Case Report

Severe Tracheobronchitis associated with Disseminated Varicella in an Immunocompromised Child

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ABSTRACT
Childhood chickenpox is usually a benign infection with mortality rate in healthy children aged 1-14 years is around 2 deaths per 100,000 cases. Among children with leukaemia mortality rate of varicella is up to 55%. We describe a 7-year-old child of acute lymphoblastic leukaemia presenting with disseminated varicella. This child was also found to have severe tracheobronchitis. Severe tracheobronchitis is rare however, an important complication. It needs to be recognized early as it has the potential to alter the course, duration, therapy and outcome of these cases.

Key Words: Tracheobronchitis; Disseminated Varicella; Immunocompromised

Introduction
Childhood chickenpox is usually a benign infection with classical clinical presentation of fever and rash. The mortality rate in healthy children aged 1-14 years is around 2 deaths per 100,000 cases. However, varicella infection can be life threatening in immunocompromised patients. Among children with leukaemia, the reported mortality rate of varicella is 7%, increasing up to 55% in cases with visceral involvement. We report a case of disseminated varicella in a child of acute lymphoblastic leukaemia complicated by severe tracheobronchitis.

Case report
A 7-year-old male child was diagnosed with ALL one and half years back. He received chemotherapy from a pediatric oncology centre and currently was on maintenance
chemotherapy. The child presented with high-grade fever, maculopapular rash for past 4 days and fast breathing for last 2 days. He was diagnosed as disseminated varicella on clinical grounds at primary centre and received injection meropenem, vancomycin, acyclovir and human intravenous Immunoglobulin (IVIG). The child continued to deteriorate and was subsequently referred to our centre after 48 hours. At arrival, he had heart rate 190/minute, respiratory rate 70/minute with severe retractions and oxygen saturation 70% on 15L/min of oxygen with non-rebreathing mask. His whole body including mucous membranes had pleomorphic rash. His peripheral pulses was palpable and blood pressure was 130/70mmHg. Child immediately intubated and started on mechanical ventilation on pressure regulated volume control mode with peak end expiratory pressure (PEEP) of 10 and fractional inspired oxygen FiO₂ of 100%. Initial arterial blood gas revealed PO₂ 60 and PCO₂ 63mmHg. Same antibiotics and antiviral were continued. Investigations revealed haemoglobin (Hb) 11.3-gram percentage, Total leucocyte count (TLC) 700/mm³, absolute neutrophil count (ANC) 56/mm³ and platelet count 27 X 10³/mm³. Renal function, liver function and coagulation profile were normal. Chest radiograph revealed bilateral dense consolidation with air bronchogram. Over the next 12 hours ventilator settings increased to (FiO₂ 100%, PEEP 12) and he required inotropic support as well (dopamine and epinephrine at 10mcg/kg/min and 0.3mcg/kg/min respectively). Injection fluconazole and Granulocyte-colony stimulating factor were added. Over the next 2 days fever spikes declined, ventilator setting decreased (FiO₂ 50%, PEEP 8) and inotropes tapered. His TLC, ANC and platelet count improved to 2600/mm³, 600mm³ and 27000/mm³. However at 96 hours, he had second worsening and required increased ventilator support (FiO₂ 70%, PEEP 11). Consequently, injection colistin and IVIG were given. He showed gradual improvement and was extubated on day 8. However, had to be reintubated after 4 hours in view of worsening respiratory distress and desaturation. There was no stridor and fever; TLC, platelet count and chest-X ray showed marked improvement. He was stable on continuous positive pressure with pressure support (CPAP-PS). Child failed extubation again on day 10. On examination, he had hoarseness of voice, cyanotic spell and bradycardia managed by bag and mask ventilation for 2 minutes. Eventually, child was intubated again after second such episode. Bronchoscopy revealed severe tracheobronchitis. [Figure 1] The visualized lesions in tracheobronchial tree looked like lesion on skin and mucous membrane; however, we could not isolate the virus in bronchoalveolar lavage (BAL). Child underwent tracheostomy placement on day 12. Next day, mechanical ventilation was weaned off. BAL revealed growth of Acinetobacter junii. Aerosolized colistin was started and after completing 3 weeks of antibiotic therapy, we discharged him on day 25 with tracheostomy tube in situ. In follow up after 3 months tracheostomy tube was decannulated.
Figure 1: Bronchoscopic snapshot showing severe tracheobronchitis with mucosal inflammation

Discussion

Immunocompromised children can have disseminated varicella, which is a life threatening entity. The lungs, liver, brain and heart are usually involved in progressive varicella. Respiratory involvement can be because of secondary bacterial invasion or from direct viral infection. Respiratory failure and death from varicella dissemination is usually due to interstitial pneumonia. In addition, this may be unresponsive to antiviral therapy. Acyclovir is highly active against varicella virus and early treatment can prevent dissemination and progression of disease. However, in our case despite treatment with acyclovir and IVIG the varicella infection rapidly progressed to severe ARDS requiring aggressive mechanical respiratory support. Another peculiar finding in this case was tracheobronchitis. Although autopsy findings in children with cancer and disseminated varicella had shown necrotizing bronchitis/bronchiolitis with demonstration of inclusion bodies in lining epithelium², there are no reports of varicella tracheobronchitis in literature. Acinetobacter baumannii is one of the commonest organism responsible for ventricular associated tracheobronchitis (VAT). In our case, tracheobronchitis may be due to varicella virus itself or due to secondary VAT or a combination of both. Nevertheless, it prolonged ventilation days, PICU stay, hospitalization days and cost in this case.

Conclusion

Disseminated varicella especially in cancer patients continues to be a challenge for the intensive care team. Severe tracheobronchitis is rare however, an important complication. It needs to be recognized early as it has the potential to alter the course, duration, therapy and outcome of these cases.

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References