



NEW ZEALAND ANAESTHESIA ASM 2011

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David Bogod

Dr. David Bogod is a Consultant Anaesthetist at Nottingham University Hospitals NHS Trust and specialises in the field of obstetric practice. He has a long-standing interest in medico-legal matters and provides expert opinions in medical negligence/ malpractice cases, consent issues and the ethics of research and clinical practice. Dr. Bogod has lectured widely on consent, negligence, risk management, obstetric issues and the pitfalls of publication, the latter drawing on his previous experience as the Editor-in-Chief of Anaesthesia. He is a Regional Assessor for the Confidential Enquiry into Maternal Deaths and a Vice President of the Association of Anaesthetists of Great Britain and Ireland.

Abstract: Alternative Practitioners in the UK

Wednesday 2nd November

13.30 – 15.00

UK anaesthesia workforce predictions in 2000 painted a bleak picture. Training numbers were not keeping up with the expansion of the NHS and the forthcoming implementation of the European Working Time Directive meant that what anaesthetist there were would work fewer hours. The Department of Health and the Royal College of Anaesthetists, having visited countries such as USA and Sweden, set up the New Ways of Working in Anaesthesia (NWWA) programme to formulate training for non-medical practitioners. Five pilot sites were set up in 2003, with 21 further NHS Trusts joining two years later. After several name changes, the practitioners, almost exclusively drawn from the ranks of nursing and operating department practitioners, became known as Physicians' Assistants (Anaesthesia) - PA(A)'s.

At the time of writing, there are approximately 100 PA(A)s practising in England, Scotland and Wales, and a review carried out by the Association of Anaesthetists of Great Britain and Ireland has helped to elucidate their roles. Most are doing what was originally anticipated, running anaesthetic maintenance with supervision provided by one medical anaesthetist looking after two theatres, in the manner of many hospitals in Sweden. Induction of anaesthesia is usually directly supervised, but a higher proportion of PA(A)s manage emergence without the medical supervisor in theatre. The commonest area of deployment is, unsurprisingly, high-turnover lists of short cases. Expanded roles include training of others, pre- and postoperative assessment, placement of central and arterial lines and, increasingly, regional nerve blocks; audit of the latter activity shows that some practitioners are performing very large numbers of blocks with excellent success rates. Indeed, the impact of these expanded functions, which have been shown in audits to improve turnaround and to allow staggered patient admission, have to a certain extent eclipsed the original intended role.

While those practitioners already in place are working effectively and safely, the anticipated shortfall of medical anaesthetists has not materialised, and the PA(A) programme has shrunk, such that only one training scheme is still functioning.

Abstract: The Changing Face of Publication

Thursday 3rd November

10.30 – 12.00

Medical publishing has come a long way since the Provincial Medical and Surgical Journal (later to become the BMJ) published a warning about the untoward effects of drunkenness - to wit, having one's face eaten by a pig - in December 1840. The pages of Anaesthesia, in its early days, were enlivened by Gordon Ostlere - better known to us all as Richard Gordon - musing on the value of a bunch of flowers in the anaesthetic room to make it more homely [1], but it is perhaps more surprising to see how relevant some of the earlier papers still are to modern practice [2].

The modern medical journal has many roles, ranging from the transmission of arcane ephemera to a small group of peers, to alerting clinical practitioners to safety hazards, and even influencing government policy [3].

Peer-review publication remains one of the best ways to enhance a professional curriculum vitae, but there are many well-recognised pitfalls which are likely to lead to rejection. Pressure to achieve publication is such that some practitioners are unwise enough to plagiarise others, fudge data, or even completely invent it in order to get into print. Successful fraud can alter the scientific record with widespread consequences: discovered fraud can lead to loss of job, profession and even liberty. Some recent examples will be examined [4,5].

Even without deliberate manipulation of submitted work, however, the scientific record can be and still is routinely distorted by a number of factors, including the insidious tendency towards publication bias. Even that ultimately clean, scientific and worthy endeavour, the Cochrane meta-analysis, is not immune from bias and misrepresentation [6].

This talk will close with an examination of some of the costs and limitations of traditional scientific publication, along with a glimpse into the possible innovations of the future.

Abstract: Medico-Legal Safety

Friday 4th November

08.30 – 10.00

The legal principles of negligence derive from British common law. In order to demonstrate that his/her care has been negligent, a patient has to demonstrate that the standard of that care fell below the level enshrined in the judgement in Bolam: "A doctor is not guilty of negligence if he has acted in accordance with a practice accepted as proper by a responsible body of medical men skilled in that particular art" [1]. This standard has recently been raised somewhat by the decision in Bolitho, which calls for the practice in question to be amenable to logical analysis and defence [2].

As well as a failure of duty of care, patients have to show that they have suffered harm - whether physical or psychological - and that this harm arose directly from the negligent act. It is this latter point - the principle of causation - that often leads to claims being unsuccessful.

Negligence litigation in anaesthesia will be illustrated in this lecture by reference to nerve damage, one of the commonest areas of claims against anaesthetists. Peripheral nerve damage, spinal cord puncture and compression, hypotensive ischaemia will be considered, along with indirect damage and incorrect attribution of surgical nerve damage to the hapless anaesthetist.

Two recent high-profile cases, one UK-based and one from Australia, have raised the spectre of antiseptic contamination of the subarachnoid space causing severe progressive arachnoiditis [6,7]. Chlorhexidine has significant advantages over povidone-iodine with regard to decolonisation of the skin, but the few animal studies that exist suggest that it is potentially neurotoxic [8,9]. At the time of writing, the debate is continuing over what solution to use and in what presentation.

The presentation will conclude with ten 'top tips' to, hopefully, protect yourself from litigation.

Ross Kerridge

Dr Ross Kerridge is a Specialist in Anaesthesia & Perioperative Medicine at John Hunter Hospital in Newcastle, Australia. He is Senior Lecturer at the Centre for Clinical Governance Research in Health, Australian Institute of Health Innovation, Faculty of Medicine and has been a health systems management consultant for many hospitals in Australasia, Canada and the UK. Dr. Kerridge has a clinical interest in Perioperative Medicine, and in the organisational and system issues of perioperative patient management. He led the establishment of the "Perioperative System" model of care for elective surgery in Australia which is now the generally accepted model of patient care and has been adopted internationally. He also established the first 'Medical Emergency Team' in 1990. His current interests include continuing to improve perioperative systems, training in perioperative medicine and improving communication and teamwork.

Abstract: Preoperative Assessment and Preparation

Wednesday 2nd November

13.30 – 15.00

Internationally, there is an ongoing 'paradigm shift' in the preprocedural clinical management, and in the organisation of preprocedural patient care. In this paper I will deal with a few particularly interesting aspects of the changes that are going on around us.

Communication (interprofessional)

The shift to multi-practitioner care means we must have more standardised and structured ways of communicating clinical information. This applies to both written and verbal communication ('ISBAR' is an example of the latter)

Computers

The long-awaited Electronic Health Record is actually arriving, although by evolution rather than the revolution desired by IT advocates. The effect of this as a 'disruptive technology' that will drive change in our clinical practices and behaviours is probably underestimated.

