The many faces of a lung virus

Keywords
human metapneumovirus; lower respiratory tract infection; symptomatic treatment

Case summaries

Case 1: A 65-year-old man presented with a 3-day history of cough and sputum production. His personal history included severe congestive heart failure. His body temperature was 38.2 °C and oxygen saturation was 92 % on room air. Fine rales in the lower left lung field were detected on auscultation. Blood test results revealed lymphocytopenia (0.9 × 10^9 l^-1; normal range 1.1–3.5 × 10^9 l^-1) and elevated C-reactive protein (15 mg l^-1; normal <5 mg l^-1). A chest computed tomography (CT) scan revealed a ‘tree-in-bud’ sign and multifocal consolidations (Fig. 1a).

Case 2: A 78-year-old woman presented with a 6-day history of fever, cough, bloody sputum production and shortness of breath. Her personal history included chronic lymphocytic leukaemia, for which she was recently treated with chemotherapy. Her body temperature was 39.3 °C and oxygen saturation was 88 % on room air. Her leukocyte count was 0.7 × 10^9 l^-1 (normal range 4.0–10.0 × 10^9 l^-1) and her C-reactive protein level was 68 mg l^-1. A chest CT scan showed ground-glass opacities (Fig. 1b). After recovery from aplasia, she gradually recovered.

Case 3: A 64-year-old women presented with a 5-day history of cough, dyspnea, sputum production, myalgias and fatigue. Her personal history included orthotopic heart transplantation 5 months prior to admission, requiring triple-drug immunosuppression. Her body temperature was 37.8 °C and oxygen saturation was 94 % on room air. Her leukocyte count was 7.2 × 10^9 l^-1 (normal range 4.0–10.0 × 10^9 l^-1) and her C-reactive protein level was 68 mg l^-1. A chest CT scan showed ground-glass opacities (Fig. 1c).

In all three cases, the diagnosis was made by PCR analysis of nasopharyngeal swabs or bronchoalveolar lavage fluid. In none of the patients was an antiviral treatment applied and all of them recovered from their disease.

Discussion

Correct answer: 4. Human metapneumovirus (hMPV).

Human metapneumovirus (hMPV) was first reported in children in 2001 (van den Hoogen et al., 2001). Transmission most likely occurs by close contact with body secretions. Seroprevalence in adults is almost 100 %, and reinfections can occur in all age groups. In temperate climates, hMPV circulates in late winter, but the timing varies from year to year (Okamoto et al., 2010). Considering that the number of patients with chronic diseases and elderly people is growing, it is important to note that hMPV is capable of causing severe infections, in particular in immunocompromised hosts. All three cases included either a patient over 65 years old or an immunocompromised host. In case 2, the course was severe.

The clinical presentation can vary from mild symptoms to severe pneumonia. Involvement of the lower respiratory tract is frequent. Severe pneumonia occurs in particular in patients with malignancy, or haematopoietic stem cell or solid-organ transplants (Schildgen et al., 2011). All patients claimed to have typical symptoms consistent with lower respiratory tract infection. In contrast, fever is not always reported in adults (Reiche et al., 2014). The diagnosis is made by PCR analysis of nasopharyngeal swabs or bronchoalveolar lavage fluid, together with an assessment of clinical and radiological features. The typical radiological features are ‘tree-in-bud’ signs (in one study, 21 % of patients had this sign), multifocal consolidations (19 %) and...
ground-glass opacities in (19 %). Of note, 21 % of the imaging study results were normal despite a clinical diagnosis of viral lower respiratory tract infection (Shiley et al., 2010). The majority of patients infected with hMPV are managed with supportive care. Immunocompromised hosts with severe pneumonia are often treated empirically with broad-spectrum antibiotics and antifungals. If hMPV is identified as the causative pathogen, ineffective antimicrobial treatment should be stopped accordingly. No evidence for significant efficacy has been shown for ribavirin or polyclonal human immunoglobulins. Hence, there are no recommendations for the treatment of hMPV infections.

Mirjam de Roche and Parham Sendi

Department of Infectious Diseases, University Hospital of Bern and University of Bern, Switzerland

Correspondence: Parham Sendi (parham.sendi@ifik.unibe.ch)

References

Okamoto, M., Sugawara, K., Takashita, E., Muraki, Y., Hongo, S., Nishimura, H. & Matsuzaki, Y. (2010). Longitudinal course of human metapneumovirus antibody titers and reinfection in healthy adults. J Med Virol 82, 2092–2096.

Reiche, J., Jacobsen, S., Neubauer, K., Hafemann, S., Nitsche, A., Milde, J., Wolff, T. & Schweiger, B. (2014). Human metapneumovirus: insights from a ten-year molecular and epidemiological analysis in Germany. PLoS ONE 9, e88342.

Schildgen, V., van den Hoogen, B., Fouchier, R., Tripp, R. A., Alvarez, R., Manoha, C., Williams, J. & Schildgen, O. (2011). Human metapneumovirus: lessons learned over the first decade. Clin Microbiol Rev 24, 734–754.

Shiley, K. T., Van Deerlin, V. M. & Miller, W. T. Jr. (2010). Chest CT features of community-acquired respiratory viral infections in adult inpatients with lower respiratory tract infections. J Thorac Imaging 25, 68–75.

van den Hoogen, B. G., de Jong, J. C., Groen, J., Kuiken, T., de Groot, R. & Osterhaus, A. D. (2001). A newly discovered human pneumovirus isolated from young children with respiratory tract disease. Nat Med 7, 719–724.

DOI 10.1099/jmmcr.0.001925
http://jmmcr.sgmjournals.org

---

Fig. 1. Axial CT image showing ‘tree-in-bud’ signs (a), multifocal consolidations (b) and ground-glass opacities (c) in patients with lower respiratory tract infection or pneumonia caused by human metapneumovirus.