

**ORIGINAL ARTICLE****Outcome of percutaneous vertebroplasty and percutaneous kyphoplasty in management of vertebral compression fractures**

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**ABSTRACT:**

**Background:** Vertebral fractures are directly correlated with increasing age and incidence of osteoporosis. The present study was conducted to compare outcome of percutaneous vertebroplasty and percutaneous kyphoplasty in management of vertebral compression fractures. **Materials & Methods:** 110 patients of vertebral compression fractures of both genders were randomly divided into two groups of 55 each. Group I patients were treated with PVP and group II were treated with PKP. All patients were examined for pain assessments using visual analog scale and anteroposterior and lateral radiographs were taken to measure the vertebral body height. **Results:** Group I had 35 males and 0 females and group II had 30 males and 25 females. The mean VAS in group I patients was 2.65 and in group II patients was 2.04. Anterior height of vertebral bodies in group I was 24.5 and in group II was 21.3 and middle height of vertebral bodies was 20.1 in group I and 20.5 in group II. The difference was non-significant ( $P > 0.05$ ). **Conclusion:** Both percutaneous vertebroplasty and percutaneous kyphoplasty in management of vertebral compression fractures found to be equally effective.

**Key words:** Percutaneous vertebroplasty, percutaneous kyphoplasty, vertebral compression fractures

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**INTRODUCTION**

Osteoporosis is a common disease in the elderly, leading to vertebral compression fractures (VCFs), which is a major health care problem and there is high incidence of morbidity and mortality. About 26% of the women over 50-year-old and 40% of the women over 80-year-old have sustained VCF.<sup>1</sup> With the trend of increased aging of population, the incidences of osteoporosis and associated VCFs are expected to be more prevalent. Vertebral fractures are directly correlated with increasing age and incidence of osteoporosis. They most commonly occur among Caucasian women and are less common among men and women of African-American or Asian ethnicity.<sup>2</sup> Bone density of the vertebral column decreases steadily with age, with elderly women having lost almost half their axial bone mass by the time they reach their eighties. The rate of vertebral fractures increases from an annual incidence of 0.9% and prevalence of 5%–10% among middle-aged women in their 50s to 60s, to an incidence of 1.7% and prevalence of greater than 30% among those 80 years and older.<sup>3</sup>

Though genetic predisposition and age of puberty onset play a significant role, a multitude of lifestyle and environmental factors increase the risk of developing osteoporosis. These include lack of exercise and low body mass index, insufficient dietary calcium, low vitamin D production, glucocorticoid medication, smoking, and excessive alcohol intake. Occasionally, vertebral compression fractures

may be the presenting finding for an underlying medical condition such as metastatic disease or hyperparathyroidism. The main conservative management for symptomatic VCFs include medical therapy, activity modification, external bracing, and rehabilitation.<sup>4</sup>

Percutaneous kyphoplasty (PKP) and percutaneous vertebroplasty (PVP) have been shown to significantly improve the long-term outcomes of VCFs in terms of pain control, analgesic requirements, function, cost, and the incidence of serious complication.<sup>5</sup> The present study was conducted to compare outcome of percutaneous vertebroplasty and percutaneous kyphoplasty in management of vertebral compression fractures.

**MATERIALS & METHODS**

The present study comprised of 110 patients of vertebral compression fractures of both genders. They were recruited in the study with the written consent. All underwent X-ray examination followed by magnetic resonance (MRI). Patients were randomly divided into two groups of 55 each. Group I patients were treated with PVP and group II were treated with PKP. All patients were examined for pain assessments using visual analog scale (VAS), and anteroposterior and lateral radiographs were taken to measure the vertebral body height. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

## RESULTS

**Table I Distribution of patients**

Groups	Group I	Group II
Method	Percutaneous vertebroplasty	Percutaneous kyphoplasty
M:F	35:0	30:25

