CASE REPORT

Pulmonary sarcoid-like granulomatous disease in an 11-month-old girl

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SUMMARY

Sarcoidosis is a chronic granulomatous disease of unknown aetiology. It is extremely rare in children, especially the early onset form, presenting with eye, skin and joint symptoms but no lung involvement. We report an 11-month-old girl with granulomatous disease restricted to the lungs consistent with sarcoidosis. This unusual presentation has never been described in the paediatric literature so far.

BACKGROUND

Sarcoidosis is a rare interstitial lung disease in children.¹ It is an inflammatory multisystemic disease characterised by non-necrotising epithelioid cell granulomas. In childhood, the common young adult form is seen, but an early onset form before 5-year-old is described with a clinical triad (uveitis, arthritis, cutaneous eruption) without lung disease.

We report an 11-month-old girl presenting with lung sarcoid-like granuloma.

CASE PRESENTATION

An 11-month-old infant girl first presented with persistent tachypnoea and fever. She was a full-term girl from a Malian origin. As her mother was treated for HIV, she received a prophylactic zidovudine treatment and was negative for HIV. At admission, the chest x-ray showed diffuse alveolar consolidations. PCR on nasopharyngeal aspiration was positive for Parainfluenzae III virus. She received oxygen therapy, inhaled salbutamol and secondary oral steroid treatment. Asthenia, fever, tachypnoea and diffuse crackles on chest auscultation still lasted after 2 weeks. She had no skin, eye or joint involvement.

INVESTIGATIONS

She was hypoxic on blood gas. C reactive protein was 57 mg/l and blood cell count was normal. Chest x-ray was worsening and thoracic CT-scan showed extensive alveolar pattern, without lymphadenopathy (figure 1). Bronchoalveolar lavage (BAL) showed increased cellular count (730 000 cells/ml) with 27% neutrophils, 14% lymphocytes (CD4/CD8=1.9) and was negative for tuberculosis. Numerous microbiological agents were found on BAL, nasopharyngeal aspiration and stool (Metapneumovirus, Branhamella catharralis, Adenovirus). Angiotensin conversion enzyme (ACE) was normal. An open lung biopsy showed sarcoid-like granulomas with giant cells protruding into the bronchioles without necrosis (figure 2).

Inclusions with calcium deposit were observed within the giant cells.

DIFFERENTIAL DIAGNOSIS

The environmental survey revealed no particle aspiration history and no drug exposition. All explorations were negative for tuberculosis (intradermic test, gastric aspirate, bronchial aspirate, BAL examination and interferon- γ test), fungus (bronchial aspirate and BAL) or parasites (serology, stool examination). Crohn's disease was excluded by gastroenterologists because no digestive symptom was present, and growth was normal. No tumour was detected and tumoral markers were negative. Nevertheless, hypothesising an infection, she underwent a macrolid treatment and a steroid intravenous pulse that allowed blood gas normalisation, but respiratory symptoms were still a concern.

OUTCOME AND FOLLOW-UP

We concluded that this 11-month-old girl had a rare early form of lung restricted sarcoid-like granulomatous disease. Monthly steroid pulses were kept on for 6 months with clinical improvement, and thoracic CT scan showed transformation of alveolar condensation into large cysts (figure 3). Twelve months after the treatment was interrupted, she presented no clinical relapse, lung and general examination, and growth were normal.

DISCUSSION

Granulomatous disease remains a diagnosis challenge for paediatricians. Sarcoidosis in infant is extremely rare. In 2008, Milman *et al*² reported an average incidence of 0.06 to 1.02/100 000 person-years in Denmark. In 2000, Baculard *et al*,³ in our unit, described 21 paediatric cases over a 10-year-period. There is no gender predominance in childhood, and a higher incidence is found among African-Americans.⁴⁻⁶

Non-specific general symptoms are described as well as lungs, eyes, skin symptoms and lymph nodes. The most common radiographic finding is bilateral hilar lymphadenopathy, with or without parenchymal involvement which usually is an interstitial pattern.⁴ Lung function tests are not specific but nearly half of the children show a restrictive pattern.⁶ The serum level of ACE is often elevated in adults but not in infants. BAL can confirm alveolitis with a high CD4/CD8 ratio which does not correlate with disease activity, treatment response nor prognosis in children.^{6,7}

Differential diseases must be excluded: infectious granulomatous diseases, exposure to dust or

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Figure 1 (A) Chest x-ray at presentation: diffuse alveolar and interstitial consolidations with thoracic distension. (B) Thoracic CT-scan showing extensive alveolar consolidations, interstitial pattern with micronodules and no lymphadenopathy.

