ECRONICON OPEN ACCESS

EC CLINICAL AND MEDICAL CASE REPORTS

Case Report

Broncholithiasis: A Late Complication of Pulmonary Tuberculosis

Benbrahim Fatima Zohra*, Imrani Kaoutar, Moatassimbillah Nabil and Nassar Ittimade

Central Radiology Department, Ibn Sina University Hospital, Mohammed V University, Rabat, Morocco

***Corresponding Author:** Benbrahim Fatima Zohra, Central Radiology Department, Ibn Sina University Hospital, Mohammed V University, Rabat, Morocco.

Received: March 20, 2024; **Published:** April 17, 2024

Abstract

Broncholithiasis is a rare pathology characterized by the presence of endobronchial calcific material secondary to erosion of the bronchial wall by peribronchial calcified adenopathies. Pulmonary tuberculosis remains the most common cause of broncholithiasis. The clinical picture is variable and lithoptysis remains the only pathognomonic symptom, although it is uncommon. The diagnosis can be made with certainty using a combination of endoscopy and high-resolution CT. Management varies from therapeutic abstention to surgical resection in symptomatic and complicated forms. We report a case of broncholithiasis complicating old tuberculosis revealed by scanty haemoptysis.

Keywords: *Broncholithiasis; Tuberculosis; Computed Tomography; Endoscopy; Chronic Cough*

Introduction

Broncholithiasis is a rare disease which corresponds to a calcified or ossified material (broncholith) within the bronchial lumen [1]. It includes disorders with calcified peribronchial adenopathies associated with bronchial distortion visualised on radiography or bronchoscopy [2]. Broncholithiasis is more frequently a late complication of lymph node tuberculosis [3]. Its clinical manifestations are rarely suggestive and it is often discovered late in the course of complications. We report a case of broncholithiasis revealed by hemoptysis in a patient with a history of tuberculosis.

Case Report

We report here the case of a 54-year-old man, non-smoker, with a history of pulmonary and mediastinal lymph node tuberculosis dating back 20 years, treated with antituberculosis treatment, who presented to emergency with a chronic cough with haemoptoic sputum of low volume, evolving in a context of apyrexia and preservation of general condition. Clinical examination revealed a patient apyretic, haemodynamically stable, with a respiratory rate of 25 cycles/min, an oxygen saturation on room air of 92% and normal pulmonary auscultation. The laboratory work-up showed moderate normocytic normochromic anaemia with haemoglobin at 11.2 g/dl.

The chest X-ray showed calcific intraparenchymal and right peri hilar opacities with atelectasis of the right lung base. CT scan showed dilatation of the right lower lobar bronchus and its segmental dividing branches containing broncholithiasis responsible for basal atelectasis associated with bilateral inter bronchial and mediastinal calcified lymph nodes. The patient tested negative for acid-fast bacilli.

Bronchial endoscopy showed an inflammatory appearance with an image of bronchiolitis. It was decided to withhold treatment and monitor the patient.

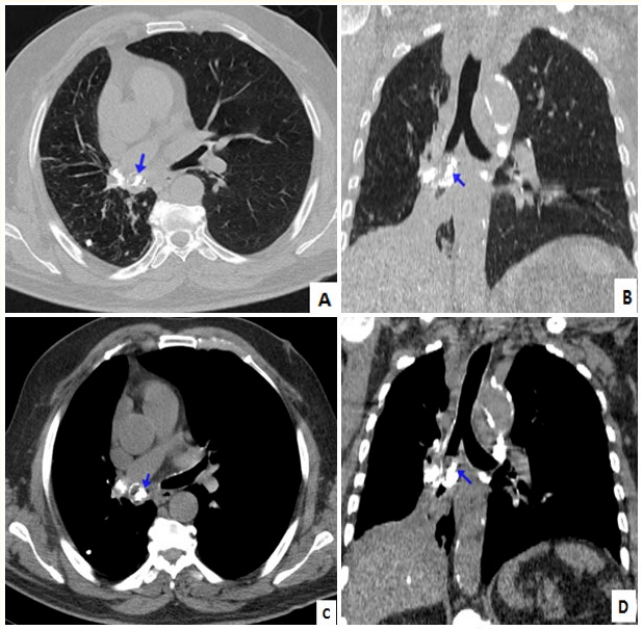

Figure 1: *High-resolution chest CT in the parenchymal window (A and B) showing the right lower lobar bronchus that is dilated and contains dense material corresponding to broncholithiasis (blue arrow) better visualised in the mediastinal windows (C and D) associated with calcified inter bronchial adenopathies.*

