AQUA 2024

Annual Queenstown Update in Anaesthesia

Programme & Abstracts

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Welcome back to Queenstown with AQUA 2024!

Dear AQUA Delegate,

We are pleased to bring you another broad-ranging collection of clinically focused updates, providing a much-needed opportunity to connect with friends and colleagues, in such a scenic location.

This year, we are delighted to welcome AP Alwin Chuan to Queenstown both for the BATS Ultrasound workshop and his first AQUA conference. Alwin will provide an update on the training and assessment of US regional anaesthesia and his second talks an interesting look at the future with of RA with AI.

We have the usual clinical updates on Obstetrics (Dr Buddicom), Day surgery (Dr Kave) and Blood management (Dr Van Der Westhuizen). Dr Alan Barber (Neurologist) has kindly joined us to provide an update on the management of acute stroke, a rapidly evolving area of clinical practice for both neurology and anaesthesia.

With the introduction of the new Acute Behavioural disturbance emergency response CPD activity we are fortunate to have Dr Kirsty Forrest and Dr Suyin Tan to run these ER workshops. They will also contribute talks during AQUA on Communication (Dr Tan) and Giving feedback (Dr Forrest).

As has become the tradition with AQUA, we look forward to yet another unique story to close the meeting, this year from Dr Graham Knottenbelt, about his experiences volunteering in South Sudan.

We have two CPD-compliant ACLS workshops on Saturday run by Jeeyoung Kim and her team.

The social programme continues to be a strength, including the traditional AQUA BBQ at Coronet Peak Friday evening. This year the AQUA Conference dinner is at Walter Peak High Country Farm, bookended by a magical night cruise cross Lake Wakatipu on the TSS Earnslaw. We look forward to the chance to catch up!

Finally, a special thank you to our sponsors for their continued support of AQUA.

We hope you enjoy the conference.

Dr JeeYoung Kim
Dr Helen Lindsay
Dr Neil MacLennan
Dr Mark Welch

AQUA Organizing Committee 2024

Faculty

Assoc. Prof Alwin Chuan	Liverpool Hospital and UNSW Faculty of Medicine, Sydney, Australia
Dr Emily Buddicom	Obstetric Anaesthetist, Women's Health Anaesthesia, Auckland City Hospital
Dr Suyin Tan	
Dr Jay Van Der Westhuizen	
Dr Vik Singh	
Dr William Law	Specialist Anaesthetist, Auckland City Hospital
Prof. Kirsty Forest	Dean of Medicine, Bond university; Staff Specialist Anaesthetist Gold Coast Hospital and Health Service
Dr Alan Barber	Neurologist, Auckland City Hospital, Professor of Clinical Neurology
Dr Ben Blaise	Specialist Anaesthetist, Starship Children's Hospital
Dr Charlotte Hill	
Dr Ben Kave	Staff Specialist Anaesthetist, Royal Melbourne Hospital
Dr Mataroria Lyndon	Senior Lecturer in Medical Education, The University of Auckland, and Co-Founder and Director of Health Equity, Tend Health
Dr Graham Knottenbelt	

ACLS Workshop

Dr JeeYoung Kim	Specialist Anaesthetist, Te Toka Tumai Auckland
Dr Lora Pencheva	Specialist Anaesthetist, Te Toka Tumai Auckland

Behavioural Disturbance Workshop

Prof. Kirsty Forest

Dr Suyin Tan

BATS on ICE Workshop

Dr Mark Welch	Specialist Anaesthetist, Te Toka Tumai Auckland
Dr Lora Pencheva	Specialist Anaesthetist, Te Toka Tumai Auckland
Dr Neil MacLennan	Specialist Anaesthetist, Te Toka Tumai Auckland
Dr David Choi	Specialist Anaesthetist, Counties Manukau
Dr Dan Cochrane	Specialist Cardiothoracic Anaesthetist, Te Toka Tumai Auckland

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Dr Sam Kransingh	Specialist Anaesthetist, South Canterbury
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Dr Alwin Chuan	
Dr Nick Lightfoot	
Dr Anthony Aho	
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Dr Neil MacLennan	Specialist Anaesthetist, Te Toka Tumai Auckland
Dr Mark Welch	Specialist Anaesthetist, Te Toka Tumai Auckland
Dr Helen Lindsay	Specialist Anaesthetist, Te Toka Tumai Auckland
Dr JeeYoung Kim	Specialist Anaesthetist, Te Toka Tumai Auckland

Event Manager

Joanne Martin	Director, Professional Events Management Ltd

Social Programme

THURSDAY, 22nd AUGUST 2024

17:00 – 19:00

Registration & Welcome Function
Exhibitor Area, Pounamu Room, Heritage Hotel, Queenstown

Browns Ski Shop Fitting Service
Icon Foyer, Heritage Hotel, Queenstown

FRIDAY, 23rd AUGUST 2024

16:30 – 21:00 approx.