Clinical Issues

Current 'Hot Topics' in clinical management issues include:-

- " CardioPulmonary Exercise Testing (CPET or CPX).
- " Blood Management.
- " Anticoagulants, antiplatelet agents and stents.
- " Appropriate Intravenous Fluids.
- " Therapeutic Bundles, Protocolised Care, Enhanced Recovery.

Corporate Risk & Benefit

Anaesthetists have tended to focus on the benefit to patients (or anaesthetists) of better preoperative assessment. In both public and private settings, there is increasing awareness of corporate interest in preoperative assessment & preparation.

Conceptual Frameworks

For many hospital clinicians and executives, (including anaesthetists) the 'mental model' of preprocedural patient care process is fuzzy. It is not clearly understood what is happening, exactly why it is important, who is responsible, and how it can be improved.

Anaesthetists need to reconceptualise the preoperative process, and generate a broader understanding of the conceptual framework of what we do. I propose a four dimensional model, and the GRADE (Gather/Review/Analyse/Decide/Explain, Educate, Execute, Evaluate) framework.

Competencies

There is a role for anaesthetists to develop skills in echocardiography for intraoperative and emergency settings, but in elective settings this may not be so clear.

Consumerism

Preoperative assessment processes are still very traditional:- electronic information systems (EHR) and new communication systems have been slowly taken up by the health sector. There is still little genuine consumer focus in health care.

Clinical Governance

Hospital-based preoperative assessment & planning systems provide a platform for proactive clinical governance. This may have major 'political' ramifications which have not been widely recognised.

Clinical Decision-Making

Highly developed preoperative assessment will provide a platform for sophisticated risk/benefit analysis, particularly including survival, quality of life, and life expectancy prediction models. This will enable better identification of futile or marginally justifiable surgery. Anaesthetists will inevitably be drawn into these issues.

Counselling

Anaesthetists preoperative discussion with patients cannot be limited to education regarding perioperative procedures and informed consent about risks. Handling 'high-stakes' or end of life discussions must be part of our repertoire of perioperative skills.

Clinical Leadership

The increasing sub-specialisation of surgery and surgeons must be balanced by 'clinical generalists' with a broad view of the hospital system and processes. Quality deficiencies in hospitals are the major preventable risk to patient outcomes. Quality improvement must be seen as a central focus in the development of perioperative medicine. Just ensuring that we are doing the basics 'right' will be an achievement in itself.

Abstract: Postoperative Systems

Friday 4th November

08.30 – 10.00

The postoperative phase of patient care in hospitals is increasingly recognised as the weak point in the perioperative process. Hospital-wide audits of perioperative outcome such as the REASON study are revealing the morbidity and mortality hidden in procedure-specific audits and prospective clinical trials, because they show what happens in the imperfect 'real world'.

Different approaches can be, and have been, used to address these unacceptable patient outcomes.

- " Better and appropriate education (e.g. CCrISP).
- " Therapeutic bundling and protocol-based care (e.g. Fast-track surgery, ERAS)
- " Change in ward function (e.g. High Dependency Units, step-down wards etc)
- " Workforce Redesign - (e.g. Advanced skills nurses)
- " Improved Response to deteriorating patient (e.g. MET Teams)

The persistence of the 'problem' suggests that these approaches are inadequate. Reengineering offers a more sophisticated and effective solution. The introduction of checklist-guided team behaviours, standardised documentation (e.g. observation charts) and standardised communication (e.g. ISBAR) are all simple examples of clinical process reengineering.

Some recent work suggests the future will bring more profound changes based on reengineering:-

- " A trial (in Newcastle) of different approaches to perioperative medication management showed little benefit from education and better documentation. Process change was needed to improve safety.
- " A trial in an acute medical ward (Manchester) of advanced wireless handheld computers to gather patient observations, and automatic escalation of clinical alerts, resulted in a major improvement in appropriate MET calls, and reduced length of stay.
- " Bellomo and colleagues in Melbourne recently reported initial data from work integrating commonly collected 'routine' laboratory data into an early warning system. They used intelligent information systems to develop remarkably accurate predictive models to produce early identification of ward patients at risk of deterioration. Further integration with physiological parameters will prove even more specific, allowing 'smart systems' to identify patients at risk and automate warnings to clinicians.

" Work with artificial language interpretation has been used to enable computers to 'read' the scientific literature and identify new patterns of illness and disease associations.

These and other developments have profound implications for the future of clinical practice. Among other things, the hospital workforce of the future may be less dependent on highly specialised knowledge held by a few individuals available on call. Rather, the need will be for skilled generalists trained to work in teams and in complex locally-engineered systems, but also trained and empowered to stop and override clinical processes when necessary. The latter requirement may be the most difficult to achieve.

Guy Ludbrook

Professor Guy Ludbrook is the Head of the Discipline of Acute Care Medicine and the Deputy Head of the School of Medicine, University of Adelaide, South Australia. He was the 1999 Lennard Travers Professor of Anaesthesia and the Douglas Joseph Professor of Anaesthetics in 2001. His research and clinical interests include anaesthesia and analgesia drug delivery, neuroanaesthesia, neuropharmacology, and advances in healthcare delivery. He has presented widely on these and other topics. He is a Member of the Primary Examination Subcommittee of ANZCA, Chair of the Medical Devices Evaluation Committee (TGA), and a founding member of the South Australian Clinical Senate.

Abstract: Physician Assistants in Perioperative Medicine

Wednesday 2nd November

13.30 – 15.00

Anaesthesia needs an enhanced presence outside the operating room. We have evidence of an association between incomplete assessment/management and poor outcomes in Australia¹. We have evidence that anaesthesia postoperative outreach substantially improves patient outcomes². However, we also have concerns about a real supply-demand disconnect in healthcare. Australia, New Zealand and many other Western countries share the challenges of an ageing population, generational changes in work-life balance, regulated working hours, the gender balance in the medical workforce³. Resource limitations suggest that simply multiplying existing workforce models, such as inexorably increasing medical school outputs, is not a sustainable solution. Additional solutions are required, and include innovative care models, international medical graduates, and extended roles of allied health care professionals.

If anaesthesia is to genuinely grasp the challenge of an enhanced presence outside the operating room, it will need to enhance its capacity through multidisciplinary care teams. This is commonplace for any specialty which needs to process referrals, and develop and implement care plans across outpatients, hospital wards, and procedural areas⁴.

Having a Physician Assistant as part of this team has potential advantages. The US model of PAs as health professionals trained in the medical model, and licensed to practice under the supervision of a medical practitioner, provides a model of a member of a multidisciplinary team with clear delegated roles and responsibilities. Further, a defined scope of practice which includes patient assessment, and ordering investigations and medications under medical supervision, provides a good fit with many of our out-of-OR needs.

PAs work well in this type of team approach to care in the USA, and have proven successful in pilots and limited settings in countries such as the UK and Australia. A pilot of PAs in perioperative medicine in South Australia, whilst challenging, provided pre- and post-operative care which was not there previously⁵. Its absence translates into real quality and cost issues, such as ill prepared or cancelled cases, and undetected postoperative problems. Any ongoing role for PAs in Australia, however, awaits review by Health Workforce Australia, and formal governance processes for both education and practice.

