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Case Report

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A case of early-stage lung cancer diagnosed concurrently with dasatinib-induced pleural effusion in a patient with chronic myeloid leukemia

Maşide Arı*[1], Bahar Kurt[2], Murat Albayrak[3]

[1]Department of Chest Diseases, Ankara Atatürk Sanatorium Training and Research Hospital, University of Health Sciences, Ankara, Turkiye
[2]Department of Chest Diseases, Ankara Etlik City Hospital, Ankara, Turkiye
[3]Department of Hematology, Ankara Etlik City Hospital, Ankara, Turkiye

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***Corresponding Author:** Maşide Arı, masidetuten@icloud.com

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ABSTRACT

Advancements in cancer therapies have increased patient survival rates but have also brought about a higher risk of secondary malignancies. Dasatinib, a tyrosine kinase inhibitor commonly used in the treatment of chronic myeloid leukemia, is known to be associated with adverse effects such as pleural effusion. In this report, we present a case of a patient who developed pleural effusion during dasatinib therapy and was subsequently diagnosed with early-stage lung cancer upon further investigation. This case underscores the importance of a multidisciplinary approach in oncologic follow-up and highlights the need for vigilance regarding secondary primary malignancies.

Keywords: Secondary neoplasms, thoracic neoplasms, drug toxicity, diagnostic imaging, multidisciplinary approach

INTRODUCTION

Chronic myeloid leukemia (CML) is a clonal hematologic malignancy driven by the BCR-ABL1 fusion gene, and the advent of tyrosine kinase inhibitors (TKIs) has significantly prolonged survival in affected patientS.[1] Among second-generation TKIs, dasatinib is known for its high efficacy but has also been associated with non-hematologic adverse effects, most notably pleural effusion, in certain patients.[2] However, attributing new symptoms that arise during treatment solely to drug side effects-particularly in patients who achieve long-term survival-may lead to diagnostic delays and missed clinical opportunities. In this context, the possibility of a second primary malignancy should be carefully considered, especially in individuals with additional risk factors such as a history of smoking. This case report discusses the diagnosis of early-stage lung adenocarcinoma in a patient receiving dasatinib for CML, discovered during the evaluation of a newly developed pleural effusion. The case underscores the importance of thorough clinical assessment of new findings in patients undergoing TKI therapy to enable early detection of secondary primary malignancies.

CASE

A 54-year-old male patient with a 40 pack-year smoking history, under follow-up for one year with a diagnosis of CML, presented to the pulmonology outpatient clinic with progressively worsening dyspnea over the past few weeks. The patient had been receiving dasatinib at a dose of 100 mg/day consistently. Systemic review revealed no symptoms such as fever, cough, sputum production, weight loss, or hemoptysis. Physical examination showed markedly diminished breath sounds and dullness to percussion in the lower right hemithorax. Vital signs were stable, and the patient's oxygen saturation was 94% at rest, decreasing to 89% with mild exertion. Routine laboratory tests revealed normal levels of leukocytes, hemoglobin, and platelets, while C-reactive protein (CRP) was approximately twice the upper limit of normal. Chest X-ray demonstrated a significant pleural effusion in the right lower zone (**Figure 1**). Diagnostic thoracentesis yielded 250 ml of clear, straw-colored fluid. Analysis revealed exudative characteristics, with a protein level of 4.1 g/dl and LDH of 360 U/L. Cytological analysis showed a lymphocyte-predominant (>80%) inflammatory cell profile. No malignant cells were detected in any of the three cytology samples, and microbiological studies were negative.

Given that the patient was in hematologic remission and in the chronic phase of CML, the pleural effusion was not attributed solely to dasatinib therapy, and further diagnostic work-up was pursued. Chest computed tomography (CT) revealed multiple solid nodules with irregular margins in the posterior segment of the right upper lobe, the largest measuring 7×5 mm (**Figure 2**). Fiberoptic bronchoscopy was performed, revealing an irregular, infiltrative lesion with disrupted mucosal surface on the posterior wall of the right upper lobe bronchus. Histopathological examination of biopsy samples confirmed a diagnosis of adenosquamous carcinoma. Subsequent PET/CT imaging showed FDG

