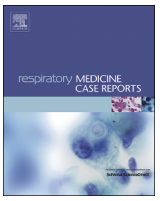
Respiratory Medicine Case Reports 43 (2023) 101858

Contents lists available at ScienceDirect

Respiratory Medicine Case Reports

journal homepage: www.elsevier.com/locate/rmcr



Case Report

Mucoepidermoid carcinoma of the bronchus in two children: Case reports

Seyram M. Wordui [a, *], Aruna Lakhan [a], Joy Eze [a], Zandiswa Nowalaza [a], Sindiswa Makate [a], Andre Brooks [b], Rik De Decker [c], Ebrahim Banderker [d], Komala Pillay [e], Shivani Singh [e], Marc Hendricks [f], Diane Gray [a], Marco Zampoli [a], Aneesa Vanker [a]

[a] *Division of Pulmonology, Red Cross War Memorial Children's Hospital: University of Cape Town, South Africa*
[b] *Chris Barnard Division of Paediatric Cardiothoracic Surgery, Red Cross War Memorial Children's Hospital: University of Cape Town, South Africa*
[c] *Division of Paediatric Cardiology, Red Cross War Memorial Children's Hospital: University of Cape Town, South Africa*
[d] *Division of Diagnostic Radiology, Red Cross War Memorial Children's Hospital: University of Cape Town, South Africa*
[e] *Division of Anatomical Pathology, Red Cross War Memorial Children's Hospital: University of Cape Town and National Health Laboratory Services, South Africa*
[f] *Division of Paediatric Oncology, Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital: University of Cape Town, South Africa*

ARTICLE INFO

Handling Editor: DR AC Amit Chopra

Keywords:
Mucoepidermoid carcinoma
Endobronchial lesion
Bronchoscopy
Hemoptysis
Radiotherapy

ABSTRACT

Childhood mucoepidermoid carcinomas (MEC) of the bronchus are rare. They present with non-specific symptoms and signs making diagnosis delayed. We present two children with bronchial MEC managed in a tertiary children's hospital in Cape Town, South Africa. The first was a 11-year male with recurrent haemoptysis and the second child was a 6-year female with recurrent unifocal pneumonia. Chest CT scan and bronchoscopy with biopsy confirmed the diagnosis. Both patients underwent treatment, including surgery and are doing well. It is important to exclude endobronchial lesions when children present with recurrent respiratory symptoms, since early diagnosis will enable lung-sparing treatment.

1. Introduction

Pulmonary mucoepidermoid carcinoma (MEC) are rare tumours arising from excretory ducts of the submucous bronchial glands and have a mix of squamous cells, mucin-secreting cells and cells of the intermediate type [1]. Aetiology is currently unknown. Due to the non-specific presentation which mimics other respiratory system ailments, diagnosis is usually delayed unless the clinician has a high index of suspicion [2,3]. Few studies are reported, and to our knowledge, none in South African children. We report two cases of primary pulmonary MEC managed in a tertiary hospital in South Africa over a 3-year period, 2019–2022.

2. Case reports

Case 1 is an 11-year male who presented with a history of progressive haemoptysis for a 1-year duration. On presentation, he was well nourished with no other symptoms.

* Corresponding author. C/o African Paediatric Fellowship Programme, ICH Building, Room 2.19, Red Cross War Memorial Children's Hospital, University of Cape Town, Cape Town, South Africa.
E-mail address: swordui@gmail.com (S.M. Wordui).

https://doi.org/10.1016/j.rmcr.2023.101858
Received 11 February 2023; Accepted 23 April 2023
Available online 24 April 2023

He was previously treated for 6 months for unconfirmed pulmonary tuberculosis (PTB) at the age of 8 years based only on suggestive radiology.

