

## Introduction

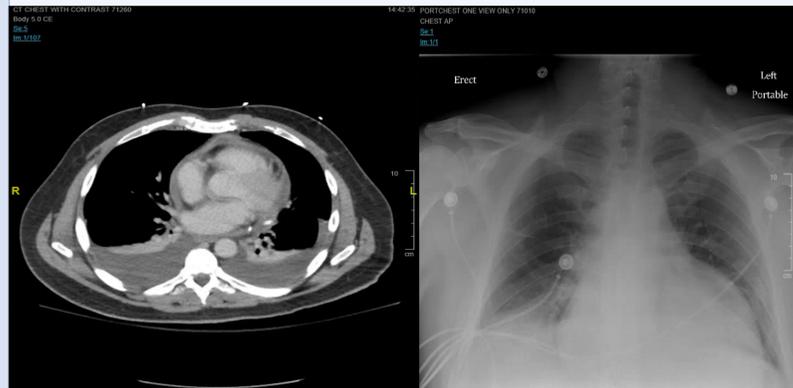
- We report a case of cardiac tamponade secondary to human metapneumovirus (hMPV) infection.
- hMPV is a novel, ubiquitous, enveloped, negative-sense RNA virus and a member of the Pneumoviridae family.
- Transmission occurs via close or direct contact with respiratory secretions from an infected individual.
- Classic clinical manifestations include: upper and lower respiratory tract infections. Most severe hMPV infections occur in young children, immunocompromised adults, and the elderly.<sup>1,2</sup>
- Extrapulmonary manifestations of hMPV such as pericarditis and pericardial tamponade, are rarely reported in the medical literature.
- Viral infections are the presumed etiology for most cases of acute pericarditis in the developed world. However, determination of a specific microbiological etiology is usually unnecessary as most cases of viral pericarditis are self-limited.

## Case Description

A 47-year-old man with a medical history significant for bipolar disorder and anxiety presented to the emergency department with five days of worsening generalized abdominal pain, nausea, and vomiting. A CT scan of the abdomen and pelvis showed no acute abdominal pathology, but demonstrated a large pericardial effusion as well as bilateral pleural effusions (Figure 1). Upon further questioning, the patient endorsed influenza-like illness, which began at the same time as his abdominal pain. On admission, the patient was tachycardic and slightly hypotensive without jugular venous distension or muffled heart sounds. A chest x-ray demonstrated an enlarged cardiac silhouette with bilateral pleural effusions (Figure 2), and an ECG demonstrated sinus tachycardia, RBBB, and some degree of electrical alternans. Laboratory findings were significant for a mild leukocytosis, normocytic anemia, elevated transaminases, elevated ESR and CRP, and a negative influenza PCR test.

## Case Description (cont.)

The patient went for an emergent pericardiocentesis after a transthoracic echocardiogram demonstrated early diastolic collapse of the mid-to-apical right ventricle consistent with tamponade physiology (Figure 3). A pericardiocentesis drained ~1,250 mL of hemorrhagic fluid with an opening pericardial pressure of 31 mmHg. There was a significant improvement in hemodynamics after the fluid was drained, with a closing pressure of 7 mmHg.



**Figure 1:** CT chest showing bilateral effusion and

**Figure 2:** CXR showing cardiomegaly and pleural effusions.

## Differential Diagnosis

- A sizeable hemorrhagic pericardial effusion with tamponade physiology in a middle-age man is suspicious for:
  - ❖ Uremic pericarditis
  - ❖ Infectious pericarditis – mycobacterial, bacterial, viral
  - ❖ Connective tissue diseases - SLE, RA and MCTD
  - ❖ Malignancy-induced pericardial effusion
  - ❖ Hypothyroidism

## Investigations

- The pericardial fluid analysis following pericardiocentesis showed:
  - ❖ 800,000 RBCs with >2,000 nucleated cells with a lymphocytic predominance.
  - ❖ Culture was negative for AFB and any bacterial or viral pathogens.
  - ❖ Cytology and an autoimmune panel (ANA, Anti-dsDNA, CCP, RF, SM/RNP, and anti-Smith) were negative for a malignant or autoimmune etiology of the patient's pericardial effusion.
- CT chest, abdomen, and pelvis showed bilateral moderate-sized pleural effusion with compressive atelectasis without any masses or pulmonary nodules (Figure 1).
- A viral respiratory panel PCR performed on a nasopharyngeal swab was positive for human metapneumovirus (hMPV).



