Kale et al., J Clin Case Rep 2015, 5:10
DOI: 10.4172/2165-7920.1000619

Journal of Clinical Case Reports

Case Report Open Access

The Oldest Alive Vertebroplasty Patient with Thoracic Compression Fracture

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Abstract

The relationship between osteoporosis and vertebral compression fractures in elder population is well known. Pain and immobility in these patients causes serious comorbid diseases. Vertebroplasty is been used to reduce pain and to return the patients to their normal life quality in osteoporotic compression fractured patients for many years. Although vertebroplasty was widely used at lower thoracic and lumbar regions earlier, with higher experience it became administrable at mid and upper thoracic vertebrae nowadays. Many cases and techniques are reported in the literature till now but, to the best of our knowledge there is no such case of vertebroplasty procedure at 103 years old.

Keywords: Thoracic; Compression fracture, Vertebroplasty

Introduction

According to the increase rate of elder population in the community, osteoporosis and related vertebral compression fractures became much more frequent. There is as much as a 15% to 30% increase in mortality rate in patients with osteoporotic vertebral compression fractures [1]. Osteoporotic VCFs in the elderly have been estimated to ocur in about 5% of the overall population in Western countries [2]. Generally, complete recovery is observed in few weeks or in a month, but in some of the patients, conservative treatment is not adequate to relief the complaints about pain. Systemic side effects of prolonged bed rest and medical treatment may cause many systemic problems so new treatment alternatives should be evaluated. Although Vertebroplasty procedure with a type of acrylic called Polymethylmethacrylate (PMMA), has been utilized in the treatment of vertebral compression fracture since 1980's [3-5], recent improvements in minimally invasive techniques facilitated application of percutaneous procedures to become much more common in the treatment of osteoporotic vertebral fractures. In this method, aim is to relief the pain by strengthening the vertebral body, instead of bringing it back to its original size. Although percutaneous procedures are preferred in lower thoracic and lumbar regions, open techniques can be preferred in mid and lower thoracic vertebrae in order to reduce the risk of pneumothorax. Since the osteoporotic vertebral fractures are generally related to older population, comorbidities of these patients, such as cardiovascular and pulmonary problems, interfere with general anesthesia most of the time.

A 103 year old patient, who had T7 compression fracture after falling on her back and did not respond to conservative treatment, was reported in this article. Pain relief was obtained in postoperative early period, by applying unilateral transpedicular vertebroplasty procedure under general anesthesia. It has been reported that percutaneous vertebroplasty procedure is a safe technique in elderly patients (≥80 years of age), aged 80 to 95 years [6]. There is no such case of vertebroplasty at our patient's age in the literature.

Case Report

A 103 year old woman applied to our hospital with a severe back pain. Neurological examination was normal, but she had sensitivity at her mid thoracic region. Patient had no any other diseases and she was not under any medication. She had an accident two months ago falling on her back and since then she had been suffering from a back pain gradually. Patient was capable of doing her own work without any limitations before the accident. Despite the immobilization and analgesic therapy for pain, she did not recover. After the Computerized Tomography (CT) and Magnetic Resonance Imaging (MRI) examinations, she was hospitalized with the diagnosis of compression fracture at the level of T7 vertebra (Figure 1A-1C). Bone mineral density test results showed us T-score -2,5. Anesthesiologist and cardiologist evaluated the patient before surgery and informed the patient and her family about the risks of the procedure. Open surgery under general anesthesia was preferred in order to reduce the complication risk, since the systemic evaluation of patient was appropriate for the general anesthesia and T7 pedicle was measured as 5mm. Following the assignment of the exact level by the help of scopy, paravertebral muscles were dissected throughout T6-8 midline skin incision and posterior components of T7 vertebra were exposed. The entry point of the needle was checked clearly. Under anterior-posterior and lateral X-ray controls, vertebral body was penetrated through left pedicle with 11-gauge needle. PMMA cement of 2ml, was injected into the vertebral body under continued fluoroscopic monitoring. It's observed that the cement did not extend the borders of the corpus. There was no complication in postoperative CT examinations (Figure 2A-2C). Patient was discharged at postoperative day 2. VAS score was 9 at preoperative period and it was 3 at postoperative first hour and 1 at postoperative day 10. No problem was detected at her follow-ups and she doesn't need any painkillers at the 9. month follow-up.

