



FROM DIAGNOSIS TO DELIVERY: A CASE OF ASYMPTOMATIC TOTAL ATRIOVENTRICULAR BLOCK IN A PREGNANT WOMAN

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ABSTRACT

Background: Bradyarrhythmias are infrequently encountered in women of reproductive age and are even less common during pregnancy, with an estimated prevalence of approximately 1 in 15,000. Total atrioventricular block (TAVB) identified during pregnancy is most often congenital in origin. In cases involving high-risk pregnancies, cardiac pacing can be safely administered under careful clinical supervision. Vaginal delivery is generally considered safe and does not confer additional risk, whereas cesarean section is reserved for established obstetric indications. **Case Description:** A 38-year-old pregnant woman at 38 weeks of gestation presented with bradycardia, and electrocardiographic evaluation revealed a total atrioventricular block (TAVB). Despite a heart rate of 41 beats per minute, she remained asymptomatic. Given that she had no prior history of pacemaker implantation, an urgent cardiology consultation was arranged. Subsequently, a transvenous temporary pacemaker was inserted prior to delivery. The patient underwent a cesarean section under spinal anesthesia and experienced an uneventful postoperative recovery. **Conclusion:** Management of total atrioventricular block during pregnancy requires a multidisciplinary approach involving both obstetricians and cardiologists. The implantation of a pacemaker is recommended and can be safely performed in high-risk pregnancies with appropriate monitoring. While cesarean section may be indicated based on obstetric factors, vaginal delivery remains the preferred mode of delivery when clinically feasible.

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INTRODUCTION

Bradycardia during pregnancy caused by total atrioventricular block (TAVB) is an uncommon but clinically significant condition, with an estimated incidence between 1 in 15,000 - 20,000 pregnancies. TAVB may arise as a congenital anomaly or develop secondary to acquired pathological processes.¹ The presence of total atrioventricular block (TAVB) in a pregnant patient presents a clinical challenge for the obstetrician and requires a coordinated, multidisciplinary approach involving cardiology specialists.² This article presents a rare case report of pregnancy complicated by TAVB. It further explores the diagnostic approach and management strategies in accordance with current guidelines while also comparing the findings with those of similar cases reported in the literature.

CASE REPORT

A 38-year-old pregnant woman at 38 weeks of gestation was referred from a regional hospital to the emergency department due to bradycardia. She was transferred by her obstetrician for delivery under multidisciplinary management, due to the presence of total atrioventricular block. The patient reported no labor pains or significant amniotic fluid leakage. Fetal movements were observed as active. Furthermore, she denied experiencing any episodes of syncope, dizziness, chest tightness, or pain.

Physical examination demonstrated a blood pressure of 123/56 mmHg, a heart rate of 41 beats per minute, a respiratory rate of 20 breaths per minute, and an oxygen saturation of 98%. Other physical findings were unremarkable. The fetal heart rate was recorded at 140 beats per minute. Electrocardiography

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(ECG) showed total atrioventricular block with a heart rate of 40 x/min (Figure 1). Additional examinations were carried out in the form of a complete blood count and electrolytes with normal results. Echocardiography was performed with the result of mild mitral valve regurgitation.

Given that the mother's heart rate was <50 beats per minute, it was decided to place a transvenous temporary pacemaker (Figure 2 shows her ECG after temporary pacemaker placement) and her pregnancy was terminated by cesarean section. The procedure was successfully completed without any

complications. The baby was born with an APGAR score of 9/10 and a body weight of 2920 grams. After delivery, a plan was made for permanent pacemaker implantation; however, the patient declined the procedure. The patient received detailed information regarding the necessity of permanent pacemaker implantation as the main treatment for TAVB, along with the potential risks of future symptoms such as syncope, dizziness, or cardiac arrest. Following this discussion, the temporary pacemaker was taken out. Later, the patient was discharged from the hospital in a stable condition.

