

Short-Term Outcomes of Civilian Ballistic Versus Blunt Diaphyseal Femur Fractures

Colin Cantrell, MD; Gregory Versteeg, MD; Erik Gerlach, MD; Eric Sanders, MD; Joseph Tanenbaum, MD; Benjamin Guerard Bruce, MD; Joel C. Williams, MD; Bennet Butler, MD

John H. Stroger Hospital of Cook County, Chicago, IL, United States

Purpose: Diaphyseal femur fractures are the most common long bone fractures associated with gunshot wounds. We aim to assess the short-term outcomes of patients treated with an intramedullary nail who sustained diaphyseal femur fractures caused by a low-energy ballistic injury when compared to blunt force trauma.

Methods: A retrospective review of operatively managed diaphyseal femur fractures between January 2015 and April 2020 at a single Level I trauma center was performed. High-energy gunshot wound (GSW) fractures and fractures extending into the articular surface were excluded. Patients demographics, fracture characteristics, treatment information, and outcome measures including complications were recorded.

Results: 96 blunt and 104 gunshot femoral shaft fractures were identified. Patients with GSW fractures had a median length of stay of 2 days shorter than those with fractures from blunt force trauma. Readmission (6.9% vs 0.0%; $P = 0.015$), infection (7.9% vs 1.1%; $P = 0.036$), and reoperation (8.9% vs 3.2%; $P = 0.138$) were significantly more common in diaphyseal femur fractures caused by a ballistic injury than in those caused by blunt force trauma. Loss to follow-up was significantly higher among GSW fracture patients (28%) compared to blunt fractures (20%) ($P = 0.038$).

Conclusion: Short-term complications, particularly infection, readmission, and reoperation, may be relatively high in diaphyseal femur fractures caused by GSWs when compared to those of blunt trauma.

Table 1. Patient Demographics, Fracture Characteristics, and Outcomes

	Blunt n(%)	GSW n (%)	p-value
patients (# fractures)	93 (96)	101 (104)	
Age (mean (SD))	35.6 (15.7)	26.1 (6.6)	<0.001
Male (%)	63 (67.7)	93 (92.1)	<0.001
BMI (mean (SD))	27.36 (5.94)	27.61 (7.19)	0.805
Isolated Injury (%)	32 (34.4)	63 (62.4)	<0.001
ISS (mean (SD))	13.89 (7.38)	12.08 (6.57)	0.261
Fracture Location (%)			<0.001
Distal Third	13 (13.5)	36 (34.6)	
Middle Third	48 (50.0)	30 (28.8)	
Proximal Third	7 (7.3)	10 (9.7)	
Subtrochanteric	28 (29.2)	28 (26.9)	
OTA classification (%)			<0.001
A	43 (46.2)	5 (5.1)	
B	14 (15.1)	0 (0.0)	
C	36 (38.7)	94 (94.9)	
Length of Stay (median [IQR])	7.00 [4.00, 13.00]	5.00 [3.00, 9.00]	0.007
Longest Clinic Follow-up (median [IQR])	3.00 [2.00, 6.00]	2.38 [1.00, 6.00]	0.189
Reoperation (%)	3 (3.2)	9 (8.9)	0.138
30-Day Readmission (%)	0 (0.0)	7 (6.9)	0.015
Non-union (%)	2 (2.2)	1 (1.0)	0.608
Surgical Infection (%)	1 (1.1)	8 (7.9)	0.036
Key: GSW= gunshot wound; BMI= body mass index; ISS= injury severity score; OTA=Orthopaedic Trauma Association; IQR= interquartile range			

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.