

CASE REPORT

# Channeled fiberoptic for vocal cord polyp excision under spontaneous respiration using intravenous anesthesia and hi-flow nasal oxygen (STRIVE-Hi) technique: A case report and review of the literature

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<http://dx.doi.org/10.5339/qmj.2020.27>

Submitted: 15 December 2019

Accepted: 5 April 2020

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Cite this article as: Menon A, Emam D, Al-Mannai O, Shallik N, Al-Khafaji M. Channeled fiberoptic for vocal cord polyp excision under spontaneous respiration using intravenous anesthesia and hi-flow nasal oxygen (STRIVE-Hi) technique: A case report and review of the literature, Qatar Medical Journal 2020:27 <http://dx.doi.org/10.5339/qmj.2020.27>

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## ABSTRACT

Microlaryngoscopy for benign vocal cord lesion excision is a procedure with good outcomes and relatively few complications that is performed worldwide. The anterior one-third of the vocal cords is a relatively common site to find benign polyps, and the excision of cases with adequate laryngeal exposure is relatively easy. However, they can sometimes present a challenge when laryngeal exposure is suboptimal, which leads to trouble in accessing the site. The factors that can lead to difficulties in laryngeal exposure are numerous, such as restricted mouth opening, limited neck extension, large tongue size, and others. The preoperative prediction of difficult laryngeal exposure (DLE) can be obtained by different scoring and grading systems. We have used the Laryngoscore in this case. However, management options for such cases remain limited. Here, we present a case that was managed using channeled cup forceps under fiberoptic endoscopy with the STRIVE-Hi technique used to administer anesthesia.

Keywords: vocal cord, otolaryngology, voice, microlaryngoscopy, surgery, strivehi

## INTRODUCTION

Otolaryngologists worldwide have been performing microlaryngeal surgery in cases of benign vocal cord lesions for a long time. It is considered to be a highly rewarding surgery with a short operating time and minimal complications. Vocal cord polyps are a common finding in patients presenting with changes

in their voices. Excessive straining of the voice and smoking are considered to be important risk factors. Polyps arising on the anterior one-third of the vocal cords, though common, can sometimes present a difficulty in visualization, especially in those with a short neck in an otherwise, routine microlaryngeal surgery. Optimal exposure of the larynx is an essential component of successful microlaryngeal surgery. Some factors can lead to difficult laryngeal exposure (DLE), which may result in unnecessary trauma, incomplete surgery, and even abortion of the operation.<sup>1</sup>

The objective of this case report is to offer an alternative to rigid microlaryngoscopy in the treatment of benign vocal cord lesions, especially in cases with poor laryngeal exposure.

### CASE DESCRIPTION

A 46-year-old male, a teacher by profession, with a history of voice abuse. He presented with a history of hoarseness for six months. He denied any history of smoking, weight loss, night sweats, or fever. He also denied any breathing abnormalities. On the fiberoptic endoscopy examination, a vocal cord polyp was found on the anterior one-third of the left vocal cord (Figures 1 & 2). The remaining ENT examination was unremarkable.

It was then decided to prep the patient for microlaryngoscopy under the STRIVE-Hi technique for excision of left vocal cord polyp. In our patient, a difficult airway was expected because of the limited mouth opening of 2.5 cm, stiffness in his neck movement with limited extension and lateral rotation, Mallampati grade of 3, and large tongue in a crowded mouth.

The STRIVE-Hi (SponTaneous Respiration using Intravenous anesthesia & High flow nasal oxygen)

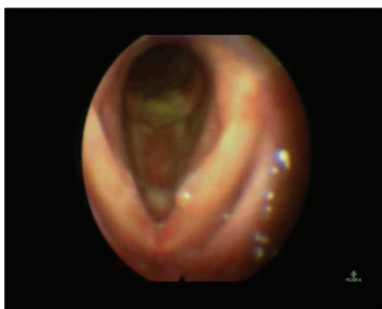


Figure 1. Shows the vocal cord polyp in the anterior one-third of the left vocal cord, as seen during the preoperative evaluation.



Figure 2. Shows the vocal cord polyp in the anterior one-third of the left vocal cord, as seen during the preoperative evaluation.

approach to endoscopic airway surgery uses spontaneous ventilation during the stepwise, target-controlled, infusion of propofol.<sup>14</sup>

We used this technique for 55 minutes. The patient's SpO<sub>2</sub> was maintained >97%. However, an optimal laryngeal exposure was found difficult with a Zeitel's laryngoscope and a Lindholm laryngoscope because of a stiff and short neck. Following this, a KARL STORZ CMAC laryngoscope was used for optimal laryngeal exposure. Even though the larynx was visible on the CMAC screen, an optimal instrument to undertake the polyp excision was lacking.

Hence, it was decided to attempt a fiberoptic endoscopy-assisted, excision of the vocal cord polyp using a channeled cup forceps (Figure 3), which proved successful. The patient then had an uneventful postop recovery period and was subsequently discharged home after one day.

