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Case Report: Adenoid Cystic Carcinoma of the Trachea Mimicking Bronchial Asthma

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ABSTRACT

We discussed a 54 years old Malay gentleman who presented to the emergency department with severe difficulty in breathing and wheezing. The patient almost collapsed and an emergency intubation was done followed by a CT scan of the neck and thorax later. CT scan showed an ill-defined heterogenously enhancing intramural lesion measuring 2.7 x 2.4 x 3.3 cm arising from the posterior tracheal wall and projecting into the tracheal lumen. A rigid bronchoscopy showed a polypoidal tumour mass at the lower one third of the trachea occluding the lumen. Partial resection of tumour and tracheal stenting were performed to relieve the obstruction. Histopathological examination of the resected sample showed a cellular tumour with cribriform pattern. The tumour composed of epithelial and myoepithelial cells. The cells displayed uniform basaloid to ovoid nuclei and scanty cytoplasm. Some of the epithelial cells showed mildly pleomorphic nuclei with prominent nucleoli. The cribriform pattern composed of predominantly myoepithelial cells with myxoid background or hyalinized globules. Mitotic figures were rarely seen. The stroma was hyalinized. A diagnosis of adenoid cystic carcinoma (ACC) was made.

1. Introduction

Adenoid cystic carcinoma (ACC) was first described by Robin, Lorian and Laboulbene in two of their articles published in 1853 and 1854, in which the cylindrical appearance of the tumor was discussed. In 1859 the tumour was termed as cylindroma by Billroth. The name “adenoid cystic carcinoma” was given by Spies in 1930 in his discussion of cutaneous and non-cutaneous tumours of the basal cell type [1,2].

Adult tracheal tumours are very rare with two third of the tumours turn out to be malignant. It is the second most common minor salivary gland tumour of the trachea after squamous cell carcinoma [3,4]. ACC of the trachea is a slow growing tumour arising from the submucosal glands, provoking benign symptoms like dyspnoea. ACC usually shows invasion of adjacent tissue at diagnosis due to late presentation to the hospital. It is commonly diagnosed in patients between the 5th and

7th decade of life and shows equal distribution in male and female. Smoking is not one of the aetiological factors for ACC [5,6].

2. Case Report

Our patient was a 54 year old man, a chronic smoker who was well until the six months prior to presentation where he frequently develop difficulty in breathing with associated wheezing. He was thought to have a late onset bronchial asthma and was given anti asthmatic drugs and inhalers. On the day of presentation at the emergency department, he developed severe difficulty in breathing and collapsed on arrival. Emergency intubation was done in view of respiratory failure and admitted to the intensive care unit. Anti-asthmatic drugs were commenced, however he did not respond to medication. A rigid bronchoscopy was performed which showed a pedunculated mass 3 cm from carina, partially obstructing the trachea. A neck and thoracic computed tomography (CT) scan was performed which showed an ill-defined hetergenously enhancing intramural lesion at the posterior tracheal wall projecting the tracheal lumen at T4 level. The lesion measured 2.7 x 2.4 x 3.3 cm. No calcification was observed within the lesion. The mass caused luminal narrowing of the trachea at T4/T5 level, with narrowest luminal diameter measuring 0.6 x 1.0 cm. Left posteriorly, there is tumour infiltration into the adjacent oesophagus. The mass appeared fungating intraluminally and extended extraluminally abutting the adjacent pleura. Bilateral parotid and submandibular glands were unremarkable. Thyroid, nasopharynx, oropharynx and hypopharynx were normal. There was no evidence of regional lymph node involvement or organal metastasis by imaging. Radiologically, differential diagnoses of squamous cell carcinoma and ACC were given. He was scheduled for bronchospic tumour resection however, complete resection was rather difficult due to risk of perforation. A tracheal stent was placed to open up the airway at tumour area.

Resected tumour was sent for histopathological examination. Microscopically the tumour exhibited fragments of fibrocollagenous tissues partly covered by respiratory type epithelium and neoplastic cells arranged in cribriform, tubular and reticular patterns were seen infiltrating the underlying stroma. The neoplastic cells were composed of epithelial and myoepithelial cells. The cells displayed uniform basaloid to ovoid nuclei and scant cytoplasm. Some of the epithelial cells show mildly pleomorphic nuclei with prominent nucleoli. The cribriform pattern was composed of predominantly myoepithelial cells with myxoid or hyalinized globules. Mitotic figures were not readily seen. The stroma was hyalinized. No squamous eddies were seen. No obvious perineural invasion or lymphovascular invasion was present. These morphological features confirmed the diagnosis of ACC. This patient was then subjected for complete tumour resection with tracheal anastomosis.

