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## Case report

## Laryngeal papilloma-induced chronic airway obstruction: A case report

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## ARTICLE INFO

## Keywords:

Papilloma  
Dyspnea  
Asphyxia  
Tracheal diverticulum  
Recurrent respiratory papillomatosis

## ABSTRACT

Laryngeal papilloma is a benign tumor characterized by minimal symptoms; however, in rare cases, it can cause airway obstruction and should be treated with caution. A 65-year-old woman presented to the clinic with a history of dyspnea for the past 20 years. Chest computed tomography revealed the presence of a tracheal diverticulum with an internal septum on the right side of the trachea at the apex of the lung. Upon examination, an otorhinolaryngologist revealed a wart-like tumor at the base of the tongue. However, it was ruled out to be the cause of dyspnea owing to the small size of the tumor. Thereafter, the patient was placed under observation. Bronchoscopy was performed to investigate the tracheal diverticulum. Bronchoscopy revealed a pedunculated papilloma entering the glottis because of inhalation in the supine position, indicating a high risk of airway obstruction by the papilloma. The patient underwent papilloma resection. Papillomas must be considered in the differential diagnosis of dyspnea. The risk of airway obstruction should not be underestimated in patients with papilloma with reported history of dyspnea, even in the case of small tumors. The patient had a rare tracheal diverticulum, which further complicated the diagnosis of dyspnea.

## 1. Introduction

Papilloma is a rare, benign tumor with an incidence rate of 1.8 per 10,000 people [1,2]. It is categorized based on the site of origin as laryngeal papilloma, tracheal papilloma, bronchial papilloma, or pulmonary papillomatosis, collectively referred to as recurrent respiratory papillomatosis (RRP) [2,3]. RRP usually presents with non-specific symptoms including a slight cough, hoarseness, wheezing, and dyspnea [4]. Furthermore, the growth of the tumor may, in turn, cause airway obstruction [4]. Although rare, asphyxia due to papilloma has been previously reported in adults [5].

Here, we report a case of papilloma diagnosed while investigating the cause of prolonged dyspnea and further treated with surgical resection.

A preliminary fibroscopic examination by an otolaryngologist did not reveal an airway obstruction because of the papilloma; however, bronchoscopy revealed the presence of a pedunculated tumor entering the glottis.

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<https://doi.org/10.1016/j.rmcr.2022.101607>

Received 10 November 2021; Received in revised form 28 January 2022; Accepted 15 February 2022

Available online 18 February 2022

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Although a papilloma is asymptomatic on general examination, clinicians should be aware of the tendency of the tumor to cause asphyxiation, depending on its shape and location.

## 2. Case presentation

A 65-year-old woman presented to our hospital with paroxysmal dyspnea. She is a ever-smoker with a history of consuming approximately 20 cigarette packs in 30 years.

Dyspnea commonly occurs at bedtime without warning, with sudden onset of difficulty in breathing and subsequent improvement within a few seconds to a minute. The patient was asymptomatic at the time of her medical examination and had been treated for bronchial asthma and psychosomatic symptoms, but had shown no improvements.

Physical examination on admission revealed a blood pressure of 140/65 mmHg, pulse rate of 64 beats per minute, temperature of 36.2 °C, and percutaneous oxygen saturation of 98% in room air. Her cardiovascular examination was normal and breath sounds were clear.

A computed tomography (CT) scan showed an internal septal cavity on the right side of the trachea (Fig. 1).

Upon consultation with an otolaryngologist, a wart-like tumor was identified on the left side at the base of the tongue (Fig. 2).

Although papilloma was suspected, the tumor was small in size and ruled out as the cause of airway obstruction; therefore, the patient was treated conservatively. A tracheal diverticulum was assumed to be the cause of her dyspnea, and thus, bronchoscopy was performed. She was placed in a supine position during the examination and her neck was bent backwards for observation of the vocal cords. At the time, a pedunculated-shaped tumor was found to be entering the glottis on inspiration (Fig. 3).

The condition was presumed to cause a high risk of asphyxia in the future and therefore, a surgery was performed to remove the tumor. The histopathology of the excised tumor is shown in Fig. 4.

Intraoperative or postoperative complications, such as mediastinal emphysema or pneumothorax, due to tracheal diverticulum were not reported, and the patient was discharged on postoperative day six.

Her tracheal diverticulum continues to be monitored on an outpatient basis, but no respiratory distress attacks have been reported since the papilloma resection.

