

Insights on Operative Treatments for Osteoporotic Vertebral Fractures

Amer Sebaaly*

Spine Surgery, Orthopedic Unit, Notre Dame Hospital, Saint Joseph University, Beirut, Canada

Editorial

Received date: 09/01/2017

Accepted date: 20/01/2017

Published date: 27/01/2017

*For Correspondence

Amer Sebaaly, Fellow in Spine Surgery, Orthopedic Unit, Notre Dame Hospital, 1560 Rue Sherbrooke E, Montréal, QC, H2L 4M1, Saint Joseph University, Beirut, Canada, Tel: + 1 (514) 586-4860.

E-mail: amersebaaly@hotmail.com

INTRODUCTION

Vertebral fractures at the thoracolumbar area are the second most common fracture after the fractures around the hip ^[1]. Osteoporotic vertebral fractures (OVF) are often related to a minor trauma like a fall, or even may happen spontaneously, not related to any minor trauma and affect 117 per 100000 persons ^[2]. Standard therapy of these fractures consists of rest, analgesia and mobilization and is often poorly tolerated in this elderly population, with the adverse effects of analgesia and immobilization leading to associated health problems (poor cognition, increased risk of falls, constipation and nausea) ^[3]. OVF are associated with a greater impact on health-related quality of life than other fragility fractures ^[2].

There is an ongoing debate whether operative treatment provide better outcome than optimal medical management and on the best operative technique to treat this common pathology. The main debate started in 2009 when two randomized controlled trials were published in the New England Journal of Medicine (NEJM): Buchbinder et al. ^[4] compared in 78 patients vertebroplasty or sham. There was no difference in matter of pain and quality of life at 1 week or at 1, 3 or 6 months after treatment. Similarly, Kallmes et al. ^[5] compared in 131 patients vertebroplasty and sham. Both groups had immediate improvement in disability and pain scores after the intervention. Although the two groups did not differ significantly on any secondary outcome measure at 1 month, there was a trend toward a higher rate of clinically meaningful improvement in pain in the vertebroplasty group. In 2010 and based on the results of these two studies, the American Academy of Orthopedic Surgeons' (AAOS) evidence-based guidelines committee strongly recommended against the use of vertebroplasty and kyphoplasty as an option for the management of painful osteoporotic compression fractures ^[9]. However, these two studies were heavily criticized for by inclusion of patients with sub-acute and chronic fractures and should be interpreted cautiously ^[6,7]. Since then, several randomized controlled trials have been published; all but one concluded the superiority of operative cement augmentation of OVF compared to optimal medical management. Including the FREE, the VERTOS and VERTOS II trials ^[8-13]. Improvement of pain scores and quality of life score were significantly better at early and late follow-ups (up to 24 months) ^[8]. Authors also concluded of a mean gain of 30000 euros per adjusted quality of life ^[10]. Thus, cement augmentation for the treatment of symptomatic OVF seems to have positive outcomes compared to optimal medical treatment of sham ^[14].

One other debate is the best operative treatment modality for these OVF. Cement augmentation options include vertebroplasty, kyphoplasty and vertebral body stenting (VBS). When performing a kyphoplasty, a balloon is used to create a cavity in the fractured vertebra thus reducing the kyphosis and the injection pressure, while in VBS; the vertebral high is persevered by an intravertebral device. It has the theoretical advantage of improving the kyphosis at the fractured level as well as reducing the injection pressure and thus limiting cement leakage ^[15]. Several studies compared these different techniques. When all results are pooled into a metaanalysis, kyphoplasty was found to have a similar long-term pain relief, function outcome (short-term ODI scores, short-and long-term SF-36 scores), and new adjacent OVFs in comparison to vertebroplasty. On the other hand, kyphoplasty was found to be superior to vertebroplasty for the injected cement volume, the short-term pain relief, the improvement of short- and long-term kyphotic angle, as well as a lower cement leakage rate with the drawbacks of having longer operation time and higher material costs ^[16]. When comparing VBS to other modalities higher rate of adverse events related to material and cuff pressure was found in the VBS group compared to kyphoplasty. There was no difference in terms of time of exposure to radiation, reduction of kyphosis or cement leakage even if stentoplasty was associated to an improvement of restoration of vertebral height ^[17].