Discussion

Broncholithiasis is a rare disease, accounting for only 0.1% to 0.2% of all lung diseases [4]. It was first reported in 300 BC when Aristotle described the symptom of stone spitting [5]. Broncholiths have a similar composition to bone, they are composed of calcium phosphate (85%-90%) and calcium carbonate (10%-15%) [1]. Broncholithiasis can be diagnosed at any age, with an average age between the fifth and sixth decades [6].

Some authors include in the definition of broncholithiasis the erosion of the bronchial lumen by calcific material or broncholith [2,7], while others consider the presence of calcified peribronchial lymph nodes deforming the airways to be broncholiths and reserve the term broncholithiasis for the occurrence of inflammation or obstruction of the airways [8]. Depending on their relationship with the tracheobronchial tree, broncholiths may be described as endobronchial, peribronchial or transbronchial [5,8,9]. Migration of calcified material from the lymph node to the bronchus is facilitated by respiratory and cardiac movements [10] and can occur as a result of peribronchiolar adenopathies that have calcified following an infectious or non-infectious inflammatory process [2]. The primary infectious cause is tuberculosis in Africa and Europe, and histoplasmosis in the Americas. In our study, broncholithiasis was considered to be secondary to tuberculosis, given the history of tuberculosis and the endemicity of tuberculosis in our country.

Cryptococcosis, coccidioidomycosis, actinomycosis, aspergillosis and nocardiosis are also rarer infectious causes of broncholithiasis [11,12]. Silicosis is the only non-infectious cause of broncholithiasis reported in the literature [11,13]. More rarely, broncholithiasis may be secondary to calcification of an intra-bronchial foreign body or bronchial cartilage rings [14].

Broncholiths most often predominate in the right bronchial tree, due to the importance of lymph node relays on the right side compared with the left [10,16] and more particularly in the upper and middle lobes [15]. In our case, the bronchiolitis was located bilaterally but predominantly on the right.

Broncholithiasis may be asymptomatic and only be revealed incidentally by chest X-ray. A variable latency period has been described between the onset of symptoms and diagnosis, ranging from one month to 35 years [17,18]. Lithoptysis or bronchitis sputum is the only pathognomonic sign, but is uncommon, occurring in only 5 - 34% of cases [3]. Clinical symptoms are often non-specific, reflecting erosion, irritation and bronchial obstruction. They are dominated by dry or productive cough, recurrent pneumonitis which may be complicated by pulmonary suppuration and bronchial dilatation, and chest wheezing which simulates asthma [10,11,14]. Haemoptysis is a frequent sign, often recurrent and minor, and reflects either erosion of the pulmonary vessels by bronchiolitis or systemic hypervascuarisation secondary to associated lesions, in particular bronchial dilatation [19]. Fistulisation between the bronchus and mediastinal structures is a complication of broncholithiasis and is revealed either by massive haemoptysis in the case of aorto-bronchial fistulas or by false routes and inhalation pneumonitis in the case of oeso-bronchial fistulas [19,20]. The association between broncholithiasis and bronchopulmonary cancer remains controversial. It is reported in 2 to 6% of cases, depending on the series, and requires regular monitoring of untreated patients [21].

The radiographic abnormalities of broncholithiasis are not very specific and include the presence of a calcified nodule or airway obstruction such as atelectasis, mucoid impaction, bronchiectasis or expiratory air trapping [22]. Sometimes it is the disappearance or migration of a calcified nidus on successive X-rays, reflecting the migration or irruption of a calcified ganglion into the bronchial lumen, that guides the diagnosis [13,22]. The chest X-ray is often normal and does not show bronchial calcification.

