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Case Report

Radiology Section

An Aberrant Case of Squamous Cell Carcinoma of Trachea in Female Patient: A Case Report

NABHA MAHAJAN[1], SURESH PHATAK[2], AVINASH DHOK[3], YASH JAKHOTIA[4]

ABSTRACT

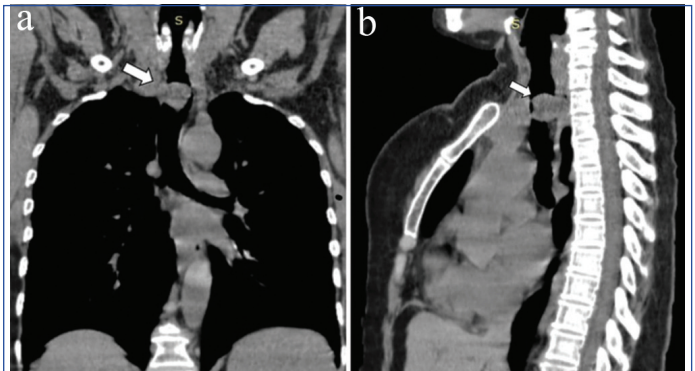
Tracheal tumours can be either benign or malignant. Benign tumours grow slowly and may mimic the clinical presentation of chronic lung diseases, resulting in delayed diagnosis. Conversely, rapidly growing malignant tumours present early with locally advanced disease. Hereby, the authors present a case of a 54-year-old female who presented with complaints of breathlessness at rest and cough with expectoration for one year, with a background history of chronic bidi smoking for 20 years. Multidetector Computed Tomography (MDCT) showed an ill-defined soft tissue mass lesion above the carina, partially obstructing its lumen with heterogeneous post-contrast enhancement. During bronchoscopy, an endotracheal pedunculated mass was observed in the proximal one-third of the trachea, occluding the distal airway. The excised mass was confirmed as Squamous Cell Carcinoma (SCC) on histopathological examination {Haematoxylin and Eosin (H&E)}. The presence of co-morbid conditions in the patient, the site of the tumour, and the availability of treatment options are some of the factors that influence the survival rate of this rare airway tumour.

Keywords: Benign, Bronchoscopy, Malignant, Tracheal tumour

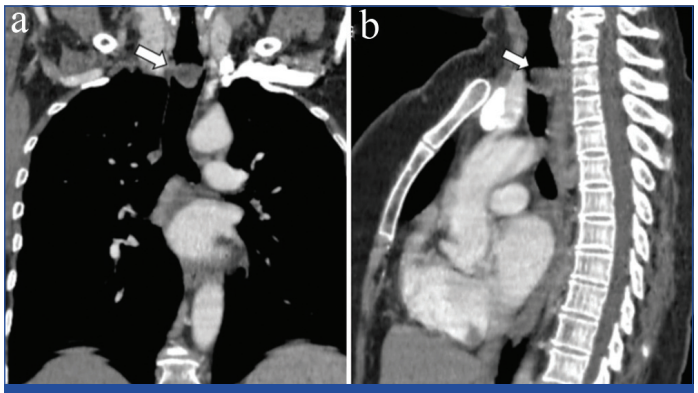
CASE REPORT

A 54-year-old female patient presented to the Emergency Department with complaints of insidious onset and gradually progressive dyspnea and cough with expectoration for one year. She had a background history of chronic bidi smoking for the last 20 years. There were no constitutional symptoms such as anorexia or loss of appetite, and no history of haemoptysis. On examination, she exhibited tachypnoea and an audible wheeze. The patient was using accessory muscles of respiration. The trachea was central and vesicular breath sounds were heard. On room air patients oxygen saturation (SPO_2) was maintained at 95%.

