ORIGINAL ARTICLE

Laser Cordectomy in Bilateral Abductor Paralysis

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ABSTRACT

Objective: To determine the effects of Unilateral Posterior Cordectomy by CO_2 laser, in terms of improvement of airway with acceptable voice quality, among the patients with Bilateral Abductor Paralysis.

Study Design: A Descriptive study.

Place and Duration of Study: The study was carried out in ENT Department Combined Military Hospital (CMH) Rawalpindi and Armed Forces Institute of Rehabilitation Medicine (AFIRM) Rawalpindi, from August 2011 to July 2015.

Materials and Methods: A total of 33 patients having difficulty in breathing or stridor with bilateral vocal cord paralysis were selected for unilateral posterior cordectomy by CO_2 laser. Prior tracheostomy was carried out. Cordectomy involved laser ablation of one of the vocal cords anterior to vocal process of arytenoids. CO_2 Laser was used in intermittent firing mode, with 5 watt power super-pulse and small spot size. Post operatively all patients were given Intravenous antibiotics, steroids and analgesics. Post operative speech therapy was carried out in all these patients at the AFIRM. Successful outcome was taken as the ability to decannulate with acceptable voice quality.

Results: Decannulation was successful in 31 patients, while acceptable voice quality could not be achieved in 7 patients. Hence successful outcome was made possible in 24 (73%) patients.

Conclusion: Unilateral posterior laser cordectomy, in patients with bilateral abductor paralysis, gives excellent results in improving the airway, while preserving an acceptable voice quality.

Key Words: *Co_2 Laser, Posterior Cordectomy, Vocal Cord Paralysis*

Introduction

Bilateral abductor paralysis with respiratory distress is not a very common finding, but may present as an acute emergency. Iatrogenic trauma, especially the thyroidectomy, has been seen as the commonest cause for this problem. The patient presents with dyspnoea and stridor, although voice quality is not affected.

First surgical intervention to address this problem was carried out by Chevalier Jackson in 1922 when he removed the entire vocal fold along with the ventricle (ventriculo-cordectomy). Since then various surgical procedures including various types of arytenoidectomy and other lateralization procedures have been carried out with varying results., Of course, aim of all these procedures was to improve the airway. But it was always at the cost of quality of voice. In any procedure designed to improve the airway the surgeon has to strike a delicate balance between patent airway and acceptable voice quality. Hence further developments in this context were made to improve the airway while preserving good quality voice as well.

In 1989, Dennis and Kashima carried out posterior laser cordectomy to address this problem. Cordectomy involves ablation of vocal fold along with the vocalis muscle. Although this procedure gives good respiration, but quality of post operative voice is less than ideal, hence reinnervation procedures were attempted to gain better voice quality, but showed inconsistent results. Bilateral posterior cordotomy is another modification in this regard. But no matter whatever procedure is adopted for improvement of airway, it is a compromise with the voice quality. But since, voice quality is not the primary aim in this condition, an acceptable voice quality with decannulation of the patient is considered a successful outcome. Since posterior laser cordectomy with Carbon Dioxide laser gives successful outcome in around 90% of the cases with negligible complication rate, it has

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become procedure of choice. Moreover, it is a safe and simple procedure which can be repeated without any increase in morbidity. However, this procedure cannot be undertaken in patients having thick, short necks or having fixation of spine as vocal cords are not properly visible.

Materials and Methods

A descriptive study was carried out in ENT Department, Combined Military Hospital Rawalpindi and Armed Forces Institute of Rehabilitation Medicine (AFIRM) Rawalpindi, from August 2011 to July 2015. The aim of this study was to determine the effects of Unilateral Posterior Cordectomy by CO_2 laser, in terms of improvement of airway with acceptable voice quality, among the patients with Bilateral Abductor Paralysis.

In this duration, 33 patients (n= 33) with Bilateral Abductor Paralysis reporting in the ENT OPD with complaints of difficulty in breathing and stridor, were selected by convenient sampling. Only those patients were included, in whom, at least six months had passed since they suffered this problem, as six to nine months are required for spontaneous recovery. Those patients, who had already undergone some corrective surgery, were not included in the study. Those patients, who refused to undergo laser surgery, were also excluded from the study. Nineteen of these patients had stridor even at rest and urgent tracheostomy was carried out on them. Detailed history was taken in all these cases to determine the cause and duration of cord paralysis. Complete ENT and head and neck examination was carried out in these patients. Indirect laryngoscopy and flexible fibreoptic laryngoscopy were carried out in all of them. Routine investigations were carried out in all these patients, while CT scans of base of skull, neck and thorax, Blood Glucose levels (R), Coagulation Profile, Serum Lipid profile and ESR were done in the patients with no apparent cause. The selected patients were counseled about procedure of vocal cordectomy with Carbon Dioxide Laser and its effects on airway and voice quality.

