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Case Report

A Case of Oropharyngeal Carcinoma with an Oblique Neck that Benefited from Transoral Robotic Surgery

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Keywords
Transoral robotic surgery · Oropharyngeal carcinoma · Skeletal disorder

Abstract
Transoral robotic surgery (TORS) and transoral videolaryngoscopic surgery (TOVS) are minimally invasive procedures for early-stage head and neck cancers. However, due to its unique nature, transoral resection often leads to skeletal and anatomical disorders. We describe a case in which TORS was used in a 71-year-old man with a skeletal disorder, spastic stridor, and a T2N1M0 stage I p16-positive oropharyngeal carcinoma. Prior to the procedure, he underwent right cervical dissection (levels II–IV). Although he had an oblique neck, the right side of his neck was naturally hyperextended because the dissection was performed on the right side. The right facial, lingual, and external carotid arteries were ligated in preparation for TORS. Postoperative pathological examination revealed no extranodal involvement of the metastatic lymph nodes. A two-stage TOVS procedure was performed for the oropharyngeal tumor, in which the surgeon was required to be positioned at the patient's head to allow direct manipulation. This makes the neck and oral cavity more susceptible to the skeletal effects. In contrast, in TORS, the da Vinci insertion angle can be set to match the angle of the neck, allowing surgeons to operate with less skeletal influence. TORS is more useful in this setting.

Introduction

Transoral robotic surgery (TORS) [1] and transoral videolaryngoscopic surgery (TOVS) [2] are minimally invasive procedures for early-stage head and neck cancers. However, due to its unique nature, transoral resection is susceptible to skeletal and anatomic disorders.

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Therefore, endoscopic laryngo-pharyngeal surgery and TOVS are challenging for patients with skeletal disorders. We describe a case in which TORS was useful for a patient with a skeletal disorder, spastic stridor, and oropharyngeal carcinoma.

Case Report

In February 2021, a 71-year-old man presented to our clinic with right cervical swelling. Endoscopy revealed an elevated lesion anterior to the right wall of the oropharynx (shown in Fig. 1). Cervicothoracic contrast-enhanced computed tomography revealed a tumor, with a maximum diameter of 26 mm, with a contrast effect in the anterior to the right lateral wall of the oropharynx (Fig. 1). Positron emission tomography revealed no evidence of distant metastasis. Upper gastrointestinal endoscopy revealed no overlapping cancer. The patient was diagnosed with a p16-positive cT2N1M0 stage I squamous cell carcinoma of the anterior wall of the right oropharynx. The patient denies any cigarette smoking or drinking alcoholic beverages. The patient previously experienced left spastic stridor secondary to dystonia syndrome. His neck was obliquely tilted at approximately 30° to the left in a sitting posture. Rotation to the right and lateral flexion were restricted. Cervical extension was possible (Fig. 2).

Right neck dissection (levels II–IV) was performed. The patient had an oblique neck, and the right side of his neck was hyperextended because the dissection was on the right side. The right facial, lingual, and external carotid arteries were ligated in preparation for TORS. Postoperative pathology showed 15 lymph nodes removed and 1 metastatic lymph node among them, and diagnosis was metastasis of squamous cell carcinoma, negative extranodal extension.

TORS was performed for anterior wall cancer of the oropharynx on day 14 after neck dissection. Pharyngeal expansion was performed using an FKWO retractor. The FKWO retractor was tilted 30° to the left and inserted according to the patient's oblique cervical angle. A cloth was placed under the post to maintain angle stability. The surgical support robot was positioned according to the angle of the patient's neck (Fig. 3). A safety zone of approximately 5 mm from the tumor was secured, and a full mucosal incision was made around the tumor. Part of the submucosal fatty tissue was resected along with the nasopharyngeal constrictor muscle. The area near the stalk pharyngeal muscle was resected so that it would not penetrate the fatty tissue of the parapharyngeal space. The tumor was resected as a single lump with adequate margins (Fig. 3). After wound cleaning, a PGA sheet was attached to the bio-glue, and the surgery was completed.

The patient was able to consume a normal diet the day after the surgery. No postoperative complications occurred. The pathological diagnosis was squamous cell carcinoma, p16 positive, well-differentiated, pT2, ly0, v0, pn0, pHM0, pVM0, negative for excisional margins. Since then, the patient has recovered without any recurrence.

Discussion

There are four indications for TORS: (1) oropharyngeal, hypopharyngeal, and supraglottic cancers; (2) cases up to T2; (3) no invasion of the surrounding organs; and (4) no impairment of mouth opening. Additionally, its off-label use on cervical spine diseases that interferes with necessary positioning has been reported [3].

