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Research Article

A Clinical Study on Unilateral Vocal Fold Paralysis and its Management at Tertiary Care Hospital

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Abstract

Introduction: Voice is an essential part of human life. It is an indispensable part of effective communication and conveys a person's mood and feelings. Laryngeal dysfunction produces symptoms which can vary from hoarseness of voice to life threatening stridor. This study was conducted to evaluate a comparative outcome between speech therapy and vocal fold medialisation techniques.

Objective: To study the outcome following speech therapy and medialisation thyroplasty in patients with unilateral vocal cord paralysis.

Materials and methods: This is a prospective longitudinal study of 30 patients diagnosed with unilateral vocal fold paralysis at Civil Hospital, Ahmedabad and underwent treatment for the same between a period of June, 2019 to December, 2021.

Result: Left vocal cord palsy was more common as compared to right, left recurrent laryngeal nerve is more frequently involved because of longer course. All patients had primary complaint of hoarseness of voice, breathiness was the next common presenting complaint, followed by vocal fatigue. An improvement in both subjective parameters was seen post treatment.

Conclusion: Conservative treatment in form of speech therapy was given to the patients (43%) which helped in improvement of voice quality but not glottic insufficiency. Improvement was seen mainly due to compensatory mechanism. Adequate glottic closure was achieved by both surgical methods that we used. The quality of voice of patients improved significantly.

Keywords: ENT; Unilateral Vocal Fold Paralysis; Fat Augmentation; Thyroplasty

Introduction

Vocal cord paresis/paralysis refers to the reduced and absent movement of the vocal cords respectively. It is not a disease per se, but is a common manifestation of numerous diseases, which may be localized to the larynx or may be of the thorax, neck or cranial cavity or even of various systemic diseases. Vocal fold paralysis leads to glottic insufficiency. The most noticeable symptoms of glottic insufficiency include hoarse sound quality and vocal fatigue.

Adequate glottal closure can improve airway protection and function, decrease aspiration, reduce phonation effort and improve vocal quality. Unilateral vocal fold paralysis (UVFP) is associated with changes in acoustic and aerodynamic voice measurements and can have a significant impact on a patient's quality of life. Failure to close the glottis may also lead to dysphagia; inability to cough and shout; dyspnoea and fatigue related to lifting and straining.

The two main modalities of treatment for glottic insufficiency nowadays include 1) speech therapy and (2) Medialisation thyroplasty.

Voice (or speech) therapy has developed over last 30-40 years and have provided functional exercises and voice production techniques as treatment options in recovering from surgery, preparing for surgery or where possible, avoid surgery altogether. Medialization thyroplasty has been used extensively to treat glottic insufficiency. There are two types of medialization laryngoplasty: 1. Implant and 2. Injection. Implant medialization thyroplasty involves exposing the larynx through direct skin incision and subsequently making a window on the thyroid cartilage and using an implant. The procedure is invasive and requires longer operation time in contrast to injection laryngoplasty. Injection laryngoplasty provides a "quick-fix" to glottic insufficiency and can be carried out relatively easily as an office-based procedure. This study is centred around unilateral vocal cord paralysis and different treatment modalities, both conservative and surgical techniques whilst determining the functional outcome of each treatment modality, using voice quality analysis, pre-treatment and post-treatment.

Materials and Methods

This is a prospective study of 30 patients who presented to ENT Outpatient department, Civil Hospital Ahmedabad with voice complaints between June 2019 to December 2021. Patients with unilateral vocal fold paralysis with any malignancy of larynx and/or thorax ruled out were included in the study. Patients with malignant lesions were excluded. All patients underwent detailed clinical examination including Indirect Mirror Laryngoscopy and Rigid endoscopy with 70^0 Hopkins Rod. Pre operative voice assessment was done on the basis of (1) CAPE-V score (2) Voice Handicap index (VHI). The treatment of VFP can be broken into three management strategies: (1) Speech therapy for a period of 6 months and (2) early surgical intervention - (a) Temporary: injection augmentation (b) Permanent: laryngeal framework surgery (type 1 thyroplasty). Patients were called once a week for speech therapy session for a period of 6 months. They were also taught exercises to perform by themselves at home. All patients were assessed for improvement in voice quality after 1 week, 1 month, 3 months and 6 months.

