

Short Communications

Videoendoscopic surgery for inaccessible glottic lesions

ANTONIO SCHINDLER, MD, PASQUALE CAPACCIO, MD, FRANCESCO OTTAVIANI, MD

Abstract

Objectives: Lesions in the anterior segment of the vocal fold are sometimes difficult to access by means of conventional suspension microlaryngoscopy under general anaesthesia because of anatomical factors such as short, stout and inflexible necks, reduced jaw protrusion, and long incisors. Various techniques have recently been proposed for the management of inaccessible glottic lesions, most of which are performed under general anaesthesia. The use of flexible videoendoscopic surgery under topical anaesthesia in two cases of anterior glottic lesions that could not be treated by means of conventional suspension laryngoscopy is described.

Study design: Case report.

Methods: A flexible videobronchoscope with an instrument channel was inserted transnasally on an out-patient basis. While the examiner carried out the endoscopy, an assistant manoeuvred the biopsy forceps through the instrument channel, and removed the lesion.

Results: Both patients underwent successful removal of an anterior glottic polyp, and the one-year follow-up evaluation revealed normal anatomy of the vocal folds and normal vocal function.

Conclusions: Flexible videoendoscopic surgery under topical anaesthesia is a safe, simple and minimally invasive procedure that can be considered as an alternative to traditional endoscopic surgery for inaccessible anterior glottic lesions.

Key words: Larynx; Vocal Cords; Endoscopy; Surgery; Out-patients

Introduction

Technological advances have led to considerable improvements in visualizing the vocal tract, particularly the vocal folds. The use of flexible fibre-optic rhinopharyngolaryngoscopy in otolaryngology, which was first described in 1976,¹ has greatly increased because it is easy to manage and is well tolerated by patients. The latest videoendoscopic systems make use of a charge-coupled device (CCD) chip built into the tip that offers the convenience of a large image and allows a higher level of resolution. The tip and flexible portion of the first-generation videoendoscopes were thick, which limited their use in the gastrointestinal and bronchorespiratory tract,^{2,3} but the application of a videoendoscopic system dedicated to the field of laryngology has been made feasible as a result of the development of a smaller CCD chip. This system enables better imaging quality, avoiding the honeycomb images typical of conventional flexible fibrescopes.⁴

Laryngeal microsurgery, such as the removal of vocal fold lesions, is generally performed using traditional rigid direct laryngoscopes. However, lesions in the anterior segment of the vocal fold are sometimes difficult to access by conventional suspension microlaryngoscopy, a problem that can only be partially solved by optimizing the patient's position⁵ and applying external counterpressure.^{6,7} Technological advances have greatly contributed to the development of new techniques for inaccessible glottic lesions. A universal modular glottiscope has recently been designed to optimize phonosurgery,⁸ and telescopic video microlaryngeal surgery as well as the passage of a

flexible bronchoscope through the laryngeal mask airway with and without the use of potassium titanyl phosphate (KTP)/532 nm laser, have also been described.^{9–12} In order to overcome the disadvantages of suspension laryngomicrosurgery, indirect microlaryngostroboscopic surgery using a mirror or rigid telescope has been proposed, as well as videoendoscopic-assisted laryngeal surgery under topical anaesthesia.^{13,14} However, these methods have not become widely used because they are difficult to implement and the images of the surgical field are poor. Kawaida *et al.*¹⁵ have recently described a new electronic videoendoscopic system that uses digital image processing to provide better quality and higher resolution images of laryngeal lesions. The availability of an instrument channel not only allows clinical evaluation, but also diagnostic and therapeutic procedures such as biopsies and foreign body extraction.¹⁶

We describe here an original application of videobronchoscopy under topical anaesthesia in two patients with anterior glottic lesions that could not be treated using conventional suspension laryngoscopy.

Technique

We used a videobronchoscope with an instrument channel (VNL-1530T, Asahi Optical Co, Ltd, Tokyo, Japan). The outer diameter of the insertion tube of the videoendoscope is 4 mm; it has an instrument channel with a diameter of 2 mm, through which biopsy forceps can be inserted. The videoprocessor (Pentax, EPM-1000, Asahi Optical Co, Ltd) has a 100 W xenon light source.

