

interstitial pneumonitis leading to the development of spontaneous pneumomediastinum. Accompanying subcutaneous emphysema compresses the trachea and can worsen the respiratory condition and we experienced a similar complication in our case. Although mechanical ventilation may cause air leaks, including pneumomediastinum, continuing it and even escalating respiratory support may be necessary depending on the severity of the underlying respiratory distress and the degree of compromise caused by the air leak. Principle objectives include the use of the lowest pressures or tidal volumes necessary to achieve satisfactory carbon dioxide removal and oxygenation [3]. There are case reports of use of high frequency oscillatory ventilation in pneumomediastinum, especially when it is associated with ARDS. However, further research is needed to support these findings [4].

Surgical intervention has rarely been described in pneumomediastinum. Its use is reserved for pneumomediastinum leading to marked cardio-respiratory compromise. Cervical mediastinotomy with or without tracheostomy is life saving in these cases [5]. We found tracheostomy to be useful in our condition.

To conclude, H1N1 infection can give rise to an unusual air leak syndrome like spontaneous

pneumomediastinum and subcutaneous emphysema in children. If required, tracheostomy is helpful.

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## Partial Extensively Drug Resistance (XDR) Tuberculosis in Children

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Emergence of resistance to two most potent first line anti-TB drugs i.e. isoniazid and rifampicin (multidrug resistant TB – MDR TB) is well known, but, the second line drugs used to treat MDR-TB are also showing resistance to the same strain of *Mycobacteria* (extensively drug resistance TB, XDR-TB). We report 3 children with partial XDR TB. Two responded to treatment while one was lost to follow-up.

**Key words:** *Children, India, Treatment, XDR-TB.*

**M**ultidrug-resistant tuberculosis (MDR-TB) is defined as TB caused by organisms that are resistant to isoniazid and rifampicin, two first-line anti-TB drugs. The emergence of extensively drug-resistant TB (XDR-TB), defined as MDR-TB that is also resistant to any one of the fluoroquinolones and to at least one of three injectable

second-line drugs (amikacin, capreomycin or kanamycin), has been identified in all regions of the world since 2006. Treatment outcomes are significantly worse in XDR-TB patients than in MDR-TB patients [1,2]. There is no term currently to identify drug resistant TB with either fluoroquinolone resistance or aminoglycoside resistance. Hence we have coined a term as partial XDR TB for these

## CASE REPORTS

patients. The prevalence of XDR TB in Indian adults has been reported to be 2.4% among those with drug resistant TB [3].

### CASE REPORT

**Case 1:** A 2½-years old girl presented in July 2007 with swelling over left foot associated with non foul smelling discharge, cough and fever for 1 month. She also had loss of appetite and loss of weight. For these complaints, the child showed to a physician who started her on 4 drugs anti tuberculous therapy (ATT) consisting of isoniazid (H), rifampicin (R), ethambutol (E) and pyrazinamide (Z) but there was no improvement and she was referred to us. On examination, her weight was 9.5 kg ( $z$  score = -2), height was 78 cm ( $z$  score = -3), she had matted cervical lymphnodes and discharging sinus over left foot. There was decreased air entry in left infra-axillary and infrascapular region with bronchial breathing and hepatosplenomegaly. Other systems were normal. Mantoux test was positive. Sputum for acid fast bacillus (AFB) was negative on smear. Her X-ray of the feet showed osteomyelitis of left fibula, left talus, left 5th metatarsal and right 5th metatarsal. X-ray spine was normal. CSF examination was normal. Pus from left foot showed AFB on smear. She was started on 6 drugs ATT consisting of HRZE, streptomycin (S) and ciprofloxacin (C) pending her culture and sensitivity report. After one month of 6 drug ATT, her fever persisted, she had loss of weight to 7.9 kg and she developed a gibbus. X-ray spine showed vertebral collapse at T<sub>4</sub>-T<sub>5</sub> level. There was no neurological deficit. TB culture sensitivity showed resistance to all first line drugs (HRZES) and to ofloxacin. The child was thus started on ATT consisting of amikacin, ethionamide, PAS and moxifloxacin. However, in December 2007, she had still not gained weight, though her fever had subsided and she was able to stand without support and walk with support. Her MRI spine showed destruction of T<sub>4</sub> vertebral body with gibbus formation at T<sub>4</sub>-T<sub>5</sub> level and collapse and destruction of L<sub>5</sub> vertebral body and large prevertebral, paravertebral and anterior epidural abscess. Amikacin was stopped by the patient in Dec 2007 due to pain on injecting. The psoas abscess was drained and sent for culture and sensitivity in Jan 2008. Her culture still grew *M.tuberculosis* which was resistant to HRZESO. The child was subsequently started on injection kanamycin, linezolid, prothionamide, clofazimine and cycloserine to which she responded and had a weight gain of 2 kg. In September 2008, her MRI spine showed healing at T<sub>4</sub>-T<sub>5</sub> vertebra with reduction in kyphoid deformity. There was no healing at L<sub>4</sub>-L<sub>5</sub> level. She was advised to continue same drugs. Subsequently the child was lost to follow-up.

