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Editorial

Transoral Laryngeal Microsurgery

Transoral Laryngeal Microsurgery, a minimally invasive surgical method comprises of both Cold Steel method of surgery and Transoral Laser Microsurgery (TLM) to functional organ preservation for lesions of the upper aerodigestive tract. Transoral Laser Microsurgery is a relatively new type of conservation surgery using specialized endoscopic instruments, microscopes and lasers. Pioneered in Boston, Massachusetts, it is the Strong and Jako, who introduced the carbon dioxide (CO_2) Laser to endolaryngeal surgery in the early 1970s by coupling the laser to an operating microscope. John Salassa of Mayo Clinic in the 1990s first coined the term TLM. His observation was to closely examine the host-disease interface by using an operating microscope, with the advantage of binocular vision and stereoscopic depth perception, combined with superb optics, making it truly a microsurgical technique[1].

Initially CO_2 Laser surgery was rejected by many surgeons because the earliest micro-manipulators could coagulate tissue making histological confirmation in a doubt to find out the negative margins with post-operative extensive scars compromising organ function. But with the advent of modern microspot manipulators, these obstracles were minimized to a great extent that produces a fine incision like sharp surgical scalpel[1].

The key to the success of this technique is patient selection, as inadequate endoscopic access to facilitate satisfactory oncologic resection is the main contraindication to TLM. The usual caveats of endoscopic exposure apply to the TLM technique: think of the fi-ve Ts, Tongue, Trismus, Teeth, Tumor and Tilt (neck extension). However, the microscope-mounted laser is limited to line-of-sight view. Therefore, appropriate tissue retraction and positioning of endoscope blades is essential for efficient and effective surgery[2].

The aim of TLM is to preserve as much normal tissue as possible, thereby maximizing the potential for functional recovery. Small super-ficial T_{1a} glottic tumours may be excised en bloc with the CO_2 laser. More complex glottis and supraglottic tumours (T_{1b}, T_2-T_3) bene-fit from an initial cut through tumour to assess depth of invasion. Assessment of the tumour should take into account the functional consequences of resection. To prevent signi-ficant functional impairment at least one competent arytenoid complex should be preserved[2].

The use of TLM as a treatment for Oropharyngeal Carcinoma (OPC) was -first reported by Steiner et al. Due to the line-of-sight constraints, complete exposure of the tumour is not the norm and tumour resection has to proceed in a super-ficial to deep direction, appreciating the 3D orientation of the base of tongue and vallecula. The management of large hypopharyngeal tumours using TLM is contraindicated in all but the most experienced hands. However, TLM removal of smaller tumours ($T_{1/2}$) is often surprisingly straightforward and results in highly favourable swallowing function outcomes. An absolute contraindication to TLM in the hypopharynx includes tumour invading through thyroid cartilage into the tissue of the neck and relative contrain-dications include large tumours, the

resection of which will also include the hemilarynx[2].

Although there are many advantages of TLM over traditional open surgical approaches, such as a decreased need for tracheostomy and gastrostomy with improved post-operative speech and swallowing function, it is not without risk of significant intra-operative and postoperative complications. Routine laser safety precautions are observed to reduce the risk of inadvertent burns to the patient and operating theatre staff. The patient's eyes and face must be covered with wet towels soaked in saline and all operating theatre personnel (with exception of the operating surgeon) must wear protective eye-glasses. It is common practice to display notices outside the operating theatre to warn staff the laser is being used[2].

By TLM, it is possible to divide and remove tumor by piecemeal, allowing the surgeon to microscopically map tumor depth and assess margins in multiple planes. This method offers several advantages: (1) thoroughly mapping the tumor-host interface assuring margin clearance and minimum loss of healthy tissue; (2) Less surgical contractions; (3) The avoidance of extensive reconstruction eliminating the morbidity of donor site and resulting insensate laryngopharyngeal graft; (4) a general avoidance of tracheostomy; (5) early swallowing postoperatively as there is no suture lines to heal; (6) early return home with serviceable voice. (7) providing a significant cost benefit; and (8) maintenance of all options in terms of salvage treatments should recurrence occur. The major exception is that soft tissue replacement is not possible. Hence Procedures of sufficient amounts of soft tissue to compromise the sphincter function of larynx should not be done transorally with the CO_2 Laser. TLM surgery is performed from the inside working outward as opposed to working from the outside in hence there is minimum damage to the supporting structures lying external to the tumors[3].

Though the instrument is deceptively simple to use, the unusual surgical approach and the changed appearance of tissue following laser vaporization may confuse the operator until considerable expertise has been gained in the animal laboratory[4]. The facility for skill lab is utmost important for mastering in the field of transoral laryngeal surgery, how to use laryngoscope, endoscope & CO_2 Laser, in future transoral robotic surgery.

There are versatile applications of TLM in treating head-neck lesions Including larynx, pharynx and oropharynx. Among the laryngo-pharyngeal lesions: recurrent respiratory laryngeal papillomatosis, laryngo-tracheal stenosis, bilateral recurrent laryngeal nerve palsy, benign neoplasm of larynx & hypopharynx (cysts, polyps, Reinke edema, vocal cord nodules, Hemangiomas, Pheochronucytomas), hypopharyngeal diverticula (Zeuker Diverticula), Laryngeal and hypopharyngeal carcinoma, even many congenital lesions of laryngopharynx are treated with this modern equipments successfully[1]. Although transoral laser micro surgery (TLM) is primary use for early stage laryngeal cancers, in recent some surgeons are performing endoscopic partial laryng-ectomy for the treatment of locally advanced golttic and supra glottic tumors with variable documented outcomes. Hinni & his colleagues showed in their patient that TLM offers acceptable rates of organ preservation and loco-regional control with low morbidity [5].

Transoral Robotic Surgery (TORS) represents a new, less intrusive surgical method. This type of surgery goes through a patient mouth eliminates scarring and quacking recovering time. TORS allows the area to function normally after surgery, also the healing time is shorter. During TORS the cancer is reached

by placing the needed tools down the throat with a high definition camera and specialized instruments. The tools used to remove the cancer are controlled by the doctor outside the body allowing the tools to move in the same way the doctor is moving. This allows them to operate in areas they could not otherwise reach. Potential benefits of transoral robotic surgery for patients: (i) less blood loss; (ii) lowers the amount of chemo-radiation or eliminates the need for it; (iii) no need for tracheostomy; (iv) shorter hospital stay; (v) quicker recovery normal speech and swallowing; and (vi) no visible scarring or disfigurement[6, 7].

The extensive continued development of minimally invasive surgically approaches through endoscopic & laser equipments offer and alternate to traditional open surgical method. Recently transoral robotic surgery (TORS) is integrated with transoral laser micro surgery (TLM), increasing the spectrum in the treatment of all head-neck lesions[8]. Developing surgical experience and expertise, understanding the equipments required to achieve optimal surgical access and the pertinent factors influencing the patient selection are the key practice of TLM. Surgeons need to familiarize themselves with the operating room setup and operative technique of TLM throughout their training to offer modern and integrated service.

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