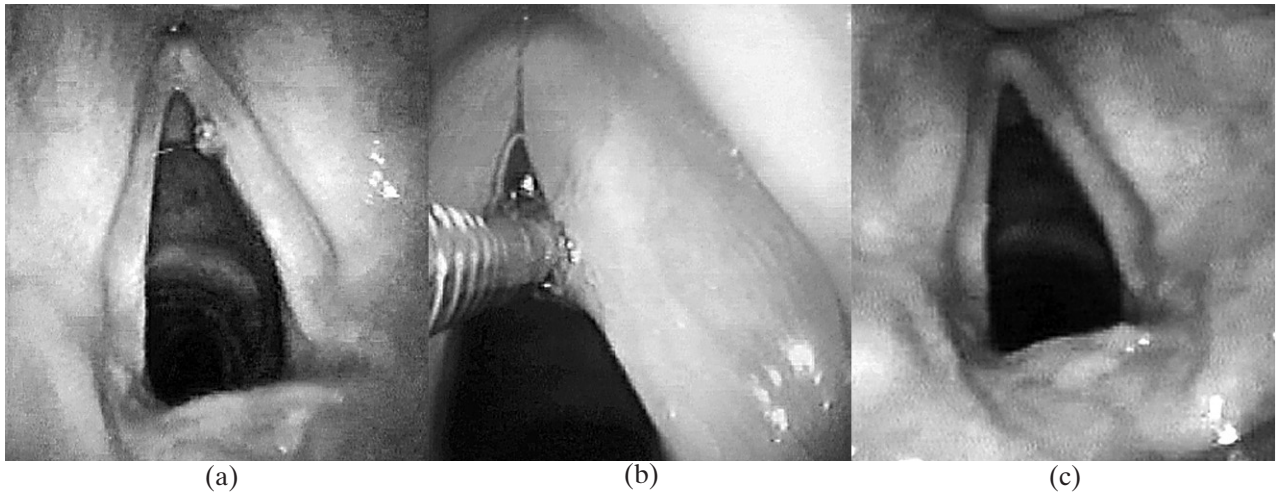


FIG. 1

Case 1: (a) Small pedunculated anterior right vocal fold polyp. (b) Polyp grasped with the forceps. (c) Laryngeal appearance at one-year follow up.

The procedure is performed on an out-patient basis after formal written consent is obtained. It is usually performed in a room, capable of handling medical emergencies and monitoring blood pressure and oxygen saturation, that is located near the operating theatre where anaesthesiologists are available for any medical emergencies. The examiner explains the whole procedure to the patient clearly, whose active collaboration is necessary. The patient sits in front of the examiner and undergoes topical anaesthesia: 10 per cent lidocaine hydrochloride is sprayed onto the mucosal surface of the nasal cavity, pharynx and larynx until the gag reflex disappears; if it reappears during the procedure, 10 per cent lidocaine hydrochloride is applied to the sensitive region through the instrument channel of the endoscope. The flexible videoendoscope is inserted transnasally and the laryngeal image is monitored. The examiner conducts the endoscopy taking care to minimize any contact between the body of the videobronchoscope and the mucosa of the laryngeal vestibule, particularly between the tip of the instrument and the vocal folds. An assistant holds the biopsy forceps, moves them downwards through the instrument channel and removes the lesion under continuous vision. The lesion is then brought out through the nose while the scope is simultaneously withdrawn. An endoscopic examination is conducted immediately afterwards to verify that the lesion has been completely removed; the voice result can also be evaluated perceptually. Post-operative voice rest for two days is recommended. The whole session takes 20-30 min, including the application of topical anaesthesia.

Case 1

A 67-year-old man was referred to the Department of Otorhinolaryngology and Ophthalmology of the University of Milan after having had a hoarse voice for three months. Videoendoscopy of the upper respiratory airway revealed a small pedunculated anterior right vocal fold polyp (Figure 1a). He had chronic liver cirrhosis with portal hypertension following hepatitis C virus/hepatitis B virus (HCV/HBV) infection, and insulin-dependent diabetes. Five years previously, he had undergone coronary angioplasty because of ischaemic cardiac disease; the pre-operative cardiological assessment revealed class III cardiac risk, and intra- and post-operative electrocardiogram (ECG) monitoring was required. He had long incisors, a reduced head extension and was classified as Mallampati class II.¹⁷

Microlaryngoscopy under general anaesthesia was unsuccessful because his anatomical configuration prevented the visualization of the lesion. Flexible videoendoscopic surgery under topical anaesthesia was therefore scheduled, and the polyp was successfully removed (Figure 1b). A euphonic voice was obtained. Histology confirmed the diagnosis of an angiomatous polyp. At the one-year follow-up examination, his voice was euphonic and videoendoscopy did not reveal any residual lesion of the vocal folds (Figure 1c).

Case 2

A 53-year-old woman was brought to our attention because of intermittent dysphonia lasting six months. Videoendoscopy of the larynx showed an anterior right vocal fold polyp. She was otherwise in good condition, with a full set of teeth, but had a short neck and reduced jaw protrusion. She was scheduled for microlaryngoscopy under general anaesthesia but the procedure was abandoned because of the inability to visualize the lesion despite strong suspension and cricoid pressure. She subsequently underwent flexible videoendoscopic surgery under topical anaesthesia and the polyp was removed (Figure 2). Histology confirmed the diagnosis of an angiomatous polyp. One year later, she did not complain of any voice problem and the endoscopic examination revealed normal vocal fold anatomy.

