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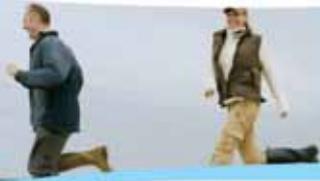
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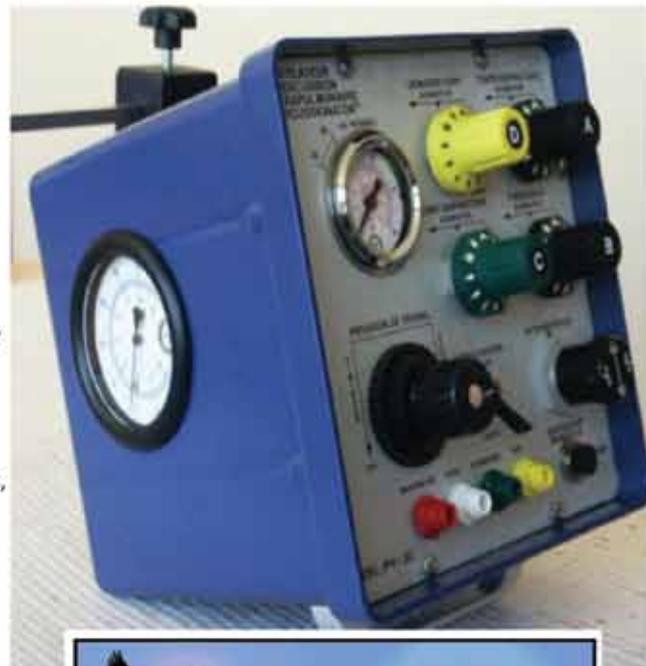
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The Importance of Case Studies in Respiratory Therapy: Sharing What We Do and What We Know

Jason Nickerson, RRT, FCSRT, PhD(c)

Bruyère Research Institute, Ottawa, ON

The presentation of case studies is an invaluable means of sharing the challenges, successes, failures, and lessons learned in the practice of clinical medicine. As clinicians encounter new or unusual cases in their practice, it is important to have an understanding of how others have provided or adapted care for similar patients, and these cases often provide a starting point for new, more structured evaluations of interventions.

The practice of respiratory therapy is no exception: as clinicians, we are often faced with new challenges that require us to be adaptable to meet the needs of our patients through new models of care, the adaptation of equipment, and the development of treatment protocols. In many ways, respiratory therapists pride themselves on their ability to integrate this flexibility and adaptability into clinical practice. This is undoubtedly something that respiratory therapists should be celebrating. More importantly, this flexibility and ingenuity is something that should be shared so that others can learn from the experiences of others.

The fundamental goal of the Journal is to function as a vehicle for knowledge translation. The Journal seeks submissions that advance the science and practice of respiratory therapy and respiratory care, which can range from randomised controlled trials to case studies from frontline clinicians. The latter of these – case studies – provide an excellent opportunity for respiratory therapists to contribute to the scientific literature while gaining a sense of the peer-reviewed publication process.

Clinical case studies provide the opportunity for readers to gain an understanding of how different departments



operate, how new or ambitious interventions are deployed for common respiratory problems, and how difficult clinical situations are managed through novel approaches to patient care. These articles allow clinicians to reflect on how patient care was provided, and to offer guidance to others who may face similar challenges. By sharing these experiences, we continue to build on the practice and science of respiratory therapy and will help to continue to develop the profession in new directions.

In this issue of the Journal, we are pleased to be presenting one such case study involving the use of Health Canada's Special Access

Programme to obtain a specialized tracheostomy tube. The author discusses the clinical circumstances that necessitated this approach, as well as the process through which the Programme was accessed.

We are also pleased to be able to present the abstracts of the poster presentations that were submitted to this year's Canadian Society of Respiratory Therapists Annual Education Conference in Niagara Falls. These abstracts present a diverse range of projects, including clinical research, quality improvement, and literature reviews.

The coming months will see some major changes for the Journal as we shift our publication model to include a stronger emphasis on our online presence. The submissions process has already been moved to an online platform, and we will be continuing to grow the journal in new directions throughout the summer and fall. As always, we value your contributions and support in furthering the science of respiratory therapy.

L'importance des études de cas en thérapie respiratoire : diffuser ce que nous faisons et ce que nous savons

Jason Nickerson, RRT, FCSRT, PhD(c)

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La présentation d'étude de cas est une façon incomparable de communiquer les défis, les succès, les échecs et les leçons apprises dans la pratique de la médecine clinique. Lorsque les cliniciens rencontrent de nouveaux cas ou des cas inhabituels dans leur pratique, il est important de comprendre comment d'autres ont assuré les d'autres patients similaires ou les ont adaptés; par ailleurs, ces cas offrent souvent un point de départ à de nouvelles évaluations, plus structurées, des interventions.

La pratique de la thérapie respiratoire n'échappe pas à cette règle : à titre de cliniciens, nous sommes souvent confrontés à de nouveaux défis qui nous demandent de nous adapter pour répondre aux besoins des patients par de nouveaux modèles de soin, l'adaptation de l'équipement et l'établissement de protocoles de traitement. De bien des façons, les thérapeutes respiratoires s'enorgueillissent de leur capacité d'intégrer cette souplesse et cette adaptabilité à la pratique clinique, et à juste raison. Par contre, il est important que cette souplesse et cette ingénuité soient connues, afin que tous puissent apprendre de l'expérience des autres.

L'objectif fondamental du Journal est de servir de véhicule de transmission des connaissances. Le Journal recherche des communications qui font progresser la science et la pratique de la thérapie respiratoire et des soins respiratoires, ce qui peut aller des essais cliniques randomisés jusqu'aux études de cas produites par les cliniciens de première ligne. Cette dernière approche – les études de cas – offre aux inhalothérapeutes une excellente occasion de contribuer à la documentation scientifique tout en apprenant à connaître le processus de publications jugées par les pairs.

Les études de cas cliniques permettent au lecteur de comprendre comment fonctionnent d'autres services, comment de nouvelles interventions ambitieuses sont mises



en œuvre pour des problèmes respiratoires communs et comment certaines situations cliniques difficiles sont gérées grâce à de nouvelles approches des soins aux patients. Ces articles permettent aux cliniciens de réfléchir sur la façon dont les soins ont été donnés aux patients et fournissent des orientations à d'autres qui peuvent être confrontés à des défis similaires. En faisant part de ces expériences, nous continuerons à développer la science et la pratique de la thérapie respiratoire et aiderons à pousser la profession dans de nouvelles directions.

Dans ce numéro, nous avons le plaisir de présenter une de ces études de cas, qui porte sur le recours au Programme d'accès spécial de Santé Canada pour l'acquisition d'une canule de trachéotomie spécialisée. L'auteur aborde les circonstances qui ont nécessité le recours à cette approche ainsi que le processus d'utilisation du programme.

Nous avons également le plaisir de présenter les résumés des présentations par affiches faites au Congrès éducatif annuel de la Société canadienne des thérapeutes respiratoires à Niagara Falls. Ces résumés couvrent un large éventail de projets portant notamment sur des études cliniques, l'amélioration de la qualité et examens documentaires.

Le Journal subira des transformations majeures au cours des prochains mois, alors que nous ferons évoluer notre modèle de publication pour mettre davantage l'accent sur notre présence en ligne. Le processus de dépôt des articles a déjà été transféré sur une plateforme en ligne, et nous continuerons de faire évoluer le Journal dans de nouvelles directions tout au long de l'été et de l'automne. Comme toujours, nous apprécions votre contribution et votre à l'évolution de la science de la thérapie respiratoire.

Case Study: How Health Canada's Special Access Programme Facilitated Patient-Centred Care for a Tracheostomy Patient

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ABSTRACT

In order to obtain a specialty tracheostomy tube for a patient, Alberta Health Services accessed Health Canada's Special Access Programme. This case study reviews the background behind the need for the specialty tracheostomy tube; the process to identify an appropriate vendor; the communication between Health Canada, Alberta Health Services staff, the vendor, and the patient; and an overview of the process and outcomes.

RÉSUMÉ

Cette étude de cas porte sur le processus d'utilisation du Programme d'accès spécial (PAS) de Santé Canada afin d'obtenir une canule de trachéotomie spéciale pour l'un de nos patients. L'étude de cas examine le besoin d'une canule de trachéotomie spéciale, le processus de recherche d'un fournisseur approprié, la communication avec le personnel de Santé Canada et d'Alberta Health Services ainsi que la documentation donnant un aperçu du processus et des résultats.

INTRODUCTION

Patient-centred care is a practice that focuses not on what we feel is best for the patient, but what the patient and team agree is the best for the patient. Sometimes this is simple to do. At other times, this can seem very difficult. The key in many of these instances is remembering that the "team" is not always those people in your office, or even your city, but people that can be found in many other places. The following is the experience of the patient-centred care that ensued with the assistance of Health Canada's Special Access Programme (SAP) [1].

The SAP is run through Health Canada and oversees the process of assisting clinicians to obtain medically necessary equipment and drugs that are not currently approved by Health Canada. Anything used medically must be approved by Health Canada in order to be purchased and used anywhere in Canada—this is not a provincially designated responsibility. Health Canada established the SAP recognizing that in certain circumstances, available options are not suitable for best patient care.

BACKGROUND

Patient consent was obtained prior to developing this case study.

The patient had been admitted with respiratory failure secondary to upper airway obstruction. Two separate emergency department visits earlier in the year for shortness of breath preceded the respiratory collapse at his home. Structurally, severe kyphosis had, over the previous two years, caused him progressive difficulty swallowing. This situation was resolved with the placement of a percutaneous endogastric feeding tube, which he dealt with expertly at home. Upon

investigation, he was rapidly sent to the operating room for placement of a tracheostomy tube. The tube had been chosen for its flexibility and armour, but a tube with an inner cannula was unavailable. Once the immediate post-surgical period had passed and the patient was stable, he was transferred from the intensive care unit to the pulmonary nursing unit.

Ongoing education for care of his site and tracheostomy tube proved very simple. This gentleman was more than eager to care for himself, and rapidly became proficient. The stoma site was healing nicely. Planning started for discharge; however, there was the issue of having a single lumen tracheostomy tube in a patient with a difficult airway. The tube itself was problematic in this situation—ongoing bleeding caused narrowing of the inner lumen. ENT services reviewed the patient and his airway regularly, and determined the tube itself needed to be removed for cleaning.

