MAR Pulmonology & Respiratory Medicine (2026) 9:1

Case Report

Dasatinib-Induced Recurrent Pleural Effusion in Chronic Myeloid Leukemia: A Case Report and Review of Management Strategies

Dr. Amit Kumar Pandey*, Dr. Krishan Kumar[1], Dr. Darshak Mehul Patel[2], Dr. Anubha Tiwari[3]

Correspondence to: Dr. Amit Kumar Pandey

Copyright

Received: 02 March 2026

Published: 01 April 2026

DOI: https://doi.org/10.5281/zenodo.19430832

Abstract

Dasatinib is a second-generation tyrosine kinase inhibitor widely used in the management of chronic myeloid leukemia (CML). Pleural effusion is a well-recognised but incompletely understood adverse effect of dasatinib therapy. We report a case of a 34-year-old man with BCR::ABL1-positive CML who developed recurrent bilateral pleural effusion during first-line dasatinib treatment. Extensive evaluation excluded infectious, cardiac, malignant, and thromboembolic causes. The pleural effusion recurred despite therapeutic thoracentesis, prompting permanent discontinuation of dasatinib and transition to nilotinib, following which there was complete clinical and radiological resolution. This case highlights the importance of recognising dasatinib-induced pleural effusion even in young patients without conventional risk factors and discusses current management strategies.

Keywords: Chronic myeloid leukemia; Dasatinib; Pleural effusion; Tyrosine kinase inhibitors; Nilotinib; Drug toxicity

Introduction

ABL1 tyrosine kinase inhibitors (TKIs) has transformed chronic myeloid leukemia (CML) into a chronic, manageable condition with near-normal life expectancy. However, TKIs are associated with off-target toxicities that may significantly impact morbidity and treatment adherence.

Among available TKIs, dasatinib is uniquely associated with pleural effusion, with reported incidences ranging from 14% to 30%. The mechanism is thought to involve immune-mediated serosal inflammation and kinase inhibition beyond BCR::ABL1. Despite increasing clinical recognition, uncertainty remains regarding optimal management, particularly in cases of recurrence. This report contributes to the growing literature on dasatinib-induced pleural effusion and supports early drug switching in severe or recurrent cases.

Case Presentation

A 34-year-old man presented with progressively worsening exertional dyspnea, intermittent non-productive cough, fatigue, bilateral lower limb edema, and abdominal distension. Symptoms had been present for approximately two months, with significant worsening over the preceding 15 days.

He had been diagnosed with chronic myeloid leukemia at 26 years of age and was receiving dasatinib 75 mg twice daily as first-line therapy. He had no history of cardiovascular disease, pulmonary illness, autoimmune disorders, hypertension, or smoking. There was no history of tuberculosis or occupational exposure.

On examination, breath sounds were reduced bilaterally with dullness to percussion over the lower lung fields. Other systemic examination findings were unremarkable.

Investigations

Chest radiography revealed bilateral massive pleural effusions. Diagnostic and therapeutic thoracentesis yielded approximately 2 litres of hemorrhagic fluid.

Pleural fluid analysis showed:

• Total leukocyte count: 1100 cells/mm³

• Differential count: lymphocytes 80%, polymorphs 20%

• Protein: 5.37 g/dL

• LDH: 240 IU/L

• Glucose: 141 mg/dL

• pH: 7.5

• ADA: 21 U/L

Cytological examination was negative for malignant cells. Microbiological evaluation, including acid-fast bacilli staining, was negative. Echocardiography showed normal cardiac function. There was no evidence of renal or hepatic dysfunction.

Differential Diagnosis

• Tuberculous pleural effusion

• Malignant pleural effusion

• Cardiac failure–related effusion

• Pulmonary embolism

• Drug-induced pleural effusion (dasatinib)

Given the lymphocyte-predominant exudate, negative workup, and temporal association with dasatinib therapy, a diagnosis of dasatinib-induced pleural effusion was made.

Treatment

Initial management included therapeutic thoracentesis and supportive care. Despite transient symptomatic improvement, the patient re-presented with recurrent dyspnea, and repeat imaging confirmed re-accumulation of bilateral pleural effusion.

In view of recurrence and severity, dasatinib was permanently discontinued. The patient was switched to nilotinib, considering its lower incidence of pleural toxicity.

Outcome and Follow-Up

Following the change in therapy, the patient experienced complete resolution of symptoms. Follow-up chest radiography showed near-complete resolution of pleural effusion. At subsequent visits, there was no recurrence of effusion, and the patient remained clinically stable on nilotinib with continued hematological response.

