

A RARE CAUSE OF BILATERAL SIMULTANEOUS VOCAL CORD PALSY

VONG KHIM SOON, IRFAN MOHAMAD

Abstract

Vocal cord (VC) palsy is a rare clinical condition. One of the causes is oesophageal cancer. It is commonly unilateral in nature and affects more on the left. A non-traumatic non-iatrogenic bilateral VC palsy is an extremely rare encounter. We report a case of bilateral VC palsy secondary to an advanced oesophageal squamous cell carcinoma.

Key Words : *vocal cord palsy; bilateral; recurrent laryngeal nerve; oesophageal cancer*

Received: 30 July 2015

Accepted: 3 November 2015

Introduction

The common causes of unilateral vocal cord (VC) palsy are penetrating neck trauma, invasion by malignant lesions, iatrogenic injuries such as in thyroidectomy, carotid surgery or mediastinal surgery. While bilateral nerves can be affected in those conditions, a simultaneous involvement of both sides of recurrent laryngeal nerve (RLN) causing bilateral VC palsy at presentation is an extremely rare encounter. For bilateral cases, the common causes include surgical trauma, malignancies, endotracheal intubation, neurological diseases, and idiopathy. For malignancy, one of the rare causes is oesophageal cancer that usually causes unilateral VC palsy. Oesophageal cancer commonly presents with dysphagia and weight loss, sometimes with bleeding, epigastric pain, bone pain, hoarseness and persistent cough. However, very rarely oesophageal cancer may cause bilateral invasions.

Bilateral VC palsy is a complication that happened in 17% of malignancies (1). It occurs if the tumour infiltrated the RLN bilaterally. It is more common to occur on either side of the VC, which is only one RLN affected. The symptom of bilateral VC palsy includes voice change (hoarseness), choking sensation, stridor and airway compromised, and can be complicated by aspiration pneumonia or foreign body inhalation.

Case Summary

A 58-year-old Chinese gentleman presented to surgical team with dysphagia and odynophagia for 6 months duration. The symptoms gradually worsened until he was unable to tolerate solid and semisolid diet orally. There was no stridor or hoarseness, no shortness of breath, no neck nodes palpable. Subsequently he was admitted to surgical ward for

hydration with intravenous fluid and further staging work up. Oesophagogastroduodenoscopy was performed and biopsies of mass in the upper oesophagus were obtained. Computed Tomography (CT) of neck, thorax and abdomen showed heterogenous enhancing prevertebral soft tissue mass at level C6 until T6 level, mass size 3.7cm (AP) x 6.0cm (W) x 14.7cm (H). The mass was arising from cervical and thoracic part of oesophagus. It causes mass effect to the trachea, and the trachea was pushed anteriorly. The left internal jugular vein and left common carotid artery were displaced laterally. Subcentimeter cervical and right supraclavicular lymph nodes were seen (Figure 1 & 2). A laryngoscopy showed bilateral vocal cords were mobile and symmetry, equal plane, and absent of any phonation gap indicating a good functioning vocal cords.

The patient presented again one month later with hoarseness however no signs of airway compromised on the same day of follow up in our clinic. A laryngoscopy showed bilateral vocal cords in paramedian position (Figure 3).

Patient underwent a difficult elective tracheostomy and bronchoscopy under general anaesthesia via oral intubation for airway protection due to bilateral VC palsy secondary to advanced oesophageal cancer. Intraoperatively a bronchoscopy showed that the infiltration of tumour tissue to the posterolateral part of trachea intraluminally at level 1 cm above the carina. Due to the infiltration, it made the placement of tracheostomy tube difficult, successful placement was obtained by using adjustable flanged tracheostomy tube, which can bypass the infiltrative mass and stent it on the tracheal wall. This is stage III (T4N0Mx) (2) and it is a sign of unresectability

Address of Correspondence: Vong Khim Soon, Irfan Mohamad, ORL-HNS Department, University Sains Malaysia, 16150 Kota Bharu, Kelantan, Malaysia

