

Emergency Thyroidectomy in a Patient with Severe Upper Airway Obstruction Caused by Goiter: Case for Regional Anesthesia

Israel K. Kolawole DA, FWACS and Ganiyu A. Rahman FWACS, FICS
Ilorin, Nigeria

A case of severe airway obstruction caused by a giant malignant goiter is presented. The patient had emergency thyroidectomy under regional anesthesia (bilateral superficial cervical plexus block). The procedure was well tolerated and the intraoperative course was uneventful. The anesthetic challenges are discussed and a case is made for regional anesthesia as a safe and reliable anesthetic option for thyroidectomy in this situation.

Key words: thyroidectomy ■ emergency care ■ obstruction ■ anesthesia

INTRODUCTION

Most patients with goiter are asymptomatic. Consequently, thyroidectomy is usually a planned elective procedure. However, there are few reports of patients with goiter presenting with varying degrees of airway compromise necessitating emergency thyroidectomy.¹⁻³ This situation presents considerable challenges to anesthetists. We present the case of an elderly woman who presented with a giant malignant goiter causing severe upper airway obstruction. There was associated pulmonary metastasis. Several anesthetic options were considered. Regional anesthesia (bilateral superficial cervical plexus block) was eventually chosen. The procedure was well tolerated and the intraoperative course was uneventful.

The case is presented and the anesthetic challenges discussed. To our knowledge, this is the first time regional anesthesia would be used for emergency thyroidectomy in a patient with giant goiter causing airway obstruction.

Case Presentation

A 65-year-old woman presented at the emergency unit of the University of Ilorin Teaching Hospital, Ilorin, Nigeria, with one-week history of progressively increasing degree of breathlessness. She had a 10-year history of a progressively increasing anterior neck swelling. She had noticed a rapid increase in the size of the swelling with associated nodularity within the preceding eight months. About two weeks prior to presentation, the patient developed a productive (purulent) cough with hemoptysis. She had no previous history of any other significant illness or anesthesia. She had no allergies. Family and social history was not contributory. Physical examination revealed a chronically ill-looking patient with dyspnea, tachypnea (respiratory rate of 32 cycles/min⁻¹ and stridor. She was mildly pale, afebrile, acyanosed, anicteric and not dehydrated. Her pulse was 120beats/min⁻¹ and regular, and blood pressure was 120/90 mmHg. She had a huge firm, nontender multinodular goiter, measuring

© 2006. From the Departments of Anesthesia (Kolawole) and General Surgery (Rahman), University of Ilorin Teaching Hospital, Ilorin, Nigeria. Send correspondence and reprint requests for *J Natl Med Assoc.* 2006;98:86-89 to: Israel K. Kolawole, PO Box, 6414, Ilorin 240001, Kwara State, Nigeria; phone: 2348033781032, 234-031-220180; e-mail: ikkolawole@yahoo.com

20x14 cm, extending from the submandibular region to the suprasternal notch (Figure 1). The goiter was more pronounced on the left. The trachea was deviated to the right with the thyroid notch located about 12 cm from the midline. She had positive Berry's sign (left) and positive Kocher's sign. There were cervical, supraclavicular and bilateral axillary lymphadenopathies. The chest was clinically clear with moderate air entry bilaterally. Examinations of the other systems revealed no abnormalities. A provisional diagnosis of giant malignant goiter causing upper airway obstruction was made. The patient was admitted for investigations and scheduled for early thyroidectomy on the surgeon's next elective list, which was to be two days later. She was commenced on oxygen therapy by nasal cannula.

Hematological and serum biochemistry results were essentially normal. X-ray of the neck (Figure 2) showed a huge multinodular goiter with retrosternal extension, producing anterior displacement of the trachea and multiple narrowing in its anteroposterior diameter. There were associated multiple amorphous and cottonwool calcifications within the goiter. Chest radiograph showed widespread cannon-ball opacities in both lung fields, (Figure 3). A diagnosis of malignant goiter, causing upper airway obstruction, with associated pulmonary metastasis was made.

On the second day of admission, the patient developed severe respiratory distress. She was conscious but drowsy and restless, cyanosed, dyspneic and tachypneic (respiratory rate was 48 cycles/min⁻¹). She had audible stridor with visible use of accessory respiratory muscles. Pulse was 132 beats/min⁻¹, regular, bounding; and blood pressure was 100/60 mmHg. The patient felt more comfortable sleeping upright with the neck flexed. Oxygen therapy was continued and consultation sent to the anesthetist for review. The consultant ENT surgeon was also invited with a

view of doing an emergency tracheostomy, but this was considered technically difficult and risky because of the size of the goiter. After consultations among the general surgeon, anesthetist and the ENT surgeon, the arrangement was made to proceed with emergency debulking thyroidectomy.

