Science and Clinical Potpourri for Your Life and Your Practice

The LMA: Development and Preliminary Trials of a New Type of Airway

An example of a truly sentinel paper was that of AL Brain et al who described the laryngeal mask airway (LMA) as a “radically new solution to the problems of airway management.” The majority of those of you reading this were not practicing at the time of its publication, but it, and many that followed in its wake, was to change the landscape regarding the way that anesthesia providers managed both the routine and difficult airway. Brain’s original device and hand-rendered illustration of the proper placement of the LMA are interesting and thought provoking. Brain et al wrote, “it may offer the advantages of tracheal intubation, and avoid the problems attending this procedure.” It seems doubtful that even Brain, confident in the device’s potential, imagined the impact that his work would have on the field. Revisiting the historical basis for what we do every day, and all too commonly take for granted, can take you on a surprisingly intriguing voyage.

Association Between Wait Time and 30-day Mortality in Adults Undergoing Hip Fracture Surgery

Many of us commonly provide intraoperative care for patients (primarily older patients) who have fallen and fractured a hip. Practice varies greatly from one locale to another in terms of type of anesthesia, and while surgical technique is fairly standardized, the “wait time” to perform surgical operative care varies in a surprising way. Many of these patients have co-morbid conditions such as high blood pressure, diabetes, cardiovascular disease and as noted, are often elderly and may be frail. While the reason(s) for delaying surgery are many, how long is it reasonable to delay surgery? This study used sophisticated risk-adjustment procedures and propensity score analysis (a kind of method where a retrospective study is adjusted to forecast “what if we had randomized the patients?”) in almost 14,000 patients. The take away message: those operated in less than 24 hours of injury had a lower 30 day mortality (5.8% vs 6.5%) and a lower composite group of complications (10.1% vs 12.2%) than those operated on beyond the 24 hour threshold. The authors encouraged attempting to achieve the goal of early surgery.

Dysfunction of NaV1.4, a Skeletal Muscle Voltage Gated Channel in Sudden Infant Death Syndrome
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Sudden infant death syndrome (SIDS) is the leading cause of post-neonatal infant death in high-income countries. Placing infants to sleep in a prone position is associated with a higher risk of sudden death but many other unidentified risk factors remain. This study is the first to explore the role of direct failure of the muscles of respiration due to dysfunction of the skeletal muscle ion channel NaV1.4 in the pathogenesis of SIDS. The work points to a genetic mutation causing a dysfunction in the management of low oxygen levels in the infant’s blood, altering the shape of the sodium pump that maintains appropriate electrical activity to stimulate muscle contraction. Previous work has pointed to another genetic mutation, this one in the heart. The researchers of the current study examined the cases of 278 children who died unexpectedly and were diagnosed with SIDS, 84 from England and 194 from the United States. Once they had sequenced the victim’s genomes, these were compared to those of adults without cardiovascular, neurological or respiratory pathology. This work is just one example of the exponential increase in the search for genetic clues to diseases and conditions that challenge human life. Stay tuned as there is likely much more to come.
as researchers attempt to unravel the mysteries surrounding the horror of SIDS.

**Global Food Security and Wellness**

Chapter 19: “Mitigation of Acrylamide Formation in Highly Consumed Foods”  

Starbucks lovers beware?  
Acrylamide is a compound created when certain foods are cooked at very high temperatures for a prolonged period. In animal models the chemical has been shown to produce tumors in a variety of organs including the thyroid, lungs, adrenals, and testes. Acrylamide is labeled as a potential occupational carcinogen by the US government. Acrylamide is also produced as a byproduct in the roasting of coffee beans. Recently a not-for-profit group sued almost 100 coffee retailers, including Starbucks, on the grounds that each was breaking a California law that mandates that companies must warn consumers of chemicals in their products that might cause cancer. A California judge ruled that those companies producing coffee did not show that their coffee posed no significant health risk, while noting that the group raising the concern did show that acrylamide may be a health risk. In the words of the judge (Elihu Berle), “Defendants (ie, coffee retailers) failed to satisfy their burden of proving by a preponderance of evidence that consumption of coffee confers a benefit to human health.” We seem to be reading on an almost weekly basis about pros and cons of coffee, wine, eggs, vitamin D and a variety of other dietary items and supplements. Not uncommonly, research that directly conflicts with previous work is encountered. Coffee has become particularly controversial, especially with these latest concerns, because of the growing literature that suggests strong health benefits and even reduced mortality. So what are we to do? Stop drinking coffee? Replace coffee with tea? Some studies have shown that hot tea can wreak havoc (including esophageal cancer!) in the body, and what about that caffeine that’s found in most teas? Perhaps this will play out more definitively as the coffee suit marches through the California courts with appeals by the coffee retailers likely. And perhaps just being aware that the discussion is going on will help us to be more informed to the potential risks associated with whatever it is that we choose to drink.