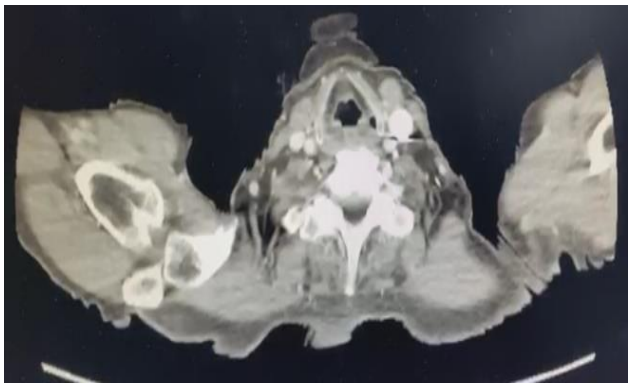

Fig. 1. CT scan imaging of the fungating tracheal mass (arrowhead)

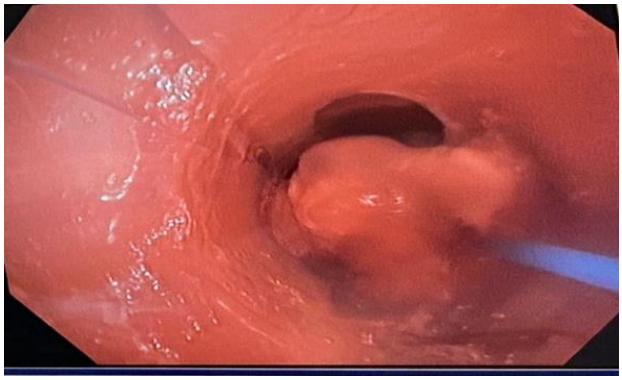

Fig. 2. Bronchoscopic imaging of the fungating intraluminal tracheal mass

3. Results and Discussion

Airway obstruction can be present as cough, shortness of breath, wheezing, stridor or respiratory collapse. It can be due to non-neoplastic and neoplastic conditions with both conditions can present with similar clinical symptoms. Non-neoplastic condition such as bronchial asthma and chronic obstructive airway disease are more common compared to neoplastic conditions. In our case, the patient presented with symptoms mimicking bronchial asthma, with difficulties in breathing and wheezing, hence initially treated as bronchial asthma. However, he was not responding to bronchodilator medications. Attempts to extubate the patient also failed with post-extubation stridor. This raised the suspicion of the attending anaesthetist that his symptoms may be due to other causes of tracheal or bronchial obstruction. Rigid bronchoscopy and CT scan were ordered based on this suspicion which positively identified tracheal mass in this patient.

Tracheal tumour can be from primary tracheal in origin or invasion from nearby structures such as lung, larynx, oesophagus or thyroid gland. CT-scan imaging shows tumour from trachea with minimal extension into oesophagus in this patient and by so, favouring a diagnosis of primary tracheal tumour. The differential diagnosis for primary tracheal tumour are limited with malignant tumour being more common than benign lesion. Common benign lesions are endobronchial hamarthomas and squamous papiloma. Both of these are usually confined to bronchus with no extension into the adjacent structure unlike in our case.

For malignant lesions, almost two third of all tracheal tumour are squamous cell carcinoma followed by ACC which comprises more than 15 % of cases. Smoking is a risk factor for squamous cell carcinoma of trachea with rapid disease progression and poor prognosis compared to ACC of trachea. It shows male predilection with a mean age of patient being more than 60 years. Most cases arose at lower third of trachea with early paratracheal lymph node metastasis [6]. Based on the degree of differentiation, this tumour composed of plygonal cells with round nuclei, prominent nucleoli, abundant eosinophilic cytoplasm, intercellular bridges, individual keratinization and keratin pearls. Mitotic figures were frequent. Immunohistochemistry stain were positive for CKAE1/AE3 and p53 however, negative for CD117.

Primary ACC usually arises in the salivary glands mainly the parotid glands and its occurrence in the trachea is rare. A study in India revealed that the incidence of primary tracheal ACC is as low as 0.1 - 0.26 per 100,000 population. It only accounts for 0.4 % of all malignant disease. The occurrence were usually in the 4^{th} and 5^{th} decades of life, similar to our patient. It shows no sex predilection [7]. As compared to squamous cell carcinoma of the trachea which predominantly occurs in smokers, ACC is unrelated to smoking. Salivary gland tumours in the head and neck share similar risk factors as salivary gland tumours occurring in the airway. The risk factors include human immunodeficiency

virus infection, Epstein-Barr virus infection and ionizing radiation. However, our patient had no documented history of such exposures.

