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Case Report

Successful management of complete heart block in pregnancy

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ABSTRACT

This case report presents a comprehensive account of effectively managing complete heart block (CHB) in a pregnant patient with prior cardiac surgery. At 36 weeks of gestation, the team opted for an elective caesarean delivery, necessitating the insertion of a temporary pacemaker. The multidisciplinary collaboration, involving obstetricians, cardiologist, and anaesthetist, played a pivotal role in ensuring a secure delivery. The report delves into the intricacies of addressing acquired CHB during pregnancy, emphasizing the scarcity of established protocols and the need for further research in this domain. Physiological changes in pregnancy, potential complications, and pacing recommendations are discussed. The success of this case underscores the significance of meticulous planning, risk stratification, and multidisciplinary approach in managing bradycardia during high-risk pregnancies. Overall, the report provides valuable insights into navigating the complexities of acquired CHB in pregnancy, advocating for enhanced screening, early recognition, and collaborative efforts among specialists.

Keywords: Complete heart block, Pacemaker, TAVB, High-risk pregnancy, Heart disease complicating pregnancy

INTRODUCTION

The National Institutes of Health defines bradycardia as a heart rate <60 bpm in adults other than well trained athletes.[1] Atrioventricular block (AVB) after congenital heart surgery affects 1% to 6% of patients.[2] Third-degree atrioventricular (AV) block or complete heart block (CHB), is an abnormal heart rhythm resulting from a defect in the cardiac conduction system in which there is no conduction through the atrioventricular node (AVN), leading to complete dissociation of the atria and ventricles.[3] The ventricular escape mechanism can occur anywhere from the AVN to the bundle-branch Purkinje system. ECG findings of CHB are 1. regular P–P interval, 2. regular R–R interval, 3. lack of an apparent relationship between the P waves and QRS complexes and 4. presence of a greater number of P waves than QRS complexes.[2] The incidence of Complete heart block (CHB) is estimated to be 1 in 15 000 to 20 000 live birth which may be congenital or acquired.[3] Whenever encountered in a pregnant woman, CHB presents a challenge for the obstetrician and calls for a multidisciplinary approach involving the cardiologist, anaesthesiologist and neonatologist.[4]

CASE REPORT

A 23-year-old primigravida came to our institution for safe confinement at 36 weeks of gestation. Patient had a history of cardiac surgery at 7 years of age. Patient pulse rate was 40-42 bpm. ECG was done which showed Complete heart block followed by an echocardiogram which showed AML prolapse, moderate MR and a bicuspid aortic valve.

At 7 years of age, the patient was diagnosed with ventricular septal defect, patent ductus arteriosus, severe aortic stenosis with bicuspid aortic valve. Patient underwent Open aortic valvotomy/PDA closure/VSD direct closure. She developed bradycardia as a complication of the surgery. It was managed with T. Orciprenaline 5 mg BD. The conduction abnormality did not improve and after about 6 months Atropine testing was

done. Before atropine AR:100 and VR:50 and after atropine AR:150 and VR:50. This indicated an above AV nodal block. Intrinsic rate of AV node is 40-60 bpm. Medical management was preferred as the patient was asymptomatic and patient was on T. Orciprenaline 10mg TDS. The review ECHO showed a BCAV, moderate AR, mild AS and MVP-AML, mild MR, mild TR, LVEF 64%, normal LVF and eccentric LV hypertrophy with no residual shunt across the VSD/PDA closure, no clot or pericardial effusion. Patient was on regular follow-up in cardiothoracic OP and cardiology OP.

At the age of 23 years, on 20/1/23 patient came to our institution with 2 months amenorrhea, patient was explained about high cardiac risk, in spite of that she opted to continue pregnancy. Careful regular antenatal monitoring was done both by an obstetrician and cardiologist. Periodic expert ultrasound with doppler was done to rule out foetal growth restriction.

When she got admitted in our institution at 37weeks of gestation, she was asymptomatic, she had a pulse rate of 43bpm and BP 120/70 mmHg. First and second heart sounds were normal and a pansystolic murmur was heard. On abdominal examination uterus was term-sized, relaxed, with cephalic presentation, liquor clinically adequate, vertex 5/5 and foetal HR 140 bpm.

Investigations

An ultrasound with doppler showed a single live foetus of 2.3 kg with a good biophysical profile. All routine investigations including serum electrolytes were normal. ECG showed a complete heart block, 44 bpm, regular PP interval, irregularly irregular RR interval, normal QRS duration, above AVN block, no ST changes.

