Case Report

Successful Airway Management on Severe Tracheal Obstruction by Thyroid Cancer - A Case Report

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Tracheal obstruction makes intubation difficult and dangerous, especially when the residual lumen is smaller than the diameter of the endotracheal tube. We report a case with severe upper airway compression caused by thyroid cancer scheduled for left thyroidectomy and tracheostomy. A 78-year-old woman suffered from mild exertional dyspnea with foreign body sensation in the throat. Her bilateral breath sounds were clear, without wheezing or stridor. Chest radiography showed tracheal deviation and narrowing. Chest computerized tomography revealed tracheal compression down to 5 mm in diameter at its narrowest point. The compressed airway, which remained flexible, was managed by fiberoptic nasal intubation that allowed immediate induction of anesthesia. After tracheostomy at the end of thyroid surgery, the patient was transferred to the intensive care unit. Awake fiberoptic intubation is suggested for patients with anticipated difficult airways. Unlike intratracheal obstruction, larger size endotracheal tubes could be inserted beyond the site of compression. All anesthetic plans should be carefully made according to the cause of compression, the site of compression, and the patient's clinical symptoms.

Key words: difficult intubation, thyroid cancer, tracheal obstruction

Introduction

Tracheal obstruction with external compression such as one from a thyroid tumor is not uncommon. The symptoms of obstruction depend on its severity. Before operation, the etiology and severity of the lesion should be carefully identified. Preoperative examination should include pulmonary function and arterial blood gas analysis.[1] We successfully managed a patient with severeairway compression caused by thyroid cancer.

Case Report

A 78-year-old woman (158 cm, 74 kg) with a history of hypertension, diabetes, and

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tuberculosis, suffered from mild exertional dyspnea and a lump sensation in the throat. Her bilateral breath sounds were clear without wheezing or stridor. A chest radiograph revealed multiple patchy opacities over both lungs, and a 1.7 cm calcified opacity superimposed over the upper mediastinum (Fig. 1). Chest computerized tomography revealed a bulging mass over the left lobe of the thyroid up to 5.1 cm in diameter with coarse calcification, and compression of the trachea down to 5.0 mm in diameter at its narrowest point (Fig. 2). Pulmonary function test gave normal results (forced vital capacity, FVC 89% predicted, forced expiratory volume, FEV_1 99% predicted, and FEV1/FVC 82%). Arterial blood gas showed pH 7.44, a partial pressure of O_2 of 66 mmHg, a partial pressure of CO_2 of 36 mmHg, and a base excess of 0.2. The patient was scheduled for left thyroidectomy and tracheostomy.

Before anesthesia, a fiberoptic bronchoscope and laryngeal mask airway were prepared. Endotracheal tubes sized from 4.5 to 6.5 were made available for use. We also prepared a chest surgeon for tracheostomy in an emergency situation. Fiberoptic nasal intubation with 6# nasal endotracheal tube was planned for the restricted airway. Standard monitors including electrocardiography, noninvasive blood pressure monitor, and pulse oximetry were established. In the operation room, her heart rate was 70 beats per minute, blood pressure was 204/89 mmHg, and oxygen saturation was 100% under room air. After preoxygenation with 100% oxygen at 6L/minute for 6 minutes, 50 mcg dose of fentanyl was given. A nasal topical anesthesia was applied