Several anesthetic options were considered for thyroidectomy in this patient. Inhalational induction followed by laryngoscopy and orotracheal intubation, or blind nasal intubation, was considered too risky because of the dangers of complete airway obstruction following loss of consciousness.^{4,5} Rapid sequence induction and intubation were considered inappropriate in view of the possibility of a "can't intubate/can't ventilate" situation,⁵ and the risk of aspiration in the unfasted patient due to inability to apply cricoid pressure because of the huge goiter. Awake blind nasal intubation was considered but dropped in view of the distorted upper airway anatomy due to tracheal compression and deviation (Figure 2). Awake fiberoptic intubation followed by induction of general anesthesia, which others have found useful in similar situation,^{6,7} would have been the best option for us. Unfortunately, fiberoptic bronchoscope was not available in our hospital. This left us with the option of performing the operation under local or regional anesthesia. The anesthetic option was discussed with the surgeon and the patient was counseled appropriately.

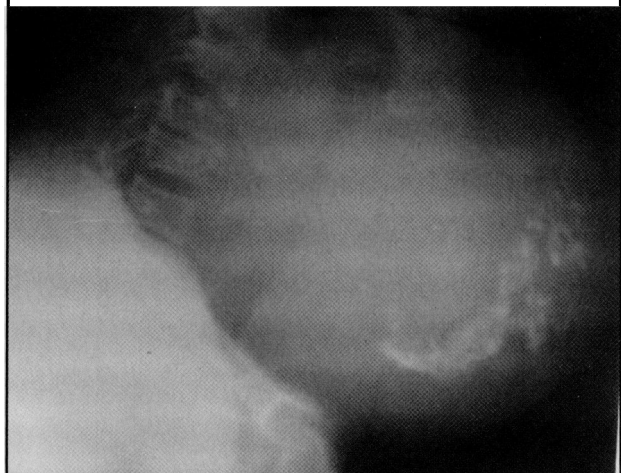
Anesthetic Management

The patient was brought to the operating room and placed in a semirecumbent position. A Nellcor Puritan Bennett multiparameter patient monitor was applied. The pulse was 120 beats/min⁻¹, blood pressure was 100/70 mmHg and peripheral arterial oxygen saturation was 92%, with the patient breathing oxygen-

Figure 1. Photograph of the patient showing goiter extending from submandibular region to suprasternal notch



Figure 2. Neck radiograph showing goiter with retrosternal extension, tracheal displacement, multiple tracheal narrowing and calcification within the thyroid gland



enriched air. A peripheral intravenous access was established and 0.9% saline commenced. This was followed by bilateral superficial plexus block performed by a consultant anesthetist (first author) as follows: the midpoint of the posterior border of the sternomastoid muscle was identified. From this point, 15 ml of 0.375% bupivacaine with 1:400,000 epinephrine was infiltrated along the posterior border of the muscle, 3 cm cephalad and caudad, to block the superficial branches of the cervical plexus. A further 3 ml of the solution was also infiltrated superficially above the muscle to block the transverse cervical nerves. The block was performed on both sides of the neck using a size 21-gauge hypodermic needle. This procedure was well tolerated by the patient. Surgical anesthesia was demonstrated in 15 minutes. The patient was positioned supine with the head supported on a head ring and elevated by about 25°. The classical thyroidectomy positioning, with the head fully extended with the aid of a shoulder pad, could not be effected because this position worsened the patient's respiratory distress.

She was given oxygen by face mask throughout the period of surgery. Hemodynamics were stable. Operative findings included: huge multinodular goiter measuring 28 x 12 cm, with areas of calcification in the left lobe and retrosternal extension. The goiter infiltrated into the surrounding tissues, including the anterior wall of the trachea rings and the left internal carotid artery. The central portion of the thyroid gland was filled with purulent foul-smelling exudates. The trachea deviated markedly to the right, forming a c-shape. The trachea was inadvertently opened into during mobilization. At this point, a transtracheal injection of 4 ml 2% plain lidocaine was performed and a size 26G tracheostomy tube was inserted. The patient was also sedated at this point with diazepam 2.5 mg and pethidine 25 mg. This was repeated as required during the procedure. However, the anesthetist maintained communication with the patient throughout the surgery, which lasted three hours and was uneventful. Anesthesia was generally effective for the procedure. The total dose of sedation was

