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A Case Report of Necrotizing Pneumonia in a Child with Human Metapneumovirus

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ABSTRACT

Background and Objective: Human metapneumovirus (HMPV) is a respiratory pathogen that causes lower respiratory tract infections in both children and adults. Necrotizing pneumonia rarely occurs in children; however, it may be associated with significant complications. The aim of the present study is to report a case of necrotizing pneumonia in a child with human metapneumovirus.

Case Report: The patient was a 1-year-and-11-month-old girl who was admitted with complaints of fever, lethargy, and cough that had begun 2 weeks before presentation. On examination, she exhibited respiratory distress. Spiral CT scan of the lung revealed severe subcutaneous emphysema in the soft tissue of the neck, the right hemithorax wall, and the right upper limb, as well as emphysema in the deep spaces of the neck and mediastinum, accompanied by bronchiectatic and cavitary changes suggestive of necrotizing pneumonia. A nasopharyngeal sample tested positive for human metapneumovirus. Due to the lack of clinical response, the patient was scheduled for thoracotomy; purulent fluid containing debris was suctioned from within the pleural sac, the peel around the lung was released, adhesions to the diaphragm were separated, lung decortication was performed, and a bilateral chest tube was inserted. One week after surgery, given the patient's appropriate clinical response, resolution of fever, and resolution of respiratory distress, the chest tube was removed, and she was discharged with oral antibiotics.

Conclusion: According to the findings of this reported case, clinical suspicion of necrotizing pneumonia should be considered in patients with human metapneumovirus who do not respond to supportive therapies.

Keywords: *Human Metapneumovirus, Necrotizing Pneumonia, Children.*

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Introduction

Human metapneumovirus (HMPV) is an RNA virus from the Paramyxoviridae family that was first identified in 2001 and is one of the causes of respiratory infections in children. In addition to children, this virus is also a cause of respiratory infections in the elderly and adults. It has been reported that in the United States, HMPV is the fourth most common cause of community-acquired pneumonia in adults leading to hospitalization. The mortality rate in patients with HMPV requiring hospitalization is 4-8% (1).

Necrotizing pneumonia rarely occurs in children but may be associated with significant complications. If appropriate treatment is not administered, necrotizing pneumonia may lead to complications including bronchopleural fistula, empyema, respiratory failure, and septic shock (2). Staphylococcus aureus is the most common causative agent, followed by Streptococcus pneumoniae, and pneumonia is one of the common invasive infections leading to hospitalization in children, as well as a cause of mortality in children. Antimicrobial therapy is the cornerstone of necrotizing pneumonia management, but surgical drainage may be required in some cases (3). Some previous reports have identified underlying lung disease and immune system deficiency as risk factors leading to hospitalization in children with HMPV. Kawataki et al. reported a 44-year-old woman with lobar pneumonia in the context of HMPV (4). In 2024, Dhariwal reported a case of an 8-year-old boy with HMPV and acute hemorrhagic edema, suggesting a rare association between the two (5). Given the rarity of such clinical manifestations in patients with HMPV, we report a child with HMPV and necrotizing pneumonia.

Case Report

This study was approved by the Ethics Committee of Zahedan University of Medical Sciences under code IR.ZAUMS.REC.1403.479. The patient was a 1-year-and-11-month-old girl, a resident of Chabahar, who was admitted with complaints of fever, lethargy, and cough starting 2 weeks before presentation. She had been hospitalized for 3 days at another center in Chabahar and had received antibiotic treatment but showed no improvement, after which she presented to the emergency department of Ali Ibn Abi Taleb Hospital in Zahedan. The patient was the third child of the family. She had no history of previous hospitalization, and her vaccination was complete. She was breastfed and had been consuming table food since the age of 1 year. She had not taken vitamin and iron supplements properly. In the patient's family history, her 4-year-old sister had similar respiratory symptoms that improved with outpatient treatment. On admission, she was conscious but febrile and restless on examination. Body temperature was 38.5 °C, blood pressure was 100/65 mmHg, respiratory rate was 50 per minute, heart rate was 115 beats per minute, and oxygen saturation in room air was 89% (SpO2=89%). Ear, nose, and throat examination was normal. In the respiratory system, she used accessory respiratory muscles and had tachypnea. Cardiac auscultation was normal, and lung auscultation revealed rales and decreased breath sounds on the right side. Abdominal and extremity examinations were normal.