1. Safety of Anaesthesia: A review of anaesthesia-related mortality reporting in Australia and New Zealand 2003-2005. Ed: N Gibbs
2. Story DA, Shelton AC, Poustie SJ, Colin-Thome NJ, McIntyre RE, McNicol PL. (2006). Effect of an anaesthesia department led critical care outreach and acute pain service on postoperative serious adverse events. *Anaesthesia* 61(1), 24-28.
3. <http://www.who.int/mediacentre/factsheets/fs302/en/index.html>
4. <http://www.dhmc.org/spine/>
5. Australasian Anaesthesia 2009, Ed: Richard Riley. pp 111-114.

Abstract: New Methods for Analgesia Delivery

Thursday 3rd November

08.30 – 10.00

High quality analgesia is critical to good perioperative care. Whilst we await the development of new analgesics with improved efficacy and safety profiles, there are opportunities to optimise the delivery of our existing drugs. Critical to genuine advancement in patient care, however, is evidence of clinically significant improvements in outcome, accompanied by safety profiles which are at least as good as existing therapies. Intraoperatively, more precise drug administration using target controlled infusion technology is an important goal, however, inter-individual variability in pharmacokinetics and pharmacodynamics remains a significant obstacle¹. As is the case for sedative-hypnotics, real-time mechanisms for intraoperative measurement of analgesic effect are necessary. Technologies such as processed EEG/EMG² and pupillometry³ show promise, and some clinical data are appearing to suggest clinically relevant patient outcomes.

The pharmaceuticals of analgesics is an active area of research, with a range of new preparations of existing drug in development, or marketed, with the goal of providing improved profiles of analgesia, or new routes of administration. Technologies used range from liposomal-based preparations to provide slow release, to ultra small nanotechnology particles or electric charges to enhance skin penetration. Drugs currently being actively explored include slow release local anaesthetics and opioids, intravenous NSAIDs, and transdermally administered opioids. Some early phase studies provide initially alluring pharmacokinetic or pharmacodynamic profiles. However, failure to translation into genuine benefit in later phase trials does not always flow, through either low efficacy, or appearance of adverse effects⁴. Lessons learned from the literature, and from first hand experience through the phases of drug development, provide insights both what we might expect from analgesia into the future, and also how we might evaluate current and future published evidence.

1. Leslie et al. Cochrane Database Syst Rev CD-006059, 2008
2. Chen X et al. *Anesthesiology* 112:1175-83, 2010
3. Sabourdin N et al. A282 *Anesthesiology* 2011, Chicago IL
4. Sumida S et al. *J Opioid Manag.* 5(5):301-5, 2009

John Myburgh

Professor John Myburgh is Professor of Critical Care Medicine at the University of New South Wales and Director of the Division of Critical Care and Trauma at The George Institute for International Health, Sydney. He holds honorary professorial appointments at the Universities of Sydney and Monash. He is a senior consultant physician in the Department of Intensive Care Medicine at The St George Hospital. He is the President of the College of Intensive Care Medicine and was a foundation member and past chairman of the Australian and New Zealand Intensive Care Society Clinical Trials Group. He has an international track record in basic science and clinical trials research, have received over \$35M of grant funding, having published over 100 original articles, including the SAFE, SAFE-TBI, NICE-SUGAR, RENAL, Dopamine and CAT studies. He is currently leading the crystalloid vs hydroxyethyl starch study (CHEST).

Abstract: Fluids in critical care

Wednesday 2nd November

15.30 – 17.00

In Critical Care Medicine, the use of crystalloid and colloid solutions for intravascular resuscitation and fluid replacement is fundamental. The selection of crystalloids or colloids is made on physiological principles, primarily those directed at sustaining an effective plasma volume and maintaining a normal metabolic milieu. However, many of the arguments advocating the use of colloids or crystalloids offer similar but diametrically opposite perspectives. It is not surprising therefore, that a mixture of the two appears to be most common selection.

Systematic reviews of crystalloids and colloids for intravascular resuscitation have demonstrated no substantive evidence of benefit of colloids over crystalloids. The 6997-patient Saline vs Albumin Fluid Evaluation (SAFE) study provides the most compelling data and dominates the latest meta-analyses from the Cochrane Collaboration. Apart from demonstrating equivalence between 4% albumin and normal saline on mortality, this study also demonstrated no difference in adequacy of haemodynamic resuscitation, duration of

mechanical ventilation or requirement for renal replacement therapy in a population of critically ill patients. This study confirmed the equivalence and safety of albumin (a colloid) resuscitation when compared to saline (a crystalloid).

Accordingly, the low cost and ubiquitous availability of crystalloid solutions throughout the world offer a distinct advantage over colloid solutions. The capital cost of colloids such as gelatin, dextran and starch are 10-30 times the cost of crystalloid solutions. These synthetic agents are non-physiological with variant half-lives, in many cases not substantially longer than crystalloids and the purported benefits on anticoagulation and immune modulation remain unsubstantiated in outcome-based clinical trials. Albumin incurs a similar capital cost to synthetic colloids (with the exception of Australia, where a single supplier provides albumin free to users) and potentially expose patients to allergy and infection. Despite these limitations, the use of synthetic colloids, particularly starch, is increasing in Europe.

An emerging body of evidence raises further concerns about the clinical utility of colloids in selected patient populations. A post hoc analysis of patients with traumatic brain injury in the SAFE study demonstrated a statistically significant higher mortality and worse functional long-term neurological outcomes in patients who received albumin compared to those who received saline. The observations of a statistically significant increase in acute renal failure in septic patients receiving hydroxyethylstarch compared to gelatin have been confirmed in a recently conducted study of septic patients randomised to receive 6% hydroxyethylstarch or Ringers Lactate. A large scale randomised-controlled trial to determine the safety and efficacy of new starch preparation, specifically 6% hydroxyethyl starch (130/0.4) is underway - the crystalloid vs hydroxyethyl starch trial (CHEST).

In the absence of proven benefit and substantially reduced costs, there is a prime facie case to preferentially recommend the use of crystalloids in critically ill patients. The use of colloids in patients with traumatic brain injury and in patients with sepsis and renal dysfunction should be done with circumspection.

Abstract: Evidence for the use of vasopressors in critically ill patients

Thursday 3rd November

08.30 -10.00

The pharmacological support of the failing circulation is a fundamental component of Critical Care Medicine. Despite a substantial body of basic science research into the cellular and biological actions of neurohormonal regulation of the circulation by catecholamines and associated hormones such as vasopressin and cortisol, the translation of this data into human studies has been limited.

Early human studies were markedly influenced by the use of synthetic catecholamines and a number of low quality trials addressing the effects of these drugs, often in combination with noradrenaline or adrenaline using a variety of dose ranges, and surrogate physiological endpoints produced conflicting results.

A recent systematic review of higher quality trials identified a only 8 trials (n=172) and concluded that there was insufficient evidence to inform clinical practice.

Three higher quality trials have subsequently been published that provides clearer evidence. A French trial comparing noradrenaline/dobutamine and adrenaline demonstrated no difference in 28 day mortality between the two groups in patients with severe sepsis. An Australian study comparing noradrenaline and adrenaline on time to resolution of shock demonstrated no difference between the two drugs and no difference in mortality or organ failures. Both of these trials demonstrated that adrenaline was associated with hyperlactataemia but no difference in organ failures or resolution of shock. The VASST trial compared noradrenaline and vasopressin in patients with septic shock and similarly demonstrated no difference in 28 day mortality between the two groups.