AQUA BBQ Function
Coronet Peak Base Building, Queenstown

16:30	Bus to Coronet Peak departs (for non-skiers) (with a 17:45 bus for POCUS Workshop attendees)	Main Entrance, Heritage
16:30	Function area opens	Coronet Peak Café
18:00	Function commences	Coronet Peak Café
20:30	First bus to Heritage departs	Coronet Peak Car Park
21:10	Bus to the Heritage departs (at the conclusion of night-skiing)	Coronet Peak Car Park

SATURDAY, 24th AUGUST 2024

18:30 – 22:30 (please be at Steamer Wharf no later than 18:45, buses depart the Heritage Hotel at 18:35)

AQUA Conference Dinner (pre-purchase)
TSS Earnslaw (with canapes and drinks) and Walter Peak Station

16:10	Bus from Coronet Peak to the Heritage departs (Arriving back at the Heritage ~16:55)	Coronet Peak Car Park
18:35	Conference Dinner bus departs from Heritage	Main Entrance, Heritage
19:00	TSS Earnslaw departs from Steamer Wharf	Steamer Wharf
19:45	Guests arrive at Walter Peak Station for dinner	Walter Peak
21:30	Guests invited to a farm demonstration	
22:30	TSS Earnslaw departs Walter Peak (Arriving back at Queenstown ~23:00)	Steamer Wharf

Scientific Programme

Friday 23 August, 2024		
0645 - 0745	**Breakfast, Exhibitor Area**	
Session 1 - Chair: TBC		
0750 - 0800	**Welcome, Introduction and Karakia**	
0800 - 0830	**Regional anaesthesia update**	***AP Alwin Chuan***
0830 - 0900	**Obstetric anaesthesia update**	***Dr Emily Buddicom***
0900 - 0930	**"Ways with Words" - practical tips to improve your communication skills**	***Dr Suyin Tan***
0930 - 1000	**Blood matters**	***Dr Jay Van Der Westhuizen***
1000 - 1030	**Morning Break**	
Session 2 - Chair: TBC		
1030 - 1100	**Training and practice of cardiac ultrasound in non cardiac surgery**	***Dr Vik Singh***
1100 - 1130	**Trauma management update**	***Dr William Law***
1130 - 1200	**Feedback conversations**	***Prof Kirsty Forest***
Close - Lunch available from MacKenzies Restaurant		
Ski Bus to Coronet Peak		
1300 - 1430	**Behavioural disturbance workshop 1**	***Prof Kirsty Forrest, Dr Suyin Tan***
1430 - 1500	**Afternoon break**	
1500 - 1630	**Behavioural disturbance workshop 2**	***Prof Kirsty Forrest, Dr Suyin Tan***
1630 - 2100	**BBQ Bus to AQUA BBQ Coronet Peak**	
1635 - 2100	**AQUA BBQ at Coronet Peak**	
1730 - 1900	**AQUA BBQ Bus departs - workshop attendees**	
2100 - 2105	**Buses depart Coronet Peak to the Heritage**	
Saturday 24 August, 2024		
0645 - 0745	**Breakfast, Exhibitor Area**	
Session 3 - Chair: TBC		
0800 - 0830	**The Antifragile Hospital**	***Dr Jennifer Reilly***
0830 - 0900	**Management of acute stroke**	***Prof Alan Barber***
0900 - 0930	**Cannabis in acute pain management**	***Dr Charlotte Hill***
0930 - 1000	**Day surgery anaesthesia update**	***Dr Ben Kave***
1000 - 1030	**Morning Break**	
Session 4 - Chair: TBC		
1030 - 1100	**Future directions in RA**	***AP Alwin Chuan***
1100 - 1130	**Pathways to health equity and cultural safety**	***Dr Mataroria Lyndon***
Close - Lunch available from MacKenzies Restaurant		
1230 - 1300	**Ski Bus to Coronet Peak**	
Cardiac arrest workshop 1		
1445 - 1515	**Afternoon break**	
Cardiac arrest workshop 2		
1825 - 1900	**Buses depart Heritage Hotel Lobby for Steamer Wharf**	
1845 - 2100	**TSS Earnslaw departs for AQUA Conference Dinner at Walter Peak**	

Regional anaesthesia update & Future directions in RA

Dr Alwin Chuan

Assoc. Professor, Liverpool Hospital and UNSW Faculty of Medicine, Sydney, Australia

This is a condensed written version of my two talks for AQUA 2024. My first talk discusses training issues in regional anesthesia (RA) and ultrasound-guided regional anesthesia (UGRA), and how we currently assess competency in RA procedural skills. My second talk will introduce the technology of artificial intelligence (AI) and virtual reality (VR) and their current uses in UGRA.

