



Organ preservation surgery for laryngeal cancer in a trombone player

Funkcionalna hirurgija karcinoma larinksa kod tromboniste

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Abstract

Introduction. Modern treatments for early glottic carcinoma achieve high rates of local control and long-term survival, but potential side effects of some of these treatments have a substantial impact on a patient's quality of life. There is a small quantity of available scientific research on the effects of organ-preservation surgery on musicians, highlighting the challenge of balancing functional outcomes with their occupational demands. **Case report.** We present a successful surgical treatment of a mid-membranous left vocal fold squamous cell carcinoma (T1a stage) in a professional trombonist with a history of many years of smoking. Due to suboptimal exposure during initial microlaryngoscopy, open cordectomy was performed for tumor removal instead of transoral laser microsurgery. After the operation and the proper rehabilitation, the patient continued to play the brass instrument unhindered and managed to fulfill all the obligations of a professional musician in a national orchestra. **Conclusion.** Selecting a method for the treatment of glottic cancers in professional musicians who play brass instruments remains challenging due to limited literature and the potential harm to the ability of performance and the musician's career. Partial open laryngectomies for laryngeal cancer treatment are shown to be feasible without compromising the musician's performance.

Key words:

laryngeal neoplasms; laryngectomy; quality of life; carcinoma, squamous cell; vocal cords.

Apstrakt

Uvod. Savremenim tretmanima karcinoma glotisa, otkrivenog u ranoj fazi, postiže se visoka stopa lokalne kontrole bolesti i dugoročno preživljavanje, ali potencijalni neželjeni efekti nekih tretmana mogu imati značajan uticaj na kvalitet života bolesnika. Malo je dostupnih naučnih istraživanja o efektima poštedne hirurgije kod muzičara, pri čemu je naglašen izazov balansiranja između funkcionalnog ishoda hirurgije i njihovih profesionalnih zahteva. **Prikaz bolesnika.** Predstavljamo uspešno hirurško lečenje skvamocelularnog karcinoma (T1a stadijum) srednje trećine levog glasnog nabora kod profesionalnog tromboniste sa višegodišnjom istorijom pušenja. Zbog suboptimalne ekspozicije tokom inicijalne mikrolaringoskopije, za uklanjanje karcinoma urađena je otvorena hordektomija umesto transoralne laserske mikrohirurgije. Nakon operacije i pravilne rehabilitacije, bolesnik je nastavio da nesmetano svira duvački instrument i uspeo da ispuni sve obaveze jednog profesionalnog muzičara u nacionalnom orkestru. **Zaključak.** Izbor metode lečenja od karcinoma glotisa kod profesionalnih muzičara koji sviraju duvačke instrumente, ostaje izazov zbog ograničenih literaturnih podataka i potencijalne štete za profesionalnu sposobnost i karijeru muzičara. Pokazalo se da su delimične otvorene laringektomije za lečenje od karcinoma larinksa izvodljive bez ugrožavanja performansi muzičara.

Ključne reči:

larinks, neoplazme; laringektomija; kvalitet života; karcinom, planocelularni; glasne žice.

Introduction

Modern treatments for early glottic carcinoma (tumor *in situ*, T1 stage) include local radiotherapy (RT), transoral laser microsurgery (TLM), and open cordectomy or partial laryngectomy. Each treatment method achieves a high rate of local control and long-term survival¹. Although the oncolog-

ic and functional outcomes are comparable, side effects may vary greatly and have a substantial impact on the quality of life of the patient². Playing a brass wind instrument necessitates not just the patient's upper airway but also the functioning larynx to efficiently conduct, regulate, and modulate the airstream required for tone creation³. There is a lack of research on the effects of organ-preservation therapy for laryn-

geal carcinoma in musicians who play wind instruments. We describe a case of a professional trombonist diagnosed with a T1a left vocal fold squamous cell carcinoma (SCC), treated with open cordectomy. According to our knowledge, this is the first documented example of an orchestral musician resuming the same level of professional activities following oncological larynx preservation surgery.

Case report

A 55-year-old male patient with an otherwise unremarkable medical history was evaluated for long-standing hoarseness and subsequently diagnosed with a T1a keratinizing SCC of the mid-membranous left vocal fold. He had a 24 pack-year smoking history before quitting 14 years ago. Apart from his medical history, he was a professional trombonist, playing various opera and ballet repertoire as a full-time member of a major theater orchestra. The case was presented to the multidisciplinary tumor board, after which the patient decided to proceed with the surgical intervention. All therapy choices and their prospective effects on the

patient's health and career were thoroughly reviewed with him before a final decision was made. Due to the suboptimal exposure of the glottis during the microlaryngoscopy, left-sided open cordectomy in general anesthesia was performed instead of the usual TLM. The thyroid cartilage was approached through the small vertical incision of the skin and subcutaneous tissues of the anterior neck. Following division and retraction of the infrahyoid muscles in the midline, the left vocal fold with the ipsilateral vocal process of the arytenoid was removed in an "en-bloc" fashion through laryngofissure. The resulting defect was left to epithelialize, and the incision was closed in layers. The final histopathology report confirmed the initial diagnosis, with complete tumor removal and tumor-free margins of the vocal fold specimen. The postoperative period was uneventful, and the patient was discharged on the seventh postoperative day, with regular monthly follow-ups by the attending surgeon (Figure 1). Two months after surgery, the patient began breathing exercises and mouthpiece buzzing without the instrument, and four months after surgery, he gradually resumed performances in the orchestra (Figure 2) ([Video 1](#)).

