5 Admission Frailty Is Associated with Acute Respiratory Failure and Mortality in Burn Patients > 50

Colette Galet, PhD, Kevin Lawrence, MD, Kathleen S. Skipton Romanowski, MD, FACS, Dionne Skeete, MD, Neil Mashruwala, MD

University of Iowa, Iowa City, Iowa; Naval Medical Center San Diego, Iowa City, Iowa; UC Davis, Sacramento, California; University of Iowa, Iowa City, Iowa; Carle Foundation Hospital, Urbana, Illinois

Introduction: Pre-injury frailty has been shown to predict mortality of older burn patients. Herein, we assessed the utility of the Canadian Study of Health and Aging Clinical Frailty Scale (CSHA-CFS) to predict burn-specific outcomes. We hypothesize that frail patients are at greater risk for complications such as graft loss, acute respiratory failure, and acute kidney injury and will require increased healthcare support at discharge.

Methods: This is a retrospective cohort study. Patients 50 years and older admitted to our Institution for burn injuries between July 2009 and June 2019 were included. Patients with inhalation injury only, no data on total burn surface area, or for whom medical history was incomplete were excluded. Demographics; comorbidities; pre-injury functional status; admission, injury, and hospitalization information; complications (graft loss, acute respiratory failure, and acute kidney disease (AKI)); mortality, and discharge disposition were collected. Patients were scored on the CSHA-CFS based on pre-admission health and functional status. The frail and non-frail groups were compared. Multivariate analyses were performed to assess the association between admission frailty and outcomes. $P < 0.05$ was considered significant.

Results: We included 851 patients, 697 were not frail and 154 were frail. Frail patients were significantly older (66.1 ± 10.8 vs. 63.5 ± 10.9, $p = 0.002$), more likely Caucasian (98.1% vs. 91%, $p = 0.027$) and to have suffered flame burn injuries (68.8% vs. 59.8%, $p < 0.001$). Frail patients had a lower %TBSA (4.4 ± 8.1% vs. 10.1 ± 13.1, $p < 0.001$) but were more likely to stay longer in hospital relative to %TBSA (3.6 ± 6.7 vs. 1.9 ± 3.1, $p < 0.001$). Frail patients were less likely to have had skin graft procedures (27.3% vs. 57.4, $p < 0.001$). On multivariate analysis, controlling for age, sex, race, mechanism of injury, %TBSA, 2nd degree and 3rd degree burn surface, inhalation injury, frailty was associated with acute respiratory failure (OR = 2.599 [1.460-4.628], $p = 0.001$). Frailty was also associated with mortality (OR = 6.915 [2.455-19.980]; $p < 0.001$) when controlling for the same variables as well as acute respiratory failure and AKI. Frailty was also associated with discharge to home with healthcare services (OR = 2.678 [1.491-4.809], $p = 0.001$), to SNF, rehabilitation, or long-term acute care facilities (OR = 3.572 [1.933-6.602], $p < 0.001$), and to hospice (OR = 5.759 [1.519-21.827], $p = 0.010$) when compared to home without healthcare services.

Conclusions: Frailty is associated with increased risk of acute respiratory failure, mortality, and requiring increased healthcare support post-discharge. Our data suggest frailty as a tool to predict morbidity and mortality as well as for goals of care discussions for the burn patient.

6 Risk Factors and Comorbidities Associated with Post-burn Hypertension

Tsola A. Efejuku, BSA, Alejandro A. Joglar, BS, Shivan N. Chokshi, BBA, Kassandra K. Corona, BS, Kendall Wermine, BS, Sunny Gotewal, BS, Giovanna De La Tejera, BSA, George Golovko, PhD, Maria Haseem, BA, Phillip H. Keys, BS, Juquan Song, MD, Steven E. Wolf, MD, FACS, Amina El Ayadi, PhD

University of Texas Medical Branch, Galveston, Texas; University of Texas Medical Branch, Galveston, Texas; University of Texas Medical Branch at Galveston, Galveston, Texas; University of Texas Medical Branch, Galveston, Texas; University of Texas Medical Branch, Galveston, Texas; University of Texas Medical Branch, Galveston, Texas; University of Texas Medical Branch at Galveston, Galveston, Texas; University of Texas Medical Branch, Galveston, Texas; University of Texas Medical Branch, Galveston, Texas; University of Texas Medical Branch at Galveston, Galveston, Texas; University of Texas Medical Branch at Galveston, Galveston, Texas

Introduction: Hypertension (HTN) is a prevalent condition in the United States and leads to an increased risk of developing other comorbidities. However, the impact of hypertension following severe burns on patient outcomes is not known. We hypothesize that post-burn hypertension is associated with an increased risk of other comorbidities and mortality.