Chest examination revealed dullness to percussion over the right upper zone anteriorly with decreased air entry over that region. Frontal and lateral chest radiographs showed a well-circumscribed opacity within the right tracheobronchial angle (Fig. 1a and b). Contrasted CT chest confirmed a well-defined, heterogeneously enhancing right paratracheal mass with foci of coarse intralesional calcification and intraluminal invasion into the right main bronchus (Fig. 1c and d). Flexible bronchoscopy showed an infiltrative mass at the entrance of the right upper lobe bronchus (Fig. 1e). This lesion was close to the carina so extensive biopsies were done around the lesion to exclude mucosal involvement.

Histopathology of the biopsy showed features consistent with mucoepidermoid carcinoma. The atypical fragments of tissues showed cells with intracytoplasmic mucin on Alcian blue PAS stain. On immunohistochemistry, the cells were positive for CK7 and scattered cells showed positivity for p63.

Because of the location of the tumour close to the carina, an ordinary lobectomy was not feasible. A sleeve lobectomy was done through a right-sided thoracotomy - thus the middle and lower lobes were spared. Cut sections of the specimen revealed a 43 × 40 × 34mm pale tumour that was located 3mm away from the closest bronchial margin. Histopathology of the resection specimen confirmed a high grade mucoepidermoid carcinoma. The lymph node biopsy was negative for metastatic carcinoma. Once he recovered from surgery, the patient received a 36-day course of radiotherapy. He made a full recovery without any complications.

A year later, the patient complained of shortness of breath with dullness on percussion and decreased air entry on the right. Lung function showed a restrictive picture with normal Diffusing Capacity of the Lungs for Carbon Monoxide. Chest CT scan showed a mass-like scar tissue of the upper segment of right lower lobe. He had a bronchoscopy on account of concerns of recurrence of tumour. Findings were granulation tissue at the site of previous resection. Histology was that of bronchial epithelium, with no indication of malignancy. The child remains well on follow-up.

Case 2 is a 6-year female with a 3-month history of cough, weight loss and night sweats and chest radiograph finding of persistent right lower lobe collapse. Over the period, she was treated for pneumonia twice with antibiotics which improved symptoms. She was referred on the 3rd presentation. The patient's brother had a history of pulmonary tuberculosis and had completed treatment and investigations were negative for tuberculosis in our patient. Examination of the patient showed her trachea was shifted to the right, with dull percussion notes and reduced air entry over the right middle and lower lung zones.

Chest radiograph showed collapse consolidation of the right middle and lower lobes (Fig. 2a and b). A CT scan of the chest showed a homogenously enhancing mass with smooth lobulated margins at the origin of right main bronchus (Fig. 2c and d). Parenchymal destruction and varicoid bronchiectasis of the lower lobe was present as well as hyperexpansion of the right upper lobe (Fig. 2e).

Flexible bronchoscopy showed a smooth right main bronchial pedunculated mass (Fig. 2f). Histology showed fragments of ulcerated respiratory epithelium and an unencapsulated neoplasm in the subepithelial stroma. The neoplasm was composed of glands in a back-to-back pattern. Immunohistochemistry was positive for CK7 and Cyclin D1 (Fig. 2i–j). This was consistent with a low grade mucoepidermoid carcinoma.

The patient had a right pneumonectomy and resection of proximal right main bronchus tumour with carinal reconstruction, due to the proximity of the tumour to the carina. Due to the size of the child, this was done on extra-corporeal membrane oxygenation. Child is doing well on follow-up.

3. Discussion

MEC of the bronchus are painless, slow-growing tumours which accounts for the often-delayed diagnosis. Common symptoms and signs are those of bronchial obstruction and recurrent infections, and include cough, dyspnoea, fever, wheeze, stridor, persistent pneumonia not responding to antibiotics, haemoptysis and clubbing [2,4,5]. It may also present as deterioration in a child already known to have a chronic respiratory illness [6]. Delayed diagnosis is common, spanning many months to years [2,5]. There is no clear sex predilection [2]. Mean age at presentation is 10 years [2].

