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Diffuse Alveolar Hemorrhage in the Setting of Adenoviral Infection in an Immunocompetent Child

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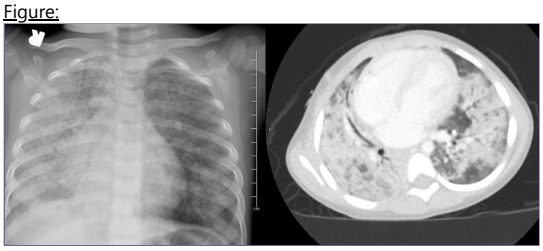
Abstract:
Introduction:
Diffuse alveolar hemorrhage (DAH) is a rare condition that can result from different etiologies. DAH has been associated with adenovirus infection in immunocompromised patients[1]. Acute DAH can be mitigated and recurrences of DAH can be prevented after systemic corticosteroid pulses[2]. Use of intravenous immunoglobulin (IVIG) has been attempted with variable reported results[2].
Case:
A 4 year old female was admitted to an outside hospital with a 1 day history of nasal congestion, cough, and increased work of breathing. Past history was significant for pulmonary tuberculosis at 2 years of age, which was treated per the family. Chest x-ray and computed tomography scan of the chest demonstrated patchy asymmetric alveolar opacities with prominent lung interstitium (Figure). Her hemoglobin was 2.4 grams/deciliter, for which she was given packed red blood cell transfusions (14 total during this illness).
Upon transfer to our institution, the exam was notable for tachypnea, accessory muscle use, and right lower lobe crackles without wheezes. She was intubated due to respiratory deterioration and bloody secretions were discovered. She required escalating positive end expiratory pressure (maximum 16 centimeters of water) to maintain oxygenation. Her lowest ratio of partial pressure of arterial oxygen to fractional inspired oxygen was 90 with an oxygenation index of 25.3. Respiratory viral polymerase chain reaction testing was adenovirus positive. Coagulation studies and echocardiogram were normal. An interferon gamma release assay for tuberculosis was not performed, but two respiratory acid-fast bacilli cultures (including one taken via deep endotracheal suctioning) were negative.
She completed a ceftriaxone course for empiric bacterial pneumonia coverage. She received two weekly 5 milligram/kilogram doses of cidofovir and three daily intravenous 30 milligram/kilogram methylprednisolone pulses. Her bloody secretions resolved, she was extubated, and she was discharged on room air 1 month after admission. She received a second course of intravenous methylprednisolone pulses and IVIG before discharge.
Discussion:
We report a rare case of diffuse alveolar hemorrhage in the setting of adenovirus respiratory infection in an immunocompetent patient. Though she clinically improved, we initiated monthly intravenous corticosteroid pulses and IVIG for a minimum of 12 months to prevent recurrence. This case is important because of the rare presentation with clinical improvement after administration of cidofovir and systemic corticosteroids.
References:
1) Von Ranke FM, et al. Infectious diseases causing diffuse alveolar hemorrhage in immunocompetent patients: a state-of-the-art review. *Lung.* 2013;191(1):9-18.
2) Schwarz MI, Brown KK. Small vessel vasculitis of the lung. *Thorax.* 2000;55:502-510.
Figure:



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