

Cervical Epidural Anesthesia for Thyroidectomy in a Patient with a Potential Difficult and Compromised Airway

A. Verma¹, A. O. Amata², S. Amir³

Abstract

We report a case of a 45-year-old man with a large thyroid swelling with the potential to cause a difficult and compromised airway. Cervical epidural anesthesia was planned and successfully performed to avoid difficult airway management. We conclude that cervical epidural anesthesia can be used for thyroidectomy in a patient with potential difficult and compromised airway.

Keywords: Cervical epidural, thyroidectomy.

Introduction

Management of the difficult airway continues to be a challenge to the anesthesia care provider [1, 2]. In spite of the availability of several authoritative guidelines and protocols on airway management [3, 4], the management of each patient is unique and is often dependent on the skills and experience of the provider as well as the availability of appropriate equipment and armamentarium. The presence of a goiter is often associated with the risk of a difficult airway [5, 6, 7, 8, 9]. We report a case of a patient who had a large multinodular goiter with severe lateral compression of the trachea and retrosternal extension and had thyroidectomy done with cervical epidural anesthesia (CEA).

Case Report

A 45-year-old, 95 kg man was seen in the preanesthetic clinic for a proposed thyroidectomy. He had a 5-year history of neck swelling that had rapidly increased in size in the past 4 months. He was now experiencing dysphagia to solid food, and dyspnea when lying in the right lateral position. He had no other significant medical or social history and was of medium stature. On examination, a large anterior

neck mass measuring 6 cm × 6 cm which occupied mainly the left side of the neck and some encroachment on the right side was noted. The mass was firm, nodular, and non-mobile and it was not possible to palpate below it. X-ray of the thoracic inlet showed severe lateral compression of the trachea with deviation to the right side and normal anteroposterior diameter. Increased depth of retropharyngeal space was documented (Fig. 1, 2). Indirect laryngoscopy demonstrated swelling in the left piriformis fossa with distortion and rightward rotation of the laryngeal inlet and poor visualization of the vocal cords. Computed tomography (CT) scan revealed multinodular goiter with severe lateral compressions of the airway in the subglottic region and retrosternal extension (Fig. 3). Airway examination showed normal dentition, reduced mouth opening (2 finger breaths), and a Mallampati score of 4. Thyromental distance could not be adequately assessed because of the mass and there was limited neck extension. ASA was 1. The clinical cardiovascular assessment was unremarkable and air entry bilaterally into the lungs was normal. The laboratory investigations indicated normal complete blood count, electrocardiogram, electrolytes, thyroid function tests, and renal

function tests. Based on our assessment, we anticipated a difficult airway management in this patient. Pre-operative tracheostomy under local anesthesia was an option, but this was expected to be difficult as the thyroid mass was covering most of the trachea and there was retrosternal extension of the goiter. The ENT surgeon expressed his reservation and hesitancy to effectively perform an emergency tracheostomy in the event that a “cannot intubate and cannot ventilate” scenario arose if general anesthesia was given. Unavailability of fine needle aspiration cytology did not allow pre-operative histopathologic diagnosis, but clinical information suggested malignancy. Fiber-optic bronchoscopy was not available even in the nearby hospitals. A decision to perform the surgery under CEA was taken. Fluoroscopy-guided placement of cervical epidural catheter was performed through C5-C6 intervertebral space and the epidural space was identified using radio-opaque contrast (Fig. 4). Epidural catheter was threaded for 3 cm in the epidural space. After a test dose of 3 ml of 2% lidocaine, 10 ml of lidocaine 2% was given through the epidural catheter. After confirmation of anesthesia of the neck, surgery commenced. On further dissection of the mass retrosternally, it was found to adhere to the upper esophagus and manipulation at this part caused significant pain which did not improve with epidural anesthetic bolus dose. Since the subglottic airway was free of compression now, gentle laryngoscopy was done under topical anesthesia which demonstrated the rightward rotation of laryngeal inlet. A minimal pull of the mass corrected the rotation. Endotracheal