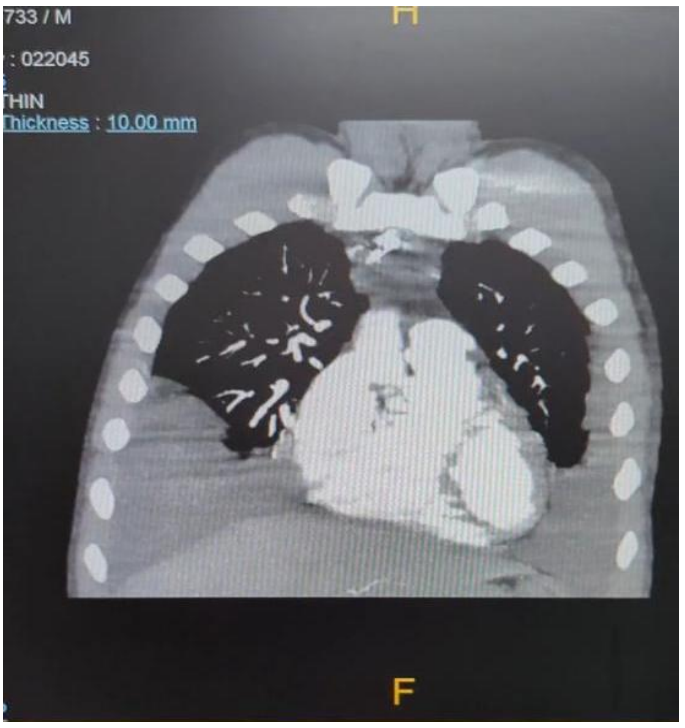

Figure 1. Coronal section of CTPA done to rule out Pulmonary Embolism as a cause for Severe Pulmonary Hypertension discovered at screening 2D-ECHO at presentation demonstrating bilateral large pleural

effusions, and passive lower-lobe compression, consistent with a **large-volume pleural fluid accumulation** in a patient on dasatinib therapy.