Discussion

Osteoporotic vertebra fractures trigger other major problems for older population. Limited mobilization and disability due to pain, bring out serious cardiovascular risks in this patient group who already had comorbid diseases. That's why it's very important to treat pain and regain the mobilization capacity as soon as possible. On the other hand, the surgical procedures of older population constitute major problems

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Received September 01, 2015; **Accepted** October 23, 2015; **Published** October 30, 2015

Citation: Kale A, Aydoğmuş E, Gun EG, Açıkgoz B (2015) The Oldest Alive Vertebroplasty Patient with Thoracic Compression Fracture. J Clin Case Rep 5: 619. doi:10.4172/2165-7920.1000619

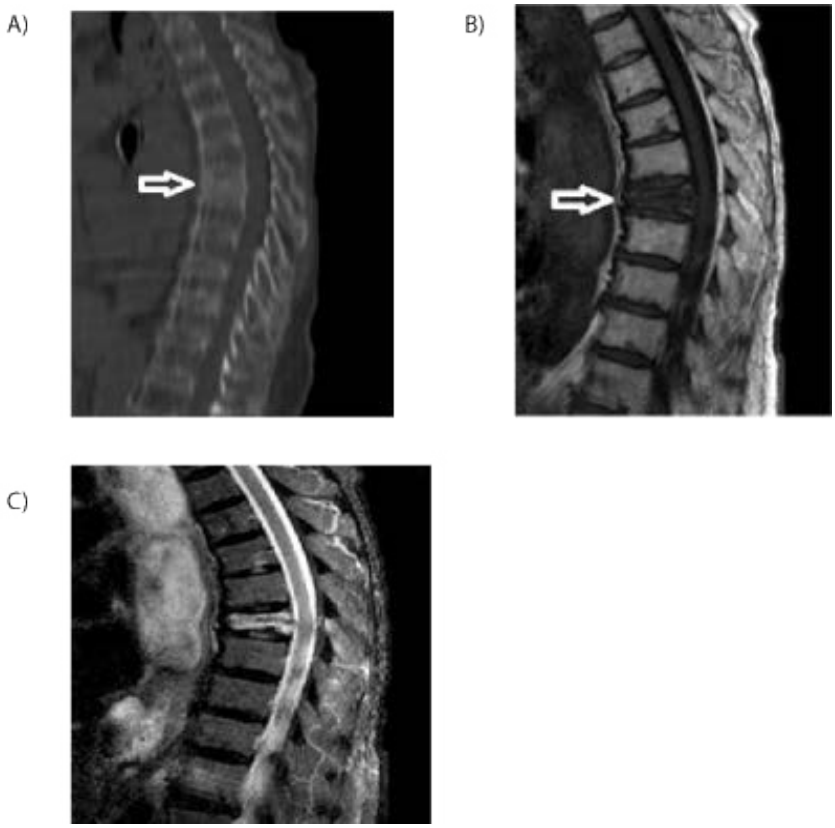

Figure 1: 50% compression fracture of the T7 vertebrae on sagittal CT (A), sagittal T1 (B) and T2 (C) weighted MRI images.

