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ARDS as the First Manifestation of Latent Multiple Myeloma: A Case Report

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Abstract **Case Report**

Acute respiratory distress syndrome (ARDS) is a medical emergency characterized by severe hypoxemia and alveolar-capillary damage leading to non-cardiogenic pulmonary edema. While commonly associated with severe infections, it can also reveal underlying conditions such as hematological diseases. Multiple myeloma, a plasma cell cancer, is often complicated by severe infections due to the immunosuppression it induces, but its association with ARDS remains rare and poorly understood. This relationship could be explained by shared immune, inflammatory, and vascular mechanisms. We report the case of a 61-year-old man admitted for severe pneumonia complicated by ARDS. Imaging and biological investigations led to the incidental discovery of latent multiple myeloma, with lytic bone lesions and hematological abnormalities. The objective of this article is to explore the underlying pathophysiological mechanisms of this association, analyze its clinical implications, and propose a multidisciplinary approach for managing this rare and complex condition.

Keywords: Acute Respiratory Distress Syndrome (ARDS), Multiple Myeloma, Immunosuppression, Hematological Malignancy, Pulmonary Complications.

INTRODUCTION

Acute respiratory distress syndrome (ARDS) is a severe medical emergency defined by profound hypoxemia and bilateral pulmonary infiltrates caused by increased alveolar-capillary permeability. It typically occurs in response to severe infections, trauma, or systemic diseases [1].

Multiple myeloma is a plasma cell cancer characterized by excessive production of monoclonal immunoglobulins. This disease leads to complications such as bone lesions, immunosuppression, and renal failure, increasing the risk of severe infections [2].

The association between ARDS and multiple myeloma is rare and infrequently reported in the literature, although severe infections account for 60% to 70% of deaths in patients with multiple myeloma [3, 4]. This relationship may be explained by shared pathophysiological mechanisms, including immune, vascular, and inflammatory disorders linked to multiple myeloma [5].

CASE PRESENTATION

A 61-year-old man with no significant medical history was admitted for severe pneumonia complicated by ARDS. On admission, the patient presented with tachypnea (30 breaths/min), oxygen saturation (SpO_2) of 60% on room air, and coarse ronchi on lung auscultation. Hemodynamically, his blood pressure was 125/65 mmHg, with a heart rate of 130 beats per minute. Oxygen therapy using a face mask at 15 liters/min improved his SpO_2 to 90%.

Biological investigations revealed severe systemic inflammation with a CRP of 457.4 mg/L, procalcitonin >100 µg/L, and leukopenia (WBC count: 2,600/mm³). Significant anemia was also noted with a hemoglobin level of 7 g/dL. Arterial blood gas analysis showed severe hypoxemia (PaO_2: 51 mmHg) with a normal $PaCO_2$ (40 mmHg). Renal function was normal.

Chest X-ray showed diffuse pulmonary infiltrates in the right lung, indicative of severe pneumonia. Thoracic CT confirmed bilateral bronchopneumonia and findings compatible with ARDS (Figure 3) and revealed lytic bone lesions highly suggestive of latent multiple myeloma (Figure 1, 2). Due to worsening respiratory distress, the patient was intubated and placed on invasive mechanical ventilation.

Initial treatment included empirical antibiotic therapy with ceftriaxone, levofloxacin, and cotrimoxazole, along with corticosteroid therapy with hydrocortisone at 200 mg/day for five days. Microbiological analysis of a protected distal sampling confirmed the presence of Streptococcus pneumoniae, which was sensitive to the antibiotics administered. The clinical course was favorable, with cessation of sedation and extubation by day 10.

A follow-up evaluation one month after discharge revealed monoclonal gammopathy of the IgA kappa type at 55 g/L, as well as massive monoclonal plasma cell infiltration on bone marrow examination (Figure 4). The patient was referred to a clinical hematology department for further management.

