

## Association between Severe Acidemia before Endotracheal Intubation and the Lower First Attempt Intubation Success Rate

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**Abstract :** Background: A presence of severe acidemia, defined as pH < 7.2, is common during endotracheal intubation for critically ill patients in the emergency department (ED). Severe acidemia is widely recognized as a predisposing factor for intubation failure. However, it is unclear that acidemic condition itself actually makes endotracheal intubation more difficult. We aimed to evaluate if a presence of severe acidemia before intubation is associated with the lower first attempt intubation success rate in the ED. Methods: This is a retrospective observational cohort study in the ED of an urban hospital in Japan. The collected data included patient demographics, such as age, sex, and body mass index, presence of one or more factors of modified LEMON criteria for predicting difficult intubation, reasons for intubation, blood gas levels, airway equipment, intubation by emergency physician or not, and the use of the rapid sequence intubation technique. Those with any of the following were excluded from the analysis: (1) no blood gas drawn before intubation, (2) cardiopulmonary arrest, and (3) under 18 years of age. The primary outcome was the first attempt intubation success rates between a severe acidemic patients (SA) group and a non-severe acidemic patients (NA) group. Logistic regression analysis was used to test the first attempt success rates for intubations between those two groups. Results: Over 5 years, a total of 486 intubations were performed; 105 in the SA group and 381 in the NA group. The univariate analysis showed that the first attempt intubation success rate was lower in the SA group than in the NA group (71.4% vs 83.5%,  $p < 0.01$ ). The multivariate logistic regression analysis identified that severe acidemia was significantly associated with the first attempt intubation failure (OR 1.9, 95% CI 1.03-3.68,  $p = 0.04$ ). Conclusions: A presence of severe acidemia before endotracheal intubation lowers the first attempt intubation success rate in the ED.

**Keywords :** acidemia, airway management, endotracheal intubation, first-attempt intubation success rate

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