Acquired Unilateral Vocal Fold Paralysis: Retrospective Analysis of a Single Institutional Experience

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Abstract

Background: Vocal cord paralysis continues to be an important issue in laryngology and is considered as a sign of underlying disease; the etiologies of this problem are varied and changing. Aims: The study was to carry out a retrospective analysis of patients with unilateral vocal fold paralysis diagnosed. Materials and Methods: The medical records of 53 patients diagnosed and treated for unilateral vocal fold paralysis were studied retrospectively. Data regarding age, sex, duration of symptoms, etiology, and side of paralysis were recorded. Results: Out of the 53 cases, 36 were females and 17 males with a ratio of 2.1:1. The age of the patients ranged from 17-75 years. In 18.9% the cause was idiopathic. Surgical trauma (iatrogenic) problems was the most encountered etiology (66%), others included malignancy (non laryngeal) (7.5%), central (3.8%), external neck trauma (1.9%) and radiation therapy 1.9%. Thyroid surgery was the most commonly reported neck surgery in 50.9%. Conclusions: Thyroidectomy continues to be the single most common surgical procedure responsible for unilateral vocal cord paralysis. For this reason, routine pre and postoperative laryngoscopy should be considered in all patients undergoing surgeries with a potential risk for recurrent nerve paralysis to reduce the postoperative morbidity.

Keywords: Iatrogenic, Unilateral, Vocal fold paralysis

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Introduction

True vocal cord paralysis signifies vocal fold immobility that is restricted secondary to mechanical fixation or neuropathy. Mechanical fixation may result from an arytenoid dislocation, edema or inflammation of the glottis, or neoplastic invasion.[1] Neurogenic immobility may result from damage to the vagus and recurrent nerve through surgeries or neoplastic invasion from brainstem to jugular foramen, neck, mediastinum, and aortic arch.[2] Unilateral vocal cord paralysis may be asymptomatic or can lead to dysphonia as well as dysphagia which lead the patient to frustration and emotional problems. A detailed medical and surgical history is particularly important and as most causes of unilateral vocal cord paralysis are secondary to surgery, the timing of the onset of the dysphonia to any relevant surgery is crucial. The examination must include a full ear, nose, and throat examination as well as a detailed inspection of the vocal cords and larynx using indirect and direct diagnostic laryngeal endoscopy.

Once the diagnosis of unilateral vocal cord palsy has been established, flexible nasolaryngoscopy, or rigid laryngoscopy should be performed to rule out an associated infiltrating lesion.

Numerous studies have documented the multiple causes of laryngeal paralysis, often without agreement on the most common etiology.[3-9]

This study was designed to carry out a retrospective analysis of patients with unilateral vocal fold paralysis diagnosed at our center and compare it with the results...
of other studies focusing mainly on evaluating the contemporary etiological profile of unilateral vocal fold paralysis.

**Materials and Methods**

After approval of our institutional review board, the medical records of 53 patients diagnosed and treated as unilateral vocal fold paralysis at Ear, Nose and Throat Department in King Hussein Medical Centre between January 2003 and October 2010 were studied retrospectively.

The diagnosis of unilateral vocal fold paralysis was based on a detailed history taking and thorough general physical and local examination. All patients were subjected to indirect laryngoscopy and or fibreoptic examination or rigid laryngoscope with a stroboscope to confirm the diagnosis.

All patients were investigated to find out the cause of paralysis and these included plain chest radiographs, thyroid sonography, and esophagoscopy and when central nervous system lesions were expected brain imaging such as computed tomography or magnetic resonance were carried out. Neck and/or chest computed tomography was performed when needed depending on the suspected pathology.

Unilateral vocal fold paralysis was labelled as idiopathic when the clinical and radiological examination failed to reveal the cause after 12 months of follow-up.

Exclusion criteria were cases of unilateral vocal fold paralysis due to congenital disease; malignancies of pharyngeal and laryngeal origin; intubation injuries and cricoarytenoid joint ankylosis; and incomplete examinations and follow-ups.

Data regarding age, sex, duration of symptoms, etiology, and side of paralysis were recorded.

**Statistical analysis**

All statistical analyses were performed with Statistical Package for the Social Sciences (SPSS) software, version 10.0.7.

**Results**

Out of 53 cases, 36 were females and 17 males with a ratio of 2.1:1. The age of the patients ranged from 17-75 years with average age (32.41 ± 7.13 years).

Regarding the side of paralysis, the majority was involving the left vocal fold, which was recorded in 41 cases (77.4%) while the right vocal fold was involved in 12 cases (22.6%).

Duration of symptoms from vocal dysfunction at presentation ranged from 16 days to three years with a mean duration of 2 months. 53% of patients presented within the first 4 months of appearance of symptoms.

