ECRONICON OPEN ACCESS

EC EMERGENCY MEDICINE AND CRITICAL CARE
Case Report

Use of CPAP in a Cytomegalovirus Pneumonia: Description of a Clinical Case in an Elderly Patient

Isabella Di Zio[1]* and Rodolfo Cisternino[2]

[1]*Internal Medicine, San Massimo Hospital, Penne, Pescara, Italy*

[2]*Community hospital, SS. Immacolata Hospital, Guardiagrele, Chieti, Italy*

***Corresponding Author:** Isabella Di Zio, Internal Medicine, San Massimo Hospital, Penne, Pescara, Italy.

Received: July 04, 2021; **Published:** August 28, 2021

Abstract

Cytomegalovirus (CMV) is a virus belonging to the Herpesvirus family, extremely widespread globally. Once contracted, CMV remains latent in the body for life, but can reactivate if the immune system is weakened. The reports of CMV that occur in immunocompromised individuals concern all organs and can often present a serious manifestation, causing substantial morbidity and mortality. We present a case of CMV pneumonia in an 84-year-old immunocompetent elderly patient treated early in our Unit with CPAP in association with medical therapy. This case report suggests that early use of CPAP in CMV pneumonia even in the elderly patient may be effective in healing in combination with medical therapy.

Keywords: *CMV Pneumonia; CPAP; Elderly Patient*

Introduction

Cytomegalovirus (CMV) is a DNA virus of the Herpesviridae family. It is estimated that over the course of their existence from 40 to 80% of the population in industrialized countries undergoes a CMV infection, which usually evolves without symptoms and results in a latent infection. In Italy, about 70 - 80% of the adult population is positive for anti-CMV antibodies.

CMV pneumonia occurs almost exclusively in patients who are immunosuppressed (organ transplant recipients and those with HIV) or who are receiving immunomodulatory/immunosuppressive agents [1,2]. CMV pneumonia results from reactivation of a latent dormant CMV infection [3]. Viral replication is controlled by T lymphocytes and "natural killer" cells (NKs), which have immunoglobulin-like receptors (KIR) on their surface, both activating and inhibiting cytolytic activity, whose role in controlling the reactivation of CMV infection in subjects undergoing kidney or bone marrow transplantation has been suggested by recent experimental evidence [4,5].

In the immunocompromised host, CMV pneumonia presents early with fever and prolonged hypoxemia with pulmonary infiltrates. Nonspecific laboratory abnormalities include leukopenia, relative lymphopenia and thrombocytopenia. Diagnosis is made using serological tests, molecular biology, and histological findings on lung biopsy [1]. Standard treatment includes oxygen administration, prompt antiviral therapy in immunocompromised individuals, and early supportive therapy. However, despite these interventions, in the forms with respiratory failure mortality remains high (5 - 10%, up to over 30% in cases hospitalized in intensive care).

During pneumonia, the application of a positive end-expiratory pressure (PEEP), kept constant throughout the respiratory act, more or less associated with a support pressure, has as a pathophysiological rationale the alveolar recruitment of areas of atelectatic parenchyma surrounding the inflammatory infiltrate and the administration of high-flow oxygen therapy. The result is an increase in functional residual capacity (CFR), an improvement in gas exchange [6,7].

At the moment in the literature there are scarce data relating to randomized controlled trials concerning the treatment with non-invasive positive pressure of pneumonia in general and in particular in CMV pneumonia. We describe below our experience in an elderly patient with CMV pneumonia treated effectively with CPAP in combination with standard medical therapy.

Case Presentation

An 84-year-old woman came to our observation for dyspnea and fever for about 2 days.

His medical history was characterized by hypertension treated at home with ACEI and rheumatoid arthritis treated chronically with low doses of steroid.

Upon arrival in the ward, the patient was dyspnoic, feverish but lucid. The pulmonary physical examination showed the presence of widespread crackles with the use of accessory respiratory muscles. Heart sounds were tachycardic, the remaining objectivity was normal. The patient was haemodynamically stable, with intact sensory (grade 1 of the Kelly - Matthay scale), respiratory dynamics were preserved, FR ≥ 28 bpm, non-responsive to O_2-standard, with PaO_2 / FiO_2 of 250, respiratory alkalosis and increased of the arterial alveolus gradient in O_2.

Initial workup included chest CT, ECG, general blood tests, blood cultures, and serovirology. The patient tested positive for CMV, and her chest CT scan showed consistent bilateral infiltrates with viral pneumonia (Figure 1).

