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**Pulmonary tuberculosis misdiagnosed as child.****A case report**

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**Abstract**

We present the case of a 4-year-old girl who had a history of many hospital admissions due to acute respiratory failure. She was now admitted to the hospital with cough, fever, and hypoxemia. She received bronchodilators, OCS, ceftriaxone, and supplementary O<sub>2</sub> for six days. After that she remained clinically stable for 24 hs. Then she developed acute respiratory failure requiring MV, inotropic drugs and broad-spectrum antibiotics in the ICU with no response. Chest CT scan showed an interstitial pattern in both lungs. As the etiology remained unknown and she was critically ill, a presumptive diagnosis of chILD was made and a corticosteroid pulse was administered. At day 12, sputum cultures were positive for Mycobacterium tuberculosis. Tuberculostatic drugs were started and the patient improved gradually.

This case highlights the importance of considering TB as a differential diagnosis of interstitial lung disease, especially in countries with a high rate of TB infection.

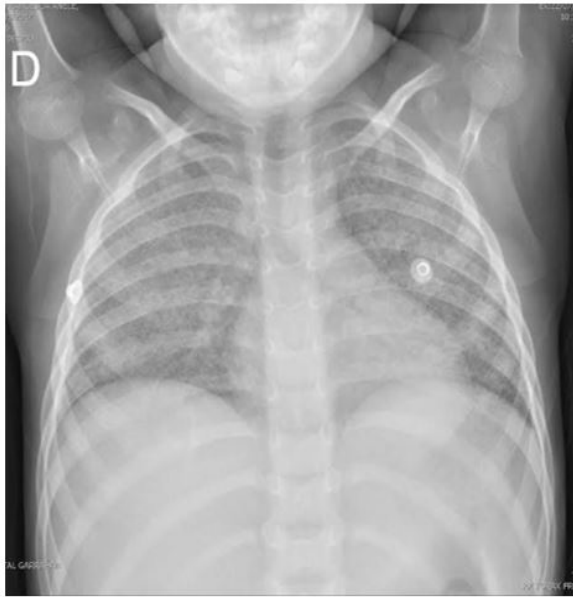
**Introduction**

Interstitial lung disease refers to disorders that feature remodeling of the lung interstitium and distal airspaces resulting in abnormal gas exchange. The children's interstitial and diffuse lung disease (chILD) syndrome exists when an infant with diffuse lung disease has at least three of the following criteria: (1) respiratory symptoms (e.g., cough, difficulty breathing), (2) respiratory signs (e.g., tachypnea, adventitious sounds, retractions, failure to thrive), (3) hypoxemia, and (4) diffuse abnormalities on CT scan. Many disorders may cause this syndrome, some of which are specific to infancy (<2 years of age), including surfactant dysfunction mutations, and some are not, such as cystic fibrosis, chronic lung disease of prematurity, and pulmonary infections (including tuberculosis).<sup>1–3</sup> Some entities are associated with few symptoms and evolve favorably, but others are more symptomatic and potentially lethal.

**Case Report**

We present the case of a 4-year-old girl who had a history of many hospital admissions due to acute respiratory failure. During the first admission was at two months of age (IIF: SRV+). During one of the episodes, she required 10 days of mechanical ventilation (MV) in the ICU (IIF: ADV+/ Sputum: H. influenzae+). On each occasion, she received oral corticosteroids (OCS), bronchodilators (B2 agonist), and supplementary oxygen (O<sub>2</sub>), improving slowly with a mean length of stay of 7-10 days.

In the last episodes the patient was admitted to the hospital with a cough and fever for longer than 2 weeks. She was tachypneic and hypoxemic on room air. The following complementary studies were performed: PCR COVID negative, laboratory with WC 13110 (N77/L19), CRP 4, TST 0 mm, three gastric lavages with a negative smear for tuberculosis, and a chest X-ray showing an interstitial pattern with alveolar opacities (Figure 1). She received B2 agonists, OCS,



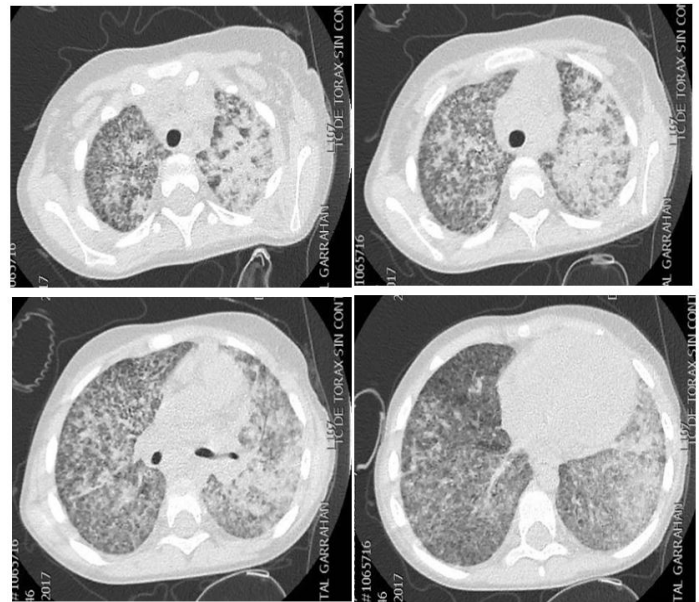
**Figure 1:** Chest X-ray showing an interstitial pattern with alveolar opacities.

azithromycin, ceftriaxone, and supplementary O<sub>2</sub> through a nasal cannula for six days, after which she improved.

