



ROLE OF CO₂ LASER IN ENT

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ABSTRACT Role of CO₂ LASER IN ENT. Objective :To study role of Carbon Dioxide laser and its application in surgeries of ear, oral cavity, pharynx, larynx & trachea. Method: This is a descriptive study of 90 patients carried out at Department of ENT and Head-Neck Surgery, B. J. Medical College and Civil Hospital, Ahmedabad who were treated by using CO₂ laser. Results & conclusions : We had used CO₂ laser in 88 patients in our institute under ENT department. Out of these 88 cases only 5 patients showed intra-operative bleeding, 3 patients had post-op oedema was seen. Hence it suggests that laser surgery is bloodless with minimal oedema which resolves within few days

KEYWORDS : CO₂ laser , ENT , otolaryngology

Introduction:

Laser is an abbreviation for Light Amplification by Stimulated Emission of Radiation. It was invented by Gordon Gould in 1958, USA.

Lasers can be visible or invisible. Visible lasers produce light of shorter wavelength in the visible spectrum seen by human eye. Example: Argon, KTP 532 laser, and Nd: YAG Laser. Invisible lasers have longer wavelengths, example CO₂ lasers.

The different types of laser most commonly used in otolaryngology:
 1. CO₂ Laser: It produces a continuous wave of coherent light at a wave length of 10600 nm which is absorbed by water and soft tissues. It has high precision and sequentially removes layers of cells. Advantages of CO₂ laser:

- Bloodless dissection: The laser beam can seal blood vessels up to 0.5 mm in diameter.
- Immediate tissue destruction by instantaneous vaporization
- Minimal instrumentation required to deliver the laser beam
- Minimal damage to adjacent tissue with minimal post-operative oedema.

2. Argon Laser: Produced by Argon gas with blue green visible light of 488-514 nm.

- It has high photo coagulation power
- There can be moderate surrounding tissue damage

3. KTP – 532: (Crystal of potassium titanyl phosphate)

- Produce by a blue-green visible light of 532 nm
- Does not require an aiming beam
- Absorption high in vascular tissue
- Moderate surrounding tissue damage

4. Nd: YAG: Crystal rod of Yttrium aluminium garnet with neodymium ions.

- Produces infrared light of 1064 nm
- Requires an aiming beam
- Absorption good in vascular tissue
- Moderate surrounding tissue damage

Indications of Laser:

CO₂ laser is most commonly used in ENT.

- Larynx: Done with microlaryngoscopy for juvenile laryngeal papillomas, laryngeal web, vocal nodules, capillary haemangioma, T1 carcinoma of mobile vocal cords, arytenoidectomy and subglottic stenosis^(1,2,3,4)
- Oral cavity: Debulking of large inoperable tumours, tonsillectomy in cases of blood dyscrasias, superficial lesions and palatal surgeries like uvulopalatopharyngoplasty⁽⁸⁾
- Nose: Inverted papilloma, haemangioma, nasal polyps, turbinectomy and nasal tumours. This is combined with

sinoscopy

- Tracheobronchial tree: Respiratory papillomatosis, tracheal stenosis, granulation tissue, bronchial adenoma^(5,6,7)
- Ear: Myringotomy, stapedectomy, Acoustic neuroma.⁽⁹⁾

AIMS & OBJECTIVE

- To study Carbon Dioxide laser and its application in surgeries of ear, oral cavity, pharynx, larynx & trachea.
- To study indications and complications of CO₂ laser surgeries in ear, nose, oral cavity larynx and pharynx.
- To study effectiveness of carbon dioxide laser and its efficacy.

Material & Methods

This is a descriptive study of 90 patients carried out at Department of ENT and Head-Neck Surgery, B. J. Medical College and Civil Hospital, Ahmedabad. All the patients included in the study were explained about the purpose and use of the study and after their consent only they were included in the study. All the patients were evaluated in ENT OPD pre-operatively for history, general examination and ENT examination All the patients were operated at ENT OT during period between June, 2015 to June, 2017 at Civil Hospital, Ahmedabad. Laser surgeries were performed by The LUMENIS and the CLINICON LASER SYSTEM.



Figure 1 : CLINICON CO2 LASER

Observation and discussion

Table 1 : Gender distribution in study

Total	Male	Female
87	48	39

Table 2 Age distribution in study

Total	<15 years of age	15-40 years of age	41-60 years of age	>60 years of age
87	20	41	19	7

Figure 2 diagnosis of patients operated by CO2 laser

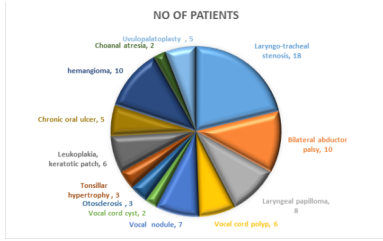


Table 4 : complications in different surgeries

	Immediate edema	Bleeding	Subcutaneous emphysema	Late granulations	Recurrence
Post corrosive laryngeal stenosis	2	-	1	3	1
Post intubation laryngeal stenosis	2	-	-	1	1
Bilateral abductor palsy	-	-	-	-	-
Laryngeal papilloma	1	-	-	-	3
Vocal cord polyp	-	--	-	-	-
Vocal nodule	-	-	-	-	-
Vocal cord cyst	-	-	-	-	-
Otosclerosis	-	-	-	-	-
Tonsillar hypertrophy	-	-	-	-	-
Leukoplakia, keratotic patch	-	-	-	-	-
Chronic oral ulcer	-	-	-	-	-
hemangioma	-	-	-	-	-
Choanal atresia	-	-	-	-	1
Uvulopalatoplasty	-	-	-	-	-

Outcomes of laser surgery

However , all surgical procedures are bound to be associated with some kind of complications ,laser is no exception.

Table 3:

Total number of cases	Patients with complications	Patients without complication
87	11	76

Otolaryngol Clin North Am. 2006;39:159-172"

Limitations of laser surgery

- Operative areas to be equipped with oxygen and drugs and CPR
- Expert training is required.
- Imprecisely aimed laser beam can destroy and burn healthy tissue.
- Fire hazard has to be tackled with proper eye care for surgeon and covering the patients face with water soaked drape.
- In cases of micro laryngeal laser assisted surgery laser flex endotracheal tubes has to be used.
- Cost factor to the patient will be higher if the set up for LASER has to be made commercially viable.

Conclusion

- We had used CO2 laser in 88 patients in our institute under ENT department.
- Out of these 88 cases only 5 patients showed intra-operative bleeding, 3 patients had post-op oedema was seen. Hence it suggests that laser surgery is bloodless with minimal oedema which resolves within few days.
- No cases of infection or cross infection were reported as no contact with the tissue and nominal instrumentation is necessary in laser surgery.
- Out of 88 cases , 68 were discharged after one day and 20 patients required admission for more than 1 day. So the duration and cost of hospital stay is decreased.

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