RADICAL CHANGES IN CONVENTIONAL TECHNIQUE OF LARYNGEAL SURGERY BY LASER

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A review of laser surgery in laryngeal disease is made. Of special interest are patients suffering from benign laryngeal conditions such as papilloma, laryngeal polyps, etc. Laser is also of good value in early cases of laryngeal carcinoma, specially so in cases of T I glottic carcinoma.

With the introduction of laser (light amplification by stimulated emission of radiation) radical changes have taken place in conventional techniques practiced in laryngeal surgery'. Laser may also be explained as a surgical knife which works in the depth of the larynx with ultimate accuracy and without opening the larynx or extended surgical maneuvering.

In 1971 it was used to treat lesion in larynx coupled with operating microscope. There are many types of lasers. Presently widespread use of carbon dioxide laser for treating lesions of the oral cavity, pharynx, larynx and tracheobronchial tree has been facilitated by previous experience with techniques of endolaryngeal microsurgery.

The actual tissue effects produced by the radiant energy of laser vary with the specific wave length of the laser used. First, for radiant energy of a laser to he delivered to the target tissue, it must be absorbed by the tissue and converted to heat. When a specific amount of energy is absorbed by the tissue to bring its temperature to 60-65 degree centigrade, denaturation of proteins occurs. Here blanching of tissue surface is visible, and the deep structural integrity is disturbed. At 1(H)C, vaporization of intra cellular water occurs with resultant vacuolization (on high speed filming), catering and tissue shrinkage. Carbonization, disintegration and smoke and gas generation with ablation of laser-radiated tissue occurs at several hundred degrees centigrade.

It the radiant energy is purely absorbed by the target tissue, excess thermal damage to the adjacent tissue occurs.

The physical properties of carbon dioxide laser beam and its interaction with soft tissues makes it a very useful tool in laryngeal surgery. The absorption of carbon laser beam energy by biological tissues is
practically complete. Therefore, in contrast to other lasers, the amount of tissue destruction is independent of its pigmentation.

By varying the power output of the laser unit, the spot size or cross sectional area of the beam, or the time exposure, the surgeon can adjust carbon dioxide laser to incise, to coagulate, or to vaporize the target tissue. For example, a low power setting such as 10 watts, for short exposure time such as 0.10 second, produces a shallow tissue vaporization of 500 microns or less m depth.

The sound created by carbon dioxide laser is characteristic. There is a central area of tissue ablation; here, just a few carbon flakes of debris can be noted. Surrounding this is an area of protein denaturation approximately 50 microns in diameter. The next is of tissue oedema usually not more than 250 microns which will remain viable tissue. Small vessels and lymphatic are sealed in the area of protein denaturation [2].

The indications tor use of carbon dioxide laser in otolaryngology have expanded since its first clinical applications in the larynx. The most useful application of carbon dioxide laser is still in the larynx. It was originally used to keep paediatric airways free of obstruction in cases of recurrent papillomata of the larynx '.

For benign laryngeal disease, carbon dioxide laser has universal application in micro-surgery. Strong et (1976) [4] state that surgery for recurrent respiratory polyposis has advanced with the use of carbon dioxide laser. Although it may not be curative, but it is effective in preserving laryngeal structures and in maintaining transoral airway with an efficiency previously unattained. Surgery in children for webs, subglottic stenosis, capillary haemangioma and other lesions is also significantly enhanced by precious preservation of normal tissue and predictable minimal post-operative oedema associated with judicious use of carbon dioxide laser[15.]

The surgery in adults for polyps, nodules, leuko-plakia, papilloma, cysts and other benign laryngeal conditions, also finds advantage with laser. In fact, laser has created an era of conservative surgery for benign disease. Classically, laryngeal surgery has been vocal cord stripping with healing by remucos- alization. Now, more normal tissue can be preserved and more limited spot ablation performed; even flaps of mucosa may be mobilized and advanced in the larynx with endoscopic laser technique. The laser has lowered the risks to the integrity of anterior commissure of the larynx during one stage operations on both vocal cords by its ability to ablate areas and to leave adjacent areas 0.1 mm away undisturbed by mechanical or other effects.

Excision biopsy may be performed with laser, although there is some area of tissue vaporization. But small spot size machine is quite helpful to perform such a biopsy (Karlan, 1985).

Koufman et al (1981) [6] has reported a less than 50% recurrence rate of anterior commissure laryngeal webs, after treatment with carbon dioxide laser.

Research work by Koufman et al (1981) [6] and Holinger (1982) have shown the successful results of treatment with laser in cases of tracheal and subglottic stenosis. Peroral ablation of stenosing part is done followed by placing of intraluminal support endoscopically. This support is fixed to the skin over the buttons with help of wires.