The patient was seen two weeks later as an outpatient during which a fiberoptic endoscopy of the larynx showed normal healing (Figure 4). His pathology revealed a benign polyp. The patient was subsequently followed once monthly for three unremarkable months.

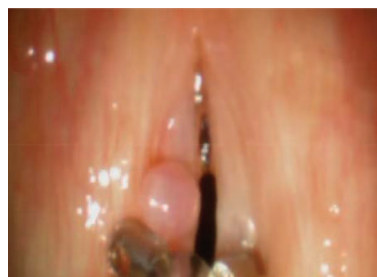


Figure 3. Shows the vocal cord polyp intraoperatively, as seen through the fiberoptic endoscope moments before the polyp's excision.



**Figure 4.** Shows granulation tissue at the site of excision of the polyp, as seen during the postoperative evaluation.

### DISCUSSION

Glottic lesion excision surgery can be difficult, especially when it is situated near the anterior commissure. This situation is further compounded in obese patients with a short neck, narrow airway, and anteriorly placed larynx. DLE is a clinical situation that arises when laryngeal exposure is found challenging during microlaryngoscopy using a suspension laryngoscope or a direct laryngoscope.<sup>2</sup> Numerous predictors and grading systems are available to predict difficult visualization of the larynx. The Laryngoscore<sup>3</sup> (Figure 5) is one such grading system that includes 11 parameters, namely interincisor gap, thyromental distance, upper-jaw dental status, trismus, mandibular prognathism, macroglossia, micrognathia, degree of neck flexion-extension, a history of previous open-neck and/or radiotherapy, Mallampati's modified classes, and body mass index.<sup>3</sup> Good/acceptable laryngeal exposure presented a median score < 6. This value was chosen as the cutoff for distinguishing favorable versus difficult/impossible laryngeal exposures. When the Laryngoscore was < 6, good laryngeal exposure was observed in 94% of patients, whereas when it was ≥ 6, DLE was encountered in 40% of patients. When considering a Laryngoscore of ≥ 9, 67% of patients had DLE.<sup>3</sup> A Difficult airway was expected in our patient because of limited mouth opening of 2.5 cm, stiffness in neck movement with limited extension and lateral rotation, Mallampati grade of 3, and large tongue in a crowded mouth (laryngoscore of 10).

The options to overcome DLE are limited in the literature, even with preoperative planning.<sup>4</sup> External laryngeal counterpressure, patient posture, and internal laryngeal distension are three basic factors that help in providing adequate laryngeal exposure.<sup>5-8</sup> Optimization of these factors may help in providing acceptable exposure and enabling visualization in

The Laryngoscore

Parameters	Scores
<b>Interincisor Gap</b>	
≥/ = 4cm	0
< 4cm	1
<b>Thyro-mental distance</b>	
> 6.5 cm	0
6-6.5 cm	1
< 6 cm	2
<b>Upper jaw dental status</b>	
Edentulous	0
Partially edentulous	1
Normal Teeth	2
Prominent Teeth	3
<b>Trismus</b>	
No	0
Yes	1
<b>Mandibular Prognathism</b>	
Absent or reducible	0
Present or not reducible	1
<b>Macroglossia</b>	
No	0
Yes	1
<b>Micrognathia</b>	
No	0
Yes	1
<b>Degree of neck flexion-extension</b>	
> 90°	0
80°- 90°	1
< 80°	2
<b>Previous treatments (Radiotherapy, open-neck surgery)</b>	
No	0
Yes	1
<b>Mallampati's modified classes</b>	
I. Hard and soft palate, uvula and pillars visible	0
II. Hard and soft palate, and base of uvula visible	1
III. Hard and soft palate visible	2
IV. Only hard palate visible	3
<b>Body Mass Index</b>	
≤/ = 25	0
> 25	1
<b>Total</b>	<b>0-17</b>

BMI = body mass index; RT = radiotherapy

**Figure 5.** The scoring system used in the laryngoscore

most cases. The glottis can be made easier to visualize changes by elevating the head to straighten the cervical spine.<sup>9</sup> The different positions in which the patient is positioned have been studied are three,<sup>10</sup> i.e., extension-extension position, sniffing: extension-flexion position, and flexion-flexion position. The sniffing (Boyce – Jackson) position is believed to be the best position for laryngeal exposure.<sup>10</sup>

For lesions located near the anterior commissure, the use of external counterpressure and internal distention is most helpful.<sup>5</sup> External laryngeal counterpressure directed posteriorly on the cricoid and lower thyroid

cartilage can displace the anterior commissure posteriorly up to 6 mm, despite movement restriction caused by the endotracheal tube.<sup>5</sup> This can be achieved by a third hand or by applying an elastoplast bandage across the larynx and fixing it on both sides of the operating table. The supraglottic structures are moved peripherally to obtain the widest possible view of the vocal folds with internal laryngeal distention. This can be done by using the largest possible laryngoscope or distending laryngoscopes, such as the Weerda, Lindholm, and Steiner laryngoscopes.