diazepam 5 mg and pethidine 75 mg. The excised tissue weighed 850 g. The patient was observed in the recovery room for about one hour before being transferred to the intensive care unit (ICU). The hemodynamics remained stable in the ICU. Peripheral arterial oxygen saturation ranged from 94–95 on room air via tracheostomy tube. The patient was transferred to the ENT ward after 48 hours for better care of the tracheostomy. She, however, died of aspiration on the fifth postoperative day due to an incoordination in swallowing caused by associated postthyroidectomy recurrent laryngeal nerve palsy. Histology of the tumor showed a well-differentiated follicular carcinoma with areas of necrosis and calcification.

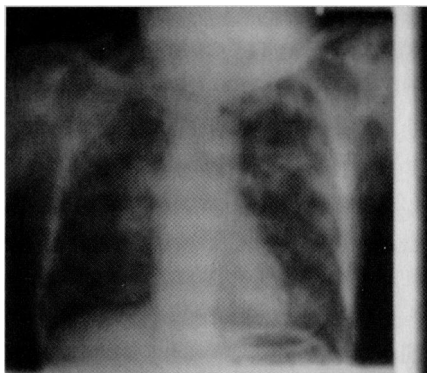
DISCUSSION

The occurrence of goiters causing airway obstruction is not new. As far back as 1821, Hedenus reported successful thyroidectomies in six patients for goiters, which he described as "suffocating."⁸ Goiter still remains an uncommon cause of upper airway obstruction even today. This is particularly so in developing countries, where goiters are often neglected for long due to ignorance and lack of ready access to affordable medical services.⁹ However, when respiratory obstructive symptom does occur, it is usually insidious, intermittent and postural in manifestation, especially in bed at night, initially.² Severe/life-threatening airway obstruction, as seen in our patient, is extremely rare.^{10,11} It is not clear why the airway obstruction in this patient suddenly worsened on admission. There was no histological evidence of hemorrhage into the thyroid gland. It could, however, be due to upper airway infection, resulting in edema and retention of secretions.²

Surgery—emergency or early—is always indicated in cases of severe airway obstruction caused by goiter.¹³ However, upper airway obstruction is a medical emergency that requires urgent management. The immediate priority in this patient was to secure a patent airway to allow adequate ventilation and oxygenation. An emergency awake tracheostomy under local anesthesia was considered. This was, however, ruled out because the thyroid gland completely obscured the thyroid cartilages, obliterating all landmarks. An isthmectomy under local anesthetic infiltration followed by tracheostomy was also considered but the isthmus was involved in the large goiter. Tracheostomy carries a high risk of heavy bleeding in a patient with large goiter.¹ An emergency debulking thyroidectomy was therefore considered the most appropriate option to relief the obstruction.

Patients with compromised airway present considerable challenges to anesthetists. Many authors have emphasized the dangers of inducing general anesthesia in patients with airway obstruction, with-

Figure 3. Chest radiograph showing metastasis in both lung fields



out prior securement of a reliable airway access.^{4,5} This is because unexpected and often total airway obstruction may occur when muscle tone decreases and voluntary control of airway is lost following loss of consciousness.^{5,12} Therefore, preservation of consciousness until the airway is secured was considered of critical importance in this patient. Consequently, in the absence of facilities for an awake fiberoptic intubation, local or regional anaesthesia became the only available option to us.

Local or regional anaesthesia has long been recognized as a reliable alternative to general anaesthesia for thyroidectomy.^{13,14} Compared to local infiltration, cervical plexus block removes the need for repeated local infiltration, its attendant inconveniences to the surgeon and the patient and the possible risk of giving overdose of the local anaesthetic agent.

Earlier, we had reported the successful use of bilateral superficial cervical plexus block for thyroidectomy in a series of 17 patients in our center.¹⁵ This technique is easier and safer than the combined superficial and deep cervical plexus block, which has been used by some other authors.¹⁴ Superficial cervical plexus block alone is adequate for thyroidectomy since only the superficial branches are sensory and the remainder of the cervical plexus is motor. The block provides complete sensory anaesthesia of C2–C4 dermatomes, which supply the skin over the neck from the mandible to the clavicle anteriorly and laterally. This takes care of the pain of skin incision and the necessary tissue dissection involved in thyroidectomy.

