



ORIGINAL RESEARCH PAPER

ENT

LARYNGEAL PALSY SECONDARY TO A NON-INFECTIVE CHEST PATHOLOGY

KEY WORDS: Laryngeal Palsy, Non-infective Chest Pathology, Sudden Onset Hoarseness

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ABSTRACT As Otorhinolaryngologists it is relatively common to encounter patients with hoarseness of voice on a daily outpatient basis. Many a times it is secondary to vocal cord palsy. The Recurrent Laryngeal and Superior Laryngeal nerves are a crucial element in phonation. Damage to either of them or both is one of the common causes for this presentation. Very frequently, patients we see on the outpatient basis with this complaint go uninvestigated and undiagnosed with a secondary cause. A missed or delayed diagnosis may lead to an erroneous treatment plan.

INTRODUCTION:

Vocal cord paralysis can follow Superior Laryngeal nerve palsy or Recurrent Laryngeal nerve palsy or both. This usually is a result of many aetiologies such as tumours, trauma, infections, intubation injuries or surgeries. However, from the number of patients that we encounter with complaints of sudden onset hoarseness of voice, we have observed it can also be secondary to a less common cause i.e. a non-infective chest pathology. We here describe a series of 4 cases presenting with this difficulty along with their aetiology.

CASE REPORT 1:

A 72 year old female walked into our outpatient department with complaints of inability to speak, dry cough and breathlessness since 15 - 20 days. The patient appeared cachexic with a history of loss of appetite and significant weight loss in the past 20 days. She was a known case of Diabetes Mellitus since 25 years, on medications, with a history of tobacco chewing for the past 55 years and exposure to Chullah Smoke for more than 25 years. Indirect Laryngoscopy (IDL) and Nasopharyngolaryngoscopic (NPL) examination revealed bilateral adductor palsy with cords in Paramedian position (Figure 1). Upon being investigated no infective aetiology was found. In order to rule out thoracic causes further investigations were done. The chest roentgenogram showed pleural effusion. However, a contrast CT of Thorax showed a 32 mm x 30 mm pulmonary nodule in the right upper lobe. Pleural tapping was planned for symptomatic relief. She underwent a CT-guided fine-needle aspiration biopsy, which showed a cellular neoplasm composed of densely packed cells, medium to large cells positive for TTF-1, suggestive of Non-small cell lung cancer.

CASE REPORT 2:

A 50 year old male was referred to us from the department of Medicine with complaints of sudden onset hoarseness in voice, non-productive cough since 20 days, with history of cigarette smoking since 30 years. On examination with Indirect Laryngoscopy right vocal Cord was found to be fixed. The patient was fully investigated. The blood workup showed no signs of any infective pathology. The chest X-ray on PA view showed left sided pulmonary opacity (Figure 2). Further investigation with a High Resolution CT Scan of Thorax came suggestive of Bronchogenic Carcinoma with Mediastinal Lymphadenopathy (Figures 2.A and 2.B). A CT guided biopsy for this patient done revealed

Adenocarcinoma of lung with tumour cells expressing TTF- 1. We referred the patient to the department of Pulmonary medicine for the management of primary lung pathology.

CASE REPORT 3:

A 39 year old male was referred to us from the cardiac intensive care unit with a history of hoarseness of voice since three days. A detailed history threw light upon the patient being a known case of Rheumatic heart disease with ST segment elevated myocardial infarction with Mitral stenosis. A mitral valve replacement surgery was planned for the patient and done, immediately post which he started developing hoarseness of voice. On examination with an Indirect Laryngoscope, left Vocal cord was found to be completely paralysed leading to a suspicion of trauma to the left recurrent laryngeal nerve, iatrogenically.

CASE REPORT 4:

A 69 year old male presented with sudden onset hoarseness of voice since 10 days. On further questioning he revealed a history of dysphagia only to solids and weight loss in past 15 -20 days. After ruling out any infective aetiology, a brief history, examination, series of imaging and PET FDG revealed mediastinal metastases secondary to an oesophageal carcinoma. On IDL, left vocal cord was found paralysed supported further by an asymmetrical FDG uptake.

