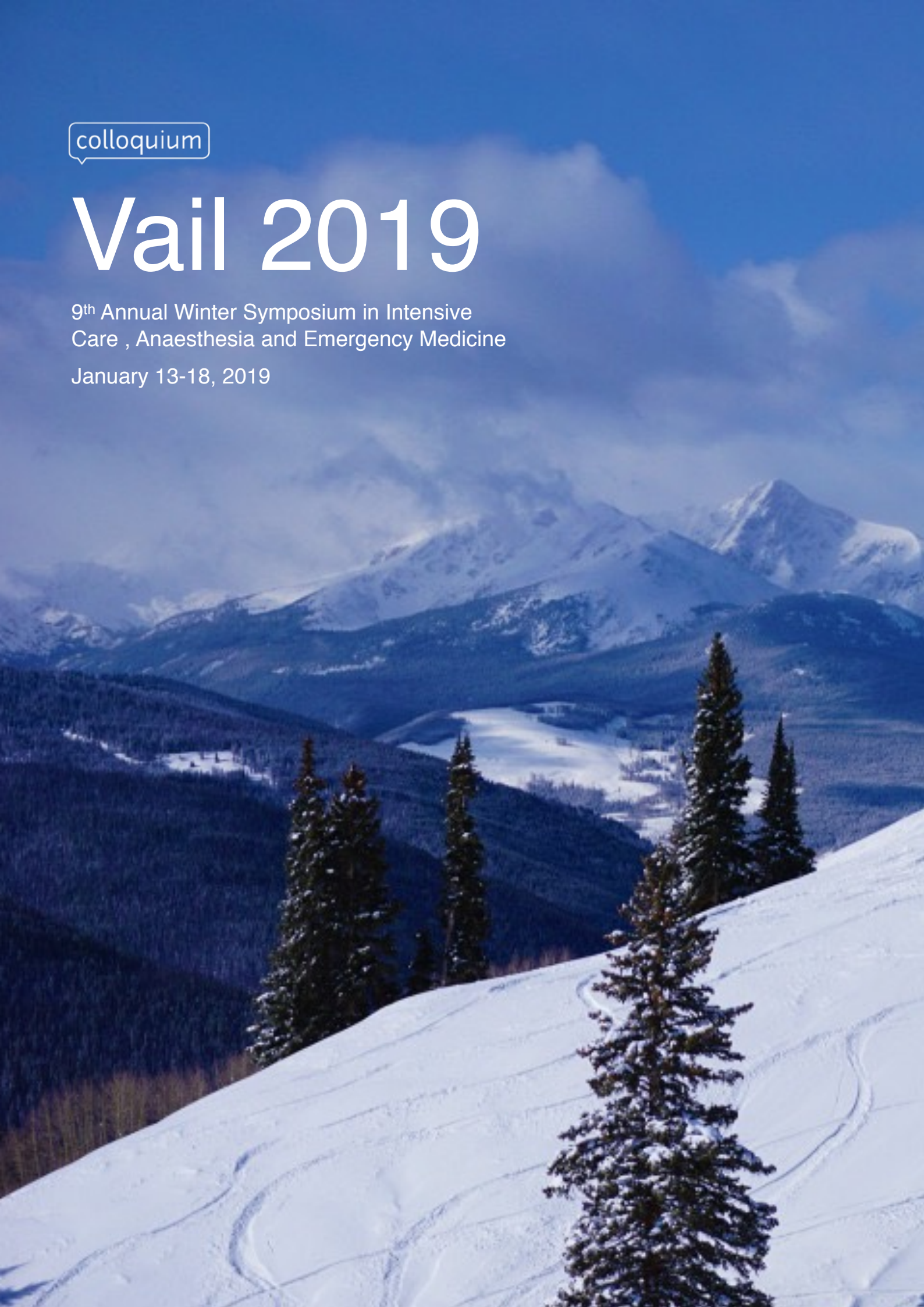
colloquium

Vail 2019

9th Annual Winter Symposium in Intensive Care , Anaesthesia and Emergency Medicine

