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Incidence, Risk Factors, and Effects on Outcome of Ventilator-Associated Pneumonia in Patients With Traumatic Brain Injury: Analysis of a Large, Multicenter, Prospective, Observational Longitudinal Study

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Abstract

Background: No large prospective data, to our knowledge, are available on ventilator-associated pneumonia (VAP) in patients with traumatic brain injury (TBI).

Research question: To evaluate the incidence, timing, and risk factors of VAP after TBI and its effect on patient outcome.

Study design and methods: This analysis is of the Collaborative European NeuroTrauma Effectiveness Research in Traumatic Brain Injury data set, from a large, multicenter, prospective, observational study including patients with TBI admitted to European ICUs, receiving mechanical ventilation for ≥ 48 hours and with an ICU length of stay (LOS) ≥ 72 hours. Characteristics of patients with VAP vs characteristics of patients without VAP were compared, and outcome was assessed at 6 months after injury by using the Glasgow Outcome Scale Extended.

Results: The study included 962 patients: 196 (20.4%) developed a VAP at a median interval of 5 days (interquartile range [IQR], 3-7 days) after intubation. Patients who developed VAP were younger (median age, 39.5 [IQR, 25-55] years vs 51 [IQR, 30-66] years; P < .001), with a higher incidence of alcohol abuse (36.6% vs 27.6%; P = .026) and drug abuse (10.1% vs 4.2%; P = .009), more frequent thoracic trauma (53% vs 43%; P = .014), and more episodes of respiratory failure during ICU stay (69.9% vs 28.1%; P < .001). Age (hazard ratio [HR], 0.99; 95% CI, 0.98-0.99; P = .001), chest trauma (HR, 1.4; 95% CI, 1.03-1.90; P = .033), histamine-receptor antagonist intake (HR, 2.16; 95% CI, 1.37-3.39; P = .001), and antibiotic prophylaxis (HR, 0.69; 95% CI, 0.50-0.96; P = .026) were associated with the risk of VAP. Patients with VAP had a longer duration of mechanical ventilation (median, 15 [IQR, 10-22] days vs 8 [IQR, 5-14] days; P < .001) and ICU LOS (median, 20 [IQR, 14-29] days vs 13 [IQR, 8-21] days; P < .001). However, VAP was not associated with increased mortality or worse neurological outcome. Overall mortality at 6 months was 22%.

Interpretation: VAP occurs less often than previously described in patients after TBI and has a detrimental effect on ICU LOS but not on mortality and neurological outcome.

Clinical trial registration: ClinicalTrials.gov; No.: NCT02210221; URL: www.clinicaltrials.gov.

Keywords: mechanical ventilation; outcome; oxygenation; traumatic brain injury; ventilator-associated

pneumonia.

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