DISCUSSION:

Laryngeal paralysis may be supranuclear or nuclear. It may be a solitary involvement of the Recurrent Laryngeal (Low vagal) or Superior Laryngeal nerves or both, the latter known as combined or complete paralysis (high vagal). The recurrent laryngeal nerves are especially vulnerable to disruption the reason being their circuitous routes¹. As aptly called by Galen² 'Reversivi', the right recurrent nerve goes under the subclavian artery at the thoracic inlet, and the left nerve moves around the aortic arch before returning to the larynx. These locations help intrathoracic tumours in invading or compressing either nerve, thereby causing unilateral vocal cord paralysis and hoarseness of voice. Since the left recurrent nerve has a longer route through the mediastinum it is the one to be affected more frequently. With an injury to unilateral recurrent laryngeal nerve there is an ipsilateral paralysis of all the ipsilateral intrinsic muscles except the cricothyroid with the vocal cord assuming median or paramedian position i.e. 1.5 mm from the midline. Recurrent laryngeal nerve (RLN) palsy follows many

causes such as neck trauma, benign or malignant thyroid diseases, thyroid surgery, carcinoma cervical oesophagus, cervical lymphadenopathy, subclavian artery aneurysm, carcinoma lung (apex), tuberculosis, carcinoma of thoracic oesophagus, enlarged left auricle, mediastinal metastases or plain idiopathic^{3,4,5}. Unilateral RLN Palsy however may remain 30% of the times asymptomatic, with others having only change in voice but no aspiration or obstructive symptoms, whatsoever. Bronchogenic carcinoma⁶, despite being a common cause, remains undetected. Patients should always be investigated for the same, as seen with case 2. Trauma is another common cause- laryngeal palsy following a cardiac surgery may be due to tracheal intubation and central venous catheterisation, or due to damage to the recurrent laryngeal nerves during surgical dissection^{7,8} as seen with case 3. In bilateral adductor palsy (Figure 1), it most commonly follows a surgical trauma like thyroidectomy, or neuritis. Position of the cord in this setting remains in gentle abduction or paramedian due to unopposed cricothyroid action. This leads to stridor, which is mostly, is worse on exertion. In such a case, a chest pathology needs to be ruled out⁹.

Superior laryngeal nerve palsy leads to cricothyroid paralysis leading to ipsilateral vocal anaesthesia above the vocal cord. Bilateral SLN palsy, however being uncommon, cannot be ignored. The aetiology behind is surgical or accidental trauma, diphtheric neuritis, cervical node pressure, neoplastic involvement. It leads to a weak and husky voice, cough and choking fits and may require a Tracheostomy. In Unilateral palsy, the most common cause is thyroid surgery, but the possibility of a primary chest pathology cannot be ignored. The cord position will be cadaveric i.e. 3.5mm from the midline since all the muscles on that side are paralysed leading to hoarseness of voice and fluid aspiration. Rarely though RLN and SLN on both sides and paralysed. If so, both cords lie in cadaveric position with total laryngeal anaesthesia.

CONCLUSION:

We see a number of patients with sudden abrupt change in voice on a daily basis. Hoarseness of voice is promptly treated for infective causes. Some patients however, do not show signs of improvement or even worsen despite being treated. This setting raises a high level of suspicion for having the patient thoroughly investigated further for a non-infective thoracic pathology. This facilitates early diagnosis of a thoracic cause with emphasis on further investigations and thus, immediate intervention^{10,11,12}.

