**Emergency Department Intensive Care Unit Reduces the Cost of Diabetic Ketoacidosis Management**

Victoria L. Zhou, BA*; Frances S. Shofer, PhD**; Nikita G. Desai, MD**; David H. Adler, MD MPH*; John C. Greenwood, MD** - *University of Rochester School of Medicine & Dentistry; **Hospital of University of Pennsylvania

**Objectives:** The Resuscitation & Critical Care Unit (ResCCU) is a novel emergency department intensive care unit (ED ICU) that provides early critical care in the ED setting with similar capabilities as an inpatient ICU. Diabetic ketoacidosis (DKA) is a common presenting diagnosis that often allows for quick transition from ICU to lower levels of care. This study examines the cost-efficiency of treating DKA in an ED ICU. We compared the hospital billing charges for DKA patients of our ResCCU versus traditional inpatient ICU care.

**Methods:** This was a retrospective, single-center cross-sectional study of DKA patients > 18 years old, presenting to an academic, urban hospital ED (>70,000 visits/year) over 16 months. Patients were identified by ICD-10 code primary diagnosis of DKA. Patient demographics, physiologic variables, severity of illness scores, and time metrics were extracted from electronic medical records. Hospital billing costs were extracted from our institution’s electronic billing system. ICU-level care was defined as ResCCU or inpatient ICU treatment. P-values were calculated for continuous variables from exact Wilcoxon two-sample test (for non-normal distributions).

**Results:** A total of 41 ED visits with the primary diagnosis of DKA and complete billing records met inclusion criteria. 14 patients were treated in the ResCCU and 27 patients were treated in an inpatient ICU. Mean age (mean ± SD) was 43.0±21.3 years and 36.6% were male. Median ICU length of stay (LOS) was significantly shorter for ResCCU vs inpatient ICU (respectively, 13.0 hours, IQR 11.0-17.0 vs 27.0 hours, IQR 18.0-43.0; p=0.0001). Total hospital billing charges were significantly lower for ResCCU vs inpatient ICU groups (respectively, $54,035 vs $68,250; p=0.02), while no significant difference was found between ED billing costs ($7,017 vs $8,437; p=0.62). There was no significant difference of initial bicarbonate, pH, anion gap, Sequential Organ Failure Assessment (SOFA) or Acute Physiology And Chronic Health Evaluation II (APACHE-II) scores and overall hospital LOS between groups.

**Conclusions:** DKA patients managed in the ResCCU have significantly lower total hospital billing charges and shorter ICU LOS than patients managed by a traditional inpatient ICU stay. An ED ICU may provide a more cost-efficient mechanism for acute DKA management.