Does Technology Matter? One Intensive Care Unit’s Experience

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Abstract

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The Neuroscience Intensive care unit (NICU) is a 32 bed unit, with a high VAP census. Patients in the NICU previously received aerosol therapy with pneumatic jet nebulizers. Respiratory Care Staff routinely perform >500 medicated aerosol therapies per month. We instituted a 9 month trial substituting all aerosol therapy previously done with jet nebulizer with administration via Vibrating Mesh (Aeroneb Solo®, Aertox, Galway, Ireland) on and off the ventilator.

Electronic controllers were mounted in each Neuro ICU Room, and all therapy on and off the ventilator was provided with the same single patient use vibrating mesh nebulizer (Fig 2) after in-service education of Respiratory Care Staff. Placement of a Controller Unit in each ICU room was intentional, to reduce risk of cross-contamination between patients.

Data collection performed via ongoing Quality Improvement Data with database initiated and maintained within the Respiratory Care Department. Initial working hypothesis was that the Vibrating Mesh Nebulizer would profoundly impact VAP rate and efficacy of therapy. Length of Stay and Ventilator Days were secondary outcome measures.

Discussion

• VAP Rate trended lower but did not decrease significantly.

  Reduced VAP may have become significant had average Vent days not also decreased at the same time.

  - Census of ventilated patients actually increased during the study period.

  - LOS decreased dramatically during the study period:

    • Exhibited indicators of increasing during the return to control.

    • May or may not be solely attributable to use of the vibrating mesh technology.

    • This decrease would appear indicative of an increased efficacy of therapy. These findings, especially the decrease in LOS pose some interesting questions and warrant further study.

  • While it may be difficult to truly determine statistical significance by retrospective review:

    • Indicators for LOS and Vent Days both began to increase when the study period ended.

    • Finding support the realization that “good” technology should be considered as integral to the form and function of every ICU.

    • In this case, placing a device in each room to ensure ready availability may have attributed directly to outcomes.

    • The Respiratory Care Staff readily embraced this technology, greatly improving staff satisfaction as well.

  • Available technology improves almost daily, but presents an enigma as it relates to value and quality. While some technology may truly advance clinical practice, other technologies may simply be trying to re-purpose an old idea and may not function as intended or add benefit.

Conclusions

In our experience, Vibrating Mesh technology demonstrated a significant increase in the quality of Respiratory Care provided, markedly improved the efficacy of patient care, and in all probability improved measurable outcomes. Further study to better quantify these outcomes is indicated.