Ossof et al (1983) [s] recommended transoral arytenoideetomy with carbon dioxide laser. It allows the surgeon to precisely vaporize the mucosa and underlying cartilage layer after layer in a dry field. Lynch [11] reported 39 cases with early glottic cancer that he successfully treated with transoral laser excision.

New et al (1941) [9] reported a 90% cure rate with transoral laser excision and diathermy.

Lillie et al (1937) [10] reported 98 patients with early glottic carcinoma who were treated with transoral carbon dioxide laser excision; all were cured although 5 of them required further treatment. Three distinct advantages exist with treatment using carbon dioxide laser:

First, with laser it is possible to remove bulky tumors of the anterior commissure area or vocal cords to obtain an accurate assessment of its treatment. Inexact staging following direct laryngoscopy is fairly common. By convention, if vocal cord is mobile, the tumor is labelled as T1, assuming that the growth has not invaded the cord muscle.

Ossof (1985) has shown deep invasion of vocalis muscle by the cancer after laser biopsy in many patients who were staged T1 by indirect method.

Airway establishment is the second advantage of carbon dioxide laser in treating patients with laryngeal cancer. Laser can be used to reduced the amount of the tumor obstructing the airway, thereby avoiding the need of a pre-operative/pre-radiotherapy tracheostomy. The third advantage of employing carbon dioxide laser in the treatment of laryngeal cancer is that endoscopic removal of carcinoma may be curative. The experience of Strong et al (1975) [4] and of Eckel & Thumfart (1992) [14] appears to support the previous work of Lillie et al (1973) [1], New et al (1941) [9] and Lynch ".

Optimal anaesthetic management of the patient for laser surgery of the larynx must include attention to the safety of the patient, general anaesthesia is required. Any non-flammable general anaesthetic is suitable, both Halothane and Entlurane fall in the category' (Ruder et al 1981 [12]).

Protection of the endotracheal tube from either direct or reflected laser beam irradiation is of primary importance. Should the laser beam strike an unprotected endotracheal tube carrying oxygen, ignition of the tube could result in a catastrophic, intraluminal blow-torch type airway fire (Hunsaker, 1994 [L]). Red rubber endotracheal tube strapped circumferentially with reflective tape reduces the risk of intraluminal fire.

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TEN KEYS TO GOOD TALK

1. **LISTEN ATTENTIVELY**

Many of us concentrate so hard on what we plan to say next that we don't really hear what the other person is saying. If we listen actively to other people, they will pay closer attention when we speak.

2. TALK ABOUT WHAT INTERESTS OTHER PEOPLE

If we encourage the other fellow to talk about his pet topics, we will never have to w'orry about an awkward silence, and will probably be so engrossed that we won't have time to be self conscious.

3. **AVOID DULL DETAILS**

"The secret of being tiresome is in telling everything", wanted Voltaire. All of us know that person who disagrees and never omits an unnecessary fact and so we are wont out long before the speaker reaches his point.

4. **SPEAK PRECISELY**

Pause a moment to marshall your words before speaking: don't plunge headlong into a sentence, hoping it will turn out all right. Avoid jumping from topic to topic.

5. **AVOID RUBBER-STAMP PHRASES**

Don't let yourself be described as a person of few words who uses them over and over again. Some trite talkers keep repeating, "Absolutely; I quite agree; You see what 1 mean". Avoid such rubber-stamp phrases and words.

6. **ASK THE RIGHT QUESTION**

Successful reporters, interviewers, etc. know that a question properly placed and stated helps make the other person "open up". It indicates a genuine interest in him and his opinion.

7. **LEARN HOW TO DISAGREE WITHOUT BEING DISAGREEABLE**

A friendly argument often enriches a conversation, but don't start an argument by a sweeping statement like "I hate him, He is all such and such, etc.". Such remark will cause all sides to line up too violently for polite conversation. Most important, don't flatly contradict anybody, even when you are sure he is wrong; use subtlety.

8. **AVOID INTERRUPTIONS**

If you sometimes feel obliged to break into a conversation, your interruption will appear less discourteous if you use a graceful phrase such as " —may I add something to what you have just said?" Incidentally, the person you interrupt will listen more attentively if you use his/her name.

9. **TRY TO BE TOLERANT AND TACTFUL**

All of us sometimes converse with people who irritate or annoy us. In such cases, try' to concentrate on a subject being discussed. If we honestly try to develop a tolerant attitude, you will be a much better conversationist.

10. **A LITTLE PRAISE SOMETIME HELPS**

Our conversation will be richer if we learn how to compliment people. Comment specifically on something the other person said, ask him to amplify one of his remarks showing that we have listened to him attentively.

If we follow these ten suggestions, they may help to make our conversation more interesting and enlarge our circle of friends.

A.A. Maline said, "The bore can be divided into classes - those who have their own subject and those who don't need a subject".