Insuficiencia respiratoria aguda y bleomicina: un caso de neumonitis inducida por bleomicina

Acute Respiratory Failure and Bleomycin: A Case of Bleomycin-Induced Pneumonitis

Sérgio Costa-Monteiro, João Faustino, Jéssica Krowicki, Jorge Henriques

Serviço de Medicina Interna. Unidade Local de Saúde da Região de Aveiro. Aveiro (Portugal)

ABSTRACT

Bleomycin-induced pneumonitis (BIP) is a potentially life-threatening complication of bleomycin chemotherapy, particularly in older patients. We report a case of a 70-year-old female admitted to the hospital with acute respiratory failure, later diagnosed with bleomycin-induced pneumonitis. This case highlights the importance of early recognition and management of BIP, as well as the role of minimizing bleomycin exposure in high-risk populations.

Keywords: Respiratory failure, bleomycin, pulmonary toxicity.

RESUMEN

La neumonitis inducida por bleomicina (NIB) es una complicación potencialmente mortal de la quimioterapia con bleomicina, particularmente en pacientes de edad avanzada. Presentamos el caso de una mujer de 70 años ingresada en el hospital con insuficiencia respiratoria aguda, que posteriormente fue diagnosticada con neumonitis inducida por bleomicina. Este caso destaca la importancia del reconocimiento y manejo precoz de la NIB, así como la necesidad de minimizar la exposición a bleomicina en poblaciones de alto riesgo.

Palabras clave: Insuficiencia respiratoria aguda, bleomicina, toxicidad pulmonar.

INTRODUCTION

Bleomycin is a chemotherapeutic agent used primarily in the treatment of Hodgkin's lymphoma, testicular cancer, and other malignancies. Its cytotoxic effects are exerted through the induction of DNA strand breaks. While effective, bleomycin is known for its dose-limiting pulmonary toxicity, which occurs in approximately 10-20% of patients receiving the drug, with the risk increasing in the elderly population, those with pre-existing lung disease, or patients receiving higher cumulative doses[1,2]. This case discusses a 70-year-old woman undergoing bleomycin-based chemotherapy who presented with acute respiratory failure secondary to bleomycin-induced pneumonitis (BIP).

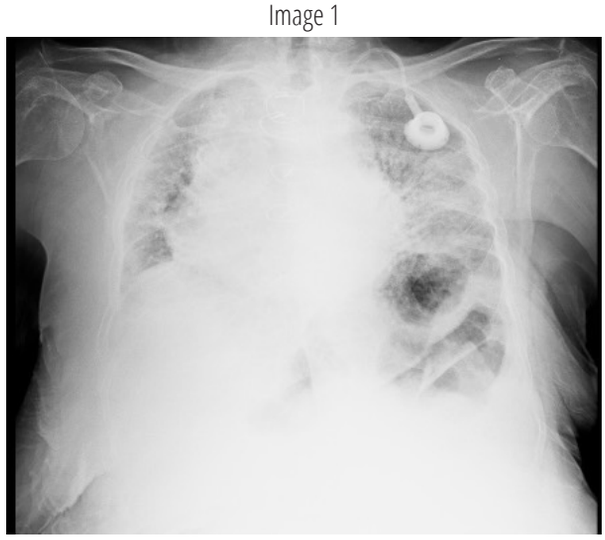
CASE REPORT

A 70-year-old female with a history of stage IIIB Hodgkin's lymphoma was admitted to our hospital with acute onset of shortness of breath, orthopnea and hypoxemia. She had completed three cycles of ABVD chemotherapy (doxorubicin, bleomycin, vinblastine, and dacarbazine), with a cumulative bleomycin dose of 180 mg/m².

Her past medical history included hypertension and coronary artery bypass surgery, but no known history of lung disease or smoking. The patient reported a gradual increase in dyspnea over the preceding two weeks, which worsened acutely in the 24 hours prior to admission. She denied fever, chest pain, or hemoptysis.

