



Spontaneous hemothorax as an adverse effect of rivaroxaban treatment

Rivaroksaban tedavisinin olumsuz bir etkisi olarak spontan hemotoraks

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ABSTRACT

Although new oral anticoagulants are known to have decreased bleeding risk compared to vitamin K antagonists, they may cause major bleeding in rare cases. In this article, we report a 78-year-old female patient who developed spontaneous hemothorax after rivaroxaban use. Left-sided pleuritic chest pain occurred in the patient due to the rivaroxaban she received for pulmonary thromboembolism. Diagnostic thoracentesis revealed a grossly bloody pleural effusion. Rivaroxaban was discontinued and the drainage of the hemothorax was performed by fine needle aspiration. To our knowledge, this is the first case report of rivaroxaban-induced spontaneous hemothorax, drawing attention to major hemorrhagic complications of new oral anticoagulants.

Keywords: Hemothorax; pulmonary thromboembolism; rivaroxaban; spontaneous.

Anticoagulants are widely used for the prevention and treatment of venous and arterial thrombosis. Until recently, vitamin K antagonists (VKAs) were the only available oral anticoagulants. Although effective, VKAs have numerous limitations owing to bleeding as an adverse event, drug-drug interactions, and slow onset and offset of action, all of which complicate its management. Therefore, new oral anticoagulants (NOACs) were developed to overcome the limitations of VKAs. NOACs can be administered in fixed doses without routine coagulation monitoring, thereby streamlining anticoagulant therapy.^[1] In a recent meta-analysis, Castellucci et al.^[2] reported that the efficacy of NOACs is comparable to VKAs. The authors also suggested that rivaroxaban and apixaban might be associated with a lower bleeding risk. Despite the relatively lower bleeding risk with rivaroxaban, the current case suggests that spontaneous hemothorax may occur after the use of NOACs.

ÖZ

Yeni oral antikoagülanların K vitamini antagonistlerine kıyasla azalmış kanama riskine sahip olduğu bilinse de onlar nadir olgularda majör kanamaya yol açabilir. Bu yazıda, rivaroksaban kullanımından sonra spontan hemotoraks gelişen 78 yaşında bir kadın hasta bildirildi. Pulmoner tromboembolizm için aldığı rivaroksaban nedeni ile hastada sol taraflı plöretik göğüs ağrısı oldu. Tanısal torasentezde şiddetli bir kanlı plevral efüzyon görüldü. Rivaroksaban kesildi ve hemotoraksın drenajı ince iğne aspirasyonu ile yapıldı. Rivaroksabanın indüklediği spontan hemotoraks hakkında olup yeni oral antikoagülanların majör hemorajik komplikasyonlarına dikkat çeken ilk olgu sunumu bildiğimiz kadarı ile budur.

Anahtar sözcükler: Hemotoraks; pulmoner tromboembolizm; rivaroksaban; spontan.

CASE REPORT

A 78-year-old female patient was admitted to our hospital as an outpatient for left-sided pleuritic chest pain and dyspnea on exertion starting three weeks previously. She did not have fever or chills, and did not complain of purulent sputum. She had been receiving rivaroxaban for the treatment of pulmonary thromboembolism for four months. Additionally, she was receiving amlodipine and atorvastatin to treat hypertension and hyperlipidemia, respectively; she was also using a fluticasone/salmeterol inhaler for asthma treatment. She had never been a smoker and did not drink alcohol. A written informed consent was obtained from the patient.

On examination, the patient was alert and oriented. Her body temperature was 36.2°C, blood pressure was 150/70 mmHg, respiratory rate was 20 breaths per minute, and heart rate was 88 beats per minute. Breath sounds were diminished, and percussion

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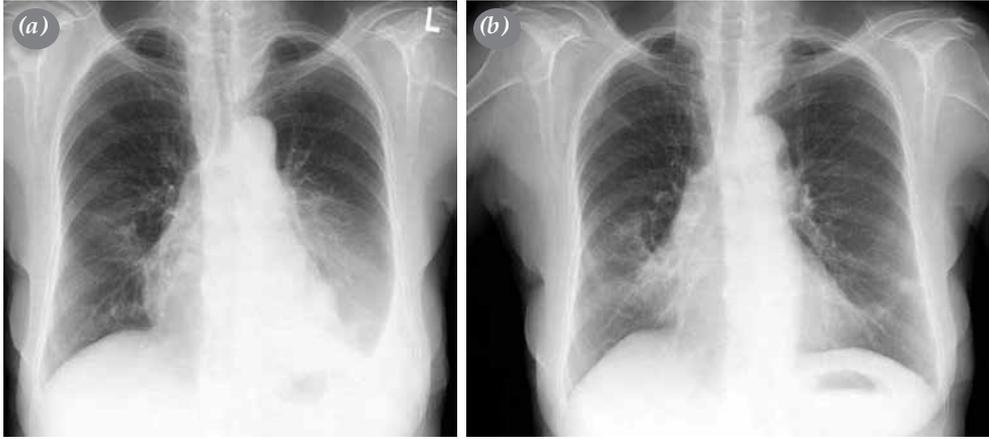


Figure 1. (a) A chest radiograph shows blunting opacity in left lower lung field. (b) A chest radiograph after fine needle aspiration shows marked resolution of pleural effusion.

sounds on her left lower hemithorax were dull. The results of physical examination of other systems were unremarkable.

