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Heena Santry
University of Massachusetts Medical School, Heena.Santry@umassmemorial.org

Christopher J. Wilbert
MedStar Harbor Hospital

Charles M. Psoinos
University of Massachusetts Medical School, charles.psoinos@umassmed.edu

See next page for additional authors

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Quadrimodal Distribution of Death after Trauma: Predictors of Death in the Fourth Peak

Heena P. Santry, MD MS1,2*; Christopher J. Wilbert, MD3; Charles M. Psoinos, MD1; Julie M. Flahive, MS1; Aimee R. Kroll-Desrosiers MS2; Timothy A. Emhoff, MD1, Catarina I. Kiefe, PhD MD2

1. Department of Surgery, University of Massachusetts Medical School
2. Department of Quantitative Health Sciences, University of Massachusetts Medical School
3. Department of Emergency Medicine, MedStar Harbor Hospital, Baltimore, MD

*2010-2015 UMass Clinical Research Scholar

Introduction
Patterns of death after trauma are changing due to diagnostic and treatment advances. We examined mortality in critically injured patients at risk of death after discharge.

Methods
We reviewed all critically injured (Injury Severity Score ≥25 AND death in Emergency Room, death within 24hrs, OR ICU admission >24hrs) adults (age ≥18) admitted to a Level 1 trauma center (01/01/2000-12/31/2010) and determined death post-discharge (Social Security Death Index) of patients discharged alive. We compared demographics, injury data, and critical care resource utilization between those who died during follow-up and survivors using univariate tests and Cox proportional hazards models.

Results
Of 1,695 critically injured patients, 1135 (67%) were discharged alive. As of 05/1/2012, 977 (58%) index survivors were alive (median follow-up 62mos (IQR35,96)). Of 158 deaths post-discharge, 75 (47%) occurred within the first year. Patients who died post-discharge had longer hospital (24dys (IQR13,38) vs. 17dys (IQR10,27)) and ICU LOS (17dys (IQR6,29) vs. 8dys (IQR4,19)) and were more likely to undergo tracheostomies (36.1% vs. 15.6%, p<0.0001) and gastrostomies (39.2% vs. 16.0%, p<0.0001) and be discharged to rehabilitation (75.7% vs. 62.5%, p=0.0001) or skilled nursing (13.1% vs. 5.8%, p=0.001) than survivors. In multivariable models, male sex, increasing age, and increasing ICU LOS predicted 1-year and overall mortality. ICU LOS>16dys increased risk of death at one year (HR1.94 (1.22,3.06)) and by the end of follow-up (HR2.19 (1.58,3.04)) compared to shorter ICU stays.

Conclusion
We propose the first year after discharge as the fourth peak of trauma related mortality. Duration of ICU LOS during index hospitalization is associated with post-discharge mortality.

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