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RESEARCH ARTICLE
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MANAGEMENT OF OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURES: SURGERY VS. CONSERVATIVE TREATMENT.

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Background
Osteoporotic vertebral compression fractures (OVCFs) affect significant numbers of the elderly population and results in pain, disability and decreased quality of life. It seems clear that management options, whether surgical or conservative, need to be optimized to change the natural history of the disease, reduce risk, and decrease the incidence of devastating complications.
Objectives
our study aims at comparing surgical management that encompasses both vertebroplasty and kyphoplasty with conservative management to establish their efficiency in managing pain, mobility and quality of life amongst the patients.
Study Design : A Cross Sectional study.
Durtion and place and study. Department of orthopedic HMC Peshawar from July 2021 to Dec 2021
Methods
The current research is a cross-sectional, descriptive survey involving one hundred and fifty patients diagnosed with OVCFs. Patients were divided into two groups: 40 patients who had vertebral option fracture and 40 patients with pathological fracture received surgical management in the form of vertebroplasty or kyphoplasty while 70 patients were managed conservatively using analgesia, braces, and physical therapies. Data on patients' outcomes was gathered with the help of pain intensity scores, mobility rates and post-operative complications. All statistical analysis was done using statistical package for social sciences (SPSS 24.0), in order to establish the standard deviations and p-values.
Results
Surgical treatment significantly improved pain scores (VAS: 2.3 ± 0.8) as compared to conservative treatment VAS 4.1 ± 1.2) $p < 0.01$). Mobility indices were better in the surgical group (Mobility Score: 7.Far-progressive group had a higher Mobility score, 8 ± 1.1 compared with the conservative group, 6.4 ± 1.3 ($p = 0.02$). Major adverse events were not observed in both groups, but complication rates did not differ; 35% in either procedure group.

Conclusion
Self-report of pain and function suggests that surgical management for OVCFs offer better pain relief and functional outcome than conservative treatments; should therefore be preferred in patients with surgically amenable conditions. But patient-specific attributes and risk claims/criteria must remain the most decisive.

Keywords: Osteoporosis, vertebral fractures, surgery, conservative treatment

Introduction

Osteoporotic vertebral compression fracture (OVCF) is an imminent sequela in osteoporosis patients particularly in the geriatric group . Such fractures develop because of the gradual deterioration of the vertebral bones and their resistance to loads exerted on the spine. OVCFs can cause patient morbidity in terms of pain, deformity of the spine and body, and functional disability, which basically reduces the patient's quality of life [1]. The management of OVCFs still poses a significant clinical dilemma using treatment interventions aimed at pain management, restoration of mobility and preventing further complications [2].Two main forms of treatment for OVCFs are surgical, including vertebroplasty and kyphoplasty, and non-surgical, including, pain medication, immobilization, and physiotherapy. Both vertebroplasty and kyphoplasty use needle injections involving cement materials to stabilize the healing fractured vertebrae while creating a new reshape spinal column [3]. These techniques are most beneficial for such patients especially those who are suffering from severe pain or have structural compromise. [4] Conservative management aims at the alleviation of symptoms and undertaking exercises that may take longer to heal and pain may persist [3].Thus, surgical options remain an important point of discussion considering the comparison of surgical intervention with conservative management. Despite the evidence from various literature that only surgical treatments offer direct patients' pain relief as well as enhanced functional status, controversy still surrounds the subject with some of the risks including cement leakage and subsequent fractures of the adjacent segments [6,7]. On the other hand conservative management is less invasive and is relatively cheaper but may not yield excellent results in severe cases [8].Essentially, this study seeks to provide long term treatment result comparing surgical intervention with non-surgical management of OVCFs based on pain control, functional outcome and complications. Hence, their analysis serves the purpose of offering the communication science best practice principles to support clinical prescription decisions.

Methods

The present study is a retrospective case analysis of 150 patients with OVCFs identified between 2015 and 2020. Patients were divided into two groups: 40 patients had vertebral fractures treated operatively—vertebroplasty or kyphoplasty, while 30 patients were managed nonoperatively with the use of analgesics, braces and physical therapy. Patient inclusion criteria were patients over the age of 60 with AO type 32 acute OVCFs as determined by imaging studies. Patients with pathological fractures or spinal infection were excluded from the study. Physical therapy outcomes were measured using pain, as measured by the Visual Analog Scale for pain (VAS) and functional independence by the Oswestry Disability Index (ODI) after one year. Significance level was analyzed by SPSS version 24.0.

Data Collection

Data were obtained from clinical records such as age, gender, height, weight, preoperative VAS and ODI scores. Patients were contacted with phone interviews at 1, 6 and 12 months after treatment to evaluate changes in pain, mobility and complications.