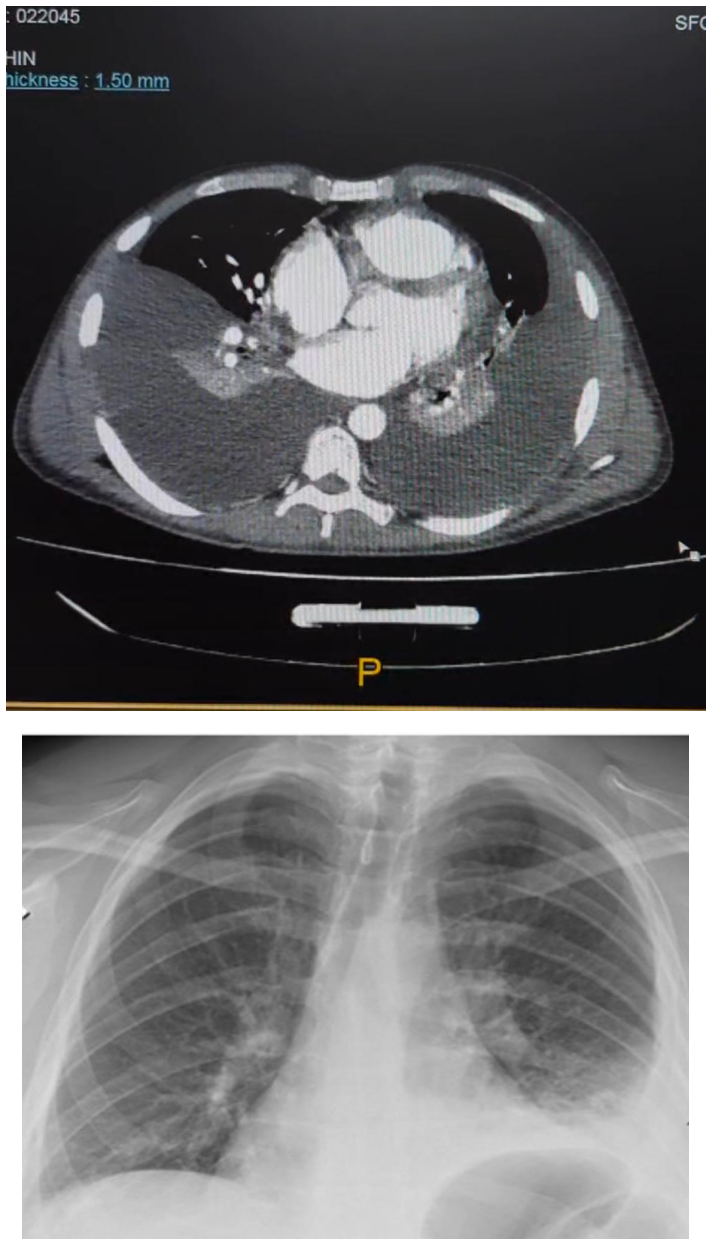

Figure 2. Follow-up posteroanterior chest radiograph obtained after permanent discontinuation of dasatinib and initiation of nilotinib, showing near-complete resolution of bilateral pleural effusions, re-expansion of the lung bases, and restoration of costophrenic angles, with minimal residual left-sided pleural fluid.

"The radiological pattern of recurrent bilateral pleural effusion without parenchymal lung disease, in conjunction with lymphocyte-predominant exudative fluid and prompt resolution after drug discontinuation, strongly supported a diagnosis of dasatinib-induced pleural effusion."

Discussion

Pleural effusion is a distinctive adverse effect of dasatinib and is uncommon with other TKIs. Proposed mechanisms include platelet-derived growth factor receptor-β inhibition, SRC kinase inhibition, and immune-mediated lymphocytic serositis. Dasatinib-induced effusions are typically exudative, lymphocyte-predominant, and non-malignant.

While older age and comorbidities are considered risk factors, this case demonstrates that pleural effusion may occur in young, otherwise healthy individuals and during first-line therapy. Recurrence rates are high, and repeated dose interruptions or reductions may be insufficient.

Switching to an alternative TKI such as nilotinib or bosutinib has been shown to be effective in preventing recurrence and maintaining disease control, as illustrated in this case.

Learning Points

• Dasatinib-induced pleural effusion should be considered in any CML patient presenting with unexplained dyspnea.

• Pleural effusion may occur early, recur frequently, and affect patients without traditional risk factors.

• Recurrent pleural effusion often necessitates permanent discontinuation of dasatinib.

• Switching to an alternative TKI such as nilotinib can lead to sustained resolution without compromising disease control.

Patient Perspective

The patient reported significant improvement in breathing and overall quality of life after the change in medication and expressed relief at the resolution of recurrent symptoms.

Conclusion

This case underscores that dasatinib-induced pleural effusion can occur early, recur rapidly, and affect patients without conventional risk factors. Permanent discontinuation of dasatinib with transition to nilotinib resulted in sustained resolution without recurrence. Clinicians should maintain a high index of suspicion for this adverse event and tailor management strategies based on severity, recurrence, and overall disease response.

References

1. Jabbour E, Kantarjian H. Chronic myeloid leukemia: 2022 update on diagnosis, therapy, and monitoring. Am J Hematol (2022) 97:1236–56. doi: 10.1002/ajh.26642

2. Iurlo A, Cattaneo D, Bucelli C, Breccia M. Dose optimization of tyrosine kinase inhibitors in chronic myeloid leukemia: A new therapeutic challenge. J Clin Med (2021) 10:515. doi: 10.3390/jcm10030515

3. Cortes JE, Kim DW, Kantarjian HM, Brümmendorf TH, Dyagil I, Griskevicius L, et al. Bosutinib versus imatinib in newly diagnosed chronic-phase chronic myeloid leukemia: results from the BELA trial. J Clin Oncol (2012) 30:3486–92. doi: 10.1200/JCO.2011.38.7522

4. Hochhaus A, Gambacorti-Passerini C, Abboud C, Gjertsen BT, Brümmendorf TH, Smith BD, et al. Bosutinib for pretreated patients with chronic phase chronic myeloid leukemia: primary results of the phase 4 BYOND study. Leukemia (2020) 34:2125–37. doi: 10.1038/s41375-020-0915-9

5. Brümmendorf TH, Cortes JE, Milojkovic D, Gambacorti-Passerini C, Clark RE, le Coutre P, et al. Bosutinib versus imatinib for newly diagnosed chronic phase chronic myeloid leukemia: final results from the BFORE trial. Leukemia (2022) 36:1825–33. doi: 10.1038/s41375-022-01589-y

6. Miura M. Therapeutic drug monitoring of imatinib, nilotinib, and dasatinib for patients with chronic myeloid leukemia. Biol Pharm Bull (2015) 38:645–54. doi: 10.1248/bpb.b15-00103

