Case Report

Arytenoid cartilage dislocation caused by a double-lumen endobronchial tube

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Following surgery requiring the use of a double-lumen endobronchial tube, a patient immediately complained of persistent severe hoarseness. On the third day after the operation, fibreoptic laryngoscopy revealed posterolateral dislocation of the left arytenoid cartilage. By the sixth day of the operation, a slight improvement was observed in the hoarseness without treatment and a spontaneous recovery of arytenoid cartilage dislocation was expected. The patient did not consent to surgical treatment, and therefore a conservative therapy was selected. Ten weeks after the operation, it was found that the dislocated left arytenoid cartilage had spontaneously repositioned and the patient regained his normal voice. The causes and treatment options are discussed.

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Hoarseness after tracheal intubation is reported in 14–50% of the patients who receive general anaesthesia.1 In most cases, the symptoms are temporary and improve within several days.2 However, in the case of arytenoid cartilage dislocation hoarseness persists, although it is a rare event. It is important to diagnose arytenoid cartilage dislocation early because recovery becomes difficult if appropriate treatment is not started immediately.3

In this report, we present a case of arytenoid cartilage dislocation caused by a double-lumen endobronchial tube (DLT).

Case report

A 52-yr-old ASA I male (55 kg and 163 cm) was scheduled for a right segmental pulmonary resection for a diagnostic biopsy because of abnormal shadows on CXR of the lower lung field. He had no history of pharyngeal and laryngeal disorders and had not had general anaesthesia in the past.

Following the insertion of an epidural catheter at the T6–T7 interspace, anaesthesia was induced with propofol 160 mg and fentanyl 100 μg. After vecuronium 6 mg for muscular relaxation, insertion of a 39 French (Fr) gauge, left-sided DLT (BronchoCath®; Mallinckrodt, St Louis, MO), into the trachea was attempted using a stylet and a Macintosh 4 laryngoscope blade. At the first attempt, the DLT was inserted into the oesophagus because the glottis could not be sufficiently viewed. On the second attempt, we obtained a better view of the glottis (Cormack grade 24), and the DLT was smoothly inserted into the trachea and fixed at the right oral angle at a depth of 29 cm. The stylet, which was in the bronchial lumen, did not distort the DLT and did not protrude from the distal orifice of the bronchial lumen, and it was removed smoothly immediately after the bronchial cuff passed between the vocal cords. A nasogastric tube (16 Fr) was passed without difficulty at the time of tracheal intubation. The patient was placed in the left lateral position before the operation. Anaesthesia was maintained with oxygen, air and propofol, and lidocaine 1.5% was used for epidural anaesthesia. Differential lung ventilation was well tolerated and no complications such as bucking occurred during the operation. After the operation, the DLT cuffs were deflated and the DLT was removed without any difficulty. The duration of the operation was 2 h 12 min and that of anaesthesia was 4 h 20 min.

The patient complained of persistent, severe hoarseness immediately after being transferred to the recovery room. The patient had no symptoms other than hoarseness. On the third day after the operation, fibreoptic laryngoscopy revealed posterolateral dislocation of the left arytenoid cartilage.
cartilage. By the sixth day after the operation, a slight improvement was observed in the hoarseness without treatment and a spontaneous recovery of arytenoid cartilage dislocation was expected. The patient did not consent to surgical treatment, and therefore conservative therapy was selected. Ten weeks after the operation, the dislocated arytenoid cartilage had spontaneously repositioned and the patient regained his normal voice.

Discussion

The frequency of arytenoid cartilage dislocation related to direct laryngoscopy has been reported to be 0.023%. The use of lighted stylet, laryngeal mask airway and McCoy laryngoscope and cases of difficult intubation have been reported to be associated with arytenoid cartilage dislocation. Cases of arytenoid cartilage dislocation with apparently straightforward tracheal intubation have also been reported. Some symptoms such as dysphagia, hoarseness, sore throat and stridor may be caused by arytenoid cartilage dislocation.

Although fibreoptic laryngoscopy is commonly used for diagnosis, laryngeal electromyography, computed tomography and helical computed tomography are also helpful. There are several types of treatment, such as voice therapy, chemical splinting and closed reduction, for arytenoid cartilage dislocation. However, recovery from arytenoid cartilage dislocation becomes difficult if appropriate treatment is delayed. Sataloff and co-workers advocated early diagnosis and treatment of arytenoid cartilage dislocation. They reported that the average time interval between the injury and surgical treatment was 10 weeks in patients who regained their normal voice and 29 weeks for patients who did not regain normal voice. This implied that there was a better rate of recovery with early treatment. They stated that it was important to remain alert for the occurrence of arytenoid cartilage dislocation in order to establish the diagnosis as early as possible, thereby optimizing the probability of restoring normal voice. Quick and Merwin also recommended early treatment to avoid possible complications caused by the loss of normal sphincteric function of the larynx, and for improving the patient’s comfort and oral intake after the operation.

In our patient, the cause of arytenoid cartilage dislocation was unclear, with a number of potential factors being present. First, the distal orifice of the bronchial lumen might have pressed against the left arytenoid cartilage during the first attempt at tracheal intubation. Oesophageal intubation appears to cause antero-medial dislocation of the arytenoid cartilage. However, we also considered that the distal orifice of the bronchial lumen could have pressed the left arytenoid cartilage downward and outward (i.e. posterolateral) during the first attempt. If the tip of the bronchial lumen is inserted into the oesophagus completely and the distal orifice of the bronchial lumen does not make contact with the arytenoid cartilage, an antero-medial force to the arytenoid cartilage will be generated by the body of the DLT. However, if the distal orifice of the bronchial lumen is first brought into contact with the arytenoid cartilage and the DLT is then advanced in the direction of the oesophagus, a posterolateral force to the arytenoid cartilage could be generated. Second, the tip of the bronchial lumen or widening of the distal orifice of the tracheal lumen might have pressed against the left arytenoid cartilage during the second attempt. The DLT was inserted into the trachea from the right side of the patient, thereby producing a posterolateral force to the left arytenoid cartilage. Additionally, the use of a stylet makes the DLT rigid and this might have facilitated the dislocation. Third, the DLT may have pressed against the arytenoid cartilage during a change in position of the patient.

Although the formation of a haemarthrosis or serosynovitis has also been reported to cause arytenoid cartilage dislocation, findings that give an indication of such pathologic changes were not observed in this patient at fibreoptic laryngoscopy.

The cause of spontaneous resolution of the dislocated arytenoid cartilage is unclear. In some cases spontaneous arytenoid cartilage repositioning has occurred in association with vomiting and coughing. However, our patient did not have any such episodes, and spontaneous repositioning, as observed in our patient, has also been reported.

In summary, we present the case report of arytenoid cartilage dislocation caused by a DLT and its spontaneous reposition. Although arytenoid cartilage dislocation following the use of a DLT is a rare event, it is important to be aware of its occurrence and to conduct diagnostic tests as early as possible in case of persistent hoarseness.

References


