CONTINUOUS, NON-INVASIVE MONITORING OF RESPIRATORY STATUS OF INJURED LUNG IN PATIENTS WITH TRAUMATIC THORACIC INJURIES

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INTRODUCTION

Closer monitoring of respiratory parameters that quantify the adequacy of breathing can help identify patients at risk for adverse outcomes in a variety of clinical settings. More specifically, advanced respiratory monitoring in patients with traumatic thoracic injuries, such as rib fractures and pulmonary contusions could improve outcomes. A non-invasive respiratory volume monitor (RVM) was used to continuously monitor patients with traumatic thoracic injuries during their stay in the ICU.

OBJECTIVES

Respiratory decompensation is common after traumatic thoracic injuries such as multiple rib fractures and traumatic pulmonary contusions. A continuous, non-invasive, impedance-based Respiratory Volume Monitor (RVM) was used to continuously monitor patients with traumatic thoracic injuries during their stay in the ICU.

RESULTS

Seven intensive care unit (ICU) patients (4 male, 3 female, average age 61.3 years, average BMI 29.2 kg/m²) had continuous RVM measurements (ExSpiron, Respiratory Motion, Inc., Waltham, MA) and corresponding clinical data to permit analysis. All three had thoracic injuries. Tidal impedance measurements were collected from the injured left side and the non-injured right side and converted into bilateral tidal ventimetry (TM). The TM was used to estimate tidal volume (TV) and respiratory rate (RR) using advanced algorithms. The TM was used to estimate tidal volume (TV) and respiratory rate (RR) using advanced algorithms. Continuous respiratory data were collected over 6 hours after the injury, reflecting the overall decrease in TM (%), p<0.01, Figure 2b). This patient was stable and did not need to be intubated.

CONCLUSIONS

Results demonstrate that RVM can generate unilateral respiratory tidal measurements and respiratory rate in patients with traumatic thoracic injuries. Continuous bilateral RVM monitoring in these patients provides a non-invasive, quantitative evaluation of unilateral lung function in real time that may aid with the assessment of the effectiveness of interventions and management of respiratory compromise. This reinforces the clinical utility of RVM in the critical care setting. Follow-up studies are planned to further evaluate this technology.