ORIGINAL ARTICLE

Consequences of CO_2 Laser Surgery for Benign Vocal Cord Lesions

IMRAN SAEED[1], MUHAMMAD IRSHAD MALIK[2], ALI HUSNAIN SHAIKH[3]

ABSTRACT

Background: Laryngeal disorders are the major source of hoarseness which effects on quality of life of patients so greater concern of ENT surgeons is to protect patient's voice. Although surgery is a good option in benign cases but it can damage the vocal cord or may result in poor functional outcome. This study was done to evaluate the outcomes of CO2 laser surgery for the treatment of benign vocal cord lesions.

Methodology: A descriptive Case Series study was carried out at E.N.T Department of Jinnah Hospital, Lahore from 20-04-2016 to 21-10-2017. Forty-five patients suffering from benign vocal cord lesions who received CO2 laser surgery for treatment were included in the study. All those patients who suffered from vocal cord malignancies, treated for benign vocal cord lesions, unwilling for CO2 surgery, having systemic diseases; thyroid, diabetes, and granulations were excluded from current study. All the patients were followed up at 6 months for acceptance of voice, recovery of lesion and hospital stay < 2 days. The data was collected in a specially designed proforma and was described as frequency distribution table.

Results: Majority (62.2%) of the patients of current study were males, presenting high male to females ratio 1.64:1, as 17 out of 45(37.8%) patients were female. Acceptance of voice was seen among 89.9% patients, whereas recovery of localized lesions was noticed in 91.1% patient, as well as hospital stay < 2 days among 84.4% patients.

Conclusion: Males commonly affected with vocal cord disorders, whereas laser beam due to power (<1 W), reduced exposure time (milliseconds), use of micro-manipulators with a focused microspot diameter of less than 300 is effective strategy for the treatment of benign vocal cord lesions and is recommended in our setup.

Keywords: CO2 laser surgery; benign vocal cord lesions

INTRODUCTION

Benign vocal cord lesions extremely implement person's quality of life due to inducing hoarseness[1]. Voice is the fundamental working tool in Western civilization[2]. Van Houtte detected 41% voice disorder in professionals whereas Fortes outlines professionals including singers, consultants, teachers, layers, sales persons and health professionals frequently complain of voice problems and seek medical aid[3]. Singer's nodule, polyps, papilloma, polypoidal degeseration (Reinke's oedema) and cysts are the benign lesions that observed in ENT departments routinely. These lesions may affect voice quality and excessive growths may cause respiratory distress. Vocal nodules, polyps or cysts do not rule out a malignancy unless lesion resolves with treatment or it is pathologically benign[4]. Ahmed N et al from Pakistan during analysis of patient's total annual admission in hospital in the year 2001detected 1.5% patients admitted in hospital for biopsy purpose of neck nodes/ larynx/ hypo pharynx[5].

Vocal cord overuse, misuse and abuse probably cause excessive mechanical stress and trauma in the membranous portion of the vocal fold considered as major elements in wound formation. (1) Several scientific researchers reported vocal cord polyps to be the commonest type of laryngeal lesion seen predominantly in 21-50 years males (male to female ratio 3:1), presented with voice hoarseness, cough, foreign body sensation and throat pain[6]. In the era of laryngeal microsurgery an important technological advancement was carried out in 1960'for laryngeal surgeons for in the form of CO_2 laser[7]. It works like a very precise hot knife with minimal collateral damage[8]. Beneficial experiences of laser therapy such as shorter duration of therapy, fewer side effects, lower morbidity and high cost-effectiveness over conventional therapy including open surgery and/or radiotherapy[9].

The reported functional results are usually encouraging as tracheotomy is not necessarily implemented, requires short duration of hospitalization and salvage therapy (surgery and/or radiotherapy) is not requisite[10]. Causes minimum disturbance of the Reinke's space, helps in superior epithelial regeneration and also diminishes the risk of peri-operative bleeding and edema[9]. As application of CO_2 laser treatment strategy involve apprehension of the effect of spot size, wattage, mode, soft tissue interactions, its complications, noesis about postoperative hospital stay, voice acceptance and recovery of localized lesions. The reason behind planning this study is to know whether claims are made in favor of CO_2 laser surgery 4.21%. Stands true or not, and how beneficial this technique is for the treatment of patients in our setup.

The objective of the study was to assess the outcome of CO2 laser surgery for treatment of benign vocal cord lesions.