The visualization of glottic lesions placed anteriorly, the use of video-assisted angled rigid telescopes<sup>11,12</sup> has a distinct and undeniable advantage over the microscope. However, using conventional nonmalleable instruments for access to the lesion remains a challenge. Malleable microlaryngeal instruments are available to access such lesions<sup>13</sup>. There have been many instances in the literature where such techniques have been used for example, Li et al.,<sup>2</sup> have used the Airtraq™ VR optical laryngoscope, which is an anatomically curved laryngoscope. In our case, we had attempted a method similar to Li et al.,<sup>2</sup> with the KARL STORZ CMAC laryngoscope. However, our instruments present at the time were either straight or not malleable enough to undertake the procedure. Hence, in our case, a channeled cup

forceps was used along with fiberoptic endoscopy to excise the polyp.

Therefore, after initially failing to visualize and access the polyp adequately using various known techniques and maneuvers, we could eventually excise the polyp successfully with a channeled cup forceps under fiberoptic endoscopy.

## CONCLUSION

Microlaryngoscopy, although a common, relatively simple, uncomplicated surgery with minimal adverse effects, can sometimes prove challenging, by presenting limitations in exposure and access. Such DLE cases are increasing in number because of the increase in the incidence of obesity and neck stiffness in the elderly age group. This case report demonstrates that the excision of benign vocal cord lesions can be performed with channeled cup forceps under fiberoptic endoscopy. This procedure (fiberoptic endoscopy), usually performed as an outpatient procedure, can be done in a theater setting under general anesthesia or STRIVE-Hi, in place of regular microlaryngoscopy, especially in DLE cases.

## Conflict of Interest

Nil

## REFERENCES

- Fang R, Chen H, Sun J. Analysis of pressure applied during microlaryngoscopy. *Eur Arch Otorhinolaryngol*. 2012;269:1471 – 1476.
- Li L, Xu T, Song Y, Yan Y, Ma F, Wang L, et al., Airtraq™ laryngoscope: A solution for difficult laryngeal exposure in phonosurgery. *Acta Otolaryngol*. 2017;137:635 – 639.
- Piazza C, Mangili S, Bon FD, Paderno A, Grazioli P, Barbieri D, et al., Preoperative clinical predictors of difficult laryngeal exposure for microlaryngoscopy: The Laryngoscore. *Laryngoscope*. 2014;124:2561 – 2567.
- Yentis SM, Lee DJ. Evaluation of an improved scoring system for the grading of direct laryngoscopy. *Anaesthesia*. 1998;53:1041 – 1044.
- Zeitels SM, Vaughan CW. "External counterpressure" and "internal distention" for optimal laryngoscopic exposure of the anterior glottal commissure. *Ann Otol Rhinol Laryngol*. 1994;103:669 – 675.
- Zeitels SM. Universal modular glottiscope system: The evolution of a century of design and technique for direct laryngoscopy. *Ann Otol Rhinol Laryngol Suppl*. 1999;179:2 – 4.
- Zeitels SM, Burns JA, Dailey SH. Suspension laryngoscopy revisited. *Ann Otol Rhinol Laryngol*. 2004;113:16 – 22.
- Jackson C. Position of the patient for peroral endoscopy. In: *Peroral Endoscopy and Laryngeal Surgery*. St. Louis, Mo: The Laryngoscope Co.; 1915. p. 77 – 88.
- Vaughan CW. Vocal fold exposure in phonosurgery. *J Voice*. 1993;7:189 – 194.
- Hochman II, Zeitels SM, Heaton JT. Analysis of the forces and position required for direct laryngoscopic exposure of the anterior vocal folds. *Ann Otol Rhinol Laryngol*. 1999;108:715 – 724.
- Kawaida M, Fukuda H, Kohno N. Video-assisted rigid endoscopic laryngosurgery: Application to cases with

- difficult laryngeal exposure. *J Voice*. 2001;15:305 – 312.
12. Kantor E, Berci G, Hagiike M. Operating videoscope for microlaryngeal surgery. *Surg Endosc*. 2006;20(Suppl. 2):S484 – S487.
  13. Anand V, Reji R, Santosh S, Preeti IA. Laryngeal fiberoptic surgery – An alternate approach to microlaryngeal surgery. *Indian J Otolaryngol Head Neck Surg*. 2009;61:2 – 4.
  14. Booth AWG, Vidhani K, Lee PK, Thomsett C-M. Spontaneous Respiration using Intravenous anaesthesia and Hi-flow nasal oxygen (STRIVE Hi) maintains oxygenation and airway patency during management of the obstructed airway: an observational study. *Br J Anaesth*. 2017;118:444 – 451.