

Anaesthetic Management of a Patient with Low Ejection Fraction on CIED Posted for Hernioplasty

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Abstract: Patients with decreased ejection fraction and pacemaker posted for non cardiac surgeries poses challenge for anaesthesiologists. While managing patients with implantable electronic device, specific issues related to equipment characteristics and troubleshooting should be a priority for the anaesthesiologists¹. It is vital to know the interaction with anaesthetic manoeuvres and agents to safely anaesthetise the patients with any of these implanted devices. The implanted devices treat near - fatal conditions¹. This is a case report of a 80 yr old male patient with IHD (postcabg status), CIED and ejection fraction 15% posted for unilateral inguinal hernia repair. Taking in consideration of patient's current cardiostability and age it was decided to conduct an open inguinal hernia repair with ilioinguinal and iliohypogastric nerve block. The CIED was synchronised to safe mode and using adequate amount of local anaesthetic agents and case was successfully conducted.

Keywords: CIED, Geriatric anaesthesia, Low Ejection Fraction, Inguinal Nerve block, Hernioplasty.

1. Introduction

As the number of Permanent Pacemaker Implantation (PPM) worldwide is increasing, the number of patients with Permanent Pacemaker for cardiac or non - cardiac surgeries is also increasing. Hence, it is reasonable to expect an anaesthesiologists to encounter these patients in their daily practice and to understand the characteristics, problems and the interaction between PPM device, anaesthesia procedure, and inhalational agents to safely provide anaesthesia for patients with any of these implanted devices.³

These patients are usually elderly and often present with clinical scenarios that require surgical interventions. A wide variety of anaesthetic techniques have been used for inguinal hernia repair such as local anaesthesia, field block, spinal/epidural anaesthesia and general anaesthesia².

Dr Harvey Cushing reported in the Annals of Surgery in 1900s that, "Almost all cases of hernia, with the possible exception of those in young children, could undoubtedly be subjected to the radical operation under local anaesthesia." Local Anaesthesia for inguinal hernia repair is a good alternative type of anaesthesia. It is safe, more economic and requires a shorter time in the operating room and shorter stay in the institution. Most importantly, local anaesthesia is the most suitable type of anaesthesia in elderly, fragile patients and patients with ASA II - IV scores as it avoids airway

manipulation and the unwanted effects of anaesthetic drugs used during general anaesthesia².

2. History and Investigations

80 year old male reported in hospital with chief complaints of pain in abdomen and loss of appetite, he was a known case of ischemic heart disease, coronary artery disease with left ventricular dysfunction for which he underwent permanent pacemaker insertion 10 years back since then he was on antiplatelets (tab aspirin+ clopidogrel) and direct thrombin inhibitors (dabigatran), patient has a history of exploratory laparotomy for bowel outlet obstruction and transurethral resection of prostate 15 years back under spinal anaesthesia.

Based on patients' history and Symptoms abdominal and pelvic sonography, routine blood investigations, 2 D Echocardiography, chest radiography were advised. USG was suggestive of left inguinal hernia.

Patient's 2 D Echo revealed – Global hypokinesia, all chamber dilatation, left ventricle ejection fraction 15% and Grade II left ventricle diastolic dysfunction.

Chest radiograph - mild to moderate cardiomegaly with left ventricular apical configuration, Pacemaker in situ noted.



Figure 1: ECG findings: Right ventricular hypertrophy and V3, V4. ST - T depression

Figure 2: Abnormal lab findings

Following were the abnormal findings in the blood investigations, rest routine investigations were within the normal limits.

Test	Result& unit	Reference range
Blood urea	*117 mg/dl	15 - 40 mg/dl
Blood urea nitrogen	*54 mg/dl	7 - 18 mg/dl
Serum creatinine	*1.82 mg/dl	0.6 - 1.2 mg/dl
eGFR	38/ml/min/1.73sqm	
Parathyroid hormone	147 PG/ML	9.2 - 44.6PG/ML
Prothrombin time	17.0 seconds	9.5 - 12.4 seconds
WBC	16.4x10 ³ /cumm	4 - 10x10 ³ /cumm
Platelets	1.45x10 ⁵ /cumm	1.5 - 4 x10 ⁵ /cumm

Plan of anaesthesia:

The plan of anaesthesia was decided to give hernia block with Ilio - hypogastric and ilioinguinal nerve block. In accordance to new ASRA {American Society of regional anaesthesia and pain medicine} guidelines⁴ for patient’s preoperative preparation tab aspirin was continued till the day of surgery and tab dabigatran and clopidogrel were stopped 7 days before procedure.

Cardiac drugs, crash cart including defibrillator were kept ready inside the operation theatre.

