The Impact of State Funding on Triage and Mortality of Trauma Patients

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Background

• Regionalization of trauma care has lowered mortality of injured patients by bringing the patients to the right place at the right time
• Less than half of states dedicate stable funding towards trauma care and systems
• This study examines the association among state trauma funding, triage rate, and mortality among severely injured patients.

Research Objectives

1. To quantify the association between state trauma funding and rates of re-triage
2. To determine the role of state trauma funding as a moderator for the association between re-triage and adjusted in-hospital mortality

Methods

• Patient encounters with an injury diagnosis and Injury Severity Score (ISS) >15 were extracted from 2016 and 2017 Healthcare Cost and Utilization Project (HCUP) State Emergency Department Databases (SEDD) and State Inpatient Databases (SID) from five states (FL, MA, MD, NY, WI).
• Data were merged with the American Hospital Association (AHA) Survey and publicly available state trauma funding data from each state's health department.
• Patients were linked across emergency and inpatient encounters to determine triage status: appropriate triage (admitted to a Level I or II trauma center (TC)), under-triage (admitted to a Level III, IV, or non-TC), or re-triage (emergently transferred from the ED to a Level I or II TC).
• We tested the association between state trauma funding and mortality using a hierarchical logistic regression, controlling for triage status with a triage-funding by triage status interaction term and adjusting for age, sex, race, primary payer, Elixhauser comorbidity score, and ISS.
• Observations were clustered using a random intercept for hospital ID.

Results

• 242,299 patients with ISS >15 met inclusion criteria
• Median age was 52 years (IQR=28–73). Median ISS was 17 (IQR=16–25).
• Two states (MA, NY) allocated $0.00 per capita trauma funding, and three states (WI, FL, MD) allocated between $0.09–$1.80 per capita trauma funding.
• Compared to patients in states with no trauma funding, patients in states with trauma funding experienced decreased adjusted odds of mortality (OR=0.75 [0.60–0.93]).
• Funding was associated with decreased adjusted odds of mortality among all triage statuses, with the lowest estimate of adjusted odds for mortality among re-triaged patients (OR=0.63 [0.46–0.87]).

Limitations

• Critically injured patients were identified based on ISS, but clinically, patients are evaluated by Glasgow coma scale, systolic blood pressure, emergent anatomic injuries, etc.
• Funding is highly variable in amount, source, and allocation. Not all states clearly document a mechanism of trauma funding, and some states may have other mechanisms not managed by the state.
• Triage protocols vary from region to region. This study followed ACSCOT triage, but not all states have developed these guidelines

Conclusions

• Developing trauma systems with robust triage protocols requires stable, adequate funding.
• Regional agencies should be given autonomy to tailor their trauma system to local needs, but this should not limit sources of funding.
• Some states have found significant reductions in mortality following implementation of a statewide trauma system with dedicated trauma funding. These states can serve as an initial model of funding allocation.