There was initial discussion about having a respiratory therapist, and ultimately the patient, learn this process. Staff therapists routinely change and downsize tracheostomy tubes, and senior clinicians are extremely skilled with these patients. However, there was great concern about the tracheal structure in this case, and current policy states that respiratory therapists only remove or replace low-risk airways [2]. It had been noted numerous times in the patient's chart by a number of specialties that this was a most unusual airway, and not in the low-risk end of the spectrum. Concern arose regarding the contradiction of policy and patient need.

Upon reviewing the chart, diagnostic imaging, and discussing the situation with the College of Respiratory Therapists of Alberta (CARTA), it was determined that this situation was much higher risk than was acceptable for staff

therapists to take on. The tracheostomy tube needed to be removed and cleaned approximately twice to three times a week, making home discharge unlikely, if not hazardous. Neurosciences staff were consulted with the possibility of surgically supporting the cervical vertebrae, and reducing the amount of soft tissue displacement. This was not an option that they considered acceptable. This left the team with no recourse but to discharge the patient with an artificial airway.

IDENTIFYING A VENDOR

In Canada, there is currently no tracheostomy tube that is armoured, flexible, and has an inner cannula. As mentioned previously, all medical devices, from contraceptives to ventilators, must be licensed through Health Canada and meet their requirements for sale and distribution [3]. Manufacturers and distributors must apply for this licensing for each and every individual model. This impacts what is available in the Canadian market, as a company is not likely to apply for a Health Canada license for a device they wouldn't have a market for.

This meant that the team needed to explore outside options. The team is critical to patient care—collaboration, and collective wisdom and transparency are the key characteristics to ensuring patient safety and best practice. Many connections established in the past allowed a broad review of possibilities and options for this case. Initial research in ICU came up with the Bivona® tracheostomy tube (Smiths Medical North America, Norwell Massachusetts) [4] This tube was armoured and flexible but, being a single lumen tube, it left no way to clear secretions without removing the entire device. This was not an optimal situation—review of the sagittal CT scan demonstrated no image showing any contiguous length of airway.

Contact was made with provincial colleagues through the Provincial Professional Practice Leader regarding possible products or any contacts with vendors or distributors. The vendors contacted were consummate professionals throughout—they suggested ideas, contacts, and phone numbers that they had, even knowing that they did not have the desired product in their stock. The supply management manager suggested a Google search, which turned up exactly one possibility—the Rusch Trachflex Plus (Teleflex Medical Europe, Ireland). It was armoured, flexible, and had the inner cannula needed.

Reading done for a previous project (with a group of respiratory therapists across Alberta regarding the appropriate length of time elapsing between tracheostomy tube changes) led us to the Medical Devices Bureau of Health Canada. The Medical Devices Bureau holds licenses, reviews the clinical documentation, studies the devices, and issues statements if there are patient concerns, equipment failures, or recalls. Drugs are given special release for compassionate reasons—the question remained as to whether the bureau would release a device, such as

the Rusch Trachflex Plus. A request for assistance was submitted via their contact email.

COMMUNICATION

Health Canada

A call was received from the SAP agent. She was very encouraging and provided detailed guidance through the process for application to get the tracheostomy tube released. This situation was precisely why the SAP was set up.

Part of the process of obtaining an SAP release is the vendor/manufacture providing as much information as possible about the device: current clinical use, trials, results, sales, product specifications, and a host of other variables. Using an unlicensed device means that the risk is much higher to the patient: as respiratory therapists, we deal with tracheostomy tubes routinely but the approved devices have met Health Canada approval. They have been deemed safe to use on patients, and there are checks and balances in place to ensure that manufacturing standards are consistently met. Health Canada also issues alerts for problematic medications and devices, alerting consumers (healthcare institutions and practitioners) to unacceptable risks or identified concerns. Without a medical device license, there is no Canadian standardization. No other practitioners are using the product. There are no indicators of possible change in risk as there may be if reports are sent in regarding other patients' experiences.

The Vendor

The Rusch Trachflex Plus is manufactured by Teleflex Medical [5] in Europe, so there were initial complications working with them here in Canada. This was a new experience for them as well. Their counterparts in the United States (who do sell the Trachflex) were not engaged to work on this project, so the Canadian sales staff needed to go directly to the European group. They were concerned that they wouldn't be able to come up with all the necessary information in a timely fashion, that they didn't have the resources, and they didn't have all the documents they needed. The Canadian sales director was contacted and alerted to the situation—she very quickly became a Teleflex advocate for this process.

Once the right people in the appropriate roles were alerted, documents came at a furious pace. All told, there were eight emails with multiple zipped files attached for Health Canada's reference.

Alberta Health Services

Health Canada now had their information, and the process was initiated. The concern now became ensuring that the product could be used within Alberta Health Services. Initially, all contacts were unaware of the SAP. Many of them did wish to learn more about it and requested further information once the project was complete. Alberta Health Services Ethics and Legal department was clear that the patient needed to be aware of the risks and benefits to all options.

The Patient

The patient had been involved since the outset, and a meeting held once or twice a week to discuss progress. He was very pleased, as he was not comfortable with the concept of removing and cleaning his current tracheostomy tube at home. Discussions regarding what the available options were, what the risks and benefits were for each were occurring regularly. He was comfortable signing a consent form indicating his understanding. He was willing to meet with the representative with Teleflex as well, permitting the company to understand the consequences to this project. Discussions also allowed him to be aware of what other staff were discussing, and be able to collaborate with his family physician in the plans.

An amazing journey was made through conversations—from CARTA through the Ethics and Legal Departments, to Senior Vice Presidents, and finally to the Calgary Zone Contracting, Procurement and Supply Management office. Everyone involved were more than happy to assist to ensure that there would be a smooth transition from the manufacturer to the hospital. At this point, many doors started to open. I became aware that purchasing managers are routinely involved in special access purchases (most commonly for pharmaceuticals), and that there is a group that is strictly involved with clinical standardization and supply.

This was the breakthrough point—documentation was completed, and within a week the tubes arrived. The patient went home within another week, once other supports such as home care and community respiratory therapy was put into place. The patient handled this with the great skill and aplomb that I knew he would, and is back in his own home doing the things he normally would. His dog is very happy as well.

CONCLUSION

The SAP permits any licensed health care professional to submit requests. Most commonly this is a physician, but it is not a rule. An SAP request is good for a single request only, and only for one month's supply. A new request is required to re-order anything regardless of previous requests.

Ensure that you have done your research, and work with the vendors. The vendors were more than generous. They were very clear about what they did and did not have in their lines, and when requirements were detailed they provided competitor contact information quite readily. Health Canada will also require information on currently available products and why they are not suitable in your instance.

Setting up a process and knowing your team is also crucial. Understanding the larger system that your team is a part of makes the process much simpler for the next task. Share your information and learning whenever you can. Many of my colleagues in Calgary and Edmonton were not aware of this process, yet as licensed healthcare professionals are entitled to complete a request.

Being optimistic (but realistic), keeping options open, having a good sense of humour, and remembering the true goal—these go a long way when you are dealing with a difficult situation. Our ultimate goal with any patient situation is the patient's needs—it is important to always be very clear and continually request feedback with your patient and their family. Communication was key—ensuring that if assistance was not forthcoming, there were suggestions for other options. We all have some information—usually much less than we think we do. In some cases it is not what we know, it is who we know as well.

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REFERENCES

1. Health Canada. Special Access Programme for Medical Devices Fact Sheet. <http://www.hc-sc.gc.ca/dhp-mps/acces/md-im/sapmdfs_pasimfd-eng.php> (Accessed May 26, 2013).
2. Alberta Health Services, Calgary Zone, Respiratory Therapy Policy and Procedure Manual. CLIN-045, Tracheostomy Adult Patient: Tracheostomy Tube Change.
3. Justice Canada. Medical Devices Regulations, 2a) and 2b). <<http://laws-lois.justice.gc.ca/eng/regulations/sor-98-282/page-2.html#docCont>> (Accessed May 26, 2013).
4. Smiths Medical. Bivona Tracheostomy Tubes catalogue: <<http://www.smiths-medical.com/catalog/bivona-tracheostomy-tubes/>> (Accessed May 26, 2013).
5. Teleflex. Teleflex Europe, Middle East, Africa (note Tracheostomy Tubes). <<http://www.teleflex.com/en/emea/productAreas/airwayManagementRespiratoryCare/index.html>> (Accessed May 26, 2013).

Airway Management: A Primer - Part 1

Peter G. Brindley MD, Stuart F. Reynolds MD, Michael Murphy MD

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“Managing an airway” means different things to different practitioners. However, it is widely understood to mean ensuring an open breathing pathway (a.k.a. airway patency), protecting the lungs from aspiration (a.k.a. airway protection), and ensuring both oxygen delivery and carbon dioxide removal (a.k.a. oxygenation and ventilation). It should be no surprise that improper airway management is a significant cause of in-patient morbidity and mortality. Competence in this area should be considered an important skill. This simple primer will not create experts. However, we do offer practical tips to temporize, triage, and tackle the patient who has airway compromise.

There is more to airway management than just intubation. In this article, we cover the rudiments of positioning, airway adjuncts and bag-mask ventilation (BMV), and airway assessment. The supplemental topics of laryngoscopy, endotracheal intubation, extra-glottic devices, airway pharmacology, and post-intubation care will be covered in a later article (part 2) in this journal. As with all medical topics, there is no substitute for “hands-on” experience, ongoing practice, and well-honed team management skills.

