



TREATMENT OF EARLY HEAD AND NECK MALIGNANCIES USING CO₂ LASER : OUR EXPERIENCE

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ABSTRACT

Introduction: Since 1970s, CO₂ laser has been an effective method of treatment of several types of Head and Neck lesions. Because of the precise cutting and superficial well delineated effect of the CO₂ laser, it is widely used in laryngology for delicate phonatory surgery, benign lesions, precise excision of carcinoma in situ or early (T1) tumors, and vaporization of bulky obstructing carcinoma of the upper airway.

Objective: To check efficacy of transoral CO₂ laser in treatment of early head and neck cancers.

Material and method: Total of 197 patients with both malignant and non malignant lesions were treated with CO₂ laser from January 2016 to December 2017. Out of these, 22 patients who had early HNCancers (18 laryngeal cancers, 4 tongue cancers) were treated with CO₂ laser. In all patients history, examination and relevant investigations were done for TNM Staging of the tumor and were treated with transoral CO₂ laser. Type of procedure, any intraoperative or postoperative complication was documented.

Result: Out of 18 patients of carcinoma larynx, 4 underwent type 1 cordectomy, 9 underwent type 2 cordectomy and 4 underwent type 3 cordectomy and 1 patient underwent type 4 cordectomy depending on depth of lesion. All 4 patients of carcinoma tongue underwent wide local excision with supra omohyoid neck dissection. HPE of all cases showed tumor free margins. All patients are under regular followup. 2 patients with Ca larynx had recurrence.

Conclusion: Our study showed that CO₂ laser is treatment of choice for early HNCancers.

KEYWORDS : CO₂ Laser , early head and neck cancers.

INTRODUCTION:

the word LASER is an acronym for light amplification by stimulated emission of radiation. The main stay of lasers in otorhinology and head and neck surgeries is CO₂ laser. Co₂ laser was first developed by Patel et al in 1964¹, and was introduced for medical use in early 1970s^{2,3,5}. It was the first laser to be used clinically in otorhinology by Strong and Jako^{4,5}. CO₂ lasers produce light with a wavelength of 10.6 microm in the infrared (invisible) range of the electromagnetic spectrum. A second, built-in, coaxial helium neon laser is necessary to indicate with its red color the site where the invisible CO₂ laser beam will impact the target tissue. This laser, then, acts as an aiming beam for the invisible CO₂ laser beam. The radiant energy produced by the CO₂ laser is strongly absorbed by pure, homogeneous water and by all biological tissues high in water content. The extinction length of this wavelength is about 0.03 mm in water and in soft tissue; reflection and scattering are negligible. Because absorption of the radiant energy produced by the CO₂ laser is independent of tissue color and because the thermal effects produced by this wavelength on adjacent nontarget tissues are minimal, the CO₂ laser has become extremely versatile for use in otolaryngology - head and neck surgery. CO₂ transoral laser microsurgery (TLM) is an emerging technique for the management of laryngeal cancer and other head and neck malignancies. The CO₂ laser is coupled to a micromanipulator and microscope, which provides enhanced tumor visualization and the ability to perform precise tissue cuts, obtain excellent hemostasis, and avoid damaging the surrounding tissues and structures that are transected during open surgical procedures. This study was done in department of Otorhinolaryngology and head and neck surgery GMC Srinagar, to check efficacy of transoral CO₂ laser in treatment of early head and neck cancers.

MATERIAL AND METHODS:

This study was conducted in department of Otorhinolaryngology and head and neck surgery GMC

Srinagar for 2 years (2016, 2017). 34 patients who had early Head and Neck cancers (18 laryngeal cancers, 4 tongue cancers) were treated with CO₂ laser. In all patients relevant history was taken. Personal history about any addiction (smoking, tobacco chewing, alcohol) was taken. Proper examination was done in all patients. oral cavity and oropharynx were examined. Site of lesion was palpated for any induration in tongue. Indirect laryngoscopy was done. FOL was done in all patients of laryngeal lesions. Excision biopsy of all lesions was taken and sent for HPE. Neck was examined for any cervical lymphadenopathy. All baseline investigations were done. MRI tongue was done in patients with CA tongue, and CECT neck was done in all patients with CA larynx. MRI tongue and CECT neck was done before taking the biopsy. During the procedure all laser precautions were taken. Recommended power settings were kept. In laryngeal surgeries power of 3 to 5 W, depth of 1mm was taken, while in oral surgeries Power of 4 to 8 Watts was used, depth of 1 mm. spot size was kept between 0.3 to 0.7 mm. Mode was kept repeat superpulse in all surgeries.

