MILIARY TUBERCULOSIS
COMPLICATED BY PULMONARY
CAVITATIONS AND PNEUMOTHORAX
IN A 14-MONTH OLD BOY

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Abstract
We report a case of a 14-month-old boy with miliary tuberculosis and recurrent pneumothorax due to cavitations of the left lung. He was admitted to hospital for a severe pneumonia and had to be ventilated with high pressure ventilation for about 4 weeks. He developed left pneumothorax for which several underwater chest drainages were performed. Finally, because of massive enlargement of the lung cavity, a thoracotomy was performed which revealed a 5x5 cm abscess cavity in the lung. Resection of the affected segment was done. In the postoperative period the child needed repeat chest intubation and prolonged steroid therapy but improved gradually. Histopathology confirmed the diagnosis of pulmonary tuberculosis.

Key words: tuberculosis, pneumothorax, cavitations

Introduction
Tuberculosis affects preferably adults. Although children account for 15-20% of cases in high-burden countries, childhood tuberculosis is a neglected global disease [1], particularly in Europe, a low burden region more and more confronted with migration effects in respect to tuberculosis.

In Germany, the pediatric population represents less than 5% of official cases (4,543 new cases in 2008 of whom 124 children under 15 years old [2]) and hematogeneous disseminated forms represent 1.2% of cases. Tuberculosis responds to chemotherapy and surgery is exceedingly rare required. However surgery may be needed in selected cases with complex lesions like broncho.

We present an unusual case of miliary tuberculosis complicated by a large pulmonary cavitation and recurrent pneumothorax in a 14-month-old boy.

Clinical Case Report
A 14-month-old boy presented with a one month history of night cough without fever but loss of weight. The chest radiograph showed bilateral pulmonary miliary pattern associated with bulla-like cystic lesion of left lung (fig.1). Cystic fibrosis or viral pneumonia with bacterial super infection was excluded. Although no index case was found at the beginning, gastric aspirate and direct microscopy provided the diagnosis of tuberculosis (wild strain). Later investigations confirmed that father had untreated pulmonary tuberculosis.

The reviews of laboratory data and computed tomography scan (fig. 2) precised the image of multiple bullae (hypodense areas) of the left lung with hilar lymphadenopathy, in a patient with malnutrition and immunological anergy.

Clinical courses worsened rapidly after admission in spite of effective tuberculosis medication (isoniazid, rifampicin,
ethambutol and pyrazinamide) and adjuvant prednisolone. A cardiac resuscitation was followed by intubation and thoracic drainage because of pneumothorax. Several pleural drainages were performed, because of immediate pneumothorax recurrence and mediastinal shift. Surgical intervention was indicated because of enlargement of the cavitation areas and symptoms of tension.

A left posterolateral thoracotomy through the sixth intercostal space was performed. After dissection of adhesions between chest wall and pulmonary parenchyma appeared a 5x5cm cavity involving the whole lingula. The thick-walled cavity was mobilised and a wedge lingula resection using a stapler was performed after liberating granuloma shaped adhesions with pericard. Unfortunately, because of the lymph node infiltration in the area of left phrenic nerve, injury of the common trunk was difficult to avoid and occurred. It was sutured directly.

The postoperative course was uneventful. The first chest tube was removed on the third and the second on the eight postoperative days because of mild air leakage. The extubation succeeded on the sixth postoperative day. A discreet elevation of the diaphragm persisted when the child was discharged from intensive care unit.

The histopathology of the cavern wall showed to be typical for tuberculosis, objecting granuloma with epithelioid cells and Langerhans cells, partially fibrosis and vasculitis. The antituberculosis chemotherapy was continued. The initial lack of CD3-positive T-cells and anergy due to the severe infection recovered after 6 weeks and showed almost normal number and function of T-cells. However, as a consequence of this, an IRIS (immune reconstitution inflammatory syndrome) reaction with clinical deterioration (tachypnea, high fever, increasing demand of oxygen supply) was observed. Because of this inflammatory reaction, the oxygen and prednisolone therapy had to be prolonged.

Discussion

The prevalence of tuberculosis in the world remains high. In developed countries, the incidence is decreasing but the open borders and migration have caused an increase of tuberculosis especially multi-drug-resistant tuberculosis (3% of all cases in Europe; 10-15% in republics of the former Soviet Union) [3].

Infant and young children and particularly neonates who are in close contact with a source case are at risk [4], especially increased risk of rapid progression to disease with severer forms [5]. Indeed, primary tuberculosis in early childhood remains underdiagnosed because of poor clinical signs. Indices of exposure are often the most relevant diagnosis tool.

Although our patient was not a typical patient at risk for tuberculosis (no HIV comorbidity, no lower social class, no malnutrition initially, no derivation from high incidence countries), the hypothesis of tuberculosis was not excluded, mainly because of X-Ray findings. It is very likely, that he got infected by his father whose tuberculosis was detected too late in this case.
Cavitations pulmonary tuberculosis follows the evacuation of the caseous material within the primary focus. This mechanism can be observed in children below 2 years of age if the course is that of progressive lung tuberculosis [6]. Residual thin walled cavities may be seen in both active and inactive disease. The differential diagnosis includes bullae, bronchiectasia, congenital and hydatid cysts. After chemotherapy, the cornerstone of treatment, tuberculosis cavity may disappear. However, cavitations tuberculosis is typically seen more often in adolescents and adults, after reactivation of primary tuberculosis infection (postprimary). In this case, the initial small cavity created with high pressure ventilation a mass effect with right mediastinal shift. Paediatric reports detailing non conservative surgical therapy for refractory respiratory infections are rare; they concern older children with a mean age at the point of intervention ranging from 6.6 to 13 years [7, 8, 9]. The indications for surgery are increased resistance to medical treatment or sequelae as acute complications of early conventional conservative medical therapy. In children whose defense against infections are overcome, resection can be carried out safely and provide significant improvement. Surgery has also a complementary role in the complex treatment in children with primary pulmonary tuberculosis. Yet, except in certain less burden countries, most paediatric surgeons have no experience with tuberculosis and parenchyma resection by young children is mainly performed for congenital lung lesions. Tuberculosis can be a difficult diagnostic problem and so appears unexpected on subsequent histopathology [10]. Acute respiratory presentation requiring pressing surgery is uncommon. We found only two case reports of young children with respiratory distress presentation and paracardial mass [11, 12]. Our case is especially unusual given the young age of the boy combined with this seldom complication by children: cavitating persistent pneumothorax despite several drainage attempts. Pneumothorax is a common complication of ventilator therapy and usually responds to tube thoracostomy. Other iatrogenic mechanisms could be related to inappropriate insertion of the chest tubes, trauma from vigorous endotracheal suction with excessively deep passage of suction catheter or from cardiac pulmonary resuscitation [13]. In this case, the recurrence of pneumothorax with a large air leak indicated the presence of a bronchopleural fistula. The pressing surgical management resulted in the resection of a complicated cyst. The mass effect and tension of the cavern forborne thoracotomy; anyway the severe adhesions into the pleural cavity would have probably led to conversion. The actual site of air leak appeared to be the bottom of dilated and destroyed lingula. By this stapler resection, we felt compelled to excise a part of pulmonary parenchyma which did not contribute to ventilation anymore. Beside considerations of future lung function with compensatory lung growth, this thoracotomy was a life-saving procedure.

Fig. 2: Chest CT scan showing the huge cavern system and bilateral miliary changes

REFERENCES