

Symptomatic segmental pulmonary thromboembolism secondary to acrylic embolization after vertebroplasty

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Vertebroplasty is a surgical method involving the injection of bone cement into the affected vertebral body. Indications for the procedure include osteoporotic and traumatic fractures, osteolysis caused by metastasis, and vertebral body hemangiomas. Complications such as local cement leakage into structures surrounding the vertebral body are rather common (about 80%–90%). However, the prevalence of cement leakage into the perivertebral venous plexus leading to pulmonary embolism is from 4.6% to 26% of all kyphoplasty procedures according to the radiological data and 6% to 8% according to the clinical databases.¹ Most patients with cement pulmonary embolism (CPE) are asymptomatic.¹ To our knowledge, there have been 51 case reports of CPE after vertebroplasty,^{1,2} and pulmonary thromboembolism secondary to cement embolization has been reported in the literature only twice.^{2,3} Our case is the third reported case of in situ thrombosis at the site of prior cement embolus.

A 40-year-old woman, nonsmoker, who in February and July 2012 underwent 2 vertebroplasty procedures of fractured vertebrae Th8 and benign hemangioma of vertebrae Th7, was admitted to our department because of progressive exertional dyspnea, which developed immediately after the second operation. Pulmonary embolism was suspected.

A physical examination revealed severe exertional dyspnea occurring after walking over 10 meters, vertigo and severe balance disorders, excessive sweating, and tachypnea of 25 bpm. Heart rate (75 bpm), arterial blood pressure (120/80 mmHg), and oxygen blood saturation (100%) were normal.

Additional tests, including electrocardiography, laboratory tests, measurement of inflammatory markers, D-dimer concentrations, cardiac troponin, and natriuretic peptide levels, did not

reveal any abnormalities. A chest radiograph revealed high-density linear opacities outlining pulmonary vessels into the lower lobes (FIGURE 1A). A computed tomographic pulmonary angiogram (CTPA) (FIGURE 1BC) confirmed extravasation of hyperdense material of the same density as the vertebroplasty cement filling bilateral proximal and distal pulmonary arteries (FIGURE 1D). A thrombus formed in the 10th segmental left pulmonary artery was detected (FIGURE 1DEF) at the site of prior cement embolus. An ultrasound excluded deep vein thrombosis. Initially, subcutaneous nadroparin (8550 IU AXa twice a day) followed by long-term oral acenocoumarol therapy was administered. Two-year follow-up shows satisfactory general condition with mild exertional dyspnea and persistent signs of cement embolization on the chest radiograph. Pulmonary hypertension and thrombophilia were excluded.

The current case of pulmonary thromboembolism secondary to acrylic embolization highlights the role of anticoagulant therapy. All patients after vertebroplasty who develop dyspnea should be screened for pulmonary embolization with or without overlapping thrombus formation, even if plasma D-dimer levels are lower than 500 ng/ml, to prevent possible complications such as secondary pulmonary hypertension or recurrence of thromboembolic lesions.