On the basis of these 3 randomised-controlled trials, it would appear that noradrenaline is the vasoactive agent of choice in terms of resolution of shock and fewer side effects, although adrenaline is an equieffective drug.

There is no substantive evidence to support the use of vasopressin as a catecholamine-sparing agent or the use of synthetic catecholamines such as dobutamine.

Ken Whyte

Dr. Ken Whyte is the Associate Professor of Medicine at the University of Auckland and a practicing respiratory physician. He has lectured widely on sleep and pulmonary hypertension and established the Pulmonary Vascular Clinic at Greenlane Hospital in 1997. Dr. Whyte is involved in the New Zealand Cardiac and Pulmonary Transplant Programme and his research interests include Non-invasive Ventilatory Support, Pulmonary Vascular Disease and Lung Transplantation.

Abstract: Pulmonary Hypertension

Wednesday 2nd November

15.30 – 17.00

The "lesser circulation" was hidden until recently and its remarkable physiology unexplored but that is rapidly changing. As we gain insight into its pathophysiology and the increasing number of conditions that damage the pulmonary vasculature an understanding of pulmonary vascular disease is becoming essential.

The classification of pulmonary hypertension (Venice Classification) into pre-capillary (PAH) and post-capillary (mostly secondary) and then subsequent sub-classification, dependent on presence of other disease that may lead to PH, is crucial to understanding these patients, their pathophysiology, clinical course and potential therapies.

Increasing access and use of echocardiography, an ageing population in which a number of important diseases which can impact on the pulmonary circulation are now "controllable" is leading to an increasing prevalence of pulmonary hypertension (PH).

Inevitably this increasing prevalence is impacting on both anaesthetists and intensivists as these patients present with acute problems and come under their care.

Unfortunately when they present acutely often accurate diagnostic work-up has not been attempted. Effectively you, whether as an intensivist or anaesthetist, are facing a patient with "PH of unknown aetiology and type" and need to understand these diseases to be in a position to offer appropriate care in the acute situation.

How can you try to tease out the issues in the acute situation to determine safety for anaesthesia or appropriateness of offering intensive care?

What therapies are available for PH and PAH and do they influence acute outcomes?

Can you avoid triggering the "cycle of death" when giving an anaesthetic and what anaesthetic techniques could you use to minimise risk?

Is intensive care ever appropriate in decompensated pulmonary hypertension with a failing right ventricle?

Abstract: Sleep and Obesity

Friday 4th November

13.30 – 15.00

Whilst we are still scraping the surface in our understanding of sleep both in terms of its purpose, its structure and neuronal mechanics, neuroscience is beginning to offer some plausible insights into both function and mechanisms of slow wave sleep. We are still struggling to confirm the pivotal purpose of REM sleep.

What is the optimal duration of sleep for humans? Does it matter? Sleep duration is linked with mortality and there is increasing evidence of a link with obesity and metabolic disease.

Obesity is the current pandemic - forget H1N1 at least for the moment - and though we think we understand the cause of obesity in our society, in fact it's causes are probably more complex than usually presented. However, there is no doubt weight kills - very slowly and via poor quality of life for many years - and is a huge burden to health systems.

Current belief is that we sleep for our brains and not our bodies. However the impact of sleep on neuroendocrine function, cardiovascular function and regulation of inflammation is offering new insights into a range of areas including control of weight, metabolic regulation and chronic disease. Diabetes impacts on sleep quality and its restorative functions and sleep impacts on diabetic control.

How much can you cut down on sleep or be up at night working without risking your health and well being?

The causes of daytime sleepiness in our society are very different from the causes that would first spring to mind. Recognising these potential causes and the fact that most sleepy individuals have more than one issue causing sleepiness is key.

Inevitably we have to mention snoring and obstructive sleep apnoea and the huge uncertainties round its prevalence, its impact on sleep and physical health are important. Its potential to affect anaesthetic outcomes is not clear-cut and whether any intervention makes a significant impact on any altered risk is equally uncertain. For the vast majority of patients with OSA it is a complication of weight gain and the only proven cure is weight loss. CPAP is a crutch every night for life and a very poor second best therapy.

Jonathan Christiansen

Dr Jonathan Christiansen is a Cardiologist working at North Shore Hospital. Dr Christiansen graduated from Auckland Medical School, and trained in Tauranga and Auckland, before moving to the USA, undertaking Fellowships at the Universities of Virginia, and Rochester, New York. His clinical practice is general Cardiology, with a clinical and research focus in non-invasive imaging, including cardiac MRI, CT coronary angiography and nuclear perfusion imaging. He is currently Head of Division of Medicine at Waitemata DHB, and maintains a keen interest in medical education, being both the Chair of the NZ Education Committee for the Royal Australasian College of Physicians, and a Clinical Senior Lecturer at Auckland University School of Medicine.

Abstract: CARDIAC MULTIMODALITY IMAGING: Informing better decisions - or just costly pictures?

Wednesday 2nd November

15.30 – 17.00

Echocardiography has been the bastion of cardiac non-invasive imaging for both preoperative evaluation, and decision making in the intensive care unit. Myocardial nuclear perfusion imaging (SPECT) is a similarly mature technology with a strong evidence base. In a minority of patients stress imaging may play an important role in the clarifying individual preoperative risk in non-cardiac surgery, and can inform treatment plans and prognosis. Recent evidence and updated clinical guidelines have refined the criteria for embarking on an imaging-based strategy. However the rapid evolution and acceptance of Cardiac MRI and CT Coronary angiography is challenging established clinical paradigms. Both modalities provide unique information - but the benefit of this knowledge in anaesthetic practice is only now being assessed. In situations where portability is crucial, echocardiography remains dominant. The use of ultrasound contrast, handheld machines and real-time 3D capability all have potential value in both the intensive care and operating theatre environments. In this presentation the current and possible future role of newer technologies will be explored, along with recent advances in echocardiography.

Ross Kennedy

Ross Kennedy Practices anaesthesia in Christchurch and is an Associate Professor with the University of Otago in Christchurch. He has interests in improving anaesthesia delivery through better understanding of drugs and equipment, and by improving the display of information that is already available. Ross feels that the advances in anaesthesia delivery being discussed in this talk finally are finally making those years of "anaesthesia practice" pay off, but accepts that some of us take longer to learn than others.

Abstract: New Tools and Approaches to Optimising Anaesthetic Drug Delivery

Thursday 3rd November

08.30 – 10.00

We all recognise that delivery of anaesthetic drugs should match individual patient needs and that these needs change dramatically as surgery progresses. However the complex relationship between drug delivery and effect make this task a challenge. Pharmacokinetic data based on volume of distribution and rates of elimination beloved of primary candidates has very little to do with onset and offset of commonly used drugs such as propofol, fentanyl or of inhaled agents.

The history of anaesthesia delivery is of new drugs, improved understanding of old drugs and new tools to aid drug delivery. The tools I will discuss are just part of this ongoing trend. As with any new drug, or technique it will take some time before we know if these tools are real advances which help us better care for our patients or passing fashion.

Effect site targeting and volatile anesthetics.

