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Not All Emboli are Thrombotic: The Silent Cement to the Lungs

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I read with great interest the article by Ufuk et al.[1] titled, "Postoperative Pulmonary Complications: Clinical and Imaging Insights". The review provides a detailed overview of postoperative pulmonary complications and emphasizes the key role of imaging. However, one important entity, that is, pulmonary cement embolism (PCE), was not mentioned among the vascular complications.

PCE, an iatrogenic embolic condition that can occur after vertebroplasty or kyphoplasty, must be included in future discussions about postoperative pulmonary complications. PCE occurs when small bone cement fragments (polymethylmethacrylate) leak into the venous system during spinal procedures and migrate to the lungs through the azygos and the caval veins.[2] Most cases are asymptomatic and discovered incidentally during chest imaging; however, severe cases can cause shortness of breath, chest pain, or hemodynamic collapse. Although the symptom incidence is low (0.1-0.5%), studies using computed tomography (CT) have reported imaging-detected rates ranging from 2% to 26%.[3] With the increasing usage of vertebroplasty in elderly patients, awareness of this complication is becoming increasingly important. According to several case reports in the literature, patients develop PCE months or even years after vertebroplasty.[2] Chest radiographs in these reports often reveal linear or nodular high-density opacities. At the same time, CT pulmonary angiography demonstrates radiopaque cement fragments within the pulmonary arteries and, sometimes, within the right cardiac chambers. Most patients were treated conservatively or with anticoagulation therapy, thereby showing clinical improvement. The obtained findings emphasize that PCE can remain clinically silent for extended periods and present either in the early postoperative phase or several years later. Therefore, clinicians must remain vigilant for PCE when encountering unexplained radiopaque intravascular lesions or persistent respiratory symptoms after spinal cement procedures. Recent studies confirmed that PCE is frequently underdiagnosed because it is not routinely considered.[4] Most patients remain stable; however, large or centrally located cement fragments can cause respiratory distress, arrhythmia, or cardiac tamponade.[3-5] PCE management generally depends on the patient's clinical status and embolus burden, ranging from a simple observation in stable cases to anticoagulation or, rarely, to surgical intervention in severe or symptomatic presentations.[5] Preventive measures, including the usage of high-viscosity cement and careful injection under fluoroscopy, are crucial in risk reduction.[3] Accordingly, better awareness and timely recognition supported by advanced imaging approaches, such as three-dimensional echocardiography in pulmonary vascular assessment, may help improve patient care and safety.[6] Although postoperative pulmonary complications are among the most concerning adverse events following surgery, clinicians must also be aware that severe cardiovascular complications, such as acute stent thrombosis or acute heart failure, can also develop after surgery.[7]

In conclusion, PCE is an uncommon but clinically crucial postoperative complication that can mimic thromboembolic disease and lead to a delayed or missed diagnosis. That is to say, early recognition and individualized management can improve patient outcomes and safety.

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