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Intraoral midline mandibulotomy improves laryngeal access for transoral resection of laryngeal cancer

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ARTICLE INFO

Article history:
Received 3 October 2015

ABSTRACT

Intraoral midline mandibulotomy is a technique that can be used to increase exposure for transoral endoscopic laser microsurgery (TLS). We describe the case of a 51 year old male with persistent T1 glottic carcinoma. At initial diagnosis, he had been referred for curative radiotherapy as laryngeal access was not sufficient for TLS. For treatment of his recurrence, we describe the technique of performing a midline mandibular osteotomy to improve access to the larynx allowing for safe and effective transoral endoscopic laser microsurgery. Surgical access to the larynx was greatly improved, and we were able to perform TLS in a case that would have otherwise not been amenable to TLS. An intraoral midline mandibulotomy can improve access to the larynx and allow for successful transoral resection of laryngeal cancer in patients with otherwise inaccessible tumors.

1. Introduction

Transoral endoscopic laser microsurgery (TLS) has become a standard treatment of early glottic cancer. The oncological results with carbon dioxide (CO2) laser excision for stage 1 and stage 2 glottic tumors are comparable to those of radiation as local control rates over 90% and laryngeal preservation in 90% of cases have been demonstrated [1,2]. For early glottic cancer, endoscopic laser excision has been shown to have similar treatment outcomes when compared to open surgical techniques, yet with less morbidity and shorter hospitalizations [3]. TLS requires specific equipment and instruments, specialty surgical training and experience, in addition to adequate exposure of the larynx [4]. Certain anatomic considerations such as retrognathia, macroglossia, small oral aperture, or cervical fibrosis with laryngeal fixation from prior radiation therapy can prevent adequate exposure of the larynx. Suboptimal exposure can lead to increased operative times, greater risk of surgical complications, and the possibility of inadequate surgical resection margins. With inadequate exposure, patients may need to be referred for radiation or are treated with more extensive open surgical techniques.

Previously, our group has described the technique of performing transoral midline mandibular osteotomies in cadavers to increase exposure to the oropharynx and hypopharynx for transoral robotic surgery. Our previous study demonstrated that such a technique could increase the craniocaudal dimension of the aperture as well as the volume of the oral cavity/oropharynx [5]. We recently encountered a

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http://dx.doi.org/10.1016/j.amjoto.2015.10.005
0196-0709/

51 year-old male with a persistent T1 right true vocal fold squamous cell carcinoma (SCC) involving the anterior commissure after radiotherapy. The patient had initially been referred for radiotherapy due to inadequate laryngeal access on direct laryngoscopy, and this also precluded performance of TLS for his persistent disease. However, we successfully performed a transoral midline mandibular osteotomy to improve laryngeal access, which allowed for an adequate endoscopic resection.

2. Case report

The patient was a 51 year-old male who was diagnosed with T1a right true vocal fold SCC. Secondary to difficult laryngeal access, the patient was referred for radiotherapy. He was treated with curative intent using 63 gray in 28 fractions. During follow-up, he was found to have persistent T1 true vocal fold SCC with anterior commissure involvement. The patient was otherwise healthy but was hesitant to pursue open approaches to the larynx secondary to the associated morbidity. In addition, the patient was not a candidate for re-irradiation. As a result, the decision was made to proceed with a midline mandibular osteotomy if adequate access for TLS could not be obtained.

The patient underwent a transnasal intubation with a laser safe tube. Direct laryngoscopy was performed by a senior laryngologist to confirm that straight line of sight access for TLS would not allow for adequate resection margins (Fig. 1). The patient was then prepped and draped for a midline mandibular osteotomy. No external incisions were used with this technique. A gingivobuccal mucosal incision lateral to the planned placement of the midline mandibular osteotomy was made down to the periosteum. Care was taken to protect papilla on both the buccal and lingual surfaces of the teeth. A mucoperiosteal dissection was then performed to expose the mandible. A cuff of mentalis muscle was left adherent to the mandible to enable re-approximation of the gingiva at the conclusion of the case. The mucoperiosteal flap was elevated laterally while ensuring that the mental nerves were protected. Reflection of the lingual mucoperiosteum exposed the lingual surface of the mandible and care was taken to prevent injury to the lingual tissues and submandibular ducts. Prior to performing the osteotomy, two four-hole miniplates were preadapted to fit the mandible, and the TPS drill (Stryker, Kalamazoo, MI) was used to create pilot holes in the mandible. Number 6 non-locking screws were used to fix the plates. Once configured and placed appropriately, the plates were removed. A reciprocating saw with a thin osteotomy blade was used to make a full thickness midline mandibular osteotomy inferior to the level of the tooth roots between the central incisors. A monocortical osteotomy was made at the level of the tooth roots, and the osteotomy was completed using a fine osteotome to protect the tooth roots from damage. At this point, direct laryngoscopy was performed ensuring that the tongue musculature was displaced into the space created by the mandibular separation (Figs. 2 and 3). The improved exposure allowed us to perform an endoscopic laser resection with adequate surgical margins (Fig. 4). After removing the suspension, the mandible was copiously irrigated. The preadapted mandible plates were secured using number 6 non-locking screws. The mentalis was reapproximated using 3-0 vicryl. The papilla were closed using 3-0 chromic gut in a vertical mattress fashion.

Postoperatively, the patient was struck in the chin by a flailing child resulting in mobility of his hardware. He was taken back to the operating room for a revision open reduction and internal fixation using a larger reconstruction plate and a lag screw. Currently, he has no evidence of disease, and his occlusion remains intact 1 year postoperatively.

3. Discussion

Transoral endoscopic laser microsurgery (TLS) has become a standard treatment of early glottic cancer. Oncologic results are similar for TLS when compared to radiation therapy and open surgical procedures [1–3]. When compared to open surgical, TLS has been found to have a lower incidence of complications and tracheotomies. TLS and radiation therapy are considered first-line therapy for early glottic cancer while

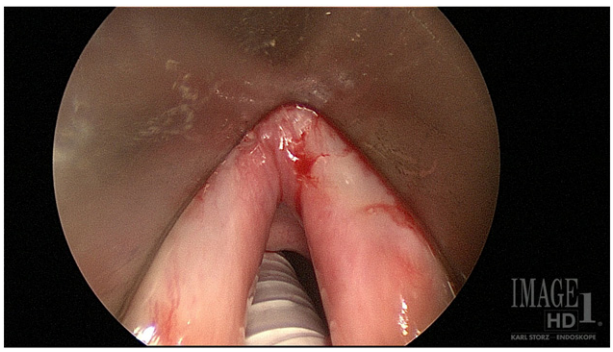

Fig. 1 – Demonstrates the obtained exposure using the anterior commissure laryngoscope prior to midline mandibulotomy.

Fig. 2 – Demonstrates the potential space created by mandibular separation.