RESULTS:

from January 2016 to December 2017, 22 patients with early head and neck cancers (T1 and T2) were treated in our department with CO₂ laser. . Among 22 patients, 18 were having laryngeal cancers, 4 were having tongue cancers. All patients were above 45 years of age. All 18 patients with laryngeal ca were males while all 4 patients with ca tongue were females. Majority of patients were from rural areas (64%). All patients with Ca larynx presented with change of voice. On FOL, vocal cord mass was present in all patients.

Table 1; Stage wise Distribution of Malignant lesion in Larynx

T Stage	Number of patients n=18	Percentage
T1	8	44.4%
T2	10	55.6%
Total	18	100%

Table 2; Type of Malignancy in Larynx

Type of Malignancy in larynx	Number of patients n=18	Percentage
Well differentiated sq.cell carcinoma	7	38.88%
Moderately differentiated sq.cell carcinoma	11	61.11%
Total	18	100%

Table 3; Type of Laser Cordectomy

Type	Number of patients(n=18)	Percentage
Type I	4	22.2%
Type II	9	50%
TypeIII	4	22.2%
Type IV	1	5.5%

Patients with ca tongue presented with lesion on border of tongue .

On examination all patients with ca tongue were having tongue ulcer with induration. Neck nodes were absent in all patients.

Table 4; Stage of malignant Lesions in Oral cavity (tongue)

Stage of malignant Lesions	Number of patients n=4	Percentage
T1	1	25%
T2	3	75%
Total	4	100%

All 4 patients underwent wide local excision of tongue using CO2 laser with supraomohyoid neck dissection.

Table 5, Recurrence:

Site of recurrence	No. of patients	Percentage (n= 119)	Procedure done post recurrence.
Subglottis	2	1.68%	Patient 1) Salvage laryngectomy Patient 2)Palliative chemotherapy
Total	2	1.68%	

Recurrence was seen in two patients of Ca larynx (1.68%). In both the patients the recurrence site was Subglottis. One patient among these underwent Salvage laryngectomy while another patient underwent Palliative Chemotherapy, due to comorbid conditions. No recurrence was seen in patients who were operated for Ca tongue. There was not any laser related Intraoperative or postoperative complication.

DISCUSSION:

This prospective study was conducted first time in the department of Otorhinolaryngology Head and Neck Surgery, Government Medical College and Associated SMHS Hospital Srinagar. The study included 22 patients with head and neck malignancies. Among the patients studied 18 patients were having laryngeal malignancy while 4 patients were having tongue malignancy.

T1 laryngeal Ca was seen in 44.4% of pts while T2 lesions was present in 55.6%(table 1). Moderately differentiated Ca was seen in majority of patients with laryngeal Ca(table 2).

Cordectomy was done in 18 patients with Ca larynx. As shown in Table 3 Among these 4 patients underwent type 1 cordectomy all of which were having T1 lesions, 9 patients underwent type II cordectomy, 4 underwent type III and 1 patient underwent type IV cordectomy. Patients who underwent type II cordectomy either had T1 or T2 lesions while all patients who underwent type III or type IV cordectomy were having T2 lesions while all patients with Ca tongue underwent wide

local excision with supraomohyoid neck dissection. According to study by C Bocciolini et al,⁶ A cohort of 79 patients with previously untreated early glottic carcinoma, subjected to endoscopic CO₂ laser excision between January 1993 and October 2000, was retrospectively examined . The population comprised 75 males (95%) and 4 females (5%), age range 40-93 years (mean 66.5). . Eight (10.1%) patients experienced local recurrence within periods varying from 4 to 55 months (mean 14.5). According to another the study by Vijay K Sharma et al⁷ on evaluation of CO₂ laser surgery for early carcinoma larynx where (n=40) Patients underwent trans oral laser surgery or radiotherapy as primary modality of treatment . This study revealed local recurrence rate 10% in CO₂ laser treated arm which was not statistically significant. In our study ,2 patients had recurrence (4.44%). In one patient recurrence was seen after 9 months of surgery , in another patient it was seen after 11 months of TOLE. Rest all patients are disease free. The recurrence rate in our study is less than the above mentioned studies, which may be due to the short study period.(table 5)

4 patients in our study were having Ca tongue. Among these 3 patients were having T2 lesion while 1 was having T1 lesion (table 4). HPE results showed squamous cell carcinoma in all patients.Thirty-seven consecutive patients with cancer of the anterior two-thirds of the tongue without clinical neck lymph nodes or distant metastasis were treated with transoral CO₂ laser microsurgery. Wang et al.⁽⁸⁾ resected the tumour under surgical microscope. Of the 28 patients in the T1/T2 group, 26 patients did not receive postoperative radiotherapy. The local control rate in all 37 patients at 5 years was 93.6 %. No local recurrence occurred in the T1 or T2 cases. In our study , none of the patients had recurrence which may be due to the less number of patients studied (table 5).

CONCLUSION:

It is concluded that CO₂ laser surgery is a preferable surgery for early head and neck cancers.

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