

Ventilator-Associated Events in Mechanically Ventilated Patients



Critically ill patients in the ICU often require life-saving mechanical ventilation. For many, this is an unavoidable intervention, despite the multiple complications associated with it. Ventilator-associated event (VAE) surveillance was proposed in 2013 by a working group of the Centers for Disease Control and Prevention (CDC). Three tiers of VAEs were defined by this group:

- Ventilator-associated condition (VAC)
- Infection-related ventilator-associated complication (IVAC)
- Possible ventilator-associated pneumonia (PVAP)

The term ventilator-associated pneumonia (VAP) is more commonly used when discussing complications from mechanical ventilation. However, VAE surveillance definitions are more objective with more potential to include a broad range of conditions and complications that could occur in mechanically ventilated critically ill patients. Studies on the incidence of VAE in mechanically ventilated patients are scarce though, with most studies focused on VAP.

In 2015, a model for VAE was established and embedded in the ICU in West China Hospital. It is a unique system for routine surveillance for VAE. A study was conducted to evaluate this system and compare the characteristics and outcomes between patients with and without VAE, the incident rate of different tiers of VAE and the pathogen distribution in patients with PVAP. Patients from six ICUs were included in the study - general ICU, surgical ICU, neurological ICU, respiratory ICU, thoracic surgery ICU and paediatric ICU. A total of 22,343 patients were included in this study. 20769 patients received mechanical ventilation for at least a day, and 6252 patients received mechanical ventilation for at least four consecutive days.

Study researchers identified 1882 episodes of ventilator-associated condition (VAC) events, 721 episodes of infection-related ventilator-associated complications (IVAC) events and 185 episodes of possible VAP (PVAP). The highest incidence of VAC was observed in surgical ICUs. Hospital mortality among patients with ventilator-associated events was more than three times compared to those with non-ventilator-associated events. In patients on mechanical ventilation for at least four days, 1.5% experienced more than one episode of VAE, and most events occurred at their first ventilation. Kidney failure was more common among VAE cases compared to non-VAE cases with at least four ventilator-days.

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Study findings show that among all patients on mechanical ventilation, the rate of VAEs was relatively low. However, VAE was more common in patients with ≥ 4 ventilator days. The rates of VAE tiers differed in different ICU units but were highest in the NICU.

Ventilator-associated events were correlated with poor outcomes, including longer hospital stay, longer ICU stay and increased risk of mortality. VAE surveillance is thus important, and new strategies need to be developed to prevent VAEs in critically ill patients.

Source: [Critical Care](#)

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