Figure 1. Chest radiograph of the patient at the time of presentation

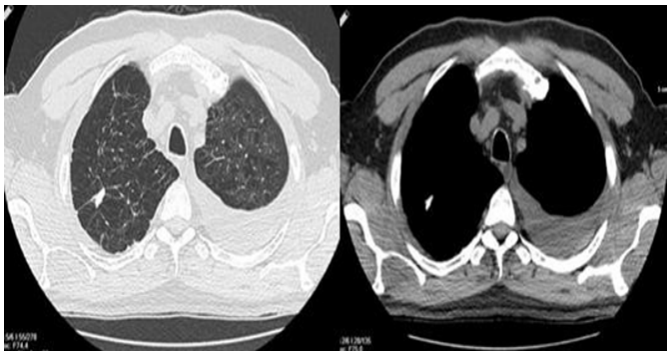

Figure 2. Computed tomography scan of the patient's chest

uptake in the right upper lobe nodule with a SUVmax of 5.8. The likelihood of malignant effusion was considered low due to the absence of FDG uptake in the fluid area on PET/CT and repeated negative cytology results. Culture results were negative, and there was no clinical evidence supporting infection. Therefore, an invasive pleural biopsy was not deemed necessary. No extrathoracic involvement or lymph node metastasis was observed. The disease was staged as T1N0M0, corresponding to stage IA1. Pulmonary function tests showed FEV_1: 2.85 L (81% predicted), FVC: 3.60 L (85% predicted), and DLCO: 78%, indicating no functional contraindication to surgery. Following a multidisciplinary evaluation with the hematology department, it was decided that the patient would continue dasatinib therapy and be referred to the thoracic surgery department for management of lung cancer. Considering that the most probable cause of the pleural effusion was drug toxicity related to dasatinib, the hematology team reduced the treatment dose and scheduled the patient for regular follow-up to monitor for fluid accumulation. There was no indication for radiotherapy or adjuvant chemotherapy. The thoracic surgery team planned a primary surgical resection, and the patient underwent right upper lobectomy. The postoperative histopathological examination was reported to be consistent with adenosquamous carcinoma.

DISCUSSION

CML is now considered one of the hematologic malignancies with long-term survival, largely due to the efficacy of TKIs. However, the treatment course extends beyond disease control, as new clinical challenges such as non-hematologic adverse effects and secondary primary malignancies have emerged during long-term follow-up.[3] Among second-generation TKIs, dasatinib offers high molecular response rates but is also associated with adverse effects such as pleural effusion.[4] Although these effusions are often considered benign, in some cases they may represent the initial manifestation of a more serious underlying pathology.

Second primary cancers are among the most significant late complications observed in oncology patients with prolonged survival. Following disease recurrence, they rank second among treatment-related late mortality causes and substantially increase morbidity during follow-up.[5] Factors contributing to this risk include cumulative exposure to radiotherapy and chemotherapy, age at treatment, time elapsed since therapy, family history, and smoking.[6] Among individuals who are long-term survivors of hematologic malignancies, lung cancer is one of the most commonly encountered secondary solid tumors.[7] Lung cancer remains the leading cause of cancer-related mortality worldwide.[8] When detected at an early stage, the likelihood of cure and overall survival increases significantly; therefore, incidental detection or diagnosis prompted by concomitant clinical conditions is of great prognostic value.[9] In the presented case, a patient receiving dasatinib therapy for CML was diagnosed with early-stage lung cancer following a thorough evaluation of newly developed pleural effusion. This case highlights the importance of not attributing new respiratory symptoms solely to drug-related side effects in patients undergoing TKI therapy. Particularly in individuals with known risk factors, a multidisciplinary approach is crucial for the timely diagnosis of second primary malignancies.

CONCLUSION

In patients undergoing long-term targeted therapy for chronic diseases, newly emerging clinical findings should not be attributed solely to drug-related adverse effects; instead, other potential underlying causes must be thoroughly investigated. As demonstrated in this case, detailed evaluation of pleural effusion developed during dasatinib therapy led to the diagnosis of asymptomatic, early-stage lung cancer. This highlights that clinical vigilance and a multidisciplinary approach can enable timely intervention, which may significantly influence survival and prognosis. Therefore, in patients-particularly those with a history of smoking-new-onset respiratory symptoms should be assessed comprehensively, as this is crucial for the early detection of secondary malignancies.

ETHICAL DECLARATIONS

Informed Consent

Written informed consent was obtained from the patient(s) included in this report. Signed consent forms are retained by the authors and are available upon request.

Peer Review Process

This report underwent external peer review.

Conflict of Interest
The authors declare no conflicts of interest.

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Author Contributions
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