Her initial white blood cell count was 7,990 cells/ μ L, with a hemoglobin level of 10.4 g/dL, a platelet count of 212,000 cells/ μ L, and an international normalized ratio of prothrombin time of 1.71. Her hemoglobin level had been 13.3 g/dL approximately three months previously. An arterial blood gas analysis showed a potential of hydrogen of 7.46, partial pressure of carbon dioxide of 27 mmHg, partial pressure of oxygen of 85 mmHg, and oxygen saturation of 97% on room air. A chest radiograph showed blunting opacity in the left lower hemithorax, with obliteration of the left hemidiaphragm (Figure 1a).

A computed tomography scan of the chest (Figure 2) showed a moderate amount of left-sided pleural effusion, with high attenuation on the left lower lobe with passive atelectasis that was not evident on a previous scan. She denied any history of chest trauma on a careful history taking. Thoracentesis was performed for diagnosis and reexpansion of the left lung after discontinuation of rivaroxaban for 24 hours. Approximately 450 mL of grossly bloody pleural effusion was removed via needle aspiration (Figure 3). Analysis of pleural fluid showed a red blood cell count of more than $2.0 \times 10^3/\text{mm}^3$ and a white blood count of $950/\text{mm}^3$. The ratio of pleural to serum hematocrit was more than 0.5. Rivaroxaban was immediately discontinued. Her pleuritic chest pain and dyspnea on exertion improved soon after fine needle aspiration, and a follow-up chest radiograph showed marked resolution of the pleural effusion (Figure 1b). Tube thoracostomy

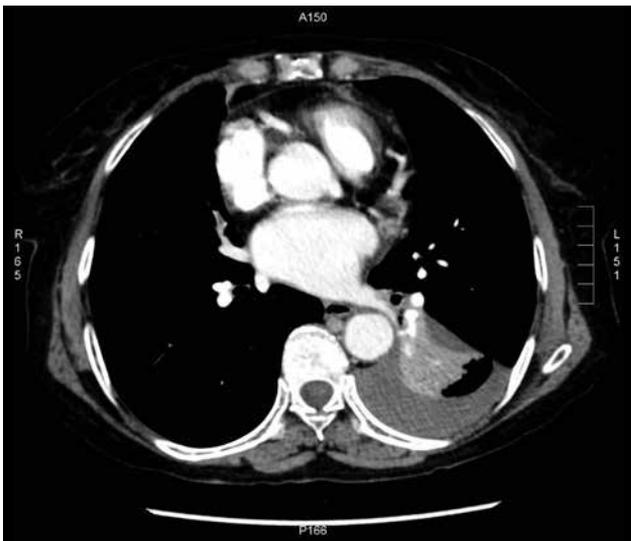


Figure 2. A chest computed tomographic scan shows left-sided pleural effusion with passive atelectasis.



Figure 3. Aspirated pleural effusion shows grossly bloody aspirate.

drainage was not needed. Culture of the pleural fluid indicated that it was sterile and cytological examination of the pleural fluid was negative for malignant causes. She was discharged after careful observation for five days and the pleural effusion was not observed on the chest radiograph obtained after three weeks.

DISCUSSION

The definition of hemothorax is the extraction of pleural fluid with a hematocrit >50% of the blood hematocrit. Most cases of hemothorax are related to open or closed chest trauma or procedures such as central line insertion, thoracentesis, pleural biopsy, or catheterization. Spontaneous hemothorax is less common compared to traumatic hemothorax and the causes include malignancies, anticoagulant medication use, vascular ruptures such as aortic dissection, endometriosis, pulmonary infarctions, adhesions with pneumothorax, and hematologic abnormalities such as hemophilia.^[3] Hemothorax associated with coagulopathy is predominantly a result of anticoagulants being administered in the setting of thromboembolic diseases.^[3] Most cases occur after heparin or warfarin treatment, and there is at least one well-documented case of hemothorax owing to enoxaparin use.^[4]

In addition to fluid resuscitation and blood transfusion, the treatment of hemopneumothorax consists of intercostal tube insertion, followed by surgical intervention via either video-assisted thoracic surgery or open thoracotomy.^[3] In a case described by Wang *et al.*,^[5] spontaneous hemothorax occurred in a 23-year-old female patient with underlying systemic lupus erythematosus after combined administration of tissue plasminogen activator and low-molecular-weight heparin for a massive pulmonary embolism. Video-assisted thoracic surgery with drainage of a large amount of hemothorax was performed. In the current case, rivaroxaban-induced hemothorax was

resolved by simple fine needle aspiration after stopping rivaroxaban treatment.

In our case report, the patient had been receiving rivaroxaban for pulmonary thromboembolism for four months. She had never experienced any trauma in her lung. However, spontaneous hemothorax occurred after using rivaroxaban. Her hemoglobin level dropped from 13.3 g/dL to 10.4 g/dL. Despite the absence of available specific antidotes for rivaroxaban, hemothorax due to rivaroxaban use in this patient could be resolved merely by stopping the drug and performing simple aspiration. To our knowledge, this is the first case report of the occurrence and treatment of spontaneous hemothorax after rivaroxaban use. This case reveals the importance of careful use of new oral anticoagulants considering the major risk of bleeding.

Declaration of conflicting interests

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