NEWS-Line for
Respiratory Care Professionals

CHEST 2017: Respiratory Compromise Institute Highlights Dangers And Growing Incidence Of Respiratory Compromise

Source: Phillip Porte, Executive Director of the Respiratory Compromise Institute

Recently, on behalf of the Respiratory Compromise Institute (RCI), for which I serve as Executive Director, I was invited to present at CHEST 2017 in Toronto, the annual meeting of the American College of Chest Physicians, on respiratory compromise and the RCI's history and work. The RCI is an alliance of professional medical societies and interested healthcare providers that seeks to educate the healthcare community and the public about respiratory compromise.

Respiratory Compromise

Definition

Respiratory compromise is a potentially life-threatening state of unstable respiratory health, which can occur across the care continuum — in the operating room, in the post anesthesia care unit, the general care floor or in out-patient care facilities. It is a multifaceted disease state in which there is a high likelihood of decompensation into respiratory failure or death, but in which specific interventions (enhanced monitoring and/or therapies) might prevent or mitigate decompensation.

Statistics

Respiratory compromise is one of the top five conditions leading to increasing hospital costs

and the third most rapidly increasing hospital inpatient cost in the United States. General care floor patients with respiratory compromise are 29 times more likely to die. However, in a majority of cases, respiratory compromise is preventable. For instance, research has shown that more than 60% of arrests brought on by respiratory compromise are potentially preventable.

What Causes and Contributes to Respiratory Compromise

Respiratory compromise may arise from several different pathways, including impaired control of breathing (e.g., via opioids that depress the respiratory function), parenchymal lung disease, airway disease or cardiovascular conditions. For example, respiratory compromise may appear postoperatively or may be drug-induced by the delivery of a sedative, opioid or analgesic to patients who were not properly assessed or monitored. The RCI hypothesizes that these pathways have similar clinical points (e.g., changes in oxygenation and/or ventilation), which can be detected early, allowing for intervention that may prevent further deterioration.

Many risk factors for respiratory compromise have been identified in the literature. Generally, these fall into three categories: 1) patient factors (e.g., existing respiratory disease, co-morbidities, etc.), 2) iatrogenic factors (e.g., respiratory depressive medications, such as opioids, procedures, etc.), and 3) care setting factors (e.g., nurse-to-patient ratios, protocols for recognition, etc.). These factors should be assessed in each patient and a commensurate level of monitoring employed. However, this kind of patient-specific monitoring is not always the standard of care used across clinical settings, which contributes to the incidence of respiratory compromise.

Addressing the Rising Incidence of Respiratory Compromise

Complications from respiratory compromise have increased at a rapid rate, yet, in spite of its growing incidence, the condition is under-recognized and therefore undertreated. This is due to the expanded use of opioids during and after surgery, as well as in non-surgical pain management scenarios, combined with the lack of standardized patient monitoring guidelines among medical specialties. However, appropriate preoperative, intraoperative and postoperative monitoring, such as with capnography, can aid in early detection and treatment of patients experiencing respiratory compromise. Identification of high-risk patients for the condition can also help. As such, the development of risk stratification models or scoring systems to screen patients who may need enhanced monitoring is key. Respiratory care professionals can help in implementing these monitoring and risk identification strategies.

The RCI's Membership, Accomplishments and Mission

Since the RCI's formation in 2015, the institute has endeavored to be the primary source for information, education, research and best clinical practices related to respiratory compromise. To this end, the RCI has worked to define and understand respiratory compromise, promulgating our findings in peer-reviewed medical journals, as with the RCI's monograph in Respiratory Care, and presenting at major medical conferences, such as at CHEST and ATS.

We have also grown to now include 13 member societies, including the: American Association for Respiratory Care, American College of Chest Physicians, American College of Emergency Physicians, American Society of Anesthesiologists, American Thoracic Society, Canadian Society of Respiratory Therapists, National Association of Clinical Nurse Specialists, National Association of EMS Physicians, National Association for Medical Direction of Respiratory Care, Physician Patient Alliance for Health & Safety, Society of Anesthesia & Sleep Medicine, Society

of Critical Care Medicine, and Society of Hospital Medicine.

Monograph

Published in April, the RCI's monograph, entitled "Respiratory Compromise as a New Paradigm for the Care of Vulnerable Hospitalized Patients," helped to provide a foundation to identify patients at risk for respiratory compromise.

Specifically, the monograph identified six distinct patient sub-types based on physiologic parameters: impaired control of breathing, impaired airway protection, parenchymal lung disease, increased airway resistance, hydrostatic pulmonary edema and right ventricular failure. It also included guidelines for identifying patients with each type of respiratory compromise, early signs of the condition, and parameters for monitoring patients' pulmonary and other vital functions.

Monitoring strategies identified for several patient sub-types included simple and non-invasive methods, such as pulse oximetry, EKG, capnography, and monitoring of heart and breathing rates. The monograph found that identifying patient sub-groups in which these and other monitoring are most beneficial is an important first step toward improving patient outcomes in a cost-effective manner. In addition, the monograph concluded that, although specific diagnostic and therapeutic interventions must be individualized, standardized screening and monitoring practices for patients with similar mechanisms of deterioration may enhance the ability to predict respiratory compromise early and prevent its occurrence.

