

## Review

# Percutaneous vertebroplasty: a short overview on a first year of implementation in General Hospital Dubrovnik

Biomedicine and Surgery

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## ABSTRACT

Percutaneous vertebroplasty represents a minimally invasive therapy used to relieve the pain for the osteoporotic or malignant fractures. In the first year of its implementation, a total of 12 patients were admitted in Dubrovnik County Hospital during the year 2016 and underwent this method. All the patients were discharged from the hospital on the same day after the procedure related to pain relief. There were no complications.

**KEYWORDS:** vertebroplasty; pain relief; treatment costs

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## INTRODUCTION

Percutaneous vertebroplasty is a minimally invasive, image-guided therapy used to relieve pain from a vertebral body fracture (1). It has been used for osteoporotic or malignant fractures. The patients who don't respond to conservative treatment or who continue to have severe pain may be helped by this method.

Vertebroplasty is usually performed by a spine surgeon or interventional radiologist. In General hospital Dubrovnik and in Croatia in general, this procedure is mostly performed by a Trauma-Orthopedic surgeon. Percutaneous vertebroplasty usually involves percutaneous injection of cement, polymethylmethacrylate, into the vertebral bodies. Patients are given local anesthesia and a light sedation for the procedure. During the procedure bone cement is injected with a biopsy needle into the collapsed or fractured vertebra. The needle is placed with fluoroscopic x-ray guidance. The cement quickly hardens and forms a support structure within the

vertebra that provides stabilization and strength. The needle makes a small puncture in the patient's skin that is easily covered with a small bandage after the procedure. X-ray or other radiological imaging is used to ensure proper placement of the cement.

For the first 24 hours after vertebroplasty a bedrest is usually recommended. Activities may be increased gradually and most regular medications can be resumed. Many patients undergoing percutaneous vertebroplasty experience 90 percent or better reduction in pain within 24-48 hours and increased ability to perform daily activities shortly thereafter (1-3).

Complications are rare, less than 3% (3) and include infection, bleeding, numbness, tingling, increased back pain and paralysis. Other risks include cement extrusion into the vertebral canal leading to spinal cord or nerve root compression, venous or pulmonary embolism, and complications due to anesthetic procedures can also be observed.

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**Table 1.** Hospitalized patients according to the indication, age and gender.

Posttraumatic fracture	47 male	70 female	75 male	81 female
Osteoporosis	61 female	72 male	81 male	82 male
Neoplasm	61 male	78 male	82 male	84 female

## PATIENTS AND METHODS

In the period between January and December of 2016 a total number of 12 patients, both men and women, underwent percutaneous vertebroplasty procedure. The age ranged from 47 to 84 years. There were four patients who sustained posttraumatic vertebral compression fractures of thoracic or lumbar spine; two female (age 70 and 81) and two male patients (47 and 75 years).

Among the patients who sustained pathologic fractures, there were three male (age 70, 72, 81) and one female patient (age 61) with osteoporotic fractures. Other patients were all men older than 61 year (age 61, 78, 82, 84) with neoplastic disease spreading into thoracic (Th9, Th11 and Th12) and lumbar spine (L1, L2, L4).

Two patients (age 61) with osteolytic lesions of Th9 and Th11 and osteoporotic L1 and L3 vertebral body lesions (age 81) underwent vertebroplasty of two vertebrae.

All the patients were discharged from the hospital in a good general condition with no pain in the region of intervention.

All the patients signed an informed consent and the study has been approved by the Dubrovnik Hospital Ethical Committee according to the Helsinki declaration.

## DISCUSSION

Percutaneous vertebroplasty is a well-established treatment for patients suffering painful vertebral compression fractures caused by osteoporosis, metastatic spinal tumors, multiple myeloma and metastatic bone disease.

Percutaneous vertebroplasty was first performed in France in 1984, and has been widely used in the United States since the mid-1990s. Initially the main indication for percutaneous vertebroplasty was spinal hemangioma treatment, as described in 1987 by Galibert et al. With the experience, other indications emerged. Minimally invasive procedure involves injecting bone cement into the collapsed or weakened vertebra to stabilize and strengthen the fracture and vertebral body. Most experts believe that pain relief is achieved through mechanical

support and stability provided by the bone cement.

Vertebroplasty can increase patient's mobility, decrease narcotic medicamentous therapy and prevent further vertebral collapse.

It was found not to be effective in treating osteoporosis-related compression fractures of the spine in the only two placebo controlled and randomized clinical trials that have been conducted (4, 5).

In this study, it proved to be very useful in the treatment of osteoporotic fractures; one third of all patients suffered osteoporotic fractures (four patients; table 1).

