

Pre-operative continuation of ivabradine therapy for dilated cardiomyopathy - Skip it or not?

Dilated cardiomyopathy (DCM) is characterized by structural enlargement and poor contractility of the cardiac chambers. Patients with DCM for non-cardiac surgery always pose a nightmare for the concerned anesthesiologist despite advances in perioperative care. These patients have risk of malignant arrhythmias, heart failure, pulmonary and systemic embolism and sudden cardiac death peri-operatively.^[1] Recently, administration of Ivabradine has been emphasized along with standard therapy for better heart rate manipulation, increased exercise tolerance, and improved quality of life. There is no consensus on continuation or discontinuation of Ivabradine on the day of surgery. We report perioperative course of a patient with dilated cardiomyopathy on Ivabradine therapy undergoing modified radical mastectomy for carcinoma breast.

A 68-year-old male, 58 kg diagnosed with carcinoma right breast was scheduled for modified radical mastectomy. He was a known case of type 2 diabetes mellitus for the past seven months on irregular medication. He had anxiety disorder for past one year for which he was on tablet Amitriptyline, Chlordiazepoxide, and Trifluoperazine, each one tablet at night. Patient had received four cycles of neoadjuvant chemotherapy with Paclitaxel and Cyclophosphamide. Post-chemotherapy, patient complained fatigue, and exertional dyspnea corresponding to NYHA class II-III. He denied history of chest pain, syncopal attacks, palpitations, or swelling of lower limbs. On evaluation, Echocardiography (ECG) was suggestive of left bundle branch block with poor R wave progression [Figure 1]. ECG revealed ejection fraction 25%, LA and LV dilatation, severe LV systolic dysfunction, moderate TR and MR and grade I LVDD. Patient was prescribed tablet Nitroglycerine 2.6 mg BD, Metoprolol 25 mg OD, and Furosemide 40 mg OD. A month later, tablet Ivabradine 5 mg BD was added as the baseline heart rate was 90-100 beats/min.

On PAC, PR was 65 beats/min and regular in rhythm. NIBP recorded was 114/72 mm Hg. The RR was 16/min and bilateral vesicular breath sounds. Jugular venous pressure was not raised and there was no hepatomegaly. X-Ray chest showed increased broncho-vascular markings and cardiomegaly. All baseline investigations were within the range. A written informed consent was taken and decided plan was general anesthesia with ventilatory back up. Patient was advised to skip tablet Furosemide and continue nitroglycerine and Ivabradine on the morning of surgery.

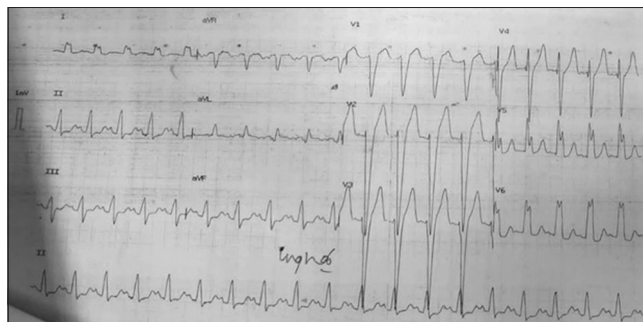


Figure 1: ECG depicting left bundle branch block pattern

In OT, ASA standard monitoring was done. 18G intravenous cannula was secured. After affirming the patient, an awake left radial arterial line was inserted prior to the induction. Induction was performed with slow administration of inj. Fentanyl 100 mcg, Inj. Etomidate 15 mg and Inj. Vecuronium 6 mg. Direct laryngoscopy was performed with 3 size Macintosh blade and patient was intubated orally with cuffed endotracheal tube of size 8 mm ID under vision. After confirmation of bilateral equal air entry, anesthesia was maintained on O₂ and N₂O (50:50), Sevoflurane (1-1.5%), and intermittent Inj. Vecuronium boluses for muscle relaxation. Ultrasound guided Serratus Anterior plane block (superficial) was performed with 20 ml of 0.2% Ropivacaine immediately after induction of anesthesia. Surgery lasted for one and half hours. Intra operatively, MAP was maintained between 65 and 80 mm Hg, HR of 60-75/min, SpO₂ of 99-100%, EtCO₂ of 30-35 mm Hg and peak pressures of 13-16 cm of H₂O with normal sinus rhythm. Additionally, Inj. Paracetamol 1g and Inj. Ondansetron 4 mg were administered. Total fluid administered was 700 ml and blood loss was not exceeding 100 ml. After reversal, patient was extubated smoothly when fully awake. Post-operative period was uneventful.

The perioperative goals in anesthetic management of DCM patients include prevention of myocardial depression, avoidance of increase in after load to improve forward flow, and maintenance of normovolemia.^[2] Enhanced HR though preserves cardiac output can be detrimental because of increased myocardial oxygen demand, impaired ventricular filling, and reduced diastolic filling time. This can lead to myocardial ischemia due to supply demand mismatch.^[3] Ivabradine is advocated as an add on drug to patients with increased baseline heart rate with diagnosis of chronic heart failure,^[4] angina pectoris,^[5] or/and dilated cardiomyopathy.^[6] Ivabradine blocks HCN channel and results in inhibition of the inward funny

current. Thus, decreases the slope of diastolic depolarization of the pacemaker action potential in SA node resulting in low HR.^[7]

The advantages with Ivabradine therapy are:

- 1) Heart rate reduction with no effects on conduction, contractility, and QTc prolongation
- 2) No effect on blood pressure
- 3) Improvement in ejection fraction and other echocardiographic parameters
- 4) Promotion of myocardial remodeling
- 5) Decreased fatal and nonfatal myocardial infarction and coronary revascularization rates
- 6) Overall improvement in effort tolerance, quality of life, and improved NYHA status.

Even a single pre-operative dose of Ivabradine administered for perioperative hemodynamic stabilization showed a significant mitigation of HR response to stressful events. It was suggested that Ivabradine is as effective alternative drug to reduce perioperative hemodynamic instability for patients who have contraindication to beta blockers. Also, it can be safely administered in normotensive patients.^[8]

On search literature, we did not find any evidence suggesting to continue or withdraw Ivabradine dose on the day of surgery. Owing to the beneficence mentioned above, we decided to continue Ivabradine dose on the morning of surgery. We found no response to laryngoscopy and intubation.

Nerve blocks supplement to blunt the pain responses and have opioids and volatile anesthetic sparing effect. We had performed ultrasound guided serratus anterior plane block in our patient which had synergistic effect for a stable and smooth intraoperative course.^[9]

To conclude, continuation of Ivabradine on the day of surgery coupled with performance of appropriate regional analgesic technique can provide a smooth and stable perioperative hemodynamic course in patients with DCM.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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