Conflicts of interest

The VR system discussed in the second talk was developed by my research team as a non- commercial research tool. There are no financial conflicts of interest to declare. I have received honoria from GE Healthcare for speaking presentations.

1. Competency versus Expertise

The Dreyfus framework is a useful model to describe how medical professionals are first introduced to new procedural skills, gain competency through increased exposure and practice, before attaining expertise in that skill [1]. In our recent editorial [2], we used this framework to help illustrate the stages through which anaesthetists gain expertise in UGRA skills (Figure 1). The model describes five distinct stages of progression. When interpreted in the context of UGRA, the stages can be described thus: novice, characterised by rigid theoretical knowledge of sonoanatomy, needs close supervision for real-time skills of keeping the needle tip under vision while advancing; advanced beginner, who can complete simpler part-tasks of UGRA but not yet integrate part-tasks into a whole performance on the patient; competent, exhibits sufficient knowledge and dexterity to be independent for simpler blocks; proficient, where the block is seen in context of overall patient management, can change their block technique either in anticipation or in reaction to difficulties; and finally expert, characterised by authoritative knowledge and excellence with UGRA.

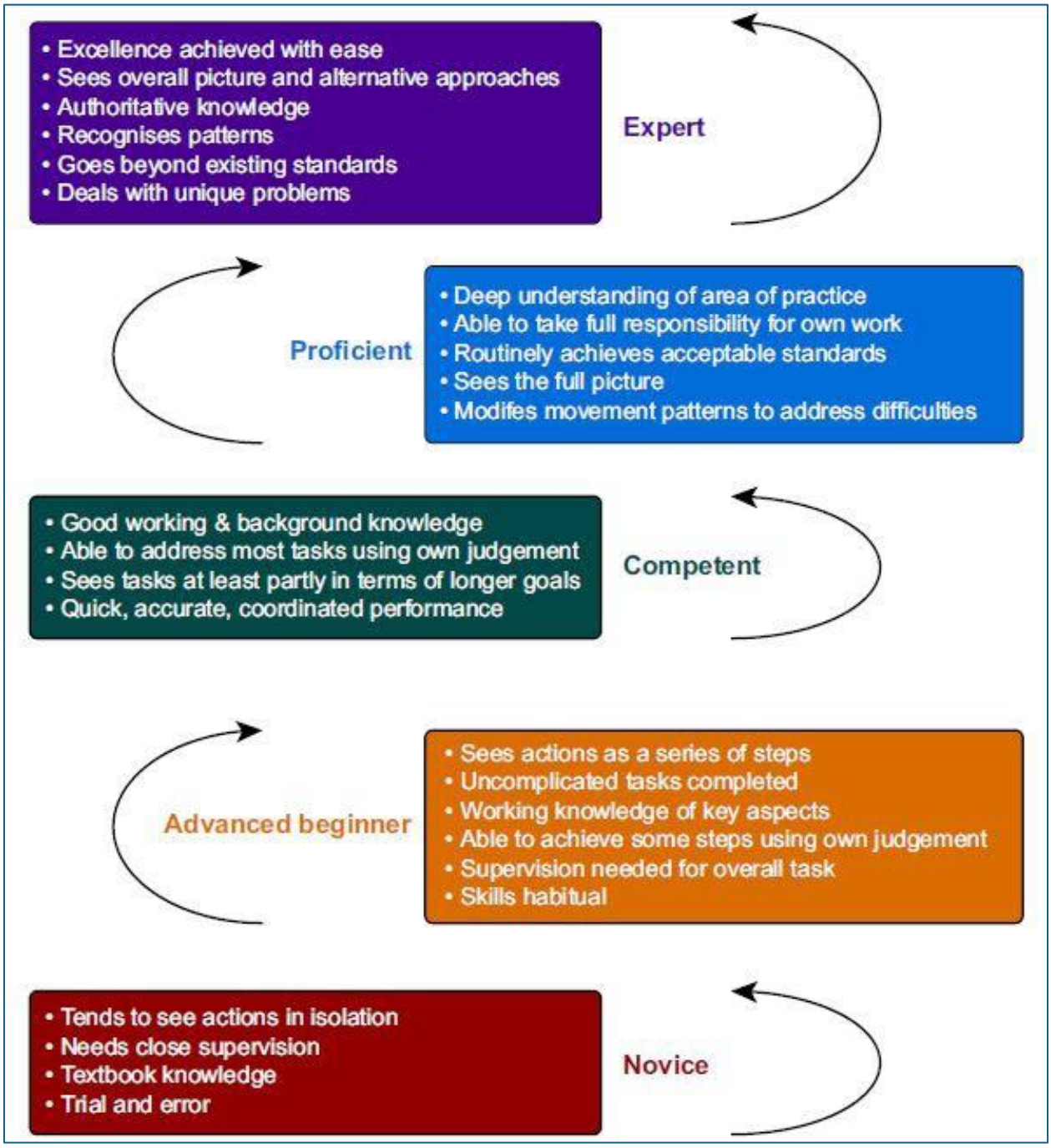

Figure 1. Dreyfus model of adult skill acquisition. Taken from [2].

2. Fellowship and non-Fellowship curriculum

RA fellowships are 6 to 12 months of dedicated exposure to RA, and by purpose aim to create experts in RA as described by Dreyfus. To achieve this outcome, Fellowship trainees are exposed to a greater variety and complexity of block techniques, increased caseload (volume of practice), enjoy protected time for teaching by expert faculty, and participate in academic activities such as research and when sufficiently trained themselves, supervising junior trainees in RA. Fellowship program recommendations and guidelines have been in North America [3] and Australia/New Zealand [4], with curricula learning objectives endorsed by their respective national RA societies.

In contrast, the purpose of non-Fellowship training is to graduate trainees at novice to competent levels. Where specifically along the Dreyfus continuum is ultimately stakeholder-driven, and these priorities are reflected in the minimum learning objectives and caseloads mandated by each national curriculum. Using ANZCA as the most relevant to this audience: there is a priority for FANZCAs to be at least competent in obstetric RA, hence the large caseload (70 spinals and 70 lumbar epidurals), but only novice-advanced beginner for peripheral limb RA (10 blocks for upper limb and 15 blocks for lower limb). By comparison, our Fellowship recommendations are for 80 upper limb and 80 lower limb blocks.