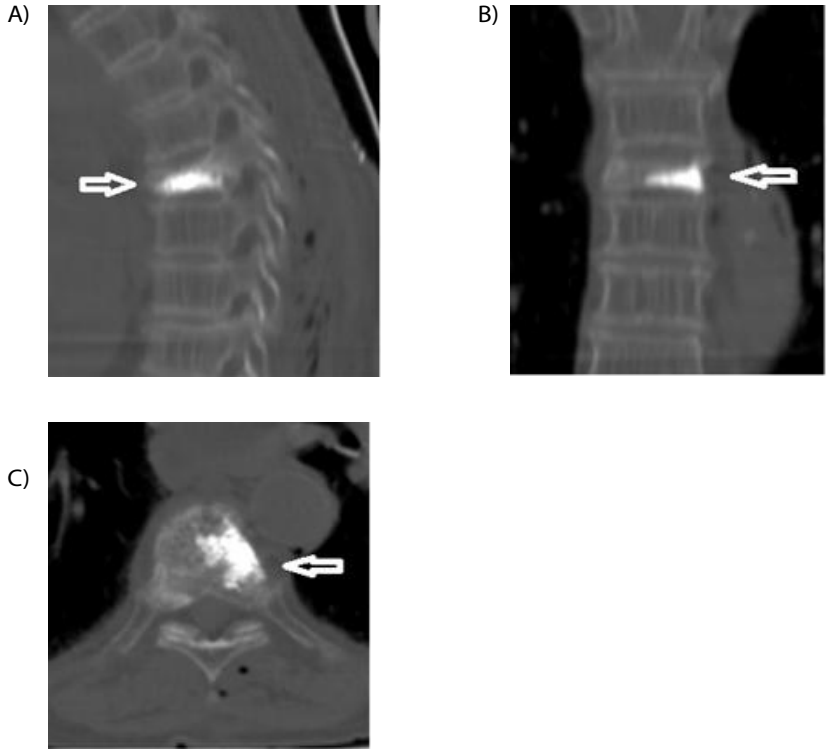

Figure 2: Sight of the T7 vertebrae after PMMA injection on sagittal (A), coronal (B) ve axial (C) CT images.

either. Pain relief capacity of vertebroplasty procedure, with a rate of 80%, makes it a favorable therapy choice [7].

There were few mechanisms described related to effect of vertebroplasty on pain relief in osteoporotic vertebral fracture cases. Stabilization of damaged vertebra, thermal or chemical nerve ablation are some of the pain control mechanisms [8,9]. Although there were several biomechanical and experimental studies carried out to determine the amount of the cement given into the fractured vertebra, there is still no consensus at this point [8-10]. Generally, amount of 2-3ml of cement injection is acceptable for thoracic region. Recent study revealed that the minimal intravertebral cement volume, in female patients with Grade 3 (40-67% compression) fracture of T7 vertebra, was measured as 1,79ml according to the scale of the severity of fracture [9]. In our study, patient with 50% compression at T7 vertebra level, was administered 2ml PMMA injection under scopy control. Another bias about vertebroplasty is whether it should be administered unipedicular or bipedicular. It's reported that unipedicular vertebroplasty is effective, if adequate amount of cement is injected [7,11].

Although vertebroplasty was widely used at lower thoracic and lumbar regions earlier, with higher experience it became administrable at mid and upper thoracic vertebrae nowadays. Among all patients participating in the study of Kallmes et al., who were applied vertebroplasty at mid and upper thoracic vertebrae levels, 33% of them had fractures at T7 level [12]. Smaller pedicle diameter, thoracic kyphosis and risk of pneumothorax, make the procedure much more complicated at these regions. Unilateral approach was reported as satisfactory at the end of the study, with higher success and lower complication rates [13].

Percutaneous transpedicular vertebroplasty, which is a minimal invasive technique, can be administered under local or general anesthesia. It can be performed with a very low complication rate and excellent clinical outcome [12]. Local anesthesia among tolerating patients, maintains neurological monitoring during the procedure and gives option to diagnose and treat the compression of neuronal structures due to possible cement leakage earlier. On the other hand, most useful identities of open surgery are providing better anatomical control and lower risk of peroperative complication when the subject is patient with thin pedicles at mid thoracic region. While osteodegenerative changes are expected at our patient due to her older age, open procedure was more reasonable for us to perform. It was very confident to place the needle while observing the pedicle.

Complication rate of vertebroplasty in osteoporotic vertebral fractures reported as 1-3%. This value rises to 10% in malignancies [13,14]. PMMA embolism, increase in pain, infection, radiculopathy due to cement leakage and spinal cord compression are the major complications of vertebroplasty. Leakage of cement into the paravertebral region is a minor complication which does not cause a problem generally. Cement injection closer to the anterior region of the vertebrae is approved as it's safer [15].

There is an argument about the necessity of giving prophylactic therapy to adjacent upper or lower vertebra in osteoporotic patients. In the presence of kyphotic deformity, it's reported that prophylactic therapy is administrable since the adjacent vertebra goes under much more stress [7].

Conclusion

Osteoporotic vertebral fractures are generally matter of older age group that accompany morbidity and mortality. Severe pain, negatively effects the life quality of patients who have no respond to conservative therapies and leads to disability. Early mobilization of such patients is a very important issue. In experienced hands, with appropriate technique, vertebroplasty procedure rehabilitates the pain and gives chance to get back to normal life as earlier.

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