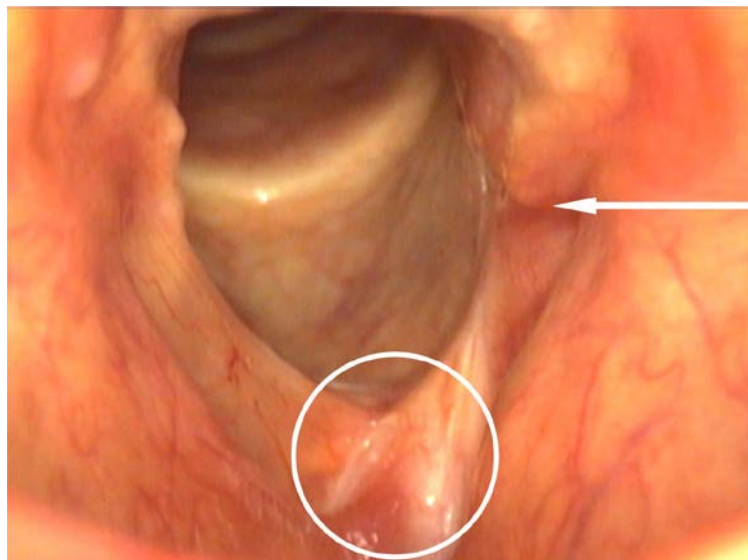


Fig. 1 – Postoperative appearance of the patient's larynx (rigid telaryngoscopy, 90 degrees): no recurrence was observed, while a small anterior neoglottal web (white circle) and left-sided contact ulcer (arrow) were found as incidental findings.

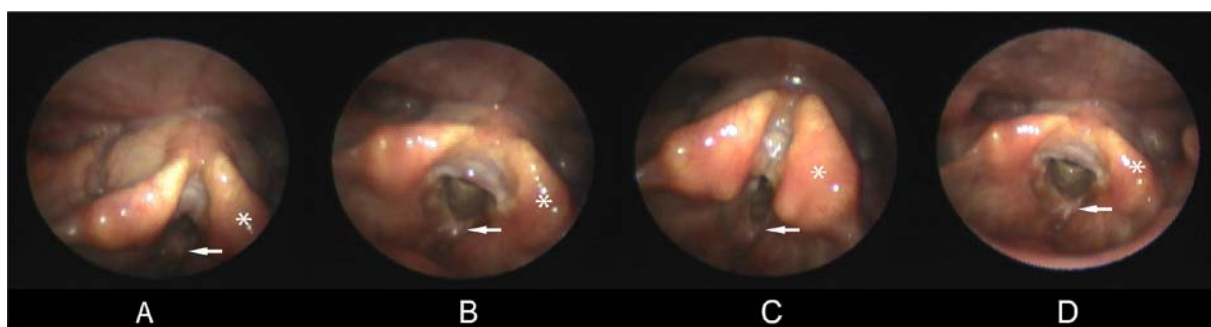


Fig. 2 – Transnasal flexible fiberoptic laryngoscopy during trombone playing showing arytenoids (*) and the neoglottis (arrow). The patient was instructed to play a sustained B-flat in four different octaves: A) Bb3, B) Bb4, C) Bb2, and D) Bb1.

Discussion

The tone of a brass wind instrument is created by the vibrating lips of the performer on the rim of the conical mouthpiece. The vibrations of the lips are generated by exhaled air and amplified by the instrument itself. Tone volume and pitch are regulated by altering the speed and volume of the supporting expiratory airstream and the tension of the perioral muscles. In addition, effective brass instrument playing requires complex coordination of facial and respiratory muscles, as well as movements of the tongue and jaw to shape and direct the airstream. The larynx and vocal folds especially contribute to the modulation of the airflow and musical phrasings, such as staccato, slurring, and vibrato, according to earlier endoscopic research on wind instrumentalists³⁻⁶. Although the larynx remains structurally intact following RT for early glottic carcinoma, a variety of local side effects, such as transitory or chronic laryngeal edema, xerostomia, or throat dryness, can have a significant impact on tone output in wind instrument players⁷. TLM is currently considered a standard in the surgical treatment of small and midmembranous vocal fold lesions⁸. It has less postoperative morbidity than open procedures, avoids the side effects of RT, and appears to be a feasible treatment choice in our case. Unfortunately, due to insufficient visibility of the endolarynx, this strategy proved to be inapplicable. Vertical partial laryngectomies, including open cordectomy through laryngofissure, imply midline transection of the thyroid cartilage for tumor exposure and removal, therefore disrupting the integrity of the laryngeal skeleton and often resulting in substantial tissue defects. Previously reported local complication rates for organ-preserving surgery for laryngeal carcinoma vary from 8% for open cordectomy to 14% for vertical partial laryngectomy⁹. Regardless of the meticulous surgical technique, subsequent healing of the transected laryngeal framework and epithelization of the resulting defect is often unpredictable. It may cause excessive glottal scarring, webs, stenosis, and granuloma formation, which might hypothetically affect the airflow control required for playing wind instruments. In our case, just a minor granuloma was discovered in the location of the excised vocal process, which did not appear to impact the performance of the player. Since our patient was a member of an orchestra with national significance, the surgeon was additionally challenged to tailor the therapeutic approach to