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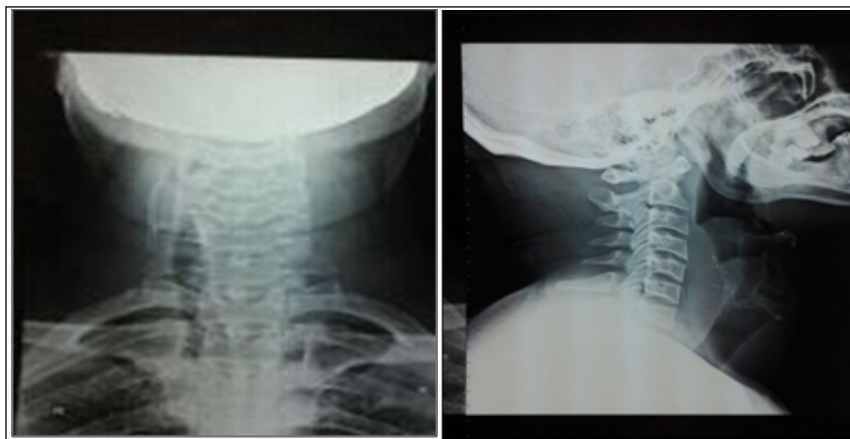


Figure 1: Thoracic inlet X-ray showing deviation and constriction of the trachea. **Figure 2:** Thoracic inlet X-ray lateral view.

intubation was then performed using propofol and succinylcholine. The rest of the surgery was then performed under general endotracheal anesthesia. After confirming the presence of leak on cuff deflation, endotracheal extubation was performed on the operation table postoperatively. The patient was transferred to the post-operative recovery unit and discharged from the hospital 2 days later. Histopathology of the mass revealed papillary carcinoma of the thyroid.

Discussion

Anesthesia for thyroid surgery can be done with general or regional techniques [6]. General anesthesia has been the most commonly used method because of its efficacy and safety [7]. More recently, however, there has been some renewed interest in the use of regional anesthesia for various reasons and in selected patients. The benefits of regional anesthesia include the avoidance of the risks of airway

instrumentation, of a difficult or failed intubation, and of general anesthesia [6, 8, 9, 10]; earlier warning by an awake patient in case of risk of trauma or damage to the recurrent laryngeal nerve [8, 9, 10, 11]; a shorter recovery period; significantly reduced costs [8, 9, 10]; better post-operative analgesia; and greater safety in patients with significant comorbidities and those who are poorly optimized preoperatively [8, 11, 12]. Regional anesthetic techniques that can be used for thyroidectomy include local infiltration, field block, superficial and/or deep cervical plexus block, and cervical epidural analgesia [6]. Thyroid gland swelling, especially when associated with compression and/or deviation of the trachea, is usually considered a risk factor for a difficult endotracheal intubation and airway compromise. This was because of the presence of a large multinodular goiter with retrosternal extension, rotated edematous laryngeal inlet, and severe lateral compression of the trachea in the subglottic region. In addition, the vocal cords could not be well visualized on indirect laryngoscopy. When planning the

anesthesia for the patient, there were a number of options we considered. These included elective tracheostomy under local anesthesia, inhalational anesthetic induction and tracheal intubation, retrograde endotracheal intubation, awake fiber-optic intubation, and local/regional anesthesia. Pre-operative elective tracheostomy under local anesthesia was not considered a suitable option by the ENT surgeon because of the large goiter covering most of the neck with retrosternal extension, the obscured or indistinct anatomical landmarks, and the distorted anatomy. Previous surveys have indicated that tracheostomy in such patients is usually technically very problematic and occasionally impossible [9]. The ENT surgeon's uncertainty about his ability to effectively perform an emergency tracheostomy in the event of a "can't intubate, can't ventilate" scenario made the option of general anesthesia and intubation not feasible. Retrograde passage of a catheter through the cricothyroid membrane and passage of a tracheal tube over the catheter from above [13] was also discarded because of the presence of the goiter in the lower neck and the fact that distal "blind" passage of the endotracheal tube past the subglottic compression could not be guaranteed, and airway trauma would worsen the situation. It was, therefore, decided that an awake anesthetic technique would be preferred in this patient. Awake fiber-optic intubation would seem the optimum method. Fiber-optic intubation has been used to successfully intubate the tracheas of patients with large goiters and its use is now considered routine whenever there is any suspicion of a difficult airway [14, 15]. A fiber-optic bronchoscope was not available to us during this period. Even if it was available, its use in such cases is not risk free. There have been several reports of inability to visualize the vocal cords, trauma, bleeding, laryngospasm, inability to proceed past very severe airway narrowing, and complete airway obstruction necessitating emergency surgical airway [16, 17]. Our choice was now down to a regional anesthetic technique. Superficial and/or deep cervical plexus blocks have been used extensively for thyroidectomy, carotid artery surgery, and other neck surgeries [6, 8, 11]. The superficial cervical plexus block provides sensory block of the neck, upper shoulder, and occipital scalp region while the deep cervical block produces both

