



Case series on management of two patients with cardiac pacemaker in situ undergoing different surgeries under anaesthesia

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Abstract

Cardiac pacemakers and implantable cardioverter defibrillators have revolutionized the treatment of cardiac arrhythmias. These patients are always at the risk of sudden death or asystole. Due to evolution in field of medical science, now a days more and more patients are presenting with cardiac pacemakers in situ for surgery. These patients pose special challenge to anaesthesiologist while undergoing elective or emergency surgery. We are hereby reporting the successful management of two cases with cardiac pacemaker in situ who underwent different surgeries under anaesthesia.

Keywords: patients, Undergoing, surgeries, anaesthesia

Introduction

Cardiac pacemakers have changed the current prospective of the treatment of cardiac patient with arrhythmias. Recent data suggests the indications for cardiac pacing are going to expand further in upcoming years, including heart failure, sleep apnoea, disordered breathing and even in routine defibrillator implantation in patients with poor ventricular function and myocardial infarction. Thus, number of patients requiring non-cardiac surgery with implanted pacemaker will rise, resulting in more patients being encountered by anaesthesiologists (1). Pacemaker requires proper care during surgery. It is also important to understand its anaesthetic implications in view of patient management intraoperatively (2). We hereby report successful management of 2 cases with cardiac pacemaker in situ who underwent different surgeries under anaesthesia.

Case series

Case report-1

A 53-year-old male, Body Mass Index (BMI) 27, with permanent pacemaker in situ presented for haemorrhoidectomy. Patient had history of hypothyroidism since 21 years and was taking tablet Thyroxine 75µg once daily regularly. He had undergone permanent pacemaker (Medtronic Dual Chamber) implantation 2 years back for symptomatic bradycardia and syncope (after being

diagnosed with complete heart block). His all preoperative routine blood investigations and thyroid function tests were within normal limits. Airway and systemic examination was within normal limits. Electrocardiogram (ECG) of the patient showed pacemaker rhythm. Chest X-ray showed pacemaker with impulse generator. ECHO showed abnormal septal motion suggestive of LBBB with left ventricular ejection fraction 55% and mild mitral regurgitation.

Pacemaker details like when it was implanted, battery life and mode were noted. Patient's baseline heart rate was set at 70/min and was on DDD-R mode.

After taking informed written consent, on the day of surgery, pacemaker was set to asynchronous mode. ASA standard monitors in the form of ECG, pulse oximeter, non-invasive blood pressure were applied and baseline parameters noted. Under all aseptic conditions, Saddle block was given in L3-L4 space with 0.5% heavy bupivacaine 2 ml. Patient was made to sit for 15 minutes so that adequate level of anaesthesia could be achieved. Thereafter, vitals were maintained within 20% baseline throughout the procedure and care was taken to prevent shivering. A bipolar cautery was used. After completion of the procedure, patient was monitored in recovery room for vitals and pacemaker was reprogrammed to DDD-R mode post-operatively.

