

A 3D CT Scan Assessment Of The Outcome Of Displaced Intra-Articular Calcaneal Fractures; Operative Vs Non Operative Treatment

¹Rajkumar V, ¹Bajuri MY, ¹Ali-Noor I, ²Sridharan R

¹Department of Orthopedics & Traumatology ; Pusat Perubatan Universiti Kebangsaan Malaysia

²Department of Radiology ; Pusat Perubatan Universiti Kebangsaan Malaysia

INTRODUCTION:

Computed Tomography (CT) scan is the best available method to identify the major bony deformities resulting from intra articular calcaneal fractures such as loss of calcaneal height, increased width with outward bulging of the lateral calcaneal wall, and disruption of the posterior articular facet. Aim of this study is to compare the precise early to mid term radiological outcome based on spiral CT scan assisted analysis of calcaneum anatomy , assessment of articular congruity and the onset of arthritic changes in patients with intra articular calcaneal fractures treated with either operative (open reduction & internal fixation) and non operative treatment .

MATERIALS & METHODS:

A total 20 patients were selected in this study with nine in the operative arm (Group 1) and 11 in the conservative arm (Group 2). A 3D CT scan of the injured foot and ankle were taken (ranging 1-4 years post trauma) followed by a detailed functional assessment based on the American Orthopaedic Foot and Ankle Society Score (AOFAS) and Maryland Foot Score (MFS) of the patients' affected limb. The length, width and measured calcaneal height were identified and subsequently compared as a benchmark to relate the functional and radiological outcome in patients. The presence and severity of arthritic changes was also been assessed.

RESULTS:

The calcaneal length, width and calcaneal height are better in term of improvement and preservation in the operative group in compared to the conservative group. A significantly larger posterior articular facet step was seen in the conservative group compared to the operative group as in Table 1. This factor directly contributes to an accelerated onset and significantly higher grade of arthritis in the the subtalar joints of the conservative group compared to the operative group.

The incidence of talonavicular and calcaneocuboid arthritis are significantly

higher in the conservative group comparatively. The operative group showed significantly improvement for both the AOFAS and MFS scoring systems compared to the conservative groups (Figure 1 & 2)

Table 1: Comparison of articular facet step and arthritic grade

	Option				χ^2	P	
	Conservative (Group 2)		Locking plate (Group 1)				
	N	%	N	%			
Arthritis grade	0	1	25.0	3	75.0	17.29	0.001
	1	1	14.3	6	85.7		
	2	6	100.0	0	0.0		
	3	3	100.0	0	0.0		
Posterior articular facet step (mm)	0	0	0.0	3	100.0	16.09	0.001
	1	1	16.7	5	83.3		
	2	7	87.5	1	12.5		
	3	3	100.0	0	0.0		

Figure 1 : AOFAS trend

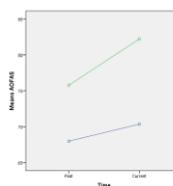
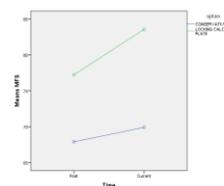


Figure 2 : MFS trend



DISCUSSION:

A 3D CT scan is an important tool in postoperative assessment of fracture reduction which offers superior detection of gap and step-off , hence a more accurate predictor of the earliest arthritic changes which can be missed with 2 dimensional radiographs. Operative reduction in a displaced intraarticular calcaneal fracture significantly have a better outcome as measured by AOFAS and MFS scoring.

CONCLUSION:

Operative intervention, provides a good framework for near anatomical bone healing and redistribute the mechanical forces on the foot resulting in improved pain, function and alignment in patients.

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