January 13-18, 2019



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Recognition and management of anaesthetic disasters

Asthma: state of the art

Faculty

Gordon Flynn MBBS FCICM
Intensive Care Physician, Prince of Wales Hospital

Phil Black MBBS FANZCA
Anaesthetist, Prince of Wales Hospital

Andrew Hoyle MBBS Barrister at Law MRCGP FRAeS
General Practitioner, Registration panelist GMC

Kit Newth MD FRACP FRCPC
Research Director, Anaesthesia & Critical Care, Children's Hospital Los Angeles; Professor of Paediatrics, USC

Andrew Numa MBBS FRACP FCICM
Director, Intensive Care Unit & Honorary Consultant in Respiratory Medicine, Sydney Children's Hospital

Tracey O'Brien MBChB FRACP MHL BSc
Head, Blood & Marrow Transplant Program, Director & Head of Clinical Service, Kids Cancer Centre, SCH

Jess Smith MBBS FANZCA
Anaesthetist, Sydney Children's Hospital

Barry Wilkins MD MA BChir FRACP FCICM MRCP DCH
Intensive Care Physician, Children's Hospital Westmead

Program

All lectures held in Piney function room, level 3, Four Seasons Vail

Sunday January 13

6 - 8 pm	Welcome Reception & Registration, East Wing, Four Seasons Bar, Vail

Monday January 14

7:30 am	Registration & Breakfast
8:00 am	Beyond “Surviving Sepsis” - Andrew Numa
9:30 am	Session close
4:00 pm	Afternoon refreshments
4:30 pm	The difficult airway - Phil Black
5:30 pm	Medico-legal challenges - Andrew Hoyle
7:00 pm	Session close

Tuesday January 15

7:30 am	Registration & Breakfast
8:00 am	Nutrition in critical illness - Gordon Flynn
9:30 am	Session close

Wednesday January 16

7:30 am	Registration & Breakfast
8:00 am	Boreout, burnout and existential futility - Tracey O’Brien
9:30 am	Session close
4:00 pm	Afternoon refreshments
4:30 pm	Paediatric ARDS - Kit Newth
5:30 pm	Oxygen toxicity in Australasian PICUs - Andrew Numa
7:00 pm	Session close

Thursday January 17

7:30 am	Registration & Breakfast
8:00 am	Acid-base balance in intensive care - Barry Wilkins
9:30 am	Session close

Friday January 18

7:30 am	Registration & Breakfast
8:00 am	Recognition and management of anaesthetic disasters - Jess Smith
9:30 am	Session close
4:00 pm	Afternoon refreshments
4:30 pm	Asthma: state of the art - Andrew Numa
5:30 pm	Conference close

A certificate of attendance will be issued shortly after the event concludes.

Abstracts

Beyond "Surviving Sepsis"

Andrew Numa

Hippocrates defined sepsis as "a process by which flesh rots, swamps generate foul airs and wounds fester". In the 19th century, Louis Pasteur, informed by microscopy and the discovery of bacteria turned to a definition of "blood poisoning". With the development of antibiotics and modern intensive care survival from sepsis became increasingly likely, but mortality remained a significant risk. Consensus definitions were proposed in 1992, and recognised that the constellation of symptoms and signs generally described as "sepsis" could occur in the absence of bacteraemia - hence a new term of SIRS was proposed. The realisation that inflammation rather than infection was a key factor in pathogenesis ushered in trials of a number of new therapeutic regimens, many of which have failed to improve outcomes. Nevertheless, significant progress has been made and mortality has halved in the last 25 years. Sepsis remains a significant problem however, accounting for approximately 750,000 hospital admissions per annum in the US and around 10% of adult and paediatric intensive care admissions. "Surviving Sepsis" guidelines have provided a useful framework for initial management, but recent studies suggest some opportunities for refinement. Type, volume and rate of administration of resuscitation fluids - only loosely specified in the guidelines - may significantly influence outcomes. Normal saline is probably the worst (or least best) resuscitation fluid in sepsis but is widely recommended despite evidence of superiority for NSA and balanced crystalloids. Overly aggressive fluid resuscitation is associated with increased need for mechanical ventilation, length of stay, and mortality. There is little evidence that the "timely" administration of antibiotics has significant impact on outcomes. Low dose steroid therapy is widely recommended for both adult and paediatric patients, albeit with little direct evidence in children, and the combination of fludrocortisone and hydrocortisone appears to be superior to hydrocortisone alone. New therapies showing promise in early trials include ascorbic acid and beta blockers.

