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## Original / research

### Unilateral Vocal Fold Paralysis — An Indian Scenario

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#### Abstract

Though vocal fold paralysis has been largely written upon and studied for a long time, its numerous and highly varying aetiologies have ensured a continuing interest in the subject. The many surgeries available for tackling this condition, and the battery of diagnostic modalities used to identify the cause indicate that this interest is justified, for no technique has been found to be infallible. This study was performed to evaluate the incidence of vocal fold paralysis and its common causes in the Indian subcontinent, and to formulate a diagnosis and management protocol for such cases.

#### Material and Methods

The study was conducted from April 2003 to July 2005 in 85 cases of unilateral vocal fold paralysis. The diagnosis was made in all patients by an indirect mirror laryngoscopy who were subsequently evaluated at our voice clinic using the following parameters.

**Laryngeal examination** Fiber optic examination and 700 rigid laryngoscopy with video recording. Stroboscopic examination helped assess the mucosal wave patterns and the regenerative potential of the paralyzed vocal fold.

Voice recording for the purpose of acoustic analysis as well as perceptive judgment of voice in terms of degree of hoarseness, roughness and breathiness.

**Aerodynamic evaluation** such as air flow, maximum phonation time and s/z ratio.

**Manual compression test** this is a good prognostic indicator and helps assess the extent of improvement that may be achieved in a patient with medialization.

An evaluation of all patients was done on the basis of a detailed history, examination and investigations like routine haematological investigations, VDRL, sputum for AFB, barium swallow and an X-ray chest.

All patients who were clinically idiopathic were subjected to a CT Scan from the level of the skull base to the level of the arch of the aorta in the upper mediastinum (Figs.1,2). Each patient's primary aetiology was diagnosed and treated on its own merit.

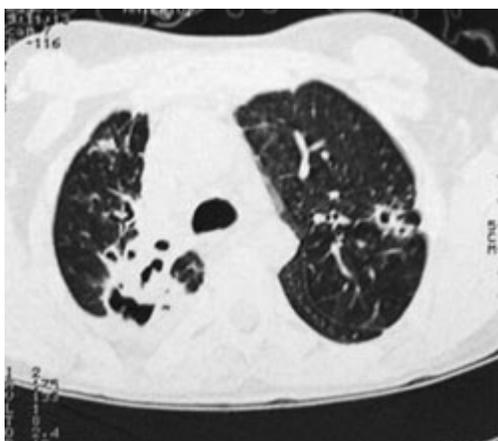


Fig. 1 : CT image of post kochs apical lung fibrosis in patient who presented with vocal fold paralysis.

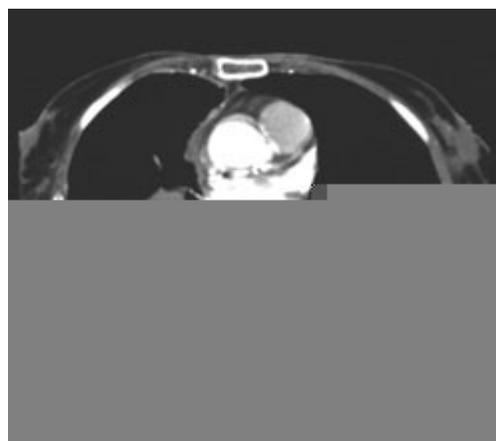


Fig. 2 : CT image of upper mediastinum showing a bronchogenic tumor in a patient presenting with vocal fold paralysis.

### Management Protocol

All patients except those with malignant aetiology were started on speech therapy for a period of 4-6 months and a regular follow up was kept every month. Patients with no improvement in voice quality after this time period were planned for surgical management.

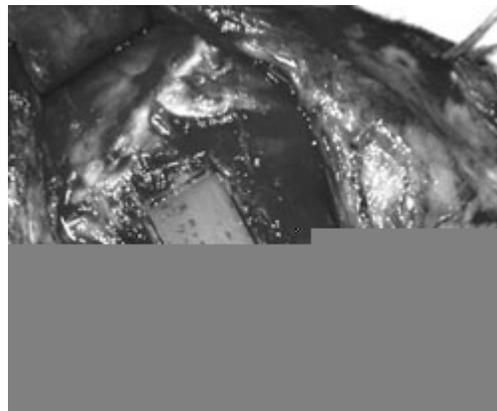
### Surgical steps

The surgical procedure performed was Netterville's modification of Ishikki's type I thyroplasty with or without arytenoid adduction. A standard window size of 6 mm x 13 mm was used in most patients, though this was varied depending upon the sex, and constitution of the patient.