Echo

Rhythm abnormality noted during study, with no RWMA, EF 64%, normal LVF, no residual shunt across the IAS/IVS/PDA, moderate AMR/AML prolapse, mild TR, mild to moderate AS, mild AR, normal RV function, BCAV, no pericardial effusion or clots. The patient was advised elective LSCS in view of cardiac complications. Elective LSCS was planned at 39 weeks on 17/8/23.

Day of surgery

Temporary pacemaker insertion under fluoroscopy guidance was done through transfemoral approach. The lead tip was positioned in the RV apex through right atrium. Pacemaker parameters set as 76bpm, voltage at 5 mV.

Post procedure ECHO revealed the same. The patient was shifted to OT for elective LSCS. In the presence of team of experienced cardiologists, obstetricians, anaesthetists, neonatologists and under general anaesthesia an elective caesarean delivery proceeded in usual way to deliver an alive, term, girl baby of birth weight 2.270 kg who cried immediately after birth and was handed over to the Paediatrician. Post operatively patient was monitored by multidisciplinary team. Her vitals were stable with a BP 130/80 mmHg, PR set at 76 bpm by temporary pacemaker. On POD-2 the temporary pacemaker lead was removed after gradual tapering of heart rate. Post operative period was uneventful.

DISCUSSION

A pregnant woman with complete heart block is a rare condition, but with increasing advances in medicine cardiothoracic surgeries are becoming common in young children. This increases the incidence of complete heart block. There is no clear-cut protocol to follow in managing these patients during labour.[5] To overcome these short comings more research should be done in these areas. Our case report will give you an insight on how we successfully managed this pregnant lady with acquired complete heart block (post-surgical).

Complete heart block can be acquired or congenital.[5] Isolated congenital complete heart block is relatively benign, heart rate increases with atropine. Acquired complete heart block during pregnancy is very rare and may be due to myocarditis, collagen vascular disease, infective endocarditis of aortic root or as a complication of cardia surgery.[3] The commonest indication for surgery in congenital heart disease is Ventricular septal defect (95%). Our patient had large peri membranous VSD with severe aortic stenosis, the bundle of His is related to posterior and inferior margins of the defect making it vulnerable to operative trauma. In acquired heart block, heart rate is usually 40 or less per minute. Some operations have been identified as conferring a higher risk of permanent AVB such as congenitally corrected transposition of the great arteries (TGA) repair, left ventricular outflow tract obstruction resections, ventricular septal defect (VSD) repair, and tricuspid and mitral valve replacement.[6]

Several physiological changes in cardiovascular system occur during pregnancy. There is rise in circulatory blood volume, heart rate, stroke volume. But heart rate fails to increase in patients with complete heart block and may lead to decompensation particularly in intrapartum and postpartum period. Patient may develop new onset arrhythmia, may go in for sudden cardiac death/ Heart failure.[3]

Foetal complications

Foetal growth restriction, Preterm labour, oligohydramnios.[5]

Pacing

According to HRS guideline, in a awake symptom free patient if any escape rhythm goes less than 40 beats/min then it is an indication for pacemaker.[7] The American

Heart Association (AHA) and European society of Cardiology (ESC) now recommend a permanent pacemaker implantation for those having complete heart block with high risk features in pregnancy, regardless for symptom presence.[2]

Mode of delivery

Fetomaternal outcome is mostly favourable in asymptomatic cases. During labour, maternal heart rate increases with every contraction due to Valsalva manoeuvre and sympathetic response.[8] But she was a case of complicated bradyarrhythmia (atropine resistant bradyarrhythmia) with significant underlying heart disease, therefore caesarean section is preferred.

Anaesthesia

There is no clearcut guidelines, regional anaesthesia can cause hypotension and among patients with bradycardia, the required compensatory mechanism to respond to hypotension is lacking.[4] Thus general anaesthesia is preferred.

CONCLUSION

Bradycardia in pregnancy due to complete heart block is a rare yet serious occurrence and often asymptomatic. With various hemodynamic changes during pregnancy, it is a herculean task to prevent complications, both antepartum and peripartum. Pacemaker implantation is often recommended. Screening, early recognition, risk stratification (mWHO, CARPREG, ZAHARA scale) and through planning are required. In our case, multidisciplinary approach involving cardiologist, obstetricians, anaesthetists helped to manage such a high-risk patient successfully.

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