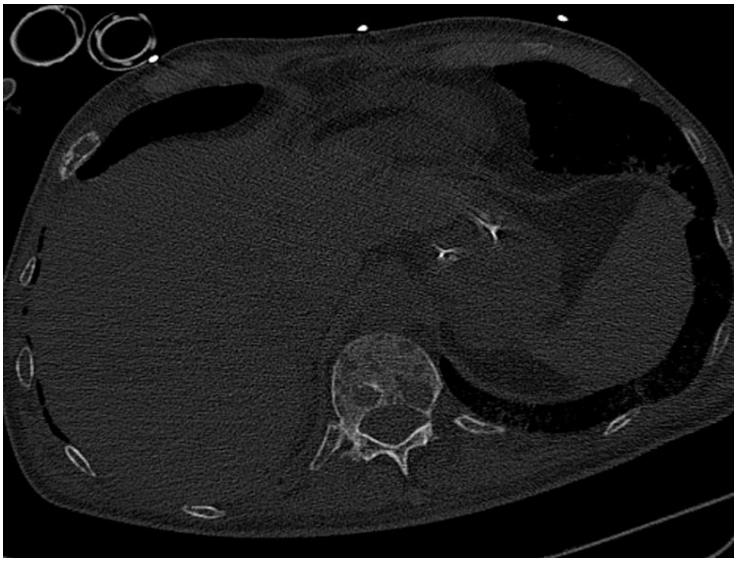

Figure 1: Axial CT scan showing lytic lesions in the vertebral body

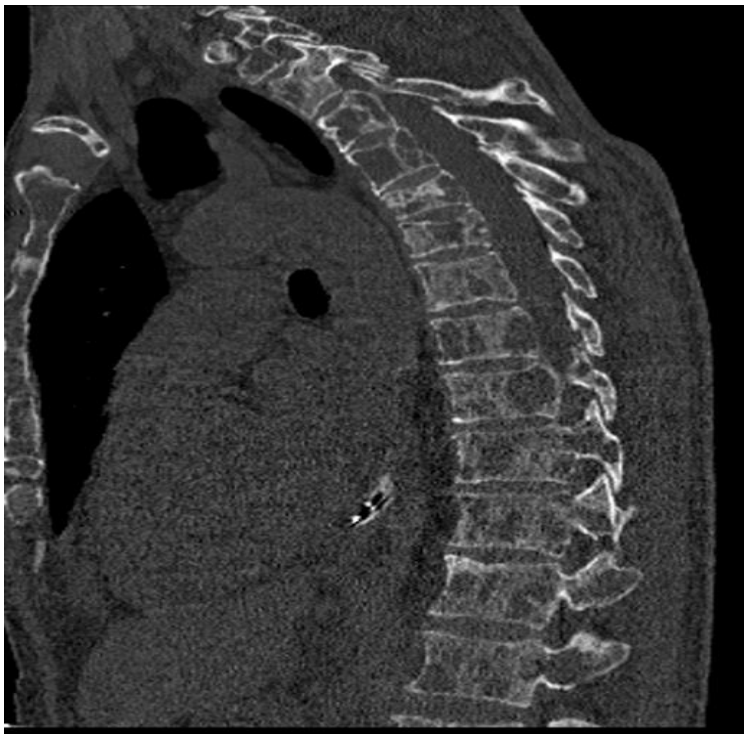

Figure 2: Sagittal CT scan showing multiple lytic lesions in the spine

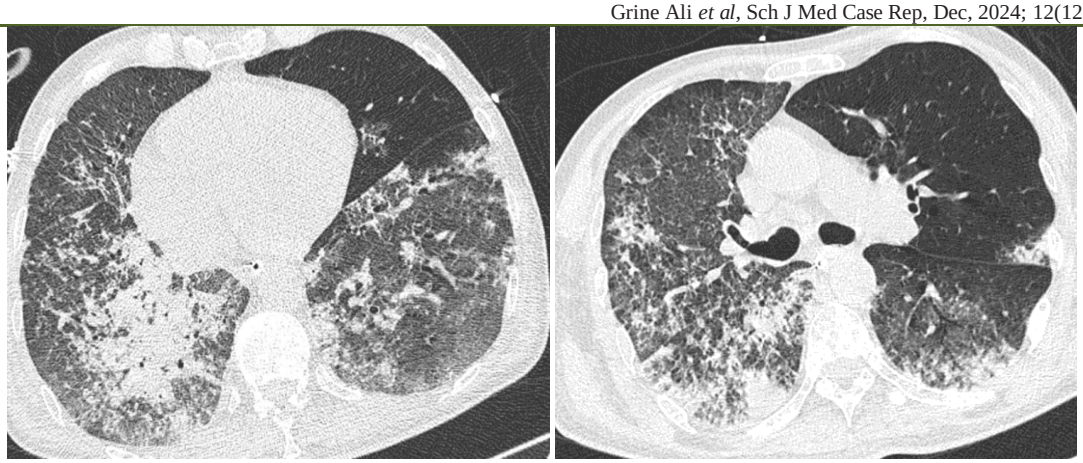

Figure 3: Axial CT scans revealing a diffuse alveolo-interstitial syndrome characteristic of ARDS (acute respiratory distress syndrome)