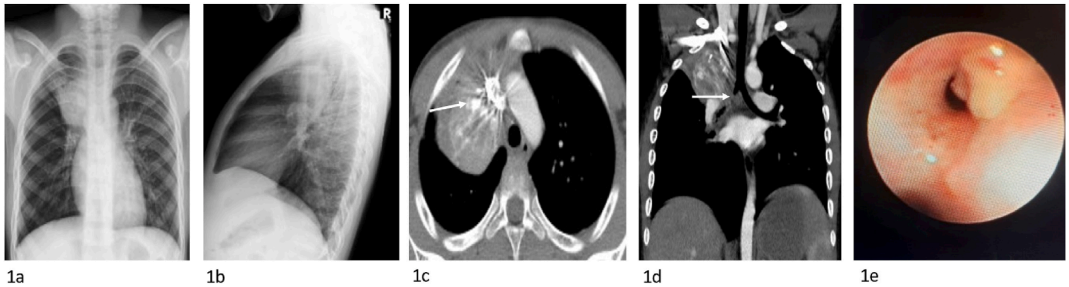


Fig. 1. Chest imaging and bronchoscopic findings for patient 1. 1a: frontal chest radiograph. Circumscribed mass within right tracheobronchial angle. Accompanying widening of paratracheal stripe with mild tracheal deviation to the left and non-visualisation of right main bronchus. 1b: lateral chest radiograph. The mass is located to the middle mediastinum with posterior displacement of the oesophagus. 1c: axial CT (soft tissue window) well defined, heterogeneously enhancing right paratracheal mass with foci of coarse intralesional calcification (arrow). 1d: coronal CT (soft tissue window) paratracheal mass with intraluminal invasion into the right main bronchus (arrow). 1e: bronchoscopic view. Plaque-like lesion at antrum of right main bronchus.