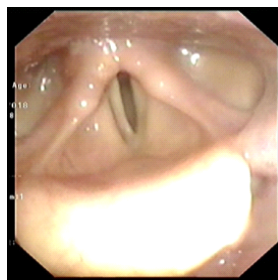


Figure 1



Figure 2

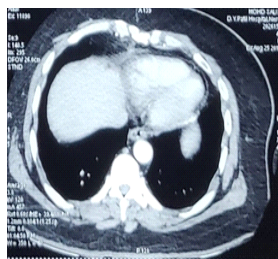


Figure 3.A

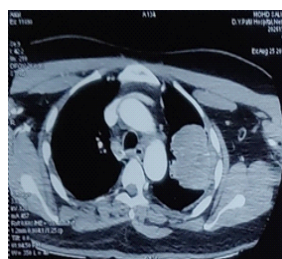


Figure 3.B

LEGENDS:

Figure 1: A nasopharyngolaryngoscopic image for case report 1 showing bilateral adductor palsy
 Figure 2: Chest xray pa for case report 2 showing left lung opacity
 Figure 3.A : HRCT thorax for case report 2 showing lung mass

Figure 3.B : HRCT thorax for case report 2 showing lung mass

REFERENCES:

1. Amer, K. (2017). Anatomy of the Thoracic Recurrent Laryngeal Nerves from a Surgeon's Perspective. *Anat Physiol*, 7(272), 2161-0940.
2. Kaplan, E. L., Salti, G. I., Roncella, M., Fulton, N., & Kadowaki, M. (2009). History of the recurrent laryngeal nerve: from Galen to Lahey. *World journal of surgery*, 33(3), 386-393.
3. Sulica, L., Cultrara, A., & Blitzer, A. (2006). Vocal fold paralysis: causes, outcomes, and clinical aspects. In *Vocal fold paralysis* (pp. 33-54). Springer, Berlin, Heidelberg.
4. Glazer, H. S., Aronberg, D. J., Lee, J. K., & Sagel, S. S. (1983). Extralaryngeal causes of vocal cord paralysis: CT evaluation. *American Journal of Roentgenology*, 141(3), 527-531.
5. Purandare, N. C., Rangarajan, V., & Shah, S. (2007). Case report: right vocal cord paralysis detected by PET/CT in a case of esophageal cancer. *Indian Journal of Radiology and Imaging*, 17(3), 166.
6. Baumann, M. H., & Heffner, J. E. (1989). Bilateral vocal cord paralysis with respiratory failure: a presenting manifestation of bronchogenic carcinoma. *Archives of internal medicine*, 149(6), 1453-1454.
7. Dimarakis, I., & Protopapas, A. D. (2004). Vocal cord palsy as a complication of adult cardiac surgery: surgical correlations and analysis. *European journal of cardio-thoracic surgery*, 26(4), 773-775.
8. Hamdan, A. L., Moukarbel, R. V., Farhat, F., & Obeid, M. (2002). Vocal cord paralysis after open-heart surgery. *European Journal of Cardio-thoracic surgery*, 21(4), 671-674.
9. Yeung, J. C., Pringle, C. E., Sekhon, H. S., Kilty, S. J., & Macdonald, K. (2016). Bilateral Vocal Cord Paralysis and Cervicolumbar Radiculopathy as the Presenting Paraneoplastic Manifestations of Small Cell Lung Cancer: A Case Report and Literature Review. *Case reports in otolaryngology*, 2016.
10. Carter, B. W., Marom, E. M., & Detterbeck, F. C. (2014). Approaching the patient with an anterior mediastinal mass: a guide for clinicians. *Journal of Thoracic Oncology*, 9(9), S102-S109.
11. Oner, A. O., Boz, A., Surer Budak, E., Kurt, K., & Hale, G. (2015). Left Vocal Cord Paralysis Detected by PET/CT in a Case of Lung Cancer. *Case reports in oncological medicine*, 2015.
12. Lee, J. H., Na, D. G., Byun, H. S., Cho, J. M., Han, B. K., Son, Y. I., ... & Moon, S. H. (1999). Vocal Cord Paralysis Due to Extralaryngeal Causes: Evaluation with CT. *Journal of the Korean Radiological Society*, 40(4), 621-625.