In 43 cases, we identified the cause of the vocal fold paralysis while in 10 cases (18.9%) the cause was not revealed and labelled as idiopathic.

Out of the 43 cases in which the cause was identified, surgical trauma (iatrogenic) problems was the most encountered etiology (66%, n = 35), others included malignancy (non laryngeal) (7.5%, n = 4), central (3.8%, n = 2), external neck trauma (1.9%, n = 1) and radiation therapy (1.9%, n = 1).

Iatrogenic unilateral vocal fold paralysis was mostly due to neck surgery in 30 cases, thoracic procedures in 3 cases, cardiac (coronary artery bypass grafting) in one case, and skull base surgery in one case.

Thyroid surgery was the most commonly reported neck surgery in 27 patients (50.9%). Other neck surgeries included: Cervical spine decompression in 2 cases (3.8%) and carotid endarterectomy in one case (1.9%).

**Discussion**

Unilateral vocal cord palsy (UVCP) is not an uncommon problem encountered in an otolaryngology practice.

Unilateral paralysis of the vocal folds may have many causes but generally it happens due to one of three reasons: Nerve injury during surgeries of the thyroid and other head and neck procedures, malignant growth causing pressure on the nerve, or inflammatory process usually caused by viral infection. These three reasons account for more than 85% of cases of paralyzed vocal folds.

As far as the etiology is concerned, we reported in this study that surgical trauma (iatrogenic) problems was the most encountered etiology in 66% of cases and thyroid surgery was the most commonly reported procedure in 50.9%. According to other reports, the incidence of postoperative paralysis ranged from 11% to 57%,[1,3-11] and the rate of post-thyroid surgery patients in the total number of paralysis was 7-28%.[1,5,10,11]

On the other hand, cases of paralysis following non-thyroid operations have been reported and new causes have also been revealed. For example, carotid endarterectomy for stenosis of the carotid artery was reported in one case in our study and other studies
have reported that paralysis may occur after carotid endarterectomy.[12-15] Cervical spine decompression is another cause reported in previous studies[16,17] and was reported in two cases in this study.

In addition to neck surgery, we reported in this study thoracic procedure, cardiac (coronary artery bypass grafting) and skull base surgery as a causative of unilateral paralysis of the vocal folds. The incidence of unilateral paralysis of the vocal folds after coronary artery bypass grafting is reported to be 1 to 2%.[18,19]

In ten cases (18.9%) of this study, the cause was not revealed and labelled as idiopathic. However, the rates of idiopathic paralysis in previous reports ranged from 2% to 24%.[3,5]

Malignant neoplasm has been reported as the most common cause of extra laryngeal vocal cord paralysis.[20] Neoplasms of the thyroid, esophagus, mediastinum, and lung are not infrequently complicated by vocal cord paralysis. Many previous studies found the most common malignancy causing unilateral vocal cord paralysis to originate from the lung.[1,10,21]

However, we reported 4 cases (non laryngeal malignancy) 7.5% responsible for unilateral vocal cord paralysis, two cases were due to thyroid malignancy and bronchogenic carcinoma were responsible for the other two cases. Previous report by Ko et al., found a 12% incidence of non-laryngeal malignancy.[22]

Radiation-induced unilateral vocal cord paralysis has been reported in previous studies.[23,24] However, in this study we reported one case as a causative reason for paralysis.

Other causes found in this study were cerebrovascular disease in two cases and another case of neck trauma with unilateral vocal cord paralysis was due to traffic accident.

When considering the age and sex of the patients in this study, the age of the patients ranged from 17-75 years with average age (32.41 ± 7.13 years). In the literature, there has been only one report addressing the age of vocal fold paralysis patients brought by Yumoto et al., series from Japan[21] in which vocal fold paralysis was found to increase with age, rising rapidly in the fourth decade, and peaking in the sixth decade.

Regarding the female to male ratio, we reported nearly double the incidence in females 2.1:1. Similar observation was reported by Rosenthal et al.[3] Another study from Taiwan also reported nearly double the incidence in females as we reported.[22] On the contrary, others reported more incidences in males.[25]

Left vocal fold paralysis was recorded in 77.4%, while the right vocal fold was involved in 22.6%. Similar results were obtained in other studies.[23] This is mostly due to the increased vulnerability of left nerve due to the longer course through the chest.

Conclusions

The most common cause of unilateral vocal cord paralysis in our study is surgery and thyroidectomy continues to be the single most common surgical procedure responsible for unilateral vocal cord paralysis. For this reason, routine pre and postoperative laryngoscopy should be considered in all patients undergoing surgeries with a potential risk for recurrent nerve paralysis to reduce the postoperative morbidity. However, understanding the etiology of vocal fold paralysis should play a significant role in the prevention and management of paralysis.

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