



Anaesthesiology

ANAESTHETIC MANAGEMENT OF A PATIENT WITH A CARDIAC PACEMAKER FOR A NON CARDIAC SURGERY

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INTRODUCTION

A pacemaker, in simple terms is essentially a device that utilizes electrical impulses to stimulate myocardial contraction. If only life was as simple as that! Any incident that spurs a thought or idea in our mind and gets us working on it instantly would be an ideal situation.

Cardiac pacemakers have been in existence since 1958 and require expertise when it comes to handling them even in non cardiac surgeries. Research has proved that the presence of a pacemaker significantly increased the probability of a mortal event within 6 weeks postoperatively, regardless of the anesthetic technique⁽¹⁾. Keeping this in mind, we must tread cautiously while dealing with such patients.

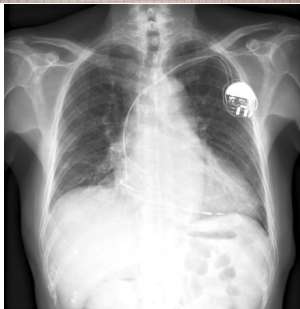
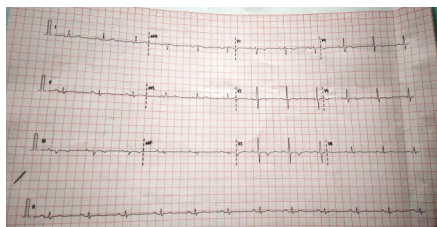
In this paper, we present the smooth anesthetic management of a 61 year old patient with a pacemaker who underwent a non cardiac surgery.

CASE DETAILS

A 61 year old male weighing 74 kgs was scheduled for Clavicle plating. He met with a RTA and sustained injury to his left clavicle. He had undergone permanent pacemaker implantation 7 months ago for symptomatic bradycardia and was taking T.Ecospirin 75mg which was withheld 5 days prior to the procedure. He was on treatment for Diabetes mellitus for 15 years with T.Metformin 500 mg twice a day. He was also being treated for systemic hypertension for 15 years with T.Concor 5mg once a day.

PRE OPERATIVE INVESTIGATIONS

A routine pre operative assessment of the patient was done. His clinical examination and investigations were within normal limits. ECG showed T wave inversion in septal leads and echocardiography was found to be normal. Chest X-ray showed pacemaker with the impulse generator. A comprehensive enquiry into the details pertaining to the pacemaker was conducted. The battery life, mode, effect of magnet, baseline rate and other details were obtained. The patient had a base line heart rate of 70/min and on AAI-DDD mode.

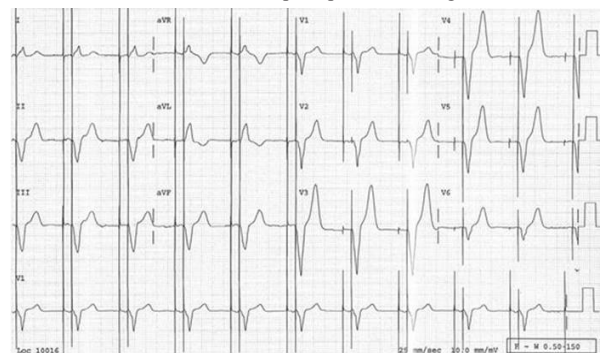


PERI OPERATIVE CARE

The day prior to surgery, patient was kept nil per oral overnight. On the day of surgery pacemaker settings was set to asynchronous mode by the appropriate personnel and the baseline heart rate was reset from 70/min to 80/min. Patient was thoroughly monitored with pulse oximetry, non invasive blood pressure, ECG recordings.

After pre-oxygenation for 3 minutes with 100% oxygen, Anaesthesia was induced with Injection Glycopyrrolate 4µg/kg, Inj. Fentanyl 2µg/kg, Inj. Thiopentone Sodium 5mg/kg, Inj. Atracurium 0.5mg/kg and intermittent positive pressure ventilation was done for 3 minutes. Patient was intubated with size 8 cuffed endotracheal tube and was mechanically ventilated. Anaesthesia was maintained with O₂ + N₂O+ Isoflurane and Inj. Atracurium. Further, under aseptic sterile precautions, brachial plexus block under an interscalene approach was performed for post operative analgesia with the use of 0.25% bupivacaine.