Results

In our study all patients had primary complaint of hoarseness of voice (100%). Breathiness (63%) was the next common presenting complaint, followed by vocal fatigue (53%). A small number of patients also complained of throat pain (20%) and difficulty in breathing (6%). Treatment modalities adopted were as discussed before – Speech therapy and/or surgical intervention (fat augmentation/type 1 thyroplasty).

Clinical presentations	Number of patients	Percentage
Hoarseness of voice	30	100%
Vocal fatigue	16	53%
Breathy voice	19	63%
Throat pain	6	20%
Difficulty in breathing	2	6%

Table 1: Clinical presentation.

13 patients were given speech therapy alone. 11 patients underwent Type 1 (implant) Thyroplasty while 6 patients underwent fat augmentation. Type-I Thyroplasty was used in patients with large gap between two vocal cords or in patients with contraindication for general anaesthesia. Fat augmentation was used in patients with small gap and was done under general anaesthesia.

Table 2 evaluation of different treatment techniques.

Table 2a: Speech therapy.

Components	Pre-treatment	Post-treatment
VHI score	17	10.2
Cape-v score	55.9	37.6
Subjective	Worse voice	Improve

Table 2b: Fat augmentation.

Components	Pre-op	Post-op
VHI score	20.3	12.5
Cape-v score	58.3	42.3
Subjective	Worse voice	Improve

Table 2c: Type-I thyroplasty.

Components	Pre-op	Post-op
VHI score	17.2	9.6
Cape-v score	56.2	41.9
Subjective	Worse voice	Improve

In 16 patients, the insufficient glottic closure was eliminated or at least reduced after first intervention. In 1 out of 6 patients, fat augmentation was repeated after one month due to inadequate glottic closure. Patients were followed up routinely and examined for improvement in voice quality.

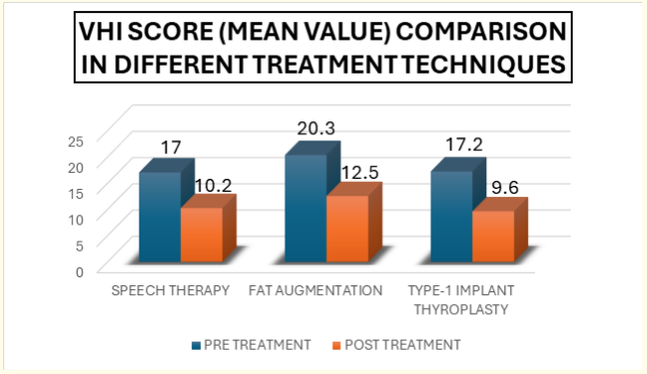

Chart 1

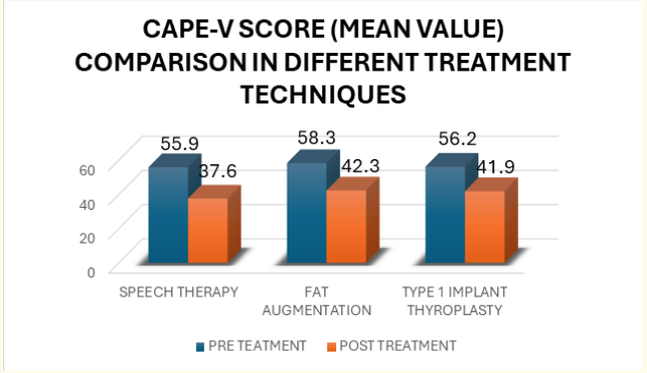

Chart 2

Above sequence of tables and charts show mean value of VHI score and CAPE-V score in 13 patients treated with speech therapy alone, 11 pts of type-1 thyroplasty and 6 pts of fat augmentation. In complications, only one patient treated with Type-1 Thyroplasty developed haematoma at paraglottic space, which resolved spontaneously. No other complications including implant migration was seen in any patient till date.

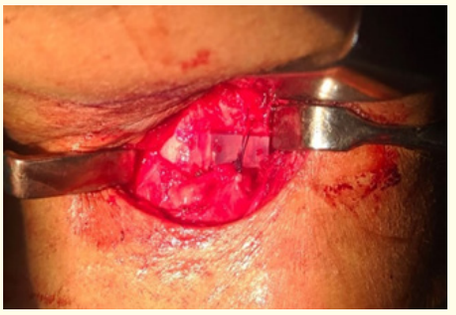

Figure 1: Implantation type 1 thyroplasty.