7. Suh KJ, Lee JY, Shin DY, Koh Y, Bang SM, Yoon SS, et al. Analysis of adverse events associated with dasatinib and nilotinib treatments in chronic-phase chronic myeloid leukemia patients outside clinical trials. Int J Hematol (2017) 106:229–39. doi: 10.1007/s12185-017-2225-1

8. Masiello D, Gorospe G, Yang AS. The occurrence and management of fluid retention associated with TKI therapy in CML, with a focus on dasatinib. J Hematol Oncol (2009) 2:46. doi: 10.1186/1756-8722-2-46

9. Cortes JE, Jimenez CA, Mauro MJ, Geyer A, Pinilla-Ibarz J, Smith BD. Pleural effusion in dasatinib-treated patients with chronic myeloid leukemia in chronic phase: Identification and management. Clin Lymphoma. Myeloma Leuk (2017) 17:78–82. doi: 10.1016/j.clml.2016.09.012

10. Cortes JE, Saglio G, Kantarjian HM, Baccarani M, Mayer J, Boqué C, et al. Final 5-year study results of DASISION: The dasatinib versus imatinib study in treatment-naive chronic myeloid leukemia patients trial. J Clin Oncol (2016) 34:2333–40. doi: 10.1200/JCO.2015.64.8899

11. Iurlo A, Galimberti S, Abruzzese S, Annunziata M, Bonifacio M, Latagliata R, et al. Pleural effusion and molecular response in dasatinib-treated chronic myeloid leukemia patients in a real-life Italian multicenter series. Ann Hematol (2018) 97:95–100. doi: 10.1007/s00277-017-3144-1

12. Steegmann JL, Baccarani M, Breccia M, Casado LF, García-Gutiérrez V, Hochhaus A, et al. European LeukemiaNet recommendations for the management and avoidance of adverse events of treatment in chronic myeloid leukaemia. Leukemia (2016) 30:1648–71. doi: 10.1038/leu.2016.104

13. Cortes J, Mauro M, Steegmann JL, Saglio G, Malhotra R, Ukropec JA, et al. Cardiovascular and pulmonary adverse events in patients treated with BCR-ABL inhibitors: Data from the FDA adverse event reporting system. Am J Hematol (2015) 90:E66–72. doi: 10.1002/ajh.23938

14. Kantarjian HM, Hughes TP, Larson RA, Kim DW, Issaragrisil S, le Coutre P, et al. Long-term outcomes with frontline nilotinib versus imatinib in newly diagnosed chronic myeloid leukemia in chronic phase: ENESTnd 10-year analysis. Leukemia (2021) 35:440–53. doi: 10.1038/s41375-020-01111-2

15. Kantarjian HM, Giles F, Gattermann N, Bhalla K, Alimena G, Palandri F, et al. Nilotinib (formerly AMN107), a highly selective BCR-ABL tyrosine kinase inhibitor, is effective in patients with Philadelphia chromosome–positive chronic myelogenous leukemia in chronic phase following imatinib resistance and intolerance. Blood (2007) 110:3540–6. doi: 10.1182/blood-2007-03-080689

16. Hochhaus A, Baccarani M, Silver RT, Schiffer C, Apperley JF, Cervantes F, et al. European LeukemiaNet 2020 recommendations for treating chronic myeloid leukemia. Leukemia (2020) 34:966–84. doi: 10.1038/s41375-020-0776-2

17. Highlights of prescribing information, FDA . Available at: https://www.accessdata.fda.gov/drugsatfda_docs/label/2018/022068s029lbl.pdf (Accessed 17 Mar 2021).

18. Quintas-Cardama A, Kantarjian H, O'brien S, Borthakur G, Bruzzi J, Munden R, et al. Pleural effusion in patients with chronic myelogenous leukemia treated with dasatinib after imatinib failure. J Clin Oncol (2007) 25:3908–14. doi: 10.1200/JCO.2007.12.0329

19. de Lavallade H, Punnialingam S, Milojkovic D, Bua M, Khorashad JS, Gabriel IH, et al. Pleural effusions in patients with chronic myeloid leukaemia treated with dasatinib may have an immune-mediated pathogenesis. Br J Haematol (2008) 141:745–7. doi: 10.1111/j.1365-2141.2008.07108.x

20. Bergeron A, Rea D, Levy V, Picard C, Meignin V, Tamburini J, et al. Lung abnormalities after dasatinib treatment for chronic myeloid leukemia. Am J Respir Crit Care Med (2007) 176:814–8. doi: 10.1164/rccm.200705-715CR

