Type of Article: Original Research Article

EFFICACY OF VERTEBROPLASTY IN MANAGEMENT OF OSTEOPOROTIC COMPRESSION FRACTURE – A CLINICAL STUDY

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Abstract

Background: In majority of senile osteoporotic vertebral compression fracture, vertebroplasty provides pain relief with correction of spinal deformity and low economic burden on patient. **Objective:** to determine the efficacy of percutaneous vertebroplasty in management of osteoporotic compression fracture and to evaluate pain relief after the procedure.

Material and Methods: Thirty patients underwent vertebroplasty and clinical evaluation of pain was done by recording the VAS score done preoperatively and after surgery.

Result: Percutaneous vertebroplasty with 1.5 year follow up. VAS score 56% were excellent, 19% good and 25% fair result.

Conclusion: Vertebroplasty is useful in management of vertebral compression fracture which are refractory to conservative treatment & helps in early mobilization.

Key words- Osteoporotic compression fracture, Visual Analog Scale (VAS), Local anaesthesia (LA)

INTRODUCTION

Elderly female patients have common senile osteoporotic vertebral compression fracture either spontaneously or trauma.

One third to three fourth of such patients may develop chronic pain due to osteoporotic spinal deformity[1]. Analgesic, muscle relaxant, bed rest and physiotherapy are used as conservative management. Variable analgesic effect shown by calcitonin in osteoporotic vertebral compression fracture.

Percutaneous vertebroplasty was primarily introduced for management of osteolytic tumors (firstly used in hemangiomas C2 vertebra) and later for osteoporotic vertebral compression fracture. Primary aim of percutaneous vertebroplasty is to reduce pain caused by vertebral fracture[2].

The purpose of our study is to determine the efficacy of percutaneous vertebroplasty in management of osteoporotic compression fracture and to evaluate pain relief after the procedure.

MATERIAL AND METHODS

Thirty patients who were diagnosed as a case of osteoporotic compression fracture were included in the study.

Patients selection criteria includes-

Anterior vertebral vertebral height loss at least 15%. Patients refractory to conservative treatment for > 6 weeks.

Prior to surgery clinical examination was performed on selected patients-

Before vertebroplasty location of patient's pain correlated with physical examination under fluoroscopy.

Visual Analog Scale (VAS) used to compare pain pre-op and post-op. Radiological evaluation in form of x ray done pre-op and post-op after procedure. MRI was done in selected cases as per existing recommendations[3].

Procedure

Under local anaesthesia (LA) / sedation patient positioned prone on the operating table with bollesters under chest and pelvis to increase the anterior widening of the vertebra. Procedure started after all aseptic precautions.

Fractured vertebrae marked by C arm. A small incision given over and a 11 or 13 gauge vertebroplasty needle with trocar and cannula (Jamshedi needle) introduced through the pedicle keeping in mind that the tip of needle is at center of affected vertebrae which is confirmed by C-arm. Fig 1. Tip is moved forward 1 cm approx posterior to anterior vertebral body. Similarly, the contralateral pedicle is cannulated. Bilateral cannulation forms safe cementing. Radio-opaque dye mixed with normal saline pushed by cannula till resistance in vaccum is felt. This vaccum signifies that now there is no leakage in vertebrae and by measuring the amount of radio-opaque dye mixed normal saline pushed we will get an idea of how much amount of bone cement to be used. The radio-opaque dye mixed normal saline is sucked out and bone cement is introduced into the vertebral body. Expansion of vertebral height noted on C-arm. To avoid leakage cannula are removed by rotatory manner until the cement hardens.

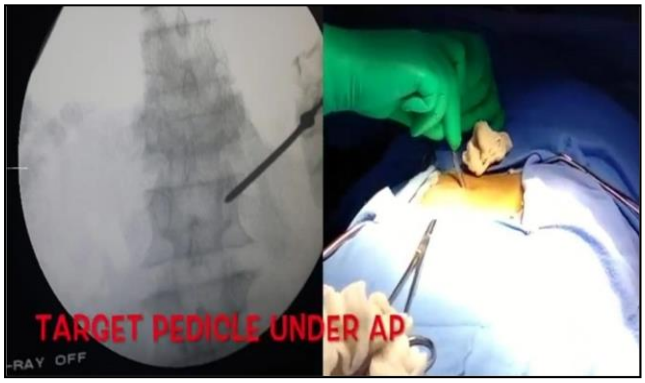

Fig 1: Target pedicle under C-arm by jamshedi needle

Follow-up:

Patient was instructed to lie supine flat position for 1 hour after procedure. Patient was mobilized 6 hours following the procedure. VAS score after procedure and compared with pre-operative VAS score. Neurological status was assessed post-operatively. X-ray on next day, then at 1, 6, 18 months after percutaneous vertebroplasty. MRI scan was done after 3 month. Pre-op and post-op vertebral height assessed and compared to each other.

RESULTS

A total of thirty patients were followed up for 1.5 year. Patient was able to respond to verbal commands while the procedure being carried out as LA. Post-op improvement in pain assessed by VAS score 56 % patients showed excellent results, 19 % good and 25 % fair. Post-operatively vertebral height improved from 3 to 6 mm. Fig 2 a & 2b

Fig (2a): Osteoporotic compression fracture at L1 level

Fig (2b): After vertebroplasty at L1

DISCUSSION

Osteoporosis is decrease in bone mass and bone strength which lead to increase risk of fracture. Hence, patients who have shown failed response to conservative treatment are treated by percutaneous vertebroplasty. Significant pain reduction was attained in 70% to 95% of patients within 24 hours [4,5] as per current literature.

In our study pain relief after percutaneous vertebroplasty was achieved 75% as per by VAS score (Figure 3) (Table 1). After 6 months of follow up, following percutaneous vertebroplasty 95.3% of patients had pain relief in comparison to the result reported by Liliang (2005) [5]. Pain relief occurred due to structural reinforcement of fractured vertebrae.

Fig (3): Visual Analog Scale (VAS)

Table (1): Showing mean VAS score and mean vertebral height pre-op & post-op.

Time Point	Mean VAS Score
Pre operative	8.2±1.4
24 hour post operative	6.7±1.4
1 month post operative	4.3±2.1
6 month post operative	2.7±1.6
18 month post operative	2.1±1.3
Mean pre-op vertebral height	**Mean post-op vertebral height**
2.2±1.3	4.3±2.6

In our study, the mean pre-op VAS score was 8.2±1.4 were decreased significantly (P<0.001) to 4.3±2.1 within 1 month of percutaneous vertebroplasty, to 2.7±1.6 after 6 months (P<0.001) and to 2.1±1.3 after 1.5 year which is highly significant results are comparable[6,7].

The main determinant of achieving satisfactory pain reduction depends on age of fracture and degree of osteoporosis[8,9]. However recurrent fracture at the level of treated vertebrae is not being reported in our study.

Vertebroplasty has been simple interventional procedure with evidence based treatment in treating severe chronic disability cause by osteoporotic vertebral fracture[10].

CONCLUSION

Vertebroplasty is extremely useful in management of vertebral compression fracture which are refractory to conservative treatment & helps in early mobilization. It is a cost effective procedure compared to other spinal surgeries procedures.

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