Many anesthetists are familiar with the concept of Target Controlled Infusion (TCI), especially of propofol. TCI systems can be automatic as in the Diprifusor and its successors, or be part of a guidance system where the dosing history is used to generate and display calculated levels over time of both plasma and effect site concentrations with the user controlling the rate of delivery. These displays commonly include predicted levels based on the current rate of administration. For many drugs "effect-site" rather than plasma levels are used. All the principles of TCI can be applied to volatile anesthetics. The "delay" between end-tidal and effect for inhaled agents is similar to the delay between plasma and effect for propofol which means there are advantages to using volatile effect site values rather than end-tidal concentrations as 'targets'.

End Tidal Control of Volatile delivery

A number of new anaesthetic "machines" provide automated control of end-tidal agent concentrations. These systems adjust gas flow and vapour delivery to achieve and maintain the end-tidal level entered by the user. These systems are very effective at achieving and maintaining ET levels, and at reducing overall gas flow and hence vapour consumption and waste

TCI anything

Modeling data is available for a wide range of anesthetic drugs. This information has been used by enthusiasts for some time but until recently has involved using specialized software. New devices that interface directly with delivery systems, such as the Drager SmartPilot View and Navigator from GE, as well as various "apps" that depend on the user inputting dosing data, have made model guided control of multiple drugs available to everyone. The ability to see levels of drugs like fentanyl and neuromuscular blockers allows much more intelligent use of these drugs.

Interaction Models

We all know that there is potent interaction between hypnotics and opioids. Most of us recognize that this relationship, like drug kinetics, is impossible to work out. The new tools that allow "TC anything" also graphically illustrate these interactions and readily allow the same "effects" to be achieved with different drug combinations. This allows dosing to be further optimized and also makes using different agents and combinations of similar agents straight forward.

These smart devices are opening up new ways of painlessly applying pharmacokinetic and dynamic knowledge in everyday practice and hopefully allow us to better match anaesthesia delivery to individual patient needs.

Alan Merry

Professor Alan Merry is head of the Department of Anaesthesiology, University of Auckland, an ANZCA councillor and Chair of the College's Quality and Safety and Research Committee. He is also chair of the Quality and Safety of Practice Committee of the World Federation of Societies of Anaesthesiologists.

Professor Merry is co-author of the publication *Errors, Medicine and the Law* (CUP, 2001) and is an international expert on safety in medicine. He is widely published in this field in addition to his work on medications, cardiac anaesthesia and training.

Emerging Strategies

Thursday 3rd November

10.30 – 12.00

Most anaesthetists in New Zealand and Australia are familiar with the Reason-Rasmussen classification of human error, 1 and with current concepts of accident causation.²⁻⁶ Additional insights into human decision making have been provided by Wegner,⁷ Runciman,⁸ Klein,⁹ and Thaler and Sunstein¹⁰.

One consistent theme in all this work is the importance of communication. There are several levels at which communication influences the quality of healthcare. Anaesthetists were very early in recognising the value of incident reporting in identifying and addressing latent factors in the system and thereby avoiding recurrences of accidents, or ideally preventing their occurrence in the first place.¹¹⁻¹³ The latest iteration of this work is WebAIRS, the craft-specific, web-based anaesthetic incident reporting system recently established by the Australia and New Zealand College of Anaesthetists, and the Australian and the New Zealand Societies of Anaesthetists as a tripartite project. Reporting incidents itself achieves nothing; local review of incidents, and actions locally and nationally to address problems identified through the reports are the key elements for quality improvement. The effective communication of important messages (e.g. through alerts) depends on organisational efficacy and on the engagement of practitioners who today are challenged with an excess of information on a daily basis.

Communication with patients is absolutely fundamental to safe anaesthetic practice. The errors which Reason called "knowledge based" occur either through incorrect logic (uncommonly) or because of an incomplete "knowledge base" (much more commonly). In Australia and New Zealand, the level of training of anaesthetists is high, and serious deficiencies in expertise are seldom the cause of accidents. On the other hand, knowledge contained in patient's minds, or in medical notes, or in the laboratory results, is quite often missed, and can be pivotal to sound decision making.^{6 14}

Communication is a two way process, and patient-centred care depends on establishing rapport with one's patients. Confidence in the relationship between a patient and an anaesthetist facilitates the exchange of key information, and underpins informed consent.¹⁵⁻¹⁷ There are many well known challenges in achieving such a relationship within the constraints of a busy anaesthesia service. More work is needed on communication with the community at large, the administrators of hospitals, and our surgical colleagues to establish the context and provide adequate time and an appropriate environment for effective communication. It would also be helpful to develop greater consensus about risk in anaesthesia.¹⁵ It does no service to either our patients or ourselves to understate the hazards of anaesthesia or the importance of our expertise in mitigating these. We, and the surgeons with whom we work, have both responsibility and opportunity to facilitate and promote values-based decision making by our patients, and to ensure that variation in practice ^{18 19 20} reflects differences between the individuals we treat rather than idiosyncrasy on the part of practitioners.

In the operating room itself communication is one of the core non-technical skills of anaesthesia.^{21 22} Simulation has become very important in teaching techniques such as closed-loop communication, graded assertiveness, and directed communication.²³⁻²⁸ A fundamental objective of the World Health Organization's Surgical Safety Checklist ²⁹ is the improvement of communication and teamwork.³⁰ Extension of the principles underlying this checklist has been very effective in improving patient safety.³¹⁻³⁴ Unfortunately, a recent audit confirms anecdotal evidence that the implementation of this checklist is variable.³⁵ In New Zealand, the Health Quality and Safety Commission has identified consolidation of the Checklist and promotion of values-based decision making as priorities for healthcare improvement in the next two to three years. Anaesthetists are well placed to engage in these initiatives and build on their speciality's established reputation for advancing patient safety.

Safety in Anaesthesia Practice

Friday 4th November

08.30 – 10.00

Anaesthetists have an enviable reputation for advancing the cause of patient safety through systematic analysis of risk and early adoption of system-based approaches to reducing the potential for harm to patients.

1 In particular, there has been great success in the application of engineering to previously very troublesome 2 3 equipment-related problems in the delivery of oxygen to patients. 4 It is generally accepted that the rate of anaesthesia mortality has become progressively lower over the last fifty years, but this claim is not unequivocally supported by the available data. 5 The best estimates of anaesthetic mortality rates are those from the Australia, 6-8 but definition 5 and case mix make a considerable difference to measurements of outcome, and mortality attributable to anaesthesia may be very much higher in older patients than is generally realised 9 10 With increased interest in the role of anaesthetists as peri-operative physicians, it is arguable that factors clearly within our influence can make substantial differences to mortality rates in some groups of patients. 11 12 Patients (often otherwise young and in good overall health) continue to die from unanticipated or poorly managed can't intubate can't oxygenate scenarios 13 14 while others continue to be harmed from the inadvertent administration of incorrect drugs. 15 16 17 18 Morbidity is also important, and often under-rated in outcomes research. 19-21

If these reflections on the situation in high income countries seem worrying, the state of peri-operative patient safety in some low income areas of the world is frankly alarming 22-24 and reflects severe deficiencies in human and physical resources. 25 26 The potential return on investment in improving the safety of anaesthesia is therefore greater in these regions, but even in countries with high standards of anaesthesia, such as Australia and New Zealand we are a long way short of the goal of the Anesthesia Patient Safety Foundation (in the USA), that "no patient shall be harmed from anaesthesia." 27 If we are to continue the progress that has undoubtedly been made in the pursuit of this goal and thereby retain or reputation as champions of patient safety, we need not only to adopt the tools of process management which are routinely used in high reliability organisations, 28-30 but more importantly, we need to engage in making them work for us.