After taking consent of the patient and relatives, explaining risks, merits and demerits of the anaesthesia plan patient was taken inside the Operation theatre. All standard monitors were attached, Pacemaker was synchronized.

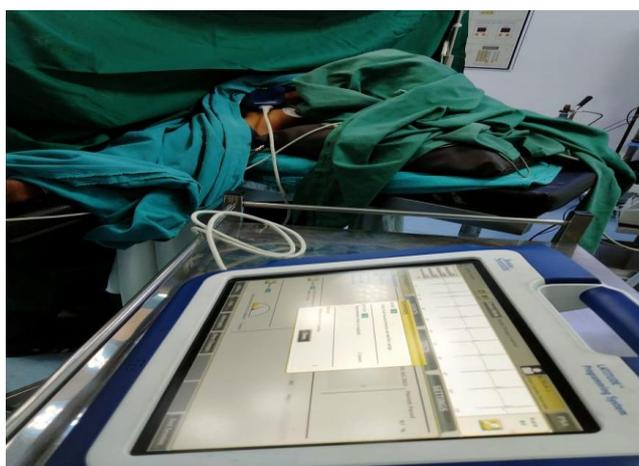


Figure 3: Pacemaker synchronization in process

After confirming the synchronization ultrasound guided ilioinguinal and iliohypogastric block was given. The patient in supine position, after preparation of the inguinal region sterile linear high frequency probe was placed between the

iliac crest and costal margin. In this location, the ilioinguinal and iliohypogastric nerves in between the transverses abdominus and internal oblique are well defined. After visualization, a 22G 1.5 - inch needle was used in out - of - plane approach to reach the nerves. After aspiration, 0.2% injection ropivacaine was injected till the nerves were surrounded on all sides by the drug (kayak sign). Then subcutaneous infiltration along the incision line was given, 15ml of 0.2% Ropivacaine was used and vitals were recorded, after 10 minutes of the block when the action was found to be adequate incision was made. After surgeon identified deep ring 2ml 0.2% ropivacaine was infiltrated there.

Inj. Fentanyl 60 mcg was used for sedation, patient remained comfortable throughout the procedure. Post - surgery pacemaker was synced to its preop status. Patient was then shifted to surgical intensive care unit for further observation where patient remained vitally stable and hence was discharged.

3. Discussion

The primary goal of the anaesthetic management of a patient with coronary artery disease for non - cardiac surgery is the avoidance of myocardial ischaemia and MI. This is by avoiding the factors which impair myocardial oxygen supply - demand balance. The factors which decrease myocardial oxygen supply are decreased coronary blood flow, tachycardia, hypotension, increased preload, hypoxia, coronary artery spasm, decreased oxygen content and its availability, anaemia, hypoxemia, etc. Factors which increase oxygen demand are tachycardia, increased wall tension, increased afterload (hypertension) and increased myocardial contractility⁵. Cardiac pacemakers are generally required in patients with symptomatic bradycardia or severe conduction block.⁸

Advancement of biomedical engineering, established safety, and efficacy of newer generation pacemakers has resulted in increasing number of patients coming for various surgical interventions with these devices *in situ*⁶. It is also to be noted that though pacemaker devices are for the betterment of physiological well being of the patient being careful with the functioning is as important as any other aspect of the procedure^{1, 10}, Electrocautery - induced pacemaker failure has also been reported during asynchronous mode leading to hemodynamic instability⁷, which increases demand for a thorough knowledge of pacemakers to the anaesthesiologists and technicians. Understanding anaesthetic care for older patients can be related to the description of fundamental alterations in physiology and changes in the pharmacokinetics and pharmacodynamics of anaesthetic

medications.⁸ Ilioinguinal and iliohypogastric blocks have been routinely used as anaesthetic technique for surgeries at the inguinal region like inguinal hernia and encysted hydrocoele and for lower abdominal surgeries. An ilioinguinal and iliohypogastric nerve block seems to be a simple and straight forward technique based on surface anatomy and visible skin landmarks⁹. Using ultrasonography Improves the accuracy and success rate of nerve block

In this case to avoid any hazardous event emphasis was given in preparation of the operation theatre, adequate temperature of the theatre, drugs and crash cart. A technician specialised in controlling the pacemaker device was kept for a standby code blue call. The main role of the procedure is the time duration, only after the assistants along with the surgeon were ready to operate, case was induced, the duration of procedure plays a key role, as it helps in avoiding blood loss, patient requires less dose of sedatives and it also leads to limited surgical manipulation that helps with post op pain management.

4. Conclusion

Such patients with high risk of on table mortality can be well managed with a detailed preop evaluation, good operation theatre preparation, anaesthetic management and well skilled surgeon.

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