Methods: This study used data from TriNetX, a global federated health research network. Burned patients who were diagnosed with essential hypertension at least 1 day after injury were identified in the TriNetX database using specific ICD codes and were compared to those who did not develop essential hypertension; neither cohort was diagnosed with hypertension prior to injury. Each cohort was balanced for age, gender, race, and ethnicity. Occurrence of the following within 3 days of burn was compared between the two cohorts: acute kidney injury (AKI), hyperglycemia, heart failure, coronary artery disease, and death. These patient cohorts were then stratified by gender, percent total body surface area (TBSA) burned, and age. Statistical analysis for the measures of association used an odds ratio with a 95% confidence interval and a risk ratio with a z-test. Significance for the z-test was set at a p-value of < 0.05.

Results: The search identified 460,977 burn patients of whom 87,808 were diagnosed with hypertension at least 1 day after burn injury. Those diagnosed with hypertension were 7.25 times as likely to develop AKI, 5.45 times as likely to develop hyperglycemia, 7 times as likely to develop heart failure, 7.17 times as likely to develop coronary artery disease, and 1.78 times as likely to die. Men were at greater risk of experiencing AKI, heart failure, coronary artery disease, and death, however, women were 1.51 times as likely to develop hyperglycemia. Stratification based on % TBSA burned indicated an increased risk for all outcomes for patients with a high percentage of total body surface area burned (60% to > 90% TBSA burned was higher than < 10% to 50-59% groups). Subgroup analysis based on age indicated elevated risk of developing AKI, heart failure, coronary artery disease,

or death with age. However, we found a spike in risk for all outcomes in the 0-9 age group. All data was significant at $p < .0001$.

Conclusions: A new hypertension diagnosis in severely burned patients is highly associated with other comorbidities including acute kidney injury, heart failure, coronary artery disease, and death. Overall, males, older patients, and those with a higher percent TBSA burned are at a higher risk of developing these comorbidities.

7 Impact of Chronic Alcohol Use on Fluid Resuscitation in Burn Patients

Sasha McEwan, MD, Kathleen A. Iles, MD, Lori Chrisco, RN, MSN, Joyce Pak, MPH, Chris Agala, PhD, Felicia Williams, MD, Booker King, MD, Rabia Nizamani, MD

University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; University of North Carolina, Chapel Hill, North Carolina; North Carolina Jaycee Burn Center, Chapel Hill, North Carolina; University of North Carolina Chapel Hill, Carrboro, North Carolina; University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; UNC Jaycee Burn Center, Chapel Hill, North Carolina; UNC Jaycee Burn Center, Chapel Hill, North Carolina; UNC Jaycee Burn Center, Chapel Hill, North Carolina

Introduction: Acute alcohol intoxication in burn patients has been associated with increased mortality, renal dysfunction and difficulty with adequate fluid resuscitation. It is less clear how chronic alcohol use, regardless of intoxication status on admission, impacts patient outcomes. In this study, we examine chronic alcohol use and both short- and long-term outcomes in burn patients.

Methods: Patients were identified using an institutional burn center registry and linked to clinical data. Adults admitted from 2017 to 2020 with a total body surface area (TBSA) % above 10% and a hospital stay greater than 2 days were eligible for inclusion. A total of 298 patients were enrolled and chart review completed for admission labs and fluid administration. Alcohol use was also examined and patients were staged based on severity and chronicity of alcohol use: none/minimal, early/moderate use, and problem/severe abuse. Renal dysfunction was defined based on Acute Kidney Injury Network criteria. Linear regression was used to assess the association between alcohol use and fluid resuscitation. Multiple logistic regression was used to assess alcohol use and renal dysfunction with adjustment for confounders.

Results: Compared to patients with none/minimal (NM) alcohol use and early/moderate (EM) alcohol use, patients in the problem/severe (PS) alcohol use category were older (NM 45.4 years, EM 44.1 years, PS 52.2 years; p=0.02), had larger mean TBSA burns (NM 18%, EM 14.9%, PS 23.1%; p=0.03), were more likely to have third degree burns (NM 53.8%, EM 36%, PS 72.4%; p=0.02), and more likely to have inhalation injury (NM 7.2%, EM 0%, PS 24.1%; p< 0.001). Patients in the PS category also had a significantly longer hospital length of stay (LOS) (p< 0.001), ICU LOS (p< 0.001), and ventilator days (p=0.005). Mortality was higher for the PS group (21.7%) compared to the NM (6.6%) and EM (0%) groups; p=0.001. These correlated to higher mean hospital costs for patients in the PS category compared to those in the NM category ($394,964 versus $868,126, p< 0.001). After adjusting for TBSA, patients in the PS category required more fluid resuscitation within 48 hours of admission compared to the NM category (p=0.0138), despite a lower mean admission BMI (27.1 vs 30.03, p=0.03). Although there was a trend toward increased rates of acute renal injury within 48 hours of admission in the PS group (32.7%) vs the NM group (21%), this did not reach statistical significance.

Conclusions: Chronic alcohol use was associated with more severe burn injury, increased morbidity and mortality, and greater resource use. Even after adjustment for comorbidities and TBSA, chronic alcohol use resulted in a need for increased initial fluid resuscitation.