Given that non-Fellowship trainees have a severely limited exposure to RA, there arose a belief that instead of attempting to teach a broad range of blocks, there should be instead a focus on high value blocks. These could be described as blocks with a combination of: highest evidence of efficacy, highest safety margin for risk, easiest to teach and easiest to learn, and useful in a large variety of indications both for anaesthesia and analgesia. We performed a world-wide Delphi consensus project [5] that recruited 496 academic educators and clinical directors of RA training across 66 countries, resulting in selection of 4 peripheral blocks (interscalene, axillary, femoral, and popliteal sciatic) and 4 spinal/epidural blocks (Table 1) that satisfied the criteria to teach in a global non-Fellowship curriculum. Turbitt et al [6] described their selection of “best-bang-for-buck” blocks as the Plan A basic blocks in their editorial. This included the aforementioned 4 peripheral blocks and added adductor canal blocks and 2 trunk blocks (Erector Spinae Plane, ESP blocks, and rectus sheath blocks) (Table 2). Subsequent to this publication, RA-UK has endorsed the Plan A blocks and actively promotes it in the United Kingdom.

Items with highest importance and strong consensus
Regional anesthesia techniques
Interscalene brachial plexus block
Axillary brachial plexus block
Femoral nerve block
Popliteal sciatic nerve block
Landmark-guided lumbar spinal block
Landmark-guided lumbar epidural block
Landmark-guided combined spinal-epidural block
Landmark-guided thoracic epidural block

Table 1. Global consensus for highest value blocks in a non-Fellowship curriculum.

Table 1 Proposed high value basic ultrasound-guided regional anaesthetic techniques.

Anatomical location	Plan A (basic blocks)	Plan B/C/D (advanced blocks)
Upper limb		
Shoulder	Interscalene brachial plexus block [14]	Superior trunk block, combined axillary and suprascapular nerve blocks
Below shoulder	Axillary brachial plexus block [15]	Infraclavicular block, supraclavicular block
Lower limb		
Hip	Femoral nerve block [16]	Fascia iliaca block, lumbar plexus block
Knee	Adductor canal block[a] [17]	Femoral nerve block ± IPACK block
Foot and ankle	Popliteal sciatic block [18]	Ankle blocks, proximal sciatic nerve block
Trunk		
Chest wall	Erector spinae plane block [19]	Paravertebral block, serratus plane block, PECS blocks
Abdominal midline	Rectus sheath block [20]	Quadratus lumborum blocks

Table 2. Plan A blocks as editorialised by Turbitt et al.