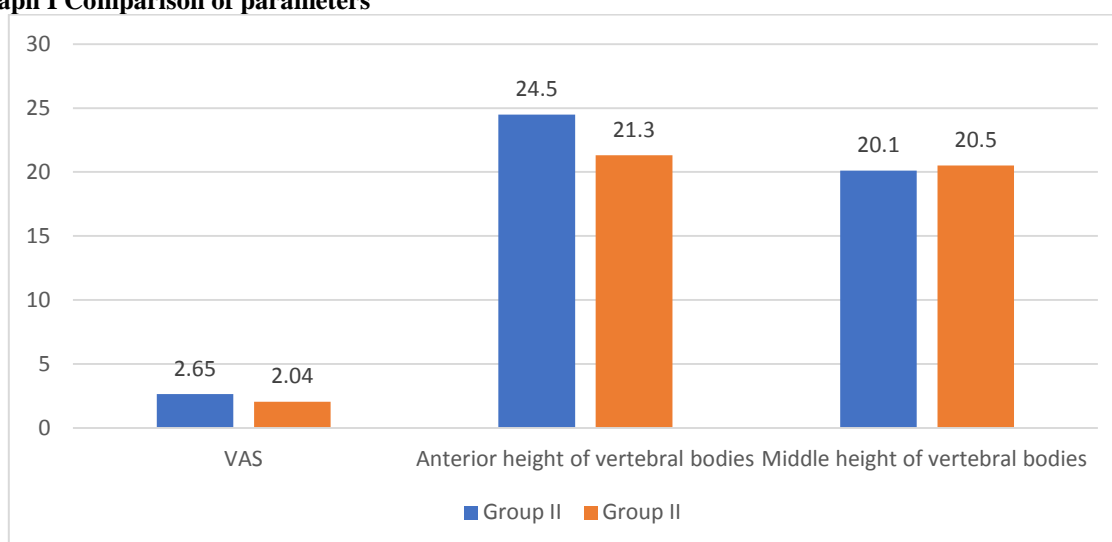
Table I shows that group I had 35 males and 0 females and group II had 30 males and 25 females.

**Table II Comparison of parameters**

Groups	Group I	Group II	P value
VAS	2.65	2.04	0.17
Anterior height of vertebral bodies	24.5	21.3	0.32
Middle height of vertebral bodies	20.1	20.5	0.17

Table II, graph I shows that mean VAS in group I patients was 2.65 and in group II patients was 2.04. Anterior height of vertebral bodies in group I was 24.5 and in group II was 21.3 and middle height of vertebral bodies was 20.1 in group I and 20.5 in group II. The difference was non-significant ( $P > 0.05$ ).

**Graph I Comparison of parameters**



## DISCUSSION

Vertebral compression fractures are the most common sequelae of osteoporosis, comprising approximately 700,000 out of a total 1.5 million osteoporotic fractures annually in the USA.<sup>6</sup> The actual incidence of vertebral fractures is likely much greater given the large number of vertebral fractures that go undetected, with only a third of vertebral fractures clinically diagnosed.<sup>7</sup> Vertebral fractures are directly correlated with increasing age and incidence of osteoporosis. They most commonly occur among Caucasian women and are less common among men and women of African-American or Asian ethnicity.<sup>8</sup> Bone density of the vertebral column decreases steadily with age, with elderly women having lost almost half their axial bone mass by the time they reach their eighties. The risk of developing a vertebral fracture is strongly associated with decreasing bone density, with the risk increasing roughly two times for every standard deviation below average vertebral bone mineral density.<sup>9</sup> Percutaneous kyphoplasty (PKP) is a modification of PVP and involves the insertion of an inflatable instrument into the vertebral body to restore the height of a collapsed vertebral body and create a

cavity inside before the cement is injected.<sup>10</sup> The present study was conducted to compare outcome of percutaneous vertebroplasty and percutaneous kyphoplasty in management of vertebral compression fractures.

In present study, group I had 35 males and 0 females and group II had 30 males and 25 females. Zhu et al<sup>11</sup> investigated the clinical characteristics and management of secondary fractures after PVP or PKP. 599 cases who had vertebral compression fracture and underwent PVP or PKP were enrolled, including 121 males and 478 females. Secondary fractures were observed in 52 cases, including 3 males and 49 females, who were treated by re-operation with PVP or PKP. The ratio of secondary fracture after PVP or PKP was 8.68% in all cases. The age ranged from 59 to 92 years ( $74.41 \pm 6.83$  average). A composition of 44.44% of the secondary fracture occurred near the initial fracture vertebrae. After re-operation with PVP or PKP, visual analog scale score significantly decreased to  $2.72 \pm 0.88$  or  $2.52 \pm 1.12$ , respectively, anterior height of vertebral bodies increased to  $24.69 \pm 4.59$  or  $24.54 \pm 5.97$  mm, respectively, and middle height of vertebral bodies increased to  $20.90 \pm 3.72$  or

20.36 ± 6.33 mm, respectively. Authors concluded that there is a high chance of secondary fracture near the initially operated vertebrae after PVP or PKP. Re-operation with PVP or PKP achieves satisfactory outcomes in these patients such as pain relief and the recovery of the vertebrae height.

We found that mean VAS in group I patients was 2.65 and in group II patients was 2.04. Anterior height of vertebral bodies in group I was 24.5 and in group II was 21.3 and middle height of vertebral bodies was 20.1 in group I and 20.5 in group II. Rho et al<sup>12</sup> reported that new fracture was significantly associated with bone density and age, and bone density was identified as the only significant factor of fracture by multivariate logistic regression analysis. It has been proposed that the most important predisposing factor for fracture after PVP or PKP was osteoporosis.

### CONCLUSION

Authors found that both percutaneous vertebroplasty and percutaneous kyphoplasty in management of vertebral compression fractures found to be equally effective.

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