

Impossible Airway: A Case Report

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Case report

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Abstract

Background: Wheezing is a common presentation of asthma and chronic obstructive pulmonary disease (COPD). However, other rare etiologies such as endotracheal tumor should be kept in mind.

Case presentation: We report a case of mucoepidermoid carcinoma of carina in which the patient initially presented with wheezing mimicking COPD. Chest roentgenogram showed a soft-tissue density in the tracheal air column. Surgical resection of the tumor was technically hindered by difficulty in airway establishment during anesthesia. Extracorporeal membrane oxygenation (ECMO) was employed to secure adequate blood-gas exchange during operation, after which the tumor was resected smoothly and the patient discharged uneventfully.

Conclusions: Endotracheal tumor should be kept in mind when facing a patient presenting with wheezing. Careful auscultation and interpretation of the chest roentgenogram are two important keys for differentiating such lesions from asthma or COPD. If further intervention was hindered by difficulty in airway establishment, ECMO proves effective and safe to “bypass” such an impossible airway and secure the procedures.

Background:

Wheezing is a common clinical symptom and/or sign in patients with asthma and chronic obstructive pulmonary disease (COPD). Nevertheless, other etiologies causing airway obstruction should be kept in mind. The pathophysiological mechanism of wheezing is mostly obstruction of the small airways. However, wheezing may also occur in obstruction of the larger airways such as bronchus or trachea [1, 2]. Herein we report a case of endotracheal tumor near carina in which the initial clinical manifestation was mistaken as COPD. Retrospective interpretation of the chest roentgenogram disclosed a soft-tissue density tumor in tracheal air column. Further, as airway establishment was difficult for obstruction at this specific anatomical site, extracorporeal membrane oxygenation (ECMO) was employed during surgical procedures.

Case Presentation:

A 76-year-old man visited the emergency department due to acute-onset dyspnea. COPD was newly diagnosed 3 months earlier at a local hospital. On arrival, diffuse expiratory wheezing was noted on physical examination. Bedside supine chest roentgenogram showed mild emphysematous change of the lung. As dyspnea rapidly deteriorated, endotracheal intubation was done. Under medical treatment, the wheezing improved gradually. However, respiratory weaning was difficult due to persistent low tidal volume. Chest computed tomography was done and disclosed an endotracheal tumor at the carina with nearly total obstruction of the airway (Fig. 1A). Surgical resection was planned, but was hindered by difficulty in airway establishment. So we employed ECMO to ensure adequate blood-gas exchange during operation. Under ECMO support, tumor resection was done smoothly. Histopathological examination

showed mucoepidermoid carcinoma. After operation, the tidal volume resumed 600–700 ml and the patient weaned off the ventilator soon. He was discharged 4 days later and became free from wheezing thereafter. In a retrospective review of an upright chest roentogram taken 3 months earlier at the local hospital, a soft-tissue density shadow could be identified just at the carina of the tracheal air column (Fig. 1B).

Discussion & Conclusion:

Wheezing is a common physical finding in clinical practice. In contrast to diffuse wheezing suggestive of diffuse small-airway pathologies (such as diffuse bronchial spasm or peri-bronchial edema), localized wheezing may indicate a focal lesion causing adjacent airway obstruction [1, 2]. This could be the only clue for small lesions that are otherwise invisible on chest roentgenogram. Since localized wheezing can radiate to the whole lungs, careful auscultation at different areas may be the only way to differentiate this from the diffuse pathologies. Take this case for example, the initial diffuse wheezing could be the result of symmetric radiation to bilateral lungs. If the stethoscope had been placed at the mid-lower chest, the localized wheezing could have been identified.

Mucoepidermoid carcinoma is a neoplasm of the airway epithelium mostly occurring in the elderly [3, 4]. Airway obstruction with dyspnea is usually the first presenting symptom. The tumor is hard to identify at early stages of the disease [3]. As the tumor grows, it progressively obstructs airway and causes localized wheezing [5]. Meanwhile, it becomes potentially visible on chest roentgenogram as a soft-tissue density shadow in tracheal air column. Careful auscultation and detailed interpretation of the chest X-ray are both important keys to early diagnosis.