3. Plan A blocks in ANZCA?

My personal belief is that it would be difficult to implement Plan A blocks in the current ANZCA curriculum. This is due to the severely restricted caseload of 10 (upper limb) or 15 blocks (lower limb), which in all studies of learning curves of acquiring RA skills shows that novices are still in the steep phase of procedural skills integration and also at highest risk of errors and complications (examples: [7-10]). To achieve a skill level closer to advanced beginner or competent, ANZCA trainees must instead go beyond the mandated minimum and be committed to pre-training in basic knowledge (anatomy, sonoanatomy, ultrasound knobology), out-of-hours workshops (optimising and recognising ultrasound scans, and part-task simulators to practice real-time needling skills), so that each clinical block experience is maximised. This is similar in principles to surgical technical skills training [11].

At a structural level, trainers can improve the quality of learning from this limited caseload by using assessment tools as part of formative assessment [12] and deliberate feedback [13].

4. Assessing UGRA skills

More than 20 different types of assessment tools have been developed to measure the performance of UGRA by anaesthetists. Of these, the most common in use in the workplace and simulation laboratory are checklists; either singly or paired with global rating scales [14]. The two most validated checklists are the “Cheung” checklist (named after the senior author [15]) originally developed for supraclavicular brachial plexus UGRA single shot blocks; and the Regional Anaesthesia Procedure Skills (RAPS) which was developed for all types of RA techniques including single shot to catheter, landmark/nerve stimulation or UGRA, peripheral and neuraxial [16].

Moreover, RAPS was designed to be anchored on ANZCA professional documents as well as including post-block care such as management of the insensate limb and transitional analgesia. The 25-item checklist is reproduced in Figure 2.

A major criticism of newly developed workplace-based assessment tools is low external reliability. Psychometric evaluation of tools requires a robust process of checking for the stability of scores between different assessors, due to the subjectivity inherent in assessing procedural skills. This phenomenon, often referred as “hawks vs doves” reduces the effectiveness of an assessment tool

as a summative examination (high stakes, pass/fail) although this is of less significance if used for formative examination (used to structure feedback after performance from trainer to trainee).

All Blocks
1. Obtains informed consent as described by Professional Standards 26 and Professional Standards 03
2. Ergonomic positioning of patient, equipment, and proceduralist
3. Obtains intravenous access and applies monitoring as defined by Professional Standards 03
4. Appropriate combination of local anaesthesia, additives, or adjuvants
5. Chooses clinically appropriate needle
6. Sets up equipment properly, including ultrasound machine or neurostimulator
7. Skin asepsis and maintains sterility for that block as defined by Professional Standards 28
8. If providing procedural anxiolysis: maintains conscious sedation as defined by Professional Standards 09
9. Aspirates to check for blood/cerebrospinal fluid, uses incremental boluses, and re-aspirates between bolus
10. Checks for signs of systemic toxicity, intravascular injection
11. Checks for signs of potential intraneural injection

Catheter item
12. Correctly fixates and checks continuous infusion catheters/epidurals

Non-ultrasound-guided regional anaesthesia techniques
13. Locates correct surface anatomy/landmarks for block
14. Chooses appropriate needle insertion point and trajectory
15. Chooses correct current and motor endpoints during block if combined with neurostimulation

Ultrasound-guided regional anaesthesia techniques
16. Performs survey scan, identifies structures pertinent to procedure
17. Optimises nerve image by probe manipulation, nerve localisation techniques
18. Chooses appropriate needle insertion point, and trajectory to maintain in-plane ultrasound views
19. Demonstrates ability to locate needle tip in real time, throughout procedure
20. Recognises spread of local anaesthesia and adjusts needle positioning to optimise local anaesthesia distribution
21. Chooses correct current and motor endpoints during block if combined with neurostimulation

All blocks
22. Demonstrates knowledge of block onset and success by motor/sensory testing
23. Formulates and performs rescue block (as necessary)
24. Formulates perioperative analgesia plan
25. Formulates plan for care of blocked region, and postoperative follow up

Figure 2. 25-item validated checklist from the Regional Anaesthesia Procedure Skills (RAPS) tool.

Nonetheless, given that assessment tools are used to officially grade performance of trainees, the subjectivity inherent in a single time-point assessment is minimised by increasing the quantity of assessments spread over time and across different contexts, and scored by multiple assessors – hence the concept of a “portfolio” of workplace-based assessments.

