

Subsequent compression fractures of adjacent osteoporotic vertebrae not result of prior repairs

Patients with osteoporosis who have sustained a vertebral compression fracture and undergone repair of that damaged bone should be made to understand that they are not immune to new fracturing in adjacent vertebra.

The literature generally accepts that, once a vertebral compression fracture occurs, the risk of additional fractures in adjacent vertebrae increases fivefold.

However, some patients and even their physicians take this awareness one step too far and mistakenly believe that new fractures are a complication of the repair performed on the original fracture.

The truth of the matter is that new fractures are a product of added stress placed on neighboring vertebrae by the original fracture's wedge deformity. These adjacent vertebrae are at risk of fracturing because they are osteoporotic, hence weakened. In other words, the repair procedure of the original fracture has nothing to do with adjacent vertebral fracturing.

Moreover, many spine specialists are of the opinion that repair procedures actually lower the risk of adjacent vertebral fracturing by halting the progression of the original fracture and, in so doing, preventing further wedge deformity.

At-risk numbers growing

In any event, when a patient with osteoporosis complains of sudden-onset low back pain, it is advisable to consider

vertebral compression fracture as a likely cause.

Indeed, the U.S. population most prone to acute painful vertebral compression fractures is growing rapidly – and as their ranks increase, so does the number of undiagnosed cases. Notably, vertebral compression fractures are twice as common in females, occurring in 153 females per 100,000 (compared with 81 males per 100,000). Such fractures are identified in 26% of women aged 50 or older and are radiographically present at a rate of 500 cases per 100,000 persons in patients aged 50 to 54 and 2,960 cases per 100,000 persons in patients older than 85.

Osteoporosis can be blamed as the source of most vertebral fractures – about 700,000 of them per year, with approximately 260,000 of them of the compression type. (Compression fractures also can result from bone weakening tumors such as metastases, multiple myeloma and hemangioma.) In addition to these cases, more than 150,000 Americans sustain fractures of the vertebral column due mainly to trauma of the thoracolumbar and lumbar spine.

The forces responsible for spinal fractures are – in addition to compression – flexion, extension, rotation, shear or distraction forces or a combination of these mechanisms. Compression fractures come about as a result of sudden axial loading, transverse process avulsion by the origin of the psoas muscle, spinous process avulsions and acute fracture of the pars interarticularis from hyperextension.

Benefits of vertebroplasty

Only about 33% of spinal compression fractures are painful – the reasons for this are not clearly understood.

For those cases in which pain is present, it typically manifests suddenly and intensely. Triggering events can be as seemingly benign as a sneeze or a cough. The resultant pain is usually debilitating. Patients often must sleep in a seated or semi-reclining position because of the difficulty they have settling into a comfortable prone or supine position on a flat bed.

The pain is almost always refractory to treatment with medications. However, a less invasive, low-complication outpatient procedure exists that immediately eliminates most or all of the pain in about 90% of patients – vertebroplasty.

Vertebroplasty is most effective on recent compression fractures and only slightly less so on old ones. However, it is a worthwhile procedure no matter the age of the fracture because of its capacity for pain reduction, if not outright elimination. Vertebroplasty may also be applied prophylactically to an at-risk vertebra between two other abnormal vertebrae.

Inclusion criteria for vertebroplasty include pain localized to a fracture or tumor. Exclusion criteria include fracture extending to a posterior vertebral cortex retropulsed fragment, cord compression, radiculopathy, fever and/or sepsis or coagulopathy.

How it is performed

Vertebroplasty involves the injection of an acrylic cement under fluoroscopic guidance or, less commonly, CT guidance.

The roughly 40-minute procedure begins with the administration of local, deep, periosteal and endosteal anesthesia. This is followed by the transpedicular placement of an 11-gauge bone biopsy needle into the affected vertebra. (Thoracic vertebroplasty is performed via a transpedicular or peripedicular route by using a 13-gauge bone biopsy needle; access to cervical lesions is via an anterolateral approach with a 13-gauge bone biopsy needle.)

The acrylic cement that will be injected is prepared from a dry, powdered polymer mixed with barium and tantalum or tungsten, which makes the compound more visible during fluoroscopy. This admixture is then mixed with a liquid monomer of methyl methacrylate to a consistency similar to that of toothpaste.

Once prepared, the acrylic cement is injected using a high-pressure torque-handle syringe. Injection continues until complete opacification of the vertebral body is achieved or the first sign of extension into the epidural venous plexus appears.

After approximately 10 minutes, the acrylic cement solidifies and becomes harder than the native bone. Vertebroplasty does not restore the height of the compressed vertebral body; however, an added benefit of the deposition of acrylic cement within the vertebra is that it significantly strengthens osteoporotic bone, reducing the likelihood of repeat fracture.

Postoperatively, the patient remains supine for one hour and then is discharged. Post-procedural medications are limited to

Flexeril® for muscle spasm and Tylenol® for incisional pain. It is not fully understood how vertebroplasty relieves pain, but one theory is that the acrylic fusion of the bone fragments into a single block prevents the painful motion of individual fracture fragments against each other. Another theory is that pain relief may be related to the heat produced by the polymerization process as the acrylic cement catalyzes.

Conclusions

Repair of a vertebral compression fracture using techniques such as vertebroplasty does not increase an osteoporotic patient's risk of fracturing adjacent vertebrae, as some mistakenly believe. Vertebroplasty may in fact decrease such risk by halting the progression of the original fracture, thereby preventing further wedge deformity.

Approximately one-third of spinal compression fractures are painful. Of those, nearly all are refractory to treatment using medical management.

Vertebroplasty is the most effective intervention for relieving and/or resolving the intractable pain of a vertebral fracture. This relatively simple, less invasive outpatient procedure eliminates the need for invasive spine surgery.

The practitioner best trained and most skilled at performing vertebroplasty is a pain specialist, to whom referral for both diagnosis and treatment is highly recommended.

Many of the vertebral fracture patients sent to us here at Comprehensive Pain Management prove to be good candidates for vertebroplasty, and from it they ultimately experience genuine, life-changing relief – just one reason among many that growing numbers of referring physicians in and

around Baton Rouge look to us first for the help their patients need.

We at Comprehensive Pain Management stand ready to perform evaluations of your patients and make intervention recommendations or, at your behest, initiate treatment and perform follow-up. Whichever path you choose, rest assured that Comprehensive Pain Management will keep you apprised every step of the way. Satisfied by the high-quality services and interactions delivered at each encounter, your patients will return to you as willing as ever to continue entrusting you with their ongoing care.

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