



Kyphoplasty Induced Cement Pulmonary Embolism

Bella V Gonzalez Perez MD, Laura DeMers MD, Radia Ksayer MD, Karam Zakharia MD, Samer M Zakhour MD, Jose M Wiley MD, MPH, FACC, FACP, FSCAI Tulane University, New Orleans, LA

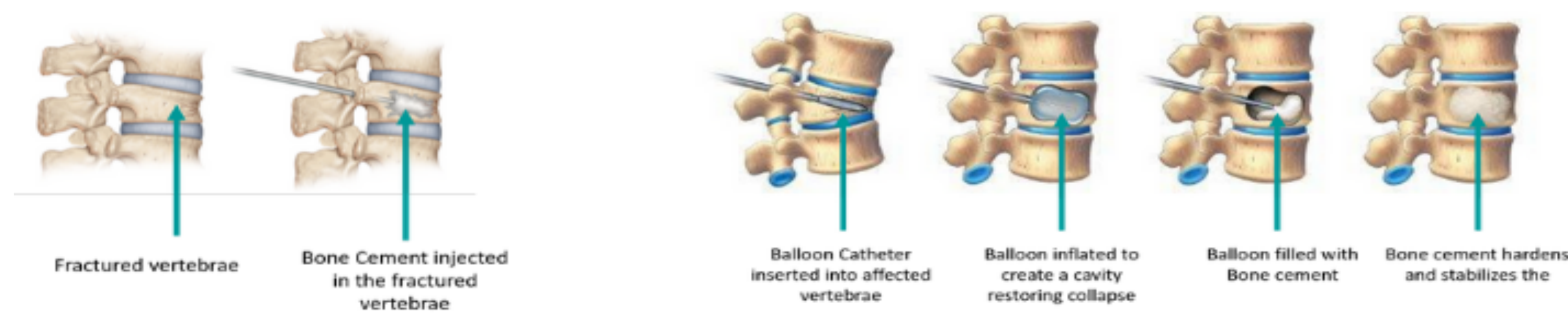
BACKGROUND

Cement pulmonary embolism (CPE), a rare but potentially life-threatening complication associated with vertebroplasty and kyphoplasty. Occurs when polymethylmethacrylate (PMMA) leaks into the perivertebral veins and subsequently travels to the pulmonary arteries.

Presentation can range from asymptomatic to dyspnea, chest pain, hypoxemia, and hemodynamic instability. The optimal management strategy remains unclear.