5. Future of Assessment: Objective metrics?

Intriguingly, technology could assist in moving assessments away from subjective opinions and towards objectively measured metrics. In UGRA, two technologies have emerged that allows kinematics to be faithfully recorded as these are continuously measured by the computerised device. The first is eye-tracking technology, which in based on a wearable device that measures eye movements in real-time, recording metrics such as eye fixations, areas of interest (heatmaps), fixation sequences, and the time spent on each of these movements. These are overlaid over real- life visual fields of the wearer. Borg et al [17] and McLeod et al [10] have shown construct validation of eye tracking devices in UGRA, recording the wider variability of kinematics exhibited by novices compared to experts – see Figure 3 and 4.

The second technology is VR, which by nature of the fully computerised virtual environment must record all real-world kinematics and represent them in the virtual. As a consequence, these metrics can be downloaded and converted into learning curves for each individual. We have demonstrated this construct validation between novices and experts in our prototype VR needling simulator [18] (Figure 5).

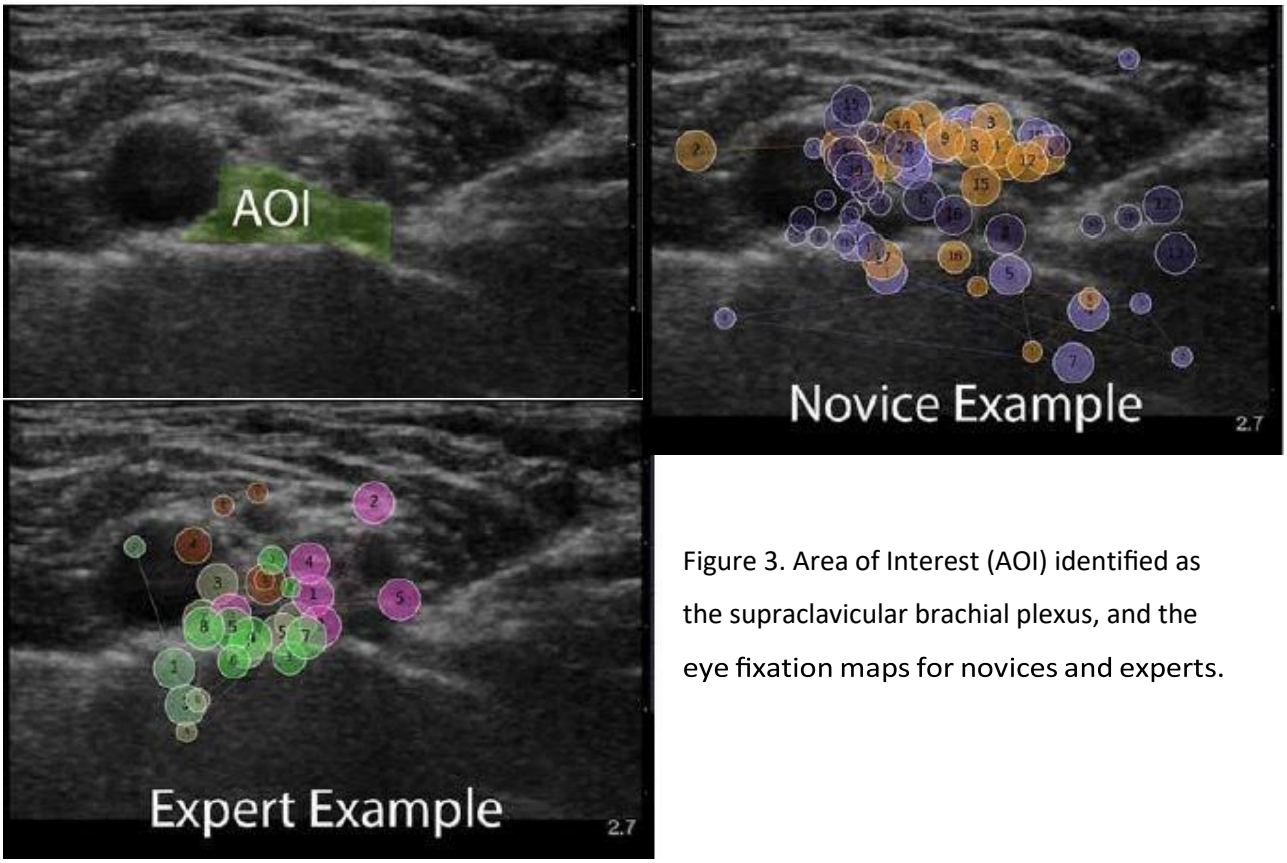

Figure 3. Area of Interest (AOI) identified as the supraclavicular brachial plexus, and the eye fixation maps for novices and experts.

