

Age Is Not Just a Number: Older Patients With Lower Extremity Fractures Have Higher Rates of Pulmonary Embolism Despite Anticoagulation

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Purpose: Deep-vein thrombosis occurs in 10-20% of patients after orthopaedic trauma, whereas the risk of pulmonary embolism (PE), which can have far more catastrophic consequences, is ~1%. There is also a difference in the physiologic response to trauma in younger patients compared to those who are more frail. We hypothesized that increasing age is associated with increased PE risk.

Methods: Using an administrative-claims database, we included 3,244,991 adult patients with lower extremity fractures (95% closed), including pelvic, acetabular, femur, tibia, fibula, ankle, and calcaneus fractures. Patients with cancer or pre-injury anticoagulation were excluded. The primary outcome was PE incidence. We used multivariable regression models to adjust for patient demographics, comorbidities, and post-injury anticoagulation.

Results: Overall, PE incidence was 0.4% in closed fractures and 0.7% in open fractures. For closed fractures, increasing age was associated with increasing PE incidence within 6 weeks after injury despite anticoagulation use. Compared to patients <50 years, patients ≥70 years had the highest adjusted odds for PE (odds ratio [OR] = 1.89, P<0.001). Results from an identical analysis of open fractures were not statistically significant.

Conclusion: Older patients (≥70 years) with closed lower extremity fractures have an increased PE risk despite anticoagulation, suggesting a need to revisit prophylaxis strategies and for increased vigilance in these at-risk patients.

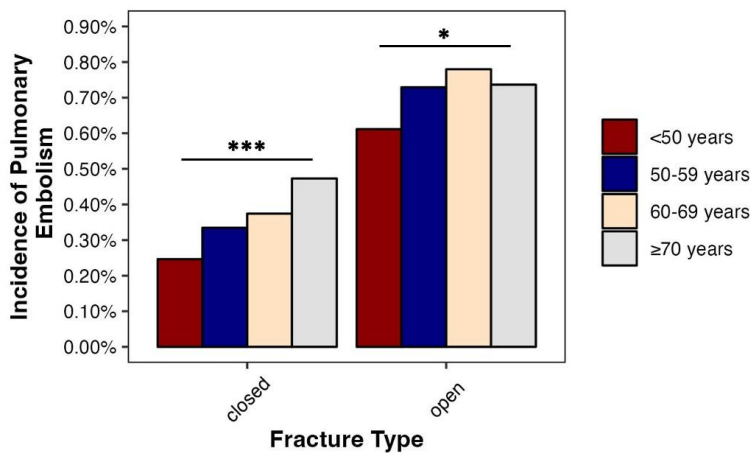


Table. Multivariable analysis.

Cohort	Closed fractures		Open fractures	
	OR for pulmonary embolism within 6 weeks	p-value	OR for pulmonary embolism within 6 weeks	p-value
Age cohort				
<50 years	Ref.		Ref.	
50-59 years	1.31 (1.23-1.40)	<0.001	1.11 (0.93-1.33)	0.24
60-69 years	1.45 (1.37-1.55)	<0.001	1.18 (0.98-1.42)	0.07
≥70 years	1.89 (1.79-2.00)	<0.001	1.15 (0.96-1.38)	0.12

Adjusted for sex, region, insurance plan, comorbidities, and filled prescriptions for anticoagulation (aspirin, enoxaparin, apixaban, rivaroxaban, heparin) within 14 days after fracture.