Management of Femur and Tibia Shaft Fractures in Chronic Spinal Cord Injury Patients

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Purpose: Optimal treatment options of nonoperative (NOP) or operative (OP) modalities is controversial in patients with chronic spinal cord injury (SCI). Our purpose is to compare union rates and complications between NOP and OP of the femur and tibial shaft fractures .

Methods: We selected patients from a retrospective review of the electronic medical record over 10 years (1 January 2009 to 31 December 2019) with operative or nonoperative treatment of a femoral or tibial shaft fracture in patients with paraplegia or quadriplegia due to a chronic SCI from 2 academic centers.

Results: A total of 48 patients with chronic SCI were included in this study. 38/48 (79%) presented trauma with low energy and 10/48 (21%) as high energy: NOP treatment involved 15/48 (31%) and OP treatment 33/48 (69%). Intramedullary nailing (IMN) was used in 31/33 (94%) of operatively treated fractures. Comparing NOP versus OP treatment 3/15 (20%) versus 3/33 (9.09%) developed an infection, 8/15 (53.33%) versus 4/33 (12.12%) (P = 0.002) had a pressure ulcer, 2/15 (13.33%) versus 2/33 (6.06%) nonunion, deep vein thrombosis (DVT) or pulmonary embolism (PE) was 3/15 (20%) versus 3/33 (9%), and presence of malunion was 1/15 (7%) versus 1/30 (3%). Finally, between NOP versus OP, the mean visual analog scale (VAS) score at first visit follow-up was 3.84 versus 1.48 (P = 0.029); mean to return to baseline activities in months was 7.26 versus 5.8 and time of union was 30 versus 31.

Conclusion: Our retrospective observational data find tibia and femur shaft fractures commonly occur from low-energy injuries during transfers. Operative treatment seems to have a lower incidence of infection, ulcers, thrombotic complication, malunion, and pain at early follow-up.

Table 1. n=48

Patient Characteristics	Nonoperative (n=15)	Operative (n=33)	P-Value
Age, Mean (SD)	52 (12.6)	47 (16.4)	0.1
Gender (%)			0.9
Female	4 (27)	7 (27)	
Male	11 (73)	24 (73)	
Race (%)			0.5
White	13 (87)	22 (68)	
African American	2 (13)	9 (27)	
Asian	0	1 (3)	
More than one race	0	1 (3)	
Comorbidities (%)			
Diabetes	2 (13)	5 (15)	0.8
Cardiovascular disease	3 (20)	8 (24)	0.7
Cancer	2 (13)	2 (6)	0.3
COPD	1 (7)	2 (6)	0.5
Dementia	0	1 (3)	0.4
Obesity	2 (13)	6 (18)	0.6
Smoking	3 (20)	16 (48)	0.06
Injury Characteristics			
Mechanism (%)			
Low energy	12 (80)	25 (76)	
High-energy	2 (13)	7 (21)	
GWS	1 (7)	0	
Level of SCI (%)			
Cervical	6 (40)	11 (33)	
Thoracic	8 (53)	17 (51)	
Lumbar	1 (7)	2 (6)	
Complication (%)			
Infection	3 (20)	3 (9)	0.2
Pressure Ulcers	8 (53)	4 (12)	0.002*
Nonunion	2 (13)	2 (6)	0.3
Malunion	1 (7)	1 (3)	0.6
DVT/PE	3 (20)	3 (9)	0.2
Myocardial Infarction	0	0	
Stroke	0	2 (6)	0.3
Amputation	1 (7)	0	0.1
Death	0	2 (6)	0.300
Outcomes			
Range of motion (%)			0.2
No	1 (7)	0	
Limited of range	2 (13)	7 (21)	
Yes	12 (80)	22 (76)	
VAS first Follow-up, Mean (SD)	3.8 (3.6)	1.48 (2.7)	0.02*
Return to baseline[1], Mean (SD)	7.2 (5.1)	5.8 (6.2)	0.4
Time of union[2], Mean (SD)	29.5 (18.9)	30.7 (27.35)	0.8

[1] Measure in months
[2] Measure in weeks

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