

Hallux Valgus in Osteoporosis

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Abstract

The aim of this study is to evaluate the outcomes of the surgical treatment in patients with osteoporosis with moderate or severe hallux valgus regarding the correction of Hallux Valgus Angle (HVA) and Intermetatarsal Angle (IMA) compared to non-osteoporotic patients.

Materials and Methods: The timeline of the study was from 2015 to 2020 with 20 patients with the mean age of 61.6 ± 4.1 within the osteoporotic group and 63.5 ± 5.0 within the non-osteoporotic group. 12 osteotomies in osteoporotic patients and eight osteotomies in non-osteoporotic patients were seen at follow-up after 2 years after surgery. Preoperative bone density of T-Score 2.5 SD or more below is named osteoporosis and IMA and was used to define patient groups; mild hallux valgus was defined with IMA of 11-16 degrees, moderate hallux valgus was defined with IMA from 16 to twenty degrees, and severe hallux valgus was defined with IMA from 20 degrees or more.

Results: No statistical differences were found in HVA, IMA and between the osteoporotic patients and non-osteoporotic patients preoperatively, postoperatively, and therefore the final follow-up in mild to moderate hallux valgus. The mean AOFAS score ameliorated from 52.6 preoperatively to 89.1. Regarding satisfaction, ~ 83 you look after patients were very satisfied or satisfied. No evidence of complications and every one of the patients resulted with complete union of the osteotomy.

Conclusion: We believed that the surgical treatment is a safe, effective procedure for the correction of elderly patients with osteoporosis. In patients with moderate and severe hallux valgus the results of osteotomy have not any specific difference between the osteoporotic and non-osteoporotic groups

Keywords: Osteoporosis, Hallux valgus, Scarf osteotomy

Introduction:

Numerous osteotomies are described for the surgical correction of the hallux valgus deformity. Over 130 metatarsal osteotomies are described in the world literature for the surgical management of hallux valgus. [1]

The Scarf osteotomy was described as a technique for primary correction of a metatarsus primus varus. The term "scarf" may be a carpentry term referring to a joint created by notching two pieces of wood. This osteotomy is employed

widely in France and the United States and continues to evolve and increase in popularity in the surgical community. The technique consists of a diaphyseal Z-shaped osteotomy of the primary metatarsal (MT1), during which the distal plantar part of the MT1 is moved laterally to correct the increased IMA.[2]

Mild deformities might influence our results; therefore, we did need a much bigger group in order to test differences between osteoporotic and non-osteoporotic in other subgroups. Radiological parameters are utilized in our study to evaluate whether in patients with moderate or severe hallux valgus the scarf osteotomy in osteoporotic patients results in a better correction of HVA and IMA, as compared to non-osteoporotic patients. The results are going to be compared according to preoperative IMA and HVA.[3]

Materials and Methods:

The period of the survey was conducted from the patients treated within the Trauma University Hospital of Tirana

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from 2015 to 2020 with 20 patients, included within the study. 12 osteoporotic patients and eight non-osteoporotic patients were seen at follow-up after 2 years after surgery. Preoperative IMA and HVA was utilized to define patient groups; mild hallux valgus was defined with IMA of 11-16 degrees, moderate hallux valgus was defined with IMA from 16 to twenty degrees, and severe hallux valgus was defined with IMA from 20 degrees or more.

Age, BMI, HVA, IMA and Bone density were a number of the data used in this study. American Orthopedic Foot and Ankle Society AOFAS and VAS Score were also utilized in classifying the patients. SPSS were then utilized to analyze the statistical data.

