CASE REPORT

Massive haemoptysis following dabigatran administration in a patient with bronchiectasis

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SUMMARY

We report a case of life-threatening haemoptysis after administration of dabigatran in a patient with bronchiectasis. A 72-year-old woman had received dabigatran at a dose of 110 mg twice daily for chronic atrial fibrillation. She was admitted to our hospital for cerebral infarction after a few days of self-interruption of dabigatran. After the diagnosis of cerebral infarction, administration of dabigatran was restarted. Seven days later, she suffered acute-onset massive haemoptysis and required mechanical ventilation. Dabigatran treatment was discontinued, and bronchial artery embolisation (BAE) was performed twice. The bleeding continued for 11 days, but she recovered and was discharged on day 58 after admission.

BACKGROUND

Dabigatran, which directly inhibits the activity of thrombin, has been recommended for prevention of embolic stroke in patients with non-valvular atrial fibrillation.¹ After the approval of dabigatran, however, the rate of reported bleeding incidents was unusually high,² and there are several reports of haemoptysis following treatment with dabigatran.^{3–4} However, haemoptysis is a rare complication and these reports do not consider risk factors in each case.

We report here a near-fatal case in which a patient with bronchiectasis showed massive haemoptysis after receiving dabigatran.

CASE PRESENTATION

The patient was a 72-year-old woman (height, 150 cm; weight, 38 kg) with a history of bronchiectasis in the left lung due to pathology at an early age and no history of sinusitis or haemoptysis (figure 1). She had chronic atrial fibrillation and hypertension, and was evaluated to have a CHADS2 score (Congestive heart failure, Hypertension, Aged 75 years or older, Diabetes mellitus, and prior Stroke or transient ischaemic attack) of 1⁵ and a CHADS2-VASc score of 3.⁶ She had been taking dabigatran (110 mg twice daily), prescribed by her primary care physician, for 2 months prior to this admission. Following a few days of self-interruption of dabigatran treatment, she was admitted to our hospital with paralysis of the left side of her body and was diagnosed with cardiogenic cerebral infarction in the area of the right middle cerebral artery. This was her first visit to our hospital, and previous medical records were not available.

Her symptoms improved immediately after administration of heparin and a neuroprotective

Figure 1 Chest radiograph before admission showing bronchiectasis in the left lung and tracheal deviation to the left.

agent, edaravone, and she had no evidence of vascular stenosis employing MRI. Therefore, the neurosurgeon did not prescribe statin or aspirin.

On day 7 after admission, administration of dabigatran was restarted. She received no other medications apart from dabigatran. On day 14 after admission, she suffered acute-onset massive haemoptysis. Level of consciousness was normal, blood pressure was 150/80 mm Hg, heart rate was 110 bpm, respiratory rate was 38 breaths/min, and oxygen saturation measured by pulse oximetry (SpO₂) was 84% with oxygen supplied at 15 L/min.

INVESTIGATIONS

Blood test results on day 14 after admission revealed near-normal values for parameters reflecting renal function (blood urea nitrogen: 18 mg/dL, creatinine: 0.58 mg/dL), inflammation (white cell count: 8800/ μ L, C reactive protein: 0.47 mg/dL) and coagulation function (prothrombin time: 14.5 s, activated partial thromboplastin time (aPTT): 37.1 s).

Chest radiography and contrast-enhanced chest CT showed left lung parenchymal destruction and bronchiectasis as well as broad consolidation in the right lung due to aspiration of blood from the left lung (figures 2 and 3).

DIFFERENTIAL DIAGNOSIS

Unfortunately, no chest imaging had taken place until the haemoptysis occurred. We diagnosed the

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Figure 2 Chest radiograph obtained on day 14 after admission showing opacity in the entire left lung and broad infiltrative shadows in the right lung.

bleeding site as left bronchiectasis on the chest images after intubation.

The patient had a history of severe pneumonia at an early age, which we considered to be the cause of the left lung parenchymal destruction with bronchiectasis.

