

The Impact of Smoking on Morbidity and Mortality in Adults with Severe Sepsis and Septic Shock

Fahad Alroumi, MD; Jasmit Minhas, MD; Ahmed Abdul Azim, MD;

Yuxiu Lei, PhD; James Dargin, MD

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Purpose: To determine the impact of smoking on morbidity and mortality in patients with severe sepsis and septic shock. We hypothesized that current smokers have worse outcomes compared to former and never smokers and that smoking may represent a modifiable risk factor for sepsis morbidity and mortality.

Methods: We performed a retrospective analysis of immunocompetent, adult patients with severe sepsis and septic shock at a tertiary center. We recorded data from the medical record, including smoking status, demographics, co-morbidities, APACHE II, and SOFA scores. The primary outcome was hospital mortality. Secondary outcomes included Intensive Care Unit (ICU) and hospital length of stay (LOS) and need for mechanical ventilation, vasopressors, or renal replacement therapy (RRT). Outcomes were stratified by current, former, or never smokers. Chi-square test and logistic regression were used to assess the categorical outcomes. Kruskal-Wallis test was used to test the difference amongst continuous outcomes with varied smoking histories. Multivariate linear regression was used to evaluate the association of the continuous outcomes with multiple risk factors.

Results: We included 158 patients with severe sepsis or septic shock. Median age was 72 years (IQR 60, 84), 61% were male, 19% (30/158) were current smokers, 43% (68/158) former, and 38% (60/158) never smoked. The mean SOFA score was 6.5 +/- 4.24 and the mean Charlson co-morbidity index was 4.89 +/- 2.65. Current smokers (median age, 58.8) were significantly younger than never (median age, 72) and former smokers (median age, 80). Pneumonia was the most common source of infection (40%, 63/158) and 46% (73/158) developed septic shock. The overall inpatient mortality was 20% (31/158). There was a trend towards higher mortality in current smokers compared with never smokers (15% vs 30%, $p < 0.23$). The median hospital and ICU LOS were 8 (IQR 4, 14) and 5 days (IQR 3, 11), respectively. Active smoking was not predictive of inpatient mortality (OR 1.99, 95%CI 0.6-6.8, $p=0.25$). Active smoking predicted the need for mechanical ventilation (OR 3.0, 95%CI 1.2-7.4, $p<0.01$), but not the need for vasopressors ($p=0.66$), vasopressor days (0.49), need for RRT ($p=0.15$), RRT days ($p=0.39$), ICU LOS ($p=0.52$), or hospital LOS ($p=0.11$).

Conclusions: In patients with sepsis, active smoking is associated with the need for mechanical ventilation. Hospital length of stay, ICU length of stay and other related morbidities are not significantly impacted by smoking status.

Although not statistically significant, mortality was twice as high in active smokers compared to never smokers with sepsis.

Clinical Implications: Active smoking may represent a modifiable risk factor for sepsis-related morbidity, including the need for mechanical ventilation.