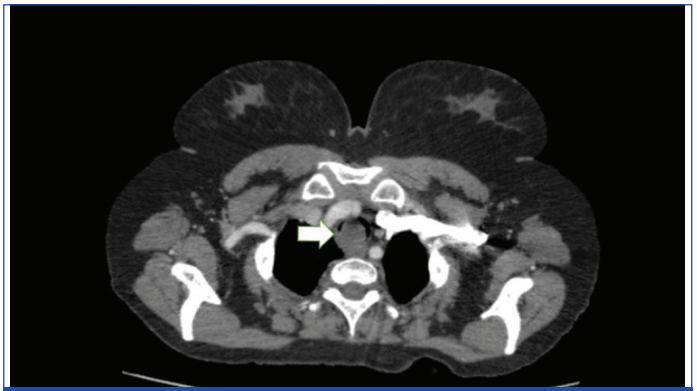
A routine blood workup revealed mild neutrophilic leukocytosis, while liver and renal functions, as well as other metabolic parameters, were normal. A MDCT chest examination showed an ill-defined soft tissue mass lesion measuring 23×18×22 mm with a density range of +20 to +48 HU. The lesion extended from the superior endplate of T1 to the superior endplate of T2, partially obstructing the tracheal lumen. The lesion was located approximately 6 cm from the carina, with its upper margin at the level of the manubrium. Posterior expansion beyond the boundaries of the tracheal edge and contact with the first thoracic vertebral body were observed from 4-9 o'clock, although no destruction of the vertebral body was noted [Table/Fig-1a,b]. Postcontrast analysis revealed heterogeneous enhancement [Table/Fig-2a,b]. There was no calcification or erosion of the thyroid cartilage, and fat planes with adjacent major vessels were maintained. During bronchoscopy examination, an endotracheal pedunculated mass was observed in the proximal one-third of the trachea, occluding the distal airway. Visualisation of the carina and the area distal to the obstruction was not possible [Table/Fig-3]. In virtual bronchoscopy, an intraluminal mass lesion with an irrgegular surface was seen [Table/Fig-4].



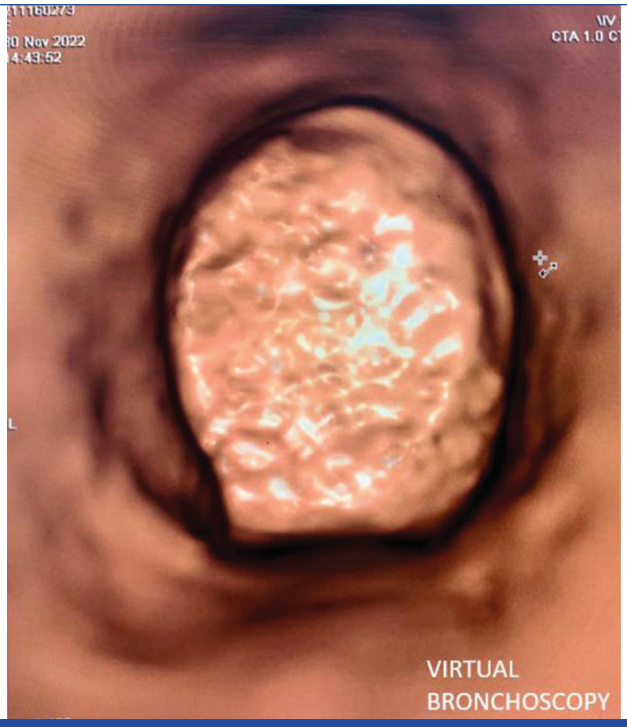
[Table/Fig-1]: MDCT scan: a) Coronal aspect b) Sagittal aspect non enhanced image: The arrow shows an ill-defined soft tissue mass lesion above the carina and partially obstructing its lumen.
MDCT: Multidetector computed tomography



[Table/Fig-2]: MDCT scan: a) Coronal b) Sagittal contrast-enhanced image: The arrow shows heterogenous enhancement of the mass.
MDCT: Multidetector computed tomography



[Table/Fig-3]: MDCT scan: Axial contrast-enhanced image: The arrow shows partial occlusion of the trachea.
MDCT: Multidetector computed tomography



[Table/Fig-4]: Virtual bronchoscopy: An intraluminal mass lesion with an irregular surface.

The patient underwent surgery, and the excised mass was sent for histopathology, which confirmed SCC. Following surgical resection, there was a significant improvement in symptoms. The patient was also recommended adjuvant chemoradiotherapy, but patient declined it. At the three-month follow-up, the patient exhibited significant symptomatic improvement, with no dyspnea and minimal persistent dry cough.

DISCUSSION

Primary tracheal tumours are rare clinical entities, accounting for less than 0.1% of all tumours. These tumours can be either malignant or benign but are generally challenging to diagnose and treat. Benign tumours are often misdiagnosed as asthma or chronic pulmonary illness, leading to delayed identification. Conversely, malignant tumours tend to be detected earlier due to their accelerated growth rate compared to benign tumours [1]. Reported frequencies of respiratory tract cancer are very low, ranging from 0.075% to 0.19% in autopsy series. In adults, primary tracheal neoplasms are malignant in 90% of cases. Histological subtypes include SCC, carcinoid, mucoepidermoid carcinoma, adenoid cystic carcinoma, and, among benign neoplasms, squamous papilloma is the most common [2].