**Figure 3:** 2-D Echo showing a large pericardial effusion.

**Figure 4:** 2-D Echo showing resolution of the pericardial effusion after pericardiocentesis.

## Treatment and Follow-Up

- The patient was discharged on hospital day five with ibuprofen and colchicine for presumed hMPV induced viral pericarditis leading to cardiac tamponade.
- The patient recovered well without any sequelae of infection.
- A repeat echocardiogram two months after discharge was within normal limits without re-accumulation of pericardial effusion (Figure 4).

## Discussion

- In 2001, a study from the Netherlands established hMPV as a cause of respiratory tract infections in 28 children.<sup>3</sup>
- Further research has established hMPV as a cause of a broad range of upper and lower respiratory tract infections in both children, immunocompromised adults, and the elderly. The infections associated with this virus range from minor respiratory infections to severe pneumonia resulting in Acute Respiratory Distress Syndrome (ARDS). This infection is commonly treated with supportive therapy, but more severe cases respond to ribavirin and IVIG.<sup>4</sup>
- Some recently published case reports indicate associations between the virus and cardiovascular disease.
- In 2011, a Japanese case-control study demonstrated an association with higher titers of hMPV IgG antibodies to hypertension in elderly patients in a long-term care facility.<sup>5</sup>
- Similarly, a case report in 2016, described a case of hMPV induced myopericarditis in an elderly immunocompetent female.<sup>6</sup>
- Due to the relative modernity of the virus, the pathogenesis of hMPV and cardiovascular disease is relatively unknown.
- It is unclear whether hMPV has a predisposition for cardiac myocytes, the pericardium, or if existing cardiovascular disease predisposes patients to a more severe clinical manifestation of hMPV infection.
- The knowledge of the possible association between hMPV and cardiovascular disease can aid clinicians in deciding whether to test patients with pericardial disease for hMPV.
- This information will also aid clinicians in deciding which patients to treat with pharmacological therapies such as ribavirin and IVIG for more severe infections.

## References:

1. Crowe, JE. Human metapneumovirus infections. In: UpToDate, Post, TW (Ed), UpToDate, Waltham, MA, 2020.
2. Teresa C. T. Peret, Guy Boivin, Yan Li, Michel Couillard, Charles Humphrey, Albert D. M. E. Osterhaus, Dean D. Erdman, Larry J. Anderson, Characterization of Human Metapneumoviruses Isolated from Patients in North America. *The Journal of Infectious Diseases*, Volume 185, Issue 11, 1 June 2002, Pages 1660–1663. <https://doi.org/10.1086/340518>
3. Van den Hoogen, B., de Jong, J., Groen, J. *et al.* A newly discovered human pneumovirus isolated from young children with respiratory tract disease. *Nat Med* 7, 719–724 (2001). <https://doi.org/10.1038/89098>
4. Haas LE, Thijsen SF, van Elden L, Heemstra KA. Human metapneumovirus in adults. *Viruses*. 2013;5(1):87–110. Published 2013 Jan 8. doi:10.3390/v5010087
5. Zeng, L., Chen, R., Ishigami, K. *et al.* Association between human metapneumovirus seroprevalence and hypertension in elderly subjects in a long-term care facility. *Hypertens Res* 34, 474–478 (2011). <https://doi.org/10.1038/hr.2010.268>
6. Choi MJ, Song JY, Yang TU, Jeon JH, Noh JY, Hong KW, Cheong HJ, Kim WJ. Acute Myopericarditis caused by Human Metapneumovirus. *Infect Chemother*. 2016 Mar;48(1):36-40.