

# Intraoperative Management of Atrial Fibrillation Secondary to Hypercalcemia in a Patient with Parathyroid Adenoma

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## Abstract

**Introduction:** Atrial fibrillation is one of the most common arrhythmias occurring in 0.4-5% of adult population and usually are not associated with any cardiac disease. Atrial fibrillation may be seen preoperatively in patients posted for anesthesia.

**Case Report:** A 48 Vyshya male patient with swelling in the neck, palpitations since two years, hypercalcemia and chronic kidney disease with irregularly irregular pulse (88 per min), BP of 110/60 mmHg and respiratory rate of 20/min. Electrocardiogram showed atrial fibrillation. Echocardiography showed non obstructive hypertrophic cardiomyopathy with dilated left atrium and right atrium, moderate pulmonary artery hypertension with ejection fraction of 60%. Patient was diagnosed to have left parathyroid adenoma and was posted for parathyroidectomy. Serum parathyroid hormone levels was 756 pg/ml. Patient was on Inj. Enoxaparin 40 mg that was stopped twelve hours before day of surgery and Amiodarone 100mg and Metoprolol 25mg which was continued on day of surgery.

Continuous ECG, invasive arterial blood pressure, pulse oximetry, capnography, neuromuscular monitoring was done. After preoxygenation, induced with propofol and fentanyl. Intubation done with injection vecuronium. Anaesthesia was maintained with Isoflurane, oxygen, nitrous oxide and vecuronium. Arterial line was established. Left inferior parathyroidectomy was done in 4 hours. Inj. Amiodarone 3mg/kg diluted in 100 ml normal saline was started before skin incision. Patient was in persistent atrial fibrillation throughout the surgery, extubation was done and the patient was sent to intensive care unit.

**Conclusion:** Patients with atrial fibrillation secondary to hypercalcemia undergoing a crucial non cardiac surgery needs thorough understanding of hemodynamic changes, vigilant intraoperative monitoring with proper preoperative and intraoperative cardiac medication.

**Keywords:** Atrial fibrillation; Hypercalcemia; Parathyroid adenoma.

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## Introduction

Atrial fibrillation may be seen perioperatively in patients posted for anaesthesia. Atrial fibrillation is one of the most common arrhythmias occurring in 0.4-5% of adult population and usually are not associated with any cardiac disease. Atrial fibrillation with hemodynamic instability poses a problem during peri operative period. This should be corrected either with use of medications or cardioversion. If it is not reverted to sinus rhythm, temporary pacing maybe necessary. Our case had persistent hypercalcemia due to parathyroid adenoma and chronic kidney disease which resulted in persistent atrial fibrillation with stable hemodynamics.

## Case Report

Here we describe the anaesthetic management of a 48 Vyshya male patient who had swelling in the neck, palpitations since two years. Known case of hypercalcemia and chronic kidney disease. Physical examination revealed irregularly irregular pulse (88 per min), BP of 110/60 mmHg and respiratory rate of 20/min. Electrocardiogram showed atrial fibrillation. Echocardiography showed non obstructive hypertrophic cardiomyopathy with dilated left atrium and right atrium, moderate pulmonary artery hypertension with ejection fraction of 60%. Patient was diagnosed to have left parathyroid adenoma and was posted for parathyroidectomy.

Other systems examination were within normal limits. Airway examination revealed a Mallampatti Score of II. Serum parathyroid hormone levels was 756 pg/ml. Patient was on Inj.Enoxaparin 40 mg that was stopped twelve hours before day of surgery and Amiodarone 100mg and Metoprolol 25mg which was continued on day of surgery.

## Anaesthetic Management

Femoral central venous catheterization was done. The patient was given metoclopramide and ranitidine. Continuous ECG, invasive arterial blood pressure, pulse oximetry, capnography, neuromuscular monitoring was done. After preoxygenation with 100% O<sub>2</sub>, induced with propofol and fentanyl. Intubation done by manual in line stabilisation and facilitated with injection vecuronium. Anaesthesia was maintained with Isoflurane, oxygen, nitrous oxide and vecuronium. Arterial line was established. Anti arrhythmic drugs and external defibrillator were kept ready. Left inferior parathyroidectomy was done in 4 hours.

Inj Amiodarone 3mg/kg diluted in 100ml normal saline was started before skin incision. Patient was in persistent atrial fibrillation throughout the surgery, extubation was done and the patient was sent to intensive care unit. Serum parathyroid hormone levels was 756 pg/ml prior to surgery, 1343 pg/ml on day of surgery, 59 pg/ml 30minutes after surgery and 84pg/ml 4 days after surgery.