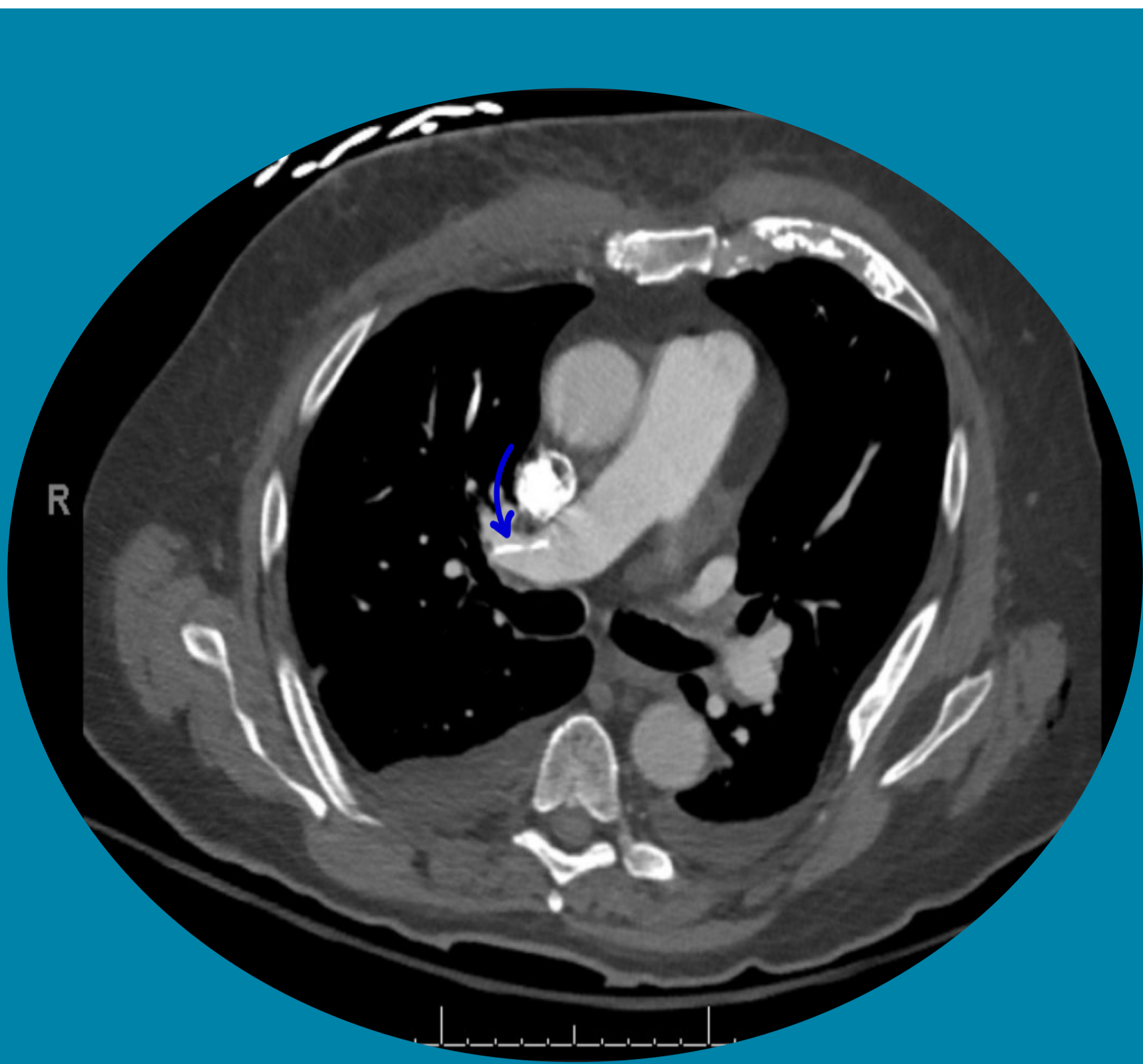
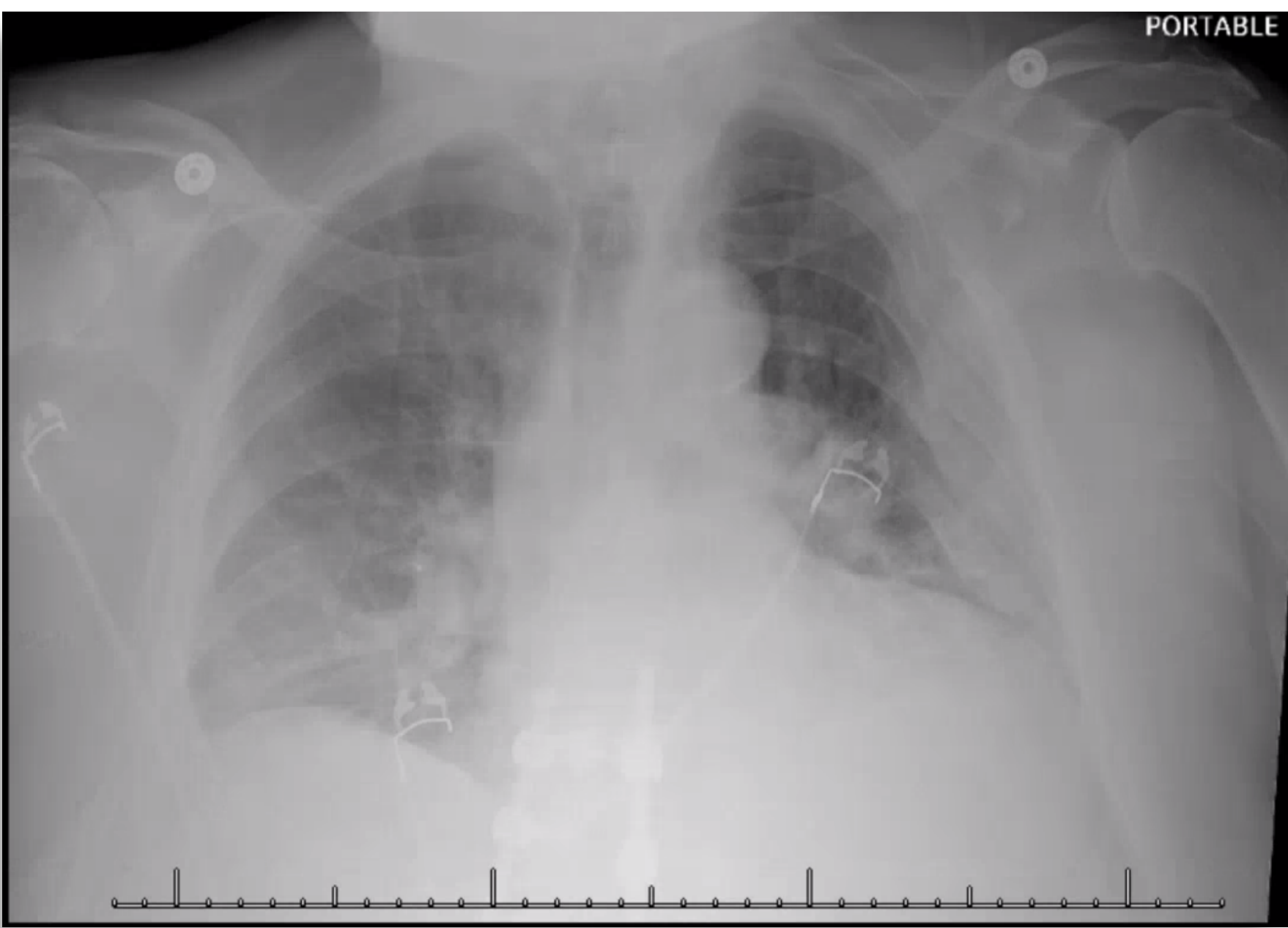
CASE PRESENTATION