In cases of anterior wall cancer of the oropharynx, anatomical factors may make TORS challenging. Further, on preoperative imaging studies, there have been reports of limited access to the tumor in cases where the (1) distance from the posterior wall of the pharynx to the hyoid bone is ≤30 mm; (2) the angle between the glottis and vertical plane of the glottis is ≥130°; and (3) the distance from the posterior wall of the pharynx to the soft palate

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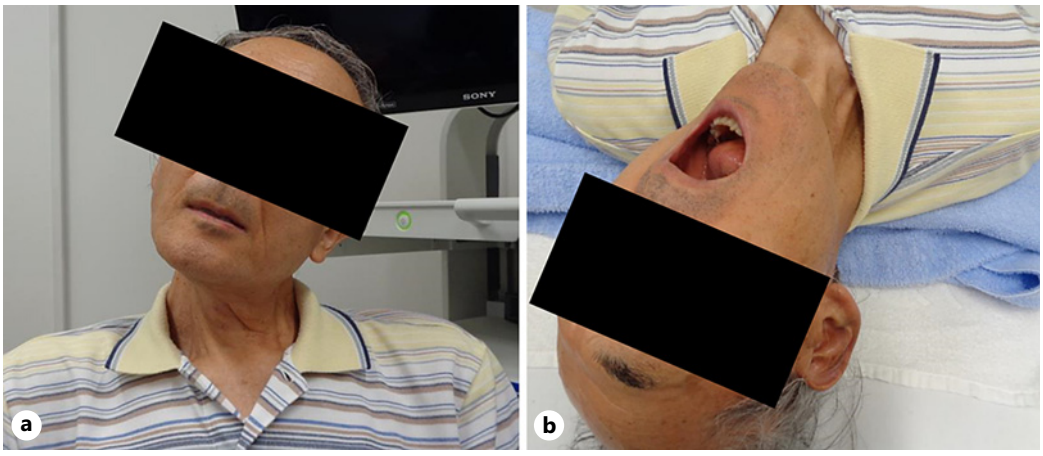

Fig. 1. Patient's cervical findings. The patient had left spastic plagiocephaly due to dystonia. There was also a limitation in cervical motion. **a** The neck is tilted 30°–40° to the left. **b** In the supine position, the neck was tilted 30°–40° to the left in cervical extension. No numbness or other neurological symptoms were observed.

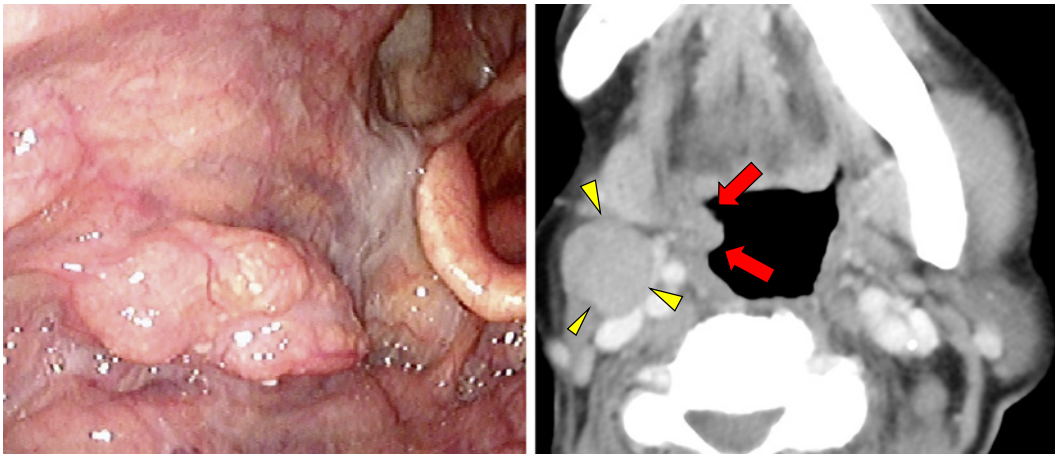

Fig. 2. Endoscopic findings and contrast-enhanced computed tomography. Endoscopic findings: tumor on the anterior wall of the mid-pharynx. Contrast-enhanced computed tomography: tumor in the anterior wall of the mid-pharynx, with no infiltration of the parapharyngeal space (red arrow). The right upper internal deep cervical lymph node was enlarged (yellow triangle).

is ≤8.1 mm [4]. The patient in this study has a T2 carcinoma of the right anterior wall of the middle pharynx, with no pharyngeal contraction muscle, vascular invasion, or limited mouth opening, making the patient a good candidate for transoral resection. Additionally, the right side of the patient's neck was hyperextended due to the left spastic plagiocephaly. However, cervical spine disease may make it difficult to secure the field of view during transoral resection. The decision to do a transoral resection was made during the right neck dissection, where the patient was placed in the open position under general anesthesia. Because the patient had a left oblique neck, the tumor anterior to the right wall of the middle pharynx was easily identified. If the patient had a right oblique neck, chemoradiotherapy would have been the treatment of choice, instead of TORS.