On examination, she was tachypneic and she has an oxygen saturation of 88% on room air. Auscultation of the lungs revealed bilateral fine crackles, and there was no peripheral edema. Laboratory investigations showed no evidence of infection, with a normal white blood cell count and no bacterial growth in blood cultures. Arterial blood gases indicated Type 1 respiratory failure (PaO2 of 55 mmHg on 60% oxygen).

Image 1



A chest X-ray showed bilateral interstitial infiltrates (Image 1). Initially, these alterations were interpreted in context of acute heart failure and oriented with noninvasive mechanical ventilation, diuretic bolus and diuresis monitoring. Despite negative balance, and a positive response to diuretic therapy (given by urinary sodium and urine output at 6 hours), the patient presents a deterioration in her pulmonary function. In this context, a high-resolution computed tomography scan of the chest revealed diffuse ground-glass opacities with areas of consolidation, without evidence of pulmonary embolism or malignancy recurrence (Image 2). Given her recent chemotherapy and imaging findings, the diagnosis of bleomycin-induced pneumonitis was suspected. Bleomycin was immediately discontinued, and the patient was started on high-dose corticosteroids (methylprednisolone 1 mg/kg/day). Broad-spectrum antibiotics were initiated empirically but discontinued after a complete two sets of negative microbiologi-

Correspondencia: 71258@chbv.min-saude.pt

Cómo citar este artículo: Costa-Monteiro S, Faustino J, Krowicki J, Henriques J.
Acute Respiratory Failure and Bleomycin: A Case of Bleomycin-Induced Pneumonitis. Galicia Clin 2025; 86-4: 22-23.
Recibido: 02/10/2024 ; Aceptado: 20/11/2024 // https://doi.org/10.22546/86/4/1358

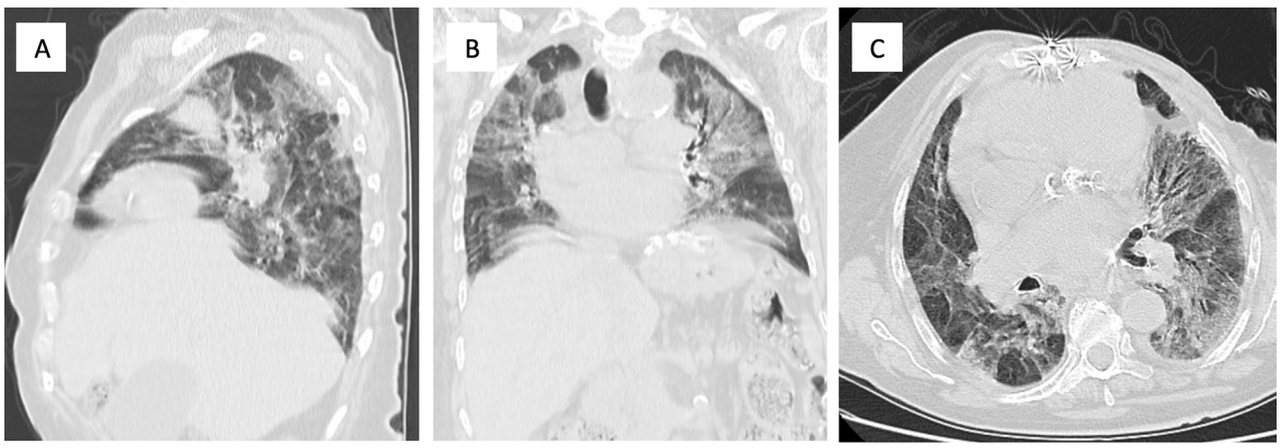


Image 2

cal tests. After two weeks with continued corticosteroid therapy, her respiratory function gradually improved. The corticosteroid dose was tapered over eight weeks, and the patient was discharged after twenty-eight days of hospitalization, with an ambulatory monitoring planning. At three months after discharge, a chest X-ray (Image 3) showed the resolution of practically all documented changes, without recurrence of symptoms.