The definitive diagnosis of broncholithiasis is based on a combination of chest CT and bronchial endoscopy [11]. High-resolution computer tomography is essential to confirm the diagnosis of broncholithiasis, showing in typical cases the endobronchial or peribronchial location of calcified lymph nodes with signs of airway compression. Signs of bronchial obstruction such as air trapping, lobar or segmental atelectasis or consolidation are observed. When this obstruction is prolonged, it can lead to bronchiectasis with mucoid impactions giving the appearance of a finger in the glove. Broncholithiasis is characterized on imaging by the disappearance of the calcified focus previously observed following lithoptysis or a change in its position due to displacement of the broncholith within the airways [22-24]. The relationship between the broncholith and the bronchial wall, as well as with the vascular and mediastinal structures, must be carefully examined, as this factor is essential to management. In our case, high-resolution CT confirmed the diagnosis, showing endobronchial broncholiths associated with peribronchial calcified lymph nodes.

Bronchial endoscopy has a dual role in the diagnosis and treatment of broncholithiasis. Bronchoscopic characteristics vary according to the type of broncholith and its relationship with the bronchial wall. It allows direct visualization of the broncholith in 24 to 56% of cases [11]. This broncholith may be free or partially or totally encrusted in the bronchial wall. Other endoscopic abnormalities, often misleading, may be seen, such as oedema of the mucosa, bronchial hyperpigmentation, bronchial stenosis, bleeding, granuloma suggestive of tuberculosis, buds simulating neoplasia or distortion of the airways. An inflammatory reaction may occur, covering the broncholith and giving it a pseudotumour appearance [10]. Bronchoscopy can also help to identify fistulas. Bronchoscopy has certain limitations in identifying broncholiths, particularly peribronchial broncholiths and in cases of airway distortion or excessive inflammation or granulation that can obscure distal broncholiths [25]. Indeed, the diagnosis is usually made in combination with radiographic findings.

The evolution of broncholithiasis may exceptionally lead to a spontaneous resolution after expectoration of the calculus [26]. Management depends on the size, position of the broncholith and secondary complications.

For asymptomatic and uncomplicated forms, therapeutic abstention with monitoring is recommended. Broncholithiasis can be managed by endoscopy or surgical resection.

Endoscopic treatment is indicated for free broncholiths within the bronchial lumen without complications [6,11,14]. It must be performed with care, given the risk of complications such as bronchial fistulisation due to trauma of the bronchial wall, or erosion of the pulmonary vessels causing abundant bleeding [6,26,27]. These endoscopic complications occur in 4% of cases and require conversion to surgical resection [27]. Per-endoscopic laser treatment prevents haemorrhage by photocoagulation and allows resection of the granulation tissue and extraction of the underlying calculus. It also allows fragmentation of broncholiths partially incarcerated in the bronchial wall, thus facilitating their extraction [10,14]. Surgical resection is indicated when the diagnosis is uncertain, posing a problem of differential diagnosis with a bronchial tumour, and for complicated cases of massive haemoptysis, recurrent lower respiratory infections, bronchial dilatation or oesobronchial or aortobronchial fistulas [6].

Anatomopathological study of the surgical specimen confirms the diagnosis of broncholithiasis not initially identified by imaging or endoscopy. Combined with cultures of biopsy fragments, it also allows an etiological diagnosis in approximately a quarter of cases [21].

Conclusion

Broncholithiasis is a rare and potentially serious condition. Lithoptysis is the only pathognomonic sign, but it occurs infrequently. The other clinical signs are not very specific, and the diagnosis of broncholithiasis is often made late, at the stage of complications. A definitive diagnosis can be made using a combination of CT and bronchoscopy. Treatment is required for symptomatic forms and in the event of complications.

