

Post-Vertebral Augmentation Spine Imaging

Sudhir Kathuria, MD

KEYWORDS

• Vertebral augmentation • Cement leakage • Compression fracture • Post vertebroplasty imaging

KEY POINTS

- The goal of the vertebral augmentation (VA) procedure is to relieve pain by providing structural stability of the fractured vertebra through the safe injection of a stabilizing material.
- Complications from VA procedures are rare and generally result from unrecognized leakage of acrylic bone cement. Meticulous needle-placement technique and fluoroscopic monitoring during careful cement injection contribute to the safe performance of these procedures.
- Any worsening of the clinical symptoms during or after the VA procedure should warrant an urgent computed tomography (CT) scan to assess for potential cement leak.
- A new neurologic deficit should lead to an emergent CT scan and spine surgical consult.
- It is important to be aware of the expected imaging changes in previously augmented vertebrae.
- Magnetic resonance imaging should be strongly considered in the evaluation of patients presenting with unexplained new or residual symptoms after an initial successful VA procedure.
- Persistent edema and interval height loss after a successful VA procedure should not be interpreted as sufficient evidence of ongoing abnormality at the treated vertebral level.
- To make an accurate diagnosis, it is of vital importance to apply the knowledge of expected imaging changes in treated vertebrae, and correlate post-VA imaging findings with new clinical symptoms and the physical examination.

INTRODUCTION

The osteoporotic population at risk of compression fracture is sizable, with more than 700,000 new fractures every year in the United States alone.¹ Although imaging plays a critical role and has become an integral part in preprocedure evaluation of these patients, a substantial number of treated patients undergo follow-up imaging. Reasons for obtaining follow-up imaging range from potential procedure-related complications to development of new symptoms after initial improvement from a successful vertebral augmentation (VA). Although imaging is frequently obtained for evaluation of these patients, there is a general lack of knowledge about imaging characteristics of treated vertebrae. This article reviews

various indications for post-VA imaging, the appearance of augmented spine on imaging; especially magnetic resonance (MR) imaging, and the important complications associated with the VA procedure.

VERTEBRAL AUGMENTATION

VA is a percutaneous, imaged-guided procedure primarily used for treating back pain associated with vertebral compression fractures that are not effectively treated by conservative or medical therapy.^{2,3} This procedure was first introduced as a technique for the treatment of a symptomatic cervical vertebral hemangioma in 1987.² Since then, it has become a valuable and frequently used therapeutic option in the management of back pain

The Russell H. Morgan Department of Radiology and Radiological Science, Johns Hopkins Hospital, 1800 Orleans Street, Bloomberg 7218, Baltimore, MD 21287, USA
E-mail address: skathur2@jhmi.edu

Neuroimag Clin N Am 24 (2014) 337–347
<http://dx.doi.org/10.1016/j.nic.2014.01.007>

1052-5149/14/\$ – see front matter © 2014 Elsevier Inc. All rights reserved.

caused by osteoporotic and pathologic vertebral compression fractures.

The fundamental aim of the VA procedure is to improve pain, stability, and compressive strength of the vertebral body through the safe injection of a stabilizing material. This goal can be achieved by both vertebroplasty and kyphoplasty. Vertebroplasty involves the injection of acrylic bone cement inside the fractured vertebra using a needle under image guidance, generally x-ray or computed tomography (CT) fluoroscopy. Kyphoplasty, in comparison with vertebroplasty, involves the additional step of creating a cavity inside the diseased vertebral body by temporarily inflating a balloon tamp followed by injection of the bone cement into the cavity.

The usefulness of cross-sectional imaging in preprocedure evaluation of a VA procedure, including MR imaging and CT, is well established.⁴ MR imaging provides information on anatomic vertebral collapse and marrow edema that is essential for identifying the location and extent of the disease (Fig. 1). It also provides useful information about any canal or neural compromise. CT is helpful in identifying the potential route of cement extravasations by demonstrating any open fracture lines and osseous destruction, especially in pathologic fractures.⁵

By contrast, the indications and role of imaging in the post-VA setting is not as well described, but is becoming increasingly important.

REASONS FOR POST-VA IMAGING

Reasons for obtaining post-VA imaging can be broadly categorized as shown in Box 1.

Post-VA Baseline Imaging

Single or biplane x-ray fluoroscopy has been the most widely used modality to perform VA procedures. Radiographic images in 2 orthogonal planes should be obtained at the end of each augmentation procedure for documentation and evaluation of cement distribution; this is generally sufficient for an uneventful treatment of an osteoporotic vertebral compression fracture. Routine postprocedure CT imaging should be considered after treatment of pathologic vertebral fractures. There is increasing use of CT fluoroscopy to perform VA procedures in both osteoporotic and pathologic compression fractures. In such cases, CT images are obtained at the completion of the procedure. This CT scan provides useful baseline information about the distribution of acrylic bone cement and also demonstrates any unsuspected complications including cement leakage, changes



Fig. 1. T1-weighted magnetic resonance (MR) image shows the acute nature of L1 vertebral compression fracture by demonstrating edema as low signal intensity (arrow). Compare this with the L3 vertebral compression fracture with no edema, suggesting its chronic nature (arrowhead). Only the L1 level was treated with vertebral augmentation (VA), with complete resolution of the patient's symptoms of back pain.

Box 1

Categories of reasons for obtaining post-VA

1. Baseline imaging obtained at the completion of an uneventful procedure
2. Imaging obtained for further evaluation of suspected complications resulting from the augmentation procedure
3. Imaging obtained for evaluation of new or recurrent symptoms after initial improvement

Download English Version:

<https://daneshyari.com/en/article/3812038>

Download Persian Version:

<https://daneshyari.com/article/3812038>

[Daneshyari.com](https://daneshyari.com)