



Maternal complete heart block in pregnancy: a case report, literature review and management options

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Abstract

Objective: to discuss the management of maternal complete heart block during pregnancy

Methods: This is a case report, discussion, and recommendations for managing complete heart block during pregnancy.

Results: Maternal complete heart block was managed successfully during pregnancy.

Conclusion: Maternal complete heart block occurring during pregnancy is a rare condition that can first present during pregnancy. Management is guided by expert opinion based on sparse literature, with no established guidelines, and requires a multidisciplinary team approach.

Introduction

Complete heart block (CHB) is defined by a disruption of communication from the atria to the ventricles in the heart's conduction system. There is a spectrum atrioventricular block, with CHB the most severe in nature, with the potential of sudden cardiac arrest.

There are several potential etiologies with adult onset of CHB, most commonly in an older population due to ischemia, inflammatory processes, electrolyte or metabolic changes. In a younger population, causes such as medication related adverse effects are more common, but are still rare [1]. Up to 30% of patients with congenital CHB can be asymptomatic until adulthood, and therefore may present for the first-time during pregnancy [1].

Given the rarity of the condition in otherwise healthy, young people, the management in CHB is dependent on previous sparse reports in the literature [1-5]. There are no established guidelines for the management of pregnant patients who present in gestation with new onset of CHB that is not otherwise attributed to reversible processes. Therefore, we share our experience in the management of a patient with symptomatic new onset CHB at term.

Case

The patient is a 28-year-old G5P3013 with a history of three previous cesarean sections admitted at 38w6d for shortness of breath and chest pain. The symptoms increased in severity over the previous two days with dizziness

which prompted her to come to the hospital. In the ED, she had symptomatic bradycardia with a heart rate in the 40s. Her baseline heart rate during prenatal visits was 70-90s. She denied personal history of cardiac issues. However, her family history is significant for her father and brother who both required pacemakers. Her father had a pacemaker placed in his 30s and subsequently had a heart transplant. Her brother had a pacemaker placed at age 25.

On admission to labor and delivery, the heart rate was 46. Cardiology was consulted and recommended transvenous pacing because of symptomatic bradycardia. She was transferred to the coronary care unit where a temporary transvenous pacemaker was placed. The patient had normal electrolytes and thyroid function tests. The pacer was set to 80 beats per minute and the patient's symptoms resolved. The following day a repeat cesarean delivery with bilateral salpingectomy was performed uneventfully. She was transferred to the cardiac intensive care unit for postoperative monitoring. A permanent pacemaker was inserted the following day. The patient did well post-delivery and after insertion of the permanent pacemaker.

Discussion

New onset CHB in pregnancy is exceptionally rare. If congenital in nature, CHB is compatible with normal pregnancy if appropriately managed. Cardiac physiologic changes in pregnancy lead to an increase in blood volume, heart rate, cardiac output, with a decrease in systemic vascular resistance. However, in CHB

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the heart rate of the patient will fail to appropriately increase due to the incoordination of the cardiac conduction system.

In the latter part of pregnancy, the increasing cardiac demand can lead to worsened symptomatology such as dyspnea, syncope and even sudden cardiac arrest. In addition, the increased vagal stimulation intrapartum in the second stage of labor can lead to significant bradycardia and asystole. Therefore, if possible, diagnosis prior to pregnancy or in the antenatal period is imperative for maternal and neonatal health.

Evaluation

Maternal bradycardia, defined as heart rate below 60 beats per minute, should have an evaluation during pregnancy even if asymptomatic. Due to the physiologic increase in heart rate in pregnancy, an incidental finding of maternal bradycardia should be investigated with an electrocardiography and cardiology consultation. Isolated sinus bradycardia or first-degree atrioventricular block are typically well tolerated and may not need further management [4]. However, second degree atrioventricular block and CHB are associated with severe morbidity and mortality and may require placement of permanent pacemakers during the pregnancy [2,5].

Reversible etiologies of heart block should be investigated and ruled out prior to placement of permanent pacemakers. Electrolyte changes, endocrine and metabolic processes, structural abnormalities, and iatrogenic causes such as medications should be taken into consideration. In our patient, the family history, and lack of any other causes, we determined that her CHB was congenital in nature. Since the patient was symptomatic, a permanent pacemaker was placed after delivery.

Multidisciplinary coordination among obstetrics, maternal fetal medicine, anesthesiology, cardiology is imperative. These patients require close monitoring and attention, especially in the intrapartum and immediate postpartum periods.

Timing of pacemaker placement

Our patient had presented one day prior to her scheduled delivery date, and therefore we proceeded with temporary pacing prior to permanent pacemaker placement. There is evidence that temporary pacing is safe in pregnancy and can be used judiciously with symptomatic patients [3-4]. In addition, the neonate was not exposed to additional radiation which is needed when a permanent pacemaker is inserted, and emergency delivery considerations in the cardiac surgical suite were avoided.

The type of temporary pacer used either transcutaneous or transvenous should be based on the experience of those inserting the pacemaker and type of temporary pacemaker available. However transvenous pacemakers may be preferred since they can accomplish two functions: (1) pace the heart and (2) sense the intrinsic cardiac rhythm. A transvenous pacemaker can pace the atrium, ventricle, or both whereas a transcutaneous pacemaker cannot. Transvenous pacemaker function as dual pacemakers. A dual chamber pacemaker can maintain

atrioventricular synchrony and therefore cardiac output. So, if available, a transvenous pacemaker is preferred.

Delivery planning

Vaginal delivery is not contraindicated in patients with CHB, other than usual obstetric indications [2-5]. In our patient, given her history of three cesarean deliveries, she was not a candidate for vaginal delivery. In coordination with cardiology, the need for temporary pacing during labor and delivery can be determined [5]. However, the safety of vaginal delivery in the appropriate setting and treated CHB, even requiring temporary pacing, has been shown [4].

Anesthetic considerations

The mainstay of treating patients with CHB is to maintain hemodynamic stability. With the activation of the sympathetic system in the intrapartum period, an early epidural in the first stage of labor may be preferred.

General anesthesia can be used in emergent situations, but agents that are less likely to cause dramatic shifts in hemodynamics should be used [5].

In our patient, we performed her cesarean delivery and bilateral salpingectomy under combined spinal/ epidural anesthesia, to allow for slow titration of the medications and compensatory physiological changes.

Conclusion

Maternal CHB is a rare condition, and congenital CHB can present for the first-time during pregnancy. Management of this disease requires a multidisciplinary approach. Evaluation and care coordination between the obstetric, anesthesia, and cardiology teams are imperative. Regional anesthesia and vaginal delivery are preferred, unless otherwise contraindicated. Pacemaker placement can be safely performed in the antenatal and immediate postpartum periods. If needed, temporary pacing is safe in the intrapartum period ..

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