Identification of factors associated with event occurrence due to unsafe management of endotracheal tubes

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Introduction:
Incidentes associated with endotracheal tubes are frequent during mechanical ventilation (MV) of intensive care unit (ICU) patients and can be associated with poor outcomes for patients and detrimental effects on health care facilities. Here, we aimed to identify factors associated with Event occurrence due to Unsafe Management of Endotracheal Tubes (E-UMET).

Methods:
A retrospective observational study was conducted in three ICUs: one surgical ICU, one stroke ICU, and one emergency department, at a tertiary hospital in Japan from 1 April 2016 to 31 March 2017. Patients requiring MV and oral intubation during their ICU stay were included. The primary finding was the incidence rate of E-UMET (biting, unplanned extubations, and/or displacement of the endotracheal tube). The patients were divided into two groups: with or without E-UMET. To investigate E-UMET, potential factors possibly related to its occurrence were obtained from electronic medical records. We conducted univariable and multivariable analyses to investigate E-UMET factors.

Results:
Of 410 patients, E-UMET occurred in 112 (27.3%). The mean and standard deviation for age and Acute Physiology and Chronic Health Evaluation (APACHE) II score were 66 (17) and 25 (7), respectively. According to a multivariate logistic-regression analysis, significant risk factors associated with E-UMET included patients of neurosurgery (odds ratio (OR) 3.3; 95% CI, 1.51-7.46; p=0.003), sedative administration (OR 2.9; 95% CI, 1.63-5.32; p<0.001), and higher Richmond Agitation-Sedation Scale (RASS) scores (OR 1.4; 95% CI, 1.24-1.77; p<0.001). The use of a restraint (OR 0.4; 95% CI, 0.22-0.95; p=0.003) was an independent factor associated with a lower probability of E-UMET.

Conclusion:
This study suggests that risk factors associated with E-UMET include neurosurgery, higher RASS scores, and the administration of sedatives. Patients with these factors and longer oral intubation periods might require extra care.