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EVALUATION OF RADIOLOGICAL AND FUNCTIONAL OUTCOME AFTER CALCANEAL PLATING IN SANDERS TYPE 2 AND 3 CALCANEAL FRACTURES AND FACTORS AFFECTING OVERALL OUTCOME

Orthopedics

Dr. Deepak K Aher* Senior resident, Orthopaedics, Gandhi Medical College, Bhopal,MP 462001 *Corresponding Author

Dr. Sonu G Mehta Senior resident , Orthopaedics, GMC Bhopal , MP

Dr. Ajay K Dandotiya Resident , Orthopaedics, GMC Bhopal,MP

Dr. Abhishek D Pathak Associate professor, GMC Bhopal, MP

ABSTRACT

Purpose: To evaluate the radiological and functional outcomes of calcaneal plating in Sanders II and III calcaneal fractures and factors affecting them.

Methods: From October 2015 to December 2017, 25 patients of calcaneal fracture (Sanders II and III) were included with 20 males and 5 females with mean age 42 years. According to Sander's classification, 15 cases were type II fractures and 10 cases were type III . Radiological assessment done using Bohler's angle and Functional outcome by American Orthopaedic Foot and Ankle Society hindfoot scale (AOFAS).

Results: Mean time of bone union was 4 months (3-6). Mean Bohler's angle was 270. Functional outcome was 8 excellent ,10 good , 4 fair and poor in 3 . Women, young adults, those compliant to non weight bearing were had better outcome

Conclusion: calcaneal plating gives better radiological and functional outcome of for Sanders II and III calcaneal fractures.

KEYWORDS

Böhler's angle, Sander's classification, AOFAS

Introduction:

Calcaneal fractures constitute 60% of all tarsal fractures 1-3. They form about 1–2 % of all fractures in our body 4 . They are mostly caused by high energy trauma with axial load on patient's heel 5,6. Incidence is more in men as it is occupation associated 7. Management remains controversial mainly due to a low level of evidence8.some authors advocate conservative management even for displaced intra-articular fractures of calcaneum which leads to poor outcomes 9-13.At present, most widely accepted management for displaced intra-articular calcaneal fractures is open reduction and internal fixation through extended lateral approach 14.Post-operative nonweight bearing for 6 weeks is suggested by many authors after which partial weight bearing is advised15,16,11,17 .This study was conducted to evaluate outcomes of calcaneal plating

Materials And Methods:

This Prospective study was conducted in our tertiary care centre from October 2015 to December 2017 with 25 patients (20 males and 5 females) . mean age group was 42 years (range 20-65). fractures classified according to classification by Sanders et al. 18. There were 15 sanders type II and 10 sanders type III fractures. mean follow up period was 14 months (12 – 16).

Exclusion criteria

1 pathological and open fractures
2 concomitant injuries in same limb

Calcaneal plating was done by lateral approach in all. Patients were kept non weight-bearing for 2 months and then partial weight bearing allowed. Böhler's angle was measured . post operative restoration of a normal range of Böhler's angle (20°–40°) 19 was considered a good radiological outcome. Functional outcome was measured with American Orthopaedic Foot and Ankle Society (AOFAS) hindfoot scale 1

Factors affecting the outcome like age, sex, compliance to physiotherapt,etc too were analysed

Results:

Overall mean age at the time of injury was 42 (20 65)years. average follow-up period was 14 (12-16) months. All patients were due to fall from height. Trauma to surgery duration was 7 days(range1 - 25) . mean duration of surgery was 2 hours (1-3) . minimum follow up was 1 year with mean 16 months (range 12-24)

On lateral preoperative x rays, mean Böhler's angle was 15°(120-190). Postoperatively, mean Bohler's angle was 270 (200-360). radiological consolidation of fracture occurred after mean period of 4 months (range 3–6). radiological outcome Is Summarised In Table (Table 1)

Table 1 : Radiological outcome

sander's type	bohler's angle (0)		mean radiological union(months)
	preoperative	postoperative	
II	16(12-19)	29(22-36)	4 (3-6)
III	13(10-18)	26(20-30)	5(4-7)

