RETROGRADE FLOW CEMENT LEAKAGE DURING PERCUTANEOUS BALLOON KYPHOPLASTY

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INTRODUCTION/ OBJECTIVE

During the last decades percutaneous vertebroplasty (PVP) and percutaneous balloon kyphoplasty (PKP) have been increasingly used for the management of painful osteoporotic vertebral compression fractures (OVCFs) and osteolytic spinal tumors.

Cement leakage is a frequent and well described complication of these procedures that may cause pulmonary and neurological complications.

The purpose of this article is to report a rare event of a retrograde flow of cement leakage during PKP and discuss the possible mechanism.

METHODS AND MATERIALS

We present a 55- year- old male patient, who underwent a 4- level PKP for Langerhans histiocytosis that had spread to the spine (T12-L3).

With the patient prone under general anesthesia, intrathoracic pressure was raised as a precaution measure to prevent cement embolic complications as a protocol reported elsewhere.

RESULTS

During the last vertebral body procedure (L1), cement leakage was noticed to flow downward in a retrograde fashion into the segmental vertebral vein.

Cement leak did not follow the predictable upward blood flow through the anterior or lateral segmental vein into the vena cava, but instead, the cement followed a retrograde downward path into the Batson's vein.

No adverse cardiopulmonary effect was observed. Evidence of pulmonary cement embolism was detected in a routine thoracic computed tomography six week later.

FIGURE 1. A) Postoperative lateral plain lumbar spine radiograph; (B) sagittal reconstruction of lumbar spine CT; and (C) corresponding 3D volume rendering of the obtained CT, demonstrate cement leakage into the paravertebral venous system (white arrows)

FIGURE 2. (A) Axial lumbar spine CT image (at the level indicated by the white long-dashed line seen in part C of the figure) and (B) axial lumbar spine CT image at a more caudal level (indicated by the white round dotted line seen in part C of the figure), display retrograde cement leakage (white arrows) into the Batsons paravertebral vein, caudally directed towards the inferior vena cava (white asterisk)

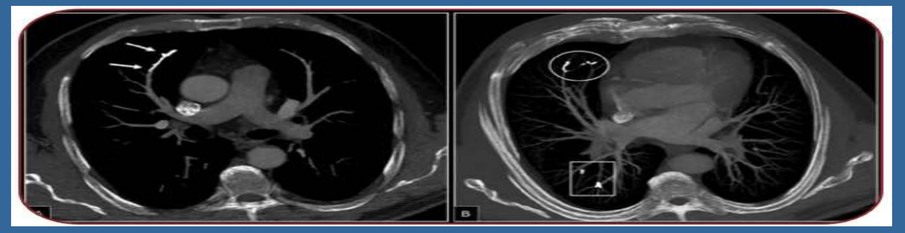

FIGURE 3. (A) Axial maximum intensity projection (MIP) images of a computed tomography pulmonary artery angiography (CT-PA) demonstrate pulmonary artery cement embolism in a segmental and in subsegmental branches of the right upper lobe (white arrows) as well as (B) in subsegmental branches of the right middle lobe (white circle) and right lower lobe (white rectangle)

CONCLUSIONS

The implementation of proper surgical and anesthetic techniques may reduce, but not eliminate, the risk of cement leakage.

The significance of manipulating intrathoracic and intra- abdominal pressure during balloon inflation and cement insertion is the only practical measure to minimize intraoperative cardiorespiratory events.

To our knowledge this is the first case in the English- speaking literature to highlight a retrograde cement intravascular flow most likely as a result of increased intrathoracic pressure.

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