

## Clinical Image in Medicine

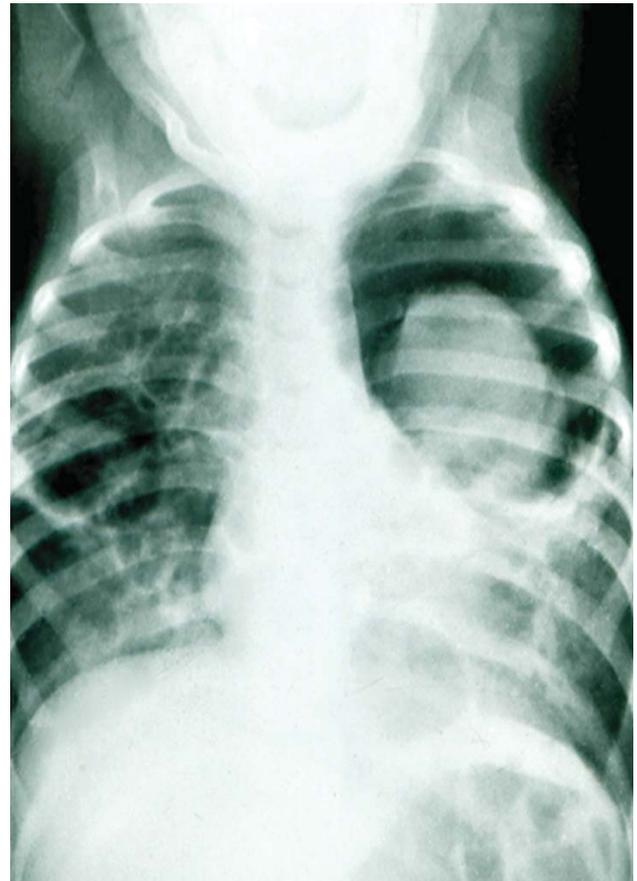
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### THE CASE

An eighteen-month-old girl of Sudanese descent was brought to the Emergency Room (ER). The child was unwell with the axillary temperature reading 38.6°C, heart rate 160/min, and capillary refill time 4 seconds over the sternum. The ER physician started oxygen *via* a face mask as the oxygen saturation reading was 91% in air, secures IV access and gives her a 20 ml/kg bolus of normal saline. The child was tachypneic with intercostal and subcostal recessions. Auscultation was challenging due to the child crying whenever approached by any doctor. The girl weighs 7kg. There was no obvious BCG scar and no confirmed contact with tuberculosis. Her HIV status was unknown. A portable chest X-ray was organised and was shown in Figure 1. Blood investigations showed normochromic normocytic anaemia with a hemoglobin level of 8.8 gms/dl, white cell count of 3900 X10<sup>8</sup>/L (Neutrophils 450 X 10<sup>8</sup>/L), platelet count of 475 x 10<sup>8</sup>/L, ESR 78 mm/hr and CRP of 68 mg/L. The rest of the blood tests were unremarkable and subsequent blood culture showed no growth.



**FIGURE 1.**

The chest X-ray of the 18-month-old girl discussed above.

- A. Describe three (3) salient findings on this chest X-ray.
- B. What four (4) further investigations are warranted?
- C. List four (4) important modalities of treatment.

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## ANSWER AND DISCUSSION

### A. Chest X-ray Findings

1. Large homogenous, rounded opacity within a large cavity in the left lung, suggestive of a fungal ball. The fungal ball was composed of fungal hyphae, inflammatory cells, fibrin, mucus and amorphous debris within a pulmonary cavity<sup>[1,2]</sup>. The usual species of *Aspergillus* recovered from such lesions was *Aspergillus fumigatus*<sup>[3]</sup>. Longstanding tuberculosis (TB) was the most common underlying lung condition<sup>[1,3]</sup>. Other underlying 'cavitating' conditions, such as cystic fibrosis, necrotising infection and emphysematous bullae, may predispose to fungal ball formation within the cavity<sup>[4]</sup>.
2. Bilateral multiple pulmonary cavities with areas of consolidation and fibrosis.
3. Marked loss of subcutaneous fat. Malnutrition in TB may contribute to impaired immunity, predisposing to the development of invasive fungemia.

### B. Further Investigations

1. Microbiological examination of gastric washings obtained through a nasogastric tube and bronchial washing (bronchoalveolar lavage) for *Mycobacterium tuberculosis*. Both *Mycobacterium tuberculosis* and *Pneumocystis jiroveci* was considered given the ethnic origin of the patient and the presenting condition. The bronchial washing examined for *Pneumocystis jiroveci* and fungal spores. However, this child was systemically unwell and it was dangerous to wait for gastric washings or bronchoalveolar lavage, and empirical treatment started while the investigations were underway.
2. Computerised tomography (CT) chest scan was indicated to provide a more accurate picture of the extent of the disease, and multiple fungal balls in the other smaller cavities can be noticed. In addition, a CT scan demonstrated that the fungal ball was mobile inside the cavity by placing the patient in different positions during the scan. In addition, a CT scan may show features suggestive of invasive aspergillosis, which include the "halo sign" (area of ground glass surrounding a nodular opacity) or a crescent of air surrounding a nodule<sup>[1]</sup>.
3. Testing for HIV given the fact that patient coming from Africa
4. *Aspergillus* precipitin antibody test are usually positive with aspergilloma.

### C. Further Treatment Options

1. As the patient was very ill, empirical treatment with antitubercular therapy (ATT) was justified, although every attempt was made to obtain samples for confirmation of the diagnosis prior to initiating ATT therapy.
2. Antiretroviral therapy needs to be considered if found to be HIV positive. Treatment with antitubercular therapy should be adjusted accordingly.
3. Systemic antifungal agents like Voriconazole was considered to be the drug of choice, or IV liposomal amphotericin was used in case of invasive aspergillosis<sup>[1]</sup>. Oral itraconazole offered partial or complete resolution of aspergillomas in 60% of patients<sup>[1]</sup>. Importantly, CT scan guided intracavitary instillation of amphotericin alone or in combination with other drugs, has been used with success<sup>[5]</sup>. Specific treatment of aspergilloma was considered when a patient develops symptoms related to the fungal ball, such as haemoptysis, which may be life threatening. Surgical resection was curative if the patient has good lung function test and was deemed stable enough to withstand surgery<sup>[1,6]</sup>.

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