The Netterville technique for implant shaping was used, whereby each implant was carved wider than the window, with a window lock extension to simulate a lock and a key (Fig. 3). A flexible laryngoscope was introduced intraoperatively following implant placement (Fig. 4) to visualize the exact extent of medialisation and at this juncture voice was assessed by asking the patient to count from one to ten. Voice rest, anti-inflammatory drugs and antibiotics were given post operatively for 7 days.



*Fig. 3 : Carved silastic prosthesis.*



*Fig. 4 : Prosthesis in situ.*

### Discussion

Vocal fold paralysis has a distinct effect on both the vocal functions and respiratory functions. The cause of a unilateral or bilateral paralysis can be any lesion from the brainstem to the region of the upper mediastinum. Hence it is essential that a

methodical approach based upon thorough clinical evaluation and exhaustive investigations be used to ascertain the cause of paralysis. More so, it is only after the above, that one can decide upon the management of such cases.

In our series of 85 cases of vocal fold paralysis that presented from April 2003 to July 2005, were studied to ascertain the aetiological factor and decide a management protocol for such patients. The commonest presenting symptom of vocal fold paralysis is hoarseness of voice.

There was a male predominance in our series with a ratio of 2:1.

Left sided paralysis is more common than the right side, because of the longer course of the recurrent laryngeal nerve on the left. In our study 68 patients had a left sided palsy and 17 had a right-sided paralysis.

Surgical trauma was the main cause of paralysis (38) in our study. Right-sided vocal fold paralysis occurs more commonly due to neck surgeries, as the right recurrent laryngeal nerve is more lateral, anterior and superficial in the tracheo-oesophageal groove. Left sided palsy is more common after thoracic surgeries as the nerve on this side recurs below the aorta in the thorax.

Of these 38 cases, thyroidectomy was the cause in 11 patients (28.95%), most of them being referred from other centre due to hoarseness of voice. Two of these patients had a right-sided palsy and 9 had a left side paralysis. Huppler in 1955, reported an incidence of 273 cases (43.13%) in a series of 633 due to thyroid surgery and Parnell in 1970 reported an incidence of 34% due to trauma in a series of 100, of which, 28 cases were due to thyroid surgery.

There were 25 cases referred to us after thoracic surgical procedures - all having a left sided vocal fold paralysis.

Vocal fold paralysis secondary to non- thyroid neck surgeries were seen in 2 cases. One was after excision of a right-sided vagal schwannoma and another patient who underwent surgery on his cervical spine via a lateral spinal approach.

Neoplasms are another common cause of peripheral laryngeal paralysis. In our study, 12 cases of vocal fold palsy were due to malignant diseases, giving an incidence of 12.9%. Clerf in a study of 299 cases in 1953 reported an incidence of 38%; and Parnell in 1970 reported an incidence of 32% in a study of 100 cases.

Out of the 12 cases, 5 cases (42%) were due to malignancy of the hypopharynx. 4 cases (33%) occurred due to bronchogenic carcinoma, 2 cases (14%) due to carcinoma of the oesophagus, and 1 case due to malignancy of the thyroid gland. Of these 12 cases, 4 cases affected the right vocal fold and the rest were left sided.

There were 9 patients (10%) who sustained non-surgical trauma to the recurrent laryngeal nerve.

Inflammatory conditions and mediastinal infections can lead to vocal cord paralysis. In our study, 7 cases of tuberculosis gave rise to vocal fold paralysis, giving an incidence of 7.53%. The cases of active pulmonary kochs were continued on speech therapy alongside Anti- tuberculous medication and a regular follow up was kept.

Vocal fold paralysis may occur due to variety of neurological causes such as cerebrovascular accidents and ischaemia.

In our series of patients, 20 were labelled as idiopathic before they presented to us, but we were able to detect pathology on CT imaging in 6 of them. Finally 14 patients were labelled idiopathic giving an incidence of 15.05%. Hoppler in 1955, reported an incidence of 29% in a series of 633 cases and Cunnings, in 1955, reported an incidence of 31% in a series of 262 cases.

Out of the 85 patients, 10 underwent medialisation thyroplasty. In 2 cases, there was a significant posterior glottic incompetence for which an arytenoid adduction was combined with Type I Thyroplasty. Netterville's technique of thyroplasty was performed in all cases under local anaesthesia during which an intraoperative voice assessment along with laryngoscopic assessment of medialisation of the paralyzed cord was performed.

All 10 cases had significant improvement of voice quality as assessed by postoperative voice analysis.

## Conclusion

A well-structured protocol is helpful in assessing the aetiology of vocal fold paralysis. A CT scan from the skull base to upper mediastinum is imperative before labelling a case idiopathic. Surgical trauma was found to be the commonest cause in our study. Type I thyroplasty is a safe and effective surgical procedure for the management of unilateral vocal fold paralysis with few complications and is a completely reversible procedure. Arytenoid adduction is a helpful technique which may be used with thyroplasty in cases of posterior glottic chinks.

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