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Keith Petrie

Over the past 10 years Professor Keith Petrie has been a key figure in developing the field of health psychology in New Zealand. He holds a personal chair at the University of Auckland in recognition of his research work in this area. His primary research focus involves how patients construct beliefs about their illness or injury and how these influence coping and recovery. His other research interests include psychoimmunology, symptom reporting and modern health worries. For the past 18 years he has also worked as a consultant psychologist for Air New Zealand and has been central to development of the airline's fatigue monitoring system for flight crew. In his spare time he plays tennis, enjoys a wide range of music, and finds new ways to avoid gardening.

Abstract: Risk Taking and Safety**Thursday 3rd November****10.30 – 12.00**

This talk focuses on patients and the factors that influence decisions about risk. There is considerable evidence to show doctors and patients often view the risk of future illness or adverse effects of treatment differently. Some of this disparity is explained by a difference in medical knowledge but there are several other factors operating. How patients think about the effects of treatment and the fit between the patient's view of their illness and their treatment is important. Emotions also play an important role in influencing risk perceptions and decision-making. There are a number of cognitive biases and mental rules of thumb that patients utilize to make sense of large amounts of information in clinical situations. I will also discuss how framing risks can strongly influence patient decision-making.

Jamie Sleight (no bio provided)**Abstract: Postoperative Pain: Nature vs Nurture****Friday 4th November****10.30 – 12.00**

It is an obvious fact to anyone working in a hospital that some patients experience much more pain after surgery than others - even amongst those having had the same operation. Why is this? Can we predict who will get severe pain and who will have almost no pain, and tailor our post-operative analgesic plans accordingly? This is the holy grail of "personalised medicine". Traditionally we have sought an explanation using various tests of the psychological state of the patients - such as depression, anxiety, and catastrophising - or pre-operative pain thresholds. The clinical application of these approaches is unclear; they seem to account for somewhere between 5% and 35% of the observed variability in postoperative pain. An alternative approach is to look for the role of genetic variability as an explanation. It is conceivable that genetic polymorphisms (SNPs) of parts of the nociceptive system are associated with innate pain sensitivity. Evidence for this is based on various animal models and human syndromes of pain insensitivity and hyperalgesia (e.g. the sodium channel protein type 9 subunit alpha (SCN9a/Nav1.7) gene.); and an increasing realisation of the crucial role of inflammation in postoperative pain. There are also well known genetic differences in proteins controlling the receptors, transporters, and metabolism of analgesic drugs - and hence their efficacy. In particular SNPs altering the function of the mu-opioid receptor (OPRM1), catechol-O-methyltransferase (COMT), and the ATP-binding cassette superfamily, subfamily B p-glycoprotein 170 (ABCB1) have been studied - with mixed results. The role of epigenetic processes is only beginning to be understood. It would seem likely that, in the near future, a combination of both nature and nurture will provide the necessary predictive information to be clinically useful.

Jim Olson

Consultant anaesthetist at Waitemata DHB. Graduated from St. George's hospital medical school, London. Pursued career in Emergency medicine and worked for the British Antarctic survey before completing training in Anaesthesia in England & Scotland. Came to NZ for pain fellowship and after passing the ANZCA FPM exam decided to stay. Major role in the recently established WDHB multidisciplinary pain outpatient service. Pain interests in Chronic Post Surgical Pain (CPSP), targeted therapeutic neuroplasticity and outcome measures.

Abstract: Persistent post surgical pain**Friday 4th November****10.30 – 12.00**

Pain persisting after surgery was identified as a major part of the workload of chronic pain clinics many years ago and estimates of its incidence have revealed it to be very common. Despite extended research on this topic prevalence of postoperative pain has not changed very much over the last 20 years and Chronic post surgical pain (CPSP) continues to present a significant burden on individuals and society. CPSP has been the focus of much work and presents a useful opportunity to study pain with a clear precipitant. Direct comparisons between studies has been complicated due to variations in definitions used in the published research to date. However research has identified pre, intra and post operative factors and more recently looked at whether influencing these factors can alter outcomes.

While it was initially thought that persistent postsurgical pain is primarily a neuropathic pain, there is now increasing discussion that in many patients, multiple pathogenic mechanisms are likely to be playing a role in this condition. This lecture will review what we know about CPSP, what we don't, and at practical common sense approaches to this complex subject.

Rick Cutfield

Dr Cutfield is a Specialist Physician and Clinical Teacher for 27 yrs. He Graduated from Auckland University and trained in Auckland with post graduate studies in the USA. Currently he is the Clinical Director of Diabetes and Endocrinology at Waitemata DHB and is the Director of Medical Specialist Group at Mercy Specialist Centre in Auckland. Rick is clinical board member of Diabetes Project Trust in South Auckland. He is a Patron of Diabetes NZ Auckland, the Past president of the NZ Society for Study of Diabetes and a past member of Endocrine Specialist Advisory Committee. Rick is married to a paediatric intensivist and has 3 children.

Abstract: Hot Topics in Diabetes**Friday 4th November****13.30 – 15.00**

Diabetes prevalence has doubled worldwide from 1995-2008. The latest estimates show that nearly 360 million people have diabetes with health care spending on diabetes approximately \$460 billion dollars. Increase is likely due to aging, population growth and lifestyle changes. Oceania has one of the largest rises with an age standardised prevalence of 16%. The costs of managing this disorder and its complications are immense and approximately 10% of most health budgets. Of interest Type 1 diabetes prevalence is also increasing.

In 2011 New Zealand has added an HbA1c of 50mmol/mol (6.7%) as a diagnostic threshold for diabetes if achieved on more than one occasion in an asymptomatic person. We are also challenging the traditional Framingham Cardiovascular Risk Score and have devised a more diabetes specific risk table to help in management decisions especially with respect to the use for aspirin, statin and BP management.

Type 1 Diabetes is now treated almost universally with longer acting insulin analogues which have been shown to reduce hypoglycaemia risk, especially at night. Even longer acting insulins are planned and more rapid acting insulins for meal time are being developed. Insulin pumps are becoming more sophisticated and are starting to deliver insulin linked to glucose levels detected by glucose sensors that patients wear. The concept of a closed-loop sensor-pump is becoming a reality. Pancreas transplants are not a reality in most centres and in New Zealand have been used only at the time of a kidney transplant. Islet transplants remain logistically

and economically a difficult answer to treating Type 1 Diabetes. New drugs to treat Type 2 Diabetes are becoming increasingly available including the newer GLP-1 analogues and DPP IV-inhibitors. There is even a once a week injectable GLP analogue that results in weight loss and reduces HbA1c in patients with Type 2 Diabetes.

The key to preventing Type 2 diabetes is obvious and involves individual, family, society and political responsibilities with the medical profession ever vigilant to identify those at risk and treating them early. The prevention of Type 1 diabetes remains elusive. Immune intervention studies are progressing.