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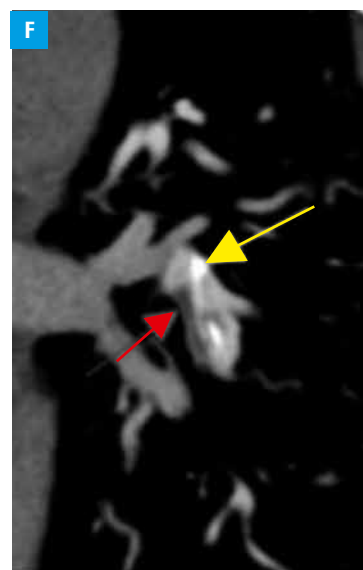
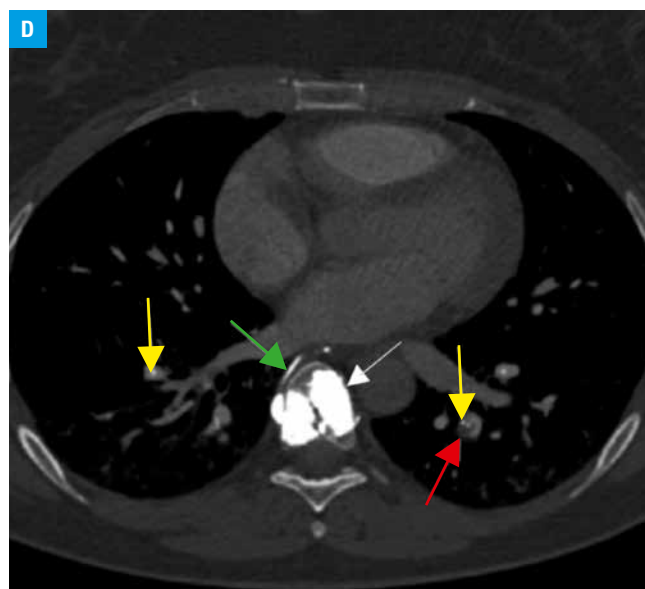
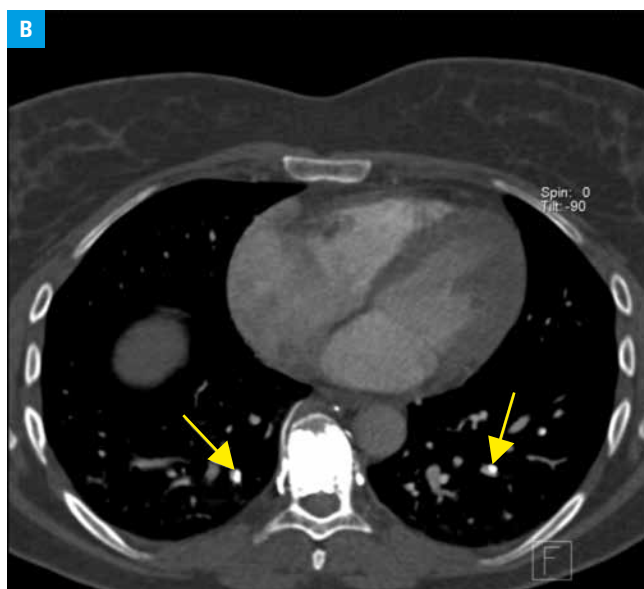
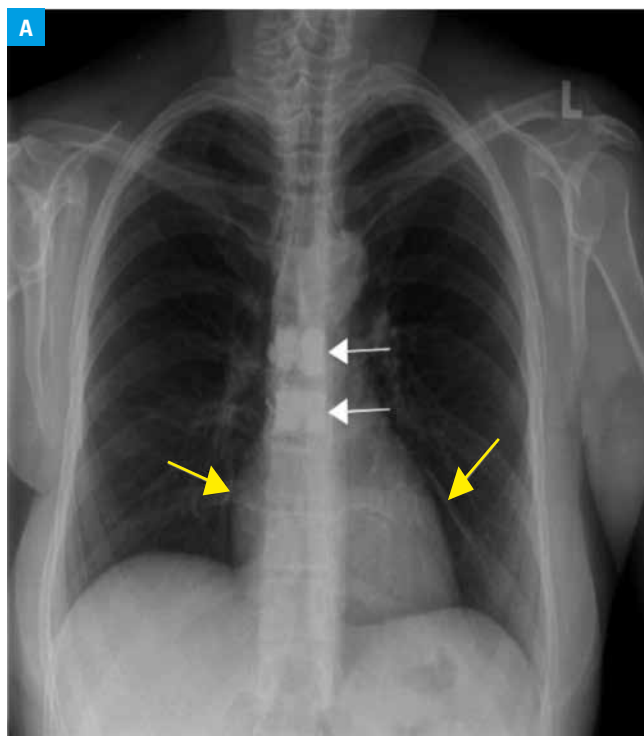


FIGURE 1 **A** – posteroanterior chest radiograph with high-density linear opacities outlining pulmonary vessels into the lower lobes related to cement emboli (yellow arrow); kyphoplasty cement in the thoracic vertebral bodies Th7 and Th8 (white arrow); a computed tomographic pulmonary angiogram with hyperdense material filling bilaterally distal; **B** – pulmonary arteries displaying the same density as the kyphoplasty cement (yellow arrow); **C** – volume rendering technique shows high-density material within segmental branches of the pulmonary arteries to the lower lobes related to acrylic pulmonary embolism after vertebroplasty (yellow arrow); **D** – computed tomographic pulmonary angiogram (CTPA) shows kyphoplasty cement pulmonary embolism (yellow arrow) due to extravasation of cement into the paravertebral veins (green arrow) surrounding the treated vertebrae (white arrow) and appositional thrombus formation in the segmental pulmonary branch (red arrow); **EF** – CTPA reveals in situ thrombosis (red arrow) in the 10th segment of the left pulmonary artery at the site of prior cement embolus (yellow arrow)