Spontaneous pneumothoraces complicating acute miliary tuberculosis in a child having recent coronavirus disease 2019

An 8-year-old boy was admitted, in August 2020, during the ongoing coronavirus disease 2019 (COVID-19) pandemic, with chronic complaints of intermittent mild-to-moderate fever, anorexia, and worsening dry cough, since the last few weeks. On examination, the patient was irritable and in a state of acute respiratory failure – pulse 160 beats/min, respiratory rate 68/min, blood pressure 77/35 mm Hg, SpO2 75% (on room air) with poorly felt peripheral pulses and cold extremities. He was mildly anemic (Hb 10 g/dL) and severely wasted (BMI-for-age z-score below -3, as per standard WHO Child Growth Standards). Bilateral matted cervical and axillary lymphadenopathy was present. Chest examination revealed severe suprasternal, intercostal, and subcostal retractions; and bilateral scattered crepitations. All other systems examination was normal. The patient was mechanically ventilated and started on intravenous resuscitation fluids and broad-spectrum antibiotics.

Chest radiograph indicated miliary tuberculosis [Figure 1]. Xpert MTB/RIF assay of gastric lavage sample detected Mycobacterium tuberculosis complex (MTBC) and sensitivity to rifampicin (RIF). Fundus examination revealed choroid tubercles in the left eye. Computed tomography scan brain (plain) showed a mild communicating hydrocephalus with minimal periventricular ooze. The patient’s mother had been detected to have pulmonary tuberculosis 1 year ago and had completed 6-months antituberculosis therapy (ATT). Fine-needle aspiration cytology of cervical lymph node revealed caseous necrosis against a background of few reactive lymphocytes. The patient was started on standard first-line ATT (INH + RMP + PZA + ETB) and oral prednisolone. He was extubated after 72 h, continued on oxygen (3 L/min) with face mask and oral nutritional rehabilitation therapy was started.

The rRT-PCR (real-time reverse transcriptase polymerase chain reaction) test of patient’s nasopharyngeal swab ruled out acute COVID-19 infection. However, blood sample for anti-SARS-CoV-2 IgG antibodies was 4.68 S/CO (non-reactive <1.0), indicating seroconversion due to past exposure.

On the 14th day of hospitalization, the patient developed sudden respiratory distress. On auscultation, there was no air entry in the left lung field. Chest radiograph revealed a left-sided tension pneumothorax [Figure 2a]. An intercostal drain was inserted and the patient’s clinical condition was stabilized. On the 40th day of hospitalization, the patient again developed acute respiratory distress and chest radiograph revealed a right-sided tension pneumothorax [Figure 2b], for which another intercostal drain was inserted [Figure 2c]. By the 60th day of hospitalization, both intercostal drains could be removed [Figure 2d]. Further clinical course of the patient was uneventful. He was afebrile and had started gaining weight. Oxygen administration with face mask had been gradually tapered off.

On the 80th day of hospitalization, a high-resolution chest tomogram (HRCT) was done which revealed miliary tuberculosis and a loculated pneumothorax [Figure 3]. Multiple partly calcified lymph nodes in both hilar, paratracheal, and subcarinal regions were noted on the HRCT, but are not shown. After 84 days of hospitalization, the patient was discharged. He was advised to complete the ATT regimen and to follow up after 2 weeks.

The present case had rare features, which has made us report it. Children with miliary tuberculosis very rarely present with acute respiratory failure.[1] Also, spontaneous pneumothorax (“non-traumatic”) has seldom been reported in children having miliary tuberculosis.[2-4] The probable mechanism of spontaneous pneumothorax in miliary tuberculosis is rupture of confluent sub-pleural miliary nodules secondary to caseation and necrosis, or rupture of a bullous lesion developed near miliary tubercles.[2-4] This rare potentially life-threatening complication should be suspected in any child (from infancy to adolescence) with miliary tuberculosis who suddenly develops increasing dyspnea.[2-5] Physicians should be aware that this complication: (i) may be seen not only on admission[1,4], soon after beginning of ATT[2-4] (as in the present case), but also several months later during the course of ATT[3] and (ii) can also recur in the patient after a gap of few days or weeks.[2-5]

Figure 1: Chest radiograph showing multiple discrete miliary deposits scattered in both lung fields mixed with consolidation or ground-glass opacities
Since early 2020, the COVID-19 pandemic has commenced in India. A case series from China has reported that spontaneous pneumothorax can occur in 1% of adult patients due to COVID-19 disease.\(^6\) Although the exact time point cannot be ascribed; the present case had suffered from COVID-19 infection in the last few weeks. It has been postulated that multiple bullae in the subpleural lung zones can develop where pneumonic consolidation occurs in COVID-19 disease, which could rupture and cause a spontaneous pneumothorax.\(^7\) We postulate that the recent COVID-19 infection in the present case might have further predisposed him to develop spontaneous pneumothoraces.

Declaration of patient consent
The authors certify that appropriate patient consent was obtained.

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Conflict of interest
Dr. Sunil Karande is the Editor of the Journal of Postgraduate Medicine.

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