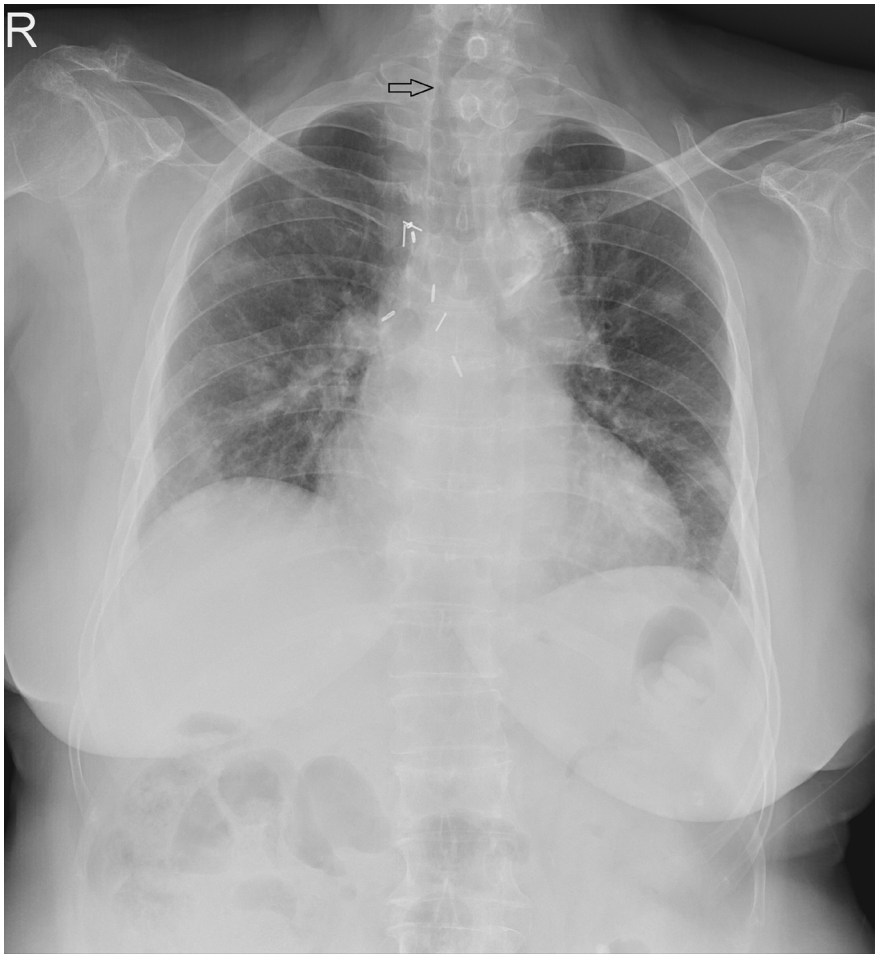

Fig. 1 The arrow indicates the tracheal deviation and narrowing

using lignocaine gel, nebulised 2% lidocaine was sprayed directly on the throat, and 2% lidocaine was then further sprayed directly on the vocal cord during fiberoptic bronchoscopy. When the fiberoptic bronchoscope passed through the vocal cord, the tracheal was observed to be intact but narrowed by an external compression. Because the tracheal rings were flexible, the fiberoptic bronchoscope and endotracheal tube could pass through the trachea without resistance. Once the airway was secured, we immediately completed anesthesia induction with 100 mg of propofol and 40 mg of rocuronium. Tracheostomy was performed at the end of the surgery. The patient was transferred to the intensive care unit after the operation.

Discussion

Airway obstruction can present with different symptoms and signs that depend on the location, size, and etiology of the obstruction. There are different respiratory physiologies for intrathoracic and extrathoracic airway obstructions. Extrathoracic lesions become exacerbated during expiration and relieved during inspiration on spontaneous breathing.[2] In the case of extrathoracic airway obstruction, the etiology should be identified, including external tumor compression and intratracheal lesion such as scar formation or granulation tissue formation resulting from trauma or inflammation. It has been reported that intratracheal lesion or scar formation may only allow an endotracheal tube that is smaller than the internal diameter of the residual lumen to pass through the obstruction site.[1]

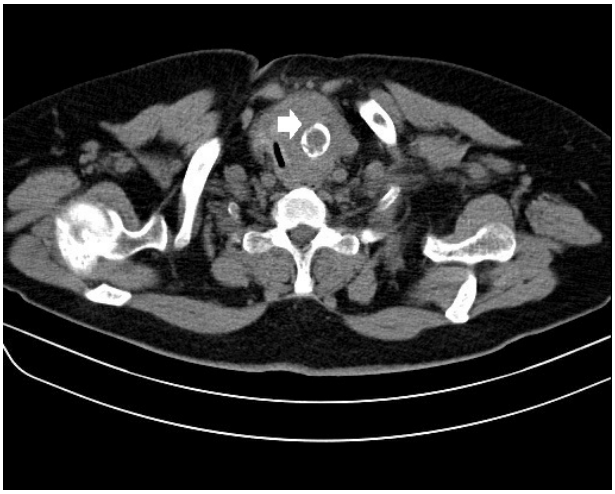

Fig. 2 Thyroid cancer with central calcification (arrow). Note compression of tracheal lumen to only 5 mm in diameter.

The patient had mild dyspnea and a lump sensation in the throat without wheezing or stridor from auscultation. This patient also had normal results from a pulmonary function test and did not display CO_2 retention on artery blood gas analysis. These results might indicate that the residual lumen could allow an endotracheal tube with diameter larger than that of the internal diameter of the residual lumen to pass through.

In this case, it was difficult to perform a tracheostomy because of the location of the calcified thyroid. For safety considerations, we chose awake fiberoptic intubation, although we predicted that the larger endotracheal tube could pass through the stenosis.

Because of the location of the thyroid tumor, both transtracheal blockade and superior laryngeal nerve blockade could not be performed precisely. Instead, we applied nasal topical anesthesia by using lignocaine gel[3] and 2% lidocaine spray on the vocal cord with the fiberoptic bronchoscope to achieve local anesthesia.[4]

Awake fiberoptic intubation is a standard procedure for an anticipated problematic airway. To maintain her airway patency and respiratory function, we did not paralyze or sedate the patient. Before the procedure, it is important to have an available chest surgeon at the scene who could perform an emergent tracheostomy under local anesthesia to establish a secure airway in case of intubation failure.

In conclusion, awake fiberoptic intubation is suggested for anticipated problematic airways.

References

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