During intraoperative period thorough monitoring and care was taken to maintain hemodynamic stability. ECG showed pacemaker rhythm. Following conclusion of surgery patient was reversed with Inj. Glycopyrrolate 10µg/kg and Inj. Neostigmine 0.04mg/kg. Patient was extubated after having adequate tidal volume, tone, power and consciousness. Then he was shifted to I.C.U for further observation. The nerve block facilitated immediate post operative analgesia and care was taken to prevent shivering. Within 12 hours, the pacemaker mode and heart rate were reset to pre-operative settings.



DISCUSSION:

Pacemakers which form a subset of cardiac implantable electronic devices (CIEDs) are used to treat problems with rhythm and heart failure. It has several indications ranging from Symptomatic bradycardia from sinus node disease, Symptomatic bradycardia from atrioventricular (AV) node disease., Long QT syndrome, Hypertrophic obstructive cardiomyopathy (HOCM) to Dilated cardiomyopathy (DCM)

PACEMAKER CODES⁽²⁾

Position I Pacing chamber(s)	Position II Sensing chamber(s)	Position III Response(s) to sensing	Position IV Programmability	Position V Multisite pacing
O	O	O	O	O
A	A	I	R	A
V	V	T		V
D (A + V)	D (A + V)	D (T + I)		D (A + V)

O - None, A - Atrium, V - Ventricle, D - Dual, I - Inhibited, T - Triggered, R - Rate modulation

Position I – Reflects the chamber(s) paced; Position II – Reflects the chamber(s) sensed. Programmed in the 'O' mode, a device will pace automatically at a specified rate, ignoring any intrinsic rhythm; Position III – Position III refers to how the pacemaker responds to a sensed event; 'I' indicates that a sensed event inhibits the output pulse and causes the pacemaker to recycle for one or more timing cycles. 'T' indicates that an output pulse is triggered in response to a sensed event. 'D' indicates dual modes of response and is restricted to dual chamber systems. An event sensed in the atrium inhibits the atrial output but triggers a ventricular output. There is a programmable delay between the sensed atrial event and the triggered ventricular output to mimic the normal PR interval. If the ventricular lead senses a native ventricular signal during the programmed delay, it will inhibit the ventricular output. 'O' indicates no response to sensed input; it is most commonly used in conjunction with an 'O' in the second position; Position IV – The fourth position reflects rate modulation, also referred to as rate responsive or rate adaptive pacing. 'R' indicates that the pacemaker has rate modulation and incorporates a sensor to adjust its programmed paced heart rate in response to patient activity. 'O' indicates that rate modulation is either unavailable or disabled; Position V – Rarely used fifth position. Specifies only the location or absence of multisite pacing, defined as stimulation sites in both atria, both ventricles, more than one stimulation site in any single chamber or a combination of these. The most common application of multisite pacing is biventricular pacing for the management of heart failure

OVERCOMING THE CHALLENGES:

The care of patients with pacemakers requires attention to both their medical and psychologic problems. Additionally, an understanding of pulse generators and their likely idiosyncrasies in the surgical unit or procedure room is needed. Reiterating the risk, as mentioned in the introduction, several other studies highlight the risk involved. Studies indicate the risk of postoperative myocardial infarctions^[3], a small but possible threat of left ventricular failure, and death due to cardiac causes during their hospitalization.

While it is challenging to deal with the care of such patients intra operatively, we can help make the process easier with a thorough pre anesthetic work up of such patients.

Preanesthetic Pulse Generator (pacemaker, Implantable Cardioverterdefibrillator) Evaluation^[4]

- Determining the indication for and the date of initial device placement
- Identifying the number and types of leads
- Determining the last generator test date and battery status
- Obtaining a history of generator events (if any)
- Obtaining the current program information (device interrogation)
- Ensuring that generator discharges become mechanical systoles with adequate safety margins
- Ensuring that magnet detection is enabled
- Determining whether the pacing mode should be reprogrammed

Appropriate reprogramming might be the safest way to avoid intraoperative problems, especially if monopolar electro-surgery will be used.

This case report aims at highlighting the process of cautious and thorough evaluation and monitoring of a high risk patient with a pacemaker who was found to be hemodynamically stable peri operatively due to the successful anesthetic management in a non cardiac surgery.

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