

# Kyphoplasty: The Importance of Post-Operative Surveillance

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## INTRODUCTION

More than 200 million people suffer from osteoporosis with 1 in 3 women over the age of 50 years and 1 in 5 men experiencing osteoporotic fractures in their lifetime.<sup>1</sup> Osteoporosis is a condition defined by low bone mass, devastation of bone tissue, and disruption of bone construction that may lead to weakened bone strength and an increase in the risk of vertebral compression fractures in the spine (VCF). Excess mortality is associated with VCFs and kyphosis due to its impact on lung function and resultant abdominal dysfunction.<sup>2</sup> Conservative treatment includes pharmacological therapy such as narcotics acetaminophen, nonsteroidal anti-inflammatory drugs, and calcitonin. In addition, more specialized treatments include physical therapy, nerve root blocks and epidural injections.

Despite medical therapy, patients with severe compression fractures often report intolerable side effects or inadequate pain relief with conservative treatment, and these patients may be candidates for surgical intervention. Kyphoplasty is a common minimally invasive technique performed by pain physicians and spine surgeons to manage symptomatic vertebral compression fractures. The interventional technique involves a balloon catheter that expands the vertebra and injects bone cement into the structure of the collapsed bone. Despite a low complication rate, these minimally invasive procedures come with their share of risks. We present a patient with a history of acute back pain who underwent kyphoplasty treatment complicated by postoperative chest pain, difficulty breathing and acute drop in blood pressure due to hemothorax.

## CASE PRESENTATION

A 94-year-old Caucasian female presented to the emergency department with progressively worsening back pain after a mechanical trip and fall several weeks earlier. The patient had attempted medical therapy prior to presentation but now reported her pain as severe, localized to the upper back between her shoulder blades, with radiation to her chest, and exacerbated by movement. She had with tenderness to palpation. A CT scan was negative for aortic dissection but revealed a T11 vertebral compression fracture.

After consulting with the spine team, the patient was referred for kyphoplasty of the T11 vertebra. The intraoperative course was without complication. Immediately after the procedure, the patient was transferred to the post anesthesia

care unit where the patient started to require blood pressure support and complained of shortness of breath and right-sided chest pain. She was tachycardic and required 14 L/min of supplemental oxygen via nonrebreather. Physical exam revealed tracheal deviation, absent breath sounds in the right chest and dullness to percussion over the anterior and posterior right chest. A chest x-ray was ordered (**Figure 1**) and the post anesthesia care unit (PACU) team then used a point of care ultrasound (POCUS) machine at the bedside, which revealed a large anechoic collection between the chest wall and the lung (**Figure 2**). A CT image confirmed the diagnosis of a hemothorax (**Figure 3**). The hemothorax was rapidly decompressed by inserting a 36F chest tube. Seven hundred milliliters drained, providing the patient with immediate relief. The patient was discharged post-op day 4 with no further interventions.

## DISCUSSION

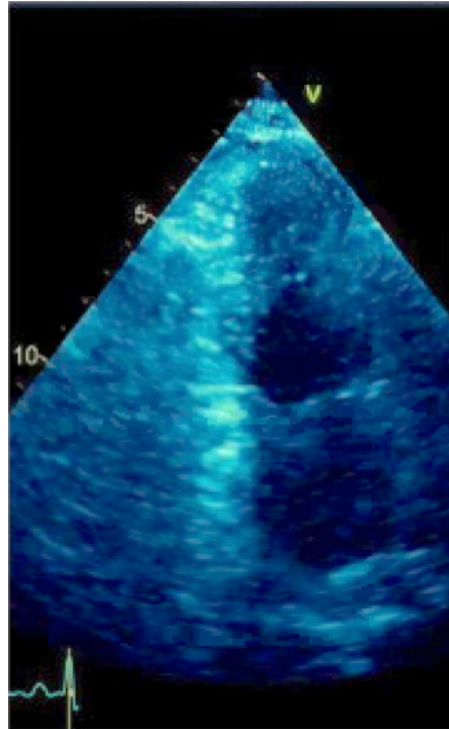
Percutaneous vertebral augmenting procedures are relatively safe and effective procedures with success rates as high as 95%, yet still come with risk.<sup>3</sup> The most concerning risk is the potential for cement extravasation causing paralysis, neuropathy, or fatal emboli from cement entering unintentional structures. In addition, the procedural complications have included air embolism, vertebral body split fracture, pneumothorax and rib fractures. The incidence of hemothorax is <1% during vertebral augmenting procedures while the success rate of a kyphoplasty provides generous benefits compared to risks.<sup>3</sup> Vertebral augmenting procedures are increasingly performed in an off-site ambulatory and office setting where clinical vigilance of the patient's clinical picture and awareness of potential complications is imperative.<sup>4</sup> The potential implications of a hemothorax in the elderly can be fatal with the potential sequelae of an empyema, fibrothorax resulting from fibrin deposition, and eventual lung entrapment from an inflammatory coating within the pleural space.<sup>5</sup>

The use of ultrasonography is a fast and highly sensitive tool for detecting hemothorax and can confirm the physical findings in emergency situations. Practitioners should monitor patients carefully for postoperative complications and consider other anesthetic methods to maintain patient awareness during kyphoplasty to better identify and manage risks associated with a vital pain-relieving procedure.

**Figure 1.** Chest X-ray prior to chest tube insertion [R hemothorax]



**Figure 2.** POCUS [Impaired Right Heart Relaxation]



**Figure 3.** CT Angiography of Chest [R hemothorax]



## References

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