

Initial Management of Unstable Complex Ankle Injuries: The Use of Emergency Department Versus Operating Room External Fixation

Philip K. McClure, MD; Stephen Klinge, MD; Dale Cassidy, MD; Roman Hayda, MD; Christopher T. Born, MD;

Rhode Island Hospital Department of Orthopedics, Brown University, Providence, Rhode Island, USA

Purpose: This study was undertaken to demonstrate the utility of emergency department external fixation (ED ex-fix) of unstable ankle injuries in comparison to external fixation in the operating room (OR ex-fix).

Methods: Records were reviewed to identify patients who had a uniplanar external fixator placed in the ED versus the OR for either pilon or ankle fracture/dislocation. Radiographic and clinical data were thoroughly reviewed (Table).

Results: In terms of pilon fractures, patients treated with ED ex-fix underwent 1.69 operating room procedures compared to 2.53 OR visits for the OR ex-fix group ($P = 0.005$). 46% (12/26) of fixators placed in the ED required frame revision, half for residual subluxation. Patients had a 6-point pain improvement in the ED after fixator placement compared to a 2.9-point improvement after splinting in the OR group ($P = 0.047$). Time to definitive fixation was similar. For Lauge-Hansen type ankle fractures, patients treated with ED ex-fix were converted to internal fixation at 4.7 days compared to 10.75 days in the OR ex-fix group ($P = 0.045$), and patients underwent 1.59 compared to 2.29 surgeries ($P = 0.002$). 36% (8/22) of frames placed in the ED for Lauge-Hansen type ankle fractures were revised, predominantly for posterior subluxation of the tibiotalar joint. There were no dislocations after ED or OR ex-fix placement. Pain improvement was slightly improved compared to splinting alone, but the difference was not significant. There were no statistical differences in complication rates among either the pilon or ankle fracture groups. In addition, our revision rate decreased over the course of the study.

Conclusion: Advantages of the ED (versus OR) ex-fix include rapid and potentially universal availability, earlier advanced imaging, improved early pain control, and decreased use of OR resources. The ED ex-fix was tolerated well with comparably low complication rates. We advocate early ED ex-fix placement for both pilon and ankle fractures that do not otherwise require early treatment in the OR.



- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.

Pilon

	ED ex fix		OR ex fix		
Number	26		15		
Age	44.2		39.1		
smoker	9	34.6%	4	26.7%	
Diabetic	4	15.4%	2	13.3%	
Time to stabilization	7:07:18		11:01:16		p=0.050
43B/C	9/17		8/7		
Adjustment	12	46.2%	1	6.7%	
Poor Reduction	6	23.1%			
ED pain scale change (10 point scale)	6.10		2.88		p=0.043
Time until Definitive Rx (days)	14.23		14.47		p=0.95
Surgeries	1.69		2.53		p=0.005
Wound complication	8	30.8%	4	26.7%	
compartment syndrome	2	7.7%	2	13.3%	
nonunion	1	3.8%	0	0.0%	
Deep infection	3	11.5%	2	13.3%	
DVT	0	0.0%	0	0.0%	
Nerve injury	3	11.5%	5	33.3%	

Ankle Fracture

	ED Ex Fix		OR Ex Fix		
Number	22		14		
Age	58.5		53.3		
smoker	4	18.2%	2	14.3%	
Diabetic	1	4.5%	2	14.3%	
Time to stabilization	6:15:51		14:23:07		p=0.047
43B/C					
Adjustment	8	36.4%	3	21.4%	
Poor Reduction	6	27.3%			
ED pain scale change (10 point scale)	5.31		3.75		p=0.61
Time until Definitive Rx (days)	6.41		12.43		p=0.08
Inpatient only	4.70		10.75		p=0.045
Surgeries	1.59		2.29		p=0.002
Wound complication	6	27.3%	3	21.4%	
compartment syndrome	0	0.0%	0	0.0%	
nonunion	3	13.6%	0	0.0%	
Deep infection	0	0.0%	1	7.1%	
DVT	0	0.0%	0	0.0%	
Nerve injury	4	18.2%	1	7.1%	