



Automated Near Real-Time Ventilator Data Feed-back Reduces Incidence of Ventilator-Associated Events: A Retrospective Observational Study

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Objectives

Best practice weaning protocols for mechanically ventilated patients reduce ventilator-associated events (VAE) and time on a mechanical ventilator. Compliance with these protocols has proved challenging and therefore real-world data fails to support these positive outcomes. Factors contributing to non-compliance are coordination of care between multiple teams and access to critical ventilation and VAE data. In many intensive care units, data related to ventilation and potential complications is not readily available at the bedside, potentially delaying appropriate interventions. The Respiratory Knowledge Portal (RKP) (Vyair Medical, Mettawa, IL) is an electronic system that gathers physiologic and nonphysiologic information on mechanically ventilated patients. This study evaluated the effectiveness of presenting RKP data to critical care teams at the bedside on a handheld computer rather than at a workstation.

Study methods

All adult mechanically ventilated ICU patients were monitored with RKP between 2014 and 2015. Best practice weaning protocols were loaded, and initially

feedback was presented on remote workstation computers (control group). Beginning in 2015, data were presented to the clinical team via tablet computers that were used during daily rounds (intervention group). VAEs were recorded by RKP software during the entire study period.

Results

Data were collected from 337 patients (187 control group, 150 intervention group). Fewer VAEs were observed in the intervention group (2.0%) compared with the control group (11.2%, $p = 0.003$). Intervention

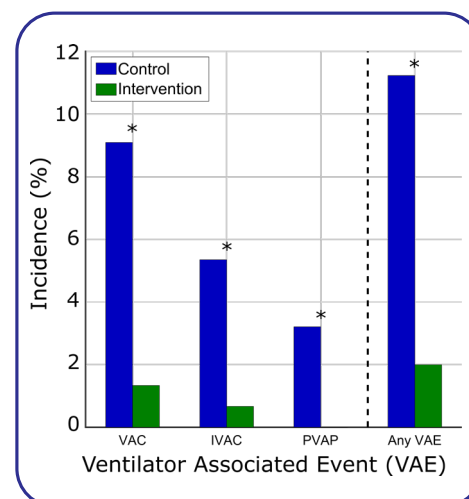


Figure 1 Incidence of ventilator-associated events in control vs. intervention groups. * $p < 0.05$

patients experienced less ventilator-associated conditions (VACs) ($p = 0.002$), infection-related ventilator-associated conditions (IVACs) ($p = 0.026$), and probable ventilator-associated pneumonias (PVAPs) ($p = 0.036$) than control patients. There was no significant difference between the days spent on ventilation nor hospital length of stay in the control group compared with intervention group patients.

Discussion

Best practice weaning protocols, which incorporate ventilator and patient data, drive reduction in VAE and time on ventilator when compliance is maintained. In current practice, clinicians primarily access data via a remote workstation. This method makes it more difficult to incorporate new data into their care during rounds as clinicians are reluctant to leave the bedside, thus increasing the risk of non-compliance to protocols. This study showed that the direct incorporation of RKP into daily multidisciplinary rounds using tablet computers is feasible and may improve care by decreasing VAEs.

What is RKP?

The Respiratory Knowledge Portal (RKP) is an electronic system that collates data from multiple sources on a single patient, then presents those data in graphical and tabular formats in near real-time. It has been designed as a quality improvement tool to track and target timeliness and execution of care therapies

that may help shorten ventilator length of stay. Data from the ventilator pairs with mathematical models to see both current and historical information. RKP then produces management dashboards and reports. When used daily, RKP provides tools that may help improve patient management and process management strategies.



Take home message

In this study RKP reduced ventilator-associated events, ventilator-associated conditions, infection-related ventilator-associated conditions and probable ventilator-associated pneumonias.

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