Bibliography

1. Singer JP., *et al*. "Bronchiolitis and other intrathoracic airway disorders". In: Murray and Nadel's Textbook of Respiratory Medicine. 6th edition. Philadelphia, PA: Elsevier Inc (2016): 897-911.
2. Arrigoni MG., *et al*. "Broncholithiasis". *Journal of Thoracic and Cardiovascular Surgery* 62.2 (1971): 231-237.
3. Mulliez PH., *et al*. "Broncholithiase au cours d'une silicotuberculose". *Revue de Pneumologie Clinique* 46 (1990): 85-87.
4. Anwer M and Venkatram S. "Broncholithiasis: "incidental finding during bronchoscopy"—case report and review of the literature". *Journal of Bronchology and Interventional Pulmonology* 18.2 (2011): 181-183.
5. Faber LP., *et al*. "The surgical implication of broncholithiasis". *Journal of Thoracic and Cardiovascular Surgery* 70.5 (1975): 779-789.
6. Hodgson NC and Inculet RI. "Acute airway obstruction secondary to bilateral broncholithiasis". *Chest* 117.4 (2000): 1205-1207.
7. Jin Y., *et al*. "Diagnosis and treatment evaluation of 48 cases of broncholithiasis". *Thoracic and Cardiovascular Surgeon* 64.5 (2016): 450-455.
8. Lim SY., *et al*. "Classification of broncholiths and clinical outcomes". *Respirology* 18.4 (2013): 637-642.
9. Moersch HJ and Schmidt HW. "Broncholithiasis". *Annals of Otology, Rhinology and Laryngology* 68.2 (1959): 548-563.
10. Nollet AS., *et al*. "Broncholithiasis: rare but still present". *Respiratory Medicine* 92.7 (1998): 963-965.
11. Dixon GF., *et al*. "Advances in the diagnosis and treatment of broncholithiasis". *American Review of Respiratory Disease* 129.6 (1984): 1028-1030.

12. Graig K., *et al*. "Broncholithiasis: A case report". *The Journal of Emergency Medicine* 23.4 (2002): 359-363.

13. Antao VCS., *et al*. "Broncholithiasis and lithoptysis associated with silicosis". *European Respiratory Journal* 20.4 (2002): 1057-1059.

14. Snyder RW., *et al*. "Bilateral partial bronchial obstruction due to broncholithiasis treated with laser therapy". *Chest* 113.1 (1998): 240-242.

15. Seo JB., *et al*. "Broncholithiasis: review of the causes with radiologic-pathologic correlation". *Radiographics* 22 (2002): S199-S213.

16. Cole FH., *et al*. "Management of broncholithiasis: is thoracotomy necessary?" *Annals of Thoracic Surgery* 42.3 (1986): 255-257.

17. Moersch HJ and Schmidt HW. "Broncholithiasis". *Annals of Otology, Rhinology and Laryngology* 68.2 (1959): 548-563.

18. Groves LK and Effler DB. "Broncholithiasis: A review of twenty-seven cases". *American Review of Tuberculosis* 73.1 (1956): 19-30.

19. McLean TR., *et al*. "Massive hemoptysis due to broncholithiasis". *Annals of Thoracic Surgery* 52.5 (1991): 1173-1175.

20. Ford MAP., *et al*. "Bronchoesophageal fistula due to broncholithiasis: a case series". *Respiratory Medicine* 99 (2005): 830-835.

21. Potaris K., *et al*. "Role of surgical resection in broncholithiasis". *Annals of Thoracic Surgery* 70.1 (2000): 248-251.

22. Ferretti G., *et al*. "Diagnostic de la broncholithiase : rôle de la tomodensitométrie haute resolution". *Journal of Radiology* 75.10 (1994): 531-536.

23. Cuppen I., *et al*. "Broncholithiasis in an immune compromised boy with disseminated *Mycobacterium kansasii*". *Pediatric Pulmonology* 42.10 (2007): 980-983.

24. Hirschfield LS., *et al*. "Broncholithiasis due to Histoplasma capsulatum subsequently infected by actinomycetes". *Chest* 96.1 (1989): 218-219.

25. Seo JB., *et al*. "Broncholithiasis: review of the causes with radiologic-pathologic correlation". *Radiographics* 22 (2002): S199-S213.

26. Olson EJ., *et al*. "Therapeutic bronchoscopy in broncholithiasis". *American Journal of Respiratory and Critical Care Medicine* 160.3 (1999): 766-770.

27. Menivale F., *et al*. "Therapeutic management of broncholithiasis". *Annals of Thoracic Surgery* 79.5 (2005): 1774-1776.

Volume 7 Issue 4 April 2024
©All rights reserved by Benbrahim Fatima Zohra*., et al.*