Figure 4. Eye gaze fixations and attention overlaid on actual real-life view of ultrasound machine.

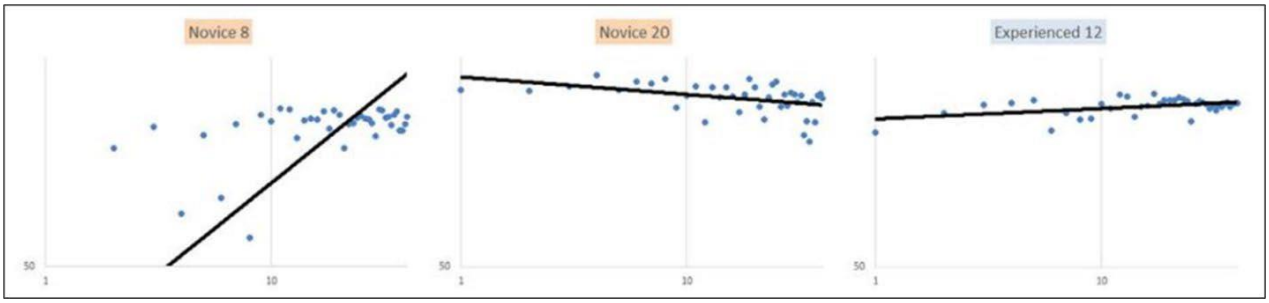

Figure 5. Individualised learning curves generated using hand movement kinematics recorded during VR-based simulation training for needling practice. Each score is based on angulation of the needle relative to the transducer, time taken to complete the procedural task, and number of withdrawals.

6. Using AI to assist sonoanatomical identification during UGRA

One strength of computer systems is their ability to rapidly process large amounts of data. Teaching the computer system to have a form of artificial intelligence so it can recognise relevant data and form conclusions from an enormous dataset is called *machine learning*.

When optimised for medical imaging applications, an AI system is taught using a *deep learning* process employing a *convoluted neural network* which mimics the same experiential learning that humans use to become experts [19]. In humans, over time and experience with hundreds and thousands of repetitions, we use pattern recognition and heuristics to recognise relevant features when we perform ultrasonography during UGRA (eg. nerve structures, muscles, fascial planes, arteries and veins, bony landmarks). Convoluted neural networks are multi-layer, hierarchical, but non-linear [20]; the AI system strips away resolution layers of each image (down-sampling) to better clarify salient landmarks, before rebuilding the layers (up-sampling). At each step, the AI compares its predictions against human experts who have already annotated the image as the gold standard. If predictions were incorrect, the AI re-iterates the process and adjusts the prediction algorithm accordingly. This re-iterative process typically requires several hundred thousand images for each nerve block location. There are now several commercially available AI systems that are available for UGRA, which overlays its prediction of structures over the ultrasound image (Figures 6 and 7).

Thus, the current application of AI in UGRA is for assisting in image interpretation. The most studied commercial AI system is ScanNav, with external validation between AI prediction rates versus human experts [21]. Rates of predictive success is very variable between the different Plan A block locations, with the worst performing being the axillary brachial plexus block [22]. These studies are all non-clinical, with no evidence yet from real world use-cases.

I provide some personal viewpoints from my own experience employing these first generation AI systems in clinical use: (1) the AI does not hesitate in providing an answer - much like the cognitive bias exemplified in the Dunning-Kruger effect, the AI can be seemingly overconfident in predicting structures; (2) the AI was taught using still images; but dynamic scanning “prescan” and “traceback” techniques resolves much of the uncertainty around structures in clinical use; (3) AI experiences *hallucinations* when faced with neurovascular variability; (4) AI is quite accurate at the “easy” scans but struggles with “difficult” scans – just like humans. Currently, assistive AI is useful

as a teaching tool in novice UGRA practitioners while they are learning how to recognise sonoanatomy.