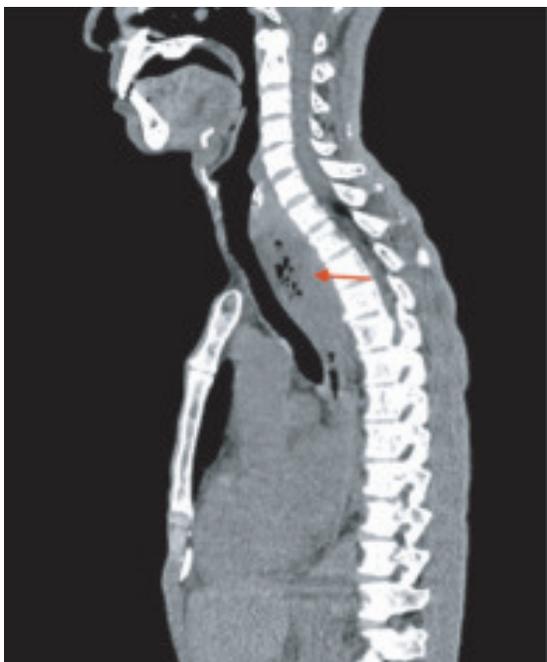


Fig.-1: (Sagittal view of the neck and thorax showed the thickening of the prevertebral soft tissue from C6 to T6 which pushing the trachea anteriorly (arrowed))

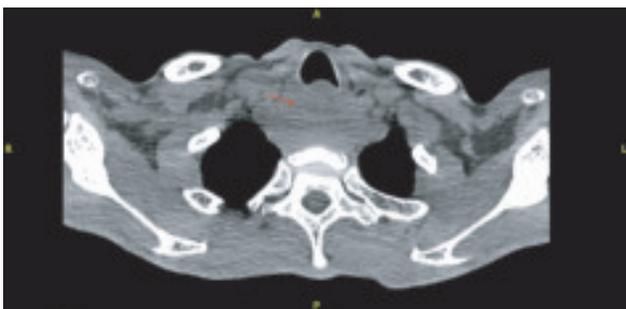


Fig.-2: Axial view of the thorax showed the enlargement of the thoracic part of oesophagus with thickened prevertebral soft tissue (arrowed).

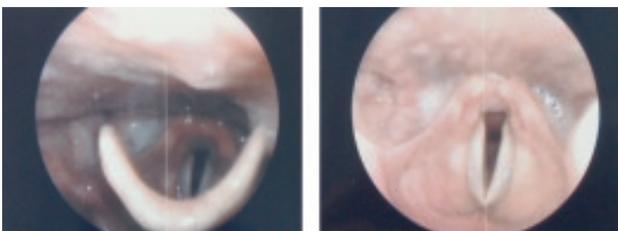


Fig.-3: 70 degree laryngoscopy showed the bilateral vocal cord at paramedian position and fixed. Also noted pooling of saliva at bilateral pyriform fossa.

and in general the prognosis is poor. And patient was planned for concurrent chemoradiotherapy. Postoperatively, patient recovered well and discharged. At home, his condition worsened and presented to emergency room for recurrent

tracheostomy tube blockage. Suction was performed and noted blood clots mixed with tumour mass in the tracheal lumen. Patient succumbed at emergency room due to upper airway obstruction lower to the tube level.

Discussion

Bilateral VC palsy is extremely rare compared to unilateral palsy. It is also a rare presentation and sequelae of an oesophageal cancer. Progressive dysphagia is the most common presenting complaints of patient with oesophageal cancer, with incidence of 74% (3,4). The main symptoms of bilateral VC palsy are hoarseness and worsened to stridorous, further more airway obstruction followed by aspiration symptoms and loss of speech. Airway obstruction can occur with any episode of upper respiratory tract infection. The condition occurred when both recurrent laryngeal nerves were infiltrated or compressed by the tumour or adjacent soft tissue. Unilateral VC palsy is more common results in the vocal fold on the affected side assuming the position midway between abduction and adduction (paramedian), and the speech is not greatly affected because the other vocal fold compensates to some extent and moves towards the affected vocal fold⁵.

Both of RLN travel in the tracheoesophageal grooves. Thus malignant lesions of the thyroid, trachea and oesophagus are not impossible to invade the nerves. Anatomy of RLN started from medulla oblongata to vagus nerve, it then descends with the carotid artery. The right RLN enters mediastinum and hooks around the subclavian artery and then ascends within the tracheoesophageal groove. The left RLN hooks around the arch of the aorta and then ascends into the neck within the tracheoesophageal groove until it approaches the cricothyroid joints then innervates the muscles participate in movement of VC (5). Due to the long and peculiarity of the RLN, the left one is more easily injured and the patient will be presented with unilateral VC palsy. In case of lower oesophageal cancer, there will be unlikely involvement of vocal cords.

The common etiology of bilateral VC palsy differs in adults and in children. In adults, these include mechanical causes, inflammatory processes, malignancy (thyroid gland tumour, esophagus, lung or mediastinal structures), surgery (thyroidectomy or cervical spine surgery), neurologic causes, radiation injury, metabolic causes, and toxin. Oesophageal cancer usually will grow to epigastric and retrosternal area that causes pain⁶. Rarely it will invade the RLN to cause hoarseness. Later on the cancer will extends

extraluminally and infiltrates the nearby structure such as trachea and causes persistent cough and respiratory symptoms. Once the cancer invades the tracheobronchial tree, T4, then it is a sign of unresectability and in general the prognosis is poor. In children, the causes of bilateral VC palsy include central neurologic abnormalities, idiopathic causes, and iatrogenic causes⁷.