Ross Henderson

Dr Ross Henderson received his medical training from the Otago Medical School and graduated with distinction in 1982. He completed training in clinical and laboratory haematology at Auckland Hospital in 1989 before starting his PhD in molecular medicine at the University of Auckland under the supervision of Professor Jim Watson. His post-doctoral research was carried out in Targeted Genetics, Seattle, Washington, a biotech company with a focus on genetic engineering aiming to harness the immune system in the treatments of malignancy and HIV infections. On his return to New Zealand in 1995 he worked as a Senior Scientist for Genesis Research and Development in discovery of novel growth factors derived from keratinocytes. He returned to clinical and laboratory medicine in 1997 when he took up the post as Haematologist for Waitemata DHB. Over the following years the Clinical Haematology Service has expanded from a staff of only 2, to over 20, including 4 SMOs, with a strong focus on clinical research into both malignant haematology and thrombosis. Dr Henderson is the Clinical Director of the WDHB Laboratory, Clinical Leader of Haematology, Chair of the Hospital Transfusion Committee, a member of the Professional Advisory Committee for International Accreditation New Zealand (IANZ), and a technical expert for IANZ.

Abstract: New drugs in haematology

Friday 4th November

13.30 – 15.00

The past decade has arguably been one of the most exciting and prolific times for new drugs coming to the haematology market. This session is an overview of my perspective as a New Zealand haematologist on the drugs that have been the "movers and shakers" in the New Zealand haematology scene. I will cover the tyrosine kinase inhibitors in chronic myeloid leukaemia - a paradigm of successful cancer research from the discovery of the Philadelphia chromosome in 1960 to the introduction of the first generation tyrosine kinase inhibitor, imatinib, which has shifted this disease from being invariably fatal into a chronic disease. The introduction of rituximab (a monoclonal antibody against CD 20) in combination with CHOP chemotherapy has improved the median long-term survival in diffuse large B-cell lymphoma from around 50% up to 80%. Pharmac has recently approved funding for use of rituximab in low grade non-Hodgkin's lymphoma and chronic lymphocytic leukaemia with resultant improved treatment free survival and arguably long-term survival. Multiple myeloma has always been one of the more difficult malignancies to treat in haematology and there was little progress in improving overall survival until the last decade. The introduction of novel agents including thalidomide, lenalidomide and velcade have improved complete remission rates and have improved median overall survival from approximately 3 years to 6 years, although cure still remains elusive. The epigenetic modifiers including hypo-methylating agents and histone de-acetylase inhibitors are not available in New Zealand outside of studies and will be only mentioned in passing. Finally no talk such as this would be complete without an update on the new orally available anticoagulants, in particular rivaroxaban and dabigatran which are now funded for specific indications. The funding of dabigatran for use in atrial fibrillation was somewhat of a surprise to the New Zealand medical community. While the initial spate of patients with bleeding due to inappropriate use of dabigatran has tailed off the irreversible nature of this drug in the acute setting remains of concern particularly to anaesthetists, surgeons and haematologists.

Ian Civil

Ian is a graduate of the Auckland University School of Medicine. He completed his initial surgical training in Auckland including his general surgical fellowship in 1983. In the mid-80s he worked in the USA for three years, first as a vascular surgery fellow at the Cleveland Clinic and then as a trauma fellow in the Southern New Jersey Regional Trauma Center in Camden, NJ. After returning to NZ in 1987, Ian took up a combined University of Auckland/Royal NZ Army Medical Corps appointment in which he served for 5 years. In 1990-1 he led the NZ Army Medical Team to the first Gulf War. Ian has been Senior Lecturer in Surgery with the University of Auckland since 1988 and from 1992 has practiced as a General and Vascular surgeon at Auckland City Hospital. He has been the Director of Trauma Services throughout this time. Since 2007 he has been Director of Surgery at Auckland City Hospital. He has served on a number of international trauma organisations becoming President of the Association for the Advancement of Automotive Medicine (AAAM) in 1990 and President of the International Association for the Surgery of Trauma and Intensive Care (IATSIC) from 2007-2009. He is a member of the Editorial Boards for the World Journal of Surgery and the World Journal of Emergency Surgery, Associate Editor of Traffic Injury Prevention, Senior Editor of the Australian and NZ Journal of Surgery and Deputy Editor of INJURY. He has been a Royal Australasian College of Surgeons (RACS) Councillor since 2002 and was Chair of the Board of Basic Surgical Training from 2004-2006 and Censor in Chief from 2007-2009. He is the current President of the RACS.

Abstract: New Horizons in the Surgical Care of Trauma Patients

Friday 4th November

15.30 – 17.00

The basic principles of surgical care of the trauma patient have not been challenged in many years. The underlying ABC basis on which the trauma patient is resuscitated and investigated remains unchanged but there have been some sentinel developments that have particular relevance to the surgeon and his/her involvement with the injured person.

Control of haemorrhage

The use of tourniquets predates modern resuscitation methods and was long decried as causing inevitable limb loss. In the modern battlefield, with predominantly penetrating injury, rapid transport and advanced trauma care, they have proven effective at saving both life and limb. Until recent times, the use of tourniquets in the civilian environment, where blunt trauma predominates and transport times generally prompt there were thought superfluous. Recent experience has shown they are both effective and life saving in the urban and rural civilian environments.

Stabilisation of rib fractures

Apart from the underlying lung and pleural injuries that accompany rib fractures, the pain and mechanical compromise to thoracic and upper limb girdle function is often significant. Patients with a flail chest often need to remain in ICU on ventilatory support for a prolonged period and once out of hospital are unable to resume work for months. An approach that involves internal fixation of rib fractures is gaining increasing favour with results suggesting few complications and impressive reductions in ICU LOS and time to return to work. Selection of patients is the most contentious aspect of this approach but the ideal candidates seem to be young patients with a more than three rib fractures and injuries limited to the thorax.

Treatment of retained haemothorax

Retained haemothorax, namely more than 300ml of fluid remaining in the thoracic cavity after an initial thoracostomy tube has traditionally been treated with the insertion of a second and occasionally a third tube. Failure of that approach, usually determined a week or more after injury either leads to thoracotomy, evacuation, and some degree of decortication or if not treated, a restrictive fibrothorax. Increasing experience with video assisted thoracoscopy (VATS) has shown that this procedure can be used to evacuate residual blood from the chest and provided it is done reasonably soon after injury (less than five days) can effectively remove the retained fluid and greatly reduce the risk of the patient progressing to need thoracotomy. The optimal approach to residual haemothorax should include CT scanning to determine the amount of retained blood at 48 hours and if greater than 300ml, VATS should be undertaken in the subsequent 24 hours.

Kerry Gunn

Specialist Anaesthetist, Dept of Anaesthesia and Perioperative Medicine, Auckland City Hospital
Chair, Blood transfusion committee, ADHB

Interest in Trauma and Liver transplant Anaesthesia. Research interests in Massive transfusion, coagulopathy and point-of-care monitoring. Currently leading a multidisciplinary group (The CONCORD Blood project) to improve the effectiveness of blood product administration in patients across the Auckland DHBS and Waikato. Member, NZ National Council ANZCA, Examiner Final Exam ANZCA.