achieve radical surgery while allowing the patient to actively maintain his musical engagement. Cavalot et al.¹⁰ described a case of a professional musician who underwent total laryngectomy for pT3 laryngeal carcinoma and resumed his career following voice prosthesis insertion. Nevertheless, there was no precise description of the patient's professional participation and musical ability before and after therapy. Playing trombone in a major orchestra requires complete technical proficiency with the instrument in terms of range, endurance, and stylistic accuracy, whether performing a 17th-century opera or contemporary ballet music. Our patient was able to respond to these demands as effectively as before surgery. RT and surgery are reported to be equally effective in the treatment of the early stages of laryngeal SCC, and, to date, there is no proof that one modality is superior to the other¹¹. Hence, the proper treatment is selected at the discretion of the patient and the physician. The location and size of the tumor, the patient's age, and the presence of comorbidities must be considered while evaluating treatment choices. The final decision should be based on the method with the lowest risk of complications that would interfere with the patient's everyday life and professional life without jeopardizing the oncologic outcome^{9, 12}. Our patient assessed that the possible post-radiation xerostomia or throat dryness would have a greater impact on his playing, and he favored surgery.

Conclusion

Due to the scarcity of literature and the possibly harmful effects of therapy on their performance and career, selecting a particular treatment for head and neck cancers in performing musical artists – professional wind players – remains difficult. This article demonstrates the viability of partial open laryngectomies for laryngeal cancer in a professional trombonist without compromising his performance. With more advanced carcinoma, it is unclear how wider partial resections of the larynx would affect the careers of wind instrumentalists; thus, additional study is required in this area.

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REFERENCES

1. Peretti G, Nicolai P, Piazza C, Redaelli de Zinis LO, Valentini S, Antonelli AR. Oncological results of endoscopic resections of Tis and T1 glottic carcinomas by carbon dioxide laser. *Ann Otol Rhinol Laryngol* 2001; 110(9): 820–6.
2. Milovanovic J, Jotic A, Djukic V, Pavlovic B, Trivic A, Krejovic-Trivic S, et al. Oncological and functional outcome after surgical treatment of early glottic carcinoma without anterior commissure involvement. *Biomed Res Int* 2014; 2014: 464781.
3. Mukai S. Laryngeal movements during wind instruments play. *Nippon Jibiinkoka Gakkai Kaiho* 1989; 92(2): 260–70. (Japanese)
4. Rydell R, Karlsson M, Milesson A, Schalén L. Laryngeal activity during wind instrument playing: Video endoscopic documentation. *Logop Phoniatr Vocology* 1996; 21(1): 43–8.
5. King AI, Ashby J, Nelson C. Laryngeal function in wind instruments: The brass. *J Voice* 1989; 3(1): 65–7.

6. *Weikert M, Schlömicher-Thier J.* Laryngeal movements in saxophone playing: Video-endoscopic investigations with saxophone players. A pilot study. *J Voice* 1999; 13(2): 265–73.
7. *Guimarães AV, Deditiis RA, Matos LL, Aires FT, Cernea CR.* Comparison between transoral laser surgery and radiotherapy in the treatment of early glottic cancer: A systematic review and meta-analysis. *Sci Rep* 2018; 8(1): 11900.
8. *Ambrosch P.* The role of laser microsurgery in the treatment of laryngeal cancer. *Curr Opin Otolaryngol Head Neck Surg* 2007; 15(2): 82–8.
9. *Ganly I, Patel SG, Matsuo J, Singh B, Kraus DH, Boyle J, et al.* Analysis of postoperative complications of open partial laryngectomy. *Head Neck* 2009; 31(3): 338–45.
10. *Cavalot AL, Schindler A, Juliani E, Schindler O, Cortesina G.* Playing a brass instrument after total laryngectomy: A case report. *Head Neck* 2009; 31(8): 1102–6.
11. *Ferreira N, Netto E, Fonseca L, Fonseca J, Esteves S, Labareda M, et al.* Surgery versus radiotherapy: Long term outcomes of T1 glottic cancer. *Rep Pract Oncol Radiother* 2020; 25(6): 860–6.
12. *Lau VH, Leonard RJ, Goodrich S, Lum Q, Farwell DG, Lau DH, et al.* Voice quality after organ-preservation therapy with definitive radiotherapy for laryngeal cancer. *Head Neck* 2012; 34(7): 943–8.

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