Once the treatment was discontinued, she remained clinically stable for 24 hs with normal peripheral oxygen saturation (SpO<sub>2</sub>) and no fever. Subsequently, she developed acute respiratory failure requiring MV and inotropic drugs in the ICU. Chest CT scan showed air space consolidation, reticular opacities, clustered alveolar opacities (nodules), and multiple small discrete nodules randomly distributed in both lungs (Figure 2). Tracheal secretion cultures, blood cultures, HIV, and other serology tests were all negative. Broad-spectrum antibiotics were given without response and the patient became critically ill. She developed refractory hypoxemia with PO<sub>2</sub> < 60 mmHg despite FiO<sub>2</sub> of 100% and required high-frequency ventilation. As the etiology was unknown and lung biopsy or bronchoalveolar lavage (BAL) could not be performed given the critical condition of the patient, a presumptive diagnosis of chILD was made and methylprednisolone 10 mg/kg/d was given for three days without a favorable response. Twelve days after admission, 2 of 3 sputum cultures were positive for *Mycobacterium tuberculosis* susceptible to isoniazid and rifampicin confirming an Acute respiratory distress syndrome (ARDS) due to tuberculosis. Tuberculostatic drugs were started and the patient began to improve gradually and could be weaned from MV. After one month of hospitalization, she was discharged with minimal pulmonary sequelae.

## Discussion

We present a case of pulmonary tuberculosis (TB), a common disease in developing countries, but with the infrequent presentation of interstitial pneumonia.



**Figure 2:** Chest CT-scan showing air space consolidation, reticular or linear opacities, clustered alveolar opacities (nodules) and multiple tiny discrete nodules randomly distributed in both lungs.

TB is a highly transmissible disease that, although preventable and curable, continues to be a significant cause of ill health and one of the leading causes of death worldwide. An estimated 10.6 million people fell ill with TB worldwide in 2021; adult men accounted for 56.5% of all TB cases, adult women for 32.5%, and children for 11% of cases. In 2021 in Argentina, 12,569 cases of TB were reported, 56.8% of which were male, 16.7% were < 20 years, and 81% were pulmonary TB (PTB).<sup>6</sup>

TB typically affects the lungs but can affect other sites as well.<sup>4</sup> The most common clinical presentation of PTB in children is persistent cough and poor weight gain. TB may also present in atypical ways including acute severe pneumonia with SpO<sub>2</sub> below 90% or severe respiratory distress.<sup>5</sup>

On the other hand, the chILD syndrome is rare and may be due to many disorders. Guidelines on Interstitial Lung Disease in Infancy suggest a series of complementary studies as the initial approach to rule out the most frequent and treatable causes: appropriate cultures (infection, including TB/sepsis/pneumonia), laboratory tests (HIV, immunodeficiency), CF diagnostic studies, echocardiogram (structural cardiovascular disease and pulmonary hypertension), thin section CT scanning of the chest (characteristic of the lung disease), flexible bronchoscopy with BAL (to exclude infection or airway abnormalities), and eventually lung biopsy (when other diagnostic investigations have not identified the precise disease, or when there is clinical urgency to identify it).<sup>2,7</sup>

Management of the CHILD syndrome is based on unsystematic observations. The decision about whether or not to initiate a trial of immunosuppressive therapy (corticosteroids, hydroxychloroquine, azithromycin) should be made for each individual case considering disease severity, progression rate, prognosis without treatment, comorbidities, and family preferences.<sup>2,7</sup>

This case highlights the importance of considering TB as a differential diagnosis of interstitial pneumonia or interstitial lung disease, especially in countries with a high rate of TB infection.

## References

1. Deterding R. New Concepts in Children's Interstitial and Diffuse Lung Disease. In: Elsevier, editor. *Kendig's Disorders of the Respiratory Tract in Children*. 9th Edition. 2019.
2. Kurland G, Deterding RR, Hagood JS, Young LR, Brody AS, Castile RG, et al. An official American Thoracic Society clinical practice guideline: classification, evaluation, and management of childhood interstitial lung disease in infancy. *Am J Respir Crit Care Med* 2013;188:376–94. <https://doi.org/10.1164/rccm.201305-0923ST>.
3. Comité Nacional de Neumonología, Sociedad Argentina de Pediatría. Enfermedades del intersticio pulmonar en niños menores de 2 años. Clasificación, diagnóstico y tratamiento. *Archivos Argentinos de Pediatría* 2019. <https://doi.org/10.5546/aap.2019.S120>.
4. World Health Organization. *Global tuberculosis report 2022*. n.d.
5. WHO operational handbook on tuberculosis. Module 5: management of tuberculosis in children and adolescents. World Health Organization; 2022.
6. Ministerio de Salud de la Nación Argentina. Boletín N° 6: Tuberculosis y Lepra en la Argentina. Banco de Recursos. n.d. URL: <https://bancos.salud.gob.ar/recurso/boletin-ndeg-6-tuberculosis-y-lepra-en-la-argentina> (Accessed 14 May 2023).
7. Bush A, Cunningham S, de Blic J, Barbato A, Clement A, Epaud R, et al. European protocols for the diagnosis and initial treatment of interstitial lung disease in children. *Thorax* 2015;70:1078–84. <https://doi.org/10.1136/thoraxjnl-2015-207349>.