Risk factors for the development of chronic back pain after percutaneous vertebroplasty

Poster No.: C-2099
Congress: ECR 2014
Type: Scientific Exhibit
Authors: J. Blasco Andaluz, A. Martinez-Ferrer, L. San Roman, J. Macho, A. Lopez Rueda, D. Campodonico, C. Ruiz, P. Peris; Barcelona/ES
Keywords: Musculoskeletal spine, Interventional non-vascular, Percutaneous, Fluoroscopy, Vertebroplasty
DOI: 10.1594/ecr2014/C-2099

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR's endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is strictly prohibited.

You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys' fees, arising from or related to your use of these pages.

Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.

www.myESR.org
Aims and objectives

Vertebral fractures (VF) are the most common manifestation of osteoporosis. Although only around one third of VF are clinically diagnosed, approximately 10-20% may be associated with the development of chronic back pain (CBP) and impaired quality of life. [1-3] Factors such as the number and/or the severity of the VF and having incident VF, among others, have been related to the development of CBP in these individuals.[1,2,4-7] Nevertheless, at present, data on the incidence and risk factors related to CBP after VF are scarce. In addition, whether or not the use of methods addressed to the treatment of symptomatic VF, such as percutaneous vertebroplasty (VP), could influence the evolution of long-term back pain in these patients has not been fully investigated.

In a recent randomized controlled trial (RCT) we compared the effects of VP versus conservative therapy (CTh) on the quality of life and pain relief in patients with painful osteoporotic VF. We observed that despite the association of VP with faster and greater improvement in short-term pain relief after the procedure, one year later both groups of patients showed a similar improvement in pain and quality of life, with a higher incidence of new VF being observed in those treated with VP.[8]

The aim of the present study was to analyze the incidence and risk factors related to the development of severe CBP in a RCT comparing the analgesic effect of VP versus CTh in patients with symptomatic VF.
Methods and materials

We had previously performed a RCT comparing VP with CTh in improving pain and quality of life in individuals with painful osteoporotic VF over a 1-year follow-up period. The study was conducted at the Neurointerventional Radiology Department of the Imaging Diagnostic Centre, in conjunction with the Rheumatology Department of the Hospital Clinic of Barcelona, Spain.

Inclusion criteria were the following: acute, painful osteoporotic VF from T4-L5 with clinical onset <12 months, as confirmed by spinal X-ray and by the presence of edema on STIR magnetic resonance imaging (MRI) or activity on bone scan, and with a Visual Analogue Scale (VAS) score # 4 on a scale from 0-10. Exclusion criteria were the following: untreatable coagulopathy, active local or systemic infection, current malignancy, vertebral canal occupation by a fragment of the vertebral body or non-osteoporotic VF, non informed consent, or active associated disorders (i.e. fibromyalgia or spondyloarthopathies) that may interfere with correct assessment of quality of life and pain. Ethical approval was obtained from our hospital.

Spinal X-rays and MRI were performed in all patients at baseline. In addition, all individuals were clinically assessed at baseline and thereafter at 2 weeks and 2, 6 and 12 months. Medication details were recorded throughout the study. Most VP procedures were carried out with bilateral transpedicular 10 or 13-gauge needle injection of PMMA cement. Dyna-CT immediately after vertebroplasty or standard CT 24 hours after the procedure was undertaken in order to check cement distribution or leakage. The procedure was undertaken in symptomatic vertebral compression fractures with associated edema in MRI, with a maximum of four vertebral levels being treated in a single session. Treatment included calcitonin during the first month and analgesics when necessary (with standardised format). Conservative therapy consisted of analgesics with standardised format and nasal calcitonin (first month). After one month of treatment, both groups began/or continued antiosteoporotic treatment.

Pain assessment was based on the Visual Analogue Scale (VAS), a scale from 0 to 10 in which 0 indicates no pain and 10 indicates the maximum level of pain. Severe CBP was defined as residual pain with a VAS # 7 at the end of follow-up (12 months).[8,9] For quality of life measurements, we used the Quality of Life Questionnaire of the European Foundation for Osteoporosis (Qualeffo-41). Domain scores range from 0 to 100, with 100 being the worst status.[8]

Standard X-rays of the thoracic and lumbar spine were obtained to evaluate VF at baseline, and at 6 and 12 months. The evaluation of the VF was performed by a semi-quantitative approach. A VF was defined as a reduction of 20% or more in the anterior, middle or posterior height of the vertebral body compared with adjacent, undeformed vertebrae.[10,11] Magnetic resonance imaging with STIR weighted images
was performed at baseline to confirm bone marrow edema of the painful vertebra (defined as acute VF) and was repeated on suspicion of a new fracture during follow-up. In cases of MRI contraindication, a bone scan was used to assess fulfilment of the inclusion criteria.
Results

Of the initial 125 patients randomized, 91 (47/64 in the VP arm and 44/61 in the conservative treatment arm) completed the 12-month follow-up. Severe CBP was observed in 11/47 (23%) of VP treated patients vs. 10/44 (23%) in the CTh patients. Patients who developed severe CBP after VP showed a longer symptom onset time (82% # 4 months in VP vs. 40% # 4 months in CTh, P=0.03). Patients with severe CBP had significantly higher mean VAS values at baseline and at 2, 6 and 12 months in the two groups of patients as well as a higher frequency of VAS values # 7 at these time-points.

In the univariate analysis the risk factor for the development of severe CBP after VP was having a symptom onset time # 4 months (OR, 7.07; 95% CI, 1.33-37.65, P=0.036). Having a VAS value # 7 at 2 months increased the risk for developing severe CBP 11-fold (OR, 11.04; 95% CI, 6.71-18.17, P<0.001). Conversely, treatment with teriparatide was associated with a decreased risk for severe CBP (OR, 0.12; 95% CI, 0.03-0.6, P=0.024) in the overall study population.

Multivariate analysis including the number of recent VF, gender, analgesic treatment, onset period of time, VAS value # 7 at baseline and during follow-up, and type of antiosteoporotic treatment showed that having a symptom onset time # 4 months after VP was the principal factor related to the development of CBP after VP.
**Fig. 3:** Multivariate analysis for developing severe chronic back pain after vertebroplasty and conservative treatment.

© Interventional Radiology, CDI, Hospital Clinic - Barcelona/ES
**Fig. 1:** Percentage of relative differences in Qualeffo-41 values along the study compared to baseline values according to the presence (dotted line) or absence (continuous line) of chronic back pain (CBP) in both groups of patients. Points are the mean estimates and vertical lines represent 95% confidence intervals. The relative difference at each time $t$ has been obtained as $100 \times \frac{\text{Qualeffo-41 at time } t - \text{Qualeffo-41 at baseline}}{\text{Qualeffo-41 at baseline}}$. * $P<0.01$, ** $P<0.001$

© Interventional Radiology, CDI, Hospital Clinic - Barcelona/ES
Fig. 2: Baseline characteristics of the patients treated with vertebroplasty (VP) and conservative treatment (CT) according to severe chronic back pain (CBP) evolution (corrected by interaction effect).

© Interventional Radiology, CDI, Hospital Clinic - Barcelona/ES
Conclusion

Nearly one quarter of patients with symptomatic osteoporo tic VF develop severe CBP independently of the type of treatment.

Increased risk for CBP after symptomatic VF was mainly associated with the time of symptom onset previous to VP in the subjects treated with this procedure and with persistence of severe CBP after treatment in the overall study population. Conversely, antiosteoporotic treatment with teriparatide was associated with a decreased risk of this complication. All these factors should be taken into account when evaluating the therapeutic approach of these patients.
References


