



Case Report

Complete heart block in pregnancy: case report, analysis, and review of anesthetic management



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Abstract Maternal complete heart block can pose significant challenges for the anesthesiologist in the antepartum, peripartum, and postpartum periods. Some patients may present for the first time in the puerperium with dizziness, weakness, syncope, or congestive heart failure as a result of the additional hemodynamic burden that accompanies pregnancy. Although there is an increase in permanent pacemaker placement in young symptomatic patients before pregnancy, prophylactic placement of pacemakers in asymptomatic parturients is not always indicated. The need for temporary or permanent pacemakers in asymptomatic women should be assessed on a case-by-case basis; many of these patients may be safely managed during labor and delivery without pacing. The parturient with complete heart block must be followed vigilantly during pregnancy and post delivery, as the need for pacemaker insertion can also arise in the postpartum period. We present a case of third-degree heart block in a 26-year-old parturient.

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Introduction

Bradyarrhythmias in the reproductive age group are rare but can present for the first time in pregnancy or in the peripartum period [1–3]. Placement of pacemakers in these patients is controversial because of young age and need for frequent generator changes, possible need for fluoroscopic exposure which can be teratogenic, and risks and difficulties associated with pacemaker placement. Although there is strong evidence to support placement in symptomatic patients, the answer is less defined regarding the asymptomatic pregnant patients. Only isolated cases and small case series of complete heart block (CHB) in parturients have been reported in the literature with no emphasis on anesthetic management techniques. We

present a case report and highlight anesthetic implications and management techniques for such patients.

Case description

A 26-year-old G2P0010 presented for antenatal care late in her second trimester after moving to Florida. She relayed a history of heart block diagnosed in the emergency room in 2008 after a miscarriage in her first trimester. She was asymptomatic and denied having dyspnea or syncopal/presyncopal episodes in both pregnancies. On further investigation, electrocardiogram (ECG) revealed a complete atrioventricular (AV) heart block with a narrow complex, junctional rhythm, and heart rate of 57 beats per minute (bpm). No evidence of structural heart disease was seen on the transthoracic echocardiogram. After a detailed negative history, the etiology of her CHB was determined by cardiology to be congenital. Holter monitoring was advised for further evaluation, and emergent transvenous pacing availability was recommended at the time of

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delivery. The patient failed to have her Holter monitoring and was admitted to labor and delivery at 37 weeks for induction secondary to intrauterine growth restriction. Anesthesiology was consulted upon arrival, and she was placed on continuous ECG monitoring. Defibrillator pads for emergent transcutaneous pacing were applied.

Transvenous pacing equipment was also kept ready in the room, and the cardiology service was informed and on standby if the need for emergent pacing arose. After obtaining informed consent, a low-dose combined spinal-epidural analgesia with 1.25 mg of bupivacaine and 15 μ g of fentanyl intrathecally was placed early in the first stage of labor to decrease the risk of pain-induced sympathetic surges and cardiac output changes. She received 30 mL of oral sodium bicarbonate before neuraxial placement and a coload of 300 mL of lactated Ringer's during the procedure. Atropine, epinephrine, and isoproterenol were available for any vagal-induced bradycardia, and ephedrine was available in the event of hypotension. Her vital signs remained stable throughout the procedure. We were called back into the room to be present during a vacuum-assisted delivery, which was uneventful. Her heart rate never decreased below 45 bpm and increased to 100-105 bpm during pushing. She delivered a 2.3-kg baby boy Apgar scores of 9,9,9 at 1, 5, and 10 minutes.

Holter monitoring performed on the second postpartum day revealed a CHB with an escape junctional rhythm. Her mean heart rate was 54 bpm, decreasing to 34 bpm during sleep and increasing to a maximum of 98 bpm. The patient remained asymptomatic throughout her hospital stay. She was discharged 3 days after delivery and was scheduled for a postpartum assessment to determine the need for permanent pacing.

At 3 weeks postpartum, the patient presented to the cardiology clinic with occasional dizziness with walking and fatigue. Her ECG revealed AV dissociation with a junctional escape rhythm in the high 50s consistent with CHB. Her Holter monitoring was reviewed, and although the patient met criteria for pacemaker insertion, she was ambivalent about proceeding. An exercise stress test was ordered to determine if she was able to produce an appropriate acceleration in heart rate and rule out worsening of symptoms with exertion. At 10 weeks postpartum, she underwent a submaximal exercise stress test achieving 45% maximal heart rate, which was terminated after 6 minutes secondary to fatigue. A repeat echocardiogram showed an ejection fraction of 55% with no structural changes; however, it revealed possible improvement in contraction indices with pacemaker insertion. At 12 weeks postpartum, a dual-chamber pacemaker was inserted with immediate improvement of symptoms.

Discussion

The most common arrhythmia in women of childbearing age is paroxysmal supraventricular tachycardia. Bradyarrhythmias are rare in this age group, with a prevalence of 1/20,000 [1-3]. Complete heart block is a disorder of the cardiac conduction system with a complete absence of conduction

between the atria and ventricles [4]. Congenital CHB is said to be of unknown etiology, but it has been found to be associated with maternal connective tissue disease, in utero exposure to lupus antibodies, and complex congenital heart disease [4]. Acquired causes in young adults include previous cardiac surgery for ventricular/atrial septum and complex congenital heart disease. Thirty percent of the cases remain undiscovered until adulthood, so they may present for the first time during pregnancy or the puerperium [4-7]. Our patient was suspected to have a block at the AV node level; she was hemodynamically stable and had narrow QRS complexes on her ECG. These patients are more commonly asymptomatic and better able to increase their heart rates in response to stress, exercise, and atropine than those with blocks below the AV node [4,5].

During pregnancy, the heart rate increases by 5 weeks of gestation and continues to increase up to 32 weeks by about 25%. The increase in stroke volume occurs slightly later at 8 weeks and reaches a maximum of 40%-50% at about 20 weeks. Vaginal delivery places an additional preload on the cardiovascular system, as uterine contractions displace blood into the central circulation, further increasing cardiac output [8-11]. It is therefore recommended that the second stage of labor be shortened and assisted to avoid Valsalva maneuvers during uterine contractions that can lead to reflex bradycardia [1,12]. Because most CHB patients cannot achieve a sufficient increase in heart rate, an increase in cardiac output during pregnancy depends mainly on an increase in stroke volume. Some parturients with CHB may remain asymptomatic during pregnancy, but others may develop Stokes-Adams attacks [8-11].

Preoperative assessment

A detailed anesthesia preoperative assessment with emphasis on the airway examination and assessment of functional capacity is important in these patients. Special note must be made of any symptoms of decreased end-organ perfusion such as fatigue, dizziness, shortness of breath, syncope, and poor urine output. Attention must be made to surgical, family, and medication histories. Previous cardiac assessment and documentation are useful to compare with current data to document possible change in functional/electrocardiographic status. An echocardiogram is mandatory to rule out structural heart disease and evaluate the ejection fraction; it is also necessary if insertion of a cardiovascular implantable electronic device (CIED) is considered. Many patients have permanent CIEDs placed; the manufacturer, model number, and type of device as well as the response to magnet intervention must be obtained preoperatively [13,14].

Anesthetic management

Many anesthetic problems can occur in patients with CHB during surgery, including bradycardia, hypotension, arrhythmias,

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