

**Body Composition and its Effect on the Badly Injured***David Bryson, MBChB, MRCS; Katie Rollins, MBBS;**Dileep Lobo, MBBS, MS, DM, FRCS, FACS, FRCP; Ben Ollivere, FRCS Tr+Orth;**Queens Medical Centre, Nottingham, UNITED KINGDOM*

**Background/Purpose:** Trauma is the leading cause of death in the under-35-year-olds and carries an even greater burden of life-long morbidity. The inception of the Major Trauma System in the United Kingdom has cut mortality greatly and in the East Midlands has reduced the chances of death from major injury by 30% over the past 2 years. Much of this improvement has been in the prevention of early deaths. Many patients still die from the Systemic Inflammatory Response Syndrome (SIRS) due to a latter burden associated with an excessive inflammatory response ("Second Hit" phenomenon). Body composition analysis has been validated as a predictor of outcome in a number of types of cancer, and more specifically skeletal muscle changes (myosteatorsis and sarcopenia) have been linked to cancer survival. This study sought to examine the association, if any, between body composition and survival in trauma patients.

**Methods:** We retrospectively analyzed 44 consecutive patients with admitted to a single Level I major trauma centre. All patients had sustained blunt multisystem trauma and all underwent a full trauma CT scan on arrival. Using validated cross-sectional CT analysis, we determined the body composition (presence of sarcopenia and myosteatorsis) for each of the patients. Data on ISS, lactate, duration of hospital admission, and mortality were collated from the trauma database.

**Results:** The mean age of patients was 48.70 years (SD 23.53) with a mean ISS of 9.85 (SD 8.91). Patients stayed on average 9 days. There were three deaths in the cohort (6.8%). Overall mean skeletal muscle Hounsfield Unit (HU) was 42.23 (SD 9.29). 18 of the 44 patients were sarcopenic; the mean age was 55.6 years. There was a positive correlation between sarcopenia and mortality but this did not reach statistical significance ( $P = 0.052$ ). There was no correlation between sarcopenia and ISS, initial lactate levels, or length of stay. Ten patients were myosteatorsic; there was a significant difference in age between patients who were myosteatorsic and those who were not ( $P < 0.001$ ). The three patients who died were myosteatorsic (3/10) which was statistically significant ( $P = 0.009$ ). There was no difference between patients who were myosteatorsic and those who were not with respect to ISS, lactate, or length of stay. Overall mean HU density was significantly lower in those who died ( $P = 0.003$ ).

**Conclusion:** Trauma deaths rank as one of the biggest global health-care challenges of the century. We have identified for the first time that body composition is associated with survival in trauma patients. Deaths from the "Second Hit" phenomenon are poorly understood. Given that the SIRS response is a metabolically mediated response, it is not implausible to suggest that body composition may play a role in influencing outcome. The results of this study suggest that body composition may influence the Second Hit phenomenon and represents a novel observation.

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.