METHODOLOGY

A descriptive Case Series Study was carried out in Jinnah Hospital Lahore within six months i.e., from April 2008 to September 2008. Through non-probability purposive sampling technique with 95% confidence level 45 cases was selected, 15% margin of error and taking expected percentage of hospital stay of <2 days i.e. 49.66%. Adults of both genders above 15 years with diagnosed cases of benign vocal cord lesion including fiber opticnaso

---

[1]Associate Professor Paediatric ENT, The Children Hospital Lahore.
[2]Associate Professor Gujranwala Medical College Gujranwala
[3]Assistant Professor Akhter Saeed Medical College, Lahore.
Correspondence to Dr. Imran Saeed
Email: drimransaeed@gmail.com, Mob# 03334254776

pharyngoscopy, planned to undergo surgery, hoarseness of voice were included in the study. Whereas all those patients suffering from malignant laryngeal malignancies diagnosed clinically and/or Histologically, patients treated somewhere else for benign vocal cord lesions by taking history or patients not willing to undergo CO_2 surgery, patients having systemic diseases like thyroid, diabetes, granulations assess on the history and clinical examination were excluded from study. Patients were confirmed about confidentiality**.** After taking informed consent from 45 subsequent patients presenting with benign vocal cord lesion in Outpatient department of Jinnah Hospital Lahore, fulfilling the inclusion criteria, there Socio-demographic data like name, age, gender, and address was collected. CO_2 Laser surgery was performed by Associate Professor of ENT department of Jinnah Hospital, Lahore. Patients were followed up at 6th month after discharge and were subjective wise assessed in terms of voice acceptance, recovery of localized lesion like fiberoptic Naso pharyngoscopy and hospital stay. Information collected from subjects was then entered in a specially designed proforma. All the collective data was subsequently entered in SPSSversion10.0 and was later on analyzed. Age was presented in terms of mean and standard deviation. Gender, voice acceptance, recovery of localized lesion and hospital stay was described in terms of frequency and percentage.

RESULTS

Forty-five patients were included in this study. The mean age of the study participants was 38.87 + 9.66 years with the range between 19 – 55 years. Two out of 45 patients with a percentage of 4.47% were between the ages of 15–20 years, out of 45 subsequent samples 4(11.1%) of them were between the ages of 21-30 years, of these patients suffering from vocal cord disorders 17(37.8%) subjects were in the middle of age range 31–40 years, Table 1 presents the age range of subjects suffering from vocal cord disorders. Out of 45 patients suffering from laryngeal disorders majority were males 28(62.2%) presenting predominant ratio of F:M, 1: 1.64.

Voice acceptance was observed among 40(88.9%) patients, whereas only 5 patients (11%) demonstrate controversial results as voice was not acceptable among them. Of these 45 vocal cord disorder patients**,** almost all of them 41(91.1%) demonstrates recovery of localized lesions, only very few of these patients 4(11.1%) did not show recovery of localized lesions. Majority **of t**hese patients 38(84.4%) stay in hospital for less than 2 days and exclusively 7(15.6%) patients hospital stay in hospital for more than 2 days.

DISCUSSION

Restoration of normal vocal function in patients with benign vocal cord lesions is off fundamental importance. Constant progress in carbon dioxide (CO2) laser technology has resulted in general optimization of laser surgery use to a focused micro spot diameter of less than 300 µ. This in turn has led to reduced thermal damage of tissue and allowed safe application of laser sinphono surgery, an area where traditionally 'cold steel' instruments have been used. This study was performed to determine the outcome of CO_2 laser use for benign vocal cord use. This study included 45 patients with vocal cord lesions treated with CO2 laser and the results were in favor of laser use with acceptance of voice among 89.9%, recovery of localized lesions in 91.1% patient, and hospital stay <2 days among 84.4% patients. In literature, the studies available which have described the outcome of laser surgery are scanty and different parameters have been used by different authors. Hussain SS carried out a comparative study (1995-1997) at CMH Rawalpindi on 100 patients and compare CO_2 Laser in laryngeal surgical techniques with conventional surgical techniques. His detected consequences confirm affectivity of CO_2 laser, as CO_2 improved the precision of traditional endo laryngeal surgical procedures and has made the end laryngeal approach possible for operations formerly performed only by external approaches[11].