AIRWAY POSITIONING: SNIFF THE AIR, BUT UNDERSTAND WHAT IT MEANS

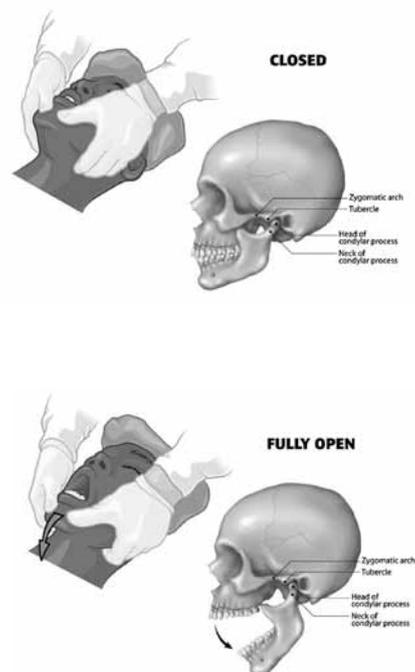
The optimal head position for airway alignment (and attempted intubation) has been traditionally described as the “sniffing position.” Practitioners should beware that many novices fail to understand what is implied. It describes flexion of the lower cervical spine, extension of the upper cervical spine, and positioning the tragus of the ear at least level with, or in front of, the sternomanubrial junction. This position may not be achievable all patients, for example, those with neck trauma. Fortunately, simple neck extension alone may be effective. Of note, recumbency may be also difficult in many critically ill patients (due to pulmonary edema or ascites). In these cases, patients can be positioned in a semi-Fowler’s or reverse-Trendelenberg position. The three aspects of airway positioning are especially important in obese patients, where the optimal position can be attained by using blankets, towels, or other devices. This can also be achieved by reconfiguring the normally flat bed (or operating room table) with flexion at the trunk-thigh hinge and raising of the back (trunk). Regardless, the importance of proper positioning explains why the impulse to remove pillows is inappropriate in adult patients. If pillows are removed due to concerns of excessive head-flexion, the use of rolled-up towels under the shoulder

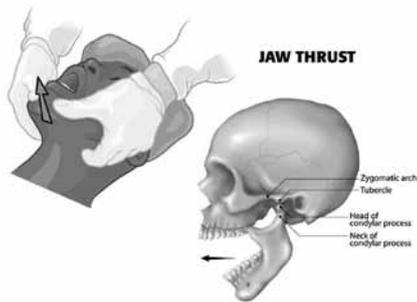
and occiput is recommended. Airway experts also recommend that unless clinicians intubate regularly (the exact number is unclear), they should defer to others if possible. As such, it seems prudent that internists focus on pre-oxygenation, BMV, and maintenance of airway patency.

AIRWAY PATENCY: KEEP YOUR OPTIONS “OPEN”

Patients may have an obstructed airway due to the presence of foreign bodies, infections, blood, vomit, trauma, or secretions. However, the medical patient is particularly at risk of closure of the pharynx due to inadequate tone and redundant tissue. Cautious efforts should be made to clear the airway, but deep suctioning can cause laryngospasm and precipitate obstruction. If the airway remains compromised, a head-tilt-chin-lift or jaw-thrust maneuver is recommended (Figure 1). If the patient has spinal pathology, then the chin-lift should be avoided but the jaw-thrust can still be used to open the airway. These manoeuvres work by increasing the distance between the soft palate and posterior tongue – the most common site of obstruction.

FIGURE 1. The anatomy of an optimum jaw thrust: disengaging the temporomandibular joint and “translating” the mandible forward. The tongue is attached to the mentum and the epiglottis to the tongue (via the hyoid), and both move forward with a jaw thrust.





If the airway remains obstructed despite a clear oropharyngeal space and a head-tilt-chin-lift/jaw-thrust maneuver, then the obstruction is likely more distal. It may also be the result of laryngospasm. This usually responds to gentle suctioning, cessation of overt airway stimulation, airway repositioning (again by the chin-lift or jaw-thrust), and gentle but persistent positive pressure by BMV. Oropharyngeal airways (OPAs) and nasopharyngeal airways (NPAs) can also be life-saving devices in order to maintain a patent airway. However, placing an OPA can be a noxious stimulus. It should therefore be cautiously placed, especially in lightly sedated patients. NPAs are somewhat better tolerated, but topicalization of the nasal mucosa with local anesthetic and vasoconstrictors is recommended in awake patients. The NPA is contraindicated in basal skull fractures or severe facial trauma. In rare instances, both an OPA and NPA may be required. Regardless, they should be sized to ensure that the distal end rests beyond the base of tongue, just above the epiglottis. If they are too long, they can cause laryngospasm; too short, and they are ineffective. Most clinicians size the OPA against the cheek, from the corner of the lips to either the angle of mandible or tragus of the ear. Alternatively, most adult females take an 8 cm and most adult males a 9 or 10 cm OPA. The OPA should be inserted with its concave side cephalad (i.e., inverted) and until resistance is felt. It is then rotated 180° (the concavity now faces caudal) until fully inserted to the lips. This technique minimizes the posterior displacement of the tongue, which could aggravate the obstruction. Adult NPAs are sized by internal diameter, with small, medium, and large corresponding to 6, 7, and 8 mm (6 mm for an average female, 7 mm for an average male).

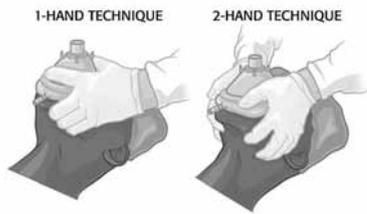
OXYGENATION AND BMV: VITAL SKILLS TO MAINTAIN VITAL SIGNS

In the critically ill patient, oxygenation is achieved passively by enriching the oxygen content of inspired gas via nasal prongs or a face mask, or actively via BMV (with or without a positive end-expiratory pressure [PEEP] valve). It can also be achieved by employing a non-invasive positive pressure circuit (e.g., continuous positive airway pressure [CPAP] or bilevel positive airway pressure [BiPaP]). When

the goal is to attempt active airway management, high oxygen concentrations are ideally delivered for several minutes in order to displace alveolar nitrogen and create an oxygen reservoir (de-nitrogenation or pre-oxygenation). Though patients with severe chronic obstructive pulmonary disease (type II respiratory failure) may rely upon a hypoxic drive, when facing possible respiratory arrest, it is more important to maintain an oxygen saturation of at least 90%. Therefore, oxygenation takes precedence and the critically ill patient should receive 100% oxygen. Clinicians should be cognizant of the potential for human errors: (1) mistakenly attaching the oxygen tubing to the neighboring medical air outlet; (2) attaching same to the suction outlet; (3) appropriately attaching to the oxygen outlet but without the oxygen flow-meter turned on; (4) letting the oxygen tubing sit on the floor or attached to an empty oxygen tank; and (5) causing inadequate oxygen flow as indicated by failure of the reservoir bag to inflate. Oxygenation (a.k.a. de-nitrogenation) is particularly important where patients have low functional residual capacity due to obesity, abdominal surgery, or lung de-recruitment.

BMV is a difficult skill. It requires a mask seal, airway opening, and assessment of oxygenation and ventilation. In order to size the mask, its lower border is applied to the groove between lower lip and chin, and the upper edge is placed on the nasal bridge (Figure 2). The clinician's thumb and index finger apply pressure to achieve a seal but without displacing the mandible posteriorly as this can cause airway obstruction. In contrast, the mandible should be lifted to meet and seal with the mask. This is done using the ring and long fingers to grasp the inferior surface of the mandible, and the fifth finger to exert upward pressure under the angle of the mandible. These fingers apply counter-pressure to the thumb and index finger. Of note, fingers should not be placed under the chin as this can compress the submandibular space. The clinician's opposite hand gently squeezes the BMV's self-inflating bag either upon inspiration (to assist the still breathing patient) or at a rate of approximately 10–15 breathes per minute and approximately 500 mL per breath. The clinician should then look, listen, and feel to identify a myriad of signs including (but not limited to) chest expansion and improving saturation and minimal air leak. BMV requires ongoing small adjustments to the position of the mask, the clinician's hand, and the patient's head. This requires experience and diligence and should therefore not be relegated to a less-skilled member of the team. It may also require more than one person, namely one to bag and another to maintain a tight seal and adequate lift on the mandible (with one or two hands). The need for BMV also means that the physician should be planning for transfer to the intensive care unit (ICU) and probable intubation.

FIGURE 2. During bag-mask ventilation, the mask's lower border is applied to the groove between lower lip and chin, and the upper edge is placed on the nasal bridge.



AIRWAY ASSESSMENT: TREAT ALL AIRWAYS AS IF THEY MIGHT BE DIFFICULT (BECAUSE THEY CAN BE!)

There are clues as to which patients will likely be more difficult to manage. When time permits, a rudimentary airway assessment is advised. The caveat is that these models were typically developed for patients in the operating room, and have not been widely validated in the ward, ICU, or emergency room. Independent predictors of difficult mask ventilation include obesity, a beard, a Mallampati score of III or IV, age >57 years, limited jaw protrusion, and a history of snoring. The independent predictors of impossible mask ventilation are a history of neck irradiation or sleep apnea and either a beard or Mallampati III/IV visualization. Risk factors for the combination of difficult or impossible mask ventilation and difficult intubation include Mallampati III/IV, an abnormal cervical spine, a thick obese neck, a thyromental distance <6 cm, a mouth opening of <3 cm, limited mandibular protrusion, snoring, sleep apnea, and obesity. Additional risk factors for a difficult airway include limitations in spinal movement (e.g., rheumatoid or osteoarthritis, spondyloarthropathies, trauma, even severe diabetes) and macroglossia (e.g., in hypothyroidism and Down syndrome).

While the Mallampati classification is useful in evaluating for difficult airway management, it was intended for patients undergoing elective intubation. Regardless, it consists of instructing a patient to sit upright and protrude his or her own tongue. The physician estimates how much of the posterior

pharynx and uvula can be visualized using a four-point system, from best (I) to worst (IV). Reasonable correlation exists between classes I and II and easy direct laryngoscopy. Similarly, classes III and IV suggest difficulty. Obviously, though, this is of limited use for emergency intubations or for the unco-operative or comatose patient. However, in preparation for intubation, any clinician can rapidly assess mouth opening (three fingerbreadths suggests adequate room for insertion and rotation of the laryngoscope blade) and thyromental distance (three finger breadths suggests adequate space for the laryngoscope blade to compress the tongue). The clinician can also perform a mandibular protrusion test (the conscious patient has the ability to protrude the lower teeth at least 1 cm, or to cover the upper lip with the lower incisors). Regardless, resuscitation should always be a team pursuit. (There really is no “I” in ICU!) As such, it seems appropriate to end with this advice: get help, and get help early.

ABOUT THE AUTHORS

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RECOMMENDED SOURCES FOR ADDITIONAL READING

1. Brindley PG, Simmonds MR, Needham CJ, Simmonds KA. Teaching airway management to novices: a simulator manikin study comparing the 'sniffing position' and 'win with the chin' analogies. *BJA* 2010;104(4):496–500.
2. Finucane BT, Tsui BCH, Santora AH. *Principles of Airway Management*, 4th edition. New York: Springer Press; 2011.
3. Hung O, Murphy MF. *Management of the Difficult and Failed Airway*. New York: McGraw Medical; 2008.
4. Kovacs G, Law JA. *Airway management in emergencies*. New York: McGraw Medical; 2008.
5. Neilpovitz D. *Acute resuscitation and crisis management*. Ottawa (ON): University of Ottawa Press; 2005.

