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**CASE REPORT**

# Influenza B Pneumonia with Pneumomediastinum, Subcutaneous Emphysema and Encephalitis. A Rare Presentation

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## Abstract

Children under the age of five are more vulnerable to influenza because they are an immunologically naïve population. When treating a child with viral pneumonia, severe consequences after an influenza infection must be considered. Here we are reporting a case series of 2 atypical severe influenza B pneumonia cases in children complicated with necrotising pneumonia, pneumothorax, and encephalitis.

**Keywords:** Viral pneumonia, Influenza, Pneumothorax, Viral encephalitis

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## Introduction

Globally, influenza poses a serious risk to public health [1-3]. Children have a higher risk of infection. The influenza viruses are single-stranded RNA viruses that are part of the Orthomyxoviridae family [1,4,5]. The influenza B (IFB) virus changes its antigens through genetic reassortment and antigen drift caused by mutations that have built up over time [4,5].

## Case 1

We are reporting a 2-year-old male child, developmentally normal for age, with uneventful antenatal, natal, and postnatal histories, immunised for age, who was admitted in November 2023 with complaints of fever for the initial 3 days, cough for 9 days, and tachypnea for 7 days, for which the child visited a local practitioner, where he was told about an air leak in the pleural cavity and an intercostal tube was placed. He later developed gastrointestinal subcutaneous emphysema. At presentation, the child had tachycardia, increased respiratory rate, and tense swelling around the eyes, neck, face, chest, abdomen, and scrotum, with crepitations felt on palpation. Routine investigations were suggested: Hb 9.78 g/dl, TLC 6800 cells/mm3, DLC N34L57, and platelet count of 62000/uL, s. creatinine 0.26, SGOT 89, SGPT 23, s. bilirubin 0.44, CRP negative, and left-sided pneumothorax were confirmed on ultrasonography. The child was managed on supportive measures, oxygen supplementation by mask, IV fluids, and IV antibiotics. The antibiotics were upgraded on subsequent days in view of fever and increased oxygen requirement to meropenem, clindamycin, and azithromycin. Blood cultures were drawn and a nasopharyngeal swab for respiratory viruses was sent. The child showed no improvement in subcutaneous emphysema, pneumomediastinum, and pneumoscrotum and continued to have fever and dependence on oxygen. The child's respiratory virus swab turned positive for influenza B virus, and oseltamivir was started for the same. In view of persistent fever episodes, pleural fluid cultures were drawn suspecting secondary bacterial infection, which showed pan-resistant Acinetobacter baumanii growth, and antibiotics were upgraded to colistin. Streptokinase was administered on day 20 of the hospital stay, and HRCT thorax was done, which showed left-sided hydropneumothorax with fibrocavitatory changes in the left lower lobe and diffuse fibrotic bands with areas of bronchiectasis in bilateral lungs. The patient's fever gradually responded; therefore, the ICD tube was clamped and subsequently removed. A diagnosis of **post-influenza necrotising pneumonia with pneumomediastinum** was made, and the patient was successfully discharged after 1 month of hospital stay.