## 3. Discussion

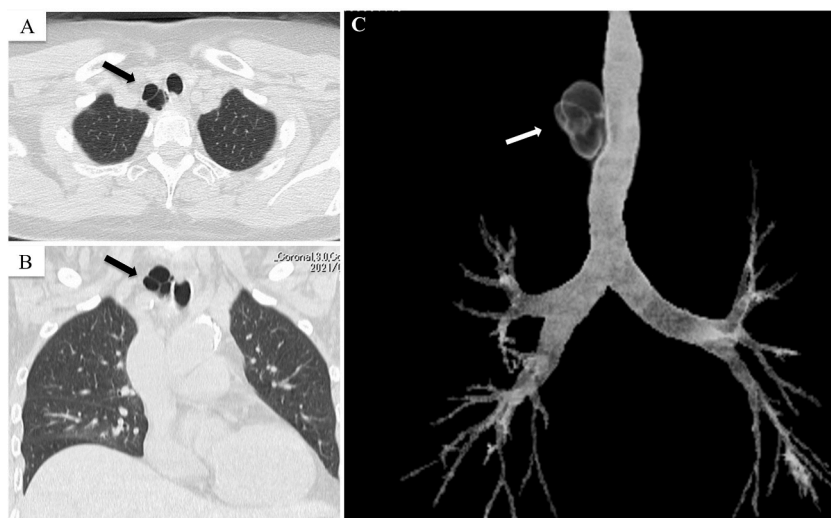
Papillomas have a bimodal distribution in children and adults. Juvenile papillomas are regarded as a potentially life-threatening condition, with a tendency for lesions to grow rapidly and for symptoms to become more severe. In contrast, adult papillomas are often solitary and tend to have milder symptoms [6]. In this case, the papilloma was also confined to the larynx, and no obvious lesion was observed in the trachea or lung parenchyma.

However, bronchoscopy revealed the presence of a pedunculated tumor, which entered the glottis on inspiration, indicating that the papilloma was the cause of the airway obstruction.

This led us to believe that, in this case, the stalked papilloma was likely to have entered the glottis while the patient was asleep (especially in the supine position, when the neck was bent backwards), resulting in airway obstruction.

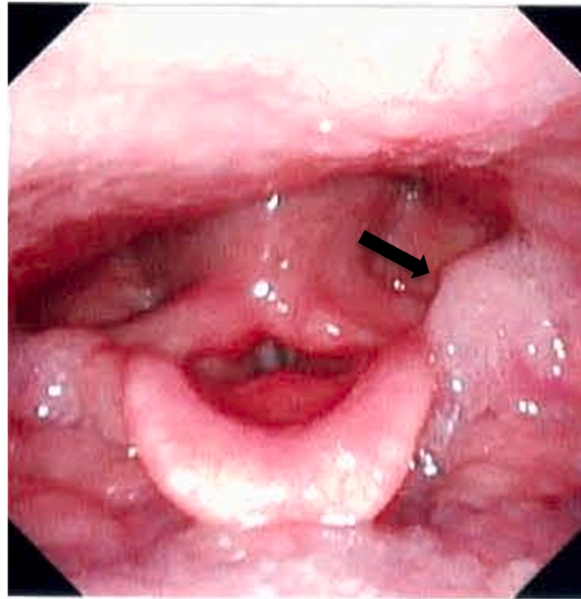
Papillomas may be categorized as sessile or pedunculated lesions based on shape [4].

Although this case was classified as a pedunculated lesion, it was difficult to accurately assess the shape of the lesion, such as the

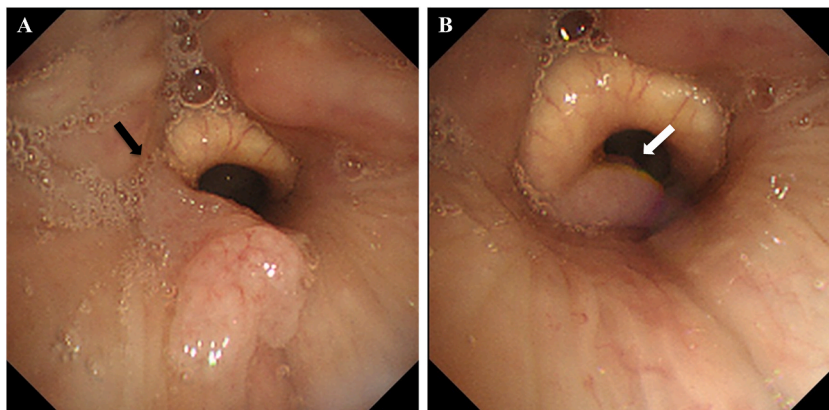


**Fig. 1. Chest Computed Tomography (CT) upon admission**

Chest CT shows a tracheal diverticulum with internal septum on the right side of the trachea (arrows) (A, B: lung windows). A) Axial images. B) Sagittal images. C) Three-dimensional reconstruction of the trachea shows a diverticulum on the right side of the trachea (arrows).



