A Case of Anterior Arytenoid Cartilage Dislocation During Nasal Tracheal Intubation Using an Indirect Video Laryngoscope

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Arytenoid cartilage dislocation can occur as a complication of tracheal intubation and laryngeal trauma, but its occurrence with indirect video laryngoscopy has not been reported. This paper reports anterior arytenoid dislocation occurring after nasotracheal intubation performed under indirect laryngoscopy using a video laryngoscope (McGRATH MAC; Medtronic). The dislocation is presumed to have resulted from the laryngoscope blade being initially inserted too deeply and applying pressure to the posterior aspect of the left cricoarytenoid joint. This patient's anterior arytenoid dislocation was treated conservatively using speech therapy with resolution occurring approximately 40 days postoperatively. On the 74th day after surgery, fibroscopic examination confirmed recovery and healing of the dislocation. However, other types of arytenoid dislocations and laryngeal injuries may require alternative treatment. Early consultation with an otolaryngologist is recommended if arytenoid dislocation is suspected.

Key Words: Indirect laryngoscopy; Video laryngoscope; Arytenoid cartilage dislocation; Tracheal intubation; Hoarseness; General anesthesia.

Arytenoid cartilage dislocation or subluxation is a rare laryngeal injury that is classically classified as either anterior/anteromedial or posterior/posterolateral, or even as a complex injury. The most common cause is iatrogenic damage during tracheal intubation,[1] with an estimated frequency of approximately 0.023% to 0.11% following orotracheal intubation using a laryngoscope,[2] followed by direct trauma to the larynx. Based on the direction of compression forces applied to the arytenoid cartilage, the dislocation or subluxation often occurs anteriorly and medially (ie, anteromedial) during intubation or posteriorly and laterally (ie, posterolateral) during extubation.[1] We report a case of left arytenoid cartilage dislocation that occurred when nasotracheal intubation was performed under indirect visualization with a video laryngoscope (McGRATH MAC; McGRATH; Medtronic).

Received December 10, 2021; accepted for publication January 28, 2022.

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Anesth Prog 70:191–193 2023 | DOI 10.2344/837325

CASE PRESENTATION

The patient was a 43-year-old woman (height, 155 cm; weight, 40 kg; BMI, 16.6 kg/m^2) diagnosed with bilateral hyperplasia of the angle of the mandible and a missing mandibular left first molar. She was scheduled for bilateral mandibuloplasty and implant placement under intubated general anesthesia. Induction of general anesthesia was performed using a continuous infusion of remifentanil (0.25 μg/kg/min) and a target-controlled infusion of propofol (5.0 μg/mL). Rocuronium (30 mg) was administered for muscle relaxation prior to nasotracheal intubation with a cuffed, size 6.5 nasal RAE (Taper Guard RAE endotracheal tube; Covidien) endotracheal tube (ETT). During intubation, the McGRATH monitor screen showed the ETT passing smoothly through the glottis without touching the vocal cords or other laryngeal structures (arytenoid notch, corniculate tubercle, cuneiform tubercle, etc). No physical movement of the patient's head or neck or "bucking" occurred during surgery, and no similarly notable findings were observed during emergence or following extubation. The surgery lasted 5 hours and 59 minutes, and the total anesthesia time was 6 hours and 52 minutes.

Upon the patient's return to her room, she began to complain immediately of hoarseness, a sore throat, and odynophagia. The patient's sore throat was relieved and subsequently disappeared after removal of the gastric tube the day after surgery, but the complaints of hoarseness persisted and failed to improve even by the 8th day after the operation (discharge date).

The patient was subsequently referred to a general hospital's department of otolaryngology where CT scans and clinical examination with a fiberscope were performed that same day. On the 17th day after surgery, the patient was diagnosed with an anterior dislocation of the left arytenoid cartilage (Figure 1A–C). Speech therapy for the dislocation was the only treatment undertaken per otolaryngology. However, the patient's hoarseness gradually began to improve approximately 40 days postoperatively. By the 74th day after surgery, complete recovery was confirmed with fibroscopic examination.

