



## Complete Heart Block with Pacemaker in Pregnancy

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### ABSTRACT

Nowadays many women with pacemakers in heart are contemplating and undergoing pregnancy. Complete heart block is an important obstetric complication. Pregnancy with complete heart block is rare and it requires a multi-disciplinary approach involving the obstetrician, cardiologist, anaesthesiologist and neonatologist. Though data on such patients where the cardiac association with obstetrics is limited. We present a case of a pregnant woman with congenital complete heart block with permanent pacemaker insitu. 21 year old primigravida at 36 weeks of gestation with congenital complete heart block and pacemaker in situ came to OPD with complaints of pain abdomen. The patient was asymptomatic throughout the pregnancy. The patient was admitted & on evaluation was found to have threatened preterm labour & underwent emergency LSCS & delivered a girl child with a good Apgar score of 8/10,9/10. Intra op & post-op mother & baby was doing good & stable throughout the hospital stay.



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### INTRODUCTION

Complete heart block (CHB) is an abnormal cardiac rhythm in which there is no conduction of electrical impulse through the atrioventricular node so that there is complete dissociation of the atria and ventricles [1]. It is characterized by a random relationship between the atrial and the ventricular activation where the atrial impulses are not conducted to the ventricle. There is complete dissociation of the atria and ventricle function [2]. Complete heart block is a rare but seri-

ous condition in pregnancy. The incidence of complete heart block (CHB) is estimated to be 1 in 15,000 to 20,000 live births [3]. It may be congenital or acquired & it is observed that about 30% of them remains asymptomatic. Patients with isolated CHB are usually asymptomatic and achieve normal growth and development although mortality in infancy is 8% [4]. Physiological response to pregnancy increases cardiac output by 30 to 50% by increasing the heart rate and blood volume [5]. This poses an increased threat to both the mother and foetus. As there is a deficit of cases in the literature there are no established guidelines regarding management. So herewith we are presenting a rare case of 21 year old primigravida at 36 weeks of gestation with threatened preterm labour with congenital complete heart block and pacemaker in situ. We successfully managed the patient, and where mother and the baby were discharged in stable condition.

### CASE REPORT

A 21-year-old primigravida at 36 weeks of gestation with congenital complete heart block & permanent pacemaker in situ booked & immunized came with

complaints of pain abdomen admitted to our tertiary healthcare centre.

The patient is a known case of congenital complete heart block since 13 years of age. She had a significant past medical history of bradycardia and syncope that required pacemaker placement. The patient at 13 years of age was evaluated and diagnosed to have a congenital complete heart block by ECG when she presented with complaints of giddiness for 1 month. ECHO was found to be normal. The patient was admitted, monitored & found to have BP-110/70mmhg with a ventricular pacing rhythm of 60 beats per minute & planned for permanent pacemaker implantation.

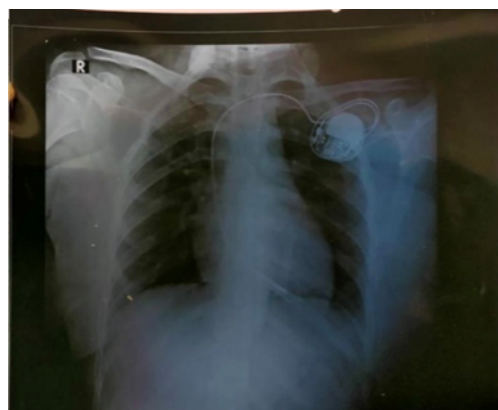
Permanent pacemaker insertion was done via the left subclavian vein under anesthesia and all pacing parameters were checked with a heart rate fixed to 60 beats per minute. The patient was regularly monitored for cardiac status, under antibiotics cover & was discharged in stable condition. The patient was advised to regular follow-up at the cardiology department. The patient again had complaints of tripping at school, followed by giddiness and a syncopal attack one year later.

The patient was admitted & observed for 3 days. The patient had no fresh complaints after admission and was discharged in stable condition. Currently, the Patient is a 21-year-old primigravida at 36 weeks of gestation who had regular antenatal visits & the antenatal period was uneventful to date. Currently, the patient was admitted i/v/o threatened preterm at 36 weeks of gestation & all routine investigations & ECG ECHO was done. ECG showed an abnormal pattern of ventricular paced rhythm heartbeat of 60bpm as shown in the image of ECG in Figure 1 & echo was found to be normal with pacemaker lead in situ visualized. X-ray is taken showing pacemaker lead in situ as visualised in Figure 1.