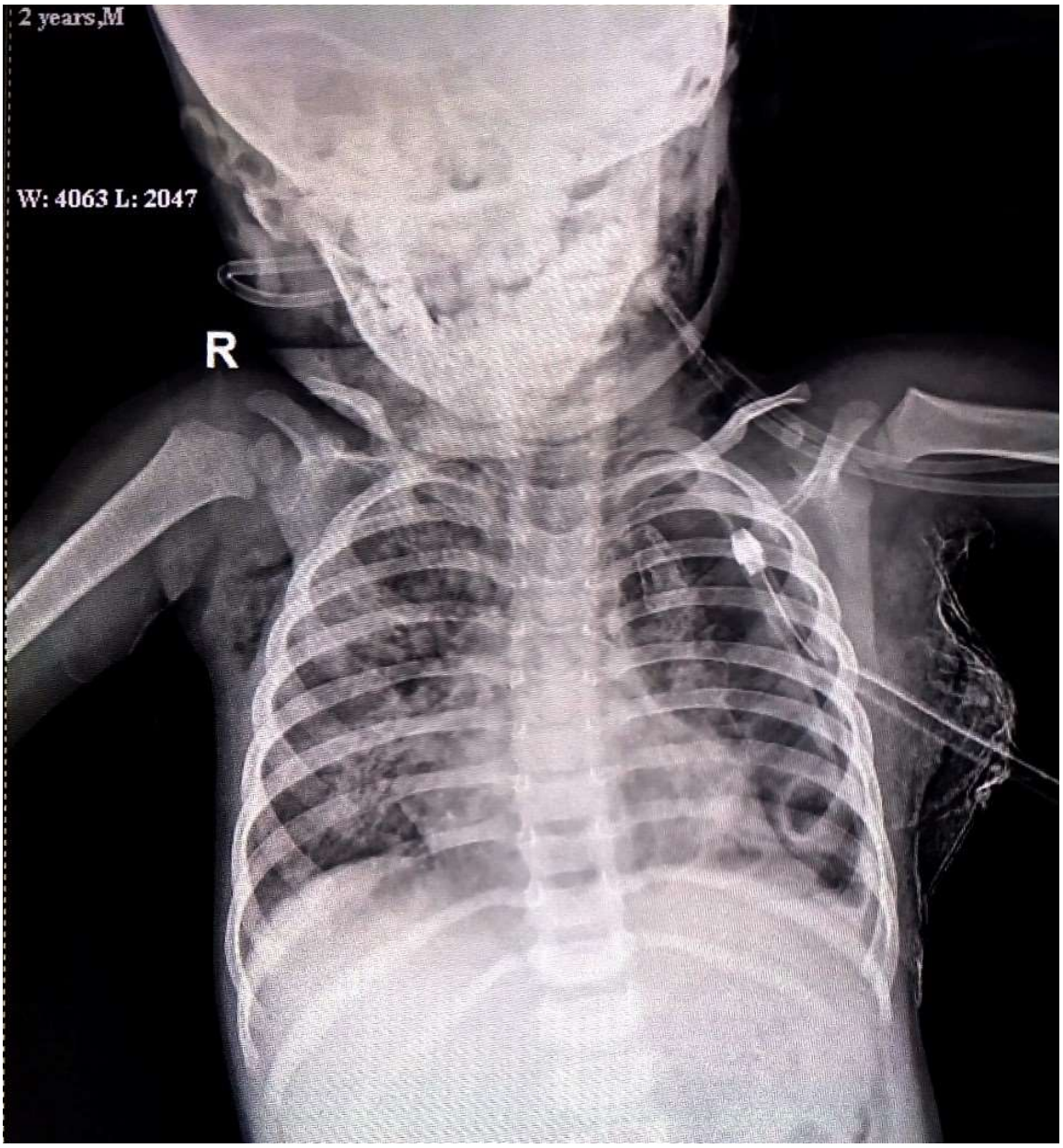


Figure 1. Chest X ray AP view at presentation to the hospital showing subcutaneous emphysema, bilateral nodular opacities and cystic changes in the lung field specially in the left lung with intercoastal drainage tube in the left pleural cavity

**Case 2**

A 6-year-old female child, developmentally normal for her age without any previous history of hospitalisation, immunised for age as per the national immunisation schedule developed fever and pain in the abdomen for 10 days, for which she consulted a local practitioner. Later, the symptoms worsened, and she developed difficulty breathing for 4 days and altered sensorium subsequently when she was referred to a tertiary care center. The child arrived with a gasping pattern of respiration and poor GCS and therefore was immediately

intubated and ventilated on SIMV mode of ventilation. On detailed examination, she had nasal flaring, intercostal and subcostal retractions, and decreased air entry in bilateral lung fields. Neurological examination revealed a GCS of E1VTM1, brisk DTR's, and planter reflex extensor with no signs of meningeal irritation. The child was managed as per acute encephalitis on IV antibiotics, IV fluids, IV antiepileptics, and other supportive measures. Chest radiography showed bilateral infiltrates and patchy areas of consolidation P:F ratio of 54, denoting hypoxaemia, thus falling into the classification of severe ARDS. Ventilator settings and pressures were upgraded in view of severe hypoxaemia, and the child subsequently developed pneumothorax and subcutaneous emphysema. Routine investigations and swabs for respiratory viruses and IgM mycoplasma were suspected and sent based on x-ray findings and rapid progress of symptoms. The child's shock worsened and progressed towards acute renal failure and developed pulmonary bleed, which was managed by upgrading vasopressors. By the 3rd day of hospital stay, she developed ventricular tachycardia; myocarditis was suspected, and DC cardioversion was tried, but the child could not be saved. She later turned positive for the influenza B virus.