**Case 2:** A 6-year old girl presented with fever and cough for 2 months. On examination, she was malnourished with a weight of 13 kg ( $z$  score = 0 to 2) and height 106 cm ( $z$  score >3). She had bilateral inguinal adenopathy with left sided otorrhea, and hepatomegaly. Auscultation revealed decreased air-entry on left side with bilateral crepitations. There was no shift of mediastinum. CT chest showed cavity and consolidation in left lower lobe with confluent centrilobular nodules in left upper lobe and lingula. Her sputum culture report showed resistance to H,R,E,S and O. She was treated with Z, amikacin, moxifloxacin, PAS and ethionamide. The patient was asymptomatic till one month when she developed cervical adenopathy with parotid enlargement that responded to non-steroidal anti-inflammatory medicines (NSAIDS). Her chest X-ray showed improvement in the consolidation. By 3 months of therapy, she had no sputum production, her weight had increased to 17 kg. However, at end of 5 months of therapy, she was detected to have bilateral moderate to severe mixed hearing loss at high frequency on audiological evaluation and thus amikacin was omitted. Her remaining ATT were continued and regular screening for adverse effects was done. She is on regular follow up. She underwent left lower lobe lobectomy after 15 months of this therapy and culture from the specimen did not show any growth of acid fast bacillus. The remaining drugs are still being continued.

**Case 3:** A 9½-year old boy presented with dry cough and evening rise of fever with abdominal pain for 1 month. He also had decreased appetite and was not gaining weight. On examination his weight was 20 kg and height was 126.0 cm. He had generalized non significant cervical, inguinal and axillary lymph nodes. Systemic examination was normal and mantoux was positive (12 × 12mm). Chest X-ray was normal. Ultrasound of abdomen showed mild hepatomegaly with multiple enlarged mesenteric lymphnodes in right paraumbilical and umbilical regions measuring 7 mm in short axis. He was started on 4 drug ATT with HRZE, which was shifted to consolidation phase of 2 drug ATT after 2 months. He was asymptomatic on follow up and at the end of 9 months of therapy gained 3 kg. However, his ultrasound abdomen showed persistence of lymphnodes and increase in size to 11.2 mm. Thus he was continued on ATT for a longer duration and was stopped after total duration of 10 months. A repeat ultrasound had shown decrease in size of node to 0.5 cm. After 3 months, child again presented with cough for 1 week and abdominal pain. CT abdomen showed 1.3 cm nodes in mesentery, paracaval regions with central hypodense areas. At the same time, parents informed that the grandmother had died due to TB 6 months ago. Thus, he was suspected to have drug resistant TB. Child

underwent abdominal lymphnode biopsy and was started on category 2 of ATT regimen as per WHO consisting of HRZES. Culture after 6 weeks grew *M. tuberculosis* complex resistant to HRZES, ofloxacin and moxifloxacin., Treatment was started with PAS, amikacin, ethionamide and gatifloxacin. Child had currently completed 15 months of this second line therapy (gatifloxacin was stopped after one year) and asymptomatic. His ultrasound shows complete regression of lymphnodes.

#### DISCUSSION

Patients with XDR-TB have poor outcomes, prolonged infectious periods and limited treatment options. Childhood TB is usually a paucibacillary TB, thus making the acquisition of drug resistance in previously treated patient less likely, unless the child has been infected by a resistant strain. In our patients, two had contact with an adult suffering from TB who had died. Two of the patients had been on ATT for a year but had no improvement on their therapy suggesting that failure to respond to standard ATT therapy or contact with suspected drug resistance should be considered as a clue to suspect drug resistance in the child.

In all our patients, we documented drug resistance based on the culture of *M. tuberculosis*. This becomes essential as diagnosis of drug resistant TB is difficult in children and prognosis is guarded. In these patients, it is

prudent to label it as a partial XDR TB as the resistance pattern is mid-way between MDR-TB and XDR-TB. It is feasible to classify different type of tuberculosis in children in different pattern of resistance for future prognosis and treatment. Although treatment success rates of 40% to 80% have been observed in a number of settings, this remains lower than the 85% to 99% cure rates achievable for drug-susceptible TB [4].

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