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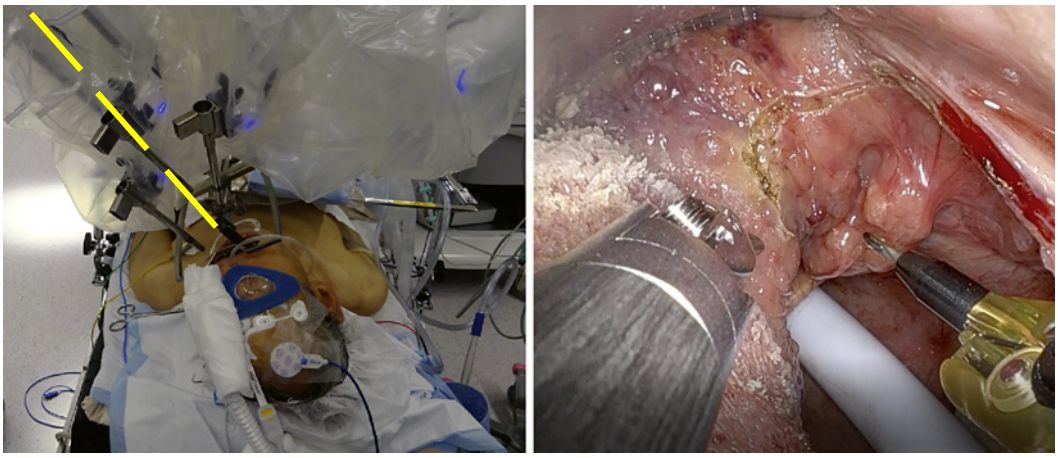

Fig. 3. TORS. The robotic arm was inserted according to the angle of the neck (dashed yellow line).

Once a field of view that allows transoral resection has been obtained, the next problem would be the surgical modality. TOVS requires the surgeon to be positioned directly over the patient's head, making the neck and oral cavity more susceptible to skeletal defects. In contrast, TORS allows the insertion angle of the da Vinci to be set to match the angle of the neck, allowing surgeons to operate with less skeletal influence. Therefore, TORS was indicated for this patient.

In this case, the neck was tilted upward to the left in the supine position, and mildly extended (Fig. 1b). Therefore, when inserting the da Vinci, the targeting laser was tilted to the left, making the crosshair of the targeting laser aligned with the midline of the upper lip. The camera and other arms were inserted perpendicularly to the oral cavity to ensure a normal field of view, allowing the surgeon to operate with minimal skeletal influence. Although this was a case of cervical dystocia, we believe that adequate surgical manipulation was obtained. Negative tumor margins were obtained in the postoperative pathology diagnosis. Though postoperative bleeding is a severe complication of TORS [5], the patient had no postoperative complications because sufficient hemostasis was achieved with a good visual field.

The percentage of positive tumor margins was 8.8% and 24.7% in the TORS and non-robotic groups, respectively [6]. Even in patients with cervical spine disease, such as the present case, TORS can be used to achieve a radical cure without the need for chemoradiotherapy. TORS is a useful treatment option even in cases of cervical skeletal involvement.

Conclusion

In some cases, transoral resection could not be performed and external approach or radiotherapy was used in cases involving skeletal disorders. As in this case, we can perform the surgery by devising da Vinci setting. The CARE Checklist has been completed by the authors for this case report, attached as online supplementary material (for all online suppl. material, see https://doi.org/10.1159/000533553).

Statement of Ethics

This case study followed the protocol of the World Medical Association Declaration of Helsinki. The study is exempt from Ethical Committee approval since the case report is exempt from committee review (Tokyo Medical University Institutional Review Board). Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

Conflict of Interest Statement

We have no potential conflicts of interest or financial relationships to disclose.

Funding Sources

The authors have no conflicts of interest to declare.

Author Contributions

Tatsuya Yamakura drafted the manuscript. Akira Shimizu designed the study and revised the manuscript accordingly. Isaku Okamoto, Takuro Okada, Kunihiko Tokashiki, Takuma Kishida, and Tatsuya Ito treated this patient. Kiyoaki Tsukahara supervised the study.

Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplementary material files. Further inquiries can be directed to the corresponding author.

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