The diagnosis of bilateral VC palsy is mainly based on history, clinical signs and symptoms, clinical and instrumental examination and imaging. This patient presented with early sign, which is hoarseness. A rigid 70 degree laryngoscopy confirmed the bilateral vocal cords in paramedian position, non mobile. In order to secure the airway and to assess the tracheal lumen, early tracheostomy and bronchoscopy or at least a tracheoscopy should be performed. Due to the nature of the disease, the tumour infiltrated the tracheal wall and entered the tracheal lumen, partially occupied around 50% of the lower portion of the trachea, 1 cm above the carina. This condition made the tracheostomy a challenge for the surgeon, because this intraluminal tumour can cause obstruction to the tracheostomy tube lumen and ventilation can be difficult or impossible. This problem can be solved by using adjustable flanged tracheostomy tube which can bypass the intraluminal mass or using suction tubing to suck out the mass (if the mass is friable) or cold instruments to trim the intraluminal mass to a smaller size.

Complication of tracheostomy for this patient includes easy dislodgement, difficult to change because the intraluminal mass is continuously growing, and it might be difficult to bypass the mass after removing the old tracheostomy tube, in case of over placing of the adjustable flanged tracheostomy tube then it will be ended up with one-lung ventilation and risk of aspiration of tumour mass. All these complications need to be anticipated by proper preoperative assessments and experienced hands such as perform direct laryngoscopy and bronchoscopy to thoroughly assess the intraluminal condition of the trachea and a good team work with anaesthetists and follows by good postoperative management plan. Intraoperatively, the anaesthetist was challenged by the difficulty to ventilate the patient after placement of tracheotomy tube, and it was due to the occlusion of the tip of an ordinary tracheostomy tube by the tumour mass. In order to secure airway, the adjustable flanged tracheostomy tube with internal

diameter 7.5 mm was applied by the surgeons and this measure successfully bypassed the mass and stent the mass to the side by the tube. There are other options, which can overcome this problem such as to perform a lower tracheostomy to bypass the mass, intraluminally curette or suck the mass to clear up the airway from the infiltrating mass.

Although the early assessment of vocal cords showed normal findings, as the disease is progressing, eventually the patient condition worsened with hoarseness and bilateral VC palsy during examination, another imaging should be performed to assess the airway and extend of the tumour in order to anticipate any difficulties during the surgical procedure later.

Conclusion

Oesophageal cancer is staged according to the widely accepted TNM system. Staging plays an integral part in guiding stage specific treatment protocols and has a great impact on overall survival. In this patient, the initial diagnosis is T3N0M0, but within one-month duration, the disease progresses to T4 (from stage IIA to III). The best treatment of choice for stage IIA is surgical intervention. However in stage III, it is a sign of unresectability and the treatment option is chemoradiotherapy. The prognosis is generally poor.

References

1. Benninger MS, Gillen JB, Altman JS. Changing etiology of vocal fold immobility. *Laryngoscope*. 1998 Sep. 108(9):1346-1350.
2. Kyle JN, Mary S, Subhasis M. Esophageal cancer: A Review of epidemiology, pathogenesis, staging workup and treatment modalities. *World J Gastrointest Oncol*. 2014 May 15; 6(5): 112-120.
3. John CL, Peter PL. Esophageal Cancer: A Review and Update. *Am Fam Physician*. 2006 June 15;73(12):2187-2194.
4. John MD, Willard AF, Alex GL, David PW, Rosemary FM, Andrew KS, et al. Esophageal cancer: results of an American College of Surgeons patient care evaluation study. *Journal of the American College of Surgeons*. 2000 May 1;190(5):562-572.
5. Snell RS, *Clinical Anatomy by Regions* (8th ed.), Wolters Kluwer and Lippincott Williams & Wilkins; 2008. P. 767 & 808.
6. Sparta C, Cossu ML, Fais E, Palermo M, Cossu F, Ruggiu M, et al. Non-recurrent inferior laryngeal nerve: anatomy, frequency and surgical considerations. *Minerva Chir*. 2004 Dec;59(6):555-561.
7. Keith MB. Esophageal Cancer Clinical Presentation. Medscape updated on March 3, 2015. [Access on July 7th 2015]. <http://emedicine.medscape.com/article/277930-clinical>