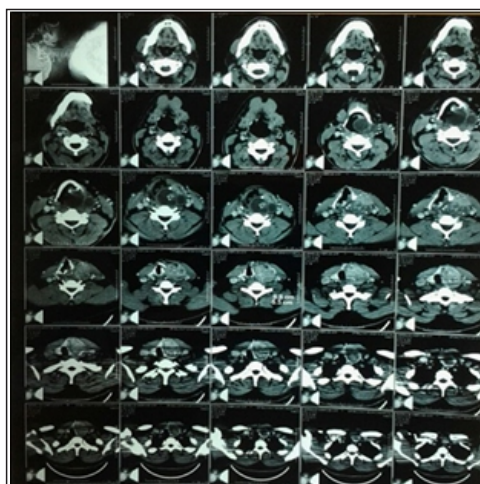


Figure 3: Computed tomography scan showing tracheal deviation, compression, and retrosternal extension.

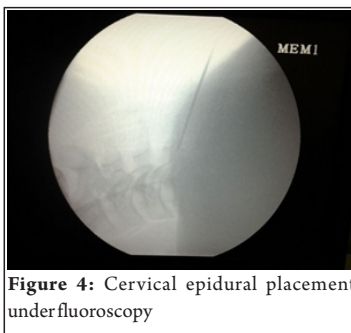


Figure 4: Cervical epidural placement under fluoroscopy

sensory and motor block of the same area. The superficial block is simple to perform and has fewer risks than the deep cervical plexus block. It has been shown that bilateral superficial plexus block alone is sufficient for thyroidectomy [8, 11]. Two major studies [18, 19] have shown that regional anesthesia using bilateral superficial cervical plexus block for thyroidectomy produced similar clinical outcomes and high patient satisfaction compared with general anesthesia and in addition the patients who had regional anesthesia had faster post-operative recoveries and returned to work earlier than their general anesthesia counterparts. Interestingly, the regional technique was more likely to be used in patients who were considered high risk for general anesthesia because of cardiac or pulmonary comorbidities [10, 12]. We did not have the required experience to confidently perform the surgery under

cervical plexus block or local field block anesthesia. Having used cervical epidural commonly for pain management, we choose to use CEA because of our familiarity with the technique. Cervical epidural anesthesia has been used for thyroidectomy, carotid artery surgery, and other neck surgeries [10, 20, 21, 22]. Some of the advantages of CEA over the other forms of regional anesthesia include the ability to prolong anesthesia and provide excellent post-operative analgesia because of the placement of a catheter, and the sympathetic blockade produced reduces blood loss. The pain the patient experienced toward the end of the surgery was because of the unusual attachment of the mass to the esophagus that has a nervous supply incompletely blocked by the CEA. Studies have shown that CEA is safe and effective for thyroid surgery [10, 20]. However, like many other highly technical and invasive procedures, it has potential major risks and

complications if not optimally performed and its use should, therefore, be reserved for those with significant experience.

In conclusion, we have shown that CEA is an alternative to general anesthesia and should be considered as an option in a patient with a difficult and compromised airway if fiber-optic bronchoscopy is not available for airway management.

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