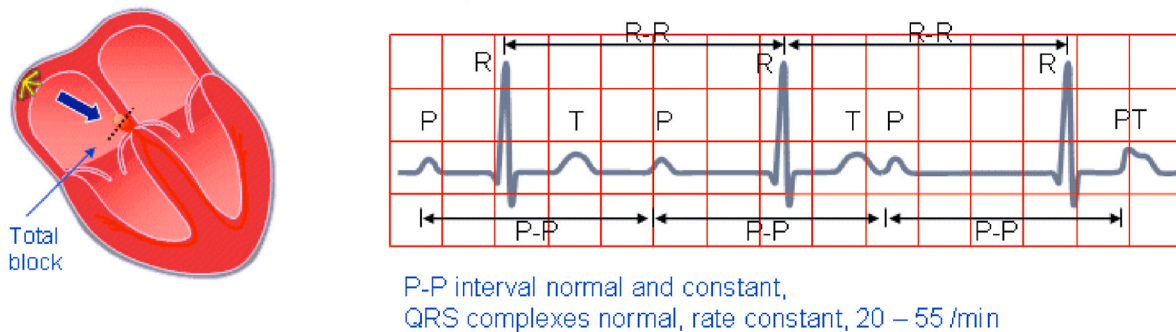


Fig. 2. Complete atrioventricular block and its ECG waveforms Complete atrioventricular block and its ECG waveforms [5].

implantation and complications associated with the implantation itself. Thus, it was initially thought that pacemakers for asymptomatic patients is made case-per-case [6].

With no large-sized studies, clinicians have had to depend on small-scale studies and occasional case reports suggesting different treatments. Whilst many advocate for pacemakers, there have been other studies demonstrating its lack of clinical benefit among asymptomatic patients [7]. Recently, the American Heart Association (AHA) and the European Society of Cardiology (ESC) have updated their guidelines and they now recommend a permanent pacemaker implantation for those having complete heart block with high-risk features in pregnancy, regardless of symptom presence [8,9]. If permanent pacemaker is not available, then at least temporary pacemaker is sufficient [8,9].

It is recommended to implant permanent pacemakers before pregnancy. Even if they presented late, then pacemakers would still be recommended [6,10]. If a permanent pacemaker cannot be installed during pregnancy, a temporary pacemaker then replaced by a permanent one postpartum would be recommended [6,10]. Still, evaluations are necessary since drastic hemodynamic changes occur between pregnancy and postpartum [6]. In our case report, both patients unfortunately had unplanned pregnancies and they had not consulted obstetricians prior to their pregnancies. Still, the second patient had been diagnosed with bradyarrhythmia during her antenatal consultations and could have a pacemaker implanted during pregnancy whilst the other patient had to have the pacemaker implanted during active labour. Both scenarios were far from ideal.

After the pacemaker was implanted, the next concern was the optimal route of delivery. The recommendation is to deliver vaginally with operative vaginal delivery if necessary [3,10]. Caesarean section remains reserved under obstetric indications [3]. There is an additional concern with routine caesarean section. Spinal anaesthesia during caesarean section induces hypotension and among patients with bradycardia, the required compensatory mechanisms to respond to hypotension may be lacking [3]. General anaesthesia is also associated with hypotension [3]. Thus, a combination of epidural and spinal anaesthesia may be better due to the immediate effect of spinal anaesthesia and the top-up dosing available from epidural anaesthesia [1]. However, both of our cases opted for caesarean section as the attending consultants were hesitant to opt for vaginal delivery due to their lack of experience in managing such complex cases. Fortunately, the caesarean sections went well, and the patients made good recovery.

There has not been conclusive evidence that TAVB in pregnancy leads to foetal complications such as preterm birth, intrauterine growth restriction, preeclampsia, and foetal distress [11]. Notably, Hidaka et al. discovered that there was no significant difference in the risks towards foetal complications among those with and without pacemaker installed [11]. However, the study had few subjects due to case rarity and its

conclusion needs to be interpreted carefully.

There are several forms of contraception to be recommended with intrauterine devices and hormonal implants being the reversible long-term options whilst sterilisation is irreversible [12,13]. Other hormonal methods such as progesterone pills and injections may also be indicated if it suits the patient's preferences. [12,13].

For future pregnancies, a thorough planning is necessary. In the preconceptional stage, every pregnancy plan should be dealt with in a multidisciplinary clinic involving cardiologists, obstetricians, intensivists and specialty nurses [14]. There needs to be a risk stratification undertaken before any pregnancy is to be attempted [15]. There are several such stratification scores available, including the modified WHO (mWHO) scale, Cardiac Diseases in Pregnancy (CARPREG) and *Zwangerschap bij Aangeboren Hartafwijking* (ZAHARA) scale [15]. The ZAHARA scale was specifically devised with congenital cardiac diseases in mind and according to this scale, a history of prior arrhythmia (bradyarrhythmia) places patients at a risk of 7.5% for future cardiac complications [16].

For patients deciding for pregnancies, there needs to be a continuous risk stratification process throughout pregnancy [15]. At the antenatal consultations, USG, foetal echocardiography and maternal ECG are recommended [14]. Foetal echocardiography should be performed during the 2nd trimester by a qualified paediatric cardiologist [14].

In the third trimester, between 32 and 34 weeks there should be a clear delivery plan [14]. Whilst vaginal delivery remains first-line, operative vaginal delivery and caesarean section should also be discussed [14]. Postpartum, patients will require further puerperal visits to assess maternal cardiac function until 2–3 months post-delivery [14].

To conclude, there is still little clinical experience with TAVB in pregnancy. The primary recommendation is to implant pacemakers regardless of symptoms. The second recommendation is to opt for vaginal delivery unless obstetric indications preclude it. A multidisciplinary team involving cardiologists, obstetricians, intensivists and nurses are required to manage such cases.

Ethical approval

This study does not require an ethical approval as determined by the institutional and departmental review board.

Sources of funding

The study did not receive external funding.

Author contribution

SI, HS and GK were the attending consultants for the patients

involved. KDT, SI and HS conceived the design of this case report. KDT, SI, HS and GK collected the data and interpreted the patient case notes. KDT wrote the draft. KDT, SI, HS and GK agreed the following version of the manuscript for publication.

Registration of research studies

Registration of research is not applicable in our case.

Guarantor

The guarantors of this study is Setyorini Irianti, M.D., Ph.D (first author) and Kevin D Tjandraprawira, M.D., M.Sc. (corresponding author).

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Provenance and peer review

Not commissioned, externally peer reviewed.

Declaration of competing interest

The authors declare that we have no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.103441>.

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