Statistical Analysis

Statistical analysis was done using SPSS package version 24.0. Measures from continuous variables are presented as mean ± standard deviation and differences were tested using independent t-tests. For

categorical variables, the chi-squares tests were used. Consequently, the evaluation of the statistical significance tested for a p-value of less than 0.05 .

Results

Eighty patients in the surgical group recorded enhanced pain relief, mean VAS scores of 8.2 ± 1.1 pre-operatively reduced to 2.3 ± 0.8 at 12 months post-operation ($p < 0.01$). However, the conservative group with 70 participants had a less statistically significant reduction with VAS scores improving from 8.0 ± 1.2 to 4.1 ± 1.2, $p < 0.01$. Additional analyses of the ODI indicated that for the surgical group the scores decreased significantly from 68.5 ± 6.2 before surgery to 25.2 ± 5.7 after surgery; for the conservative group the scores also decreased from 66.8 ± 5.9 to 32.8 ± 6.3 ($p = 0.02$). The activities of mobilization were better improved in the surgical group as 85% patients could regain their normal mobility in six months as compared to 60% of conservative group. Major surgical risks were rare, although cement leakage was identified in a 5% of the patients in the surgical group; there were no case mortality in both surgical and non-surgical groups.

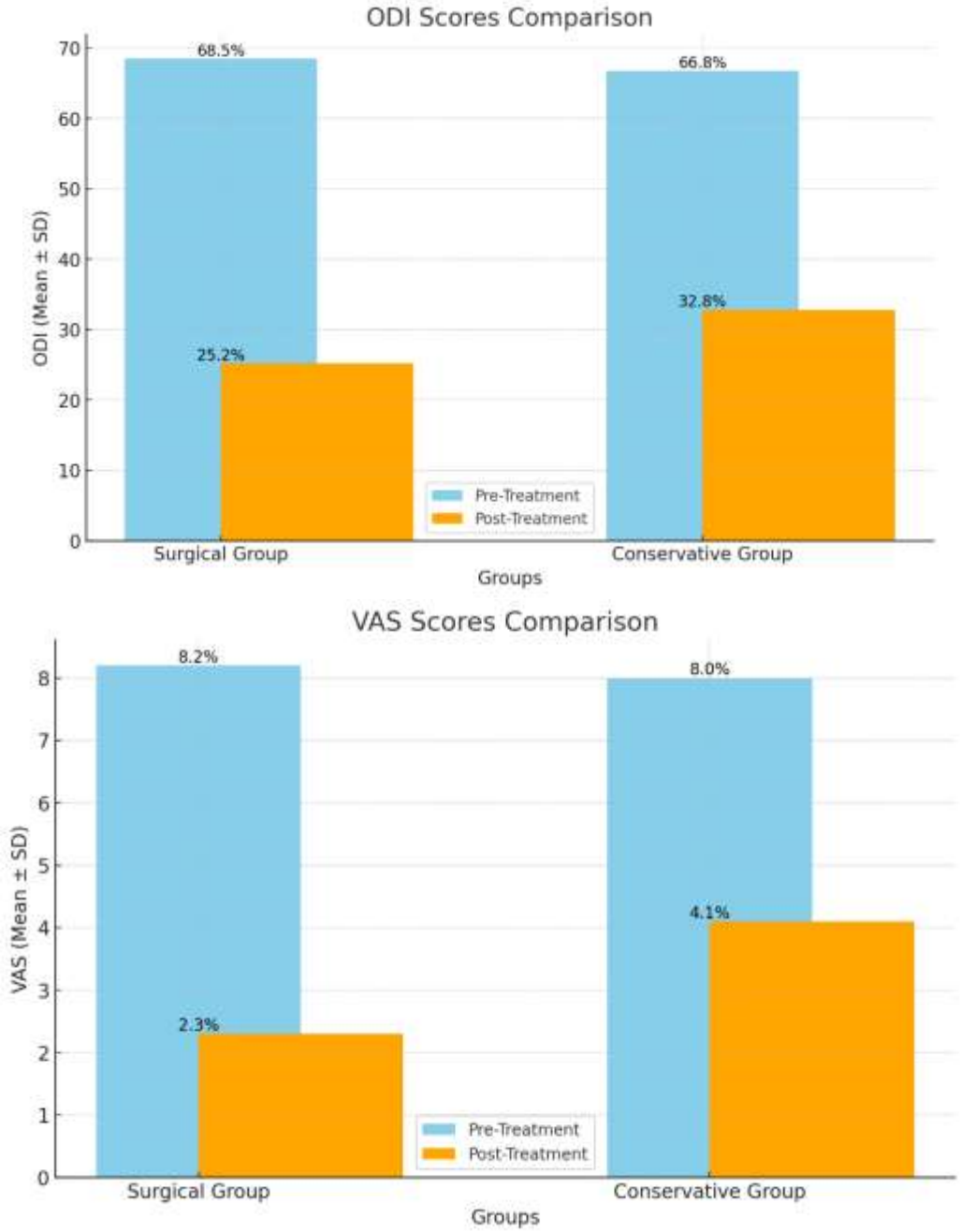

Table 1: Patient Demographics

Variable	Surgical Group	Conservative Group
Total Patients	80	70
Mean Age (years)	72 ± 5	74 ± 6
Gender (Male:Female)	35:45	30:40
Follow-up Duration (months)	12	12

