



Case report

Follicular bronchiolitis: A rare cause of persistent atelectasis in children



Ângela Dias^{a,*}, Joana Jardim^a, Teresa Nunes^a, Conceição Souto Moura^{b,c}, Luísa Vaz^a

^aUnidade de Pneumologia Pediátrica, Serviço de Pediatria, Centro Hospitalar São João, Porto, Portugal

^bServiço de Anatomia Patológica, Centro Hospitalar São João, Porto, Portugal

^cFaculdade de Medicina do Porto, Portugal

ARTICLE INFO

Article history:

Received 21 May 2013

Received in revised form

10 June 2013

Accepted 17 June 2013

Keywords:

Follicular bronchiolitis

Lymphoproliferative disorder

Histopathology

Atelectasis

ABSTRACT

Although atelectasis is common in children, its persistence or refractoriness to treatment should lead prompt evaluation to identify causal mechanism. We describe the case of a child presenting in first year of life with persistent left upper lobe atelectasis, recurrent wheezing and respiratory infections refractory to medical therapy, submitted to partial lobectomy when he was 3 years old age. Histopathological examination revealed follicular bronchiolitis. Systemic underlying diseases were excluded. Clinical improvement was initially achieved using inhaled corticosteroids, but oral therapy was needed due to clinical relapse, with favorable response.

Follicular bronchiolitis, a rare pulmonary primary lymphoid lesion, consists of numerous reactive lymphoid follicles in a peribronchiolar distribution. Its precise cause is unknown, particularly in children, in which few cases have been reported. Treatment usually includes steroids and prognosis is generally good.

© 2013 Elsevier Ltd. Open access under [CC BY-NC-ND license](http://creativecommons.org/licenses/by-nc-nd/3.0/).

1. Introduction

Atelectasis consists in collapse of alveolar spaces. It is a common feature in pediatric patients, to which they are particularly prone because of their chest wall compliance and lack of collateral ventilation observed in adults [1]. Its persistence or refractoriness to treatment should lead to prompt evaluation to identify causal mechanism, ensuring an adequate approach.

Although most frequent type of atelectasis described in children is obstructive, mainly as consequence of mucus plugging [1], it is rarely reported as consequence of bronchial obstruction due to hyperplasia of bronchus-associated lymphoid tissue. We report a unique case of a boy presenting with persistent atelectasis, recurrent wheezing and severe respiratory infections, which had follicular bronchiolitis (FB) diagnosis.

2. Case report

A 21-month boy was referred to our consultation because of persistent left upper lobe (LUL) atelectasis. He had a previous history of recurrent wheezing since the first trimester of life,

conditioning three previous admissions at local hospital due to dyspnea and respiratory distress (at 2, 8 and 9 months). In latter episode adenovirus and parainfluenza 3 were identified in viral antigen detection on nasopharyngeal swab, and chest X-ray revealed a LUL atelectasis.

Despite clinical improvement verified during acute episodes described above, chronic cough, maintenance of tachypnea and respiratory effort in intercritical period justified chest X-ray reevaluation, which demonstrated persistence of atelectasis previously found, motivating referral to a tertiary care hospital.

In our first observation he was tachypneic, with mild respiratory effort and non-hypoxemic. Pulmonary auscultation revealed reduced respiratory sounds on upper third of left lung with fine crackles on same location.

Additional studies performed included high resolution thoracic computed tomography (CT), which evidenced diffuse ground-glass opacity, LUL atelectasis and mild bronchial dilation. Bronchoscopy revealed airways with normal morphology and purulent bronchorrhea, with no residual obstruction after aspiration.

Blood cell count, allergologic panel and sweat chloride test were normal. Genetic study for cystic fibrosis and protein-chain reaction assay for *Mycobacterium tuberculosis* in gastric aspirate were negative. Serum analysis of immunoglobulins and evaluation of blood lymphocyte subsets were normal.

During initial follow-up period, he maintained recurrent LUL infection, often requiring hospital admission and need for frequent

* Corresponding author. Tel.: +351 933409935; fax: +351 220835957.
E-mail address: angeladias2@gmail.com (Â. Dias).

courses of antibiotic therapy. Cough and recurrent exacerbations persisted. No improvement was achieved with daily physiotherapy, impairing his quality of life.

The case was discussed with cardiothoracic surgery department and considering failure of medical therapy, recurrent respiratory infections, persistent sputum production and chronic cough he was submitted to a LUL lobectomy, when he was three years old. Histopathological examination revealed numerous reactive lymphoid follicles in a peribronchial/peribronchiolar distribution, diagnosing follicular bronchiolitis (Fig. 1).

Underlying diseases were excluded, such as vascular collagen disease as well as primary or secondary immunodeficiency.

In the first six years after surgery pulmonary function tests remained stable, he had few exacerbations marked by bronchospasm controlled with inhaled short acting β 2-agonist (salbutamol) and inhaled corticosteroid (fluticasone).

When he was 10 years old he referred mild exertional dyspnea and recurrence of cough. Spirometry showed a mixed pattern with a Forced Vital Capacity (FVC) of 78%, a Forced Expiratory Volume in one second (FEV1) of 65% and a reduced ratio of FEV1/FVC of 74%. A course of oral prednisolone (40 mg/day) was initiated, with gradual clinical and lung function improvement, allowing oral steroid dose tapering six months after.

Actually, at 11 years old, he is kept asymptomatic on daily inhaled corticosteroid.

3. Discussion

FB is a rare disorder and represents hyperplasia of mucosa-associated lymphoid tissue along airways (bronchus associated lymphoid tissue – BALT). It occurs mostly in middle aged adults [2] and rarely reported in children [2,3].