The following abstracts were presented at the 2013 CSRT Education Conference in Niagara Falls, ON, May 30-June 1, 2013. These abstracts have not been peer reviewed.

— WINNING RT POSTER —

Evaluation of a practice guideline for the management of respiratory distress syndrome in preterm infants

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INTRODUCTION

The use of mechanical ventilation (MV) to treat respiratory distress syndrome (RDS) in preterm infants has been associated with the development of bronchopulmonary dysplasia (BPD). To help minimize the use of MV, a practice guideline for the management of RDS in preterm infants was developed to include the INSURE (INtubate, SURfactant, Extubate) method. The INSURE method involves intubating preterm infants to facilitate surfactant administration followed by rapid extubation to non-invasive respiratory support. The practice guideline was implemented into practice in the NICU in February 2012.

PURPOSE

The purpose of this study was to compare rates of ongoing mechanical ventilation, surfactant use and the incidence of BPD before and after the guideline was implemented.

METHODOLOGY

A descriptive, retrospective one-year before and after study design was used to conduct the study. All inborn infants with a gestational age of 26-32 weeks born within the two-year study period who did not meet any exclusion criteria were included in the study (n=272). Preterm infants born in the one-year study period prior to the implementation of the guideline were compared to infants born in the one-year study period after. Data for the study was obtained retrospectively from the local NICU database.

RESULTS

After the implementation of the guideline, the use of MV was reduced from 49% to 26% ($P < .001$) and the incidence of BPD in survivors was reduced from 27% to 18%; however, this did not reach statistical significance ($P = .07$). The number of infants treated with surfactant was similar before and after the implementation of the guideline (54% versus 49%).

CONCLUSIONS

Implementation of this guideline significantly reduced the use of MV in preterm infants with RDS which may help to reduce the incidence of BPD in this patient population.

Can the strategy of utilizing an innovative technology in ventilation support of critically ill neonates result in the reduction of health care cost and be cost-effective?

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BACKGROUND

Increasing financial burden of healthcare by the utilization of new technological innovation was reported in several studies. Neonatal health Care is a prime example of the recent proliferation of more innovative technologies that promise higher standards of care.

OBJECTIVES

Through analyzing the daily weight gain of very low birth weight infants admitted to the neonatal Intensive care unit as they are ventilated by different modes, this study examined the economic effect of neurally adjusted ventilatory assist (NAVA), a new innovative technique in ventilating newborns. The daily weight gain—a major factor which determines the hospital length of stay and cost of hospitalization and an indicator of financial expenditure in NICU—was monitored and compared between two groups on very low birth weight (VLBW) infants ventilated by using the new innovative technology and other traditional methods. This study also examined the strategic decision of utilization NAVA in neonatal ventilation as a profitable financial investment over the lifespan of the NAVA machine, and its effects as a differentiated strategic investment in future of neonatal healthcare.

METHODOLOGY

A retrospective analysis of inpatients hospital electronic medical records using one sample pairwise t-test statistical technique was performed to compare the patterns of weight gain in seven very low birth weight infants who were consecutively ventilated by the conventional and NAVA. The aim of this study was to demonstrate the beneficial financial effect of implementing the new technology in the NICU, and to analyze the financial results of its clinical utilization by focusing on cash flow and long term profitability and cost-effectiveness.

RESULTS

A trend of favorable effect of NAVA over conventional ventilation was demonstrated regarding weight gain of VLBW infants, which reflect a financial savings by shortening the length of stay at the hospital and subsequently the overall hospital cost. A positive net cash flow is demonstrated to be achieved within four years of utilizing this technology, with increasing cumulative profits throughout the machine lifespan. A cost utility analysis measured the incremental cost efficiency ratio (ICER) calculated by cost/quality adjusted life years gained (QUALY) demonstrated a value which is lower than several international thresholds for health care interventions.

CONCLUSIONS

This study presented the first insight on the financial impact of implementing a new technological innovation in the neonatal intensive care unit by comparing the daily weight gain on NAVA technology compared to the traditional methods of ventilation, in addition to illustrating the financial results of investing in this new technology in terms of cash flow and strategic differentiation in the neonatal ventilation market. Since there are no published evidence on NAVA financial impact in the NICU, this study attempted to provide better understanding of the importance of decision making in implementing this new technology in caring for the VLBW infants. By studying this impact further in larger prospective studies, looking variable factors that may affect neonatal growth, researched can develop more understanding of the effect of this technology on nutrition status and growth.

METHODS

The study included rural COPD patients who were referred to a 12-week pulmonary rehabilitation program consisting of education, exercise, and optimization of pharmacotherapy. Participants were followed via maintenance groups and/or home visits for up to one year. Assessments were scored using the comprehensive BODE (body mass index, obstruction, dyspnea, exercise capacity) index. Reassessments were performed at three months. Comparisons were made between baseline and post-program results to determine changes to measured values. There were 30 participants enrolled in the rehabilitation program. The average age was 75.1 years with 53% female.

RESULTS

The initial mean BODE index was 3.46 with a standard deviation of 1.90. The mean three-month follow-up BODE index was 2.57 with a standard deviation of 1.68. This was a statistically significant decrease of 0.88 ($p < 0.001$), indicating that the pulmonary rehabilitation program produced beneficial outcomes among the participants at twelve weeks. Overall, 20 of the 30 participants showed at least a one-point decrease in their post-treatment BODE score.

CONCLUSIONS

To assess the full benefits of this 12-week rehabilitation program, further evaluation will be conducted among the thirty participants. However, the results observed to date demonstrate that COPD can be managed effectively in the rural setting using a pulmonary rehabilitation program.

Every breath you take: Successful pulmonary rehabilitation program for COPD in the rural setting

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INTRODUCTION

Chronic obstructive pulmonary Disease (COPD) is the fourth leading cause of death in Canada. Access to treatment, continuity of care, and effective self-management/pulmonary rehabilitation programs has been proven to be essential for the optimal management of COPD. Rural healthcare differs substantially from that offered in urban settings, potentially creating a new set of challenges.

OBJECTIVES

This study attempts to demonstrate that COPD can be managed effectively in the rural setting.

Respiratory therapy care across the continuum: RT role in complex continuing care

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ABSTRACT

With the integration of Toronto Rehabilitation Institute (TRI) into the University Health Network (UHN) an opportunity to incorporate Respiratory Therapy services was recognized. The introduction of the RRT into the existing interprofessional team (IP) provided an opportunity to enhance practice and further interprofessional patient care.

OBJECTIVE

The Toronto Rehab Bickle Centre, consisting of 208 inpatient beds, provides rehabilitation and complex continuing care (CCC) and ~ 50 patients have tracheostomy tubes and complex respiratory care needs. Practices pertaining to tracheostomy care and respiratory management were already in place, and patients had been managed under the care of a strong IP team, but lacked the expertise of an RRT. Recognizing the complex respiratory needs of these patients and capitalizing on the hospitals' integration, a full time RRT role was introduced.

METHODOLOGY

An initial on-site environmental scan and needs assessment was conducted to determine respiratory equipment, current practices and gain an overview of the current and future patient care needs. Further consultation with the IP and leadership teams was used to ascertain their perspective of the respiratory needs of the patient population. The RRT role was phased in unit by unit, and included staff education and a full assessment of all patients to determine respiratory needs in consultation with the existing IP teams.

RESULTS

The RRT role encompasses specialized direct patient care, consultation and education to shape and support implementation of respiratory best practice. Successes to date include: revision of tracheostomy decannulation protocol, oxygen therapy education, establishment of role within ENT Clinic, code team member, and improvements to respiratory equipment and care delivery.

CONCLUSIONS

Since implementation of an RRT to the CCC setting we have seen enhancement of best practices in respiratory care and the ability to provide more complex respiratory management to meet the growing demands of this unique patient population.

Interfacility and interprofessional collaboration: Facilitating access to the appropriate level of care for patients who require bi-level non-invasive ventilation (NIV) for sleep disordered breathing

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INTRODUCTION/OBJECTIVE

Bridgepoint Health (BH) has been accepting patients who require nocturnal CPAP therapy and are self-sufficient in the management of their equipment. However, an increasing number of patients are diagnosed with moderate or severe forms of sleep disordered breathing and require more advanced treatment such as bi-level NIV therapy. The Toronto Western Discharge and Flow Team identified that patients who required bi-level NIV therapy did not meet the existing BH admission criteria and were denied access to rehabilitative or continuing complex care. A collaborative partnership arose between BH, Toronto Western Hospital (TWH) and St Michael's Hospital (SMH) to improve patient flow issues for this specific patient population. The objective was to facilitate access to the appropriate level of care for patients who required bi-level NIV therapy for sleep disordered breathing.

METHODOLOGY

The key stakeholders formed an interprofessional and inter-facility working group to identify the current state and barriers related to supporting the needs of patients who required bi-level NIV therapy for sleep disordered breathing. The project group developed policy and practice standards, a comprehensive admission form for BiPAP/CPAP patients, an e-learning module for nursing staff, and a process to ensure that the BH respiratory therapist provided ongoing support for this patient population.

RESULTS

Through collaboration and process change, patients who require bi-level NIV therapy for sleep disordered breathing are now able to transition through the continuum of care in a more timely, safe and supportive manner. Education was provided to BH clinicians regarding current clinical management of patients with sleep disordered breathing and bi-level NIV devices. This was a key factor in facilitating process change. To-date, there has not been a significant increase in the number of patients who require bi-level NIV admitted to BH. This is likely attributed to the fact that the sending facilities are not aware that BH now accepts this patient population.

CONCLUSIONS

For patients who require bi-level NIV therapy for sleep disordered breathing, there is now a potential to access rehabilitative and complex continuing care services. This project supports a model of care that addresses patients' needs and alleviates some of the burden on acute care resources. Our plan is to continue to evaluate the process changes and ensure that key stakeholders are aware of the changes to the BH admission criteria. We hope this project inspires other facilities to review their existing patient admission criteria and to make changes that will support patient flow throughout the continuum of the healthcare system.

An interprofessional approach to early mobilization for extra-corporeal support

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OBJECTIVE

The care of patients on extracorporeal life support (ECLS) is complex. Typically, patients are intubated, restricted to their bed with no opportunity for mobilization. Recent trends in intensive care practices focus on early mobilization of patients in order to prevent complications such as respiratory deterioration and muscle wasting. Our greatest barrier to promoting regular mobilization of patients on ECLS was the number of healthcare providers necessary to perform safe mobilization. Our objective was to incorporate an interprofessional approach to care that would result in the integration of early mobilization and pulmonary rehabilitation into the management of patients in an ICU.