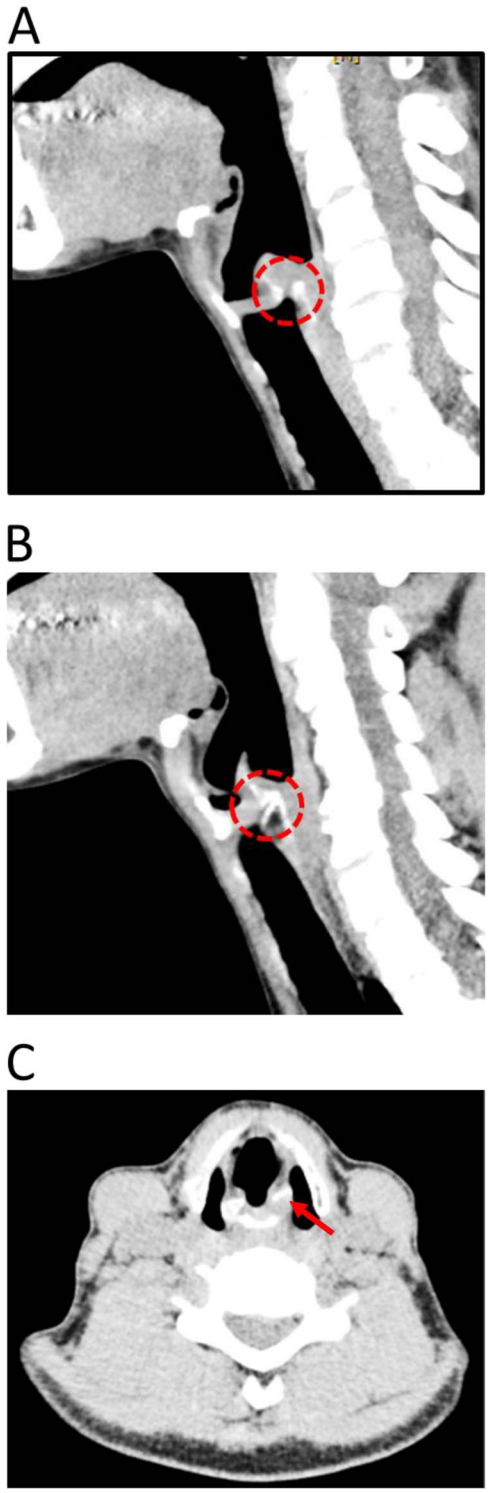
DISCUSSION

Arytenoid cartilage is often dislocated anteromedially during intubation and posterolaterally during extubation because of forces applied to the arytenoid cartilage and/or cricoarytenoid joint. In addition to tracheal intubation, laryngeal mask insertion and blunt direct laryngeal trauma have also been reported as causes of dislocation. Arytenoid dislocation associated with indirect video laryngoscopy, as in this patient, has not been reported. Dislocation is more likely to develop as intubation time and the number of intubation attempts increase.

In our patient, the glottic opening was not difficult to view under indirect laryngoscopy on the McGRATH monitor screen, and the tracheal tube was observed passing smoothly through the glottis during the only intubation attempt without compressing the vocal cords. However, the attending anesthesiologist had a tendency of inserting the video laryngoscope blade tip deeply. Thus, in this patient, the anterolateral arytenoid dislocation was presumed to have been caused by airway instrumentation. We believe that the McGRATH video laryngoscope was initially inserted too deeply, causing the blade tip to compress the posterior surface of the left cricoarytenoid joint (Figure 2A and B).[3] However, over insertion of the blade was quickly corrected, accounting for the ease of visualization and intubation.

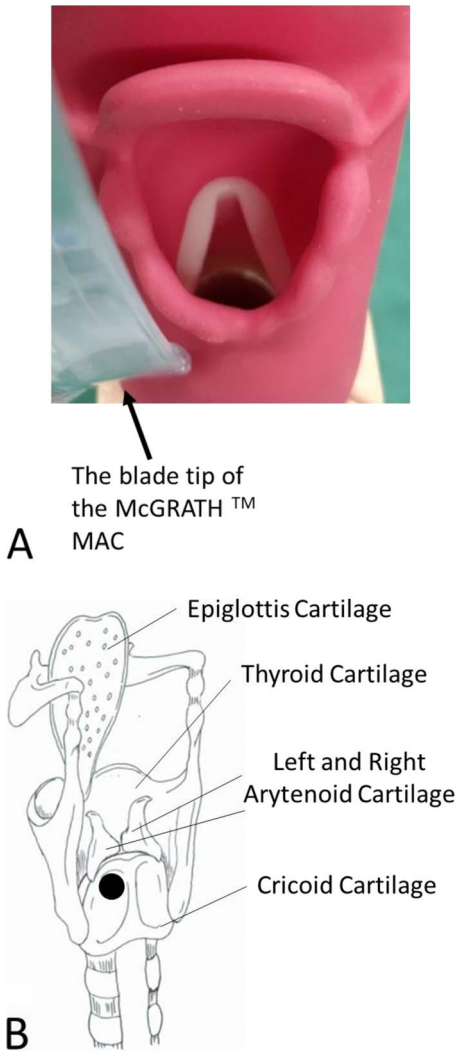
The most common symptoms of arytenoid cartilage dislocation are hoarseness, sore throat, laryngeal pain, difficulty swallowing, difficulty breathing, and wheezing.[4] The characteristic symptom of odynophagia accompanied by hoarseness is useful for differentiating arytenoid dislocation from transient laryngeal nerve paralysis. Contraction of the pharyngeal constrictor and cricopharyngeal muscles that accompanies swallowing moves the dislocated arytenoid cartilage and leads to pains, as is common with posterior dislocation. Similar symptoms were noted in this patient despite the anterior dislocation.

Figure 1. Postoperative Computed Tomography Imaging



(A) Sagittal view of the left cricoarytenoid joint reveals a gap (red circle) between the arytenoid and cricoid cartilages due to the arytenoid dislocation. (B) Sagittal view of the right cricoarytenoid joint illustrates the arytenoid and cricoid cartilages are contacting (red circle). (C) Axial view shows the left arytenoid cartilage is displaced anteromedially (arrow).

Figure 2. Laryngeal Anatomy and the Video Laryngoscope Tip



(A) The tip of the video laryngoscope blade may have been initially inserted too deeply and compressed the posterior aspect of the cricoarytenoid joint. (B) A 3-D diagram of the laryngeal structures illustrating where a strong force is presumed to have been exerted on the left (black circle).

In this case the arytenoid cartilage dislocation was treated conservatively with speech therapy (eg, breath-holding, vocalization, and swallowing), which promotes movement of the thyroarytenoid muscles. In cases of anterior dislocation of the arytenoid cartilage, spontaneous recovery is often achieved with such conservative treatment. However, posterior dislocation rarely recovers spontaneously, and manual or open reduction is often indicated.[5]

CONCLUSION

We report a case of anterior arytenoid cartilage dislocation, which we presume occurred during tracheal intubation under indirect video laryngoscopy. This serves as a reminder that tracheal intubation, even using a video laryngoscope, can cause arytenoid dislocation. Consultation with an otolaryngologist should be an early consideration for a patient reporting prolonged hoarseness after tracheal intubation due to the possibility of arytenoid cartilage dislocation.

This research was originally published in the *Journal of the Japanese Dental Society of Anesthesiology*. 2022;50(2): 66–69.

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