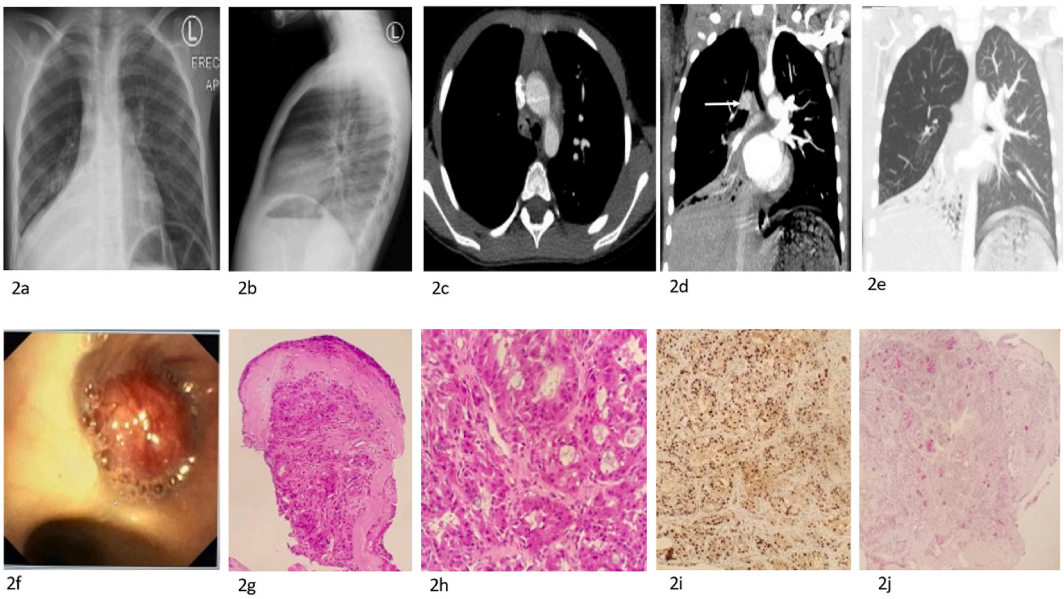


Fig. 2. Imaging, bronchoscopic and histological findings for patient 2. 2a and 2b: frontal and lateral chest radiographs showing collapse consolidation of right middle and right lower lobes with a small accompanying right pleural effusion. 2c: axial CT (soft tissue window), 2d: coronal CT (soft tissue window): homogenously enhancing lobulated intraluminal mass within the right main bronchus (arrow). 2e: coronal CT (lung window) note destruction of right lower lobe and hyperlucent, hyperexpanded right upper lobe. 2f: large, smooth, vascular pedunculated mass in right main bronchus. 2g: low power image of the Haematoxylin and Eosin stain showing a polypoid neoplasm with overlying respiratory epithelium. 2h: tumour arranged as nests and ductal structures with cytoplasmic and luminal mucin. 2i: Cyclin D1 immunohistochemical stain demonstrating nuclear positivity. 2j: Mucicarmine special stain highlights cytoplasmic and luminal mucin.

Chest CT scan is central to diagnosis [2]. Chest radiograph and CT scan usually demonstrate a mass with signs of bronchial obstruction such as differential aeration, air trapping and atelectasis. Areas of bronchiectasis will also be delineated on chest CT scan to allow for surgical planning. Post-treatment, chest CT scan is useful for follow-up, as in our case. PET CT scan has been used to survey for metastasis in some reports [7].

Bronchoscopy is key to evaluation and diagnosis [6]. Bronchoscopy and biopsy are recommended in any child with persistent respiratory symptoms [3]. This is even more true in a population like ours, where TB is very common and presents with similar features. In some cases, bronchoscopy may be used for resection of small, hanging lesions in the lumen that do not infiltrate the bronchial wall [3].

Tumours are usually right-sided with low histologic grade although there are cases of high grade MEC documented among children [2]. In our cardiothoracic surgical unit, recommended treatment is by surgical resection. However, multiple bronchoscopic procedures have been used successfully to treat low grade MEC with no recurrence up to 16–72 months on follow-up [8]. Bronchoscopic procedures are less invasive than open surgical options. Therefore, this would be an option for children with severe respiratory compromise who are judged not fit for open procedures [6]. Jaramillo et al. report a local recurrence rate of 30% in their review of 8 patients out of 145 who had endoscopic resection [2]. Another disadvantage of endoscopic resections is that they do not permit adequate lymph node sampling [2]. Furthermore, when bronchoscopic resection is done, active surveillance with repeat bronchoscopies is required. This would not be an ideal option in a low resource setting with poor access to bronchoscopy [5].

Paediatric MEC has a good prognosis. In a German series, survival was 100% at 3 years [5]. However, there have been few reported deaths among children with high grade tumours [2]. Cytogenetic analysis of MEC shows that t (11,19) or a variant is associated with lower risk of recurrence and higher survival [9,10]. Potential targeted therapies are also under investigation [11].

Distant metastases is rare [5] but lymph node metastasis has been reported, prompting the need for chemotherapy [12]. One of our patients had radiotherapy to the local area because his tumour was high grade. This highlights the lack of uniformity among practitioners regarding treatment modalities, and calls for harmonizing recommendations [3,5]. Likewise, there are no guidelines on how long to follow-up, how frequently to follow-up and what investigative tools to employ on follow-up.

4. Conclusion

Paediatric MEC is uncommon and presents with non-specific symptoms and signs. This leads to delayed diagnosis. Bronchoscopy and endoscopic biopsy are useful for evaluation of any child with persistent respiratory symptoms or atelectasis, especially in high-TB prevalence settings where this is an important differential diagnosis. Besides the paediatric pulmonologist, a multidisciplinary input is required for individualized diagnosis and management, involving the radiologist, thoracic surgeon, interventional radiologist, pathologist, and oncologist. MEC generally has a favourable prognosis, but delayed diagnosis leads to excess morbidity like destroyed lungs and can lead to death. There is the need for a large international prospective registry to guide recommendations on management, preferably with clear distinctions as to what should be done in limited resource-settings as well as settings where bronchoscopy facilities exist.

