

Vertebral Augmentation

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Vertebral augmentation is considered the procedure for the patients presenting with a symptomatic vertebral fracture which results in severe disabling back pain, marked reduction in mobility and quality of life. There are two vertebral augmentation procedures i.e vertebroplasty and kyphoplasty.

Vertebroplasty is a minimally invasive, fluoroscopic guided procedure that involves injection of polymethylmethacrylate (PMMA) which is considered as bone cement and is injected into the vertebral body. Demond., *et al.* [1] first described this procedure in 1987. He was a French neurosurgeon who used vertebroplasty to stabilize cervical vertebral weakness by a hemangioma.

Kyphoplasty is the procedure which involves injection of bone cement (PMMA) into a balloon tamp after inflation. This procedure was first introduced by Kyphon in North America and was later taken over by Medtronic.

Both of these vertebral augmentation procedures are performed for symptomatic osteoporotic patients and to treat the painful vertebral body secondary to spinal tumors, lytic lesions compression fractures, hemangiomas, myeloma, lymphoma and aneurysmal bone cyst (ABC). These procedures not only relieve the pain but provide the stability of the involved vertebral level. So, the aim of vertebral augmentation procedures is to reduce the disabling pain, morbidity and to enhance the quality of life [2].

There are class I evidence to show the safety and effectiveness of vertebral augmentation procedures. One of the biggest international multicenter open labelled randomised trial by the name "The Fracture Reduction Evaluation Trial" (FREE trial) published in 2009, included 300 patients and were divided into kyphoplasty and conservative medical management group. The result showed that kyphoplasty group had better quality of life at 1 month follow up. Back pain scores were significantly reduced at 1 week and 12 month follow up.

VERTOS II [3] was an international randomized controlled trial between conservative management versus vertebroplasty for osteoporotic fractures published in 2010. This trial included 202 patients and these were equally randomized into conservative management and vertebroplasty group. The results showed significant pain relief in vertebroplasty group.

Hulme., *et al.* [4] reviewed 69 clinical studies comparing vertebroplasty and kyphoplasty in 2006. He found 87% pain relief with vertebroplasty and 92% pain relief with kyphoplasty. As far as kyphosis correction was concerned, kyphoplasty was superior to vertebroplasty.

Vertebral augmentation procedures are associated with complications which I would like to stress upon. Complication rates are low in osteoporotic fractures as compared to oncologic fractures. The complications associated are adjacent level vertebral fractures, cement extravasation, injury to thecal sac, hematoma formation and cement thrombus in peripheral pulmonary vessels. Hulme., *et al.* [4] found that cement leaks occurred more in vertebroplasty (41%) as compared to kyphoplasty (9%) group. Xin Long., *et al.* [5] studied the risk factors for new vertebral compression fractures after vertebroplasty. They found that low mineral density, intradiscal cement leak and vertebral height restoration are risk factors associated.

Early intervention is recommended to reduce the pain substantially. Clinical significant pain reduction was seen when vertebral augmentation procedures were done within 7 weeks as compared to the patients in which the procedures were done after 7 weeks [2]. "The Cancer Patient Fracture Evaluation" (CAFE) trial [6] was an international multicenter randomized trial between conservative manage-

ment and kyphoplasty for fractures in cancer patients. The trial was published in 2011 which included 134 patients in two groups of conservative management and kyphoplasty group. This study showed marked reduction in disabling back pain in kyphoplasty group.

Dudeney, *et al.* [7] performed 55 kyphoplasty in their series of 18 multiple myeloma patients. Pain and health related quality of life had shown significant improvement at even after one year of follow up. Fourny, *et al.* [8] reported a direct comparison on the treatment of tumourous lesions with vertebroplasty and kyphoplasty in 56 patients undergoing 65 vertebroplasties and 32 balloon kyphoplasties. Leak was observed in 9% of vertebroplasties and 0% in kyphoplasties.

We conclude by observing the literature that both vertebroplasty and kyphoplasty had better outcome in pain management, disability reduction and to improve quality of life when compared with those patients managed conservatively.

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