An 83-year-old male with PMHx of HTN and lumbar spondylolisthesis who underwent elective lumbar fusion and kyphoplasty at T10-T11. On postoperative day 3, he developed tachypnea, hypoxemia, and tachycardia. Labs showed hemoglobin 10.3 g/dL, WBC 12.4 x 10^9/L, high sensitive troponin I 156>>139 ng/L, D-dimer 0.77 µg/mL, creatinine 1.21 mg/dL and ESR 42 mm/hr. Chest x-ray showed cardiomegaly, central vascular congestion and trace pleural effusions and basilar atelectasis. Computed tomography angiography (CTA) revealed a small linear hyperdense filling defect in the distal right pulmonary artery. Given its small size and location, the embolus was managed conservatively.

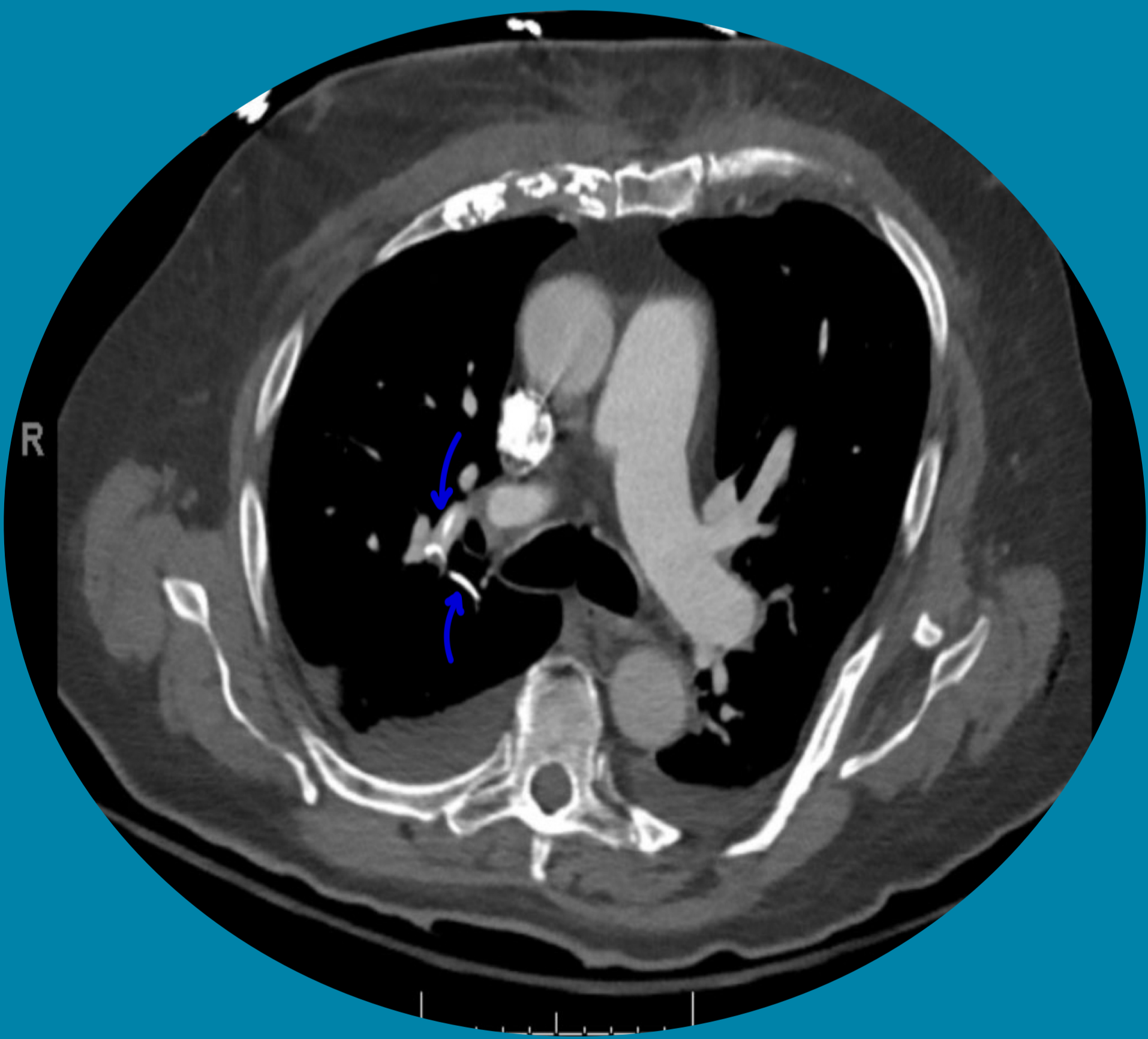


Vertebroplasty

Kyphoplasty



HYPERDENSE FILLING DEFECT in the distal right main pulmonary artery extending into the segmental and subsegmental branch of the right upper lobe



No standardized guidelines exist for managing CPE. Most studies suggest following thrombotic PE guidelines in symptomatic patients given the pro-thrombotic nature of acrylic cement

DISCUSSION

CPE incidence varies from 3.5% to 23%, with vertebroplasty leaks being more common. Although most CPEs are asymptomatic, common symptoms include shortness of breath, tachypnea, tachycardia, chest pain, hemoptysis and hemodynamic instability.

Some studies recommend routine post-procedural chest X-rays. Additionally, symptomatic patients or those with significant cement leakage during the procedure should undergo further evaluation with CT scans.

There is no standardized management protocol for CPE. For symptomatic cases, whether peripheral or central, treatment should follow thrombotic pulmonary embolism guidelines. This includes anticoagulation for both central and peripheral emboli, with surgical intervention or embolectomy reserved for cases involving large central pulmonary emboli.