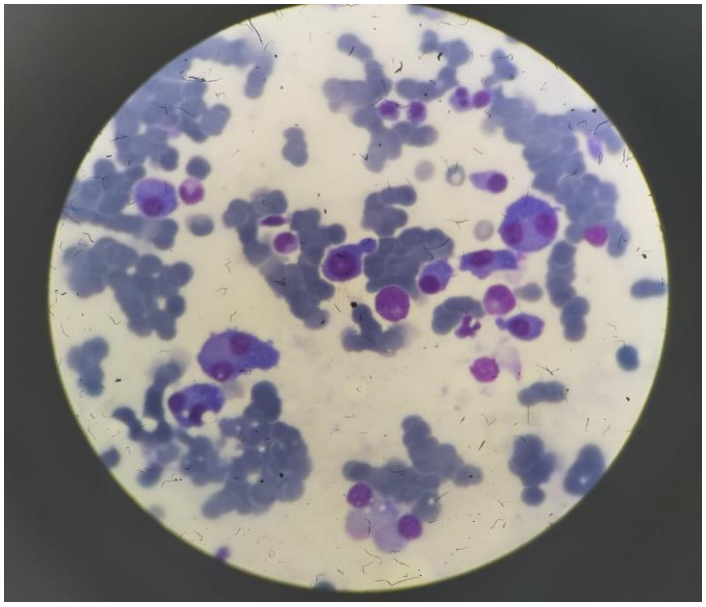

Figure 4: Microscopic examination of myelogram showing the presence of plasma cells

DISCUSSION

The pathophysiological link between ARDS and multiple myeloma involves several interconnected mechanisms. First, immunosuppression induced by multiple myeloma, through the overproduction of dysfunctional monoclonal immunoglobulins and impaired lymphocyte responses, increases the risk of severe infections, a major trigger of ARDS [2, 3]. Second, paraproteins secreted by tumor plasma cells contribute to hyperviscosity and endothelial dysfunction, exacerbating the alveolar-capillary damage typical of ARDS [4]. Finally, systemic inflammation, characterized by the release of pro-inflammatory cytokines common to both conditions, worsens pulmonary injury and non-cardiogenic pulmonary edema [5]. These mechanisms, though rarely reported together, illustrate a complex pathophysiological interaction.

Clinically, this rare association presents significant diagnostic and therapeutic challenges. Severe infections, as observed in multiple myeloma, are responsible for 60% to 70% of deaths in this population [3]. However, the occurrence of ARDS in this context is poorly documented, which may delay the recognition of underlying multiple myeloma, as seen in this case. Early diagnosis is critical, as it allows for targeted management of multiple myeloma, potentially altering the prognosis [6]. Clinicians should consider hematological investigations when faced with extrapulmonary signs, such as bone abnormalities or unexplained anemia [7].

The management of these complex patients requires a multidisciplinary approach integrating several therapeutic strategies. The initial treatment of ARDS focuses on protective mechanical ventilation and aggressive management of underlying infections with appropriate antibiotics, as applied in this case [8]. Corticosteroid therapy may be considered to reduce systemic inflammation, although its role in this context remains debated [9]. Concurrently, specialized hematology evaluation is essential to confirm the diagnosis of multiple myeloma and initiate specific

treatment. Coordinated care among pulmonologists, intensivists, and hematologists can optimize clinical outcomes and reduce long-term complications [10].

CONCLUSION

This case highlights the rare association between ARDS and latent multiple myeloma, emphasizing the importance of thorough investigation in atypical ARDS cases. Early recognition of multiple myeloma enables tailored management and improved prognosis through a multidisciplinary approach involving pulmonologists, intensivists, and hematologists.

Conflicts of Interest: The authors declare no conflicts of interest.

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