

clinical outcomes in geriatric patients with rib fractures. METHODS/STUDY POPULATION: A retrospective 5-year review was performed of a single Level 1 Trauma center registry. Geriatric patients (≥ 65 years of age) diagnosed with rib fractures from January 1, 2014 to December 31, 2019 were included. The primary outcome of interest was in-hospital mortality. Secondary outcomes included hospital and intensive care unit length of stay (HLOS and ICU LOS, respectively) and discharge disposition, as a surrogate for loss of independence. Further, subgroup analysis based on number of rib fractures (i.e. <4 and ≥ 4 rib fractures) was performed. RESULTS/ANTICIPATED RESULTS: 2,134 adult trauma patients were admitted with at least one rib fracture. Of these, 1,037 (49%) were ≥ 65 years old. This cohort had a mean age of 78.6 years old, injury severity score (ISS) of 11.4, HLOS of 7.4 days and 29% required ICU care with mean ICU LOS of 1.9 days. Only 36% were discharged home compared to 64% who were discharged to a care facility and thus had a loss of independence. Overall mortality was 6.3%. Compared to survivors, non-survivors had a higher ISS (19.3 vs. 10.8, $p < 0.0001$) and longer ICU LOS (7.1 vs. 6.5 days, $p = 0.04$). Analysis based on number of rib fractures showed that those with ≥ 4 rib fractures had significantly higher mortality (8% vs. 4%, $p = 0.008$), longer HLOS (8.7 vs. 6.1 days, $p < 0.0001$), longer ICU LOS (2.6 vs. 1.3 days, $p < 0.0001$), and significantly lower discharge to home (32% vs. 39%, $p = 0.02$). DISCUSSION/SIGNIFICANCE: To our knowledge, this is the largest single-center study of geriatric patients with rib fractures. In this study, the observed mortality in patients ≥ 65 years of age was 6.3% which represents a lower mortality rate than historically reported. Despite this, only 36% were able to be discharged directly to home.

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Developing a Digitally Integrated Endotracheal Tube for Neonates to Improve Safety and Respiratory Function

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OBJECTIVES/GOALS: Neonatal endotracheal tubes (ETTs) are usually uncuffed to avoid subglottic stenosis and other complications, but cuffed ETTs allow better ventilation. Our goal was to detect and control pressure in the cuff below the limit of occluding venous flow to minimize the risk of subglottic stenosis. METHODS/STUDY POPULATION: We designed a pressure sensor to fit on a 2.5 ETT for prototype testing in 8 age adult female rabbits. Eight uncuffed age- and sex- matched rabbits served as control. Study duration was 2 hours during which pressure in the cuff was limited by novel sensor (intervention) or auscultation (control). Anesthesia was maintained with sevoflurane. Ventilation was provided mechanically. Subsequently the tracheae were removed, sectioned crosswise, and compared histologically for mucosal damage. RESULTS/ANTICIPATED RESULTS: Preliminary data demonstrated an almost 30% greater amount of intact mucosa in the intervention group. The sensor also provided data on heart rate and respiratory rate, although this signal was not optimal. After filing an invention disclosure and provisional patent, we are refining our device to include multiple compartments for local control of cuff pressure and applying for a STTR Phase I/II application. DISCUSSION/

SIGNIFICANCE: Ventilation in neonates with uncuffed ETTs can be suboptimal due to leak around the tube, but cuffed ETTs pose the threat of subglottic stenosis and other complications. We have designed a prototype cuffed ETT with a sensor to maintain low cuff pressure while preventing leaks and largely avoiding damage to the tracheal mucosa.

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Biobehavioral predictors of dose-limiting toxicities of cancer therapy: Identification of areas for preventative intervention[†]

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OBJECTIVES/GOALS: This presentation outlines a novel approach to evaluating multiple risk factors for the development of dose-limiting toxicities in adolescents and young adults with cancer. This is the first to evaluate biobehavioral predictors originally identified in animal models in clinical human studies. METHODS/STUDY POPULATION: Adolescents and young adults (AYAs) have seen the slowest improvements in cancer survival and have some of the highest rates of dose-limiting mucositis (mouth sores). AYAs receiving chemotherapy with a significant chance of dose-limiting mucositis were recruited for a prospective study. Baseline perceived psychologic stress levels and inflammatory markers were collected at the time of chemotherapy administration and participants completed a daily assessment of mucositis for 14 days following chemotherapy. Logistic regression will be used to evaluate stress and inflammation as predictors of mucositis and Sobels testing will evaluate the role of inflammation as mediators in this relationship. RESULTS/ANTICIPATED RESULTS: We anticipate that, as seen in animal models, stress and inflammation will predict mucositis development. First, we hypothesize that stress levels and inflammatory markers will have a direct correlation and that the level of inflammation at the time of chemotherapy administration will predict mucositis incidence and severity. Through mediation testing, we hypothesize that inflammatory markers will explain a significant amount of the variance in mucositis also explained by stress, identifying inflammation as a mediator in this relationship. In all, we expect that stress and inflammation both predict mucositis development and will be identified as important modifiable factors that can be altered to reduce the risk of toxicity development during cancer therapy. DISCUSSION/SIGNIFICANCE: This work intends to evaluate predictors of chemotherapy-related toxicity development in AYAs with cancer and identify areas of intervention that will reduce toxicity profiles and close the gap in cancer survival for AYAs. Findings are applicable to biomedical, nursing, and psychosocial professionals and will inform future, large clinical studies

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Exoskeletons increase paretic limb use in stroke survivors during a bimanual virtual reality reaching task*

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OBJECTIVES/GOALS: Almost 8 million Americans live with disability caused by stroke. However, recent advances in stroke rehabilitation are costly and lack resemblance to activities of daily living. The goal of this study was to develop a rehabilitation platform to increase