ATS 2017

In May, the RCI presented data from two retrospective studies evaluating the incidence of respiratory compromise among hospitalized Medicare patients at ATS 2017, the annual meeting of the American Thoracic Society. Up until that point, few studies had assessed whether patients' outcomes following respiratory failure that develops during hospitalization differ from those of patients who are admitted with respiratory failure. The studies were the first retrospective analyses of mortality associated with respiratory failure based on Medicare administrative claims data for inpatient admissions to short-term acute care hospitals. While these studies verified that respiratory compromise was a significant safety issue in the hospital setting, particularly among elderly populations, they also underscored that respiratory compromise can be identified in most cases, and, by doing so, acute respiratory failure could be prevented. Accordingly, the results supported the need for improved monitoring and intervention strategies to reduce the risk of respiratory compromise and improve outcomes.

CHEST 2017

During the RCI's plenary workshop presentation at CHEST 2017, entitled "The Respiratory Compromise Institute and Its Current and Future Research Endeavors," I introduced attendees to the RCI's history and recent activities. The RCI was formed to examine the challenges of respiratory compromise across the full spectrum of healthcare delivery settings. Since our formation, we secured corporate sponsors, established ourselves as a 501(c)(3) organization and assembled our Clinical Advisory Committee, which includes representatives from our member societies.

In addition, we pursued an ambitious research agenda, presenting finding on the growing incidence of respiratory compromise through data mined from Medicare claims. During the

RCI's presentation, my colleagues — James Lamberti, MD, FCCP, Professor of Medicine, Virginia Commonwealth University School of Medicine, Inova Campus, and Sidney Braman, MD, FCCP, Ichan School of Medicine at Mount Sinai — reinforced these findings, providing an in-depth discussion about the methodology informing the data mining approach and how the use of Medicare claims for clinical research permits access to a large, readily available pool of otherwise inaccessible patient data. Based on their conclusions, Drs. Lamberti and Braman underscored that respiratory compromise in hospitalized patients should be carefully studied and that future research should focus on early preventive strategies.

Jeffrey Vender, MD, FCCP, Evanston Hospital, and Neil MacIntyre, MD, FCCP, Duke University Hospital, presented on how future research, specifically in surgical and medical patients, could be directed to help the medical community better understand and respond to respiratory compromise. For surgical patients within the perioperative care setting, Dr. Vender noted that an opportunity existed to reduce the afferent limb failure rate in rapid response systems (RSSs) of emergency medical teams. The afferent limb of an RSS concerns what prompts or activates the emergency medical team to act. The efferent limb concerns the action or response itself of the team. Dr. Vender explained that employing algorithms to reduce nonactionable patient monitoring alarms could allow for more timely activation of emergency medical teams in cases of actionable alarms, thereby decreasing the chance of afferent limb failure. These algorithms could also assist in the identification and integration of relevant monitoring data, helping healthcare providers better understand if the correct parameters were being monitored for respiratory compromise.

Dr. MacIntyre discussed how research, to deepen our understanding of respiratory compromise in medical patients, should focus on unplanned intubations, specifically by further examining disease states that create additional risk (e.g., diabetes and renal disease) and by better understanding the trajectories of deterioration (e.g., unexpected respiratory events, a cardiovascular collapse, or the gradual, deleterious neurologic impact of a sedating drug). Dr. MacIntyre noted that one way to conduct this research would be to explore the electronic medical records of health systems across multiple hospitals and care environments. Doing so would provide a pathway for prospectively validating risk scores, and their SOFA equivalents, for patients who may present with respiratory compromise. SOFA stands for Sequential Organ Failure Assessment and was originally developed to predict risk of death in cases of sepsis. It is a scoring system that assesses the performance of several organ systems in the body (neurologic, blood, liver, kidney and blood pressure/hemodynamics) and assigns a score based on the data obtained in each category. The higher the SOFA score, the higher the likely mortality. Dr. MacIntyre concluded his presentation by discussing how developing strategies for the detection and prevention of respiratory compromise would be key to driving down the condition's incidence.

Conclusion

The RCI's work continues to demonstrate the uniqueness and importance of our institute as a one-of-a-kind alliance, with representatives and thought leaders from multiple physician, nursing, respiratory therapist and patient safety organizations. The RCI is dedicated to expanding the depth and breadth of knowledge about respiratory compromise and raising awareness about the condition and how it can be prevented. Technology available today, combined with the implementation of appropriate monitoring, identification and intervention strategies to assess and treat at-risk patients, can help make respiratory compromise rare and save lives. Respiratory care professionals, attuned to the respiratory care needs of their

patients, have the opportunity to help drive these changes to better recognize and prevent respiratory compromise.

To learn more about the RCI, please visit: **http://www.respiratorycompromise.org/.**.

Mr. Porte has been directly involved with health policy for nearly 40 years, with a heavy focus on matters related to pulmonary medicine, oxygen therapy, home mechanical ventilation, pulmonary rehabilitation and sleep medicine.

Mr. Porte has also worked closely with numerous medical and allied health societies in addressing matters on Capitol Hill and at the Centers for Medicare and Medicaid Services (CMS) to advocate for patient interests directly related to coverage and payment under the Medicare and Medicaid programs. He has also served as a contributing author to several books on respiratory care and written dozens of articles for various respiratory-related magazines.