

Anaesthetic Management of a Carcinoma Rectum Patient with Second Degree Heart Block Posted for Laparoscopic Assisted Anterior Perineal Resection

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Received: 31 May 2022, Manuscript No. OCCRS-22-65474; **Editor assigned:** 8 June 2022, PreQC No. OCCRS-22-65474 (PQ); **Reviewed:** 11 June 2022, QC No. OCCRS-22-65474 (Q); **Revised:** 21 June 2022, Manuscript No. OCCRS-22-65474(R); **Published:** 26 June 2022, DOI.10.37532/2471-8556.22.8.6.1-3

Abstract

Laparoscopic-assisted surgeries in a patient with second-degree heart block have an exponential risk of progression to complete heart block. The prognosis of a patient with AV node (nodal block) is usually benign and block distal to AV node (intranodal block) has a potentially high risk of progression to complete heart block. Insertion of a pacemaker preoperatively remains a tricky situation even in distal AV node block. At our institute, a 75-year-old male patient with a second-degree Atrio Ventricular (AV) block with left bundle branch block was scheduled to undergo laparoscopic-assisted anterior perineal resection without prior pacemaker insertion. So, in this case, in the report, we would discuss how a case of second-degree AV block with bundle branch block was managed safely under general anaesthesia without prior pacemaker insertion.

Conclusion: Early recognition and timely intervention by the anesthesiologist, cardiologist and surgical team can avoid unnecessary perioperative complications and also associated postoperative morbidity.

Background

Atrio Ventricular (AV) conduction is assessed by the relationship between the P and QRS complex. Delay in conduction between the atria and ventricles results in Atrio Ventricular (AV) conduction blocks [1,2]. Depending on the electrocardiogram, conduction blocks are classified into first degree, second degree and third-degree AV blocks. Second-degree AV blocks are further classified into type 1 (Mobitz 1 or Wenckebach) and type 2 (Mobitz 2 or two-to-one block). (2:1) Type 1 block is usually associated with a narrow QRS complex reflecting AV nodal block. Type 2 AV block is usually intranodal and if it's associated with a wide QRS complex then it's 80% bundle branch and 20% AV node related [3].

Major perioperative concern in AV conduction abnormality is progression to complete AV block intraoperatively. Administration of atropine may subside type 1 block but worsens the scenario in type 2 block especially if it's associated with bundle branch. In higher degree cardiac conduction abnormalities like type 2 AV block, there is a higher perioperative risk for bradyarrhythmias and the risk is still exponential in laparoscopic-assisted surgeries [4]. Indication of permanent pacing is tricky and controversial unless the patient is symptomatic. There is no published case report of anaesthetic management of a patient undergoing laparoscopic-assisted surgery with Type 2 AV block associated with bundle branch abnormalities without prior pacemaker insertion.

Case Presentation

A 75-year-old male patient with k/c/o carcinoma rectum presented to our surgical OPD with per rectal bleeding since 3 months. His Computed Tomography (CT) findings were a (6 cm × 6 cm) malignant mass with multiple enlarged mesorectal nodes and henceforth the patient received 28 fractions of 6 mv X-rays along with capecitabine chemoradiation. On post chemo radiation the malignant mass measured around (3.6 cm × 3 cm) from the anal verge involving the lateral wall of the rectum which was surgically resectable. On pre-anaesthetic evaluation, the patient is non-smoker, non-alcoholic, with nil comorbidities and MET >8 with nil cardiac symptoms of dizziness, syncope, and chest pain. Routine 12 lead electrocardiogram revealed type 2 AV block with left bundle branch block. For further evaluation on cardiologist reference, a 2D echocardiogram and angiogram were performed which had no significant findings. Preoperatively we counselled the patient about potential risks associated and higher risk of progression to complete AV block and additional laparoscopic-assisted risk without prior temporary pacemaker insertion. On patient approval, we proceeded with surgery without any preoperative insertion of a temporary pacemaker.

On the day of surgery, after shifting the patient to the operation room, all standard monitors were connected, patient's ECG pattern showed a second-degree AV block with a left bundle branch block similar to that of preoperative ECG findings.

In addition to the above standard monitors, radial artery cannulation was done under local anaesthesia for the beat-to-beat blood pressure monitoring. In view of the emergency, an external transcutaneous pacemaker was kept ready. On the table vital parameters showed a heart rate of 65 bpm, blood pressure was 112/72 mmHg, SpO₂ was 98% at room air and Perfusion Index (PI) of 0.82. The patient had 20 - a gauge cannula fixed from the surgical ward in addition we secured an 18- gauge cannula in the operation theatre before induction. No pre medications were administered preoperatively, after preoxygenation of the patient for 3 minutes, general anaesthesia was induced with 100 mg propofol, 100 mg fentanyl and 6 mg vecuronium intravenously and just 90 seconds prior to endotracheal intubation 50 mg of 2% xylocarp was administered intravenously. Then, the patient was intubated with a size 8 endotracheal tube and then connected to a mechanical ventilator using volume control mode with 400 ml tidal volume, respiratory rate of 14 per minute and a positive end-expiratory pressure of 5 mm of Hg. Peak Inspiratory Pressure (PIP) was maintained at 21 mm of Hg, and End Tidal Carbon Dioxide (ETCO₂) at around 40 mm of Hg. Intraoperatively, anaesthesia was maintained with 50% oxygen and air mixture with an inhalational agent as Sevoflurane (1% -2%) and titrated bolus doses of fentanyl and vecuronium. Immediately after induction, the patient had a heart rate of 38-40bpm, atropine of 0.6 mg was administered immediately and the heart rate improved to 90-100bpm and patient remained hemodynamically stable and henceforth no requirement of pacing or pharmacological interventions. After discussion with surgeons, in view of consideration of complications which may occur during insufflation of CO₂ during laparoscopic surgeries, surgeons were instructed to maintain a flow rate of 6-8l/min, and not to exceed 12 mm of Hg intraabdominal pressure. Perioperatively, the patient was hemodynamically stable without any significant events and the patient emerged smoothly and extubated in the operating room. On the 2nd postoperative day, in the intensive care unit patient developed one episode of supraventricular tachycardia with a palpable pulse with a blood pressure of around 140/90 mm of Hg, SpO₂ was 99% and immediately 60mg xylocard intravenously was administered and rhythm reverted to sinus rhythm. During that time, blood electrolytes and cardiac biomarkers including troponin, 12 lead ECG and 2D Echo were performed and were



