Coincident Diagnosis of a Pulmonary Abscess and Ascaris lumbricoides Infection: a Possible Causal Connection?

Zweitgleiche Diagnose eines Lungenabszesses und einer Ascarideninfektion: Ist ein kausaler Zusammenhang möglich?

Background

Pulmonary abscesses have become exceedingly rare in developed countries since the introduction of antibiotics. Aspiration, immunodeficiency, and hematogenous spread of pathogens are the main etiological causes of pulmonary abscesses in childhood. (Table 1) The main pathogens in primary abscesses are pneumococci, followed by Staphylococcus aureus.

Case report

An 11-year-old German male from a rural part of Germany was admitted for cough, chest pain, and subfebrile temperatures lasting for 5 days. Previously, he and his whole family had suffered from a common cold accompanied by a cough for 2 weeks. Aside from this, the patient's medical history was completely uneventful. He had never traveled abroad. Chest radiography and a CT-scan performed prior to admission showed a focal lesion of 5.6 × 4.0 cm in the sixth bronchopulmonary segment with broad-based contact to the pleura; an air bubble 13 mm in diameter, connected to the bronchial system; and smaller round pulmonary lesions in the sixth right segment. The left lung showed a focal lesion in the area of the former inferolateral segment. The patient was without any pathological findings before and after the disease (Table 1). As abscesses associated with certain parasites, e.g. Entamoeba histolytica have been reported, a scatoscopic examination and serological diagnostics. In this case these remained without any pathological finding, except for an infection with A. lumbricoides. Ascariasis is the most common human nematode disease and affects about one fourth of the population worldwide, mainly in tropical areas and regions with poor hygiene. Infectious eggs are incorporated via contaminated food, especially with unwashed vegetables, or cystic congenital adenoid malformation were also unlikely, because the patient was without any pathological findings before and after the disease. In a radiographic control there were no abnormalities other than a discrete streaky opacification in the area of the abscess (Fig. 3). As abscesses associated with certain parasites, e.g. Entamoeba histolytica have been reported, a scatoscopic examination and serological diagnostics. In this case these remained without any pathological finding, except for an infection with A. lumbricoides. Ascariasis is the most common human nematode disease and affects about one fourth of the population worldwide, mainly in tropical areas and regions with poor hygiene. Infectious eggs are incorporated via contaminated food, especially with unwashed vegetables.

Discussion

The sudden appearance of a pulmonary abscess in the previously healthy and immunocompetent boy raised questions as to the etiology of the disease (Table 1). Based on the patient's medical history, primary immunodeficiency was unlikely, and a HIV infection could be ruled out. Focused examinations (echocardiography, abdominal ultrasound, basic immunostatus) regarding other causes for lung abscesses in children remained negative. An innate bronchopulmonary disease such as a bronchogenic cyst, lung sequestration, or cystic congenital adenoid malformation were also unlikely, because the patient was without any pathological findings before and after the disease. In a radiographic control there were no abnormalities other than a discrete streaky opacification in the area of the abscess (Fig. 3). As abscesses associated with certain parasites, e.g. Entamoeba histolytica have been reported, a scatoscopic examination and serological diagnostics. In this case these remained without any pathological finding, except for an infection with A. lumbricoides. Ascariasis is the most common human nematode disease and affects about one fourth of the population worldwide, mainly in tropical areas and regions with poor hygiene. Infectious eggs are incorporated via contaminated food, especially with unwashed vegetables.

Table 1 Predisposing factors and pathogens in children with pulmonary abscesses.

<table>
<thead>
<tr>
<th>Predisposing factors</th>
<th>Pathogens</th>
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<td>Primary lung abscess</td>
<td><em>Staphylococcus aureus</em> gram-positive cocci</td>
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<tr>
<td>Secondary lung abscess</td>
<td><em>Staphylococcus aureus</em> streptococcal species gram-negative bacilli</td>
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Predisposing factors include recurrent aspiration, congenital cyst, adenomatoid malformation, bronchogenic cyst, chronic lung disease, primary ciliary dyskinesia, cystic fibrosis, hematogenous spreading, endocarditis, thrombemboli, and septicemia. Pathogens include *Staphylococcus aureus*, *streptococcal species*, *gram-negative bacilli*, *Pseudomonas aeruginosa*, *bacteroides species*, and fungi (Candida and Aspergillus).

Also noteworthy is an article on bacterial clearance in ascariis-infected piglets. Curtis et al. found that piglets orally inoculated with *Ascaris suum* ovi, showed a significantly impaired bronchial clearance during the time of larvae migration. The authors assume that impaired clearance leads to a greater propensity for the development of bacterial pneumonia in ascariis-infected pigs (Curtis SE, Can J Vet Res 1987; 51:525–527).

Even though these findings from veterinary medicine cannot be applied to humans, the question of whether ascariosis could lead to lung impairment extending to Loefflers syndrome in humans, eventually resulting in a (super-)infection including the formation of an abscess, ought to be researched. Unless it is purely coincidental, Loefflers syndrome or even impaired clearance followed by staphylococcal superinfection are a possible cause for the lung abscess in the specific case at hand.

Conclusion

In order to analyze a possible association between ascariis larvae migration and severe lower airway infections, further clinical cases must be collected. *Ascaris lumbricoides* infection in affected children could be diagnosed using stool samples for ovi or through detecting third-stage larvae in sputum and gastric fluid, as well as PCR from surgical material. Serial pharyngeal smears and sputum samples could help to determine if alveo-bronchial clearance is impaired in children with an acute ascariis infection.

Areas with a high prevalence of nematode infections would be of special interest in any study. Attempts to collect data regarding unusual presentations of ascariasis have already been made, but further investigation is needed to gain a more comprehensive picture.

Conflict of interest: The authors have no conflict of interest to disclose.