**Fig. 2.** Fiberoptic nasopharyngoscopy findings on admission  
A wart-like tumor is observed at the base of the tongue on the left side (arrows).



**Fig. 3.** Bronchoscopic image showing the papilloma.  
A) Bronchoscopy showing a pedunculated tumor on the left side of the base of the tongue with its base near the epiglottic vallecula (**black arrows**).  
B) Bronchoscopy findings during inhalation. When the patient inhaled, the tumor tip moved toward the glottis (**white arrows**) and airway obstruction was observed.

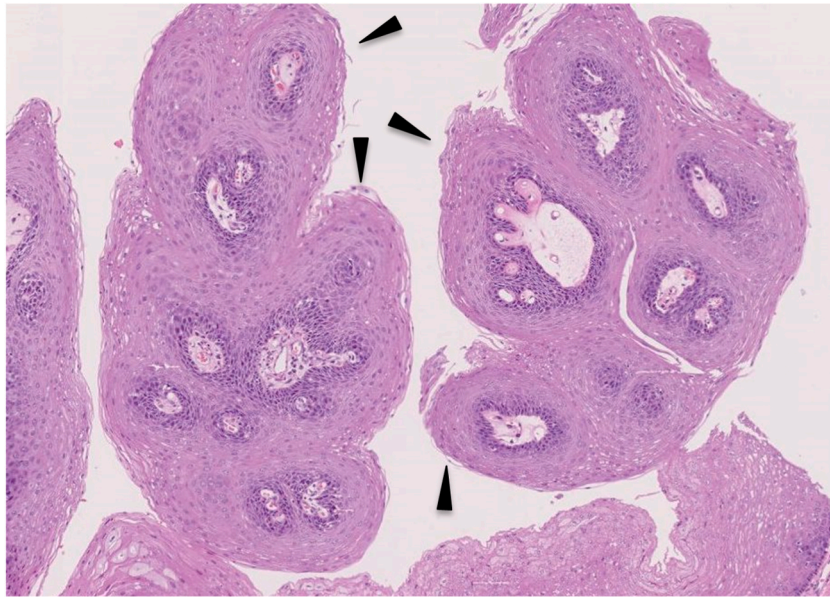
presence or absence of a stalk, during sitting examination.

Airway obstruction in adult papillomas is asymptomatic during the period of progressive tumor growth, but is said to develop suddenly when the tumor has grown to a size that compromises airway patency [5]. However, there are no reports of a difference in the risk of airway obstruction between sessile and pedunculated lesions. In this case, the tumor was pedunculated and its base was located near the glottis. Therefore, even though the tumor was small, there was a high risk of airway obstruction due to the pendulum-like movement of the tumor into the glottis, and surgical resection was performed.

Airway obstruction at the level of the larynx and subglottis is an emergency condition that carries a high risk of death from respiratory failure if not properly managed [7]. Even if the patient is asymptomatic at the time of consultation, as in this case, when a pedunculated tumor is present near the glottis, active resection should be considered to avoid asphyxiation.

Furthermore, this patient was diagnosed with a tracheal diverticulum. Tracheal diverticula are relatively rare, with a reported incidence of 1–6%, based on autopsy and chest CT studies [8–10]. Symptoms are often asymptomatic, but may include chronic cough, dyspnea, wheezing, and recurrent bronchitis [11].

In addition, tracheal diverticula have been reported to be associated with symptoms, such as asphyxiation [11,12]. In this case, the possibility of tracheal diverticula as a cause of dyspnea was considered and a bronchoscopy was performed; however, there was no evidence of airway narrowing within the area of observation.



**Fig. 4.** Histological examination of the pharyngeal tumor

The section shows the hyperemic pharyngeal mucosa covered by non-disordered, acanthotic, and hyperplastic squamous epithelium with papillary fibrovascular cores (arrowheads). No evidence of malignancy was found. (Hematoxylin and eosin staining,  $\times 50$ ).

Although no recurrence of dyspnea has been reported following papilloma surgery, tracheal diverticula is an indication for surgery if subjective symptoms occur [13] and further follow-up is warranted.

To date, there has been no previous report of a papilloma associated with a tracheal diverticulum, suggesting that this is a coincidental combination.

#### 4. Conclusion

A case of tracheal diverticulum and papilloma was found during a thorough investigation of the cause of dyspnea. Upon investigating in the supine position, the papilloma was observed to be entering the glottis and was, therefore, considered to be the cause of dyspnea. Clinicians should consider papillomas as a rare cause of dyspnea in the differential. In addition, papillomas may be asymptomatic; however, the possibility of asphyxia should be considered depending on the shape and location of the tumor.

#### Consent for publication

Written informed consent was obtained from the patient and her family for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of the journal.

#### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### Declaration of competing interest

None.

#### Acknowledgements

Not applicable.

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