

## A Case of Ankylosing Spinal Hyperostosis with Massive Hemothorax Due to Thoracic Vertebral Fracture Caused by Minor Trauma

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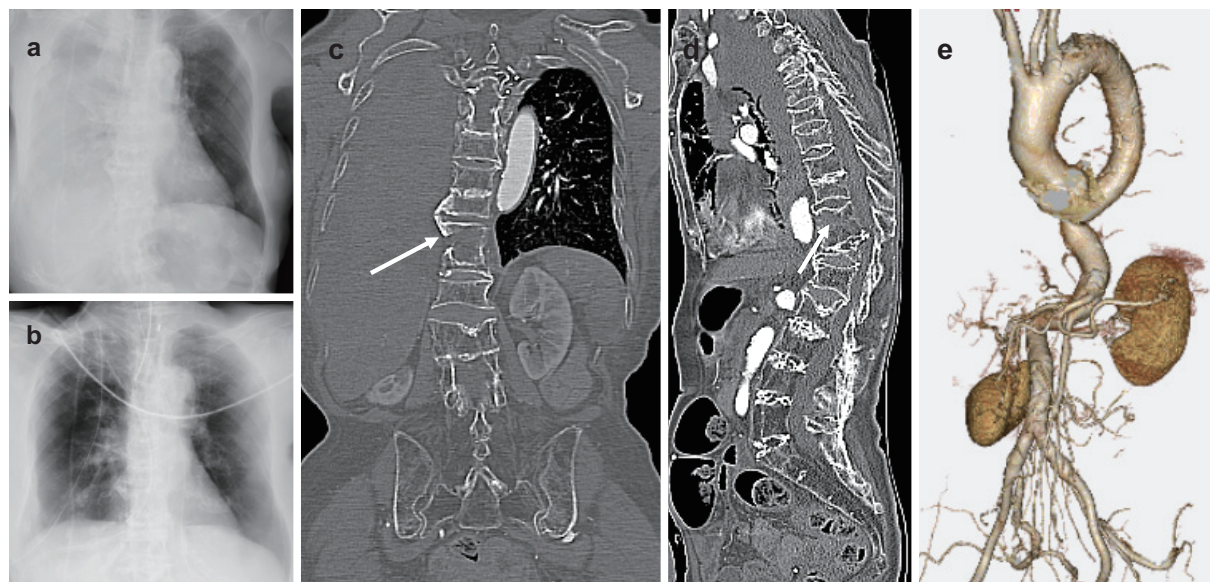
A 74-year-old woman was presented to our emergency department following a fall, and was conversant immediately after her accident. However, her consciousness deteriorated during transport, and she experienced shock. Initially, her blood pressure was unmeasurable, her heart rate was 114 bpm, her respiratory rate was 12 rpm, but her SpO<sub>2</sub> level could not be measured. There was no obvious muscle weakness and neurological sign. On chest radiography, right lung field permeability was reduced and 1200 cc of blood drainage was observed with the insertion of a thoracic drain. Tachypnea improved following drainage, but low blood pressure remained (systolic blood pressure: 50 mmHg). Hemoglobin concentration was 5.3 g/dl and she was severely anemic. Ossification of the anterior longitudinal ligament at the thoracic level was observed on computed tomography (CT). Moreover, an extension-distraction injury of the eleventh thoracic vertebrae was seen, and this was confirmed as the ankylosing part. On angiographic CT, meandering of the aorta was observed, but an obvious bleeding point was not detected (Fig. 1). Hence, we performed open chest hemostasis. A fracture on the eleventh vertebra and the pleural wall injury, with bleeding from the vertebral body vein and the vertebral venous plexus (Fig. 2), was observed. Coagulation hemostasis and filling of the fracture site with a coagulant sheet were performed.

Postoperatively, anemia disappeared and consciousness improved. Posterior fixation without fusion was performed on thoracic spine injuries to prevent re-bleeding, and pro-

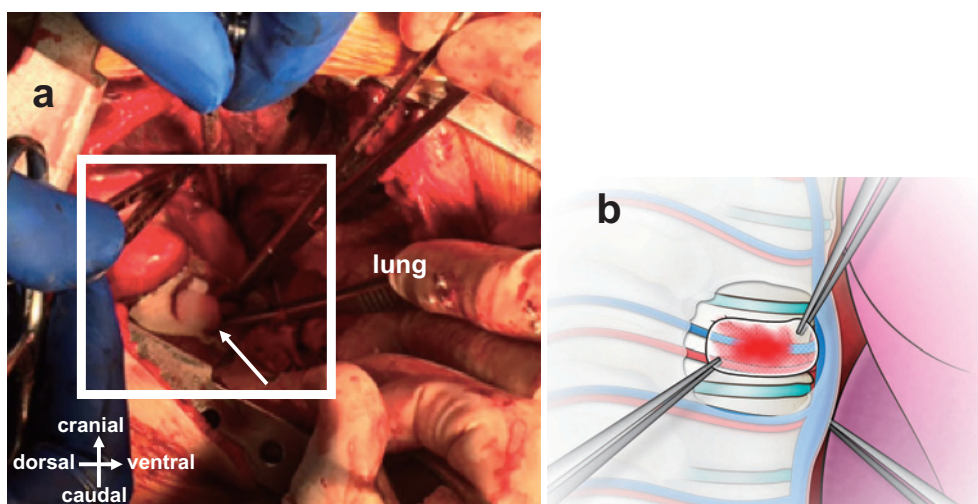
mote spinal stabilization of the vertebral column three days postoperatively. Posterior fixation with a pedicle screw was performed from the seventh thoracic to the second lumbar vertebra using the open method (Fig. 3). The patient's condition improved and on post-operative day 14, she started rehabilitation. She was transferred to a regular room on the 52<sup>nd</sup> day after surgery.