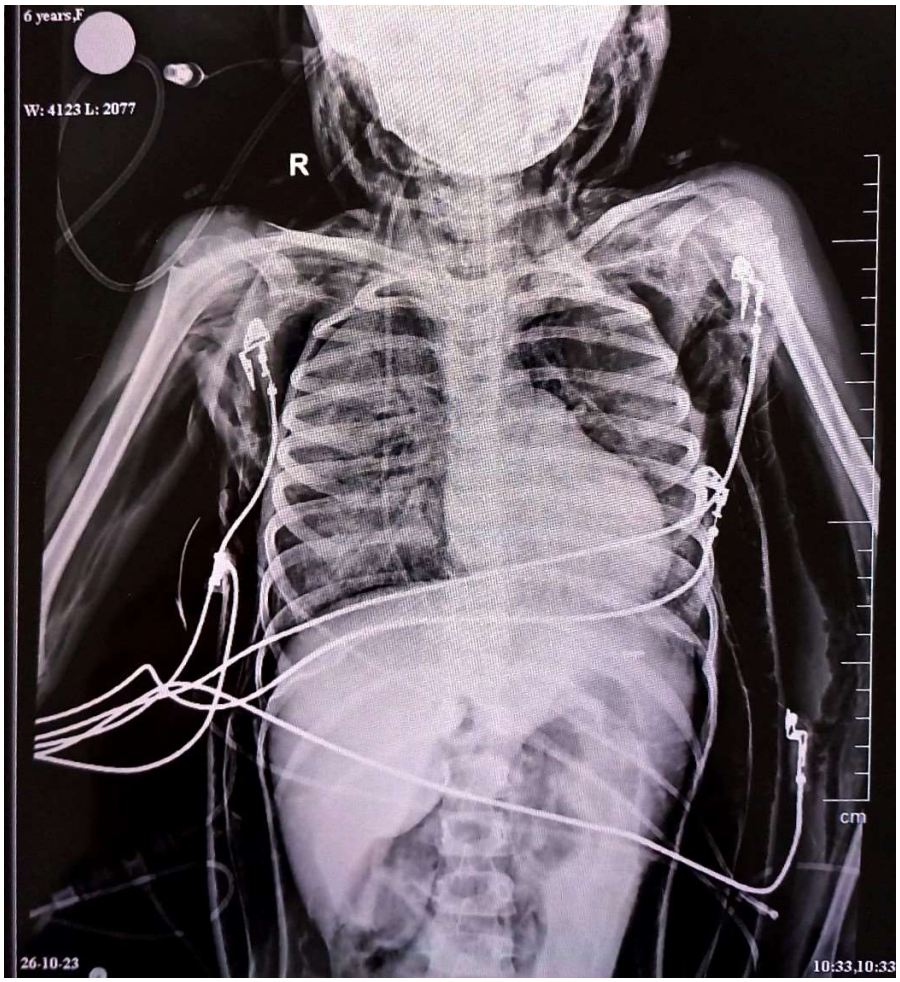


Figure 2. Chest X ray AP view at presentation to the hospital showing bilateral homogeneous opacities in the lung field.

## Discussion

Influenza is among the most prevalent infectious respiratory conditions. Globally, the severity of the disease was higher in young children exposed to influenza B (IFB) than in adults [6–10].

According to an Indian study, 78.5% of children with IFB had upper respiratory tract infections, 19.6% had pneumonia, and 1.7% had severe pneumonia [9]. As highlighted in our first case, in which a 2-year-old boy developed severe influenza B pneumonia with spontaneous pneumothorax, an Indian study revealed that influenza-associated mortality was high in both the elderly population and children under the age of five [7]. Other studies have also reported the predominance of males in IFB illness [11-16]. Children under the age of five had a greater hospitalisation rate (82.9%), according to a similar case reported by Eski et al. [17]. Compared to other age groups (36.4%), children ≤ 2 years old had the greatest correlation between hospitalisation and age (63.6%). We here in our case series are emphasising the severity of influenza B infection to an extent of spontaneous pneumothorax, as was reported in a 17-day-old neonate admitted for neonatal sepsis since day 1 of life who developed worsening after acquiring influenza B pneumonia with spontaneous pneumothorax by van den Dungen et al. [18]. Antivirals help in decreasing the severity of illness and hospitalisation, as in our case, where the child improved clinically and was discharged.

Gastrointestinal complaints like abdominal pain, vomiting and diarrhea in IFB-positive children were observed by Lennon *et al.* [13], similar to our second case, who presented with fever and gastrointestinal symptoms initially. Later on, she experienced respiratory distress and encephalitis. McCullers et al. [19] reported a strikingly similar case of a 6-year-old child who had acute IFB viral encephalitis with neurological sequelae. Encephalitis is a rare manifestation of IFB. A 10-year-old child was reported to have IFB-associated encephalitis, severe weakness, and an oseltamivir response by Straumanis et al. [20]. Based on the x-ray picture, the child was evaluated and turned out to be influenza B positive but developed clinical worsening in a day and spontaneous pneumothorax with subcutaneous emphysema, as seen in our first case. This child also developed features of myocarditis and died of ventricular tachycardia. Research by Paddock C.D. et al. [21] found pathologic evidence of myocardial injury in 69% of case patients for whom cardiac tissue samples were available for analysis, primarily in fatal influenza B case patients under the age of 18 years.

## Conclusion

When treating a child who has viral pneumonia with altered sensorium, especially in young children, it is important to consider the serious complications that may follow an influenza infection. Effective vaccinations are available for children beyond six months of age. Children respond well to the antiviral medication oseltamivir, especially when it comes to lowering the duration of symptoms, viral shedding, and secondary complications associated. Children are recommended to receive the quadrivalent flu vaccine, which contains the IFB strain.

## Statements and Declarations

### Conflicts of interest

The authors declare that they do not have conflict of interest.

### Funding

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