21. Kelly K, Swords R, Mahalingam D, Padmanabhan S, Giles FJ. Serosal inflammation (pleural and pericardial effusions) related to tyrosine kinase inhibitors. Targeting Oncol (2009) 4:99–105. doi: 10.1007/s11523-009-0110-4

22. Puttini M, Coluccia AM, Boschelli F, Cleris L, Marchesi E, Donella-Deana A, et al. In vitro and in vivo activity of SKI-606, a novel src-abl inhibitor, against imatinib-resistant bcr-Abl1 neoplastic cells. Cancer Res (2006) 66:11314–22. doi: 10.1158/0008-5472.CAN-06-1199

23. Remsing Rix LL, Rix U, Colinge J, Hantschel O, Bennett KL, Stranzl T, et al. Global target profile of the kinase inhibitor bosutinib in primary chronic myeloid leukemia cells. Leukemia (2009) 23:477–85. doi: 10.1038/leu.2008.334

24. Cortes JE, Kantarjian HM, Mauro MJ, An F, Nick S, Leip E, et al. Long-term cardiac, vascular, hypertension, and effusion safety of bosutinib in patients with Philadelphia chromosome-positive leukemia resistant or intolerant to prior therapy. Eur J Haematol (2021) 106:808–20. doi: 10.1111/ejh.13608

25. Tiribelli M, Abruzzese E, Capodanno I, Sorà F, Trabacchi E, Iurlo A, et al. Efficacy and safety of bosutinib in chronic phase CML patients developing pleural effusion under dasatinib therapy. Ann Hematol (2019) 98:2609–11. doi: 10.1007/s00277-019-03802-y

26. Gambacorti-Passerini C, Cortes JE, Lipton JH, Dmoszynska A, Wong RS, Rossiev V, et al. Safety of bosutinib versus imatinib in the phase 3 BELA trial in newly diagnosed chronic phase chronic myeloid leukemia. Am J Hematol (2014) 89:947–53. doi: 10.1002/ajh.23788

27. Kreutzman A, Yadav B, Brummendorf TH, Gjertsen BT, Lee MH, Janssen J, et al. Immunological monitoring of newly diagnosed CML patients treated with bosutinib or imatinib first-line. Oncoimmunology (2019) 8:e1638210. doi: 10.1080/2162402X.2019.1638210

28. Weatherald J, Bondeelle L, Chaumais MC, Guignabert C, Savale L, Jaïs X, et al. Pulmonary complications of bcr-abl tyrosine kinase inhibitors. Eur Respir J (2020) 56:2000279. doi: 10.1183/13993003.00279-2020

29. Chakraborty K, Bossaer JB, Patel R, Krishnan K. Successful treatment of nilotinib-induced pleural effusion with prednisone. J Oncol Pharm Pract (2012) 19:175–7. doi: 10.1177/1078155212447530

30. Teke H.Ü, Akay OM, Şahin DG, Karagülle M, Gündüz E, Andjç N. Pleural effusion: a rare side effect of nilotinib–a case report. Case Rep Med (2014) 2014:203939. doi: 10.1155/2014/203939

31. Satoh K, Morisawa S, Okuyama M, Nakae H. Severe pleural effusion associated with nilotinib for chronic myeloid leukemia: cross-intollerance with tyrosin kinase inhibitors. BMJ. Case Rep (2021) 14:e243671. doi: 10.1136/bcr-2021-243671

32. Padula WV, Larson RA, Dusetzina SB, Apperley JF, Hehlmann R, Baccarani M, et al. Cost-effectiveness of tyrosine kinase inhibitor treatment strategies for chronic myeloid leukemia in chronic phase after generic entry of imatinib in the united states. J Natl Cancer Inst (2016) 108:djw003. doi: 10.1093/jnci/djw003

33. Yamamoto C, Nakashima H, Ikeda T, Kawaguchi S-I, Toda Y, Ito S, et al. Analysis of the cost-effectiveness of treatment strategies for CML with incorporation of treatment discontinuation. Blood Adv (2019) 3:3266–77. doi: 10.1182/bloodadvances.2019000745

34. Ciftciler R, Haznedaroglu IC. Tailored tyrosine kinase inhibitor (TKI) treatment of chronic myeloid leukemia (CML) based on current evidence. Eur Rev Med Pharmacol Sci (2021) 25:7787–98. doi: 10.26355/eurrev_202112_27625