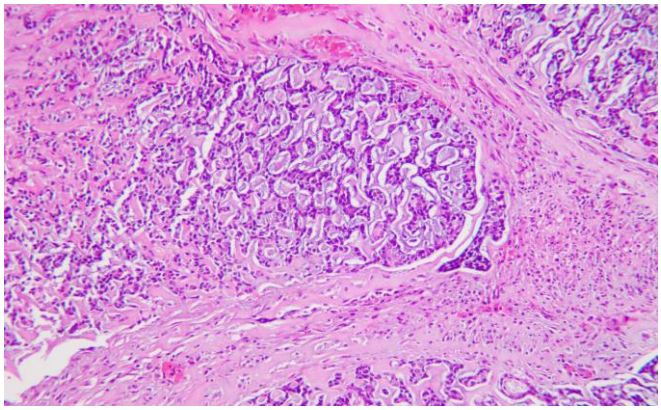

Fig. 3. ACC with cribriform pattern at x100 magnification

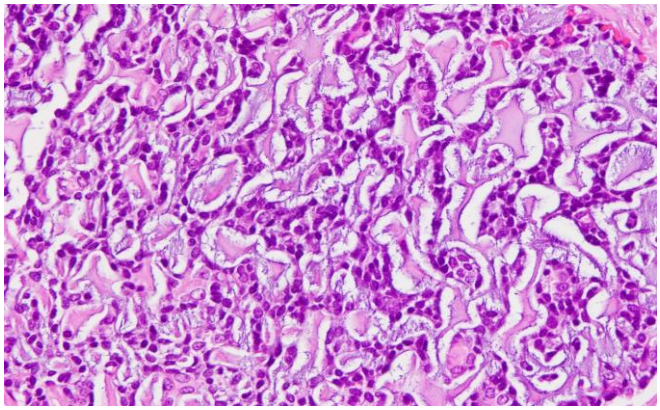

Fig. 4. ACC with cribriform pattern at x400 magnification

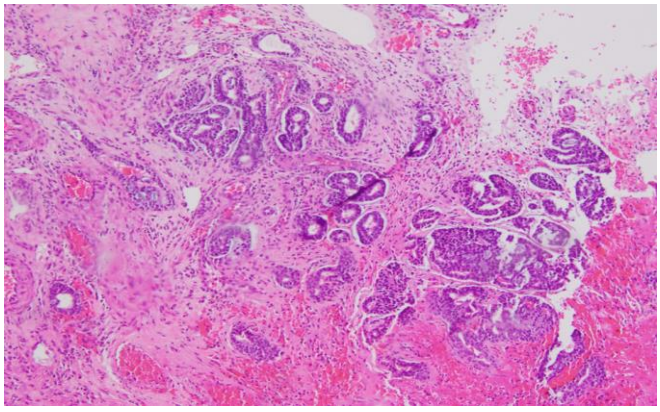

Fig. 5. ACC with tubular pattern at x100 magnification

Histological examination of ACC showed biphasic appearance comprising ductal and myoepithelial components. The tumour cells were arranged in cribriform, tubular or solid pattern with cribriform pattern showing myxoid or hyalinized globules. The myoepithelial cells have dark angulated nuclei and scanty cytoplasm, giving a basaloid appearance. Presence of solid pattern defined as solid nest of basaloid cells was a factor for adverse outcome and regarded as a high grade tumour and should be reported if present [8,9]. ACC is usually diagnosed by morphology, however immunohistochemistry stain can be useful in unusual location or morphology when such cases

occurs. ACC is positive for CK7, CD117 and myoepithelial markers such as p63, calponin, SMA, GFAP, S100 and p40. Most common molecular abnormities for this tumour is t(6,9) MYB-NFIB fusion [9].

ACC is a slow growing tumour with late presentation. It spreads *via* submucosal or along the perineural planes. Distant metastasis occurs by haematogenous route with the lung being the most common site. Even so, ACC has a good prognosis compared to squamous cell carcinoma (SCC) with average survival time period of nine years compared to SCC which shows much shorter survival period of nine months. The most important prognostic factor was the surgical margin status with higher local recurrence and distant metastasis observed in margin-involved cases [10-12].

Primary tracheal ACC is rare and patient may present with symptoms mimicking bronchial asthma, however a high index of suspicion by clinicians should be given in cases where regular treatment for bronchial asthma shows no improvement of symptoms. Radiological imaging and histopathological examination of the lesion may enable a correct diagnosis and treatment been done.

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