Laboratory tests revealed an elevated white blood cell count (16.5/µL) with neutrophil predominance (77%), hemoglobin of 7.3 g/dL (microcytic hypochromic anemia), and an elevated platelet count (818,000). Serological tests showed elevated CRP (96 mg/L; normal: <3 mg/L) and elevated ESR (75 mm/h; standard: <10 mg/h). Liver function tests, including AST (33 U/L), ALT (19 U/L), and alkaline phosphatase (280 U/L), were normal. Other laboratory tests, including renal function tests, electrolytes, and coagulation tests, were normal. Blood culture and throat swab culture were reported as negative. A nasopharyngeal sample collected with a nasopharyngeal swab was sent for COVID-19 and influenza PCR, both of which were negative. Chest radiography revealed consolidation and pleural effusion on the right side, which was

confirmed on chest ultrasound, and the image showed moderate loculated septated pleural effusion in the right hemithorax (Figure 1). Antibiotic treatment with meropenem and vancomycin was initiated for the patient. A chest tube was inserted, and alteplase at a dose of 4 mg in 40 cc of normal saline was injected into the chest tube on 3 consecutive days.

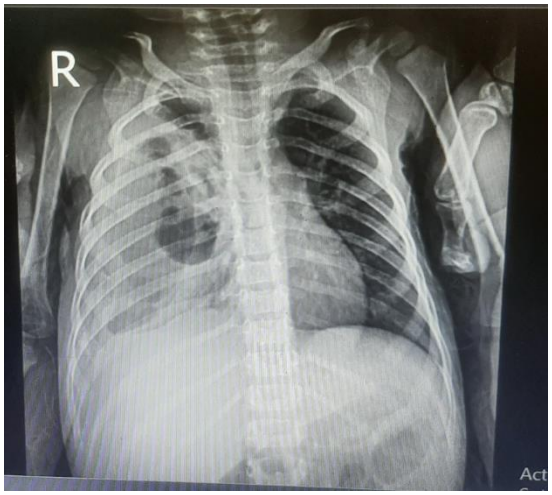


Figure 1. Chest radiography

Despite the therapeutic measures taken, no acceptable clinical response was observed in the patient. Fever and respiratory distress persisted, and the patient's respiratory distress even worsened. Spiral CT scan of the lung was performed for the patient. In the spiral CT scan of the lung without contrast, severe subcutaneous emphysema was observed in the soft tissue of the neck, the right hemithorax wall, and the right upper limb, as well as emphysema in the deep spaces of the neck and mediastinum, along with bronchiectasis and cavitary changes suggestive of necrotizing pneumonia (Figure 2).