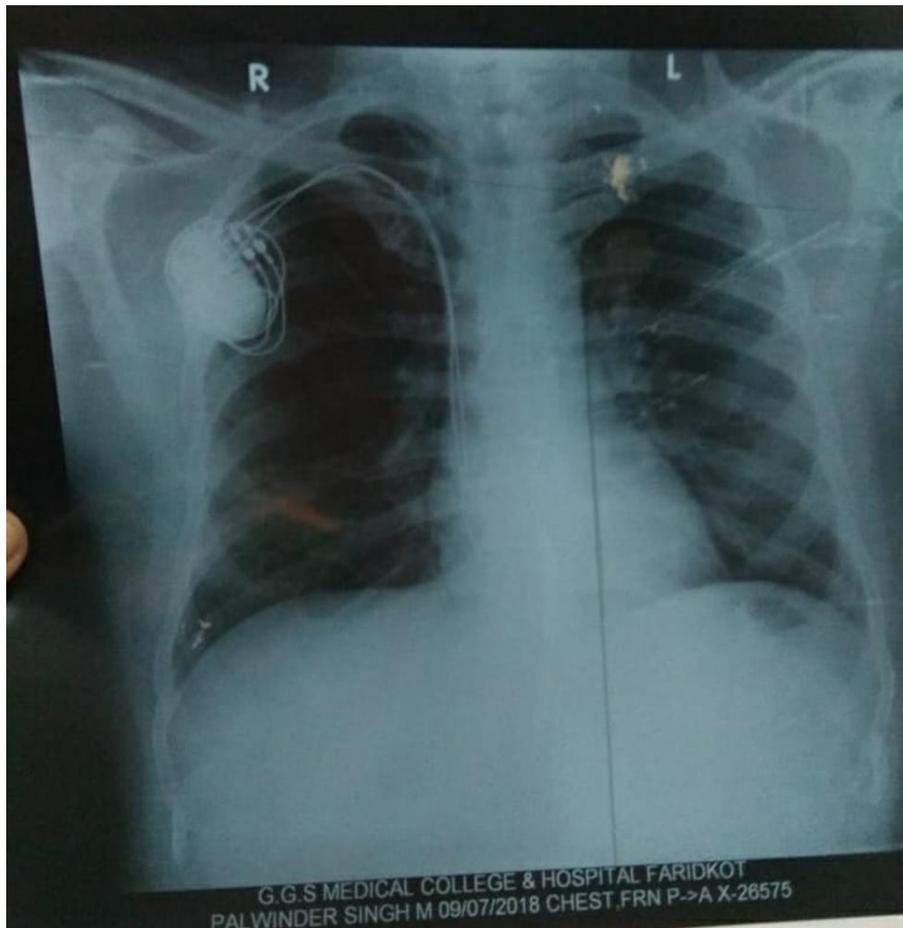


Fig 1

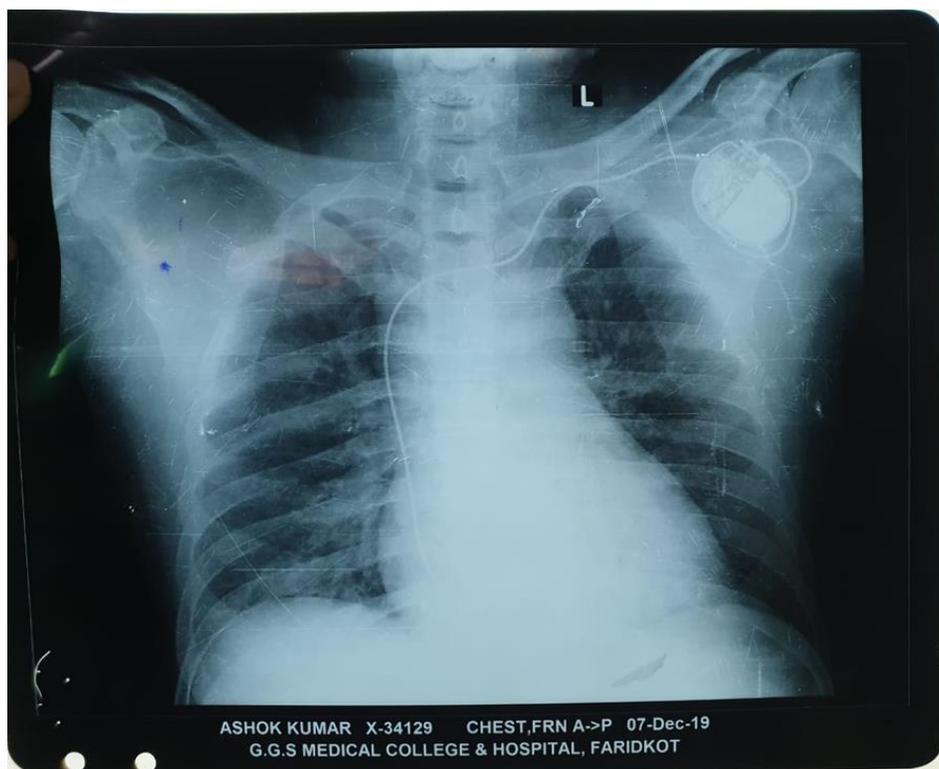


Fig 2

Case report -2

A 50 years male with proximal tibia fracture posted for tibial plating. Patient had undergone temporary pacemaker insertion 7 months back for cardiac symptoms (chest pain radiating to ipsilateral shoulder, sweating) followed by permanent pacemaker insertion (single chamber Medtronic VVIR, MRI compatible) 4 days later for complete heart block. Patient had medical history of hypertension since 5 years for which patient is on Telmisartan 20mg BD and Ecosprin AV 175/20 mg OD. His general and systemic examination, routine blood investigations were within normal limits. ECG showed pacemaker rhythm. ECHO showed 35% ejection fraction, global hypokinesia of left ventricle, mild LV systolic dysfunction, tricuspid regurgitation and atrial regurgitation. Chest X- ray showed pacemaker with impulse generator. Our patient had baseline heart rate of 82/min and on VVI-R mode. After taking informed consent for general and regional anaesthesia patient kept nil per oral for night. On day of

surgery pacemaker programming done and pacemaker set to asynchronous mode (VOO). ASA standard monitor were applied after taking the patient to operation theatre (non-invasive BP, ECG, pulse oximetry applied).

After pre-oxygenation for 3 min with 100% oxygen. Anaesthesia induced with titrated doses of fentanyl (50 µg + 50µg) and propofol (20 + 20 + 20 mg), followed by LMA insertion. Anaesthesia was maintained with oxygen + nitrous oxide + sevoflurane on spontaneous ventilation. Normotension and normocapnia maintained.

After induction under all aseptic precautions, USG guided unilateral sciatic nerve and femoral nerve block was given using 0.25% Ropivacaine. Vitals were maintained within 20% of baseline. Hypotension was treated aggressively with phenylephrine. After completion of surgery, patient was monitored in surgical ICU. Pacemakers re-programmed to VVIR mode. Patient was pain free post-operatively.