**Structure-based Discovery of Opioid Analgesics with Reduced Side Effects**


The quest to produce clinically relevant analgesia without side effects has proven to be an extremely elusive goal. In the current climate of the opioid epidemic affecting the United States (and other countries as well) this goal has recently achieved even more aggressive attention. Medicinal chemists and pharmacologists are working in a domain known as “biased opioid agonists” and seem to be pursuing a line of inquiry with reasonable potential. Agents in this category activate G-protein mediated pathways that are associated with desirable analgesic effects yet avoid, or only partially activate, beta-arresting pathways that are linked to opioid side effects. One emerging compound that has been developed using synthetic chemistry procedures is known as PZM21, an agent that appears to initiate strong analgesia yet causing little respiratory depression and minimal effects on the gastrointestinal system. Another synthetic molecule labeled TRV130 has also been shown to possess similar, favorable properties. The chemistry of producing analgesia and reducing (or even eliminating) side effects is complex with many challenges that will need to be overcome. Stay tuned as this important domain of work continues to evolve.

**Cancer Researcher at The Ohio State University Resigns Following Multiple Misconduct Findings**


What causes an investigator to falsify research findings or engage in scientific misconduct? The answer to those troubling questions are not always apparent, but appear to be happening with greater frequency than ever before. Or perhaps detection of misconduct is getting better. The most recent sobering example comes from The Ohio State University involving cancer scientist Ching-Shih Chen who was found guilty of “deviating from the accepted practice of image handling and figure generation and intentionally falsifying data.” The misconduct involved 14 different instances in 8 published papers. Chen was ordered to retract the papers immediately. The concerns were first raised about Chen’s work in 2016, and what followed was that the more the investigators sought out, the more concerns were found. Chen resigned from OSU in September 2017 and one month prior to that he resigned from a dual appointment at The Institute of Biological Chemistry in Taiwan, where he was director.

Misconduct can have a far-reaching effect in biomedical research, as patients may be exposed to therapies that have wrongly been marshalled to the patient’s bedside. While OSU ruled that “patient safety was never compromised,” most of us read these reports and simply wonder how anyone could engage in this kind of egregious violation of scientific and moral
principles. Research misconduct, especially where it involves possible treatment decisions for a patient, is a serious crime and those who commit such egregious acts should be held strictly accountable.

Prevalence of Needlestick Injuries, Attitude Changes, and Prevention Practices over 12 years in an Urban Academic Hospital Surgery Department


Most of us have seen a surgeon or his or her assistant experience a needlestick injury during the intraoperative care of a patient. Some of us have experienced such an injury ourselves. We know that occupational exposure to bloodborne diseases such as Hep B, Hep C, and HIV from a needlestick injury can be life-changing and thus understanding the genesis of these injuries and how best to prevent them should be of interest to all of us. The most recent data from the CDC notes that some 385,000 sharps injuries occur each year to healthcare workers; that's about 1,000 taking place every day! Especially in cities, where care is provided in an academic center, the prevalence of bloodborne diseases such as those noted above is quite high. In this study, needlestick injury prevalence protection practices, and attitudes were assessed in 358 medical students and 247 members of the surgical staff including nurses, in a very busy, urban academic setting. While the survey response rate was only about 25%, 38.7% of the respondents reported at least one needlestick injury, the most careless etiology was “careless/accidental.” Of great concern was that needlestick injury prevalence increased from medical students (22%), nurses (51%), residents (74%), to fellows (100%). Over the 12-year period, attitudes regarding needlestick injury evolved, with concerns for contracting a bloodborne pathogen significantly decreased compared to work done in 2003. Needlestick injury is common, but at least among medical students seroconversion may be underestimated as fewer now receive the Hep B vaccine. Rigorous education and training seems warranted. The risk is real.