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The difficult airway

Phil Black

Difficult airway access is a medical emergency that requires a systematic approach and stepwise escalation of interventions in order to achieve a satisfactory outcome. Algorithmic approaches to cant't intubate / can't ventilate will be discussed.

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Medico-legal challenges

Andrew Hoyle

Dr Andrew Hoyle holds a Licence to Practise with the General Medical Council (UK) and he maintains a Practising Certificate with the Bar Standards Board (UK). He qualified in medicine from Guy's and St Thomas' Hospitals in 1996 and spent several years working in acute medicine before completing his training as a General Practitioner. He was called to the Bar in 2006 and completed his pupillage at 3 Serjeants' Inn, one of the UK's leading sets in clinical negligence and medical law. Andrew is now Head of Medico-legal Services for a UK Government department and he sits as a panel member for the Medical Practitioners Tribunal Service.

Andrew will provide an update to current medico-legal issues including recent cases that have changed practice.

Nutrition in critical illness

Gordon Flynn

Much has changed over the last ten years in the field of ICU nutrition with ideas coming and going. There is renewed interest and studies around which route is optimal,1 how much we should feed, how soon should we start and is a little better than a lot early on in critical illness?2,3 How should we measure our patients needs and is this of any value? What if any point is there in measuring gastric residual volume (GRV)?4,5 Superfoods what are they and what role if any do they have in our diets and the diets of our patients? Should we meet full nutritional goals early or may there be a message of harm?6,7 Apart from calories and protein is it important to consider micronutrients and what is the current trend in immune-nutrition?8,9,10 Vitamin C, thiamine and steroids should I give these to all my patients with sepsis? Is there a role for protein supplementation in the presence of active and passive muscle exercise.

Looking at some of the research over the last 10 years one hopes we can shed some light on how best to feed our patients during their time in the ICU. I will also highlight some of the studies on the horizon to watch out for which will hopefully assist us in this slightly forgotten yet critical part of the recovery of our patients.

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Boreout, burnout and existential futility

Tracey O'Brien

Burnout syndrome is described as a state of exhaustion resulting from exposure of high and sustained levels of stress in the work place. Burnout is typically measured across three domains of emotional exhaustion, depersonalisation and personal accomplishment. Symptoms of burnout can include headaches, hypertension, GI problems, insomnia as well as relationship problems, disillusionment, lack of empathy, feeling overwhelmed, substance abuse, depression and anxiety and suicidal ideation. Large cross-sectional studies of the medical workforce suggest that at least 50% of medical professionals experience significant signs of burnout. Further, rates of burnout among medical professionals are higher in comparison to other professional workers with higher rates of suicidal ideation, post traumatic stress disorder, anxiety and depressive disorders. Emergency and critical care workers are particularly vulnerable. In addition to detrimental health effects on individuals, physician burnout impacts negatively on patient safety, perceived physician-patient communication, staff turnover and morale.

Excessive workloads, increasing use of electronic medical records, deteriorating work conditions, loss of autonomy and meaning in work and trouble balancing personal and professional life all contribute to physician burnout. Literature suggests that female physicians are more vulnerable to burnout as are younger doctors. Significant barriers to accessing help exist with significant concerns of lack of privacy, embarrassment, concerns for impact on other staff and lack of time all self-reported reasons for failure to seek help. Solutions for solving professional burnout are complex and require both individual and organisational approaches with the later shown to have greater impact in improving outcomes. are required to address the problem.

