Retrosternal goitre: Anaesthetic implications and management

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Received: 13th May, 2017
Accepted: 29th December, 2017

Abstract
Large retrosternal goitre is a challenge to the anaesthesiologist and the surgeon. We describe the successful anaesthetic management of a 44 year old male patient with extensive retrosternal goitre with severe tracheal compression, operated for total thyroidectomy under general anaesthesia by combined cervical approach and sternotomy. A multidisciplinary team approach with surgical colleagues allowed successful management of the patient.

Keywords: Retrosternal goitre, Thyroidectomy, Sternotomy, Awake fibreoptic intubation.

Introduction
Huge goitres have a dramatic appearance but often present fewer problems than smaller retrosternal goitres.1 Retrosternal goitre (RSG) may be classified depending on the location: grade 1, above the aortic arch; grade 2, between the aortic arch and pericardium; and grade 3, below the right atrium.2 Retrosternal goitres usually cause compression of mediastinal structures and may also cause serious complications like cerebral hypoperfusion and axillarysubclavian vein thrombosis.3 A surgical approach is usually via a cervical incision but, depending upon intra-thoracic extension, it may necessitate manubriotomy, sternotomy or thoracotomy (3.1, 6.6 and 4%, respectively)2 which exposes the patient to the risk of pneumothorax and haemorrhage.

Anaesthesia for thyroid surgery requires an anaesthetist who is experienced in the recognition, assessment, and management of a potentially difficult, shared airway, in a patient who may also have significant co-morbidity. We describe the anaesthetic management of a massive retrosternal goitre with severe intrathoracic tracheal narrowing scheduled for total thyroidectomy.

Case Report
A 44 year old male (170 cm, 90 kg, BMI=31.1 kg/m2) having diffuse colloid goitre with retrosternal extension was posted for total thyroidectomy. Patient complained of swelling in the neck since 6-7 years not associated with symptoms or signs of mediastinal compression, hypothyroidism or hyperthyroidism. Patient was a known smoker (15-20 pack years) and known diabetic since 6 months on oral hypoglycaemic agents.

General physical examination was unremarkable. Local examination revealed a firm neck swelling measuring 12x15 cm with dilated superficial veins. No bruit was heard and lower border of swelling was not palpable. Neck movements were restricted. Patient had adequate mouth opening with MMP III. On Indirect laryngoscopy, bilateral vocal cords were mobile. Other systemic examination did not show any abnormality.

Blood count, electrocardiogram, blood sugar levels, renal/liver function test, thyroid function test, serum calcium, coagulation profile and arterial blood gas were within normal limits. Chest radiograph showed well defined lobulated soft tissue opacity with base towards mediastinum in right paratracheal location suggesting mediastinal origin. X-ray soft tissue neck lateral view revealed increased soft tissue density in posterior tracheal space at C4-C6 level causing widening and deviation of airway towards left side. CECT (Contrast enhanced computed tomography) of neck reported diffuse enlargement of thyroid gland with right lobe measuring 5.8x6.8x15.9cm with retrosternal extension measuring 7.5x7.4x5.5cm and left lobe measuring 5.5x5.6x11.6cm without retrosternal extension (Fig. 1). In addition, gland produced mass effect in the form of deformation and attenuation of tracheal lumen and posterior displacement of great vessels of neck. No mass infiltration into the airway was noted.
Preoperatively, patient was advised to stop smoking. Patient’s blood sugar were well controlled on OHA. Patient was advised to omit the morning dose of OHA on the day of surgery. Chest physiotherapy and incentive spirometry were started. Patient was started on bronchodilator therapy. He was taken up for surgery under ASA II. Patient was explained about the need for elective mechanical ventilation post surgery in view of the nature of the surgery, the risks of difficult airway and consequences of hypoxia and mediastinal mass syndrome following induction of anaesthesia. Standard NPO orders were followed. Adequate blood and blood products were ensured on the day of surgery.

Multiple perioperative challenges in the form of difficult airway, possibility of acute cardiorespiratory decompensation (anterior mediastinal syndrome), significant blood loss, postoperative pain management and rehabilitation required a comprehensive contingency plan preoperatively involving the anaesthesiologist, intensivist, ENT surgeon, CTVS surgeon. Morning blood sugar level on the day of surgery was 98 mg/dl. In the preoperative room, patient was prepared for awake nasal fibreoptic intubation.
In our patient, there was gross handling of the retrosternal region. CT scans revealed retrosternal mass suggesting tracheomalacia. In view of the anticipated blood loss and the risk of cardiovascular decompensation, invasive haemodynamic monitoring was done by placing an arterial catheter and PICC (peripherally inserted central catheter) line. In case of mediastinal mass can collapse at any stage perioperatively, so vigilant monitoring is mandatory in these patients. Availability of adequate blood and blood products should always be ensured before taking up the patient for surgery. Sternotomy is a very painful procedure which requires adequate analgesia, deeper planes of anaesthesia and airway rescue in the event of loss of airway control. Each case needs to have a tailored “plan ABC” after weighing the risks and benefits. Cook et al. showed that there is no consensus on the best ‘plan A’ to secure the airway in patients with goitre, even among international airway experts.

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In our patient, there was gross handling of the trachea intraoperatively. In addition, there was significant blood loss and there was a possibility of hypocalcaemia (following parathyroid gland excision).
In lieu of the above reasons, we planned to electively ventilate the patient for 24 hours to allow airway oedema to settle and help in smooth extubation of the patient. The thoracic epidural provided adequate pain relief perioperatively and patient could resume deep breathing exercises and incentive spirometry following extubation; decreasing the chances of postoperative pulmonary complications.

In conclusion, patients with goitre are common and, in extreme cases, may present unique set of challenges to the anaesthetist. Careful consideration of the disease process (and its secondary effects), the patient’s detailed history and examination, and relevant investigation are essential. A comprehensive preoperative planning and optimisation with a close working relationship among multidisciplinary medical teams were prerequisite for successful perioperative management and uneventful recovery of this patient. A structured in-house clinical protocol should be developed and deployed in order to ensure safe management of such patients in the future.

References