Hussain SS observed less than half (49.66%) of his study sample stay postoperatively in hospital < 2 days, where as in our research where majority (84.4%) of the patients did not stay more than 2 days in hospital post operatively. In case o fvoice acceptance the results are same as Hussain SS demonstrate 84.21% patients with voice acceptance and in current study 89.9% patients presents voice acceptance.[(11)]When we compare the consequences of recovery of localized lesions, the results were again almost similar as 84.21% subjects of Hussain SS research presents recovery of localized lesions however almost all (91.1%) of current research subjects manifested recover of localized lesions. The results of both studies (current and Hussain SS) were encouraging and in favor of laser surgery[11]. Another study was carried out by Geyer, et al[12]. He evaluated glottic function following carbon dioxide laser-assisted phono surgery of benign laryngeal disease on 235 consecutive patients. The outcomes were confirming the effectiveness of laser therapy as 94.3% patients recovered. On the other hand, in our study, the recovery was assessed with fiberoptic nasopharyngoscopy and recovery was seen among 91.1% patients. Voice acceptance in our study was seen among 89.9% patients who were assessed subjectively. In the study of Geyer, the quality of voice was assessed objectively by elecroacaustic voice recorders. They observed a significant improvement in different parameters of voice quality e.g. the pre-surgery voice frequency among male was124.6+27.1whichimproved to 168.4 + 44.6 Hz (P < 0.001). The results of this study are more reliable due to large sample size moreover they assessed the outcome parameters on the objective basis. Whereas in our setup, due to cost issues we couldn't assess the quality of voice. Similarly, patients follow up is also a problem in third world country as majority of patients belong to poor and illiterate population.

CONCLUSION

TheuseofCO2laserfortreatmentofbenignvocalcord lesion results in high frequency of recovery and voice acceptance. Short hospital stay was also observed in majority of patients. So, its use is recommended in our setup for patients with vocal cord lesions.

Conflict of interest: None

Source of Funding: None to declare

limitations of study: It was first study to be conducted in the setup of public sector hospital to evaluate the outcome of CO2 laser use for benign vocal cord use. Although it presents the effectiveness of CO2 therapy but it was done in a single Teaching Hospital, to get more generalized and reliable results, patients of different hospitals of the provinces should be included.

REFERENCES

1. Saha DPP, Jana DS. A Clinicopathological Study of Benign Lesions of the Vocal Fold. IOSR J Dent Med Sci [Internet]. 2017; 16 (02): 09–12. Available from: http://www.iosrjournals.org/iosr-jdms/papers/Vol16-issue2/Version-1/B1602010912.pdf
2. Van Houtte E, Van Lierde K, D'Haeseleer E, Claeys S. The prevalence of laryngeal pathology in a treatment-seeking population with dysphonia. Laryngoscope. 2010; 120 (2): 306–12.
3. Imamura R, Tsuji DH, Sennes LU. Profile of Voice Professionals. Braz J Otorhinolaryngol [Internet]. AssociaÃ§Ã£o Brasileira de Otorrinolaringologia e Cirurgia CÃ©rvico-Facial; 2007; 73 (1): 27–31. Available from: http://dx.doi.org/10.1016/S1808-8694(15)31118-6
4. Huang DY1, Yang WY, Yu P, He Y HD. Case-control survey on risk factors of benign vocal fold lesions. Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi. 2008; 43 (2): 120–4.
5. Nisar Ahmad, Aamir A H, Iqbal Hussain SG. Annual prevalence of various diseases in hospitalized patients in a tertiary level teaching hospital at Peshawar. Pak J Med Res. 2004; 43 (4): 166–71.
6. Singhal P. Benign tumors of the larynx : a clinical study of 50 cases. Indian J Otorangeal Head Neck Surg. 2009; 61 (Suppl 1): 26–30.
7. Benninger MS. Microdissection or Microspot C0 2 Laser for Limited Vocal Fold Benign Lesions : A Prospective Randomized Trial. Laryngoscope. 2000; 110(Suppl 92): 1–17.
8. Yan Y, Olszewski AE, Hoffman MR, Zhuang P, Ford CN, Dailey SH, et al. Use of Lasers in Laryngeal Surgery. J Voice [Internet]. Elsevier Ltd; 2010; 24 (1): 102–9. Available from: http://dx.doi.org/10.1016/j.jvoice.2008.09.006
9. Brandenburg JH. Laser cordotomy verses radiotherapy: An objective cost analysis. Ann Otol Rhinal Laryngol. 2001; 110: 312–8.
10. Eckel HE. Local recurrences following transoral laser surgery for early glottic carcinoma: frequency, management and outcome. Ann Oro! Rhino! Laryngo. 2001; 110: 7–15.
11. Hussain SS. Comparative study of Laser and Conventional Surgery in laryngeal diseases. Pak Armed Forces Med J. 2004; 54 (1): 54–8.
12. Geyer M, Peppino G, Neil L, Brennan PA, Puxeddu R. Carbon dioxide laser-assisted phonosurgery for benign glottic lesions. Eur Arch Oto-Rhino-Laryngology. 2010; 267: 87–93.