CONCLUSION

Cement extravasation, though rare, is a recognized complication of vertebroplasty and kyphoplasty that can lead to CPE. While the utility of routine post-procedural imaging remains debated, symptomatic patients should undergo chest CT evaluation. Individualized management is critical, with anticoagulation as the first-line treatment. Surgical intervention may be considered for large, central emboli.

REFERENCES

- Albusoul L, Alaouie D, Muthanna Shadid AL, Kassab C, Adawi Awdish RL. CEMENT PULMONARY EMBOLISM FOLLOWING VERTEBROPLASTY. *CHEST*. 2023;164(4):A6104-A6105. doi:10.1016/j.chest.2023.07.3930
- Zou D, Dong S, Du W, Sun B, Wu X. Risk factor analysis of pulmonary cement embolism during percutaneous vertebroplasty or kyphoplasty for osteoporotic vertebral compression fractures. *Journal of Orthopaedic Surgery and Research*. 2021/05/13 2021;16(1):312. doi:10.1186/s13018-021-02472-9
- Krueger A, Bliemel C, Zettl R, Ruchholtz S. Management of pulmonary cement embolism after percutaneous vertebroplasty and kyphoplasty: a systematic review of the literature. *European Spine Journal*. 2009/09/01 2009;18(9):1257-1265. doi:10.1007/s00586-009-1073-y
- Saglam M, Altintas Taslicay C, Musaoglu IS, Bayramoglu FS. Pulmonary cement embolisation after percutaneous vertebroplasty. *BMI Case Reports*. 2023;16(2):e254292. doi:10.1136/bcr-2022-254292
- Córdova A, Alfageme I. Cement Pulmonary Embolism. *CHEST*. 2014;145(3):508A. doi:10.1378/chest.1822247
- Malik MK, Wroblewski J, Darki A. Pulmonary Cement Embolism After Vertebroplasty. *Cureus*. 2023/5/18 2023;15(5):e39194. doi:10.7759/cureus.39194
- Kalekar T, Kumar MK, Dahiya A, Shah VP, Harshyene KK. Pulmonary cement embolism: a complication following vertebroplasty - a case report with brief review of literature. *The Egyptian Journal of Bronchology*. 2023/06/19 2023;17(1):28. doi:10.1186/s43168-023-00202-9

