

Does Treatment at a Level I Trauma Center Reduce Disparities in Patient Outcomes for Open Tibia Fractures?

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Background

Race and insurance status are independent predictors of healthcare outcomes following lower-extremity trauma. ACS-accredited Level 1 trauma centers are considered exemplars for acute care within the U.S. medical system. They have increased resources, are equipped with highly-trained staff, and follow national protocols for acute care of the trauma patient. Level I trauma centers are shown to produce lower adjusted complication and mortality rates for patients overall, but it is unknown whether they specifically improve outcomes in those with black race and/or a lack of private health insurance.

Aims

1. Do Level I trauma centers improve outcomes in patients shown to be at high risk of experiencing adverse outcomes due to differences in race and insurance status?

Methods

The National Trauma Databank was reviewed from 2008-2015, identifying 81,855 encounters with an open tibia fracture, and 33,047 at a Level I trauma center. Regression models determined effects of race and insurance status on outcomes by hospital designation while controlling for confounders.

Main Finding:

The impact of race and insurance status on clinical outcomes is not mitigated by treatment at Level I trauma centers following lower extremity trauma

Tables:

Presented as Odds Ratios (95% CI), Bolded values are significantly greater than 1 (P < 0.05)

		Injury-specific Complications			
		All Hospitals	ACS Level I	ACS Level II-IV	State designated hospitals
Race	White	Reference	Reference	Reference	Reference
	Black	1.36 (1.17, 1.58)*	1.28 (1.03, 1.60)*	0.96 (0.62, 1.49)	1.57 (1.25, 1.98)*
	Other	1.28 (1.07, 1.52)*	1.05 (0.82, 1.35)	1.45 (1.01, 2.07)*	1.56 (1.12, 2.18)*
Insurance Status	Private	Reference	Reference	Reference	Reference
	Government	1.11 (0.96, 1.29)	1.08 (0.87, 1.35)	1.29 (0.94, 1.77)	1.08 (0.86, 1.36)

		Systemic Complications			
		All Hospitals	ACS Level I	ACS Level II-IV	State designated hospitals
Race	White	Reference	Reference	Reference	Reference
	Black	1.11 (1.02, 1.21)*	1.08 (0.95, 1.24)	1.08 (0.86, 1.37)	1.14 (1.00, 1.30)*
	Other	1.04 (0.94, 1.16)	0.91 (0.78, 1.05)	1.12 (0.89, 1.40)	1.24 (1.03, 1.48)*
Insurance status	Private	Reference	Reference	Reference	Reference
	Government	1.07 (0.99, 1.16)	1.06 (0.94, 1.20)	1.13 (0.95, 1.35)	1.05 (0.92, 1.19)

		Length of Stay			
		All Hospitals	ACS Level I	ACS Level II-IV	State designated hospitals
Race	White	Reference	Reference	Reference	Reference
	Black	0.85 (0.63, 1.08)*	0.95 (0.61, 1.30)*	0.65 (0.19, 1.10)*	0.87 (0.53, 1.22)*
	Other	1.66 (1.37, 1.94)*	1.21 (0.80, 1.62)*	1.12 (0.55, 1.68)*	2.66 (2.06, 3.26)*
Insurance status	Private	Reference	Reference	Reference	Reference
	Government	1.38 (1.12, 1.65)*	1.58 (1.19, 1.98)*	1.42 (1.00, 1.85)*	1.15 (0.76, 1.55)*

Results

- Black race [OR 1.36, 95% CI, 1.17-1.58; p<0.05] and “other” race [OR 1.28, 95% CI, 1.07-1.52; p<0.05] were associated with higher odds of injury-specific complications amongst all hospitals
- At Level I trauma centers, black race remained an independent predictor of injury-specific complications (OR 1.28, 95% CI 1.03-1.60, p<0.05), though “Other” race did not (OR 1.05, 95% CI 0.82 – 1.35).
- Government health insurance predicted a longer length-of-stay in the overall cohort of patients (OR 1.38, 95% CI 1.12 – 1.65). At Level I trauma centers, this disparity in length-of-stay persisted (OR 1.58, 95% CI 1.19-1.98).

Conclusions and Implications

Limitations: Length-of-stay is not a precise marker for poor care, as a patient’s hospital stay can be lengthened due to their social situation and is not always correlated with a patient’s physical recovery. Additionally, there are inherent limitations to the use of the National Trauma Databank, which does not allow for the evaluation of complications that occur after a patient’s index hospitalization. The current review encompassed patients from 2008-2015, which does not provide us information about any changes that have occurred more recently.

Conclusions: Treatment at an ACS Level I trauma center did not reduce the independent effects of race and insurance status on outcomes after an open tibia fracture, underscoring the need to recognize this disparity and improve care for at-risk populations.

What might be recommendations to address these findings?

- Increasing the objectivity of decision making
- Implementing standardized triage guidelines
- Increasing focus on provider education

What future research might allow us to make more targeted recommendations for our Level I trauma centers, such as Jefferson?

- Qualitative research in which patients can express their personal experiences with trauma care
- Identify local, regional, or national differences in protocols, and compare results between hospitals that have differences in protocols or services offered