Discussion

Endotracheal suspension laryngomicrosurgery under general anaesthesia is frequently performed because it allows a two-handed tissue manipulation.¹⁸ However, visualizing anterior glottic lesions through a rigid direct laryngoscope may be difficult in subjects with difficulties in opening the mouth, macroglossia, obesity, retrognathia, short, stout and inflexible necks, long incisors and limitation of extension of the cervical spine.¹⁹ Various solutions have been proposed over the years, starting with open-neck procedures such as laryngofissure. Different clinical predictors of difficult laryngeal exposure have been proposed so far; among these the thyroid-mandible angle has been recently considered as the most sensitive and reliable.²⁰ The problem of reduced glottic exposure has been partially overcome by specially designed laryngoscopes,^{8,21} optimal patient positioning with neck flexion and head extension,⁵ and the use of external counterpressure applied by hand or by means of a



FIG. 2

Case 2: Small anterior right vocal fold polyp just before being grasped.

mechanical device.^{6,7} The use of 0°, 30° and 70° telescopes after standard intubation, and the introduction of rigid laryngoscopes seems to improve exposure.¹⁰ Recently, a new technique for anterior glottic lesion surgery has been described using the laryngeal mask airway,^{9,11,12} but general anaesthesia is still required and two-handed tissue manipulation is not possible.

Over the last few years, indirect laryngeal and pharyngeal surgery has become more widely used because it is cost-effective and more convenient for both the surgeon and patient.²² Besides fibre-optic biopsy on an out-patient basis is regularly performed in other areas of the respiratory tract.²³ Indirect laryngomicrosurgery using a mirror or rigid telescope under topical anaesthesia has also been described and is practised at some institutions,^{13,24} but it has not become widely used because of manipulation difficulties.

Our two cases of inaccessible anterior glottic lesions were successfully treated by means of flexible videoendoscopic surgery under topical anaesthesia. Both patients had their glottic lesions successfully removed without any complication and with good functional recovery. Flexible videoendoscopic laryngeal surgery was first introduced by Omori *et al.* in 2000.¹⁴ The flexible videoendoscope is inserted transnasally by an assistant, while the laryngeal lesion is removed transorally by the operator, the only disadvantage of the procedure is that it requires patient collaboration. Though no respiratory or bleeding complication was observed in our experience, flexible endoscopic surgery should be performed in units capable of handling medical emergencies, because of the risk of bleeding into the lower airway and of oxygen desaturation.

The technique we describe offers various advantages: as in the case of direct laryngoscopy and videoendoscopic laryngeal surgery, a large image with a high level of resolution is obtained thanks to the development of modern videoendoscopes. The different regions of the pharynx and larynx can be easily accessed and visualized by means of indirect laryngoscopy with the patient seated.

Viewing the laryngeal structures under physiological conditions makes it possible to treat otherwise difficult lesions, such as pedunculated polyps in the subglottic face of the vocal folds. Biopsies of neoplastic lesions are also feasible whenever general anaesthesia is contraindicated. As no operating room or hospitalization is required, the technique is cost-effective and more convenient for both surgeon and patient. Finally, the need for patient collaboration is minimal because the instruments are inserted through the operating channel and not transorally. As in the case of other procedures performed under topical anaesthesia, an endoscopic examination during and immediately after surgery allows the voice result to be evaluated perceptually.

In conclusion, flexible videoendoscopic surgery under topical anaesthesia is a safe, simple and minimally invasive procedure for small laryngeal lesions that can be considered as an alternative to traditional endoscopic surgery for inaccessible anterior glottic lesions.

Summary

Flexible videoendoscopic surgery under topical anaesthesia is a safe, simple and minimally invasive procedure for small laryngeal lesions and it can be considered an alternative to traditional endoscopic surgery for inaccessible anterior glottic lesions. The technique allows a large image with a high level of resolution and it is cost-effective since no operating room or hospitalization is required. The need for patient collaboration is minimal because the instruments are inserted through the operating channel and not transorally; an endoscopic examination immediately after surgery allows the voice result to be evaluated perceptually. Laryngologists familiar with videoendoscopic voice and swallowing assessment may easily master the procedure.

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Address for correspondence:

Professor Francesco Ottaviani,
Clinica Otorinolaringoiatrica IV,
Azienda Ospedaliera 'L Sacco',
Via GB Grassi 74,
20157 Milano, Italy.

Fax: +39 02 39043538

E-mail: francesco.ottaviani@unimi.it

Professor F Ottaviani takes responsibility for the integrity of the content of the paper

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