METHODOLOGY

An interprofessional approach was used to develop a plan of care to optimize the mobility, rehabilitation, and activity of a patient mediastinally cannulated with a Novalung iLA[®] membrane. Input was provided by a diverse group of healthcare providers including respiratory therapists, physiotherapists and registered nurses, with the aim of optimizing the patient's opportunities for respiratory muscle training, and stimulation while preventing adverse events related to the ECLS membrane. With the use of an ICU mobilizer developed by this interprofessional group we safely secured all equipment necessary for both ambulation and wheelchair-mobilization for patients.

RESULTS

With the use of the ICU mobilizer, we were able to progress rehabilitation goals daily. We were able to wheel-chair mobilize effectively throughout the unit and out-doors. Improvements in strength, pulmonary function, activity level, and overall mood were achieved. Conclusions: An interprofessional approach to the early mobilization and stimulation of ICU patients supported with ECLS may minimize the risk of development of pulmonary sequelae such as pneumonia, lung segment collapse (atelectasis), and muscle wasting. The ICU mobilizer provides a safe and feasible way of mobilizing our patients, and utilizes minimal staff resources.

Changing tracheostomy tube material and utilizing silicone dressings healed this stoma: A case study

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ABSTRACT

Tracheostomy tubes are made of a variety of materials: plastic, silicone, stainless steel. Chronic wound infections and misshapen stomas are a complication of prolonged tracheostomy. Our goal was to see if a change in tracheostomy tube material in conjunction with stabilizing the tube could improve the condition of this stoma.

HISTORY

52-year-old male with diagnosis of MS decompensated requiring tracheostomy and prolonged mechanical ventilation. A number 6 Shiley tracheostomy tube was inserted. Over time, the stoma enlarged and the site was a constant source of infection; red, irritated skin at the stoma site, copious foul-smelling secretions, and bad breath. Routine 30-day tube change showed a black moldy substance on the shaft of the tube. The weight and constant movement of the ventilator circuit caused the stoma to become enlarged and misshapen; the cuff could be seen. The decision was made to place a 6 Shiley XLT tube with increased distal length to better seal the airway for mechanical ventilation. This patient weaned from the ventilator, but remained tracheostomized secondary to his weakened neuromuscular state. The stoma site continued to be a challenging wound, so the decision was made to change tube material and stabilize the tube.

OBJECTIVE

Our goal was to see if a change in tracheostomy tube material in conjunction with stabilizing the tube could improve the condition of this stoma.

METHODS

Size 8 Bivona TTS silicone tube was inserted and stabilized with a SilFlex TC Pad. This silicone pad was applied under the flange. Nothing else was changed in regards to his routine tracheostomy care or oral care.

RESULTS

Within three days the foul smell was gone, secretions had cleared, and the mucosa became a normal pink color. There was evidence of new healthy skin growth around the stoma. The patient noted less movement of the tube immediately and greater comfort. Other benefits noted were increased SaO₂, skin tone/colour, and LOC. After one month, routine tube change revealed a remarkably clean shaft of the tube, inside and out.

CONCLUSION

This single-patient case study demonstrated significant improvement in the tracheostomy stoma site when the tube material was changed to silicone and stabilized with the Sil.Flex TC Pad.

Respiratory therapists making safety a priority

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ABSTRACT

At St. Michael's Hospital, quality improvement has been adopted as a cornerstone of activity and one of the main corporate objectives. One of the key dimensions of quality which has been identified is safety. In order to ensure that the respiratory therapy (RT) department was in keeping with corporate objectives and doing our part to contribute to a culture of safety, the RT Safety Committee was initiated in April 2012. The committee's objective was to help identify risk factors, reduce the occurrence of adverse events, and create a safer environment for both patients and staff. Several safety concerns and issues have been identified and solutions have been implemented. These changes have helped provide standardization of care.

OBJECTIVES

The RTs at St. Michael's Hospital wanted to answer the question: How can RTs effect change in clinical practice to enhance patient safety? To facilitate this challenge, the RT Safety Committee was developed in April 2012. The committee consists of a core group of RTs. Membership is voluntary and open to all members of the RT Department. The committee meets every 2 months to discuss equipment and process issues that may have a negative impact on patient or staff safety. Strategies are brainstormed and implementation of solutions is completed.

METHODOLOGY

Committee meets every two months for a review of potential equipment and practice concerns. Current issues are discussed and ideas formulated for providing enhanced patient care and an improved work environment. Strategies and action plans are developed and initiated to address each issue brought forth. Implementation of new processes is collaborative with the units involved and information is shared amongst all staff. Monthly reports are submitted to the RT Practice Council. Results: To-date, 15 safety concerns and issues have been identified, and solutions have been implemented. These changes have helped provide standardization of care. Regular reports from the Safety Committee at RT Practice Council have helped inform and engage the staff with respect to the safety initiatives. The RTs are now playing an integral role in creating a safer healthcare environment for staff and patients. RTs are being empowered to improve the safety of patient care. Conclusions: By assessing our environment and current practice on an ongoing basis, RTs can anticipate and identify concerns to help keep our patients and staff safe. Recognizing potential flaws in delivery systems and implementing change may reduce the number of adverse events in our institution.

Using team huddles to enhance learning from unplanned extubations

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ABSTRACT

Endotracheal intubation is a common practice in critical care units and the sudden, unexpected, or unplanned dislodgement of an endotracheal tube is a serious adverse event that subjects the patient to potential harm, and even death. Limited information is known about the factors that place pediatric patients at risk of unplanned extubation. Effective teamwork and communication have been cited as essential for achieving high reliability systems and creating a “culture of safety” to support the safe delivery of patient care (Leonard et al, 2004). Having an opportunity for inter-professional teams caring for critically ill patients to debrief following an unplanned extubation could enhance team learning from these serious adverse events can assist frontline critical care staff in identifying patients at risk and implementing mitigating strategies to prevent patient harm. The aim of the unplanned extubation huddle is to improve team learning from these events by providing a forum for early identification of contributing factors placing patients at risk and an opportunity to develop preventative solutions through enhanced team communication.

METHODOLOGY

Using the model for improvement, a team “huddle” or debriefing was implemented following each unplanned extubation in the Pediatric Intensive Care and Cardiac Critical Care Units at the Hospital for Sick Children. The team huddle is led by the registered respiratory therapist (RRT) shift leader with participation by the critical care fellow, RRT and RN caring for the patient involved. The huddle is held at the patient’s bedside as soon as possible following the adverse event. Contributing factors which placed the patient at risk are discussed and strategies to prevent future unplanned extubations are identified. A safety report (i.e., incident report) documenting details of the event, identified contributing factors and is completed as per current hospital process. The incidence of unplanned extubation and identified contributing factors are monitored monthly and reported at the Critical Care Quality & Safety committee and other forums as needed. This information is used to inform the development of strategies to improve the incidence of unplanned extubations.

RESULTS

The impact of the unplanned extubation huddle on improving learning from these serious adverse events will be discussed including potential impact on the rate of unplanned extubation, trends in contributing factors and resulting improvements to the management of endotracheal tubes.

CONCLUSIONS

A brief team huddle or debriefing following unplanned extubations in critical care can enhance team learning and help teams identify contributing factors that may place patients at higher risk. Providing an opportunity for team discussion as soon as possible following an adverse event improves teamwork and results in immediate implementation of strategies to reduce the risk to individual patients. Team debriefing can result in the identification of common contributing factors which can focus improvement efforts on those areas placing patients at higher risk. Defining a staff member responsible for leading the debriefing is an effective way to ensure that the process is completed for all unplanned extubations. A team debriefing process following serious adverse events is an effective way to improve teamwork and communication and provides an opportunity for frontline staff to identify common contributing factors and develop team based solutions to prevent future events from occurring. Ongoing analysis of lessons learned can be used to develop comprehensive targeted solutions that reduce harm to already vulnerable critical care patients.

1. Leonard M, Graham S, Bonacum D. The human factor: the critical importance of effective teamwork and communication in providing safe care. *Qual Saf Health Care.* 2004;13 Suppl 1:i85-90.
2. Salas E, Sims D, Klein C, Burke CS. Can teamwork enhance patient safety? *Forum Risk Manag.* 2003;23(3):5-9.
3. Mann S. Changing culture: implementation of MedTeams. *Forum Risk Manag.* 2003;23(3):14-8.

RT professional practice council case review series: A professional development opportunity

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ABSTRACT

Recognizing that case reviews provide professional development opportunities, an initiative was started to make a case review series a regular part of RT practice council at SMH. This poster will outline the case review framework, and describe the vision/goals, the process, and the case studies done to date. It also highlights that feedback that has been received from RT staff on this initiative as a professional development activity.

INTRODUCTION/OBJECTIVE

Professional development and ongoing continuing education are important for respiratory therapists (RT) to maintain and upgrade their knowledge and skills, in order to keep current and be able to provide quality patient care. A variety of activities exist that can be used to obtain this goal and contribute to ongoing learning efforts. One such activity, which can be a powerful tool for learning and reflection, is a case review. With this in mind, an initiative was started to create a case review series as part of RT Practice Council.

METHODOLOGY

A systematic approach was developed to provide a clear, concise, logical presentation framework. The components of the case review include: Patient Summary; Clinical Course; The Event (review of main issue/event/situation; focus of case review); Outcome; Discussion (issues, alternative actions, impact to patient, best practice implications); Recommendations (take home messages, links to education and professional development ideas) and References (review of relevant literature, clinical guidelines and theory).

RESULTS

To-date, several case studies have been presented to RT Practice Council. The topics of the presentations include: Difficult Airway in Interventional Radiology, Status Asthmaticus, Hypoxic Respiratory Failure, Spinal Cord Injuries and Ventilatory Management, Long-Term (Prolonged) Mechanical Ventilation and Refractory Status Epilepticus and Use of Inhaled Anaesthetic Agents.

CONCLUSIONS

Overall, the case study reviews have received positive feedback and are now embedded as part of RT Practice Council. The case studies reviewed have made clinicians re-think or evaluate their clinical practice and the associated education/professional development has been meaningful to their clinical practice.

