

## Effect of Delirium Motoric Subtypes on ICD-9 Documentation of Delirium in the Intensive Care Unit

**Introduction:** Studies have attempted to quantify delirium prevalence using International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) administrative codes. We hypothesized that surgical intensive care unit (ICU) patients with hyperactive or mixed delirium (HYPER/MIX) versus hypoactive delirium (HYPO) would be more likely to receive ICD-9-CM documentation for delirium. The objective of this study was to compare the proportions of patients with HYPER/MIX versus HYPO that received delirium ICD-9-CM documentation.

**Methods:** This retrospective cohort study was conducted at a 24-bed surgical ICU from 06/01/2012 to 05/31/2013. Adult patients with less than 24 hours surgical ICU care, admission to another ICU during the hospital stay, or not screened with the Confusion Assessment Method for the ICU (CAM-ICU) were excluded. Delirium was assessed twice daily and was defined as one or more positive CAM-ICU ratings during surgical ICU care. Delirious patients were categorized into three motoric subtypes using corresponding Richmond Agitation Sedation Scores (RASS), where all RASS of 1 to 4 was HYPER, all RASS -3 to 0 was HYPO, and the presence of RASS that were both 1 to 4 and -3 to 0 was MIX. We identified 26 unique ICD-9-CM codes used in previous studies; documentation of delirium was defined as having  $\geq 1$  of these 26 codes that was not present on admission. Proportions were compared with the Chi-squared test.

**Results:** Of included patients, 40% (423/1055) were diagnosed with delirium (253 as HYPER/MIX and 170 as HYPO) using the CAM-ICU and 17% (183/1055) had an ICD-9-CM code for delirium. The sensitivity, specificity, positive and negative predictive values, and diagnostic accuracy of ICD-9-CM codes for delirium were 36%, 95%, 83%, 69% and 71%, respectively. Patients with HYPER/MIX were 50% more likely to receive ICD-9-CM documentation compared with HYPO (42% [95% CI 35%-48%; 105/253] HYPER/MIX versus 27% [95% CI 21%-34%; 46/170] HYPO, relative risk = 1.5 [1.1-2.2],  $P=0.002$ ).

**Conclusions:** Administrative ICD-9-CM codes had a poor sensitivity for documenting delirium in surgical ICU patients. Patients with HYPER/MIX were 50% more likely to receive an ICD-9-CM code for delirium compared with HYPO. Oversampling HYPER/MIX may bias studies that use ICD-9-CM codes to quantify delirium incidence.