

Endoscopic laryngeal surgery: Our technique

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Abstract

Background: The authors present an alternative laryngeal surgical technique to traditional laryngeal surgery performed using the microscope.

Key word: microlaryngoscopy, telescope, laryngoscope, endoscopy, phonosurgery, vocal phono

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INTRODUCTION

We present our experience using a new technique for laryngeal surgery: a telescope with a high definition (hD) endoscopic video system as an alternative to the operating microscope. Currently, the principal surgical technique used in endoscopic surgery of the larynx is microlaryngoscopy, which uses a surgical microscope^{1,2}. The pathological conditions of the larynx that can be treated with this technique include: papillomatosis, leukoplakia, dysplasia, carcinoma, nodules, cysts, polyps, reinke's oedema, granuloma, scar, sulcus and vergeture, vascular lesion, glottic web and vocal fold paralysis. Microlaryngoscopy is a technique that can be performed with either 'cold' instruments or with a Co2 laser, in phonomicrosurgery and in the treatment of benign and malign diseases of the larynx. The operating laryngoscope is used to expose the glottal floor, allowing direct view of the vocal cords. The surgical microscope is positioned behind the patient's head^{3,4}. With the technique we use, the pathological conditions of the larynx that can be treated are the same as for MLS.

MATERIALS AND METHODS

The telescope is positioned in place of the operating microscope and is equipped with an HD endoscopic video system. The patient is in supine position on the operating table, with hyperextended head attached to a laryngosuspension apparatus. The Havas laryngoscope is placed into the oral cavity. It is slid along the ventral surface of the tongue and advanced down towards the base of the tongue and posterior pharyngeal wall. The laryngoscope is then placed under the epiglottis, allowing direct view of the vocal folds, as in MLS. The telescope is positioned inside a special channel positioned along the length of the body of the Havas laryngoscope which is at the end of the same and therefore at the level of the glottal floor when the laryngoscope is correctly positioned. The camera head is mounted on the proximal end of the telescope, illumination is provided by a cold light fountain, and images are displayed on a hD monitor. This optical system also provides a sense of depth, and light transmission is excellent. It is possible to use a classical set of phonosurgical micro-instruments such as curved alligators, triangular Bouchayer forceps, microscissors, microaspirators and endoscopic needles.^{5,6} From 1 March 2001 to 31 December 2008 145 laryngeal surgery operations were performed using the operating microscope at the San Camillo di Messina nursing home; of these 25 laryngeal nodules, 24 Reinke edemas, 78 laryngeal polyps and 18 malignant neoformations of which 7 cordectomies with DIODE LASER.^{7,8} From 1 January 2009 to 31 December 2019 235 endoscopic laryngeal surgery operations were performed (until 31 August 2016 at the San Camillo nursing home in Messina and from 1 September 2016 at the COT nursing home in Messina); of

these 110 laryngeal polyps, 28 nodules, 52 Reinke edemas and 45 malignant neoforations of which 20 cordectomies with DIODI LASER^{9,10,11}.

OBSERVATION AND RESULTS

The origin of modern laryngeal surgery is due to Kleinsasser who proposed special endoscopic tubes which, due to their size, presuppose general anesthesia and muscle relaxation, guarantee the possibility of working safely and comfortably with both hands and help of the microscope. Kleinsasser is also responsible for a whole collection of special instruments for endolaryngeal microsurgery. For enlargement, a common operating microscope such as that used for microsurgery of the ear is used, taking care to match the axis of the endoscope with that of the microscope. When using the operating microscope it is possible to associate the use of the CO2 LASER which can be used above all for cordectomies in case of laryngeal carcinoma, but also in all benign pathologies. Through a micromanipulator, LASER light can be used to perform laryngeal surgery through the operating microscope. The use of the CO2 LASER is only possible in association with the operating microscope and is not possible using endoscopic surgery. Using endoscopic surgery it is possible to associate the use of the diodi LASER [12,13], inserting the fiber in special laryngeal microsurgery forceps. In an initial phase, our endoscopic approach to

laryngeal surgery was undertaken using a normal Kleinsasser laryngoscope and holding a long 30 ° optic in the left hand thus allowing an excellent visualization of the larynx and trachea which is very useful especially in oncological pathologies. The limitation of this method consists in the fact that only the right hand of the operator can be used to hold the laryngeal microsurgery forceps, thus limiting the type of procedures that can be performed to the more simple ones; in practice there was an excellent view of the operating field but a poor manual ability.

For this reason we have taken into consideration the new operating laryngoscopes equipped with a channel for the insertion of an optics which allows connecting the optics to a high definition camera to have an enlarged and detailed view of the operating field and allows the operator to have both hands free to handle two instruments simultaneously, for example a micro-pincer and a micro-scissors or a micro-pincer and an aspirator. [14,15]

Thanks to its shape, the Havas laryngoscope allows an excellent exposure of the glottic plane (fig. 1, 2) ; the channel for housing the optics slightly limits the operating space and sometimes interferes with the two-hand use of the micro-pincers. For this reason we sometimes use the laryngoscope according to Kantor-Berci (fig. 3), which has a channel for the optics located laterally and externally to the laryngoscope, allowing a better bimanual movement of the instruments, with a slightly less complete exposure than that according to Havas.



Figure 1, 2: Havas laryngoscope; practical surgical use



Figure 3: Kantor-Berci laryngoscope

In all cases preoperative and postoperative evaluations were carried out with a flexible fiber optic rhinofibrolaryngoscope and evaluation of the vocal results according to the protocols of the Italian Society of Phoniatics and Speech Therapy using the GIRBAS scale and the multi-dimensional voice program (MDVP).^{16,17,18,19} The polyps and laryngeal nodules were always removed with the "cold" technique with micro scissors and micro forceps.²⁰ Reike's edema was always

operated with the cord lifting technique, which allows a more conservative approach and the possibility of intervening bilaterally without the risk of synechia between the vocal cords. As far as malignant neoforations are concerned, in some cases the intervention consisted of a biopsy, since they were extended neoforations subsequently operated in open surgery; in other cases, limited to the T1 and T2 chords, a

cordectomy was performed using the DIODE LASER easily performed in endoscopic surgery.²¹⁻²²

CONCLUSION

The cost of the system is modest, which is 10 times less than a common operating microscope. The system is not bulky and the operator can use all instruments for endoscopic laryngeal surgery, the system combined with hD video endoscopy allows excellent view on the monitor. This optical system has excellent depth of field, magnification, contrast and colour, especially if combined with a hD camera. In conclusion this method can be considered an excellent alternative to the operating microscope in endoscopic surgery of the larynx. Over the years, endoscopic surgery has become essential in the common otolaryngology practice. In the initial phase, the use of rigid endoscopes concerned exclusively the endoscopic surgery of the paranasal sinuses (F.E.S.S.) while today it also concerns laryngeal surgery and ear surgery. The use of endoscopic methods allows more precise and conservative approaches in all ENT pathologies.

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