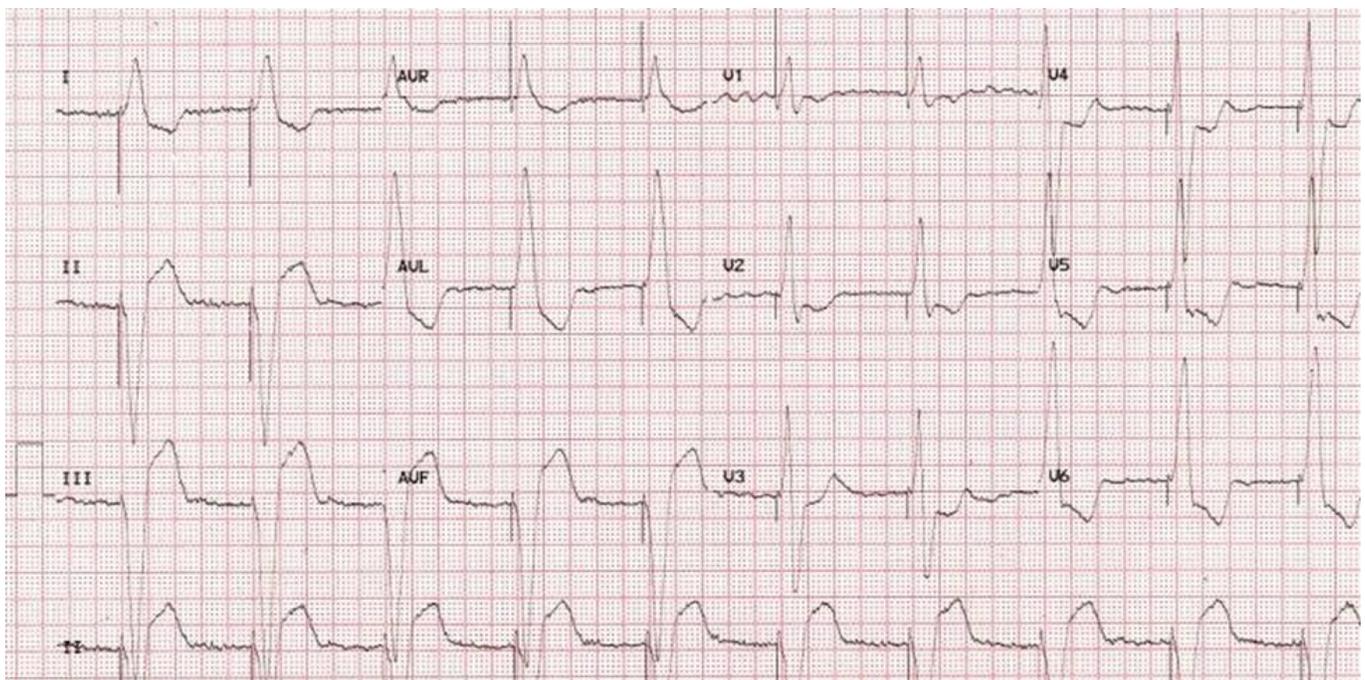


Fig 3

Discussion

Cardiac pacing is one of the most reliable documented treatment for various cardiac arrhythmias since 1950 (3). Cardiac pacemaker comprises of an impulse generator, one or more leads

and an electrode from each lead. Leads can be unipolar/ bipolar/ multipolar connected to the heart chamber through vena cava or on surface of heart epicardially.

Generic codes for pacemaker are (4):

I Pacing	II Sensing	III Response	IV Programmability	V Tachycardia
O – None A – Atrium V – Ventricle D – Dual (A + V) S – Simple (A Or V)	O – None A – Atrium V – Ventricle D – Dual (A + V) S – Simple (A Or V)	O – None I – Inhibited T – Triggered D – Dual (I + T)	O – None C – Communicating P – Simple Programmable M – Multi Programmable R – Rate Modulation	O – None P – Pacing S – Shocks D – Dual (P + S)

Fig 4

Indications for pacemaker include symptomatic sinus node disease, symptomatic AV nodal disease, long QT syndrome, hypertrophic obstructive cardiomyopathy, dilated cardiomyopathy(5).

Pre-anaesthetic management of patients with pacemaker in situ include proper evaluation and optimisation of co-existing disease. Anesthesiologists should strive to understand the basic features of the devices and be able to perform basic clinical evaluation, especially in the setting of an emergent surgery. Interrogation with programmer is most reliable method for evaluating battery life, battery impedance, lead performance and adequacy of current settings. Appropriate reprogramming is safest way to avoid intraoperative problems. Reprogramming a pacemaker to asynchronous mode at rate more rapid than patient's baseline rate ensures that no over sensing during electromagnetic interference will take place.

Intraoperative patient monitoring includes, detecting pacing discharge by ECG monitoring and ensuring conversion of this paced electrical activity to mechanical systole. Succinylcholine, ketamine, etomidate should be avoided as they cause myoclonic movements which can be mistaken as electrical signals (6). To control bleeding bipolar cautery is preferred over mono-polar cautery due to risk of interference with electrical signals (7). Hypotension and hypothermia are to be avoided. Post operatively shivering is avoided to prevent dislodgement of pacing leads.

Conclusion

Pacemaker device does require special attention during surgery and anaesthesia. Awareness about the outcomes of patient and device behaviour, is the key to safe management for an uncomplicated procedure. Careful history taking, inspection of the patient's device information card and by contacting pacing clinic that the patient attends are most important.

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