The use of regional anaesthesia has a number of advantages in this patient compared with any form of awake intubation technique. The technique avoided spraying the airway with local anaesthetic or making contact with the vocal cords, which may be a hazardous maneuver that could precipitate total obstruction in a patient with severe stridor. Furthermore, no sedation was employed and, thus, the risk of aspiration in an unfasted patient was minimized. The patient remained conscious, retained spontaneous respiratory effort and was able to control and protect her airway. Careful tissue handling, dissection and retraction were employed to minimize the airway irritation and discomfort that may result from surgical manipulation of the thyroid gland. We could not employ our usual technique of transtracheal injection of local anaesthetic to obtund the airway reactivity at the beginning of the operation in this patient because of technical difficulty due to the size of the goiter. This was, however, done as soon as the trachea was entered into before the insertion of the tracheostomy tube. An alternative method for producing anaesthesia of the upper airway is to nebulize 3–4 ml of lignocaine 4% through an oxygen face

mask. However, this would be unwise in an unfasted patient with a high risk of pulmonary aspiration.

Varying degrees of postural aches and pains are not uncommon during surgical procedures under regional anaesthesia.¹⁵ This is particularly the case in thyroidectomy because of the prolonged immobility on the hard operating table and the classical thyroidectomy position, which requires significant neck extension to guarantee optimal surgical access. The analgesic effect of the pethidine used for sedation was relied upon to relieve postural aches and pains in our patient. Adequate padding of all bony prominence was also ensured to minimize postural discomfort.

The technique of combining local or regional anaesthesia with sedation, as used in this patient, is known as sedoanalgesia or conscious sedation.¹⁵ It is a form of monitored anaesthesia care, which is simple, safe and effective.¹⁵

Finally, there are no universal recipes for the management of an obstructed airway. Anaesthetic management of a patient with large goiter causing severe airway obstruction can be extremely challenging. We have successfully demonstrated that superficial cervical plexus block is well suited for emergency thyroidectomy in this patient. Compared to techniques that involve induction of general anaesthesia, the preservation of consciousness it offered is a desirable end in itself.

REFERENCES

1. Ayaba H, Kawahara K, Tagawa Y, et al. Upper airway obstruction from a benign goitre. *Japanese Journal of Surgery*. 1992;23:88-90.
2. Raftos JR, Ethell AT. Goitre causing acute respiratory arrest. *Australian and New Zealand Journal of Surgery*. 1996;66:331-332.
3. Gittoes NJL, Miller MR, Daykin J, et al. Upper airway obstruction in 153 consecutive patients presenting with thyroid enlargement. *BMJ*. 1996; 312:484.
4. Buggy D, Schnittger T, Fox L. Airway management after severe facial contractures. *British Journal of Hospital Medicine*. 1994;52:367.
5. Goh MH, Liu XY, Goh YS. Anterior mediastinal masses: an anaesthetic challenge (case report). *Anaesthesia*. 1999;54:670-674.
6. Flewer BMF, Torrance JM. Anaesthesia for a patient with a mediastinal mass presenting with acute stridor. *Anaesth Intensive Care*. 1996;24:605-608.
7. Lacoste L, Gineste D, Karayan J, et al. Airway complications in thyroid surgery. *Ann Otol Rhinol Laryngol*. 1993;102:441-446.
8. Farling PA. Thyroid disease. *Br J Anaesth*. 2000;15-28.
9. Olurin ED. Surgical techniques in giant goiters. *Br J Surg*. 1971;58:739-746.
10. Torrest A, Arroyo J, Kostanos N, et al. Acute respiratory failure and tracheal obstruction in patients with intrathoracic goitre. *Crit Care Med*. 1983; 11:265-266.
11. Chiriboga M, Oropello J, Padmanabhan K, et al. Case report. Advanced upper airway obstruction caused by cervical goitre. *American Journal of Medical Science*. 1989;297:176-177.
12. Northrip DR, Bohman BK, Tsueda K. Total airway occlusion and superior vena cava syndrome in a child with an anterior mediastinal tumour. *Anaesthesia and Analgesia*. 1986;65:1079-1082.
13. Ajao OG. Thyroidectomy under local anaesthesia. *Trop Doct*. 1979; 9:73-75.
14. Saxe AW, Brown E, Hamburgery SW. Thyroid and parathyroid surgery performed with patients under regional anaesthesia. *Surgery*. 1988; 103:415-420.
15. Kolawole IK, Rahman GA. Cervical plexus block for thyroidectomy. *South African Journal of Anaesthesia and Analgesia*. 2003;9:10-17. ■