

Primary inflammatory myofibroblastic tumor of the trachea

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Abstract

Inflammatory myofibroblastic tumors (IMTs) are rare neoplasms that can involve the airway. Recent studies have shown their malignant behavior with local recurrence and potential metastatic spread; half of the cases are associated with anaplastic lymphoma kinase gene rearrangement. Complete surgical resection is recommended, when feasible. We present a case of a 26-year-old woman admitted to our institution with severe respiratory failure; she was affected with primary IMT of the trachea and underwent complete surgical resection.

Introduction

Primary tumors of the trachea are rare; they are usually malignant in adults and benign in children. The vast majority are squamous cell carcinoma or adenoid cystic carcinoma. Inflammatory myofibroblastic tumors (IMTs) are rare and occur predominantly in the lung; trachea is affected with a frequency of 0.04%–0.07% of all respiratory tract tumors [1]. Although in the past years IMTs were considered benign, evidence of recurrence after resection, the potential metastatic spread, and the recent cytogenetic studies have suggested that these are true malignant tumors [2].

Case Report

A 26-year-old woman with a history of cough and wheeze treated for presumed asthma was admitted to an emergency unit of a community hospital with severe respiratory distress and stridor. At that time, she was at the seventh week of pregnancy. For the deterioration of the respiratory symptom with severe hypoxia and hypercapnia (pCO₂ >120 mmHg), she was intubated. Computed tomography (CT) showed the presence of endotracheal tissue causing a

tight stenosis of the airway (Fig. 1); very high ventilation pressures were required. The patient was transferred to our intensive care unit and underwent rigid bronchoscopy; multiple biopsies were obtained and most of the lesion was removed with Nd:YAG laser. Bronchoscopy confirmed the presence of an endotracheal lesion involving the distal two-thirds of the trachea for 4 cm in length, down to 2 cm from the carina. The patient was extubated 24 h after the procedure. CT was repeated and it showed a full thickness involvement of the membranous part of the trachea and the left lateral wall of the cartilaginous rings. For these reasons, definitive endoscopic treatment was not considered. Histology showed the presence of primary IMT anaplastic lymphoma kinase (ALK)+ and a tracheal resection was planned. The patient decided to voluntarily interrupt pregnancy. We subsequently performed the tracheal resection and reconstruction with an end-to-end anastomosis, removing 4.5 cm of the airway. The postoperative course was uneventful and the patient was discharged 8 days after surgery. The final histological report confirmed the diagnosis. She underwent postoperative therapy with ALK inhibitor. After 1 year, the patient is alive and well, free of disease.

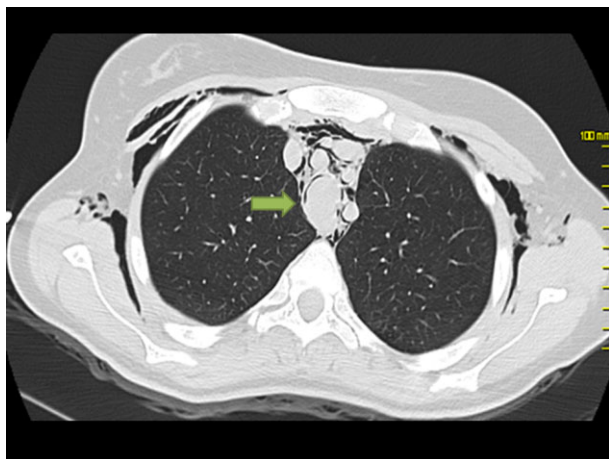


Figure 1. At computed tomography scan: presence of a huge endobronchial lesion with stenosis of the trachea with mediastinal and subcutaneous emphysema because of the high ventilation pressures.

Discussion

IMTs have been reported with a number of synonyms: plasma cell granuloma, inflammatory pseudotumor, xanthogranuloma, and fibrous histiocytoma. Histologically, IMTs are defined by the World Health Organization as lesions composed of a myofibroblastic spindle cell population accompanied by an inflammatory infiltrate of plasma cells, lymphocytes, and eosinophils.

This tumor can involve different organs but the most frequent site of origin is the lung. Tracheal involvement is exceedingly rare. Gaissert reviewed a series of 90 uncommon primary tracheal tumors in 44 years and reported just one case of IMT [3]. Fabre collected, between 1974 and 2007, 26 IMTs of the chest and reported one tracheal resection [4].

The exact etiology of this tumor is still not completely known. It seems that trauma, surgery, inflammation, and infection could result in the development of IMT. Recent studies suggest that the true neoplastic nature of the lesion is due to the evidence of chromosomal rearrangement involving the ALK gene that results in the activation of a tyrosine kinase receptor and a more aggressive clinical behavior of the tumor with potential local recurrence and distant metastases; this cytogenetic alteration seems to occur in approximately 50% of the cases [2]. ALK gene rearrangements or the resulting fusion proteins may be detected in tumor specimens using immunohistochemistry and thus fluorescence in situ hybridization should be used to confirm the results.

Considering the locally invasive behavior, the high rate of recurrence that has been reported to range from 18% to 40%, and the metastatic potential, complete surgical resec-

tion is the gold standard, when feasible [4, 5]. This is certainly preferable to endoscopic resection when the tumor occurs in the airway, particularly when it is not pedunculated or seems to grow deep into the wall. The prognosis after radical resection is excellent as reported by Cerfolio (5- and 10-year survival are 91% and 77% respectively), although a 60% recurrence rate in patients undergoing incomplete resection has been reported [5]. Fabre reported a 10-year survival rate of 89% after complete resection [4]. Radiotherapy and conventional chemotherapy seem to be useful after surgery, in cases of incomplete resection or metastatic spread or as primary treatment when surgery is not feasible.

In case of tracheal tumor, the resection is recommended when complete resection seems feasible; microscopic involvement of airway margins is accepted if the airway is normal on macroscopic inspection and no further length of airway could be resected; in this case, adjuvant radiotherapy should be administered, not earlier than 2 months after surgery, with acceptable long-term results [3].

New biological therapies using inhibitors of the kinase domain of ALK protein, as Crizotinib, have shown an impressive response rate, especially in patients with IMT ALK+ that otherwise show only 10% response with traditional chemotherapy. There is no clear correlation between the ALK expression and the clinical behavior of the tumor, although the high rate of response in ALK inhibitors seems to correlate the ALK positivity to a good prognosis [2].

In conclusion, although IMT is a rare tumor involving the airway, a correct diagnosis is required to direct treatment; when feasible, complete surgical resection is the gold standard. Radiotherapy and chemotherapy could be useful after surgery or in cases of unresectable tumors. The immunohistochemistry research of ALK rearrangement is mandatory to identify the group of patients with the best prognosis that could benefit from biological therapy.

Disclosure Statements

No conflict of interest declared.

Appropriate written informed consent was obtained for publication of this case report and accompanying image.

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