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Paediatric ARDS

Kit Newth

The adult medical community is now celebrating 50 years of Acute Respiratory Distress Syndrome (ARDS) research(1). While the syndrome has been recognized to occur in children from its initial description(2), until recently there has been no attempt to specifically define ARDS in children. Both the American European Consensus Conference (AECC) and Berlin Definitions of ARDS were not created with children in mind(3,4). Given substantial differences in the epidemiology and management of children with ARDS as compared with adults, the Pediatric Acute Lung Injury Consensus Conference (PALICC) was convened to develop a pediatric definition of ARDS(5).

The Berlin and PALICC definitions of ARDS are similar in regards to (a) the development of signs and symptoms within 7 days of a clinical insult, and (b) development of pulmonary oedema that is not fully explained by cardiac failure or fluid overload. Unlike the Berlin Definition, the PALICC definition: (i) does not require bilateral infiltrates on chest X-ray (CXR), (ii) incorporates pulse oximetry based metrics when a PaO2 is not available, (iii) introduces use of oxygenation index (OI) or oxygenation-saturation index (OSI) to stratify severity groups instead of PF ratio with minimum Positive End Expiratory Pressure (PEEP), and (iv) creates specific criteria to define ARDS in children with chronic lung disease and cyanotic heart disease. The PALICC definition was established based on literature review, consensus opinion, and evaluation of existing data from previously published studies of ARDS which used AECC or Berlin Criteria(6). Its publication appears to have had a beneficial effect of stimulating discussion and research in the paediatric critical care community. The true implication of routine use of the PALICC criteria on the epidemiology of PARDS has been recently elucidated in a 145 Pediatric ICU international study (PARDIE) undertaken to compare the difference in number of cases of ARDS and their respective mortality rates when applying the PALICC definition of PARDS(7). The effect on mortality of PEEP application below the ARDSnet grid has been examined(8) and the role of computer-based decision support tools on mechanical ventilation is being tested both in the acute(9) and weaning(10) arms of PARDS.

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Oxygen toxicity in Australasian PICUs

Andrew Numa

2017 marked the centenary of John Haldane's first description of the therapeutic use of oxygen in acute respiratory failure. Although Haldane also described an LD_{50} for oxygen exposure, at least in mice (12 weeks at F_IO_2 of 0.70), it is only recently that the true risks of hyperoxaemia are being appreciated. There is substantial evidence from animal and human studies that even relatively short-term exposure to an enriched oxygen environment lead to deleterious changes in the lung including increased capillary leak, fibroblastic proliferation and production of inflammatory cytokines.

It is curious that despite a century of use of supplemental oxygen, no large RCTs have investigated the effects of different oxygenation targets in patients with acute respiratory failure managed with mechanical ventilation. In fact there is no clear agreement of a definition of hyperoxaemia, with various arbitrary threshold values for P_aO_2 of 120, 200, 300 and 400 mmHg suggested in recent literature. Several large retrospective trials suggest the presence of a U shaped risk-adjusted mortality curve with higher mortality observed at both low and high levels of inspired oxygen, and it appears that mortality begins to increase at P_aO_2 values of > 120 mmHg, a value that was exceeded in 49.8% of patients in a recent Australasian observational trial.

Recent prospective trials point to increased infarct size and post-infarct complications in patients randomised to receive supplemental oxygen, and a single centre study comparing saturation targets of 94-98% vs 97-100% in a general adult ICU population demonstrated a 40% reduction in mortality in patients randomised to conservative oxygenation. Several large muliticentre prospective trials of conservative versus more liberal oxygen supplementation are in progress at present, and the results are awaited with interest. In the meantime, it appears prudent to avoid extremes of hyperoxaemia wherever possible. A targeted maximum P_aO_2 of 120 mmHg seems reasonable. Oxygen is a drug that has potential to cause significant patient injury in overdose.

