

Comparison of Clinical Outcomes in Pulmonary Complications for Continuous Rotation Therapy via Two Different Therapeutic Beds

Submitted by:

Chandler Regional Hospital
Catholic Healthcare West
Diane Fortune, RN, MSN, CCRN, CCNS
Clinical Supervisor - ICU

Introduction

According to the Centers for Disease Control and Prevention (CDC), pneumonia is the second most common nosocomial infection in the US and is associated with substantial morbidity and mortality. Patients with mechanically assisted ventilation have the highest risk of developing the infection, since intubation and mechanical ventilation alter their first-line defenses. A study comparing continuous lateral rotation therapy (CLRT) via two therapeutic beds was conducted at Chandler Regional Hospital to evaluate the impact of each bed on ventilator-associated pneumonia and ventilator length of stay rates in ICU patients.

Chandler Regional Hospital is a 148-bed community hospital in Chandler, Arizona, USA, and a member of Catholic Healthcare West. It is located in the greater Phoenix metropolitan area, approximately 20 miles southeast of Phoenix. The hospital is a Level II hospital with a 12-bed Intensive Care Unit. The unit's nursing staff consists of approximately 70% RNs and 30% CCRNs.

Methods

The patient population consisted of intubated, ventilated patients in the adult intensive care unit at Chandler Regional Hospital from August 1999 through September 2001. The Pulmonary Predicus™ tool was used to evaluate all patients within 12 hours of intubation for identification of those patients at risk for pulmonary complications and placement on the therapeutic bed.

The NNIS definition for nosocomial pneumonia was used in identifying the incidence of nosocomial pneumonia (National Nosocomial Infections Surveillance System) of the CDC (www.cdc.gov/ncidod/hip/pneumonia/pneu_mmw.htm#top). All practice protocols and care methodologies remained unchanged during the two-year period, except for the therapeutic bed used. Consistency in nursing practice throughout the 2-year period is evidenced by the nursing staff turnover rate in the unit, which is extremely low with the average length of employment in the unit equal to 10 years.

The TriaDyne® bed (KCI, San Antonio, Texas) was used for rotation therapy exclusively from August 1999 through August 2000. Rotation therapy was provided from September 2000 through September 2001 via exclusive use of the TotalCare SpO₂RT® bed (Hill-Rom, Batesville, Indiana). Patients were rotated continuously, with rotation stopped for no longer than 30 minutes at a time for treatments/procedures. Patients rotated at least 20 out of 24 hours. Patients were rotated to the greatest degree of rotation tolerated. Tolerance was measured by a 20% negative change from baseline in the following hemodynamic monitoring parameters: (1) cardiac output and pulmonary arterial pressure if the patient had a Swan-Ganz line, (2) blood pressure and heart rate if no Swan-Ganz line in place.

The degree of rotation achieved varies in cushion-based rotation and is dependent on the patient's size and weight. Only table-based rotation provides the ability to guarantee the degree of rotation. Therefore, the degree of rotation was not measured. Patients were rotated to the maximum degree tolerated, with tolerance measured as described above. The clinical focus was to achieve positioning one lung above the other.

After two full years of therapeutic bed use, a retrospective analysis was completed. Data collection was performed via chart review of 100% of patients receiving rotation therapy during the two-year period (August 1999 – September 2001). Inter-rater reliability of the data collection was assured via use of a single reviewer, the ICU Clinical Supervisor, who completed all chart reviews and data collection.

Data was collected on the number of mechanically ventilated patients, patient age, ICU length of stay, number of ventilator days, incidence of ventilator-associated pneumonia, and the rate of ventilator-associated pneumonia in the ICU. The data is presented in Table 1 below. The ICU's VAP rate was also tracked for another full year (September 2001 – September 2002) to monitor on-going impact of continuous lateral rotation therapy on ventilator-associated pneumonia in the ICU.

Table 1 – Data Collected

	Group 1	Group 2
Therapeutic Bed Used	TriaDyne®	TotalCare SpO ₂ RT®
Dates Assessed	Aug 1999 - Aug 2000	Sept 2000 - Sept 2001
Number of Vent Patients	34	65
Average Patient Age	67.3 years	67.6 years
Ventilator Days (total = 280)	106	174
Mean Vent LOS (# Vent days / # pts)	3.12	2.68
Incidence of Ventilator- Associated Pneumonia (VAP)	3	1
VAP Rate (# Pneumonia Cases / # Pts)	8.8%	1.5%

Results

Ninety-nine charts (100% of patients receiving CLRT) were reviewed at the end of the 2-year period. Thirty-four patients received CLRT via the TriaDyne® bed (August 1999 to August 2000) and 65 patients received CLRT via the TotalCare SpO₂RT® bed (September 2000 to September 2001). Minimal difference was noticed in the average age of the two groups of patients. Group 1 average age was 67.3 years; the average age for Group 2 was 67.6 years. (Chart 1)

Mean ventilator length of stay decreased by .44 days, from 3.12 for Group 1 patients on the TriaDyne® bed to 2.68 for Group 2 patients on the TotalCare SpO₂RT® bed. (Chart 2) The incidence of ventilator-associated pneumonia dropped from 3 in Group 1 (TriaDyne®) to 1 for Group 2 (TotalCare SpO₂RT®) (Chart 3). The VAP rate decreased by 7.37%, from 8.8% in Group 1 (TriaDyne®) to 1.5% for Group 2 (TotalCare SpO₂RT®) (Chart 4).

During the following four consecutive quarters (September 2001 - September 2002), the VAP rate in the critical care unit was zero with continued use of CLRT via the TotalCare SpO₂RT® bed.

