

The anaesthetic management of patient with amiodarone-induced thyrotoxicosis posted for thyroidectomy

Sir,

A 44-year-old male, case of arrhythmogenic right ventricular dysplasia was on treatment with tablet amiodarone 200 mg/day. After 2 years of treatment, he developed breathlessness, fatigability, increased appetite, tremors, and loss of weight. There was no thyroid swelling, but thyroid function tests were showing raised T_3 , T_4 and decreased thyroid stimulating hormone. Thyroid scintigraphy and MIBI scan were suggestive of destructive thyroiditis. He was diagnosed to be suffering from mixed type amiodarone-induced thyrotoxicosis (AIT) and was treated with carbimazole and prednisolone, with no response to treatment. Amiodarone was stopped, but the patient was not relieved of symptoms for 4 months and hence total thyroidectomy was planned.

Pre-operative electrocardiogram showed right bundle branch block, two-dimensional echocardiography showed left ventricular ejection fraction of 60% with right ventricular free wall thinning. Pulmonary function tests were done to rule out pulmonary toxicity. High-risk consent was taken, and the patient was pre-medicated with tablet metoprolol and injection dexamethasone. Pre-induction blood pressure was 150/94 mmHg with a pulse rate of 100/min and regular. Automated external defibrillator pads

were attached in an anterolateral position to provide emergency defibrillation without disturbing surgical field drapes.

After giving injection midazolam and fentanyl, right radial artery and left antecubital vein were cannulated under local anaesthesia. Invasive monitoring was done since the pre-induction period for early recognition of thyroid storm and cardiac failure. Cold intravenous fluids were infused and arterial blood gas monitoring was started. For pre-emptive analgesia, ultrasound-guided bilateral superficial and deep cervical plexus block was performed with 20 ml of 0.25% bupivacaine (5 ml at each point) to avoid stimulation due to thyroid handling and thus reduce requirement of analgesics and for post-operative analgesia.

Anaesthesia was induced with injection propofol and vecuronium. Proseal® laryngeal mask airway (LMA) No. 4 was inserted and anaesthesia was maintained with oxygen, nitrous oxide and isoflurane. At the end of surgery, skeletal muscle paralysis was reversed, LMA removed, and patient shifted to Intensive Care Unit. In the post-operative period, oral metoprolol was continued with tapering doses of steroids. Serum calcium and thyroid function tests were monitored.

Amiodarone is a class III antiarrhythmic drug used in the treatment of recurrent severe ventricular and supraventricular arrhythmias.^[1] Due to structural similarity with thyroid hormone, 14–18% of patients develop overt thyroid dysfunction.^[2] Depending on dietary iodine content, it can be either AIT or amiodarone induced hypothyroidism. AIT is classified as type 1 (pre-existing thyroid disease) and type 2

(destructive thyroiditis), but mixed forms frequently exist.^[2] This classification does not affect the clinical outcome, but it is required for medical treatment. Type 1 is treated with methimazole and potassium perchlorate and type 2 with glucocorticoids.^[1]

There is controversy regarding the further continuation of amiodarone. Withdrawal can cause rebound rise in tri-iodothyronine. Due to long half-life thyrotoxic symptoms persists for months.^[1] Before withdrawing amiodarone, underlying cardiac condition and availability of other antiarrhythmic agents or any cardiac intervention should be considered. Dronedarone is a congener of amiodarone. It is as potent as amiodarone and without any adverse effects.^[3] (Automatic internal cardioverter-defibrillator) is a good option, but it is costly. Therapeutic options for refractory cases of AIT include radioiodine, plasmapheresis and surgery.^[4] Radioiodine inhibits the peripheral conversion of T4 to T3, but not feasible due to destructive changes. Plasmapheresis is costly, and the effect is transient.^[5]

When a patient does not respond to medical management, total thyroidectomy is considered. Total thyroidectomy is performed under general or local anaesthesia with sedation. Local anaesthesia is good for the critically ill patient when operated by the experienced surgeon for faster recovery. Snyder *et al.* have found similar results and patient satisfaction for both types of anaesthesia.^[6] Anaesthesia management of such patient is a high-risk scenario. We have to take into consideration underlying cardiac condition, possibility of thyroid storm because of uncontrolled thyrotoxicosis and effects of amiodarone on other systems of the body. While managing this patient, we have to avoid haemodynamic stress response related to intubation, extubation and thyroid handling, maintain fluid electrolyte balance, normothermia and good pain relief.

Use of Proseal® LMA and pre-emptive analgesia with ultrasonography (USG) guided a cervical plexus block is a novel approach for managing this type of patients. Proseal® LMA is less likely to elicit a catecholaminergic stress response to laryngoscopy, intubation and extubation, but its drawback is that it can get displaced during retraction of trachea and thyroid handling. Though bilateral cervical plexus blocks are deferred, USG guided block is safe and

allows for less volume of local anaesthetic to be used. It avoids complications like a puncture of vertebral artery and deposition near the dural sleeve. For stable haemodynamics and faster recovery, cardio-stable and short-acting anaesthetic and relaxant drugs are preferred. Post-operatively, patients must be monitored because of the risk of hypothyroidism and hypocalcemia.

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