The treatment of mucoepidermoid carcinoma is basically surgical resection [3, 6]. If the tumor was located at mid-lower trachea, however, this is usually hindered by difficulty in airway establishment. Facing an impossible airway like this, ECMO may serve as an ideal solution refraining from immediate airway compromise during anesthesia, and ensuring optimal blood-gas exchange during surgery. Originally designed for neonatal respiratory distress syndrome [7], ECMO has been increasingly applied in other critical scenarios such as sepsis [8], cardiogenic shock [9], cardiac arrest undergoing cardiopulmonary resuscitation [10] etc. It can also be considered in severe diffuse small-airway obstructive diseases such as status asthmaticus [11]. If critical airway obstruction occurred in mid-to-lower trachea where no adequate artificial airway could bypass the lesion, ECMO is most suitable for procedures such as bronchoscopic or surgical intervention. This is especially of value if the airway obstruction is acute, life-threatening, and hard to resolve with traditional endotracheal intubation. If the purpose is blood-gas exchange only, venous-venous ECMO is usually satisfactory. If the cardiac function is poor, however, venous-arterial ECMO may be necessary for ensuring both pulmonary and circulatory support.

In conclusion, mid or lower endotracheal tumor should be kept in mind when facing a patient presenting with wheezing. Careful auscultation and interpretation of the chest roentgenogram are two important

keys for differentiating such lesions from asthma or COPD. If further bronchoscopic examination or surgical intervention was hindered by difficulty in airway establishment, ECMO proves effective and safe to “bypass” such an impossible airway and secure the procedures.

Abbreviations

chronic obstructive pulmonary disease, COPD; extracorporeal membrane oxygenation, ECMO.

Declarations

Ethics approval and consent to participate: a waiver of ethics approval.

Consent for publication: Written informed consent was obtained from the patient for publication of this case report and any accompanying images

Availability of data and material: Not applicable

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Authors' contributions:

YT, and PC described case and drafted the manuscript.

YT, PC, WC and WT performed the literature search and jointly wrote the manuscript.

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Figures

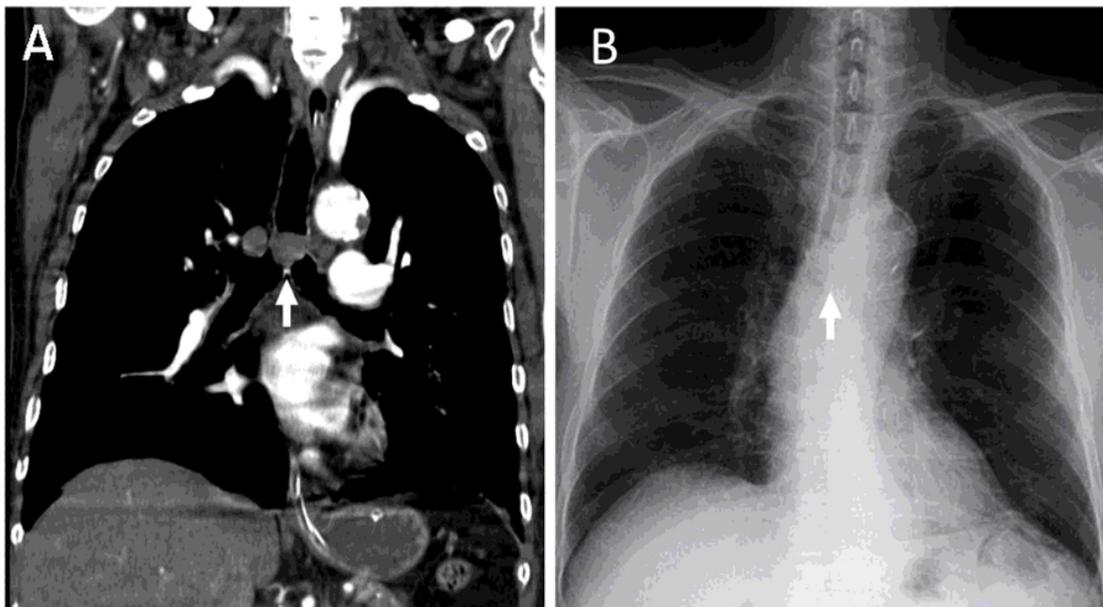


Figure 1

(A) Chest computed tomography showed a round endotracheal tumor near carina, resulting in nearly total occlusion of the airway. (B) Retrospective review of an upright chest roentgenogram taken 3 months earlier at another hospital disclosed a round soft-tissue density shadow in the lower tracheal air column.