In conclusion, there is no definite evidence on the best way to treat OVFs and results of the above mentioned studies

Research and Reviews: Orthopedics

should be interpreted with caution since the majority of these papers were sponsored by industry^[45]. Nonetheless, there is some evidence on the superiority of cement augmentation over an optimal conservative treatment for OVF. Kyphoplasty is associated with significant improvement of local kyphosis and less cement leakage without any difference in long-term pain or functional outcome. Cement augmentation remains a plausible available option in treating this frequent and rising problem that affects mainly the older population.

REFERENCES

1. Wang H, et al. Comparison of open versus percutaneous pedicle screw fixation using the sextant system in the treatment of traumatic thoracolumbar fractures. *Clin Spine Surg.* 2016.
2. Sebaaly A, et al. Vertebral augmentation: State of the art. *Asian Spine J.* 2016;10:370-376.
3. Goldstein CL, et al. Management of the elderly with vertebral compression fractures. *Neurosurgery.* 2015;77:S33-45.
4. Buchbinder R, et al. A randomized trial of vertebroplasty for painful osteoporotic vertebral fractures. *N Engl J Med.* 2009;361:557-568.
5. Kallmes DF, et al. A randomized trial of vertebroplasty for osteoporotic spinal fractures. *N Engl J Med.* 2009;361:569-579.
6. Aebi M. Vertebroplasty: About sense and nonsense of uncontrolled "controlled randomized prospective trials". *Eur Spine J.* 2009;18:1247-1248.
7. Chen L, et al. Vertebroplasty trials: The medium is the message. *J Vasc Interv Radiol.* 2014;25:323-325.
8. Wardlaw D, et al. Efficacy and safety of balloon kyphoplasty compared with non-surgical care for vertebral compression fracture (FREE): A randomised controlled trial. *Lancet.* 2009;373:1016-1024.
9. Voormolen MHJ, et al. Percutaneous vertebroplasty compared with optimal pain medication treatment: short-term clinical outcome of patients with subacute or chronic painful osteoporotic vertebral compression fractures. The VERTOS study. *AJNR Am J Neuroradiol.* 2007;28:555-560.
10. Klazen C a H, et al. Vertebroplasty versus conservative treatment in acute osteoporotic vertebral compression fractures (Vertos II): An open-label randomised trial. *Lancet.* 2010;376:1085-1092.
11. Farrokhi MR, et al. Randomized controlled trial of percutaneous vertebroplasty versus optimal medical management for the relief of pain and disability in acute osteoporotic vertebral compression fractures. *J Neurosurg Spine.* 2011;14:561-569.
12. Blasco J, et al. Effect of vertebroplasty on pain relief, quality of life and the incidence of new vertebral fractures: A 12 month randomized follow-up, controlled trial. *J Bone Miner Res.* 2012;27:1159-1166.
13. Boonen S, et al. Balloon kyphoplasty for the treatment of acute vertebral compression fractures: 2 year results from a randomized trial. *J Bone Miner Res.* 2011;26:1627-1637.
14. Anderson PA, et al. Meta-analysis of vertebral augmentation compared with conservative treatment for osteoporotic spinal fractures. *J Bone Miner Res.* 2013;28:372-382.
15. Savage JW, et al. Vertebroplasty and kyphoplasty for the treatment of osteoporotic vertebral compression fractures. *J Am Acad Orthop Surg.* 2014;22:653-664.
16. Wang H, et al. Comparison of percutaneous vertebroplasty and balloon kyphoplasty for the treatment of single level vertebral compression fractures: A meta-analysis of the literature. *Pain Physician.* 18:209-222
17. Martín-López JE, et al. Stentoplasty effectiveness and safety for the treatment of osteoporotic vertebral fractures: a systematic review. *Orthop Traumatol Surg Res.* 2015;101:627-632.