As Per AOFAS Score, There Were 8 Excellent, 10 Good, 4 Fair And 3 Poor Outcome . Functional Outcome Results Are Summarised In Table (Table 2)

Table II : Functional Outcome

Sanders type	Functional outcome				Total
	EXCELLENT	GOOD	FAIR	POOR	
II	5	6	3	1	15
III	3	4	1	2	10

Out of 8 excellent, 5 (62.5%)were females and 6 (75%)were type II fractures. Out of 10 good, 7 (70%)were below 40 years and out of 3 poor outcomes, 2(66%)were type III. Most patients who were compliant with non weight bearing and post operative immobilisation showed good results.



FIGURE 1- Lateral approach



figure 2 : bohler's angle preoperatively

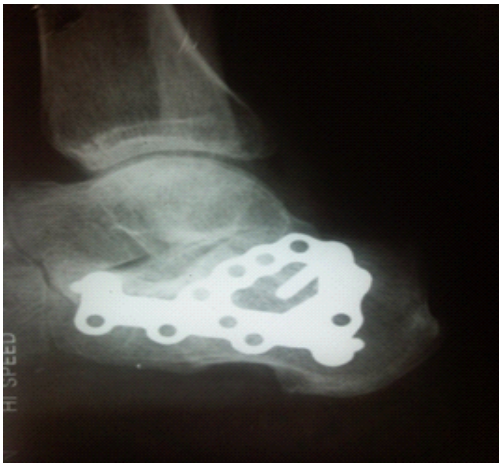

figure 3: plating on xray



figure 4: bohlers angle postoperatively



figure 5: radiological union





Figure 6: range of motion

Discussion

In our study majority were males and all had fall from height . Mitchell et al. in their study, detected two frequency peaks at 20 and 50 years of age, majority were males who had fallen from height 20.According to Buckley et al, calcaneus reconstruction did not carry much importance for elderly patients diagnosed with calcaneal fracture due to their little demand for function21 . Herscovici et al22 studied 37 elderly patients with calcaneal fracture in follow-up of mean 44 months, and found that operative treatment yielded favourable clinical results with mean AOFAS score 82.4 . In our study, mean postoperative Bohler's angle was 270 and overall excellent to good rate was as high as 72%. Thus, recovered Bohler's angle was important for functional recovery of elderly patients with calcaneal fracture. Loucks and Buckley 23 found that Bohler angle is prognostic factor in displaced fractures. Paul et al24 reported that poorest outcome in calcaneal fractures was seen in patients who were treated operatively without restoration of Bohler angle. Also, Isaac et al. 19 reported strong correlation between Böhler's angle less than normal range and diagnosis of calcaneal fracture.

In our study,8 had excellent results with AOFAS score of 96,10 had good results with mean AOFAS score of 82, 4 had fair results with mean score of 68 and 3 had poor results with mean score of 38. In Sander's study, excellent or good results were seen in 73% of type-II, 70% of type-III, and 27% of type-IV fractures 25. It was comparable to our study, in which 56% of patients had excellent or good outcome and 44% had fair or poor results. In a study by Johny Joshi et al in 2015, the functional outcome was excellent in 26.4% cases and good in 61.64% cases. None of the cases had poor outcome26 . prognostic value of today's most frequently used Sanders classification 27 has been recently validated by the same author comparing long-term clinical results 28. That study was confirmed by ours; each considered variable obtained better values in the Sanders II group

Our study also showed that women had more excellent outcomes . those with age less than 40 years had more good outcome, those who were compliant to non weight bearing had better outcomes and those with fracture type III had more poorer outcome.

Conclusion

From this study, we can conclude that calcaneal plating is very effective in sanders type II and III calcaneal fractures for restoration of normal bohlers angle and good functional outcomes . Women, young adults , those compliant to potoperative non weight bearing are some factors which surely affect the prognosis of calcaneal plating. Sanders classification is of good prognostic value

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