Declaration of competing interest

None.

Abbreviations

MEC mucoepidermoid carcinoma

References

[1] C. Shen, G. Che, Clinicopathological analysis of pulmonary mucoepidermoid carcinoma, World J. Surg. Oncol. 12 (1) (2014) 33, https://doi.org/10.1186/1477-7819-12-33.
[2] S. Jaramillo, Y. Rojas, B.J. Slater, et al., Childhood and adolescent tracheobronchial mucoepidermoid carcinoma (MEC): a case-series and review of the literature, Pediatr. Surg. Int. 32 (4) (2016) 417–424, https://doi.org/10.1007/s00383-015-3849-y.
[3] L. Pio, P. Varela, M.J. Eliott, et al., Pediatric airway tumors: a report from the international network of pediatric airway teams (INPAT), Laryngoscope 130 (4) (2020) E243–E251, https://doi.org/10.1002/lary.28062.
[4] C. Vogelberg, B. Mohr, G. Fitze, et al., Mucoepidermoid carcinoma as an unusual cause for recurrent respiratory infections in a child, J. Pediatr. Hematol. Oncol. 27 (3) (2005) 162–165, https://doi.org/10.1097/01.mph.0000155120.50936.73.
[5] S. Voggel, M. Abele, C. Seitz, et al., Primary lung carcinoma in children and adolescents – clinical characteristics and outcome of 12 cases from the German registry for rare paediatric tumours (STEP), Lung Cancer 160 (2021) 66–72, https://doi.org/10.1016/j.lungcan.2021.08.004.
[6] S. Fonseca, S. Silva, A. Magalhães, et al., Endobronchial mucoepidermoid carcinoma in a child with postinfectious bronchiolitis obliterans, Pediatr. Pulmonol. 56 (12) (2021) 4063–4065, https://doi.org/10.1002/ppul.25685.
[7] E.Y. Lee, S.O. Vargas, G.S. Sawicki, D. Boyer, F.D. Grant, S.D. Voss, Mucoepidermoid carcinoma of bronchus in a pediatric patient: 18F-FDG PET findings, Pediatr. Radiol. 37 (12) (2007) 1278–1282, https://doi.org/10.1007/s00247-007-0607-x.
[8] H. Wang, J. Zhang, D. Li, N. Zhang, J. Li, J. Mao, Efficacy of bronchoscopic therapies for bronchial mucoepidermoid carcinoma in children: results from six patients, Tumori J 101 (1) (2015) 52–56, https://doi.org/10.5301/tj.5000213.
[9] A. Behboudi, F. Enlund, M. Winnes, et al., Molecular classification of mucoepidermoid carcinomas—prognostic significance of the MECT1–MAML2 fusion oncogene, Genes Chromosomes Cancer 45 (5) (2006) 470–481, https://doi.org/10.1002/gcc.20306.
[10] A. Serra, H.K. Schackert, B. Mohr, A. Weise, T. Liehr, G. Fitze, t(11;19)(q21;p12~p13.11) and MECT1-MAML2 fusion transcript expression as a prognostic marker in infantile lung mucoepidermoid carcinoma, J. Pediatr. Surg. 42 (7) (2007) e23–e29, https://doi.org/10.1016/j.jpedsurg.2007.04.031.
[11] S.W. Han, H.P. Kim, Y.K. Jeon, et al., Mucoepidermoid carcinoma of lung: Potential target of EGFR-directed treatment, Lung Cancer 61 (1) (2008) 30–34, https://doi.org/10.1016/j.lungcan.2007.11.014.
[12] T.T. Tri, L.T. Vu, T.T.T. My, P.N. Thach, N.M. Duc, Mucoepidermoid lung carcinoma in a pediatric patient confused with pneumonia, Radiol Case Rep 16 (9) (2021) 2749–2753, https://doi.org/10.1016/j.radcr.2021.06.078.