It is defined by its histological pattern that consists of numerous reactive lymphoid follicles in a peribronchiolar distribution, which can cause airway lumen compression and obstruction because they frequently lie between bronchioles and pulmonary arteries [4,5].

It can be secondary, occurring in patients with underlying collagen vascular disease, in cases of congenital or acquired immunodeficiency or in a heterogeneous group characterized by

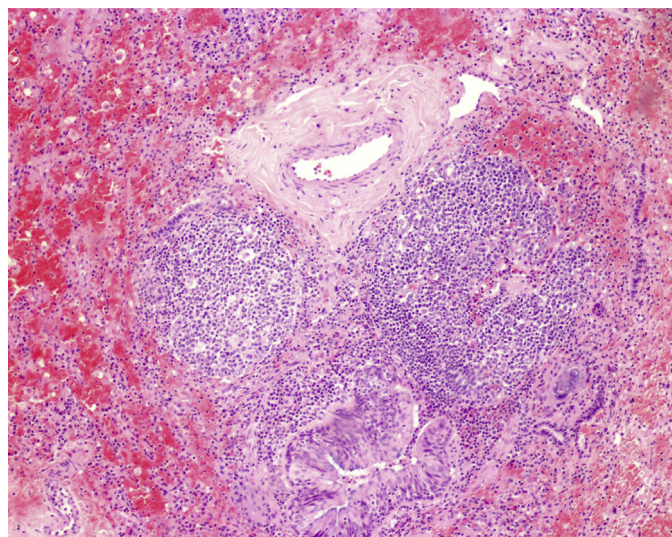


Fig. 1. HE (40 \times). Reactive lymphoid follicles containing germinal centers located between bronchioles and pulmonary arteries.

peripheral eosinophilia [4]. Less frequently it can be idiopathic [6], as in our case.

Although the precise cause is still unknown, it was suggested that it may represent a polyclonal hyperplasia of bronchus associated lymphoid tissue in response to an antigenic stimuli (intrinsic or extrinsic) [4,7]. In our case, previous respiratory infection with adenovirus and parainfluenza 3 might have contributed to development of FB.

Most patients present with cough, dyspnea or recurrent pneumonia, weight loss and fatigue [4]. In children, failure to thrive, recurrent hemoptysis and tachypnea are also possible features [3]. Multiple pulmonary function studies abnormalities have been reported, including obstructive, restrictive and mixed patterns [4,7,8]. Chest X-ray findings usually include bilateral small nodular or reticulonodular infiltrates with intrathoracic adenopathy. TC evidences centrilobular and peribronchial nodules and ground-glass opacity, normally bilateral and diffuse [7,9,10]. Some cases have mild bronchial dilation [7], as in our case.

Despite presence of suggestive clinical, laboratory and radiological findings, definitive diagnosis requires open lung biopsy [6]. Bronchoscopic biopsy is not diagnostic because of the patchy nature of disease, leading to sample error and the amount of tissue obtained by this technique, which is often insufficient [9].

Treatment, although not fully understood, is usually directed to the underlying cause, when recognized. Idiopathic cases generally are treated with bronchodilators and steroids [7]. Macrolide therapy was recently suggested as an alternative approach in some patients and considered in those who remain corticosteroid-dependent [9]. Immunosuppressive agents are generally reserved for refractory cases. As there are few cases reported, experience in treatment options in children is scarce, so we believe our report may be important in establishing a therapeutic plan in cases similar to ours.

Prognosis is unclear, but generally described as favorable, although progressive disease is recognized when it presents in young ages [5,7,9].

Contributor's statement

Ângela Dias – conception and design of the manuscript, drafting of the article.

Joana Jardim – conception of the manuscript, data collection.

Teresa Nunes – manuscript revision.

Conceição Souto Moura – manuscript revision.

Luísa Vaz – manuscript revision and final approval of version to be published.

Disclosure statement

The authors report no biomedical financial interests or other potential conflicts of interest in this manuscript. There were no sponsors in this study.

References

- [1] Finder J. UpToDate, Basow DS, editors. Atelectasis in children. Waltham, MA: UpToDate; 2013.
- [2] Nicholson AG. Pulmonary lymphoproliferative disorders. *Curr Diagn Pathol* 2000;6:130–9.
- [3] Dai YW, Lin L, Tang HF, Jiang KW. Follicular bronchiolitis in a child. *World J Pediatr* 2011;7(2):176–8.
- [4] Guinee Jr GD. Update on pulmonary and pleural lymphoproliferative disorders. *Diagn Histopathology* 2008;14(10):474–98.

- [5] Travis WD, Galvin JR. Non-neoplastic pulmonary lymphoid lesions. *Thorax* 2001;56:964–71.
- [6] Benesch M, Kurz H, Eber E, Varga EM, Gopfrich H, Pflieger A, et al. Clinical and histopathological findings in two Turkish children with follicular bronchiolitis. *Eur J Pediatr* 2001;160:223–6.
- [7] Ryu JH, Myers JL, Swensen SJ. Bronchiolar disorders. *Am J Respir Crit Care Med* 2003;168(11):1278–92.
- [8] Yousem SA, Colby TV, Carrington CB. Follicular bronchitis/bronchiolitis. *Hum Pathol* 1985;16:700–6.
- [9] Aerni MR, Vassallo R, Myers JL, Lindell RM, Ryu JH. Follicular bronchiolitis in surgical lung biopsies: clinical implications in 12 patients. *Respir Med* 2008;102(2):307–12.
- [10] Howling SJ, Hansell DM, Wells AU, Nicholson AG, Flint JD, Muller NL. Follicular bronchiolitis: thin-section CT and histologic findings. *Radiology* 1999;212:637–42.