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Difficult laryngoscopy caused by massive mandibular tori

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Abstract
Mandibular tori, defined as bony protuberances located along the lingual aspect of the mandible, are a possible cause of difficult intubation. We describe a case of mandibular tori that resulted in difficult intubation. A 62-year-old woman who had speech problems was diagnosed with mandibular tori, and was scheduled for surgical resection. On physical assessment, the patient had a class II Mallampati view and bilateral mandibular tori. Preoperative computed tomography images demonstrated that the bilateral mandibular tori arose from the lingual aspects of the second incisor to the first molar regions of the mandibular corpus, and occupied the floor of the mouth. In the operating room, anesthesia was induced with remifentanil and propofol. After complete paralysis was achieved, laryngoscopy was attempted several times with Macintosh blades. The massive tori prevented insertion of the tip of the blade into the oropharynx, and neither the epiglottis nor the arytenoids could be visualized, i.e., Cormack and Lehane grade IV. Blind nasotracheal intubation was successful and the surgery proceeded uneventfully. The anesthesiologist should examine any space-occupying lesion of the oral floor and should be vigilant for speech problems in order to detect mandibular tori that might impede intubation.

Key words Mandibular tori · Difficult Laryngoscopy · Cormack and Lehane classification · Mallampati classification

Introduction

Mandibular tori, defined as bony protuberances located along the lingual aspect of the mandible, are reported as a possible cause of difficult intubation. Despite the high prevalence rates of mandibular tori, few reports have been published regarding intubation difficulties due to this condition. We describe a case of mandibular tori that resulted in difficult intubation and discuss anatomical problems caused by mandibular tori in relation to laryngoscopy.

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Case report

A 62-year-old woman (164.5 cm, 51.8 kg) presented with a 5- to 6-year history of bony protuberances on the floor of her mouth. These had recently interfered with her speech. She was diagnosed with mandibular tori, and was scheduled for surgical resection. Her medical history included epilepsy, since the age of 59, and hypertension. On physical assessment, the patient had normal external anatomy, a mouth opening of more than three fingerbreadths, a class II Mallampati view [1], and bilateral mandibular tori on either side of the frenulum of the tongue (Fig. 1). Preoperative computed tomography (CT) images demonstrated massive bilateral exostoses arising from the lingual aspects of the second incisor to the first molar regions of the mandibular corpus. The masses overrode the mylohyoid muscles and occupied the floor of the mouth (Fig. 2a, b).

We planned to first insert the endotracheal tube via the nostril into the pharyngeal space to secure the airway and allow ventilation, and then maneuver the tube into the trachea using a Macintosh blade. A flexible fiberoptic bronchoscope was prepared in case routine nasotracheal intubation was impossible. Midazolam 3 mg was given as premedication 1 h before surgery. Following bilateral mandibular nerve blocks with 2% lidocaine containing 1/80 000 epinephrine, the patient was administered oxygen via a face mask. Anesthesia was induced with remifentanil (0.25 μg·kg^{-1}·min^{-1}) and propofol (80-mg bolus), and after confirming airway patency with mask ventilation, 5 mg vecuronium was injected. After complete paralysis was achieved, a 7.5-mm internal diameter polyvinyl chloride tracheal tube (nasal RAE; Mallinckrodt, Hazelwood, MO, USA) was inserted via the right nostril. Oxygen-

ation was maintained by intermittent ventilation via the tracheal tube placed in the pharyngeal space without desaturation (peripheral oxygen saturation [$S_{p_{O_2}}$] >98%) while we had several attempts at laryngoscopy with Macintosh 3 and 4 blades with head and neck repositioning and external compression. However, the massive tori prevented displacement of the tongue and insertion of the tip of the blade into the oropharynx, and the epiglottis could not be seen. The first attempt at blind nasotracheal intubation was successful and the surgery proceeded uneventfully. The resected specimens measured 16.8 × 31.3 × 33.4 mm on the right side and 17.3 × 36.4 × 28.7 mm on the left.

Discussion

Mandibular tori are benign focal overgrowths of cortical bone and are not uncommon; they do not usually develop until adulthood and gradually increase in size over the patient's lifetime [2]. Unless the tori interfere with the function or proper fitting of dentures or other dental devices, surgical treatment is not required. Therefore, tori are generally asymptomatic and are regarded by patients as normal. If large enough, however, an exostosis may interfere with speech and other functions [3].