The presence of co-morbid conditions in the patient, the tumour's location, and the availability of treatment options are factors that influence the survival rate of such rare airway tumours [3]. In present case, early diagnosis through imaging and prompt surgical management led to significant symptomatic improvement. However, close follow-up is necessary to monitor for symptom recurrence and tumour reappearance since the patient opted against chemoradiation therapy. Conditions that can resemble tracheal masses include injuries following intubation, rare cases of tuberculous airway involvement, inflammatory stenoses related to collagen vascular diseases, idiopathic laryngotracheal strictures, malignant obstructions caused by metastatic lymph nodes in the trachea, as well as benign or malignant strictures affecting adjacent structures like the larynx or main bronchi [4]. The most common tracheal tumour is SCC, which predominantly affects males two to four times more frequently than females [2]. SCC is often asymptomatic initially but can manifest symptoms such as cough, hoarseness, dyspnea, haemoptysis, and wheezing when it obstructs over half of the airway's diameter [2].

In individuals with generalised respiratory symptoms, a chest radiograph is typically the initial course of action. However, radiography has low sensitivity for tracheobronchial diseases and can overlook numerous lesions [4]. The preferred investigative method is MDCT. On an MDCT scan, the mass may appear as a polypoidal or discrete sessile growth, eccentric airway luminal narrowing, or circumferential thickening of the tracheal wall in the lower part of the trachea. Since this tumour originates from the epithelium, its borders are often irregular. It may directly extend into the mediastinum or spread through the lymphatic system. Endobronchial SCC can cause pulmonary atelectasis or lobar collapse by obstructing the airways [2].

A similar case was reported by Agrawal V et al., where a 72-year-old lady, a former smoker, presented with a history of recurrent lower respiratory tract infections. MDCT evaluation and bronchoscopy revealed a soft tissue mass extending from the carina into the left mainstem and right upper lobe bronchus. Biopsy confirmed SCC. Due to extensive tracheal involvement, surgery was not feasible, and she received radiotherapy. Unfortunately, the patient progressively worsened and passed away 15 months after diagnosis [5].

Endobronchial Ultrasound (EBUS) is an emerging technology that can provide valuable guidance during bronchoscopic procedures. Imaging-guided biopsy and dynamic Transbronchial Needle Aspiration (TBNA) with EBUS can improve diagnostic outcomes. EBUS can be performed using linear or radial probes. Linear EBUS-TBNA allows for faster diagnosis of hilar lymph nodes and mediastinal levels [6]. Benign tumours typically show minimal to no uptake on FDG-PET and can be differentiated from malignant tumours. Most tracheobronchial SCC shows significant 18-Fluoro-Deoxyglucose Positron Emission Tomography (FDG-PET) uptake [7]. Advancements in anesthetic and surgical techniques have facilitated a primary surgical approach, which is often preferred for the treatment of tracheal malignancies [8]. Patients undergoing surgical treatment for tracheal masses have reported 5-year survival rates ranging from 41% to 57% [5].

Other treatment modalities include Radiation Therapy (RT) and chemotherapy. Patients treated with definitive RT have lower 5-year survival rates, ranging from 6% to 11% compared to surgery. Approximately one-third of cases involve patients with extensive locoregional disease who may not be suitable candidates for surgery. In such instances, RT has traditionally been the preferred treatment option, with limited research on the use of chemotherapy. Local recurrence is the primary pattern of failure in tracheobronchial SCC, occurring in a range of 19% to 73% of cases. However, distant failure is also significant, with reported rates between 13% and 46%. These findings suggest that incorporating chemotherapeutic regimens into the treatment of this disease may be beneficial, as they can address both local and distant failures [5].

CONCLUSION(S)

Malignant tracheal tumours are very rare and are typically asymptomatic in the initial stages, often only being detected when they have already advanced. However, MDCT can diagnose suspected tracheal tumours at an early stage, enabling early treatment and potentially improving the survival rate.

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PARTICULARS OF CONTRIBUTORS:
1. Junior Resident, Department of Radiodiagnosis and Imaging, NKP Salve Institute of Medical Sciences and Research Centre, Digdoh Hills, Nagpur, Maharashtra, India.
2. Professor, Department of Radiodiagnosis and Imaging, NKP Salve Institute of Medical Sciences and Research Centre, Digdoh Hills, Nagpur, Maharashtra, India.
3. Professor and Head, Department of Radiodiagnosis and Imaging, NKP Salve Institute of Medical Sciences and Research Centre, Digdoh Hills, Nagpur, Maharashtra, India.
4. Junior Resident, Department of Radiodiagnosis and Imaging, NKP Salve Institute of Medical Sciences and Research Centre, Digdoh Hills, Nagpur, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Suresh Phatak,
Professor, Department of Radiodiagnosis and Imaging, NKP Salve Institute of Medical Sciences and Research Centre, Digdoh Hills, Nagpur-440019, Maharashtra, India.
E-mail: suresh_phatak@yahoo.com

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