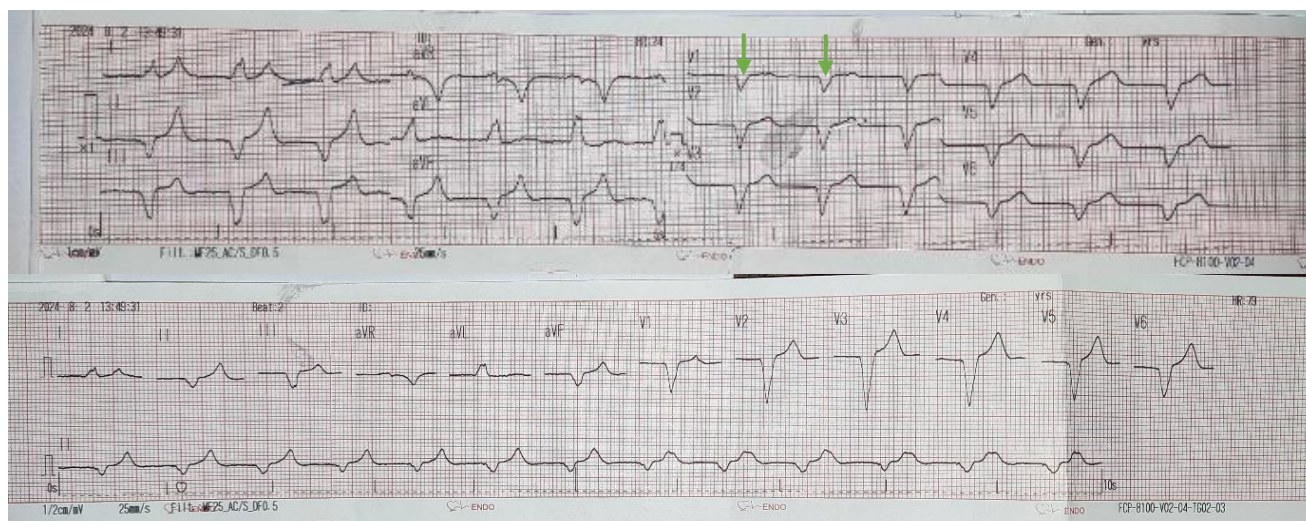


Figure 1. The electrocardiogram (ECG) demonstrates atrioventricular dissociation characteristic of total atrioventricular block (TAVB), evidenced by the presence of P waves (indicated by blue arrows) and QRS complexes (indicated by green arrows) that occur independently of one another.

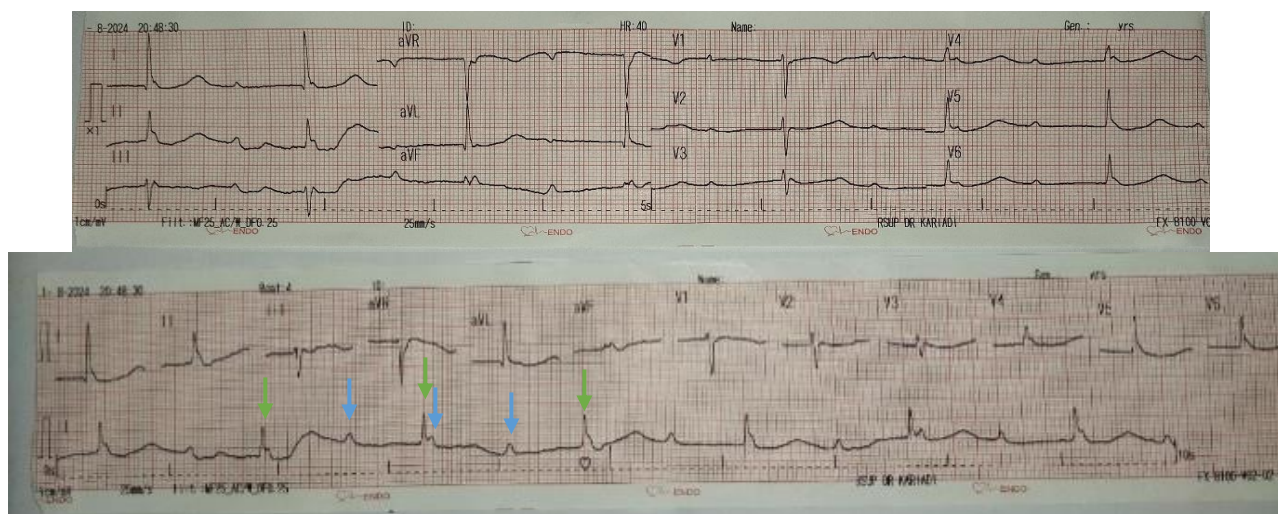


Figure 2. The ECG shows a pacemaker rhythm characterized by a wide QRS wave (green arrows) with an Left Bundle Branch Block (LBBB) pattern indicating right ventricular



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DISCUSSION

Hemodynamic changes in pregnant women start early in pregnancy, peaking during the second trimester and early third trimester. Maternal systemic vasodilation begins as early as the fifth week of gestation. Systemic vascular resistance (SVR) decreases by 35-40% in the middle of the second trimester, when cardiac output (CO) begins to increase.³

During the mid-second trimester, the decrease in systemic vascular resistance (SVR) stabilizes. Blood pressure usually drops by 10 to 15 mmHg from pre-pregnancy levels and then steadily increases starting around 26 weeks of gestation until childbirth. Cardiac output continues to increase nonlinearly, peaking in the third trimester. Heart rate (HR) progressively increases throughout pregnancy, reaching its peak at the end of the third trimester, with an average elevation of approximately 16 beats per minute above pre-pregnancy baseline values.³