Ankylosing spinal hyperostosis (ASH) is a part of diffuse idiopathic spondylopathy and is a disease that causes loss of spinal movement because of spinal ligament ossification<sup>1)</sup>. The mobility of the spine decreases, which often leads to kyphosis<sup>2,3)</sup>. Furthermore, in several cases, the spine is severely osteoporotic due to aging and the lack of mechanical stress to the central part of the vertebral body. Hence, there are many instances wherein unstable damage occurs because of an external force, such as during a fall<sup>4)</sup>.

Massive hemothorax leading to shock is found in cases of dislocation fracture to the spine due to high-energy trauma<sup>5)</sup>. In cases of low-energy trauma, such as in this case, they are very rare<sup>6)</sup>. On the other hand, in patients with ASH, the plasticity of the spine is markedly diminished and deformity occurs<sup>7,8)</sup>. If these patients fall, sudden extension forces will be added, and an extension-distraction type of injury in which the soft tissue around the vertebral body will be stretched and damaged may occur. Bleeding from the chest wall and blood vessel damage on the back of the intercostal space and sternum will occur, resulting in massive bleeding. In this case, the patient had a massive hemothorax in the



**Figure 1.** Radiograph of the chest (a-b) a: on admission, b: after the thoracic drain is inserted. CT scan in the coronal plane, (c) in the sagittal plane, (d) and angiographic CT scan (e). An extension-distraction injury of the eleventh thoracic vertebrae was seen (white arrow).

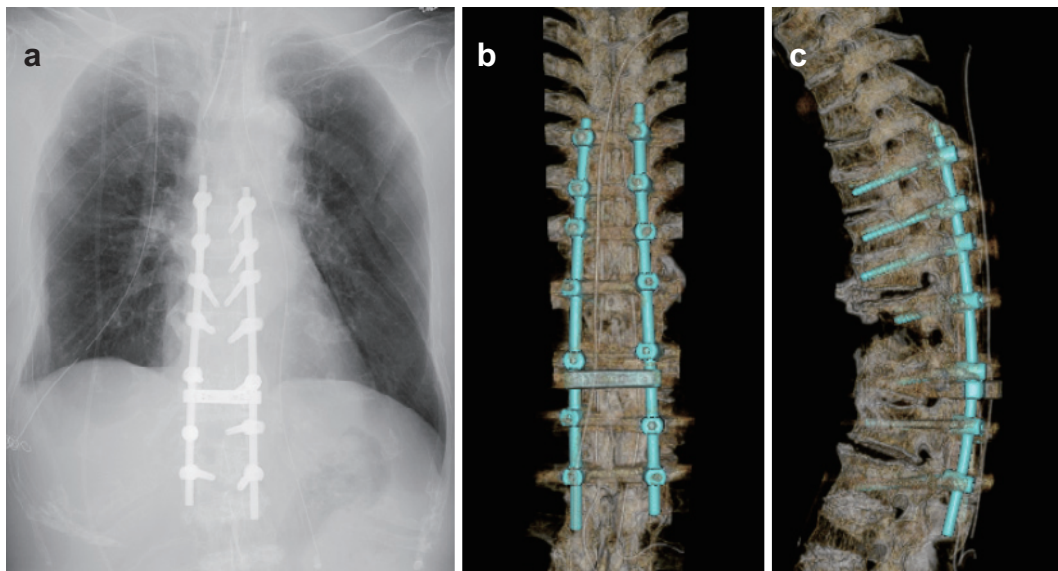


**Figure 2.** We confirmed the presence of continuous bleeding from the vertebral body vein, and the vertebral venous plexus of the eleventh thoracic vertebrae. We confirmed the presence of continuous bleeding from the vertebral body vein, and the vertebral venous plexus of the eleventh thoracic vertebrae. Coagulation hemostasis was performed, and the fracture site was filled with the coagulant sheet (white arrow).

right lung field and a fracture from the right side to the center of the vertebral body after the injury, as detected by CT (Fig. 1). Blood vessel damage occurred on the right side of the vertebral body, and blood was stored in the ipsilateral thoracic cavity. For ASH-based vertebral body injuries, anticipating unexpected large bleeding that can occur in the acute and chronic phase is important. Even in cases of low-energy trauma, early spinal stabilization is desirable.

**Conflicts of Interest:** The authors declare that there are no relevant conflicts of interest.

**Author Contributions:** R.H, H.I, M.Y and T.Y did posterior fixation. N.T, E.M and A.T did emergency treatment. M.M and A.W did open chest hemostasis. R.H wrote the manuscript. All authors read and approved the final manuscript.



**Figure 3.** Post-operative radiograph of the thoracic spine (a) and post-operative 3-D CT images (b-c).

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