DISCUSSION

Bleomycin-induced pneumonitis (BIP) is an established complication of bleomycin therapy, with a reported incidence of 10-20%. The risk of BIP is influenced by cumulative dose, patient age, renal function, and concurrent oxygen therapy[3]. In this case, the patient received a total dose of 180 mg/m², which is within the range associated with higher risk for pulmonary toxicity, particularly in elderly patients.

The pathophysiology of BIP is not fully understood, but it is thought to involve direct cytotoxic effects on pulmonary endothelial cells and the generation of reactive oxygen species, leading to oxidative stress and inflammation.[4] The disease typically presents with progressive dyspnea, non-productive cough, and hypoxemia. Radiological findings include bilateral interstitial infiltrates and ground-glass opacities, as seen in our patient.[4]

The differential diagnosis of acute respiratory failure in cancer patients is broad and includes infection, pulmonary embolism, cardiogenic edema, and progression of the underlying malignancy. However, the absence of infection, malignancy recurrence, and the presence of characteristic imaging findings supported the diagnosis of BIP in this patient.

The management of BIP involves the immediate cessation of bleomycin and the administration of corticosteroids, which can reverse the inflammatory process. In severe cases, mechanical ventilation may be required, as was necessary for our patient. The role of corticosteroids is well established, though the optimal dose and duration remain debated[5]. In this case, prolonged steroid therapy with gradual tapering was effective. Given the significant morbidity and mortality associated with BIP, it is crucial to identify patients at risk and minimize bleomycin exposure when possible. Alternative chemotherapy regimens without bleomycin should be considered in elderly patients or those with predisposing factors for pulmonary toxicity.[6]

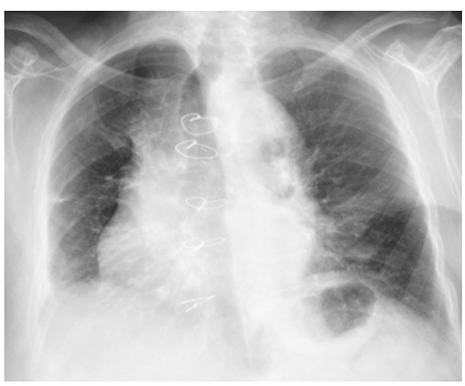


Image 3

This case highlights the potentially life-threatening pulmonary toxicity of bleomycin, especially in older patients. Prompt recognition and treatment with corticosteroids can improve outcomes, but BIP remains a challenging complication that requires close monitoring. In patients at high risk, such as the elderly or those with underlying pulmonary disease, bleomycin-sparing regimens should be strongly considered to reduce the likelihood of this serious adverse event.

CONFLICT OF INTEREST
All authors declare that there are no conflicts of interest in carrying out this work.

SOURCE OF FUNDING
There were no external sources of funding for this article for any of the authors.

ETHICAL ASPECTS
The patient's written consent was obtained for publication of this case.

REFERENCES

1. Sleijfer S. Bleomycin-induced pneumonitis. Chest. 2021; 120(2), 617-624
2. Hecht SM. Bleomycin: new perspectives on the mechanism of action. Journal of Natural Products. 2000; 63(1), 158-168.
3. Williamson JD, Sadofsky LR and Simon PH. Bleomycin-induced lung injury. American Journal of Respiratory and Critical Care Medicine. 2006; 174(7), 661-664.
4. Santos-Ribeiro D, Lecocq M, Beukelaer M., et al. Bleomycin-induced lung injury: Revisiting an old tool to model group III PH associated with pulmonary fibrosis. Pulm Circ. 2023; 174(7), 661-664.
5. Reinert T, Baldotto C, Nunes F and Scheliga A. Bleomycin-Induced Lung Injury. Journal of Cancer Research. 2013; 480608.
6. Aykaç N, and Tecimer C. Imatinib Treatment for Bleomycin-Induced Pulmonary Toxicity. Thorac Res Pract. 2020; 21: 457-460.