Quality improvements for patients with obstructive sleep apnea (OSA)

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INTRODUCTION

OSA is a disorder with repetitive obstruction of the upper airway characterized by episodes of cessation of breathing during sleep [1,2]. OSA affects 10-25% of surgical patients. The incidence of OSA increases in obese patients, the elderly, and those with chronic medical illness. OSA is associated with increased risk of perioperative complications: hypoxemia, respiratory failure, reintubation, unexpected ICU admissions, cardiac events, and mortality. Adequate screening of patients for OSA and perioperative use of continuous positive airway pressure (CPAP) therapy could prevent serious complications after surgery [1,2]. A review of the perioperative pathway of surgical OSA patients at SMH identified areas that needed improvement. There was no formal mechanism to identify patients with OSA pre-operatively. No pre-operative assessment of CPAP equipment, compliance or settings was performed. There were no routine prompts reminding patients to bring their CPAP machine on the day of surgery. Respiratory Therapists (RT) were not routinely called to the post-anesthetic care unit (PACU) to assess post-operative CPAP patients, resulting in decreased compliance of CPAP therapy, lack of follow-up and potential for late identification of post-operative OSA related complications.

OBJECTIVES

Improve safety and care of surgical diagnosed OSA patients through the implementation of simple interventions to: screen for known OSA in surgical patients in the Pre-admission Clinic (PAF); collect information regarding type of therapy, CPAP settings and compliance; educate patients to bring their own CPAP machine on the day of surgery; implement routine assessment of OSA patients by RT in the PACU; develop guidelines for postoperative monitoring of OSA patients.

METHODOLOGY

The project was designed as a two phase process: intervention and evaluation. *Intervention* included development of posters for the Surgeon's offices as a visual reminder; updating the patient's information handbook to include prompts for OSA patients to bring their own machines to hospital on the day of surgery; updating the existing forms in the Pre-Anesthetic Clinic to include prompts to screen for OSA patients and obtain information regarding their therapy; and the Anaesthesiology PACU pre-printed order set now includes an order for RT to assess post-operative OSA patients (and an OSA specific charting form was created for the RTs). *Evaluation* included the following: preliminary audits were completed to measure both process and outcome markers, to assess the change in practice resulting from the various interventions. *Process Measures* included: % of patients screened for known OSA in the PAF; % of patients given OSA/CPAP education in the PAF; % of patients assessed by RT prior to discharge from PACU; and number of OSA

patients followed by RTs postoperatively. *Outcome measures* included: % of patients who bring their own CPAP equipment; compliance with CPAP therapy postoperatively; number of “emergency calls” for OSA-related adverse events; and number of OSA patients who were “missed” in the initial postoperative period, but subsequently identified on the ward/step-down/ICU.

RESULTS

After the implementation of the revised PACU pre-printed order set to include RT assessment of OSA patients in PACU, more patients overall (and relative to 2012) were monitored postoperative by RT.

CONCLUSIONS

The implementation of the order for RT to routinely assess post-operative OSA patients, in the Anaesthesiology PACU pre-printed order set, has facilitated a timely assessment and follow up therapy for diagnosed OSA patients. The completed and ongoing quality improvement initiatives in this project have enhanced patient safety and postoperative care for patients with diagnosed OSA. This project is ongoing and the next steps will be to: complete interventions in progress; solicit ongoing feedback on efficacy of interventions, and make changes accordingly; apply success of this project to screening and managements of patients at risk for OSA; and consider continuous respiratory monitoring for OSA patients.

1. Seet E, Han TL, Chung F. *Perioperative clinical pathways to manage sleep-disordered breathing*. Sleep Med Clin 2013; 8:105-120
2. Jain SS, Dhand R. *Perioperative treatment for patients with obstructive sleep apnea*. Curr Pulm Med 2004; 10: 482-488

Respiratory services within the MIS standards: A revision project

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INTRODUCTION

All respiratory services funded by Canadian ministries of health rely upon *The Standards for Management Information Systems in Canadian Health Service Organizations* (MIS Standards) to report financial and statistical data. An MIS Standards revision project related to respiratory services will ensure the next publication better reflects the technological and operational changes that have occurred in these services since the last redevelopment published in 2003. The goal is to meet the financial and statistical data needs so that functional centre clinicians, such as respiratory therapists and cardiopulmonary technologists, and their managers or directors can plan and make evidence-based decisions for respiratory services. Revising the MIS Standards to reflect current reality in the Canadian health care system generates valuable data that provides information on the inputs and outputs of clinical respiratory services for comparison and trending among facilities, for planning, informed decision-making, and for management of clinical operations.

OBJECTIVE

The MIS Standards provide an integrated approach to managing financial and statistical data related to the operations of Canadian health service organizations. This standard is used to generate data which informs health system decisions including managing clinical laboratories. In 2013 CIHI will undertake a major revision of the MIS Standards relevant to clinical laboratory workload measurement systems. This will enable a more accurate and flexible framework for financial and statistical data collection that is comparable for all levels of automation, patient population, best practices, systemic processes and other variables. Since the MIS Standards will become more reflective of the RT's current realities encountered in today's health care system, decision-makers can plan and make evidence-based decisions for respiratory services clinical operations with greater confidence.

METHODOLOGY

The respiratory services MIS Revision requires experts in the field to provide their knowledge and experience in managerial and clinical perspectives. The poster content explains the 5 W's for this project: *Who* (would be involved?) *What* (is the project scope?) *Where* (are meetings, are the revisions going to be represented in the MIS Standards) *When* (is the revision project dates) *Why* (is the project necessary?) and also *How* (can I provide my opinion?). Materials include 3'x6' poster to highlight the main MIS Standards sections to be revised and the changes to the 2011 MIS Standards generally using graphics, charts and text. The poster can also be supplemented with personal dialogue with conference attendees. The 2013 MIS Standards can be referenced directly using a laptop.

RESULTS

This poster will highlight the main MIS Standards areas for revision revised generally using graphics, charts and text. The intent is to generate interest amongst conference attendees, and to solicit offers to contribute clinical expertise where required.

CONCLUSIONS

This poster presents conference attendees with a high-level summary about the respiratory services MIS Revision and extends an invitation to participate by providing an opportunity to communicate with CIHI's project team, to share ideas, opinions and professional knowledge, and/or volunteer to serve as a RT clinical specialty expert advisor for the CIHI project leads.

Paediatric respiratory care in Nepal: A four month experience

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INTRODUCTION

On behalf of Respiratory Therapists without Borders, Vilija Valadka spent four months in Nepal performing a needs assessment at International Friendship Children's Hospital, a pediatric hospital in Kathmandu. To obtain a well-founded

basis of information to learn from, time was spent working amongst the hospital's staff. The majority of the time was dedicated to the hospital's ventilator ICU. It is in the VICU where many respiratory therapy based techniques and knowledge practices are used, and would offer the best reflection of the hospital's respiratory therapy needs. By befriending staff as a pro-medical colleague, hosting educational lectures on topics of respiratory therapy, utilizing information data-sheets to track patient information, and working through cultural and education barriers, areas in need of improvement in terms of respiratory therapy treatment for patients were recognized and reasonably corrected.

OBJECTIVES

The goal of this project is to assess the utility of having a respiratory therapist on staff in Nepal.

METHODOLOGY

To gain the trust and respect of staff, I worked at IFCH 5 days a week. It was essential that professional relationships were forged with staff as soon as possible. Befriending the staff as a pro-medical colleague allowed teaching and bedside RT advice to be more generally accepted. The main area of assessment for this project was the hospital's ventilator ICU, as it proved to be a good reflection of the RT needs of the hospital. Education sessions based on RT practices were held for all interested staff. Topics included CPAP, Introduction to Mechanical Ventilation, Pediatric Resuscitation, Weaning, ABGs, and Ventilator Waveforms. They were presented in a manner understood by staff, and were chosen based on observations made in the VICU. Areas of RT practice executed by staff showing room for improvement were considered a potential educational topic. Questions were encouraged, and time was allotted for discussion following the sessions. Many education sessions were held in the VICU for staff unable to attend the original presentations. Bedside education is abundantly used at IFCH. Some areas of improvement would not require an educational session, as simple suggestions made sufficed. Keeping records of VICU patients is vital to assessing the need of an RT, allowing for retrospective analysis on patterns in regards to illnesses, mortality, and population. Using the methods stated, meaningful observations were made for the analysis of the needs of RT care.

RESULTS

Developing professional relationships proved challenging. Many volunteers spend short periods of time at IFCH proving it difficult to become established as a long-term volunteer. To help bridge professional connections, staff were encouraged to call me at any time with RT related questions. Though I was available as an on-call option, staff were uncomfortable to do so due to cultural differences. Eventually, doctors did call for advice relating to RT practices, and after one month, I was able to participate as an RT member of the VICU. When staff showed areas of RT practice with potential for improvement, educational sessions were created based on observation. The 6 educational sessions presented were greatly accepted and referred to often in practice as well as in discussion. Due to cultural and language differences, some points of improvement were not easily

adopted. An example was using high levels of FiO₂ regardless of patient population. Suggestions made in conjunction with documentation were adopted with encouragement. To cement the importance of appropriate FiO₂ levels, the topic was discussed in every educational session. In practice, suggestions were made followed by discussions involving the importance. Eventually, the suggestion was heeded without prior instruction proving that with encouragement, improvements in practice can be made. A data-sheet tracked the treatment of 22 patients admitted to the VICU requiring respiratory care, 9 were intubated. From the 9 intubated patients, 5 (56%) were successfully weaned from ventilation and extubated, while 4 patients (44%) expired. Of the 22 patients, 15 (68%) were discharged. Of them, 9 (60%) left against medical advice. No weaning algorithm was in place, and many patients are on similar ventilator settings regardless of age, weight, or medical. The tracking sheet shows improvement in weaning towards the end of the 4 month period showing that suggestions supporting weaning techniques were taken into account.

CONCLUSIONS

The primary objective of this project was to assess the utility of having a respiratory therapist on staff. By befriending staff as a pro-medical colleague, hosting educational lectures on topics of respiratory therapy, utilizing information data-sheets to track patient information, and working through cultural and education barriers, the hospital's needs in terms of respiratory therapy were properly assessed. FiO₂ levels began to be set specifically for the patient, weaning techniques improved, daily SBTs have been integrated into the hospital's protocol, and efforts of moving towards shorter periods of intubation have been recognized. Though cultural and language barriers prove that suggestions require persuasion and encouragement, and educational sessions aid in making improvements in RT practices, this project validates that the presence of a respiratory therapist is an asset in Nepal, as staff accept information shared, and integrate new knowledge into every day practice.