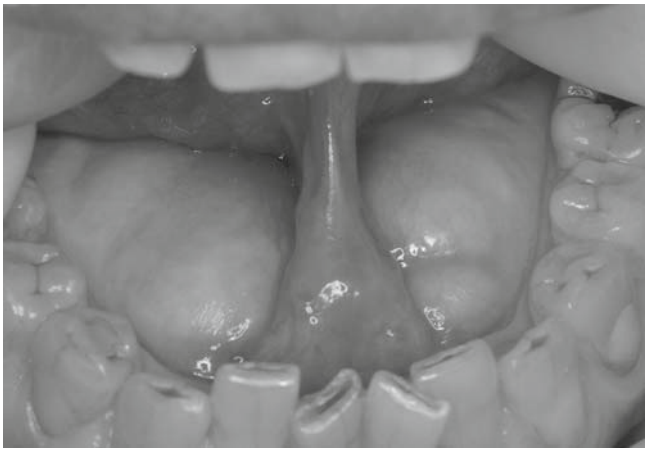

Fig. 1. Bilateral massive mandibular tori were apparent on either side of the frenulum of the tongue

Woods [4] and Durrani and Barwise [5] reported cases of difficult laryngoscopy due to massive bilateral mandibular tori. In their patients, the tip or anterior surface of the epiglottis, the base of the arytenoids, or the lower portion of the glottis was barely visible with backward, upward, and rightward pressure (BURP) on the thyroid cartilage; i.e., Cormack and Lehane grade III B [6]. In the present patient, neither the epiglottis nor the arytenoids could be visualized, i.e., Cormack and Lehane grade IV, and the tip of the Macintosh blade could not be inserted into the oropharynx during laryngoscopy. The CT images in our patient indicated that the oropharyngeal space was deficient because the mandibular tori extended to the posterior aspect of the first molars, suggesting that severe difficulty in laryngoscopy might be encountered.

A combination of the Mallampati classification and thyromental distance or the assessment of other multiple features may improve the sensitivity and specificity of predicting a difficult airway, and they are recommended for this purpose [6–11]. The prevalence rates of laryngoscopy with Cormack and Lehane grades III and IV are reported as 5.1% and 1.0%, respectively [9], and mandibular tori are reported in 13.9% to 38.7% of the population [12–15]. While the prevalence of massive mandibular tori has not been reported, it is possible that this abnormality is a contributory factor in some cases of difficult airway.

Mandibular tori generally grow slowly and asymptomatically. Massive mandibular tori, however, can be detected when the patient raises the tongue to touch the roof of the mouth. On preoperative assessment, the anesthesiologist should examine any space-occupying lesion of the oral floor and should be vigilant for speech problems in order to detect mandibular tori that might

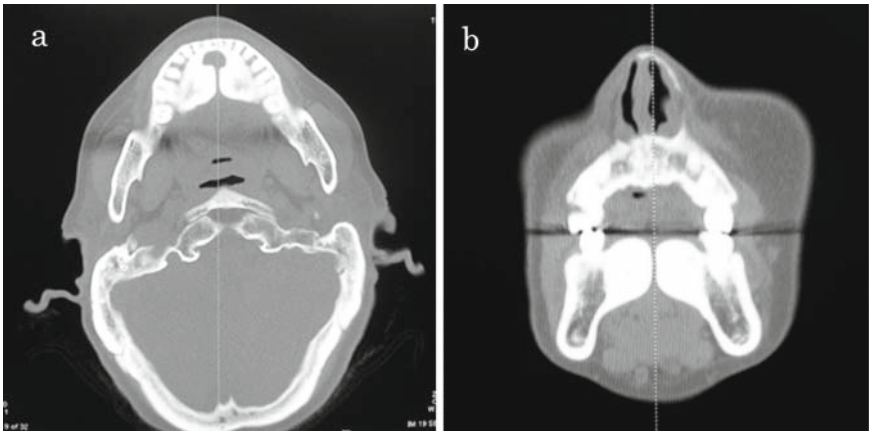

Fig. 2. a Axial computed tomography (CT) image demonstrates bilateral mandibular tori arising from the lingual aspects of the second incisor to the first molar regions of the mandibular corpus. **b** The masses, which overrode the mylohyoid muscles and occupied the floor of the mouth, are shown on a sagittal CT image

impede intubation. This approach allows an appropriate airway management plan to be formulated. Because massive mandibular tori might cause difficult laryngoscopy, the preparation of optional devices such as a flexible fiberoptic bronchoscope or a Miller blade is advisable in such cases.

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