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Case Report

Delayed chest wall hematoma caused by progressive displacement of rib fractures after blunt trauma

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ABSTRACT

Rib fracture is a common injury resulting from blunt thoracic trauma. Although hemothorax and pneumothorax are known delayed complications of rib fracture, delayed chest wall hematoma has rarely been reported. We discuss the case of an 81-year-old woman who was not undergoing antiplatelet or anticoagulant therapy who presented to our emergency department after a traffic injury. This patient had a nondisplaced rib fracture that went undetected on the initial computed tomography scan; the development of progressive displacement led to hemorrhagic shock due to delayed chest wall hematoma. The chest wall hematoma was effectively diagnosed and treated via contrast-enhanced computed tomography and angiographic embolization. This case highlights the possibility of this potential delayed complication from a common injury such as a rib fracture.

Introduction

Rib fractures are a common injury associated with blunt thoracic trauma. Although hemothorax and pneumothorax are well-known delayed complications of rib fractures, delayed chest wall hematomas have rarely been reported [1,2]. We present a unique case of hemorrhagic shock caused by a delayed chest wall hematoma caused by progressively displaced rib fractures. We have defined a delayed complication as a complication appearing 24 h or more after an injury [3].

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Case report

An 81-year-old female with a medical history of hypertension presented to the emergency department in a tertiary care hospital with retrograde amnesia, headache, and chest pain after a motor vehicle accident. Vital signs on arrival were blood pressure 172/112 mmHg, pulse rate 80 beats/min, and respiratory rate 31 breaths/min. She had an occipital contusion and tenderness on her left precordium but no back pain or chest contusion. Glasgow coma score was 15 with retrograde amnesia. There was no history of antiplatelet or anticoagulant therapy. Computed tomography (CT) revealed a mild brain contusion, traumatic subarachnoid hemorrhage, and occipital bone fracture, but no signs of chest injury such as rib fracture (Fig. 1). The patient was admitted with a diagnosis of mild brain contusion, traumatic subarachnoid hemorrhage, and occipital bone fracture. Surgery was not required.

The patient complained of left chest pain with motion that started 3 days after admission. On day 14, radiographs revealed posterior fractures of the left 6th and 7th ribs; because there were no fracture-related complications, conservative treatment was applied. On day 22, the patient experienced acute back pain of unknown cause. A mass was detected on the left side of her back. Chest radiographs revealed rib fractures of the left 6th, 7th, and 8th ribs. CT showed posterior fractures of the left 6th, 7th, and 8th ribs, and a small chest wall hematoma around these fractures without extravasation. As the patient was hemodynamically stable, she was kept rested under close observation.

On day 26, the patient again experienced sudden severe back pain at rest. Her condition became unstable and the mass on her back enlarged. CT showed posterior fractures of the left 4th, 5th, 6th, 7th, and 8th ribs, and enlargement of the chest wall hematoma with extravasation (Fig. 2). We diagnosed chest wall hematoma with hemorrhagic shock. After consulting an interventional radiologist, a blood transfusion with emergency angiographic embolization was arranged. There was contrast extravasation in the branch of the suprascapular artery around the rib fracture (Fig. 3); embolization was performed using a sterile absorbable gelatin sponge. There was no further bleeding from the chest wall, and the patient was discharged on day 37.

Discussion

Chest wall hematoma is often caused by trauma, although nontraumatic causes include anticoagulant use and tumors [4,5]. Chest wall hematoma usually occurs immediately after trauma, and active bleeding is managed by surgery or embolization [6,7]. We present a case of trauma causing delayed chest wall hematoma and hemorrhagic shock.

Fig. 1. Computed tomography on day 1 revealed no signs of chest injury such as a rib fracture.

Fig. 2. Computed tomography taken on day 26 with the patient in right lateral decubitus position because of severe left back pain. This scan revealed posterior fracture of the left 6th rib (arrow), and an enlargement of the chest wall hematoma with extravasation (arrowhead).