— STUDENT POSTERS — WINNING STUDENT POSTER

Initial ventilation settings after emergent endotracheal intubation: A retrospective analysis

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INTRODUCTION

Mechanical ventilation instituted after emergent endotracheal intubation is a standard procedure in the management of critically ill patients. In the absence of evidence-based recommendations on optimal initial ventilation strategies, the impact of ventilator settings has not been studied.

OBJECTIVES

We hypothesize that over-ventilation after cardiopulmonary arrest and resuscitation correlates with adverse outcomes in hospitalized ICU patients. The purpose of this study is to describe ventilator settings after cardiopulmonary arrest and their effect patient outcomes.

METHODOLOGY

Retrospective analysis of health records of patients requiring emergent endotracheal intubation in a tertiary care adult medical-surgical intensive care unit. Data were collected from the health records of all patients admitted to a medical/surgical intensive care department in 2007 that required emergent intubation and mechanical ventilation of > 24hrs. Mechanical ventilation parameters, pre and post-arrest arterial blood gas values and vital signs were collected for 15 minutes before and after intubation. Data were analyzed by an independent statistician according to a predefined analyses. Over-ventilation was defined as presence of at least 4 of 6 parameters characteristic for non-protective ventilation:

PaO₂ > 200 mmHg; PaCO₂ < 35 mmHg; VT > 12 ml/kg IBW; PEEP < 5 cmH₂O

Pplat > 30 cmH₂O; VE > 0.2 l/kg IBW

RESULTS

A total of 200 patients were included in the analysis, of whom 29.5% did not survive. Fatal outcome was associated with severe acidosis, high lactate, high FiO₂, high respiratory rate and minute ventilation. The post resuscitation PaO₂ and PaCO₂ was not associated with survival, but survivors had a significantly higher pH (7.4 vs. 7.2), HCO₃ (25.1 ± 7.1 vs. 20 ± 80) and a lower lactate 2.2 ± 1.8 vs. 4.3 ± 3) (p<0.01). Most patients (n=140) were ventilated with a PEEP of <8 cmH₂O and had a higher mortality (31.4%) compared to those ventilated with PEEP 8 cmH₂O (n=52; mortality 17.3). A PEEP <5 cm H₂O was correlated with mortality (OR 0.546). 17% were ventilated with a tidal volume of >12 ml/kg IB, which was not associated with mortality (p=0.25). Survivors had lower minute ventilation 0.13 ± 0.06 vs. 0.16 ± 0.09 l/kg/mi (p=0.06). Patients who fulfilled criteria for overventilation (n=18) had a more than a twofold increase for the risk in fatal outcome (OR 2.46; CI 0.99-7.09; p=0.05).

CONCLUSIONS

This study suggests that initial post-intubation ventilator settings may be associated with adverse patient outcomes. Symptoms of inadequate tissue perfusion after arrest were predictive of death, but we could not identify a single parameter of ventilation setting that was associated with mortality. The combination of several factors indicating over-ventilation correlated with mortality. Further study is required to elucidate the importance of ventilation strategies in the immediate phase post resuscitation of critically ill patients.

The impact of bronchopulmonary dysplasia on neurodevelopmental outcomes in very low birth weight infants

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BACKGROUND

Bronchopulmonary dysplasia (BPD) is one of the leading causes of morbidity in very low birth weight (VLBW) infants. BPD is defined as a need for supplemental oxygen greater than 28 days with radiological evidence of chronic lung disease. The pathogenesis is linked to prematurity of lungs, mechanical ventilation and oxygen therapy exposure. Infants who develop BPD are at risk for pulmonary dysfunction as well as possible altered brain development due to exposure to chronic hypoxia.

OBJECTIVE

To identify the impact of bronchopulmonary dysplasia on cognitive, motor, and language development in VLBW infants.

METHODS

A systematic literature review was undertaken to evaluate the effect of bronchopulmonary dysplasia on the neurodevelopment of VLBW infants. The participants include VLBW infants defined by a weight of less than 1500 grams. The primary outcomes of interest include cognitive/academic, motor and language development.

RESULTS

Infants with bronchopulmonary dysplasia show statistically significant differences in cognitive/academic function with impairment in IQ, reading and mathematical skills, and overall poor cognitive outcomes. BPD study groups also were found to have altered motor development, particularly in the infancy period, and continued impairment of fine motor skills such as hand-eye coordination. Differences between the groups were no longer significant in older age groups suggesting possible improvement in previous motor impairments. When language development was evaluated, specific impairments were found in verbalization, articulation and receptive language skills of VLBW infants with BPD.

CONCLUSION

After controlling for possible confounds faced in infant prematurity, the literature demonstrated statistically significant differences in all three primary outcomes of this review. These results show a strong relationship between bronchopulmonary dysplasia and negative neurodevelopmental outcomes in VLBW infants.

The accuracy of diagnosing deep venous thrombosis using clinical assessment and d-dimer testing compared to standard diagnostic management

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INTRODUCTION

Deep venous thrombosis (DVT) often presents with non-specific early symptoms therefore prompt early detection and management is important to reduce the mortality, morbidity, and the likelihood of developing a pulmonary embolism (PE). Current diagnostic standards involve radiographic scanning, however, scanning each patient presenting with the symptomatology of DVT would be costly, inconvenient, and inefficient.

OBJECTIVE

To investigate whether DVT and PE can be successfully and safely ruled out by using clinical assessment and D-dimer levels from blood samples as opposed to undergoing radiographic scans (e.g. CT, ultrasonography).

METHODS

A systematic review was undertaken to identify current literature investigating the incidence of venous thromboembolic events (VTE) at 3 months in certain patients with non-radiologic testing compared to standard diagnostics performed in the remainder of the participants. Twenty-two articles were retrieved from PubMed and Scopus using a comprehensive search strategy with key words including “deep vein thrombosis,” “pulmonary embolism,” “clinical score,” “d-dimer,” and “evaluation.”

RESULTS

The literature demonstrated an overall VTE prevalence of <0.01% in patients presenting to the ER with low clinical pre-test probability with the combination of a negative d-dimer level compared to the remainder of the patients. Incorporating this management strategy has allowed 27% patients in the studies included to avoid unnecessary radiographic scans or additional testing.

CONCLUSION

Routine radiographic scans can be safely withheld in a proportion of outpatients with low C-PTP and negative d-dimer levels.

Knowledge translation of evidence based medicine in respiratory therapy: Attitudes, knowledge, practice and perceived barriers

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INTRODUCTION

Evidence based medicine (EBM) is defined as the process in which clinicians systematically evaluate the most recent research to address various questions they encounter in clinical practice (Jette et al., 2003; Iles & Davidson, 2006). The use of EBM largely relies on the clinician's ability to critically evaluate the quality and validity of research, and the suitability of findings for implementation in current practice/patient population (Upton, 2006). Respiratory therapists (RTs) act as an integral part of the health care team with the aim to use the best practices in the overall respiratory management for the care of patients; however, few studies into RTs' understanding and views towards EBM have been conducted.

OBJECTIVES

This study aims to evaluate knowledge translation of evidence based medicine (EBM) amongst RTs using a self-administered electronic questionnaire adapted from Jette D.U et al. (2003) and Funk S.G et al. (1995) for RT practice.

METHODOLOGY

The questionnaire has been submitted for approval from the Research Ethics Board (REB) at the University Health Network. The questionnaire will collect data from three domains: attitudes and beliefs towards EBM, perceived barriers to the implementation of EBM, and RT background knowledge and understanding of research. A sample size of convenience will be utilized for the completion of this study by RTs working in Ontario who belong to the College of Respiratory Therapists of Ontario (CRTO) as well as the Canadian Society of Respiratory Therapists (CSRT). An advertisement in the monthly College of Respiratory Therapists of Ontario (CRTO) newsletter will introduce the study to RTs and provide the link to the questionnaire. As well, an electronic advertisement containing a link to the survey will be sent by the CSRT. All RTs registered with either organizations who receive the newsletter and email respectively will be eligible to participate. The advertisement will be placed in the CRTO Newsletter for two consecutive months, concurrently, an electronic advertisement will be sent by the CSRT at the beginning of each month. Participants will be given a 30-day time frame after each advertising date for completion of the survey after which time it will be closed.

DATA MANAGEMENT

Responses to questions regarding subject demographics will be computed as frequency counts or as means \pm standard deviations (as appropriate). For those questions using Likert scales percentages responses for each category will be calculated. Demographic variables (e.g. gender, years experience, level of education) may be used to explore any between group differences using t-tests ($\alpha=0.05$). Responses to open-ended questions will be analyzed by the research team to identify any trends/themes.

DISCUSSION

This proposed benchmark study aims to address the attitudes, knowledge and perceived barriers in the translation of EBM into the daily practice of Respiratory Therapists in Ontario, Canada. The aim is to identify the areas where gaps exist in knowledge

and attitudes towards EBM amongst RT. Upon identifying the aforementioned factors affecting the knowledge translation of EBM into practice, one can aim to create appropriate strategies to help rectify any issues that may have arisen. Two separate studies by Jette et al. (2003) and Iles and Davidson (2006), investigated the beliefs, attitudes and knowledge of evidence based practice amongst practicing physiotherapists in the United States. These studies revealed that the majority of physiotherapists hold positive attitudes towards applying EBM in their daily practice (Jette et al., 2003; Iles & Davidson, 2006). There was also a positive correlation between the level of education and attitudes towards EBM. Interestingly, both studies demonstrated that the greatest barrier to remaining updated and applying EBM was lack of time to gather information from new literature (Jette et al., 2003; Iles & Davidson, 2006). Similar results are anticipated in the proposed benchmark study amongst the RT population due to the evolutionary nature of patient-centred care and emphasis on evidence based practices amongst health professionals.

Beliefs and knowledge regarding tobacco use on the Thompson Rivers University Kamloops campus

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BACKGROUND

We surveyed student cohorts from various credentialed programs (Graduate, Undergrad, and Certificate/Diploma) at Thompson Rivers University (TRU) and assessed their positions on smoking cessation and beliefs around tobacco education on campus.

OBJECTIVES

While many studies have investigated the role of specific socio-economic factors and their influence on tobacco use, our goal was to see if higher levels of university education affect the students' knowledge and beliefs regarding tobacco use, and how students feel about current policies involving tobacco use on campus.