Conclusion

Based on the improved outcomes in ventilator length of stay, incidence of ventilator-associated pneumonia, and on-going VAP rates demonstrated with continuous lateral rotation therapy via the Hill-Rom® product, the TotalCare SpO₂RT® bed is the therapeutic bed of choice in caring for patients at risk for pulmonary complications at Chandler Regional Hospital.

Chart 1

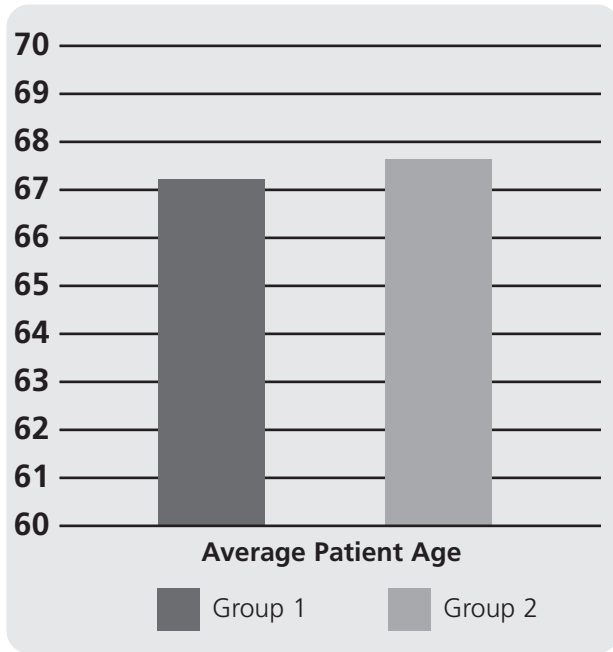


Chart 2

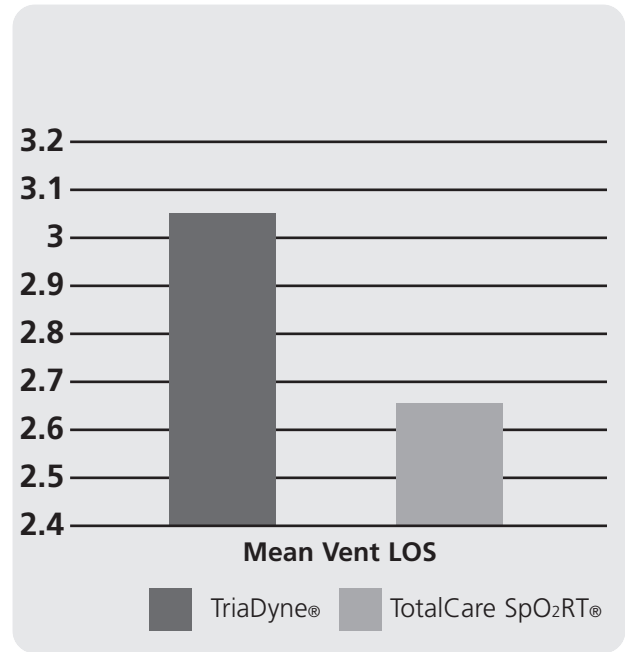


Chart 3

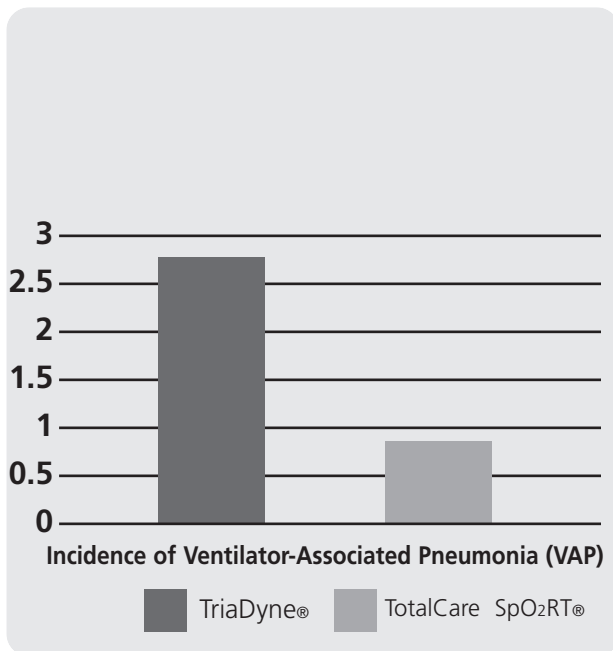
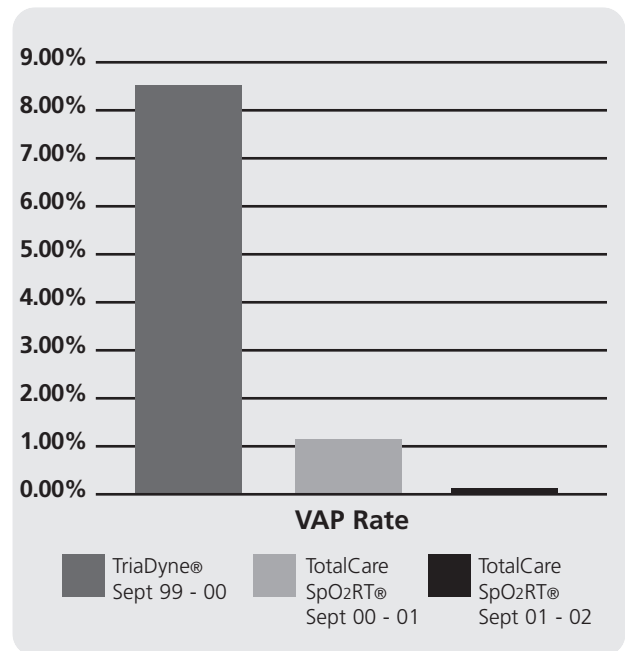


Chart 4



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CLS087ra 6/19/03

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