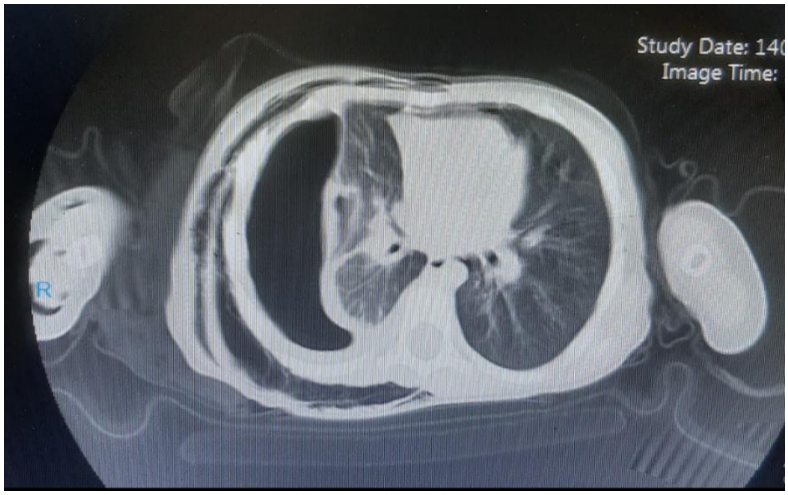


Figure 2. Non-contrast spiral computed tomography (CT) scan of the lung

A nasopharyngeal sample was sent for PCR testing for respiratory syncytial virus (RSV) and human metapneumovirus (HMPV), and tested positive for HMPV. The patient was also evaluated for congenital and acquired immunodeficiency (HIV), which was normal. A surgical consultation was requested for the

patient, and the patient was scheduled for thoracotomy; purulent fluid containing debris was suctioned from within the pleural sac, the peel around the lung was released, adhesions to the diaphragm were separated, lung decortication was performed, and a bilateral chest tube was inserted for the patient. The patient was transferred to the pediatric intensive care unit. One day after extubating, she was transferred to the pediatric ward. Antibiotic treatment was continued, and respiratory support was provided for the patient. One week after surgery, given the patient's appropriate clinical response, resolution of fever, and resolution of respiratory distress, the chest tube was removed, and she was discharged with oral antibiotics. The patient was followed up for 6 months and has had no problems to date.

Discussion

The present case report describes a case of necrotizing pneumonia caused by HMPV, which is a rare occurrence in a patient with HMPV. According to our knowledge, no case of HMPV infection leading to necrotizing pneumonia and empyema has been reported. Regarding the radiological findings of human metapneumovirus in pneumonia, Marinari et al. stated that the tree-in-bud pattern, peribronchial consolidation, and ground-glass opacities (GGO) have been reported in 68 to 77% of HMPV-related pneumonias (6). Karimata et al. also reported lobular nodules as common findings in lower respiratory tract infections caused by HMPV. In our patient, cavitary changes suggestive of necrotizing pneumonia were proposed (7).

Previous studies have shown that HMPV in practice causes ciliary destruction, intercellular edema, and neutrophil infiltration into the epithelium and submucosa, destruction of epithelial structures, and filling of alveoli with macrophages. Bacterial pneumonia following HMPV infection can be complicated by structural destruction of bronchioles and alveoli. In our patient, it is likely that bacterial pneumonia developed following these proposed injuries and structural destruction of bronchioles, leading to complication of the disease (8). Some previous reports have identified underlying lung disease and immune system deficiency as risk factors leading to hospitalization in children with HMPV; however, our patient had no underlying lung disease or congenital and acquired immune system deficiency (9). A retrospective study showed that most patients with severe HMPV had experienced chronic respiratory failure or immunodeficiency; however, younger patients without a history of immunodeficiency have also developed critical conditions and acute respiratory distress syndrome (10).

Kawataki et al. reported a 44-year-old woman with lobar pneumonia in the context of HMPV. The patient presented with fever, cough, and nausea. Computed tomography of the chest revealed scattered GGOs in the right upper lobe and infiltrative shadows with air bronchograms in the lingular and bilateral left lower lobes. A nasopharyngeal aspirate sample tested positive for HMPV (4). This patient, like our patient, did not have an immune system deficiency.

Dhariwal et al. reported a case of an 8-year-old boy with HMPV and acute hemorrhagic edema. The patient presented to the emergency department with fever, cough, and newly developed red macular skin lesions without discoloration, which were distributed across the face, neck, chest, abdomen, back, and legs and gradually increased in size during the course of the illness. Complete blood count showed neutrophilia with a normal leukocyte count. HMPV was detected in a nasopharyngeal aspirate sample, suggesting a rare association between the two conditions. This contributes to the understanding of HMPV as a potential infectious trigger in the pathophysiology of acute hemorrhagic edema (5). In 2025, Kongala et al. reported a woman with cardiomyopathy caused by HMPV infection, which is not a recognized complication of HMPV infection (11).