TREATMENT

Intubation and mechanical ventilation were required following haemoptysis. There was a large quantity of blood entering the right lung, but this was mostly removed by suction, obviating the need for one-lung intubation or a double-lumen cuffed tube. Dabigatran treatment was discontinued on day 14 after admission. Circulatory dynamics were maintained by administration of vasopressors and transfusion of fresh frozen plasma and red blood cells. A bronchial blocker was placed in her left main

bronchus. Bronchial artery embolisation (BAE) was performed on days 14 and 17 after admission to stop the bleeding (figure 4).

Despite treatment, minor bleeding continued, and we performed a tracheostomy on day 21 after admission.

OUTCOME AND FOLLOW-UP

The bleeding gradually decreased and stopped completely on day 24 after admission.

The patient was removed from the ventilator on day 28. Left paresis persisted, but she was discharged on day 58 after admission. Subsequently, she has not received any anticoagulant therapy and has not shown haemoptysis.

DISCUSSION

Patients with chronic atrial fibrillation require anticoagulant or antiplatelet therapy depending on the risk of embolism.⁷ The CHADS2 score and the CHADS2-VASc score are useful tools to evaluate the risk of embolism.^{5 6} According to the results of these schemas, an oral anticoagulant drug was recommended to the patient.⁸

Dabigatran is recommended as an option for patients with a CHADS2 score of 1, and a dose of 110 mg twice daily is recommended for patients over 70 years of age, in whom risk of bleeding is considered high.⁹ According to these guidelines, dabigatran (110 mg twice daily) was a reasonable treatment choice in this case.

A large-scale randomised control trial showed that dabigatran had a lower risk of major bleeding at a dose of 110 mg twice daily compared with warfarin.¹⁰ Further, the terminal half-life of dabigatran is 12–14 h.¹¹ However, the patient developed near-fatal bleeding, which continued for 11 days after discontinuation of dabigatran. The aPTT of the patient was normal. Therefore, the dabigatran dose was not considered excessive.¹² The main cause of bleeding might be bronchiectasis; however, we suspect the association of dabigatran therapy, because the patient had no history of haemoptysis. Even dabigatran, which is regarded as a safer drug,¹⁰ might have been associated with severe bleeding in this case.

BAE successfully resolves pulmonary haemorrhage in most cases, but early technical failures occur occasionally.¹³ Therefore, the prolonged bleeding might have been caused by BAE failure.

Figure 3 Contrast-enhanced chest CT obtained on day 14 after admission showing volume loss with bronchiectasis and dilated arteries in the left lung as well as diffuse ground glass opacity and consolidation in the right lung. There was no evidence of pulmonary embolism.

Figure 4 Bronchial arteriography obtained on day 14 after admission showing many dilated bronchial arteries.

The patient-specific risk of bleeding should be considered before instituting anticoagulant drug therapy. Multiple bleeding risk scores are available, such as the HASBLED (Hypertension, Abnormal renal or liver function, Stroke, Bleeding history of predisposition, Labile INR, Elderly, Drugs or Alcohol concomitantly) score.¹⁴ However, relatively rare comorbidities are not reflected in such risk scores.

Bronchiectasis is a common cause of haemoptysis.¹⁵ A retrospective study showed that 27% of patients with bronchiectasis developed haemoptysis.¹⁶ Therefore, the possibility of massive haemoptysis should be considered in patients with bronchiectasis, prior to prescribing anticoagulants.

Learning points

- Bronchiectasis can predispose to massive haemoptysis even with dabigatran, which is regarded as a safer anticoagulant drug.
- We should also evaluate pulmonary lesions that may cause haemoptysis, such as bronchiectasis, prior to prescribing anticoagulants.
- We should examine whether dabigatran would increase the risk of haemoptysis in patients with bronchiectasis in the future.

The CHADS2 score of the patient was 3 after the cerebral infarction, and her stroke rate per year was 5.9%.⁵ However, we considered that antithrombotic therapy was not recommended because of the continuing risk of life-threatening haemoptysis. Therefore, we have not administered any anticoagulant agent.

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