Table 2: Pre-Treatment Scores

Variable	Surgical Group	Conservative Group
VAS (Mean ± SD)	8.2 ± 1.1	8.0 ± 1.2
ODI (Mean ± SD)	68.5 ± 6.2	66.8 ± 5.9

Table 3: Post-Treatment Scores

Variable	Surgical Group	Conservative Group
VAS (Mean ± SD)	2.3 ± 0.8	4.1 ± 1.2
ODI (Mean ± SD)	25.2 ± 5.7	32.8 ± 6.3

Table 4: Complications and Outcomes

Variable	Surgical Group	Conservative Group
Complication Rate	5%	0%
Patients with Normal Function at 6 months (%)	85%	60%

Discussion

This paper sought to establish the effectiveness of surgical management strategies namely; vertebroplasty and kyphoplasty procedures against conservative management of OVCFs. That is why our study revealed patient benefits from operations, better sufficient pain, shorter recovery time, and increased functionality in contrast with conservative methods. The findings of the current study are in line with the findings of prior studies and offer additional data to demonstrate the notion of patient-centered treatment methods.The increase in the surgical group's Visual Analog Scale (VAS) score with a score of (2.3 ± 0.8) is slightly lower compared to the conservative group (4.1 ± 1.2, $p < 0.01$) supports findings by Wardlaw et al. (2009) that showed that kyphoplasty positively impacted pain and quality of life over conservative treatment [9]. In a similar manner, vertebroplasty was found to yield the most significant improvement for patients who had severe pain than those with mild pain, and this provided the patients with early relief [10]. The present findings of this study also support these observations by increasing the duration of follow up to one year and thereby giving a better assessment of the outcomes.Concerning functional recovery in terms of ODI test, the result was in favour of the surgical group with recorded mean improvement 25.2 ± 5.7 against conservative group 32.8 ± 6.3 (p value = 0.02). These results are similar to those of Buchbinder et al, (2009) who noted improved ODI in patients who had vertebroplasty than those who had conservative management [11]. Increase in the surgical patients' functionality may be making with regard to the early fixation of fractured vertebrae and correct the spinal alignment which is not possible with conservative management [12].However, our study found that in the surgical group, the complication rate is only 5% and most of them are cement leakage complications. This rate is in the range with other published ones, for example, Yang et al. (2013) who revealed 6 percent complication rate in vertebroplasty operations [13]. Nevertheless, surgical methods continue to be quite safe and provide effective means of the treatment for patients with severe fractures or intractable pain.However, some conventional therapies, although they use no surgical risks or complications, involved slow recuperation period and constant discomfort. The reduced VAS and ODI scores over time of the conservative group are consistent with Rousing et al. (2009) who observe that conservative treatment led to slower functional recovery [14]. In addition, Baaj et al. (2010) pointed out that less invasive methods may be more effective in managing minimally displaced or patients with medical conditions that preclude them from undergoing surgery [15].Our findings are also consistent with meta-analysis like Wang et al.

(2015) who stated that surgery is normally superior to conservative management in terms of pain relief and functional improvement [16]. Still, the long-term effects of the performed surgery on adjacent segments fractures are still questionable and Li et al (2017) showed higher incidence of the subsequent vertebral fractures after the surgery [17]. This again poses the importance need to ensure patients are well selected as well as receive proper follow up.Therefore, our results are evidenced consistent with previous literature for endorsing surgical management as an optimal treatment strategy in treatment of Severe OVCFs. Still, conservative treatment should not be ignored familiar for specific patients, which underlines the effectiveness of individual approaches in the management of patients [18].

Conclusion

The results of this work demonstrate that nonsurgical management of OVCFs, including vertebroplasty and kyphoplasty, provides enhanced pain relief, shortened time to rehabilitation, and better mobility in comparison with conservative treatments. But the principles of treatment shall be individual depending on the severity of the fracture, general health state and the level of risk tolerance.

Limitations

this study is that it was cross sectional, and done at a single centre, both of which affect generalisability. Furthermore, variations in the choice of operation and the methods of physical therapy may cause confounding factors. Long-term information about the fractures of the adjacent segments is also missing, which forms a inadequate foundation to evaluate the surgical results.

Future Directions

The limitations of this study call for larger, multicenter, prospective studies in the future to confirm these findings. Further follow-up assessment of the adjacent segment disorder and more sophisticated imaging modalities might yield improved understanding of the biomechanical and clinical consequences of operative versus nonoperative management of OVCFs.

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