METHODOLOGY

During February 2013, 353 students were surveyed at Thompson Rivers University (TRU) about their tobacco habits, beliefs, and knowledge. The students who were polled were all enrolled in upper level courses, or in a specific career program. The goal was to target this student body to observe whether or not higher levels of education altered knowledge and beliefs around tobacco use, and to ensure that the students were all enrolled in full time studies and spend the majority of their study time on campus. One specific question within the survey focused on how students feel about current smoking practices on campus, current policy allows students to smoke anywhere on campus with the exception of 25 feet within doors, windows and air intakes. We analyzed this data to see if different student cohorts hold differing opinions when it comes to individual use, knowledge and beliefs surrounding tobacco and how students feel about the current tobacco practices, specifically smoking, on campus.

RESULTS

Whole campus (including Trades students): 39% prefer current smoking practices; 61% do NOT prefer current smoking practices and want to change smoking policy on campus to designated areas (like smoking gazebos) or banning smoking on campus. *Whole campus (excluding Trades students): 29% prefer current smoking practices; 71% do NOT prefer current smoking practices and want to change smoking policy on campus to designated areas (like smoking gazebos) or banning smoking on campus.

CONCLUSION

The results show that students have minimal knowledge regarding the specific chemicals and dangers of tobacco use, but they know some of the negatives about tobacco and believe that it does impact their health in a negative way. One key factor in the current practices for smoking on campus is that numerous non-tobacco users and those who are trying to kick the habit have to walk through clouds of second-hand smoke around the campus to get to their classes. Increasing tobacco education around the campus will further increase student knowledge regarding what is fact and fiction when it comes to tobacco use. Designated smoking gazebos will aid in reducing second-hand smoke, and improve student health throughout the TRU Kamloops Campus.

Bronchial thermoplasty: A review of efficacy and future use in asthma treatment

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INTRODUCTION

Asthma is caused by the inflammation and spasm of airway smooth muscle (ASM) in response to external irritants. Currently, people with asthma are most commonly treated using inhaled corticosteroids and bronchodilators, but in some patients even large doses of these medications do little to manage symptoms. Bronchial Thermoplasty (BT) is a relatively new treatment where patients with severe asthma undergo a series of bronchoscopy procedures in which the ASM is burned away so that exacerbations of asthma are less common and less severe. The procedure is still under study and is only offered by a few hospitals in Canada at this time, but data from the most recent and largest multicenter sham-controlled trials show promising results. From November 2012 to February 2013, a review of current literature concerning BT and consultation with a number of healthcare workers including several respiratory therapists and a Pulmonologist was performed. A number of challenges present themselves when considering the widespread implementation of this procedure including a narrow spectrum of patients for whom this procedure is indicated, the cost of the procedure itself and the apprehension with which doctors regard this procedure due to the relative lack of clinical evidence for its efficacy. It is questionable whether the hypothetical cost savings to the health-care system as a result of BT (decreased hospital visits due to exacerbations and decreased need of medications) will help to alleviate the surgical cost of BT. Current and future clinical trials will help to broaden the scope of asthma severity for which BT

is indicated and will provide doctors the evidence they need to include BT referrals in their practice. This procedure may not cure asthma, but it suggests that some patients may find a moderate amount of relief from symptoms, this certainly makes future BT research a worthwhile pursuit.

OBJECTIVES

The objective of this project was to review current literature on BT with a focus on efficacy, costs and possible future uses in asthma treatment.

METHODOLOGY

A search for current literature was made utilizing Fanshawe College's online database of journals. A number of articles were cited on this poster and used for statistics or figures, but the main article used was the AIR2 trial published in 2009 which focused on severe asthmatics (as previous study indicated that these patients benefitted most). This study is still the largest of its kind with 288 subjects across 30 investigational sites in 6 countries and was the first to be randomized, double blinded and sham-controlled.

RESULTS

The AIR2 trial showed that there was a statistically significant decrease in severe exacerbations, physician office visits, ER visits and hospitalizations in the BT group compared to the sham control group. They also scored statistically better on the Asthma Quality of Life Questionnaire (AQLQ), showing that patients did experience change (albeit not a clinically significant amount). Unfortunately, no corticosteroid weaning was performed for the BT patients post procedure, and therefore it is unlikely that the healthcare savings balance with the costs of surgery. However, it was shown that the receivers of BT had a decrease in the number of days of work/school missed. It is impossible to determine the economic savings as a result of this, but this fact must be taken into account when determining the benefits of this procedure. These indirect savings as a result of BT may warrant its use in the long run.

CONCLUSIONS

Much more study is required in order to encourage pulmonologists to include BT in their evidence-based practice. Future sham controlled studies should seek to broaden the patient population for which the treatment is indicated, determine if any decrease in corticosteroid support is possible post treatment, and focus on efficacy via more objective indicators than the AQLQ. Putting more emphasis on methacholine challenges, forced expiratory volumes, and peak expiratory flows post treatment may strengthen conclusions of efficacy. Higher powered studies with different inclusion parameters will show more clearly the niche patient population for whom this treatment will benefit most. Though the current studies available have flaws and are somewhat inconclusive, the 5 year safety results show that the procedure does no lasting harm to the airway, and if some patients have had a better quality of life as a result of bronchial thermoplasty, then continuing research is unquestionably warranted.

The impact of immune modulating nutrition on length of ventilation in adults with acute respiratory distress syndrome

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BACKGROUND

It is estimated that there are over 17,000 cases of Adult Respiratory Distress Syndrome (ARDS) in Canada each year. According to current information on the UpToDate database, ARDS is caused by injury to the alveolar-capillary membrane by immune factors. Inflammation, of the tissues therefore hinders transfer of oxygen. The use of immune modulating nutrition rich in γ -linolenic acid as well as eicosapentaenoic acid is hypothesized to suppress the immune reaction, via competition with and incorporation into arachidonic acid, which reduces expression of pro-inflammatory mediators.

OBJECTIVE

This systematic review investigates specific enteral nutrition as an adjunct in the treatment of ARDS as a therapy that may reduce length of ventilation of adult ARDS patients.

METHODS

Current literature was retrieved from several databases, including UpToDate, PubMed and Scopus. All articles included in this review were randomized control trials, or meta-analyses. Search terms used included (but were not limited to) "ARDS," "acute lung injury," "enteral nutrition," "eicosapentaenoic acid," "gamma linolenic acid" and "antioxidants."

RESULTS

This review found that the therapeutic use of immune modulating nutrition impacted ARDS in several ways including a significant reduction in the length of ventilation, and a reduction in mortality and improved outcomes. The use of antioxidant rich diets was also found to improve gas exchange across the alveolar-capillary membrane. These promising results were not consistent in all literature retrieved.

CONCLUSION

Current studies have shown that there is some benefit to the use of enhanced enteral nutrition. Length of ventilation has been significantly reduced in ICU patients. Further research is warranted, particularly in regards to dosing and separation of patients based on etiology.

Evaluation and use of EasyPulse Oxygen Conserving Flowmeter in the hospital

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BACKGROUND

Trudell Medical has introduced to Canada a wall mounted gas conserving device developed by Precision Medical. Until recently, this type of device has typically been used to conserve oxygen from gas cylinders.

OBJECTIVES

The upfront costs to convert to these pulse or breath activated flowmeters was contrasted against the cost of institutional liquid bulk oxygen costs in specific nursing units and a small community hospital. This took place at Horizon Health Network, Moncton Area New Brunswick.

METHODOLOGY

For timeframes of 3, 5 and 31 days, the upfront costs to converting to these devices were contrasted against the cost of institutional liquid bulk oxygen costs. Safety advantages were also considered. Nursing units were isolated and supplied by a bank of oxygen tanks. Bank consumption was measured pre and post pulse flowmeter installation. Exception: Sackville Memorial Hospital was measured as a whole facility. Prior to installation training was provided to the nursing and respiratory staff.

RESULTS

Extrapolated from the results were projected reductions in gas consumption of approximately 36.5 % per year in selected units. An accounting of all the nursing units suggests a reduction of consumption would be in the order of 23-25%.

CONCLUSIONS

This reduction would reflect corresponding financial savings of the same magnitude. Another aspect of savings as well as safety is that oxygen does not flow when the patient is not hooked up to this device. There were also water bottle savings since humidification is not required. The Sackville Memorial Hospital primarily consists of palliative care and end stage patients. Although the staff's resolve was questioned early in the study, it soon became evident that the majority of this patient population simply did not have the ability to trigger these devices. Patient selection is an important aspect of using the EasyPuls flowmeter. For those patients that will clearly benefit, success lays on the hands of the care provider. Without buy in from the participating staff, these devices would not have been used to their potential.

Cerebral oximetry monitoring in clinical practice vs. standard monitoring techniques in prevention of adverse outcomes

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OBJECTIVE

Cerebral oximetry is a method of measuring regional cerebral oxygen saturation (rSO₂) using near infrared spectroscopy (NIRS). The use of cerebral oximetry monitoring to make changes intraoperatively, during a procedure or a treatment is still an emerging field. Studies in different clinical and surgical settings, where the use of cerebral oximetry monitoring and associated interventions have been used to improve patient outcomes, were examined.

METHODS

A systematic review was conducted to examine the correlation between levels of cerebral oxygenation and outcomes in patients. Published articles were then retrieved through a literature search which sought to identify original articles that evaluated the use of cerebral oximetry monitoring as a clinical tool to improve neurological outcomes and reduce complications. Databases searched included PubMed, Scopus and EMBAS and search terms included "cerebral oximetry," "near-infrared spectroscopy," "cardiopulmonary bypass," "extracorporeal membrane oxygenation," "abdominal surgery," "cardiopulmonary resuscitation," and "mechanical ventilation."

RESULTS

Four relevant articles were reviewed to determine the predictive value of rSO₂ to patient outcomes. Seven articles were reviewed to determine the efficacy in monitoring rSO₂ value to improving patient outcomes. In CPB bypass, there are some patient outcomes that improved with cerebral oximetry monitoring. This technology was also helpful in predicting eventual brain death of patients on ECMO. In abdominal surgery, when rSO₂ values were monitored, elderly patients had less cognitive decline post surgery and spent less time in hospital. In CPR, there was no statistically significant difference in rSO₂ between low quality and high quality CPR. In mechanically ventilated patients, an increase in intrathoracic pressure led to a decrease in rSO₂.

CONCLUSION

Cerebral oximetry monitoring is entering new areas of clinical practice. In the future, there may be even more applications where cerebral oximetry monitoring can contribute to improving patient outcomes. This technology may be utilized to adjust ventilation strategies in mechanically ventilated patients which one day could have significant impact on respiratory therapy.

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