Bradyarrhythmias in women of reproductive age are rare, especially during pregnancy. There is an estimated prevalence of 1 in 15,000 - 20,000 in this population, but the exact number is still unknown.¹ In patients with TAVB, the heart rate cannot increase and may cause decompensation, especially in the intrapartum and postpartum phases. The etiology of total atrioventricular block (TAVB) during pregnancy is usually congenital. Approximately 30% of congenital TAVB cases notably go undiagnosed until adulthood, leading to the initial diagnosis often happening during pregnancy. In addition to congenital causes, other factors contributing to TAVB in pregnancy may include myocarditis, systemic lupus erythematosus, infective endocarditis, or post-cardiac surgery complications. TAVB may be independent or may be accompanied by other congenital heart diseases.⁴

Symptoms such as dizziness, presyncope, and syncope can occur in late pregnancy, during labor, or immediately after delivery. During the second stage of labor, the Valsalva maneuver could stimulate the vagus nerve, potentially leading to worsened bradycardia, asystole, and even cardiac arrest. Asymptomatic TAVB typically results in a favorable pregnancy outcome. However, intrauterine growth restriction (IUGR) and preterm birth have been reported in some patients.^{5,6} In our patient,

fortunately, there were no complications during pregnancy, and the baby was born healthy.

According to the guidelines from the European Society of Cardiology (ESC), pacemaker implantation is recommended in pregnant patients classified as high-risk, including those experiencing syncope, exhibiting a wide QRS complex rhythm, or maintaining a heart rate below 50 beats per minute during daytime hours. The risks associated with pacemaker implantation are typically low and can be conducted safely, particularly when the fetus is beyond 8 weeks of gestation.⁷ In our patient, transvenous temporary pacing was done before delivery because the heart rate was <50 beats/minute even without other symptoms.

Vaginal delivery does not confer additional risk to either the mother or the infant and remains the preferred mode of delivery for patients with total atrioventricular block (TAVB), whereas cesarean section is reserved for established obstetric indications.⁷ The increase in cardiac output (CO) occurs during labor and continues immediately after parturition. Specifically, the first stage of labor is associated with a 12 to 30% rise in CO. During the second stage of labor, there is a more significant increase in cardiac output of 49%. The increase in cardiac output is due to the increase in heart rate and stroke volume.² However, in patients with total atrioventricular block (TAVB), the compensatory increase in heart rate is not achievable, necessitating an increase in stroke volume to meet the elevated cardiac output demands. In the present case, cesarean section was selected due to limited clinical experience managing pregnancy complicated by TAVB, particularly given the concern that the hemodynamic adaptations typically observed during labor might be inadequate in such patients.

Sectio caesarean itself carries risks for patients with TAVB due to anesthesia administration. Regional (spinal) anesthesia can lead to reduced sympathetic response and potentially result in hypotension leading to cardiac arrest. Hence, it is said that opting for regional anesthesia using epidural with titration or a blend of small spinal doses with epidural could serve as an alternative. As for general anesthesia, it is reported to be well tolerated in TAVB patients.^{8,9}



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Similar treatment with temporary pacemaker insertion and termination of pregnancy by cesarean section was also performed by Iriani et al¹⁰ but the anesthesia used in their patient was general anesthesia. In another case report by Swain et al,² caesarean section chosen due to obstetric indication was performed under regional anesthesia, but they did not immediately place a pacemaker in the patient; instead, they administered an isoprenaline drip and prepared for transcutaneous pacing if needed. The delivery was successful without the need for transcutaneous pacing. Our patient underwent a caesarean section under spinal anesthesia with a transvenous temporary pacemaker inserted before the procedure, and there were no adverse hemodynamic changes during the operation.

The association between TAVB during pregnancy and obstetric complications like preterm delivery, intrauterine growth restriction, preeclampsia, and fetal distress has not been proven. Hidaka et al. found no discernible difference between the risks of fetal problems for those with and without pacemakers. However, because the case was rare, there were few participants in the study, and its findings should be cautiously evaluated.¹¹

CONCLUSION

Total AV block in pregnancy is rare, and it is mostly congenital. A common investigation using ECG can diagnose it. Management of such a condition needs a multidisciplinary team approach involving a cardiologist and an obstetrician. Pacemaker implantation can be performed safely, especially if the fetus is beyond 8 weeks gestation if needed. Vaginal delivery is preferred, and cesarean section is reserved for obstetric indications. Lastly, asymptomatic TAVB typically results in a good pregnancy outcome.

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