Prospective Evaluation of Percutaneous Vertebroplasty in Patients with Intractable Pain from Osteoporotic or Metastatic Fractures Using Quality of Life Assessment

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Purpose
Percutaneous vertebroplasty is a minimally invasive outpatient procedure whereby vertebral compression fractures are stabilized with injection of bone cement or polymethylmethacrylate (PMMA). Rapid, partial, or complete pain relief can be achieved through this procedure. We prospectively assessed the efficacy of percutaneous vertebroplasty (PVP) by an improvement in patient global quality of life using various standardized measures.

Materials & Methods
Patients with intractable pain for vertebral metastases, many resistant to palliative radiation therapy, and patients with intractable painful osteoporotic fractures were treated with parapedicular or transpedicular injection of PMMA. Patients with compromise of the neural foramen or significant compromise of the spinal canal were excluded. A multidisciplinary team approach is essential for proper patient selection. An orthopedist, oncologist, and neuroradiologist assessed all patients. Plane X-rays, CT and MR scan were performed on all patients. Using a reflux hammer, percussion pain was correlated to the imaging abnormalities. MR scanning is essential to exclude patients with neural foraminal or significant spinal canal compromise. The exact entry point and angle of the bone biopsy needle can be calculated using the planning CT scan, making the procedure significantly safer. All patients were assessed before and after the procedure for quality of life and amount of pain using; 1) Edmonton Symptom Assessment Score (Quality of Life Assessment), scoring global pain, nausea, tiredness, depression, anxiety, drowsiness, appetite, sense of well-being, shortness of breath, and site specific pain score (0-10, 0 = pain-free, 10 = worst pain), 2) Townsend Functional Scale (A = normal pain-free use of spine/extremity, B = normal use with pain, C = significant limited use and D = nonfunctional extremity/spine) and, 3) amount of analgesic intake. A postprocedural CT scan was performed the same day on all patients. Follow-up assessment consisted of a phone call at days 1, 2, 4, weeks 1, 2, 4, 8 and 12. These patients were also followed up in the bone metastases clinic in 2 weeks, then monthly. Nineteen patients (11 females, 8 males, median age 68 years, range 31-87 years) were evaluated. Twenty procedures (N = 20) at 28 vertebral levels were performed. Eleven procedures were for pathologic fractures and nine procedures were for osteoporotic fractures.
Results
The Townsend Functional Scale demonstrated 1-2 level improvement in 15/20 procedures. Evaluation of the site-specific pain score showed a decrease of 2 or more levels. The site-specific pain score with movement was 9.4 preprocedure and 1.8 postprocedure with a 4-week minimum follow-up. There was no significant difference in pain relief between the osteoporotic fractures and the pathologic fractures. Also, there was significant improvement in some of the Edmonton Symptom Assessment Scores. There were no complications with up to 20 months follow-up. Three patients died at 4, 6, and 8 weeks unrelated to the procedure. The majority of levels had extravertebral extravasation of cement without complications.

Conclusion
Percutaneous vertebroplasty significantly improved global quality of life and function by markedly decreasing patient back pain, and reducing intake of pain medications. The procedure is safe with no complication noted in our series.