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Anesthetic Management for Surgical Removal of a Tracheal Polyp under Fiberoptic Guidance

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Abstract

Tracheal tumors are rare but potentially life-threatening conditions that can lead to progressive airway obstruction. Primary tracheal tumors are often malignant, with squamous cell carcinoma being the most common subtype. Benign tumors, though less frequent, include endobronchial hamartomas and squamous cell papillomas.

Surgical resection is the preferred treatment, offering the best chance for long-term disease control. We present a case of a 26-year-old male with a history of Hodgkin lymphoma who was incidentally found to have a tracheal polyp on chest imaging. The polyp was surgically excised via anterior cervicotomy under fibroscopic guidance, with resection of the involved tracheal cartilage. The patient had an uneventful recovery, with no recurrence at follow-up.

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Introduction

Benign tumors of the trachea are rare, accounting for less than 2% of all airway lesions, the most common types being hamartomas and squamous cell papilloma [1-3].

Benign tumors generally present as smooth, rounded masses under 2 cm and grow slowly, while malignant tumors, such as squamous cell carcinoma, may show more aggressive features, including exophytic or ulcerative growth patterns [4,5]. Most of the tracheal tumors are malignant, with squamous cell carcinoma being the most common [5].

Tracheal tumors can lead to airway obstruction and require early detection and surgical intervention for the best outcomes. Surgical resection is the primary treatment, especially when the tumor is symptomatic or obstructing the airway [2,5].

We present a 26-year-old male with a history of Hodgkin lymphoma, who was incidentally diagnosed with a tracheal polyp that was growing in size and causing mild respiratory symptoms. The patient underwent successful surgical removal of the lesion via anterior cervicotomy. Postoperative course was uneventful with no complications. Written informed consent was obtained from the patient to publish this case report with all the data and images.

Case

The patient is a 26-year-old male with a history of Hodgkin lymphoma who completed treatement with chemo and radio therapy 6 months prior to presentation.

He presented for surgical resection of a tracheal polyp incidentally identified on PET scan performed as part of the patient's Hodgkin lymphoma follow-up. A bronchoscopy performed at the time revealed a 0.5 cm, located on the lateral wall of the trachea, 4 cm distal to the larynx. The polyp was monitored and 3 months later he presented for follow up. Bronchoscopy revealed mobile vocal cords and a well-vascularized polyp increased in size now measuring 0.9 cm, and PET scan demonstrated stable radiotracer uptake within the polyp at the T1-T2 intervertebral disc level, measuring 0.9 cm with a Maximum standardized uptake value (SUVmax) of 3.3, increased from the previous measurements of 0.5 cm with an SUVmax of 3.2. No significant lymphadenopathy, pleural or pericardial effusion, or evidence of metastasis were observed. The patient also reported new mild respiratory symptoms, including intermittent cough and exertional dyspnea.

The decision was made to remove the polyp due to the rapid increase in its size and since the possibility of a cancerous lesion could not be eliminated especially in the setting of the history of Hodgkin's lymphoma. The patient was planned for tracheal tumor resection via open anterior cervicotomy.

On the day of the surgery, anesthesia was induced and the patient was paralyzed after which the trachea was intubated through direct laryngoscopy with a 6.5-mm endotracheal tube to allow enough space for adequate surgical manipulation. A radial arterial line was placed for continuous blood pressure monitoring and arterial blood gas sampling. Intraoperative fiberoptic bronchoscopy was utilized for localization of the tumor and surgical guidance. The vascularized polyp along with a segment of the involved tracheal cartilage was excised. The surgical site was closed using 3-0 Vicryl interrupted sutures, and BioGlue was applied to ensure hemostasis and aerostasis. At the end of the surgery, the muscle relaxant was reversed, and the trachea was extubated with no complications. The postoperative course was uneventful, with no recurrence of the polyp noted on follow-up. With no respiratory complications.

Discussion

The trachea, serving as the conduit for airflow between the larynx and lungs, is lined by columnar and ciliated mucosa that help filter and clear foreign particles [6]. Tracheal tumors, although rare, can originate from any of the tissues in the trachea [5]. Primary tracheal tumors are exceedingly rare, with an incidence of about 0.1 per 100,000 population per year [5]. Most of the tracheal tumors are malignant, with squamous cell carcinoma being the most common [5].

Malignancies of the larynx and bronchi are 40 and 400 times more common than tracheal cancer, respectively [7]. The lower incidence of malignancy in the trachea is likely due to the trachea's laminar airflow, which reduces the accumulation of carcinogens on its mucosa [7].

The peak incidence of tracheal tumors occurs in the sixth and seventh decades of life, and these tumors are more common in men than in women [5]. Smoking is a significant risk factor [5].
Tracheal tumors often do not produce symptoms until they have grown big enough to cause significant airway obstruction [8]. Diagnosis is therefore often delayed in patients with this disease [8].

The management of a tracheal tumor depends on its histopathological type, the extension of the disease and tissue involvement, and the patient's comorbidities [8]. Surgical resection is the primary treatment, especially when the tumor is symptomatic or obstructing the airway, with open resection followed by primary end-to-end anastomosis [2,5]. For patients who cannot undergo surgery, radiation therapy or chemotherapy may be considered [9]. Emerging treatments, such as laser ablation and cryoablation, are being explored, along with advances in tracheal reconstruction, including the use of autografts, allografts, and tissue-engineered grafts, offering promising options for improving patient quality of life and survival [10].

Our patient underwent open surgical resection as the tumor was localized and malignancy could not be ruled out, especially given its rapid growth and the history of Hodgkin's lymphoma.

On the day of the surgery, following induction of anesthesia, ventilation and intubation were not problematic. Intraoperative fiberoptic bronchoscopy was utilized for localization of the tumor and surgical guidance through the scope's light. The vascularized polyp along with a segment of the involved tracheal cartilage was subsequently excised. After surgical closure of the trachea, the patient was successfully extubated in the operating room and transfered to the recovery room. He was discharged home 24 hours after the surgery without any postoperative complications.

Conclusion

Benign tracheal tumors are rare. Symptoms of this disease are often non-specific, with coughing, wheezing, or shortness of breath. Airway obstruction could occur if the tumor was large enough. Our technique of transtracheal surgical resection under flexible bronchoscopy guidance is an effective and safe treatment option.

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