All of these patients underwent surgery. All of them were operated by the same Consultant ENT surgeon. Cordectomy involved laser ablation of one of the vocal cords anterior to vocal process of arytenoids. Carbon Dioxide Laser was used in intermittent firing mode, with 5 watt power super-pulse and small spot size. Post operatively all patients were given Intravenous antibiotics, steroids and analgesics. Post operative speech therapy was carried out in all these patients at the AFIRM Rawalpindi. Successful outcome was taken as the ability to decannulate with acceptable voice quality, the voice that is easily understandable.

The parametric data was analyzed for frequencies by SPSS 19.

Results

The causes of bilateral abductor paralysis are shown in Table I.

Table: I. Etiology of Bilateral Vocal Cord Paralysis

S.No	ETIOLOGY	NO OF PATIENTS
1	Surgical Trauma	23 (70%)
	a. Thyroid Surgery	20
	b. Cardiac Surgery	01
	c. Tracheal Surgery	02
2	Accidental Trauma	03 (9%)
3	Idiopathic (No known cause)	07 (21%)
	Total (n)	33

Unilateral posterior laser cordectomy was carried out in 33 patients. Twenty (61%) patients were successfully decannulated on 5th post operative day, while 5 (15%) patients were decannulated in the 2nd post operative week. In four (12%) of these patients procedure had to be repeated once after a fortnight, while in two patients (6%) the procedure was repeated thrice fortnightly, before decannulation was possible.

Two (6%) patients could not be decannulated despite repeated procedures. In 7 (21%) patients, the post operative quality of voice was poor. Hence the successful outcome was possible in 24 (73%) patients.

Discussion

Our study shows success in 73% of the patients. These results are comparable with results of other studies carried out at various centers. Our study also describes thyroidectomy to be the commonest cause of bilateral abductor paralysis.

Bilateral abductor paralysis is a potentially life threatening condition. Its management is one of the biggest challenges an Otolaryngologist has to come across, and still tracheostomy is considered to be the safest and permanent solution for this problem.

Bilateral abductor paralysis mostly occurs as a result of trauma, mostly iatrogenic. Among surgical procedures, thyroidectomy has been the most frequent cause. Our study also confirmed this fact. In our study the thyroidectomy appeared to be the most frequently carried out surgical procedure (87%) that resulted in bilateral abductor paralysis. Probably it is the result of poor surgical technique where the surgeon does not identify the recurrent laryngeal nerves while doing surgery. Other such studies also show thyroidectomy to be the most frequent cause of bilateral abductor paralysis. Ozdemir et al (2013) also showed thyroidectomy as the surgical procedure resulting in bilateral abductor paralysis in 92% of the patients.

As posterior glottis accounts for 50-60% of the glottis, any surgical intervention in this area is bound to improve the airway. This is the basis for posterior laser cordectomy, but degradation of voice quality after any such procedure is a known fact. The patients included in this study were counseled about this outcome. Any improvement in the airway is always at the cost of voice quality. In our study, decannulation was possible in 76% of the patients after first surgical intervention. The results are not much different from other studies as decannulation was made possible in 94% of the patients after repeated interventions. Khalil & Tawab (2014) had similar results in terms of improvement in airway. Similar results in terms of improvement in airway were shown in another study by Motta S et al (2003). Another study also showed improvement of airway in 89% of the patients and similar results were shown by Shvero et al (2003).

In our study satisfactory voice quality was achieved in 73% cases. Similar results were shown in a study by Segas et al (2001). Dispenza et al (2012) also showed satisfactory results in a similar study. Landa et al reported a 95% success rate with posterior transverse cordotomy, with excellent voice outcome. Although our study includes only 33 patients in a descriptive case series, it may not be very significant. Hence, it is recommended that further studies be carried out at a broader level that should compare the results of various surgical procedures carried out to manage bilateral abductor paralysis.

Conclusion

Unilateral posterior laser cordectomy, in patients with bilateral abductor paralysis, gives excellent results in improving the airway, while preserving an acceptable voice quality.

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