Abstract

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 >100000 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 (Aeronee SLO®). We hypothesized that the Vibrating Mesh Nebulizer would profoundly impact VAP rate and efficacy of therapy. Length of stay and Ventilator Days were secondary outcome measures.

Methods/Materials

All modes of medicated aerosol therapy were converted from Jet nebulizer to Vibrating Mesh Nebulizer:
- In-Line nebulization with Conventional Mechanical Ventilator
- Nebulizer placed in the inspiratory limb
- Via mask/mouthpiece
- High Frequency Percussive Ventilation
- Positive Expiratory Pressure Therapy
- Standard intermittent nebulizer treatments

All aerosolized medications were included in the conversion:
- Beta-agoners/sympathomimetics
- Parasympathetic anticholinergics
- Antibacterials
- Glucocorticoids

Expected findings:
- Reduction in VAP (primary outcome)
- Improved efficacy of therapy (primary outcome)
- Staff satisfaction (secondary outcome)

Results

NICU census and number of ventilated patients was similar to higher during the trial period than preceding period. Cumulative findings illustrated in Table 1

A trend to reduced VAP Rate (5%), but not as expected (Table 2).
A trend to decreased Ventilator days (30%) (Table 3).

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.

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.