Pipitò et al. reported a 73-year-old HIV-positive man with multiple comorbidities, including insulin-dependent diabetes mellitus, who presented with fever, weakness, and glycemic-metabolic decompensation. Despite a chest CT scan that initially showed no specific findings, the patient developed progressive respiratory failure and required high-flow oxygen therapy. A nasopharyngeal aspirate sample tested positive for HMPV (12). However, unlike our patient, this patient had underlying immunodeficiency, which increases the risk of complicated and severe HMPV infection. Clinical suspicion of necrotizing pneumonia should be considered in cases of patients with HMPV who do not respond to supportive treatments.

Human metapneumovirus is a respiratory pathogen first identified in 2001 that primarily causes infection in children during the spring and winter seasons, and the course of symptoms can vary from a mild respiratory illness to severe bronchiolitis. It can also cause otitis media. Necrotizing pneumonia rarely occurs in children but may be associated with significant complications. Clinical suspicion of necrotizing pneumonia should be considered in cases of patients with HMPV who do not respond to supportive treatments. The association between HMPV and necrotizing pneumonia requires further investigation.

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References

1.Loubet P, Mathieu P, Lenzi N, Galtier F, Lainé F, Lesieur Z, et al. Characteristics of human metapneumovirus infection in adults hospitalized for community-acquired influenza-like illness in France, 2012-2018: a retrospective observational study. Clin Microbiol Infect. 2021;27(1):127.e1-6.

2.Ramgopal S, Ivan Y, Medsinge A, Saladino RA. Pediatric necrotizing pneumonia: a case report and review of the literature. Pediatric Emergency Care. 2017;33(2):112-5.

3.Yousefi M, Mohammadi M, Afshar D, Nazari-Alam A. Evaluation of Frequency, Drug Resistance and Serotyping of Streptococcus Pneumoniae in Iran: A Systematic Review. J Babol Univ Med Sci. 2021;23:189-98. [In Persian]

4.Kawataki M, Ito A, Koyama T, Ishida T. Lobar pneumonia due to human metapneumovirus: a case report. Int J Infect Dis. 2024;146:107162.

5.Dhariwal K. Human Metapneumovirus Associated With Acute Hemorrhagic Oedema of Infancy: A Case Report. Cureus. 2024;16(11):e73296.

6.Marinari LA, Danny MA, Simpson SA, Schmitt JE, Miller WT Jr. Lower Respiratory Tract Infection with Human Metapneumovirus: Chest CT Imaging Features and Comparison with Other Viruses. Eur J Radiol. 2020;128:108988.

7.Karimata Y, Kinjo T, Parrott G, Uehara A, Nabeya D, Haranaga S, et al. Clinical Features of Human Metapneumovirus Pneumonia in Non-Immunocompromised Patients: An Investigation of Three Long-Term Care Facility Outbreaks. J Infect Dis. 2018;218(6):868-75.

8.Kuiken T, van den Hoogen BG, van Riel DA, Laman JD, van Amerongen G, Sprong L, et al. Experimental human metapneumovirus infection of cynomolgus macaques (Macaca fascicularis) results in virus replication in ciliated epithelial cells and pneumocytes with associated lesions throughout the respiratory tract. Am J Pathol. 2004;164(6):1893-900.

9.Falsey AR, Erdman D, Anderson LJ, Walsh EE. Human metapneumovirus infections in young and elderly adults. J Infect Dis. 2003;187(5):785-90.

10.Vidaur L, Totorika I, Montes M, Vicente D, Rello J, Cilla G. Human metapneumovirus as cause of severe community-acquired pneumonia in adults: insights from a ten-year molecular and epidemiological analysis. Ann Intensive Care. 2019;9(1):86.

11.Kongala BP, Bhattarai M, Ammar H. A Case of Takotsubo Cardiomyopathy Triggered by Human Metapneumovirus. Cureus. 2025;17(5):e84977.

12.Pipitò L, Mazzola CV, Bono E, Gioè C, Giammanco GM, Bonura C, et al. A Case of Severe Respiratory Failure Caused by Metapneumovirus and Influenza Virus in a Patient with HIV Infection. Viruses. 2025;17(3):289.