Some have suggested that this procedure should only be done in those patients with fractures less than 8 weeks old (6). Others consider the procedure only appropriate for those patients with other health problems making bedrest possibly detrimental, those with metastatic cancer as the cause of the spine fracture, or those who do not improve with conservative management (7).

There were no associated risks from acrylic cement leakage to the outside of vertebral body. Also, we did not encounter other complications such as headache, infection, bleeding, numbness and paralysis.

Pulmonary cement embolism is reported to occur in approximately 2-26% of procedures (8, 9). No such mentioned complication appeared in our patients.

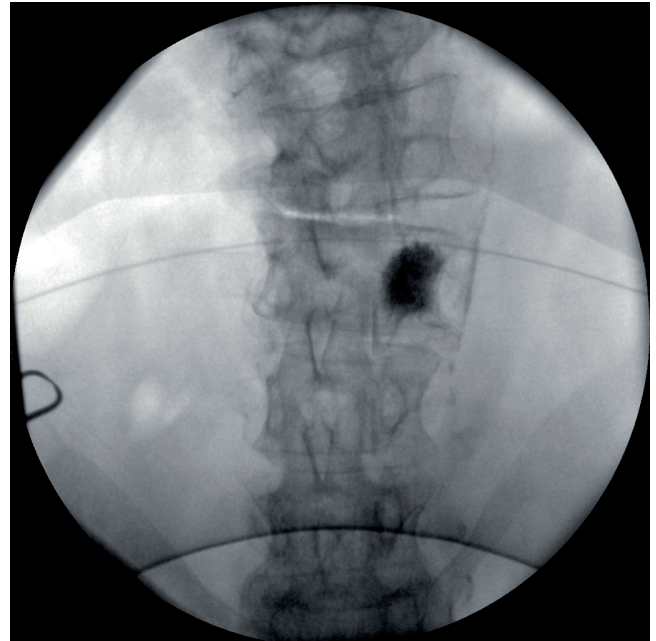
From the year 2010, the cost of percutaneous vertebroplasty per patient in Europe is around 2500 Euro (10); while in the United States when done as an outpatient procedure, the costs are around 3300 USD (11).

In Croatia, the cost of percutaneous vertebroplasty per patient was approximately 1000 Euro in 2016.

Percutaneous vertebroplasty patients are associated with significantly lower costs of associated treatment within the remaining postoperative period. We find these patients as more active and with a significantly less pain occurrence after undergoing this procedure.



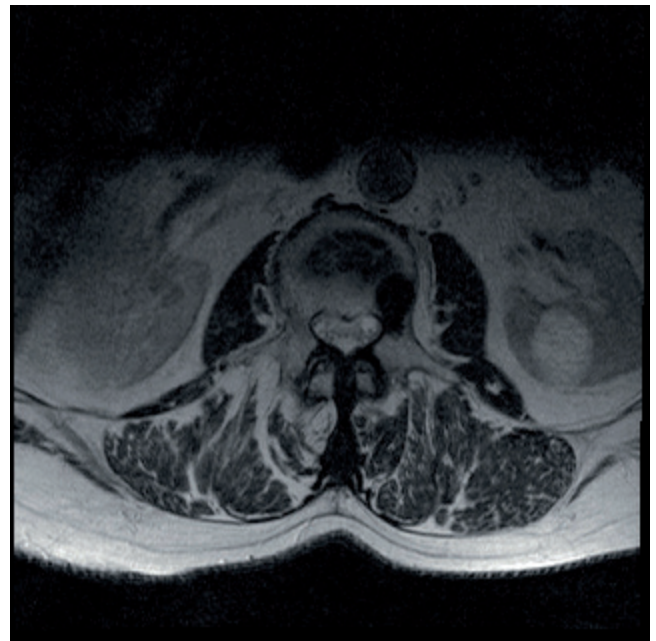
**Figure 1a.** MSCT sagittal scan of the lumbar spine shows acute vertebral collapse of the superior endplate of L3 vertebra.



**Figure 1b.** Fluoroscopic image in lateral projection during percutaneous vertebroplasty shows cement extending in the left part of L3 vertebra.



**Figure 1c.** Sagittal T2-weighted MR image of the lumbar spine at follow up after percutaneous vertebroplasty shows cement as low intensity signal in the body of L3 vertebra.



**Figure 1d.** T2-weighted MR transversal image shows low intensity signal of the cement in the body of L3 vertebra.

### CONFLICT OF INTEREST

All authors declare no conflict of interest and confirm that no funding was used to carry out this project.

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