Figure 2 Hematoxylin and eosin stain showing non-caseating sarcoid-like granulomas with giant cells protruding into a bronchiole causing marked narrowing of the airway lumen (*). Asteroid bodies can be seen in giant cells.

respirable bioaerosol, drug-induced pneumonitis, juvenile idiopathic arthritis, Behcet disease, Sjogren syndrome, chronic granulomatous disease, Crohn's disease, tumours, histiocytosis and Blau syndrome.⁸

Multiple triggers exist as infectious agents, genetic susceptibility, environmental exposure or immune abnormalities.^{9–10} In this case, suspected triggers were viral infection and immune abnormality secondary to the zidovudine neonate treatment.

In literature, very few series of early-onset sarcoidosis are described. In 2004, three male patients were reported. One child presented at 8 months of age with fever and erythema, developing 8 months later splenomegaly, hypercalcaemia and hilar lymphadenopathy. The two other children were 4-year-old twins who were secondary found to have a Blau syndrome.⁴ In 2006, three girls were described: two followed the typical triad; the third one had a multisystem disease starting at the age of 6 months affecting the lung and bone marrow.¹¹

Because the clinical and pathological presentations were consistent with sarcoidosis, we believe this child had sarcoidosis-like disease. However, as we had no evidence for another organ involvement, no other pathological clue of sarcoidosis is provided from another tissue than the lung. As early onset granulomatous diseases, and moreover sarcoidosis are rare, it is of major importance to group those suspected cases. The French national database for rare lung diseases Respirare (<http://www.respirare.fr>) allows us to further study those atypical forms of sarcoidosis-like diseases.

Learning points

- ▶ Sarcoidosis remains a rare lung disease in childhood, especially in infants.
- ▶ In young children presenting with granulomatous disease, a Blau syndrome should be searched for.
- ▶ Pulmonary involvement in infant sarcoidosis is rare but should be evoked in alveolointerstitial syndrome with no other founded aetiology.

Figure 3 Thoracic CT scan after 6 months of treatment. Alveolar condensations have improved but large cysts have appeared on the left lung.

Contributors NN and JP wrote the manuscript and were in charge of the patient. AC managed the pathological study that provided the diagnosis. HC lead this work.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Clement A, Nathan N, Epaud R, *et al.* Interstitial lung diseases in children. *Orphanet J Rare Dis* 2010;5:22.
- 2 Milman N, Hoffmann AL. Childhood sarcoidosis: long-term follow-up. *Eur Respir J* 2008;31:592–8.
- 3 Baculard A, Blanc N, Boule M, *et al.* Pulmonary sarcoidosis in children: a follow-up study. *Eur Respir J* 2001;17:628–35.
- 4 Hoffmann AL, Milman N, Byg KE. Childhood sarcoidosis in Denmark 1979–1994: incidence, clinical features and laboratory results at presentation in 48 children. *Acta Paediatr* 2004;93:30–6.
- 5 Pattishall EN, Kendig EL Jr. Sarcoidosis in children. *Pediatr Pulmonol* 1996;22:195–203.
- 6 Shetty AK, Gedalia A. Childhood sarcoidosis: a rare but fascinating disorder. *Pediatr Rheumatol Online J* 2008;6:16.
- 7 Fauroux B, Clement A. Paediatric sarcoidosis. *Paediatr Respir Rev* 2005;6:128–33.
- 8 Okafuji I, Nishikomori R, Kanazawa N, *et al.* Role of the NOD2 genotype in the clinical phenotype of Blau syndrome and early-onset sarcoidosis. *Arthritis Rheum* 2009;60:242–50.
- 9 McGrath DS, Daniil Z, Foley P, *et al.* Epidemiology of familial sarcoidosis in the UK. *Thorax* 2000;55:751–4.
- 10 Morgenthau AS, Iannuzzi MC. Recent advances in sarcoidosis. *Chest* 2011;139:174–82.
- 11 Al-Mayouf SM, Al-Sonbul A, Al, , *et al.* Sarcoidosis: a delayed or missed diagnosis in children. *Ann Saudi Med* 2006;26:220–3.

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