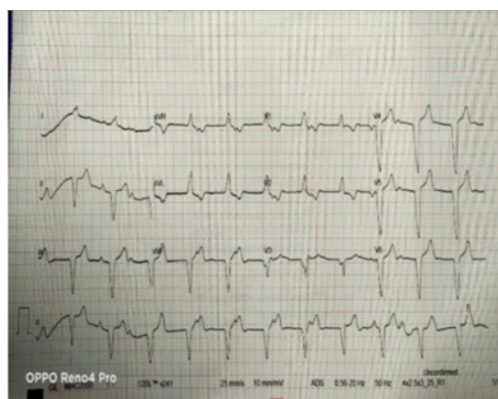
High-risk consent was obtained. The patient underwent emergency LSCS in view of a complete heart block with a pacemaker in the heart under spinal anesthesia. The intraop period patient had hypotension & 450ml of blood loss was managed effectively by the anaesthesia team & Post operatively patient was shifted to ICU & continuous vital monitoring was done. IV fluids, IV antibiotics & adequate analgesics were given. The patient's condition improved, and vitals were stable throughout the ICU stay with BP of 120/70mmHg, PR of 60 per minute and SPO2 of 99%.

The patient was shifted from ICU to HDU on POD2 continued monitoring & patient was transferred to the ward on POD4. The neonate was evaluated & found to have no rhythmic disturbances

and required no ICU admission Patient was stable throughout the hospital stay & neonate was on the mother's side. A cardiology review was obtained & advice to follow up with the cardiologist. The patient was discharged on postop day 9 & advised on regular follow up in Gynae OPD & cardiology outpatient department.



**Figure 1: Xray showing heart with pacemaker lead in situ**



**Figure 2: ECG showing complete heart block picture**

## DISCUSSION

Complete Heart Block (CHB) was reported in 1901, by Morquio who described a familial occurrence. Complete heart block has an incidence of around 1:15000 to 1:20000 [6]. The reason for heart block is not known but mostly it is congenital. The most patient may not develop symptoms early age but can present clinically in later life depending on the degree of heart block. Several physiological changes in the cardiovascular system occur during pregnancy to meet the increased demands. There is a rise in circulatory blood volume, stroke volume, and heart rate and a fall in systemic vascular resistance during pregnancy [7].

A study done by Mandal et.al has reported that in CHB patients the foetomaternal outcome included

syncope (29%), pre-term labor (11%), fetal growth restriction (14%), oligohydramnios (7%) and postpartum hemorrhage (4%) [8]. The concern in pregnant women with complete heart block is not only specific to pregnancy related complications but also related to the fetus.

There is a chance of FGR or preterm delivery. Conditions like hydrops foetalis, heart failure in neonates or exercise intolerance in children might result due to decreased heart rate [9]. Preconception counselling should be done to discuss fetal risks for cardiac anomalies which increases in case the mother is affected, genetic counselling might also be needed so certain genetic markers can be tested using chorionic villus or amniocentesis samples.

Preconception counselling allows thorough maternal cardiac status with the chance of optimising her condition, modifying medications suitable for pregnancy and dealing with medical conditions that may affect pregnancy.

In our case report patient was asymptomatic during the antenatal period. There was no specific complication noted to the mother or the foetus during pregnancy. A patient who presents for the first time with a complete heart block poses a challenge for the treating physician. If the patient is symptomatic should be managed with the use of a permanent pacemaker whenever diagnosed with a complete heart block.

During pregnancy new onset of symptoms such as palpitations, shortness of breath, syncope, seizure like activity, dizziness, confusion, and exercise intolerance should be paid attention to [7]. It is difficult to differentiate between pregnancy symptoms and some degree of cardiac dysfunction which requires further evaluation and adjustments in pacemaker rate. However, there is no protocol for perioperative management during LSCS due to the rarity of the case [10].