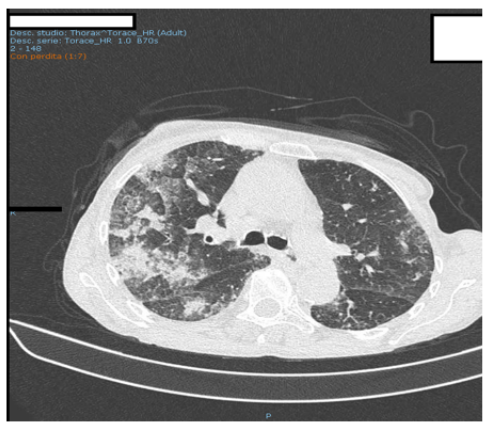

Figure 1

Atypical lymphocytosis and increased serum transaminases was present, PRC and procalcitonin were also increased. Other blood tests, including kidney function, were normal. A mild sinus tachycardia on the EKG.

Supportive therapy with CPAP high flow with external venturi was immediately started at a pressure of 12 cmH20 for 24 hours a day, with suspension only for nutrition and hydration and as soon as the result of the serovirology started therapy with ganciclovir 600 mg twice a day for 14 days.

The steroid the patient was using for rheumatoid arthritis was discontinued because it was believed to be responsible for immunosuppression that caused CMV infection or reinfection.

The patient performed CPAP for 24 hours a day for the first 3 days of hospitalization in order to achieve the saturation target of 94 - 99% with the attention focused on the trend of the PaO_2/FiO_2 ratio and respiratory rate.

There was an improvement in oxygenation values therefore CPAP was gradually reduced to suspension and replaced with oxygen support only. Medical therapy was also accompanied by supportive respiratory physiotherapy.

Results and Discussion

In the case presented, an elderly woman immunosuppressed due to chronic steroid therapy presented with pneumonia with severe hypoxemia requiring ventilatory support. Bilateral infiltrates present on chest CT suggested an infectious process responsible for an oxygen diffusion defect. The diagnostic suspicion of CMV, confirmed by serological investigations, was subsequently considered in the light of some of the laboratory findings (atypical lymphocytosis and increased serum transaminases) and the immunosuppression caused by the steroid. Severe hypoxemia unresponsive to standard oxygen therapy led us to use CPAP in combination with antiviral therapy.

Already from the first hour there was an improvement in oxygenation and respiratory mechanics; CO_2 has always remained stable. The monitoring was clinical, instrumental multiparametric continuous and biochemical with BGA every 3 hours in order to first of all confirm the stability of the condition but above all to detect early signs of deterioration and intervene promptly.

Antiviral therapy with ganciclovir was also started. The patient made a rapid recovery and after 3 days CPAP was gradually tapered to discontinuation.

After 2 weeks the patient was discharged without oxygen therapy and is doing well in the follow-up visits.

Conclusion

This article highlights the importance of considering CMV as a cause of pneumonia even in elderly individuals. Early diagnosis allows for prompt treatment and potentially complete recovery. The use of continuous positive airway pressure provided effective ventilatory support in our patient, avoiding intubation, improving hypoxia in synergy with antimicrobial treatment to achieve clinical improvement and complete recovery.

Conflict of Interest

No conflict of interest to report.

Bibliography

1. Burke A Cunha., *et al*. "Severe cytomegalovirus (CMV) community-acquired pneumonia (CAP) in a non-immunocompromised host". *Heart Lung* 38.3 (2009): 243-248.

2. Staras SA., *et al*. "Sieroprevalenza dell'infezione da citomegalovirus negli Stati Uniti, 1988-1994". *Clinical Infectious Diseases* 43 (2006): 1143-1151.

3. Charles H. Cook., *et al*. "Pulmonary cytomegalovirus reactivation causes pathology in immunocompetent mice". *Critical Care Medicine* 34.3 (2006): 842-849.

4. Guma M., *et al*. "Imprint of human cytomegalovirus infection on the NK cell receptor repertoire". *Blood* 104 (2004): 3664-3671.

5. Mancusi A., *et al*. "Donor activating KIR genes and control of infections after haploidentical haematopoietic transplantation". *Bone Marrow Transplant* 37.1 (2006).

6. A Brett and DG Sinclair. "Use of continuous positive airway pressure in the management of community acquired pneumonia". *Thorax* 48.12 (1993): 1280-1281.

7. Rochwerg B., *et al*. "Official ERS/ATS clinical practice guidelines: noninvasive ventilation for acute respiratory failure". *European Respiratory Journal* 50.2 (2017): 1602426.

Volume 5 Issue 9 September 2021