

This month's Editor's Choice paper describes the results of a survey of COPD subjects regarding their knowledge, attitudes and practices of inhaled drug delivery devices. Dhand and colleagues distributed an online survey to a group of COPD subjects who use inhaled medications. They obtained 254 responses from a balanced gender population with a mean age of 62 years. While just over three-quarters of subjects stated they understood their disease and available treatments well, less than half knew the symptoms of COPD. Surprisingly, only 43% of subjects ever used a pressurized metered dose inhaler (pMDI) or dry powder inhaler (DPI), and small volume nebulizers (SVNs) were preferred over other devices by subjects who had used them. Subjects described SVNs as easy to use, fast acting and essential for treatment. Overwhelmingly, subjects expressed the desire for greater education on their disease and use of inhaled drug delivery devices.

The authors publish an accompanying paper evaluating the knowledge and practices of pulmonologists. In this online survey, 80% of the 205 respondents felt very knowledgeable about COPD management and use of medications. In concert with the subject findings, 70% of providers believed that SVN was more effective in severe COPD than either pMDI or DPI. Importantly, few of the respondents knew about teaching patients about device use and maintenance. Becker considers these papers together in an editorial detailing the importance of educating COPD patients toward self-management. Educated patients adhere more closely to regimens and help reduce costs. Becker describes the issues of training clinicians who teach patients and providing the necessary time for this interaction.

Koyama and colleagues report on a bench study of inspiratory pressurization during pressure control ventilation in a lung model. Using 5 current ICU ventilators they simulated a series of inspiratory efforts across the range of pressurization settings. Their main findings were that the same parameters on individual ventilators resulted in widely different pressurization rates. This has implications when deciding on parameters for reducing patient work of breathing. Chatburn pens an accompanying editorial outlining the pitfalls of lung model studies and describing what these studies can tell realistically us about device performance.

Aggarwal and others evaluated patient satisfaction scores in asthmatic subjects using pMDI and DPI. In their analysis, subjects using pMDIs had better treatment adherence and satisfaction scores compared to DPI users. Given the first two papers in this issue, readers should consider if the education with newer DPI devices might account for these differences.

Ventilator triggering systems have become exquisitely sensitive with changes in technology. In fact, there have been a number of reports of cardiac triggering in apneic patients. Glauco and co-workers describe an evaluation of triggering, while modeling cardiac oscillations in the airway pressure waveform. This study demonstrates the sophistication of current lung models and the range of problems which can be simulated. They demonstrate that the optimum trigger is not the most sensitive, but a setting that avoids auto-triggering while maintaining appropriate trigger response.

Bedside, portable, lung ultrasound has been touted as a method for monitoring and evaluating respiratory function across a range of conditions. Antonio et al describe a 2-year study of lung ultrasound prior to SBT. Their study focused on the presence of bilateral B lines as an arbiter of SBT success. In this study of 250 SBTs they did not find that the addition of lung ultrasound predicted on B-pattern predicted SBT success. Ultrasound provides a wealth of data and future studies should perhaps include this

information in decision making related to ventilator discontinuation.

Marcondi and colleagues describe the acute effects of NIV on tissue perfusion in subjects following coronary artery bypass grafting surgery. They compared lactate and central venous oxygen tension in 100 subjects intraoperatively, during invasive ventilation in the ICU, following extubation, and after an hour of NIV. There were differences associated with all 4 scenarios. The use of NIV decreased lactate and improved central venous oxygen tension in this group of subjects with left ventricular dysfunction compared to spontaneous breathing.

High flow nasal cannula (HFNC) for oxygen delivery has seen widespread adoption in recent years. Valencia-Ramos et al compared aerosol delivery via HFNC to standard delivery using a jet nebulizer via a face mask on subject comfort and satisfaction. Subjects with bronchiolitis receiving HFNC had increased satisfaction and comfort scores. This study did not address efficacy or adverse effects.

Miller and colleagues survey AARC members and Children's Hospital Association members regarding HFNC practices. Sixty-three responses were obtained, 98% of which stated they used HFNC. Perhaps not surprisingly, there was not consensus on HFNC definition, initial flow, or subsequent adjustments. Aerosols were delivered via HFNC by 75% of respondents. This report highlights how rapid adoption of therapies which have not been adequately studied lead to wide variations in practice and unanswered safety concerns.

Transcutaneous carbon dioxide (P_{tcCO_2}) and oxygen (P_{tcO_2}) monitoring has been used in the NICU for over four decades. Injuries due to high electrode temperatures often limit application in extreme prematurity. Jakubowicz et al describe the use of electrode temperatures from 38-42°C in a group of premature neonates. They report that electrode temperature as low as 38°C provided an accurate assessment of P_{CO_2} compared to 42°C. P_{tcO_2} trended P_{aO_2} but did not accurately predict it.

Lambert and colleagues perform a retrospective review of the correlation between P_{tcCO_2} to CO_2 values obtained by arterial blood gas (ABG) and capillary blood gas (CBG). In 912 paired measurements from 34 subjects, they found that CBG comparisons showed less variation and a slightly lower correlation with P_{tcCO_2} than did ABG. After accounting for serial measurements per subject, the wide limits of agreement and poor repeatability, the authors suggest that relying on P_{tcCO_2} readings to predict P_{aCO_2} is questionable.

Electronic cigarette use has been touted as an alternative to traditional cigarettes, perhaps even as a smoking cessation aid, while others have warned that e-cigarettes might be a gateway to and equally as dangerous as traditional smoking. Martinasek and colleagues surveyed undergraduate students on e-cigarette use and attitudes toward use. There were 508 respondents (approximately half) who used e-cigarettes. Students perceived e-cigarettes as less harmful than traditional cigarettes, but these were rarely used as a smoking cessation tool. These findings demonstrate that e-cigarettes are primarily a secondary source of tobacco for poly-tobacco users.

Menezes et al provide a systematic review of interventions aimed at improving respiratory function after stroke. They identify 5 interventions to improve respiratory function after stroke. They report that respiratory muscle training is effective for improving inspiratory and expiratory strength, lung function, dyspnea, and activity. The review failed to demonstrate any efficacy of aerobic, breathing, and postural exercises, or the electrical stimulation in respiratory function.