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CRITICAL CASE AND RESUSCITATION

IMAGING VIGNETTE: CLINICAL VIGNETTE

Dyspnea After Spinal Surgery and a Troubling X-Ray

A Case of Cement Embolism

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ABSTRACT

An older woman developed dyspnea after instrumented lumbar spinal fusion surgery. During clinical work-up, a chest radiography revealed a U-shaped object within the cardiac silhouette. Further imaging confirmed that the object was entrapped in the tricuspid subvalvular apparatus. Surgery was performed for removal of the object, which was later identified as cement (polymethyl methacrylate). Cement extravasation and embolism are well-known but rarely clinically significant complications after spinal surgery. (JACC Case Rep 2024;29:102425) © 2024 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

A 72-year-old woman developed worsening dyspnea hours after instrumented lumbar spinal fusion surgery (**Figure1A**). She had no known medical history.

On examination, she was mildly tachypneic, with a blood pressure of 140/85 mm Hg and an oxygen saturation of 90%. Her lungs were clear on auscultation, and no added heart sounds were noted. The initial work-up included a chest radiograph, which revealed a U-shaped object in the cardiac silhouette that was later confirmed, by echocardiography and fluoroscopy, to be inside the right ventricle (**Figure1B**, Videos 1 and 2). Computed tomography angiography ruled out pulmonary embolism as the cause of dyspnea.

After a neurosurgery consultation, cement (polymethyl methacrylate [PMMA]) embolism from the recent surgery was probable, so we proceeded with surgical extraction of the object because of its fragile nature. A U-shaped object entrapped between the tricuspid valve chordae tendineae was successfully removed (**Figures 1C and 1D**). Histopathologic examination confirmed the PMMA embolism. The patient's course was uneventful, and she was discharged 15 days later.

Cement extravasation and embolism are well-known but rarely clinically significant complications after spinal surgery because the emboli are generally small.[1] In our patients, cement was used for added stability of the screws in the osteoporotic vertebrae. The patient's dyspnea was attributed to smaller lung emboli. Usually, anticoagulation therapy and conservative measures are enough for treatment of small, scattered emboli, whereas larger particles lodged in the right ventricle require open heart surgery.[2] Cement migrates through the

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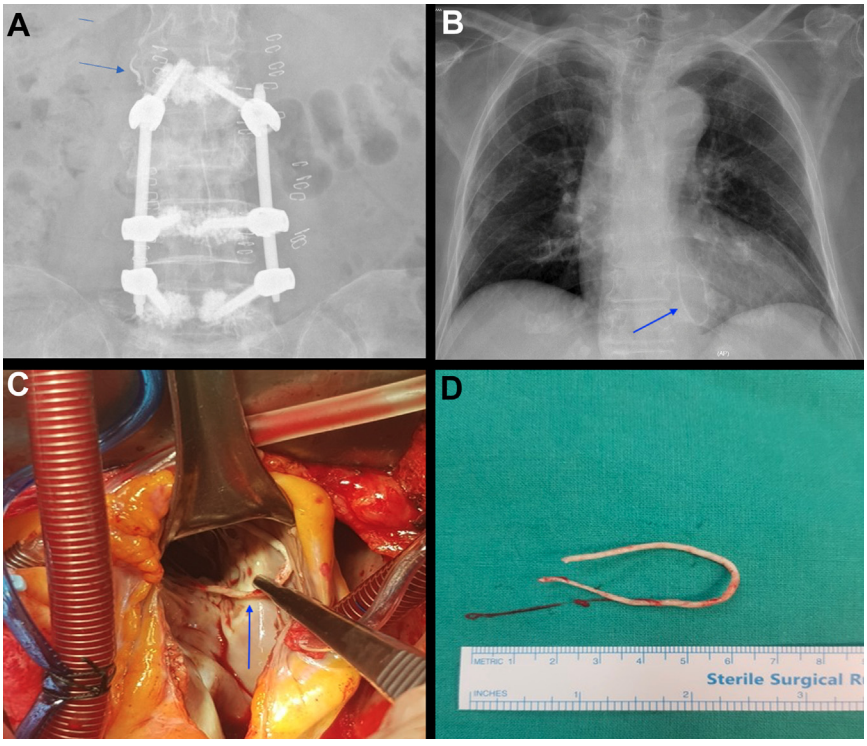
ABBREVIATIONS AND ACRONYMS

PMMA = polymethyl methacrylate

perivertebral venous plexus to the hemiazygos and azygos vein, then to the inferior vena cava, and finally to the right-sided heart chambers. Even though this complication is rarely fatal, cement embolism rates are reduced with good hemostasis before cement insertion and medullary lavage.[3,4]

FIGURE 1 Cement Embolism After Spinal Fusion



(A) Lumbar spine radiograph demonstrating spinal fusion surgery with concomitant cement use. The arrow points to a cement cast of a perivertebral vein. (B) Chest radiograph demonstrating a U-shaped object in the cardiac silhouette, as shown by the arrow. (C and D) U-shaped cement (arrow in C) retrieved through the tricuspid valve through an incision in the right atrium.

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KEY WORDS cement, echocardiography, embolism, foreign object

APPENDIX For supplemental videos, please see the online version of this paper.