In relation to choose the mode of delivery both modes vaginal and cesarean delivery has equal support and there is no contraindication to vaginal delivery, however, it depends on the cardiopulmonary tolerance.

During the first stage of labor, there is a 12% increase in cardiac output and as the labor continues with further cervical dilatation cardiac output increases to 34% the effect of such changes can be weakened by using epidural anaesthesia [11].

Symptoms are common in the 2<sup>nd</sup> & 3<sup>rd</sup> trimesters of pregnancy, during labour & immediate postpartum. During the second stage of labour valsalva manue during bearing down stimulates the vagus

nerve and may cause dangerous bradycardia, asystole and cardiac arrest [12]. Hemodynamic fluctuations during bearing down can be reduced if the delivery is performed in a lateral decubitus position. Cardiac demand and unwanted effects of Valsalva manue induced bradycardia when the mother is bearing down can be limited if assisted delivery with vacuum or forceps is performed [13].

The need for pacemakers during pregnancy is debatable. But pacemakers will be needed in this situation for proper cardiac functioning. Some support that without pacemakers asymptomatic patients can be managed with the backup of an emergency pacing facility [14]. Others suggest that in patients with first second degree AV block, atrial fibrillation, low ventricular rate and atropine-resistant bradycardia temporary pacing should be done. As one of the major reasons for a scare is syncopal attacks that result in high mortality and morbidity [15].

Therefore evaluating the maternal condition and then placement of a pacemaker in the early stages of pregnancy can reduce mortality and this should be analysed. Patients with pacemakers require extra vigilance. Women who are asymptomatic without pacemakers may lead to cardiac failure during pregnancy [11]. There should be adequate knowledge about the mode of pacing, date of implantation, and durability of the batteries of the pacemaker.

Signs of reduced cardiac output and pacemaker dysfunction on ECG should be able to identify and electrolyte imbalance should be corrected as hypokalemia or hyperkalemia can affect the pacemaker threshold.

Epidural anaesthesia is preferred more than spinal anaesthesia as the latter has a chance of hypotension that finally results in fetal bradycardia. adequate hydration and proper use of vasopressor can help decrease hemodynamic changes with regional anaesthesia [16]. If general anaesthesia is planned then the use of drugs that have a less depressing effect on the heart should be used such as ketamine for induction of anaesthesia. Fentanyl and suxamethonium have been found to cause asystole and bradyarrhythmias so should not be used.

During cesarean delivery, only bipolar cautery should be used to avoid interference with the pacemaker and inappropriate resetting of the device [17]. Electrocautery may create interference which leads to inhibition of output finally resulting in asystole in a pacemaker-dependent patient. In pacemaker-dependent patients reprogramming the pacemaker to asynchronous mode is safe against electromagnetic interference. Pacemaker program-

ming if changed before surgery should be settled back to its initial settings after surgery is done. The grounding plate for the cautery system has to be placed near the operating site but as far as away from the pacemaker [17].

Associated nonobstetric complications with a pacemaker might result in skin irritation and ulceration at the implantation site. In case of emergency, medications such as isoprene lol and atropine should be used to increase heart rate in case of syncopal attacks. Our patient had only developed intraoperative hypotension & which was managed very effectively & patient was shifted to ICU followed by HDU monitoring continuously. On POD 4 patient was shifted to the normal ward and then discharged to home on POD9 with no specific complaints.

## CONCLUSION

Complete heart block in pregnancy is a rare but a topic of concern. The easiest way of diagnosing can be with the use of ECG, which is a reliable, cheap method and can give an accurate diagnosis. Once the condition is diagnosed pacemaker dependency should be recognised early in pregnancy. Management of patients is important that involves the role of obstetricians, cardiologists, and anesthesiologists. Women with asymptomatic complete heart block presenting during labour pose a challenge for treatment. The mode of delivery is based on obstetric indications. However during Vaginal delivery or LSCS adequate hydration, and epidural analgesia / regional anesthesia is safe because play a vital role to maintain hemodynamic status, and controlling labour pain & hypotension. Constant close patient monitoring, multidisplinary approach, & follow up of symptoms & cardiac functional status during the antenatal period, intraop & postop period is warranted in these pregnant women.

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## Conflict of Interest

The authors declare that they have no conflict of interest.

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