



ORIGINAL ARTICLE

A comparative study of laser posterior cordotomy and vocal cord lateralization



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Abstract *Introduction:* The treatment of bilateral vocal cord paralysis continues to be a challenge to the otolaryngologist, head and neck surgeon even today. Numerous surgical procedures have been proposed to improve the patient's airway insufficiency without leaving the patient with a breathy, weak voice or an incompetent larynx. In this study we compared the outcome of laser posterior cordotomy and vocal cord lateralization in a group of bilateral abductor palsy patients.

Method: Retrospective as well as a prospective study of 25 patients was carried out. The total of 25 patients was divided into 2 groups, group 1 consisted of 15 patients who underwent vocal cord lateralization with SUTUPAK suture and group 2 consisted of 10 patients who underwent laser assisted posterior partial cordotomy.

Results: Thyroidectomy was the commonest cause for bilateral vocal fold paralysis i.e. 80% (20) of cases. Patients who underwent laser posterior cordotomy had 100% successful decannulation rate as compared to 92.8% for vocal cord lateralization patients. Comparison between pre and post operative voice assessment data by WILCOXON SIGNED RANKS test revealed that excepting the parameter of fluctuations/s in F_0 , all other parameters were statistically not significant.

Conclusion: Laser cordotomy is a superior, reliable and viable alternative to the other lateralization procedures for bilateral vocal fold paralysis.

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1. Introduction

One of the serious medical situations wherein a patient presents with hoarseness, reduction in speech volume, obstructive sleep apnea syndrome, dyspnea, and even death in patients

with restricted lung capacity is bilateral abductor paralysis. Thyroidectomy surgery is the most common etiology and less frequently by some other external injury to the larynx or neck or maybe due to a neurological disorder or any thyroid neoplasms.¹ If the injury is to the recurrent laryngeal nerves only, the vocal cords assume a paramedian position with a good voice but an inadequate airway. Sooner or later, all patients with bilateral abductor paralysis have stridor. This may be present immediately after operation or may be precipitated later

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by an upper respiratory tract infection. The immediate need is a satisfactory airway, so a tracheostomy is required.

The treatment of bilateral vocal cord paralysis continues to be a challenge to the otolaryngologist, head and neck surgeon even today. Numerous surgical procedures have been proposed to improve the patient's airway insufficiency without leaving the patient with a breathy, weak voice or an incompetent larynx. In other words the management of this problem involves searching for a compromise between socially satisfactory phonation and an airway compatible with an active life. The various treatment options available to the patient include extralaryngeal vocal cord lateralization using sutures, endoscopic laser arytenoidectomy and endoscopic laser posterior cordectomy. The decision as to which of the several procedures should be undertaken is determined by the patient's individual needs and the surgical preference.

In 1922 Jackson first described resection of the vocal cord and ventricle². Later Woodman³ described external arytenoidectomy and Thornell described transoral arytenoidectomy⁴. All these require prophylactic tracheotomy and result in low quality of voice. In 1989 the carbon dioxide (CO₂) laser endoscopic posterior cordotomy technique with lower aspiration and tracheotomy rates and higher postoperative vocal quality was described by Dennis and Kashima⁵.

We conducted a case series to compare the results obtained following vocal cord lateralization surgery with SUTUPAK against the results obtained following Laser assisted posterior partial cordotomy surgery in patients who presented with bilateral abductor vocal cord paralysis.

2. Materials and methods

This is a retrospective as well as a prospective study of 25 patients who presented to the department of E.N.T and head and neck surgery, Kasturba Medical College during a 5 year period. All the 10 patients who underwent Diode Laser assisted posterior partial cordotomy as per Manolopoulos et al. modification of Dennis & Kashima's⁵ procedure were followed up prospectively, whereas 7 of the 15 patients who underwent D.R. Nayak's modification¹ of EJNELL'S vocal cord lateralization procedure with SUTUPAK suture were studied retrospectively. Remaining 8 patients were followed up prospectively.

All patients were treated for bilateral abductor paralysis which was confirmed by taking a detailed history, thorough clinical examination and a battery of investigations including radiological investigations and rigid telescoping of the larynx. Objective pre and post op voice quality assessment was done in laser cordotomy cases using the computerized VAGMI diagnostic module.

The total of 25 patients was divided into 2 groups, group 1 consisted of 15 patients who underwent vocal cord lateralization using D.R. Nayak's modification of EJNELL'S vocal cord lateralization procedure with SUTUPAK suture and group 2 consisted of 10 patients who underwent laser assisted posterior partial cordotomy as per MANOLOPOULOS modification of DENNIS & KASHIMA's procedure.

All patients were followed up postoperatively from a minimum period of 1 month to a maximum period of 33 months in one case. At follow up patients were assessed clinically as well as with rigid telescoping of the larynx.

The 2 groups were compared on the basis of various parameters. The group of 10 patients who underwent Diode laser cordotomy were selected for objective assessment of voice quality parameters preoperatively and postoperatively. The speech samples of all subjects were recorded in the sound treated speech sciences lab of the hospital. Recordings were made using a professional stereo deck (AHUJA) and AKG-D222 dynamic microphone. The microphone to mouth distance was kept constant at 15 cm. The subjects were instructed to phonate the vowels a, i, u at a comfortable level as long as possible. Three trials were given and the best one was chosen for analysis. Similarly a standardized speech passage was also recorded. The data were analyzed by VAGMI, a computerized voice lab and speech systems. The recorded phonation and speech samples of each subject were digitized at the rate of 8 kHz and analyzed using the diagnostic module of the software.

The analyzed parameters were subjected to appropriate statistical analysis and relevant inference drawn.

3. Results

Our study constituted a total 25 patients: 20 (80%) females and 5 (20%) males. Majority of the patients were in the 41–60 year age group (60%). The commonest presenting symptom was dyspnea (100%) followed by hoarseness of voice (85%) and aspiration (10%). The mean duration of bilateral vocal fold paralysis was 5.49 years. The minimum duration of bilateral vocal fold paralysis was 4 months and the maximum duration was 25 years. Thyroidectomy was the commonest cause for bilateral vocal fold paralysis i.e. 80% (20) of cases (Fig. 1). Among this the first thyroidectomy surgery itself was responsible for B.V.F.P. in 60% (16) of cases and revision thyroidectomy surgery only in 20% (4) of cases. 68% (17) cases were already tracheostomized elsewhere at the time of presentation to us. In the laser cordotomy group 9 (90%) of patients were already tracheostomized elsewhere. One patient in group 2 underwent laser cordotomy following successful endotracheal intubation with FLEXIMETALLIC endotracheal tube. In group 1, the remaining 7 (46%) of patients underwent preliminary tracheostomy followed by definitive surgery i.e. vocal cord lateralization.

In group 1, 9 (60%) of the patients underwent right vocal cord lateralization and 6 (40%) of patients underwent left vocal cord lateralization. The mean postoperative duration of hospital stay in group 1 was 10.16 days and in group 2 was 7.66 days. Two patients in group 1 had a failure of surgery

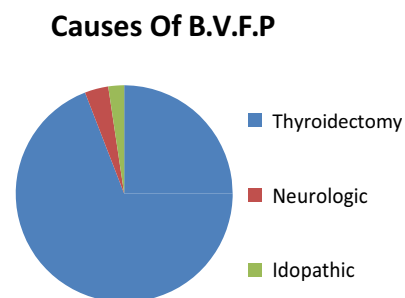


Fig. 1 Causes of B.V.F.P.

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