Pulmonary cement embolisation after percutaneous vertebroplasty

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DESCRIPTION
A woman in her 80s was presented to the neurosurgery department with lower back pain aggravated by standing and relieved with rest. She had a medical history of osteoporosis. Mechanical back pain was considered and an osteoporotic lumbar (L1) vertebral compression fracture was verified by MRI and CT. It was decided to perform percutaneous vertebroplasty (PV). A 4 mL of polymethylmethacrylate bone cement was injected into the thoracic (T10) vertebral body and 2 mL into the thoracic (T1) and lumbar (L2) vertebral body with fluoroscopic guidance. No complications developed during the procedure. Two days later, the patient had right-sided non-pleuritic chest pain and dyspnoea. Blood gas analysis was normal, she was haemodynamically stable and transthoracic echocardiography showed normal cardiac chambers. Cement embolisation (CE) to pulmonary vessels was suspected. Thorax CT without intravenous contrast administration was performed due to the patient’s contrast allergy. Segmental and subsegmental pulmonary CE and accompanying consolidation and pleural effusion were seen in the right lung on CT. In addition, thorax CT demonstrated the cement leaking from the T10 spine linearly into the vertebral venous plexus (A, C, D; white arrow) and reaching into the right pulmonary arterial circulation through the azygos vein (B, E; black arrow).

Figure 1  CT (A) and MRIs (B, C) showed lumbar (L1) vertebral body compression fracture.

Figure 2  A preoperative thorax CT image performed for another reason revealed normal imaging findings (A, B). Postoperative thorax CT without intravenous contrast administration demonstrated segmental and multiple subsegmental pulmonary cement embolisms and accompanying consolidation and pleural effusion in the lower and middle lobes of the right lung (C, D).

Figure 3  Axial (A, B) and sagittal (C–E) CT images of the thorax showed the cement leaking from the T10 spine linearly into the vertebral venous plexus (A, C, D; white arrow) and reaching into the right pulmonary arterial circulation through the azygos vein system (B, E; black arrow).

Figure 4  A coronal CT image of the thorax revealed a pulmonary cement embolism (white arrow) and cement in the azygos vein (black arrow).
Patients typically present with symptoms weeks or months after the procedure, but cases presenting immediately or years after the procedure have also been reported. This is because inferior vena cava foreign bodies such as intravenous cement can serve as a potential nidus for thromboembolism at any time. Even though these may not alter the management of the asymptomatic patients, it should be kept in mind that IVC foreign bodies such as intravenous cement can serve as a potential nidus for thromboembolism at any time. Standard treatment guidelines for pulmonary thromboembolism are suggested for symptomatic peripheral cement embolisms but it was observed that only symptomatic therapy could be an alternative approach as experienced in the present case.

Learning points

- Pulmonary cement embolism may occur as a complication of percutaneous vertebral augmentation procedures. It is often asymptomatic but can cause pulmonary infarction and even death.
- Routine chest X-ray after vertebroplasty may be helpful for early detection. However, control CT scans should be performed after the procedure for patients with indicative symptoms of pulmonary embolism and/or those in which large cement leakage is detected during the procedure. Even though these may not alter the management of the asymptomatic patients, it should be kept in mind that IVC foreign bodies such as intravenous cement can serve as a potential nidus for thromboembolism at any time.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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