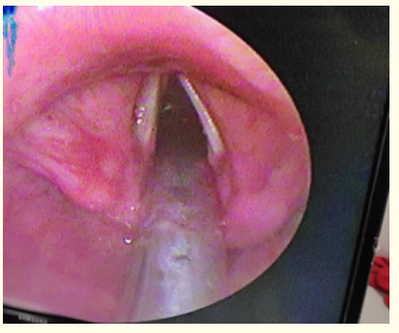

Figure 2: Before fat injection.

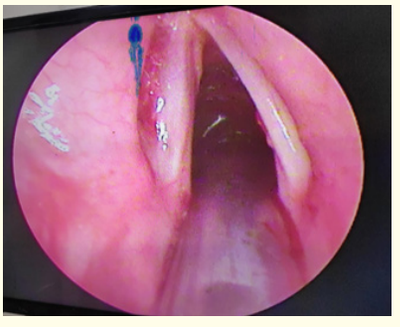

Figure 3: After fat injection.

Discussion

30 patients with unilateral vocal fold paralysis were enrolled into the study. Detailed preoperative assessment was done. All patients for fat augmentation underwent general anaesthesia while type-1 implant thyroplasty was conducted in local anaesthesia (Superior Laryngeal Nerve block). Post operative progress of all patients were noted meticulously and outcome in terms of subjective satisfaction in symptom relief and voice quality parameters, as well as direct endoscopic assessment of the larynx and glottis was done.

Among the complaints with which the patients presented, the most common was hoarseness of voice which was in 100% of the patients included in this study. Followed by it were breathy voice (63%) and vocal fatigue (53%). This observation was supported by study conducted by Kim Min-Hyun., *et al*.

For pre-treatment voice assessment, voice handicap index was calculated by making all patients fill out a questionnaire. 21 out of the total 30 patients had abnormally high values of VHI (70%). It's mean was 17.8. The other 9 had borderline values. This shows that VHI is an important parameter which can be calculated very easily for all patients and this can give us an idea about the subjective sense of voice dysfunction. The mean post treatment VHI score was 10.6 in our study. This marks a significant improvement in patient's sense of his/her voice dysfunction. Patients who underwent speech therapy alone for treatment for hoarseness of voice did not show sufficient glottic closure post-treatment, however they showed an improvement in symptoms due to compensatory mechanism of the opposite (unaffected) vocal cord. This was consistent with Heur., *et al*. [1] (1997) study.

Type-I Thyroplasty was used in patients with large gap between two vocal cords or in patients with contraindication for general anaesthesia. Following thyroplasty, the patients showed significant improvements in the VHI score and CAPE-V score, comparable to the study published by SJ Adams., *et al*. [2] in 1996.

The outcome between both type-1 thyroplasty and fat augmentation was comparable and similar improvement was seen after 6 months of intervention. This was also shown by the study conducted by Hartl., *et al*. [3] in 2009.

Adequate voice rest of at least 2 weeks with strict adherence to post-operative voice therapy is absolutely essential to ensure proper healing and improved outcome in these patients.

Limitation of the study

The limitation in our study was that there are no studies which exactly specify the time duration of voice rest needed. In our study, we followed a protocol of complete voice rest for the initial 48 hours after surgery. Thereafter till 2 weeks post surgery, minimal voice usage was allowed. Then patients were slowly brought back to regular voice usage but were advised to never go back to pre surgery levels. Further studies are required in this direction to find out the optimum time of voice rest.

Conclusion

30 cases of unilateral vocal cord palsy were evaluated for clinical presentation, investigation and management presenting in E.N.T. Department, Civil hospital, Ahmedabad during June 2019 to December 2021. Conservative treatment in form of speech therapy was given to the patients (43%) which helped in improvement of voice quality but not glottic insufficiency. Improvement was seen mainly due to compensatory mechanism. Adequate glottic closure was achieved by both surgical methods that we used. The quality of voice of patients improved both subjectively and objectively. Disadvantage of fat augmentation is that we had to repeat injection in one patient due to its absorption. No obvious complication of both surgical methods has been observed in our study. Post operative speech therapy plays a vital role in recovery of voice quality and overall voice rehabilitation.

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Conflict of Interest

No conflict of interest is between any authors or among any author and other people or organisations.

Ethical Approval

Ethical committee approval and written consent from patients has been taken to participate in this study.

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