Figure 1A and B: Intraoperative vital parameters of the patient. The tracing of lead II shows the second-degree atrioventricular block with LBBB. Every P wave is followed by QRS with sudden dissociation of P from the QRS complex.

within normal limits. For further two days, the patient has kept in the intensive care unit the patient was quite stable and was discharged on the 7th postoperative day.(Figure 1A and 1B)

Discussion

The development of complete AV block remains a potential risk in patients with cardiac conduction abnormalities[4]. Laparoscopic surgeries using CO₂ to make a pneumoperitoneum, tend to have a higher risk of bradycardia, arrhythmia and cardiac arrest which may require cardiopulmonary resuscitation[5]. So, our patient had both the potential preoperative risk factors for progression to complete heart block. But the choice of implantation of a temporary pacemaker prior to surgery was not opted by us due to patient refusal, as well as the patient, being asymptomatic, henceforth we proceeded to surgery with an external transcutaneous pacemaker as standby.

The prognosis of a patient with AV node (nodal block) is usually benign and block distal to AV node (infranodal block) has a potentially high risk of progression to complete heart block[6]. Electrocardiographically, wide QRS-associated AV block is usually infranodal [6] and may require prior pacemaker insertion because of chances of progression to complete heart block are comparatively higher[1,2]. Electrophysiological studies are definitely needed to anatomically locate the site of the AV block[7]. Since it is invasive and the patient is asymptomatic as well as not willing for the EPS we proceeded with the surgery.

Preoperative administration of anticholinergic medications to prevent bradycardia hasn't shown any significant benefit in terms of mortality and morbidity [8,9]. So, we didn't consider preoperative administration of anticholinergics. Perioperatively, our patient developed bradycardia post-induction, one such potential reason could be hypoxia, hypercarbia and the anaesthetic medications used for induction. Hypoxia and hypercarbia events are less likely to occur because the patient was adequately preoxygenated and well ventilated, and the next possibility could have been our choice of muscle relaxant. Vecuronium and rocuronium have potential vagolytic activity [10], so our choice should have been cisatracurium [11], due to the nonavailability of cisatracurium at our institute we had vecuronium as the only choice of muscle relaxant. The usage of propofol and fentanyl could have also been the cause of bradycardia but only anaesthetic agents couldn't be claimed as the sole agent in a patient with prior AV block. Few clinical studies have shown, that an anaesthetic agent when administered in relevant doses had fewer chances of causing a negative dromotropic effect on AV conduction [12].

Laparoscopic surgeries have shown to be a potential risk factor for having a negative dromotropic effect on AV conduction. Peritoneal stretch and CO₂ insufflation on the high flow rate of CO₂ insufflation leads to a strong and fast vagal response [13] and can have direct effects on the cardiovascular system. Studies have shown limiting peritoneal pressure to 15mmHg and maintaining a flow rate of 8l/min could be a precautionary and protective measure to avoid negative dromotropic effects on cardiovascular events. So, after discussion with the surgeon, we limited the flow rate to around 8l/min and abdominal pressure not to exceed 12 mm Hg. So, in our patient, after CO₂ insufflation we didn't have any significant cardiovascular events requiring intervention. Intraoperatively during the surgery patient remained hemodynamically stable and the patient was successfully extubated and shifted to the intensive care unit.

On the second postoperative day, the patient developed sudden Supra

Ventricular Tachycardia(SVT), with a heart rate of around 180 bpm, palpable peripheral pulses, and blood pressure of 130/80 mm of Hg, and peripheral saturation of 98%. Vagal manoeuvres and pharmacological management with adenosine or calcium channel blockers are the suggested treatment for SVT. Vagal manoeuvres weren't performed in our patient due to a history of AV block, on the administration of adenosine 6 mg intravenously SVT settled. Additionally, to know the cause we assessed the cardiac and metabolic status which were found to be normal. Following the event, the patient remained asymptomatic and after 4 days the patient was discharged and referred to a higher cardiac centre for further evaluation and management as per cardiologist advice.

Conclusion

Patients with higher degree AV block (Mobitz type 2 AV block, 3rd degree) tend to have severe damage to the conduction system and when posted for laparoscopic surgeries risk tends to increase exponentially and chances of progression to asystole, ventricular tachycardia and sudden cardiac death are higher. In this case, we emphasise that a prior prophylactic pacemaker in type 2 AV block could be a precautionary and when it is not feasible, general anaesthesia could still be safely performed in patients posted for laparoscopic surgeries with early recognition, effective communication and timely intervention.

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