PII-32: Exhaled Gas Analysis of Mechanically Ventilated Subjects

Author List:
Presenting Author: Alison J. Montpetit
Additional Author: Mary Jo Grap, Cindy Munro, Kevin Ward

Presenting Author: Alison J Montpetit
Address: 7606 Antionette Drive
Richmond, Virginia 23227
United States
Ph: 804-828-3422
Fax:
Email: ajmontpetit@vcu.edu
Institution: Virginia Commonwealth University, School of Nursing

Additional Author: Mary Jo Grap
Address: 1100 East Leigh Street
Richmond, Virginia 23298
United States
Ph: 804-828-3433
Fax:
Email: mjgrap@vcu.edu
Institution: Virginia Commonwealth University, School of Nursing

Additional Author: Cindy Munro
Address: 1100 East Leigh Street
Richmond, Virginia 23298
United States
Ph: 804-828-3422
Fax:
Email: cmunro@vcu.edu
Institution: Virginia Commonwealth University, School of Nursing

Additional Author: Kevin Ward
Address: 1201 E. Marshall St
Richmond, Virginia 23298
United States
Ph: 804-828-3422
Fax:
Email: krward@vcu.edu
Institution: Virginia Commonwealth University
Presentation Preference: Research Abstract

Abstract Categories:
Research Interest Groups (RIGs): Biobehavioral
Thematic Areas: Adult Health

Abstract:
Introduction: Ventilator-associated pneumonia (VAP) is the second most common nosocomial infection in the US, occurs in up to 30% of mechanically ventilated (MV) patients and has mortality rates of 20-41%. Development of sensitive tools for monitoring VAP such as noninvasive monitoring of the exhaled breath would potentially reduce patient burden, increase patient safety during diagnostic testing and reduce health care expenditures. Changes in exhaled gases have been observed during inflammation and oxidant stress. The aims of this study are to characterize exhaled breath gases in the MV population and examine relationships between exhaled gases and pulmonary infection scores.

Method(s): Subjects for this cross sectional descriptive study will be recruited from adult intensive care units at an academic medical center. Exhaled breath will be assessed for volatile compounds (gases) by noninvasive fourier transform infrared spectroscopy (FTIR) technology. FTIR uses the absorption of infrared radiation at discrete frequencies for specific compounds. Exhaled breath sampling will occur over a 15 minute period in which data are compiled every 8 seconds. Exhaled gases associated with oxidant stress and inflammation will be analyzed in this study including: acetone, acetonitrile, acrolein, carbon dioxide, carbon monoxide, cyclohexanone, ethane, ethanol, formaldehyde, methane, methanol, nitric oxide and propane. Pulmonary infection, quantified using the clinical pulmonary infection score (CPIS), will include body temperature, white blood cell count, tracheal secretions, oxygenation, chest radiograph and tracheal aspirate culture measures. Data will be analyzed by descriptive statistics, Pearson’s r correlation coefficient, graphical profiling and regression.

Results: Exhaled gas analysis of one MV subject has been conducted. Data collection in a larger sample is currently in progress.

Discussion & Conclusions: Exhaled breath gas analysis might aid in development of pulmonary specific indicators of disease state, exacerbation, and/or treatment effects. Developing noninvasive, real time tools for monitoring pulmonary disease would reduce patient burden, increase patient safety during diagnostic testing and reduce health care expenditures.

Abstract History:
This abstract has been presented or accepted for presentation in whole or in part at the SNRS or other scientific meeting. Accepted for presentation (in part) at the Council for Advancement of Nursing Science-Special Topics
Financial Disclosure:
No, I (or a member of my immediate family) have not received something of value* from or own stock (or stock options) in a commercial company or institution related directly or indirectly to the subject of my presentation.

FDA Disclosure:
I will not be describing any pharmaceutical and/or medical device.

Non-Exclusive License:

Submitted by:
ajmontpetit@vcu.edu