

Anaesthetic management of total thyroidectomy with multinodular goiter in atrial fibrillation- A case report

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Abstract

Multinodular goiter (MNG), a disorder of the thyroid gland often detected as mass in the neck, produces pressure symptoms compressing the airway and major vessels. It often needs surgical intervention. Atrial fibrillation (AF) is one of the common cardiac arrhythmias. Thromboembolic events and heart failure from AF lead to significant morbidity and mortality with increased cost of management. Management of patient with MNG for total thyroidectomy with chronic AF poses a challenge to anesthesiologist in management of airway and AF. This is a case of MNG with AF for total thyroidectomy managed with nasotracheal intubation and β blocker intraoperatively and antiarrhythmic drug amiodarone for AF

Keywords: amiodarone, atrial fibrillation, β blocker, multinodular goiter, nasotracheal, intubation, thyroidectomy.

Case Report

A 68-year-old female weighing 55kg came with anterior neck swelling, was diagnosed with MNG. Computed tomography (CT) neck showed grossly enlarged thyroid

gland displacing carotid vessel suggestive of MNG without evidence of retrosternal extension.

Video laryngoscopy showed normal anatomy of bilateral vocal cords, mobile on phonation. Patient was scheduled for total thyroidectomy. Patient was evaluated preoperatively as per the department protocol. She was a known case of hyperthyroidism and hypertension since 3 years and regularly on Tab. Methimazole, Tab. Propranolol, and Tab. Amlodipine.

Her laboratory reports showed deranged thyroid function test (T_3 -238, T_4 -15.4 TSH - 0.01). Preoperative Electrocardiography (ECG) showed AF with ventricular premature complex (Figure 1). She was started on Tab. Verapamil and Tab. Diltiazem.

Preoperative Echocardiography showed moderate tricuspid regurgitation /pulmonary hypertension (PASP by TR jet 67mmHg), dilated left atrium/ right atrium/ right ventricle, grade 3 mitral regurgitation with good left ventricular function.

Airway examination revealed adequate mouth opening (Mallam Patti classification II), inter-incisor distance of 3 fingers and thyromental distance of 2 and half fingers

and neck extension was restricted After shifting the patient to the operating room, peripheral oxygen saturation (SPO₂), 5 lead ECG, noninvasive blood pressure and heart rate were monitored. Nasivion drops were put to each nostril, s (2 drops). Patient was preoxygenated for 3 minutes and premedicated with Midazolam 1mg Glycopyrrolate 0.2mg, Fentanyl 50mcg i.v. She was induced with Propofol i.v. 100mg.

After confirming that mask ventilation was possible, inj. Succinylcholine 75mg i.v was administered. Nasotracheal tube (North Pole RAE) is introduced through a right nostril, laryngoscopy done through McIntosh laryngoscope and patient was intubated using 7.5mm North Pole nasal tracheal tube. Bilateral air entry confirmed with 5-point auscultation method. Inj. Cisatracurium 3mg was given to achieve muscle relaxation. Left radial arterial catheter was placed.

Ventilation was maintained with volume control mode, with tidal volume 480ml, fraction of inspired oxygen (FiO₂) 0.4, respiratory rate 14 cycles per minute, end tidal carbon dioxide (EtCO₂) monitored throughout the surgery. Maintenance of anesthesia by Sevoflurane 2%, Propofol infusion, Opioids and bolus doses of Inj. Cisatracurium Patient was positioned by placing head ring and sand bag below the shoulders to achieve adequate extension (ROSE position). Total thyroidectomy of a huge MNG was performed (Figure 2). Intraoperatively AF persisted (Figure 3) and heart rate was maintained with bolus doses of Inj. Esmolol 5mg.

After spontaneous breathing attempts patient was reversed with Inj. Neostigmine 2.5mg and Inj. Glycopyrrolate 0.5mg i.v. and trachea was extubated. Patient was shifted to intensive care unit, monitored according to department protocol.

Postoperative analgesia maintained with boluses of intramuscular Pethidine and i.v. Tramadol. In the Post-operative period patient had persistent AF treated with Amiodarone infusion 3ml/hour, later patient developed bradycardia of heart rate 20/min, patient was unresponsive to 5 doses of 0.6 mg atropine later patient had hypotension and was started on noradrenalin infusion 2ml/ hr. patient was diagnosed as complete heart block. Immediately Amiodarone infusion was suspended. Patient was taken to Cath lab and temporary pacemaker was placed later 3rd day Permanent pacemaker was placed. Patient was discharged on 7-7-2021

Discussion

Multinodular goiter (MNG) presents as a nodular swelling compressing airway and great vessels.^[1] It poses problem during intubation making it difficult requiring fibreoptic intubation.^[1] Because of its larger size neck extension will be restricted. Reducing the size of the gland by thyroxine therapy and radioiodine is ineffective.^[1] Main complications encountered will be thyroid storm ^[2], hematoma ^[2], tracheomalacia ^[2], laryngeal oedema ^[2], hypocalcemia.^[2]

