

Vertebral and Sacral Augmentation: Our Future in Spine Care

– Michael E. Frey, M.D.

Osteoporosis and cancer are the two leading causes of vertebral and sacral fractures in the United States. Percutaneous vertebral augmentation has been performed since 1984 and is continually evolving in the last several decades. Reviewing the literature, efficacy varies for early treatment using vertebral and sacral augmentation from 80-100% cure rate.

The technique involves a unilateral or bilateral transpedicular injection of polymethylmethacrylate (PMMA) into the fractured vertebral body via an introducer needle. The procedure can be performed transvertebral if desired. The objective of this intervention is to stabilize the spine, increase mobility, and decrease pain. Indications include acute, sub-acute or chronic pain refractory to conservative measures. Absolute contraindications include severe cardiopulmonary disease not conducive to sedation or anesthesia, uncorrectable coagulopathy, and myelopathy requiring surgical intervention. The published incidence of minor complications (transient radicular pain) has been less than 6% in treating osteoporotic compression fractures. Major complications such as pulmonary embolism, death, myelopathy, and radiculopathy due to cement extravasation can occur, but are rare.

Some fundamental, yet key concepts in treating patients with compression fractures are: the ability to read and interpret radiological films, knowing one's own skill limitations, and the ability to take an accurate history and physical exam. This sounds simple, however I hear so many physicians who rely on radiology reports only.

Radiologists and transcriptionists are human and dictation errors can occur. The two most important concepts in the history and physical exam are that the patient's pain is in the same location of the compression fracture and there is a lack of myelopathic signs. Once determined that vertebral augmentation is recommended, a thorough explanation of all potential risks and complications regarding vertebral augmentation is necessary.

When performing vertebral augmentation, first check in a lateral view what the vertebral body looks like so that one may determine the direction of the introducer needles. In an AP view, line up the inferior endplate in the oblique view so that it sits in the middle of the vertebral body. This can help guide the needle into the middle of the vertebral body. For high thoracic vertebrae such as T1-T4, placing the pedicle in the middle of the vertebral body may be unachievable. Finding the pedicle and knowing the depth and angle will become more important in these cases. Vision the pedicle as a clock-face. Anesthetize the skin and the pedicle to aid in pain relief. Place the trocar in the 2 o'clock position on the right pedicle and 11 o'clock position on the left pedicle. Some physicians utilize their own force to put the needle in. I prefer using light hammer taps to ensure smooth control. Tap the needle just enough until it is securely in the pedicle. Using the fluoroscope, one can go "down the beam" to tap the needle in. Always inject cement and place the needle under lateral image to prevent complications. The needle tip should be placed in the anterior third of the vertebral body. Inject the cement extremely slow to decrease the incidence of cement extravagation. Fill at least 50% of the vertebral body or between 3-5 cc of cement for each vertebral body to ensure accurate success. Gently withdraw the needles and have the patient lie on his/her stomach for a minimum of 15 minutes to ensure adequate hardening.

As the economy is changing, cost may become important to the institution where the procedure is being performed. Kyphoplasty is performed predominately in the hospital whereas vertebroplasty can be performed in an office-based practice, or surgery center. There are

significant cost differences between the two. Kyphoplasty, spineoplasty, and other "balloon-type" vertebral augmentation procedures are significantly more costly, averaging about \$3,000 for a single level case. Vertebroplasty equipment can vary from different companies, but even the most expensive vertebroplasty kits cost about \$1500 and have the ability to perform several levels without adding significant cost.

Vertebral augmentation is one of the few procedures that can provide instant gratification for both the patient and the physician. Technology to instill cement, and the types of cement used are continually evolving. I continue to learn from the students and fellow teachers every year when teaching this course. I look forward to seeing new faces this year.

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OTHER DR. FREY ARTICLES:

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