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Acid-Base balance in intensive care

Barry Wilkins

Acid-Base theory dates from the mid 19th century with the discovery of electrical charges, the proton as the ion of acidity, and the law of mass action and dissociation constants. Lawrence Joseph Henderson, an American physiologist in the early 20th century was pivotal in the discovery of the buffering power of carbon dioxide (which he consistently called carbonic acid) and phosphates. Donald van Slyke, an American biochemist, determined the relationship between acid load and plasma bicarbonate, invented a manometric method to measure carbon dioxide content of blood (still used today), and titrated albumin. Therefore, any “new” acid-base theory is not new.

The Danish school (Astrup, Severinghaus and siggaard-Anderson) studied blood isolated from the body and invented the concepts of standard bicarbonate and base excess. This work has dominated clinical acid-base analysis ever since. The ionograms of James Gamble Sr., an American paediatrician, are little known and form the basis of anion gap and the more recently labelled “strong ion gap” which is a calculated variable based on the ionic values of major anions and cations in plasma. Lactate should be counted on its own, rather than a component of the strong ion gap, because of its powerful association with mortality in all groups.

We can show that bicarbonate alone is an adequate measure of the acidity or alkalinity of blood.

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Recognition and management of anaesthetic disasters

Jess Smith

This talk will focus on emergencies that we could encounter in any of our critical care environments - local anaesthetic toxicity, malignant hyperthermia, and anaesthesia Induced rhabdomyolysis. It will provide a clinical overview of how to recognise and treat these rare but life threatening events, and maybe even convince everyone that suxamethonium is a drug of the past.

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Asthma: state of the art

Andrew Numa

Asthma is the most common disorder presenting to the emergency department, and occurs in approximately 20% of the paediatric population. A number of effective therapies are available to clinicians, however there is a substantial variation in both practice guidelines and their clinical implementation. Nebulised salbutamol and systemic steroids are the mainstays of treatment in mild-moderate cases. The severe or critical asthmatic is often relatively unresponsive to simple therapy, necessitating adjunctive treatment. Additional therapies include aminophylline, magnesium, ketamine, adrenaline and mechanical support. Despite the majority of clinical practice guidelines recommending IV salbutamol in severe cases there is no evidence to support efficacy. Salbutamol administered by any route substantially increased oxygen consumption, an extraordinarily undesirable effect in a patient in severe respiratory distress. The IV administration of massive doses (up to 900 mcg/kg in the first hour in some guidelines) of a beta-agonist that is approximately equipotent with adrenaline, with attendant implications for oxygen consumption and accumulation of toxic S-isomers is of unproven benefit and may well be quite deleterious. Adrenaline inhibits histamine-induced bronchoconstriction more effectively than salbutamol *in vitro* and should be considered if the patient is unresponsive to maximal doses of salbutamol and may also be of value in patients where mucosal oedema is a significant feature. Aminophylline is synergistic with beta-agonists through phosphodiesterase inhibition, which imposes no metabolic cost. Several recent trials have suggested that high doses of Mg sulphate (40-50 mg/kg/hour for up to 4 hours following an initial 50 mg/kg bolus) are both safe and effective. Although steroids are almost universally used there is disagreement around dosing. Adult data indicates increasing dose-response up to approximately 2 mg/kg q6h, with much larger doses not offering additional benefit. Dexamethasone has a longer half-life than prednisolone and recent studies suggest that a single IM or oral dose of dexamethasone offers equivalent benefits to a 5 day course of oral prednisolone. This may be particularly advantageous in patients with poor compliance. In patients that do not respond to pharmacological treatment, mechanical support with CPAP is a useful adjunct. Mechanical ventilation, however, should be avoided if at all possible as the necessary use of muscle relaxants eliminates active exhalation, leading to significant ventilatory challenges. Approximately 20 children die each year from asthma and by no means all are either known or severe asthmatics. Asthma can be lethal in a first attack, and a lethal episode can occur in children previously categorised as mild asthmatics.

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