Abstract: Trauma Bleeding

Friday 4th November

15.30 – 17.00

Historically blood transfusion, even with massive blood loss required coagulation factors to be given upon the receipt of abnormal coagulation screen results often leading to late delivery of clotting factors. Borgman et al (2) reported their experience of using warm whole blood and plasma showed a reduction from 65% to 19% in military casualties that received FFP:RBC in a ratio of 1:8 to 1:1. Death by exsanguination dropped from 92% to 37%. Civilian results have generally reflected positive reduction in mortality also, but all studies have been retrospective, and often FFP and platelet availability was less than RBC. Duchesne (3) recently showed a distinct survival advantage of 1:1 in a civilian trauma centre, and Holcomb (4) reported a retrospective multicentre study of 466 trauma patients showed survival advantages at 6 hrs, 24 hrs and 30 days when a ratio better than 1:2 was used. The German Trauma Registry database (5) has reported the best reduction in 24 hr and 30 day mortality when high ration RBC:FFP was used. Of note in most of these papers significantly less crystalloid was used than before the MTPs using plasma were introduced.

On the basis of retrospective studies many institutions have introduced massive transfusion protocols for patients receiving large blood transfusions. To date no prospective randomised study has tested the hypothesis, but is likely one will commence in the near future. Critics have suggested there is no improved outcome, and two studies in US Civilian trauma centres have shown this, also the beneficial outcome in these patients relate to early deaths from exsanguination being in patients that plasma cannot be delivered as fast as red cells, preferring patients surviving long enough to receive plasma. Thus they receive plasma because they survive, the don't survive because they receive plasma (6). In addition the risks of increased blood products on immunomodulation and infection have not been quantified.

An important paper from the Stanford group looks at outcome before and after the introduction of a MTP at their hospital, which treated trauma and a range of other massive haemorrhages. They had always adopted a philosophy of treating major blood loss with a 1:1 ratio of blood and plasma and so after the introduction of the MTP the ratio of products delivered did not change. However the time from ordering to delivery of plasma dropped from 254 min to 169 min, with a reduction in mortality from 45 to 19% (7) This introduced the concept that it may not be the ratio itself that is important but the system that delivers plasma rapidly to the patient. Trauma Care is littered with evidence of improved outcome through the introduction of orderly systems that replace the previous chaos. MTPs might be simply an example of that, due to the previous limited rapid availability of plasma.

Research has suggested the advantage of early plasma delivery may be supporting higher levels of fibrinogen, which drop precipitously with massive blood loss, due to consumption and dilution (8). MTPs promote early and better normalisation of serum fibrinogen concentrations. Recent evidence suggests that the standard Claus method of measuring fibrinogen levels may not accurately reflect available substrate to clot, in the presence of acidosis and starch infusions. Elevation of the minimum fibrinogen from 1.0 g/l to 2.0 g/L restores normal fibrinogen deposition in the clot. In massive haemorrhage this may be a more logical minimum level of fibrinogen to tolerate.

If fibrinogen is key to restoring haemostasis in massive haemorrhage then why not use the concentrate of this? Studies are now available showing the same mortality benefits of using fibrinogen in place of FFP and the primary drug given in the MTP (9). Interestingly these papers use ROTEM to guide endpoints rather than serum fibrinogen.

2. Borgman et al. The ratio of blood products transfused affects mortality in patients receiving massive transfusions at a combat support hospital. *J Trauma* 2007; 63: 805-813

3. Duchesne et al. Review of current blood transfusion strategies in a mature level 1 Trauma centre. Where we wrong for the last 60 yrs? *J Trauma* 2008;65: 272-276

4. Holcomb et al. Increased plasma and platelet to red cell ratios improves outcome in 466 massively transfused civilian trauma patients *Ann Surg* . 2008;248:447-458

5. Maegele M et al. Red Blood Cell to plasma ratios transfused during massive transfusion are associated with mortality in severe multiple injury; a retrospective analysis from the Trauma Registry of the Deutsche Gesellschaft für Unfallchirurgie. *Vox Sang* 2008;95: 112-119
6. Kashuk et al. Postinjury life threatening coagulopathy. Is 1:1 fresh:frozen plasma: red blood cells the answer? *J Trauma* 2008; 65: 261-270.
7. Riskin et al. Massive Transfusion Protocols. The role of aggressive resuscitation versus product ratio in mortality reduction. *J Am Coll Surg* 2009; 209: 198-205
8. Mittermayr et al. Haemostatic changes after crystalloid or colloid fluid administration during major orthopaedic surgery: the role of fibrinogen administration. *Anesth Analg* 2007; 105: 905-17
9. Schöchl et al. Goal-directed coagulation management of major trauma patients using thromboelastometry (ROTEM®)-guided administration of fibrinogen concentrate and prothrombin complex concentrate. *Critical Care* 2010, 14:R55

Nigel Latta

Nigel is the second oldest of a family of four and was born in Oamaru on the East Coast of the South Island of New Zealand. Oamaru was, he says, an "interesting" place to grow up. At age eighteen he left home to study at the University of Otago gaining a Bachelor of Science in Zoology, and then a Master of Science in Marine Science.

In 1990, whilst he should have been working on his marine science master's thesis, he had a brief foray into the world of rock and roll, playing and touring with the world-famous-in-some-parts-of-Dunedin Gavin Thornton's Steam Injected Band. This was a six piece skiffle band (ukulele's, tea-chest bass, washboards etc). Gavin's was huge on the Dunedin busking scene and their gigs included the Telethon bomb scare, the Otago Daily Times Children's Christmas party, the Alexandra Blossom festival, and a pub in Invercargill. The band broke up following a wildly successful South Island tour on the 1st of January 1991.

At this point he faced a tough decision: either get a real job or find something else to study. It's no surprise then that he subsequently enrolled at the University of Auckland to train as a Clinical Psychologist. He graduated with a Master of Philosophy with First Class Honors in Psychology, and a Postgraduate Diploma in Clinical Psychology. His professional experience to date reflects a dual interest in both forensic psychology and working with young people and their families. In recent years he has developed an increasing specialty and passion for working with kids in the 'too-hard' basket. Nigel has been in private practice for the last thirteen years having finally accepted the fact that working in organizations just wasn't for him. The deciding factor was sitting in a staff meeting so inane and trivial that he found himself wishing for death. This, on reflection, didn't seem like a great way to spend his time. In addition to working with literally thousands of families over the past seventeen years, he also consults with a range of private and public organizations from throughout New Zealand including social service agencies, sex offender treatment programs, prisons, the Department of Corrections, the New Zealand Police and Child Youth and Family Services. He is a sought after trainer and speaker. In December 2004 Nigel and his family moved from Auckland to Dunedin in search of better parking and a view of the sea. Whilst he continues to work with families, teach, and consult with organizations from throughout the country, he now spends less time stuck in traffic and more time enjoying the many and varied wonders of the South Island of New Zealand. Kayaking around the Otago coastline is a particular passion.

Alan McLintic

Alan McLintic is a Consultant Anaesthetist at Middlemore Hospital and an Honorary Senior Lecturer at the University of Auckland. After completing his training in Glasgow, Alan set off for New Zealand for a year of skiing and mountaineering with a smattering of anaesthesia thrown in for good measure. Having found a playground beyond his wildest imagination and a garage large enough for his toys he remains there today, 17 years later. Alan's academic interests lie principally in teaching the scintillating Part 1 topics of medical physics, monitoring, medical statistics and perhaps the most impenetrable of all, how to turn up in time for tutorials. Alan's other great interest is in how we form our beliefs in medicine and to this end he is a regular speaker on the Philosophy of Science, cognitive illusions and research validity.