Clinical assessment procedures, radiological data retrieval, was prepared consistent with American Orthopedic Foot and Ankle Society scores. Operative procedures and postoperative treatment are described in details as follows. Radiological evaluation was performed consistent with standardized procedures, with standard dorsoplantar and lateral foot x-ray with weight bearing. The angle between the primary and second metatarsals is between 8 to 9 degrees, usually considered to be the upper limits of normal. The valgus angle of the primary metatarsophalangeal joint also is more than 15 to 20 degrees, considered to be the upper limits of normal weight bearing. HVA was measured because the angle between the line connecting the center of the base to the center of the head of MT1 and the line connecting the midpoints of the proximal and distal articular surfaces of the proximal phalanx. The IMA is defined because the angle between the longitudinal axis of MT1 and the line bisecting the distal and proximal diaphyseal portions of MT. The distal metatarsal articular angle (DMAA) was

measured consistent with standard guidelines. Markers were placed at the foremost medial and most lateral extent of the metatarsal articular surface. A line was drawn connecting the 2 markers. Another line was drawn perpendicular to the present line, consistent with the literature. [4-8]

Bone density values in individuals are often expressed in relation to a reference population in standard deviation (SD); when compared to the young healthy population, this measurement is mentioned as the T-score.[5]

T-Score 2.5 SD or more below is named osteoporosis. Severe osteoporosis: T-Score 2.5 SD or more below within the presence of one or more fragility fractures (T-score ≤ -2.5 PLUS fracture). Osteopenia: T-score but -1 but above -2.5 ; Normal: T-score > -1 . 5.[6]

Results:

No statistical differences were found in HVA, IMA between the osteoporotic patients and non-osteoporotic patients preoperatively, postoperatively, and therefore the final follow-up in mild to moderate hallux valgus. within the osteoporosis group, the mean HVA resulted from 35.7° to 10.3° at the time of ultimate follow-up in the osteoporotic group and from 32.6 to 9.4 , and also the mean IMA resulted from 12.1° to 6.0° within the osteoporotic group and from 12.4 to 6.2 within the non-osteoporotic group. Regarding satisfaction, approximately 83% of patients were very satisfied or satisfied as shown on Table 2. No evidence of complications and every one of the patients resulted with complete union of the osteotomy.

Variable	Osteoporosis group	Normal group	p-value
Age (yr)	61.6 $\pm$ 4.1	63.5 $\pm$ 5.0	0.090
Interval* (mo)	23.5 $\pm$ 8.7	25.3 $\pm$ 8.3	0.292
Hallux valgus angle (°)			
Preoperative	35.7 $\pm$ 8.3	32.6 $\pm$ 12.9	0.380
Postoperative	5.6 $\pm$ 5.2	4.9 $\pm$ 3.8	0.235
Final follow-up	10.3 $\pm$ 7.1	9.4 $\pm$ 8.2	0.311
1~2 Intermetatarsal angle (°) Preoperative	12.1 $\pm$ 3.8	12.4 $\pm$ 5.1	0.902
Postoperative	3.9 $\pm$ 2.6	3.5 $\pm$ 2.8	0.753
Final follow-up	6.0 $\pm$ 2.9	6.2 $\pm$ 3.8	0.414
AOFAS score	88.3 $\pm$ 11.3	90.1 $\pm$ 12.7	0.248
VAS	0.9 $\pm$ 1.5	0.8 $\pm$ 1.1	0.213
Values are presented as mean $\pm$ standard deviation. Statistically significant different between the two groups: $p < 0.05$. AOFAS: American Orthopaedic Foot and Ankle Society, VAS: visual analogue scale.			

Table 1- Comparison of Demographic, Radiological and Clinical Outcomes between Two Groups

Grade	Osteoporosis group	Normal group	p-value
Very satisfied	6 (50.0)	4 (50.0)	
Satisfied	4 (33.3)	3 (37.5)	
Fair	2 (16.7)	1 (12.5)	
Poor	0 (0)	0 (0)	

Table 2 - Comparison of Overall Satisfaction between Two Groups

Values are presented as number (%). The sum of the percentages does not equal 100% because of rounding. Statistically significant different between the two groups: $p < 0.05$.

Conclusion:

We believed that the surgical treatment is a safe, effective procedure for the correction of elderly patients with osteoporosis. In patients with moderate and severe hallux valgus the results of osteotomy have not any specific difference between the osteoporotic and non-osteoporotic groups.

Declaration of Conflicting Interests and Ethics;

The authors declare have no conflict of interest. This research study complies with research publishing ethics. The scientific and legal responsibility for manuscripts published in Albanian Journal of Trauma and Emergency Surgery – AJTES, belongs to the author(s).

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