Hemothorax and pneumothorax are well-known delayed complications of rib fractures; however, delayed chest wall hematoma is rare. This is probably because hemothorax occurs in the pleural cavity; therefore, the origin of the bleeding cannot be compressed and is easily detected. By contrast, chest wall hematomas occur in closed tissue, so compression of the bleeding vessel usually stops further bleeding. The mortality rate of chest wall hematoma is low [8].

In the present case, hemorrhagic shock occurred approximately 4 weeks after trauma due to delayed chest wall hematoma in the absence of antiplatelet or anticoagulant therapy. Delayed bleeding could also

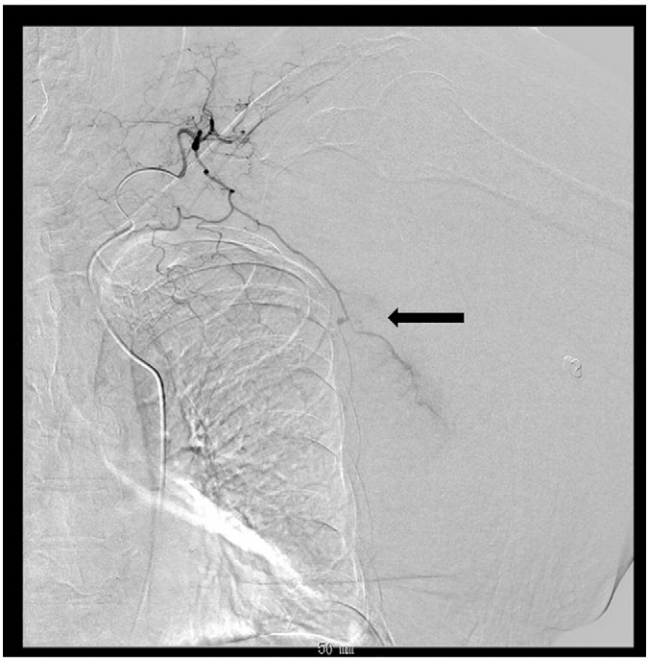

Fig. 3. Angiography showing contrast extravasation in the branch of the left suprascapular artery (arrow).

potentially be caused by pseudoaneurysm resulting from arterial injury at the trauma site; however, in this case, the initial CT did not reveal any rib fracture, hematoma, or evidence of arterial injury. All CT scans were interpreted by board-certified radiologists. Therefore, we believe that the rib fracture displaced progressively until the fracture edge injured a nearby branch of the suprascapular artery on day 22; on day 26, CT showed that further displacement of the rib fracture had caused major arterial injury. The patient was elderly and had loose skin connective tissue, which may have contributed to the deterioration of her condition. However, the main reason was most likely the nondisplaced rib fracture that was undetected on initial CT and became progressively displaced.

The present case highlights the possibility of a delayed chest wall hematoma in patients with chest pain, particularly after high-impact trauma, which can lead to delayed hemorrhagic shock. In patients with chest trauma, contrast-enhanced CT is necessary for differential diagnosis, assessing the clinical course, and planning treatment. Chest radiography may detect pneumothorax or hemothorax but may miss a chest wall hematoma. By contrast, CT is sensitive enough for detecting hemothorax, pneumothorax, pulmonary contusions, and chest wall hematomas [9] and can help locate the site of active bleeding [7]. In this case, we were unable to find the cause of shock on chest radiography, but CT revealed the chest wall hematoma resulting from active bleeding of a branch of the suprascapular artery. Thus, clinicians should follow up with contrast-enhanced CT if delayed complications are suspected after rib fracture.

We treated the chest wall hematoma via angiographic embolization without surgery. Angiographic embolization is commonly performed to stop bleeding from a variety of vessels [10] and is effective for chest wall hematomas [7]. Minimally invasive angiography allows identification of the source of bleeding and achievement of hemostasis.

Conclusions

We describe a case of hemorrhagic shock due to delayed chest wall hematoma as a complication of progressively displaced rib fractures after blunt chest trauma. The possibility of a chest wall hematoma should be considered in patients with chest pain, particularly after high-impact trauma. Contrast-enhanced CT and angiography can effectively diagnose and treat chest wall hematoma.

Conflict of interest statement

The authors have no conflicts to declare.

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