Acute respiratory distress syndrome associated with HHV-7 infection in an immunocompetent patient: a case report

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SUMMARY

The association of human herpesvirus-7 with lung diseases is poorly known, although it has been suggested a role in causing interstitial pneumonia in non-transplant patients and bronchiolitis-obliterans-organizing-pneumonia in lung transplant. No case of acute respiratory distress syndrome associated to human herpesvirus-7 has been reported, while only one case associated with human herpesvirus-6 has been described in an immunocompetent patient. This report describes the identification of human herpesvirus-7 reactivation in an immunocompetent patient with acute respiratory distress syndrome, as evidenced by the increasing viral load in bronchoalveolar lavage, polyneuropathy, histopathological findings, and tissue positivity. Human herpesvirus-7 reactivation in this context could be a consequence of the tissue damage due to the underlying lung disease, rather than the cause, as suggested by the temporal profile of viral load on BAL.

KEY WORDS: Human herpesvirus-7, Acute respiratory distress syndrome, Bronchoalveolar lavage, Transbronchial biospy

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A 71-year-old woman was admitted for non-productive cough that had been present for 4 weeks, ingravescent dyspnoea and chest pain, in the absence of fever. Physical examination showed tachypnoea (36 breaths/min) and bilateral basal decreased vesicular sounds with crepitations on auscultation. Blood tests revealed anemia (Hb 9.4 mg/dl), leukocytosis (WBC 11.4x10^9/l), and increased C-reactive protein (172 mg/l). Arterial blood gas analysis demonstrated a severe type 1 respiratory failure (PaO2 47mmHg, $PaCO_2$ 34mmHg, oxygen saturation [SaO_2] 84%). Chest radiography revealed bilateral diffuse infiltrates without evidence of left ventricular failure and pulmonary embolism. Extensive confluent ground-glass consolidation was observed on computed tomography (CT) scan. The patient fulfilled three of the four criteria for the diagnosis of ARDS. High flow oxygen was administered with no significant improvement in the next 48 hours. She was put on non-invasive mechanical ventilation, but the tendency to oxygen desaturation persisted and the patient required tracheal intubation and mechanical ventilation with varied levels of positive end-expiratory pressure. Treatment included the administration of corticosteroids. Microbiological assays (bacterioscopy, culture, Aspergillus galactomannan antigen, Legionella urinary antigen) resulted negative. At virological assays, including 17 viruses (Costa *et al.*, 2009; Bergallo *et al.*, 2009), 544 HHV-6 and 384 HHV-7-DNA copies/ml BAL were detected. Cytopathological evaluation of BAL showed neutrophil predominance. Organizing pneumonia of possible viral etiology was evidenced at transbronchial lung biopsy (Figure 1). Immunohistochemistry for cytomegalovirus was negative. HHV-7 load on lung tissue was 363

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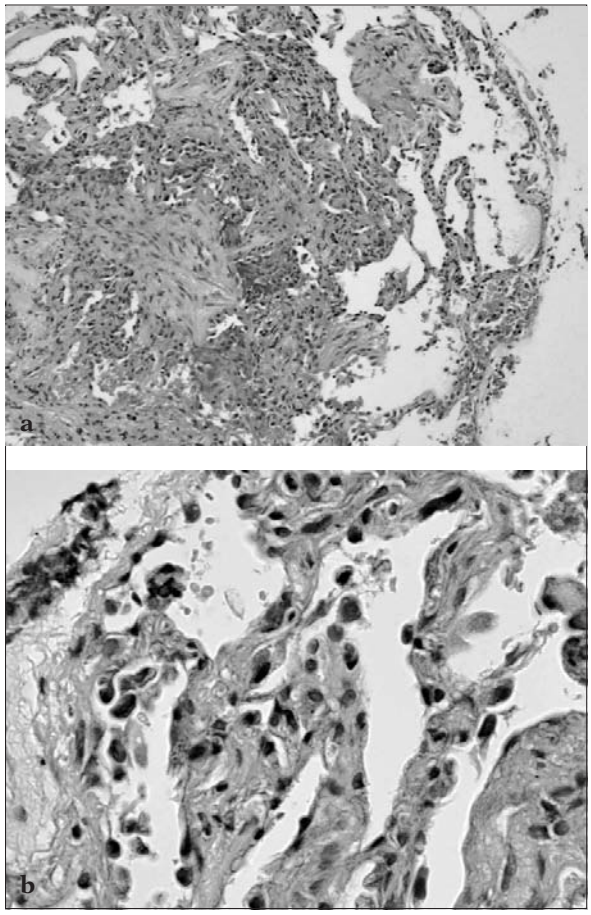

FIGURE 1 - *(a) Transbronchial biopsy showing intra-alveolar loose fibrocellular tissue of organizing pneumonia (Hematoxylin and Eosin stain, x10). (b) Interstitial mononuclear and neutrophil inflammatory infiltrate. Type II cell hyperplasia and some alveolar epithelial cells with ground-glass, pale, eosinophilic, intranuclear inclusions(H&E, Hematoxylin and Eosin stain, x40).*

copies/10^4 cells. Clinical conditions remained severe: the patient developed flaccid tetraparesis and anesthesia/hypoesthesia with marked alterations at somatosensory evoked potentials to median suggestive of peripheral polyneuropathy. After 30 days, another BAL disclosed the following results: 297 HHV-6 and >12.5 x 10^6 HHV-7-DNA copies/ml. CT scan showed extensive confluent ground-glass opacities with partially excavated nodular consolidation. Subsequently, while receiving intensive care, the patient gradually recovered. Mechanical ventilation was suspended and SaO_2 98% was obtained with oxygen therapy. Neuropathy slightly improved with the administration of vitamin B12 and physiokinesistherapy. Chest radiography one month later showed mildly increased vascular markings without interstitial pneumonia. Residual polyneuropathy persists. A pulmonary infection either before or after the onset of lung injury is common in ARDS. Viral pneumonia is recognized among predisposing conditions, particularly in immunocompromised patients. Mechanical ventilation is an essential part of ARDS treatment, although it may constitute an additional risk factor of infectious complications. The association of HHV-7 with lung diseases is poorly known. A role in causing interstitial pneumonia in non-transplant patients (Yamamoto *et al.*, 2005) and bronchiolitis-obliterans-organizing-pneumonia (BOOP) in lung transplant (Ross *et al.*, 2001) has been suggested. In this case, the increasing viral load in BAL, polyneuropathy and tissue positivity suggested an association between HHV-7 and ARDS. To our knowledge no case of ARDS associated with HHV-7 has been reported, while only one case associated with HHV-6 has been described in an immunocompetent patient (Merk *et al.*, 2005). HHV-7 reactivation in this context could be a consequence of the tissue damage due to ARDS, rather than the cause, as suggested by the temporal profile of viral load on BAL.

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