Research - R149

Oral Presentation

Abstract Title:

Baseline Immunological Disparities in African American and Caucasian Trauma Patients

Authors:

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Background & Purpose:

Eliminating disparities in outcomes of care is a primary goal of the National Institutes of Health. Health disparities exist for African Americans (AAs) in chronic diseases, but few studies describe disparities in trauma outcomes. AAs comprise a significant percentage of trauma patients. Research non-specific to trauma has shown that AAs have higher rates than Caucasians of sepsis and related complications, a leading cause of trauma mortality. The inflammatory response to trauma is a key variable in determining sepsis, of which, white blood cell (WBC) counts are a measurable component. The purpose of this research was to compare WBC count data between AA and Caucasian patients following trauma.

Study/Project Design:

This analysis was part of a larger, prospectively designed study funded by the National Institutes of Health.

Setting:

The setting was an urban Level 1 Trauma Center in the southeastern United States. Annual census at this center is ~2,100

Sample:

All patients admitted to the Emergency Department with injuries seen by the trauma interdisciplinary team were screened for participation.

Procedures:

We recruited 70 individuals over a 2-year period who were 18-44 years of age and admitted to the ICU from the Emergency Department (ED) with moderate to severe trauma. Individuals were consented within 24 hours of admission. We excluded patients with pre-existing infections, pregnancy, spinal cord injury, steroid or NSAID use, cancer, organ, or autoimmune diseases. With IRB approval, we collected baseline data for WBC counts from extra blood samples drawn in the ED as part of the routine care protocol. These samples, which would have otherwise been discarded, were stored for use until patient consent occurred in the ICU. Samples from individuals who did not later consent in the ICU were discarded. WBC counts were also collected daily throughout the ICU length of stay. Demographic data were also collected. Data were analyzed using a two-tailed, unpaired Student's t-test and a two-tailed, unpaired Mann-Whitney U-test.

Findings/Results:

We screened all eligible individuals (N=313) and consented N=70 between October 2010-July 2012. Among those consented, 53 were eligible for analysis. Descriptive data were as follows: Males [n = 39(74%)]; Females [n = 14(26%)]; AAs [(n = 25(47%); Mean age = 28.43+7.48]. Caucasians [n = 28 (53%); Mean age = 30.4+8.22]. Statistical significance existed in baseline levels of WBC between AAs vs. Caucasians (13000±6300 cells/µL vs. 17380±9140 cells/µL, respectively, ($p < 0.05$). We also found significance in the systemic inflammatory response syndrome (SIRS) for diagnosis of sepsis vs. no sepsis ($p < 0.05$). SIRS is a clinical syndrome measured by a score with established predictive validity and reliability for sepsis. The score is achieved by assigning one point for each measure: 1) temperature > 38°C or < 36°C; 2) heart rate > 90 beats/minute; 3) respiratory rate > 20 breaths/minute (or $PaCO2 < 32$ mm/Hg); and 4) WBC count > 12,000 or < 4,000 cells/µL. A score of 0 or 1 defines "No" SIRS, whereas a score of 2, 3, or 4, combined with a positive culture, defines sepsis. No significance was found between WBC counts between AAs vs. Caucasians collected daily through the ICU length of stay

Discussion/Conclusions/Implications:

These data support similar findings published by our group. In a previous retrospective analysis of N=246 trauma patient records with inclusion and exclusion criteria nearly the same as this study, we found that AAs had 14% lower WBC counts on ICU admission (M = 15,200 cells/µL, 95% CI = 14,400 cells/µL to 16,000 cells/µL, $p < 0.001$) compared to Caucasians (M = 17,700 cells/µL, 95% CI = 16,700 cells/µL to 18,700 cells/µL, $p < 0.001$). In contrast, AAs had fewer SIRS occurrences than Caucasians ($T = 9,949$; $p = 0.04$). Nurses may use these data in the future to assess patients and tailor preventative treatments. More research is needed in larger sample sizes to investigate mechanisms that explain these differences