Atrial fibrillation (AF) has increased risk of in hospital morbidity and mortality. Patient related risk factors being increasing age, history of AF, ischemic heart disease, cardiac valvular disease, hypertension, chronic renal failure, sepsis, thyroid disorders ^[4]. Surgery related risk factors being hypovolemia, hypoxia, anemia, pain causes increase in sympathetic activity catecholamine release increased heart rate and arrhythmogenicity.^[4]

Amiodarone is a class III antiarrhythmic drug.^[7] It results in phase III repolarization without dispersion. It is considered safe as intravenous infusion but there are instances where its infusion resulted in electrolyte abnormalities and heart blocks.^[7]

Here in this case nasal intubation using North Pole RAE tube was performed (Mallam Patti II and adequate mouth opening) but the only concern was neck extension. Patient had persistent AF treated with amiodarone infusion following which she developed complete heart block. There were no signs of ischemia and patient was hemodynamically stable following which amiodarone infusion was suspended. Laboratory investigations showed hypocalcemia which was treated with calcium supplements

Bacuzzi et al considered propylthiouracil and methimazole for preoperative optimization to euthyroid state and β blockers for controlling heart rate.^[2]

Karamchandani et al reported that patients with clinically and hemodynamically stable rate-controlled AF will not require any modification of medical management special evaluation in the perioperative period and delay of surgery.^[4]

Abhay et al reported rate control can be done by drugs which predominantly affect AV conduction such as digoxin, β blockers (propranolol, atenolol, esmolol) and non-dihydropyridine calcium channel blockers (verapamil and diltiazem)

Sequiera et al reported that an elderly woman being treated with amiodarone infusion for paroxysmal AF developed complete heart block with QT prolongation without any signs of ischemia and electrolyte disturbances and normal cardiac enzymes following which amiodarone infusion was suspended immediately and regained sinus rhythm few hours later.^[7] They also reported that the patient developed torsades de pointes followed by ventricular fibrillation which responded to DC shock.^[7]

Ozcan et al reported that patients with 2nd and/or 3rd degree AV block in the setting of thyroid dysfunction

almost always need permanent pacemaker insertion even after normalization of thyroid status. AV block associated with thyroid dysfunction needs greater attention regardless of type of the thyroid disease.^[8]

El-Harasis et al reported that AV dysfunction does persist in a substantial proportion of patients despite treatment of their underlying thyroid dysfunction in contrast to higher degree of reversibility of atrial fibrillation once the underlying hyperthyroidism is treated.^[9]

Vosnakidis et al reported that suspected mechanism of AV block with primary hyperparathyroidism (PHPT) is calcification and dysfunction of AV node due to higher level of serum calcium. AV conduction was restored postoperatively leading to diminished requirements of ventricular pacing. It included calcium level measurement in routine investigation of patients with symptomatic bradycardia.^[10]

Lu et al reported that older age was a significant predictor of symptomatic brady arrhythmia in patients with beta blockers than those without beta blockers. Majority of patients with symptomatic brady arrhythmias on beta blockers were reversible without the need of permanent pacemaker implantation.^[11]

Thota Kura et al reported that severe hypocalcemia can cause significant conduction system alteration, including complete AV block. A prolonged QTc can be seen. Temporary support with transvenous pacemaker may be needed, the conduction system abnormality is expected to resolve by treatment of underlying hypocalcemia.^[12]

Zeltser et al reported that AV block is commonly associated with therapy with verapamil, diltiazem and beta blockers but is rarely caused by it, for Majority of patients presenting with AV block discontinuation of

medications will not obviate the need for pacemaker implantation.^[13]

Conclusion

Proper preoperative preparations and optimization of physiological status of the thyroid and AF, reduces the perioperative morbidity in the patient. Airway management in case of MNG poses challenge and should be prepared for unpredicted or any unanticipated airway. Postoperative continuation of rate control therapy initiated during perioperative period is recommended for paroxysmal AF.

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Legend Figures



Figure 3

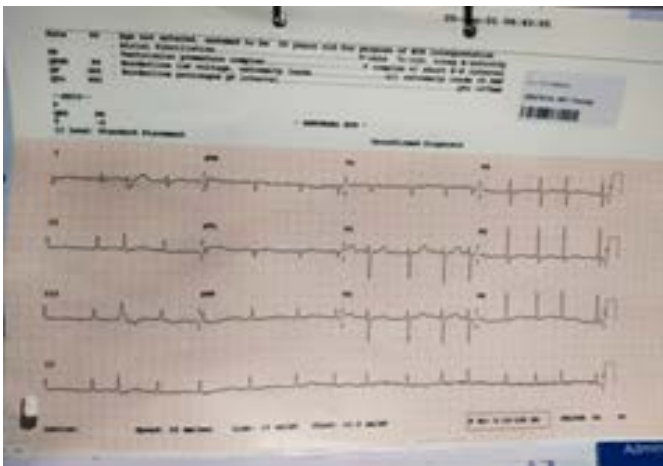


Figure 1



Figure 2