## Discussion

Atrial fibrillation is an arrhythmia seen commonly during the perioperative period in patients undergoing surgery. New onset atrial fibrillation is uncommon during the intraoperative period. The overall incidence of supraventricular tachycardia was found to be less than 1% and the incidence of AF and atrial flutter in SVT was 30% and 12%, out of which only 20% of arrhythmias occur intraoperatively.<sup>1</sup>

Management of AF mainly includes eliminating precipitating factors that can aggravate the condition of the patient and treatment of arrhythmia itself with pharmacological intervention. When patient is unstable, AF is treated by direct current cardioversion but pharmacological agents can also be used to obtain cardioversion. The ventricular rate in rapid and chronic AF can be controlled using pharmacological interventions. If precipitating factors are not removed or treated aggressively, arrhythmias may develop. Anticoagulation was given to reduce the risk of thromboembolism.

Diltiazem effectively controls ventricular rate but does not convert it into sinus rhythm. Better rate control has been found with digoxin compared to amiodarone but should be used cautiously because of associated hypotension. In persistent AF rate control is achieved using digoxin but it has no benefit in paroxysmal AF. Digoxin is to be supplemented with other drugs as it has slow onset for better ventricular rate control. So we decided to give Inj. Amiodarone intraoperatively to control rate and rhythm.<sup>2</sup>

There are no separate guidelines for anaesthesia in patients with primary hyperparathyroidism, but it has its own difficulties.<sup>3</sup>

Patients with primary hyperparathyroidism are usually asymptomatic. Clinical features in symptomatic patients include renal calculi, bone pains, pathological fractures, skeletal muscle weakness. Cardiac manifestations include prolonged PR interval, short QT interval and systemic hypertension. Primary hyperparathyroidism is demonstrated by persistent

hypercalcaemia in the presence of normal or elevated parathyroid hormone concentration.<sup>4</sup>

Intravenous fluids are the starting therapy for severe hypercalcaemia. Until euvoemia is reached, diuretic therapy should not be started. Loop diuretics decreases the proximal tubular reabsorption of calcium and rises the urinary calcium excretion by 200mEq/day. Thiazide diuretics should not be administered as it may increase renal tubular reabsorption of calcium. Forced diuresis is associated with cardiac decompensation, hypophosphataemia, hypokalaemia and hypomagnesaemia. Other treatment methods include calcitonin, bisphosphonates and dialysis, that are for the renal failure patients. In our case, normocalcaemia was attained with furosemide and hydration.<sup>5</sup> Malnutrition and low albumin levels are to be corrected in the preoperative period.

In intraoperative period, attention was on acid base status and transfusion of huge amounts of citrated blood. Continuous ECG monitoring in these patients is vital as hypercalcaemia can be associated with cardiac rhythm disturbances.<sup>6</sup> Accompanying skeletal muscle weakness can decrease the need of muscle relaxant. Hence neurological monitoring is mandatory by TOF monitoring and muscle relaxant given accordingly. As the patient was a vyshya ,skeletal muscle relaxant used after induction was vecuronium.

Alteration in the acid base status in the perioperative period can affect the serum calcium level and adds to the existing problem. Acidosis decreases calcium binding to albumin hence increasing the levels of ionized calcium, which can cause life threatening hypercalcaemia, and it is important to maintain normocarbia.

Our patient had no osteoporosis or pathological fractures after radiological examination. This is a point of concern while managing patients with hypercalcaemia. Positioning in the operating table hence needs particular care in such patients. Hence patient was intubated using manual inline stabilization technique .Another complication in these patients is recurrent laryngeal nerve injury. Therefore vocal cord movement needs to be assessed during extubation is needed.<sup>1</sup>

Postoperative hypoparathyroidism needs to be observed carefully to prevent a life threatening respiratory failure and associated ECG changes. Hence patient was shifted to ICU for postoperative monitoring. Serum calcium level returns to normal value by 3rd-4th day and needs to be monitored regularly postoperatively.<sup>7</sup>

## Conclusion

Patients with atrial fibrillation secondary to hypercalcaemia undergoing a crucial non cardiac surgery needs thorough understanding of hemodynamic changes, vigilant intraoperative monitoring with proper preoperative and intraoperative cardiac medication.

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