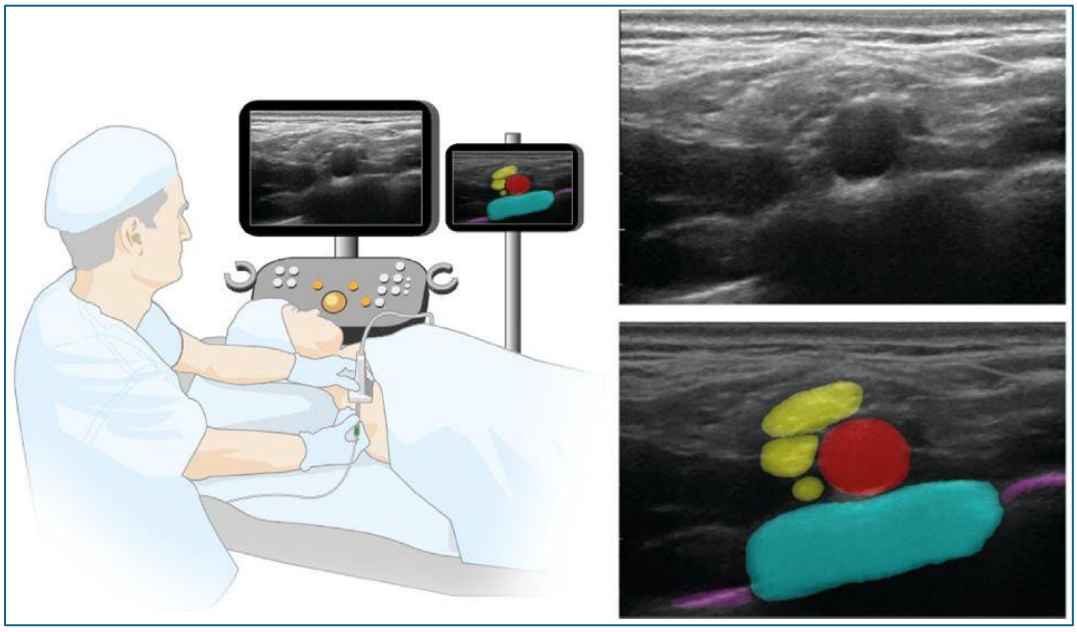

Figure 6. ScanNav (Intelligent Ultrasound, UK) system. A second slave monitor overlays the AI prediction over the ultrasound image.

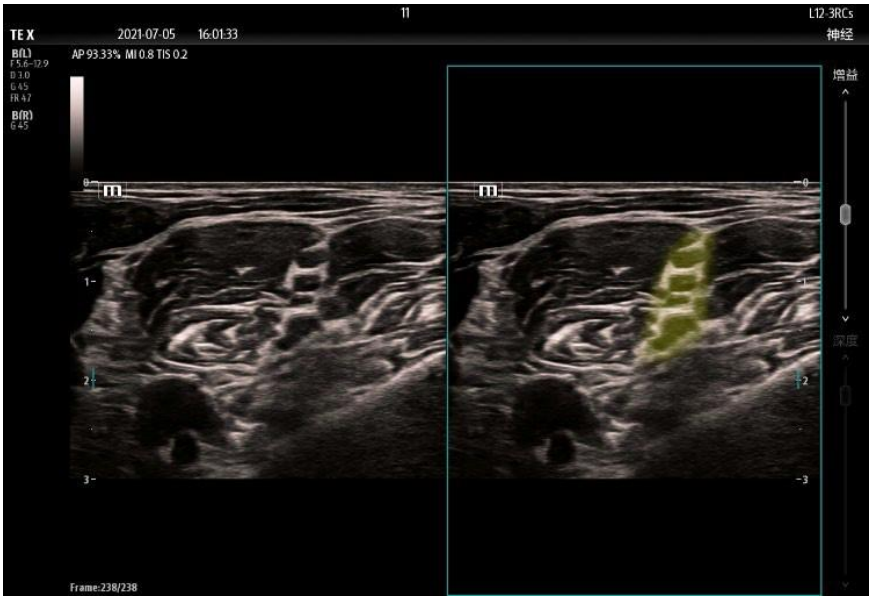

Figure 7. SmartNerve (Mindray, China) system. The screen divides into 2 views with the AI overlay over the second image.

7. Using VR to teach regional anaesthesia

VR is a computerised system that generates a 3D multisensory environment that replaces the real- world with a virtual world. Interaction within the virtual world occurs through hand motion controllers. When the VR system includes an occlusive headset that excludes real-world visual and auditory cues by virtual ones, and with specific hardware features (>90 degree field of view, >60 frames per second refresh rate, <20 millisecond latency, and at least 1080p resolution) there is sufficient *immersion* to feel transported into the virtual world. These are high end VR systems called immersive VR (iVR) and has been used as a type of high fidelity simulator to teach both technical and non-technical skills, predominantly relating to surgical procedural skills [23,24]. We have designed and validated a iVR system [18] to teach novices real-time needling skills necessary in UGRA (Figures 8 and 9). This system uses a Meta/Oculus VR headset and gaming laptop to recreate a high fidelity part-task trainer with ultrasound transducer and needle. Construct validation between novices and experts has been established and learning curves (Figure 5) can be constructed during training sessions, leading to the possibility of tailoring training to the individual.

Figure 8. iVR virtual environment replicating an operating theatre

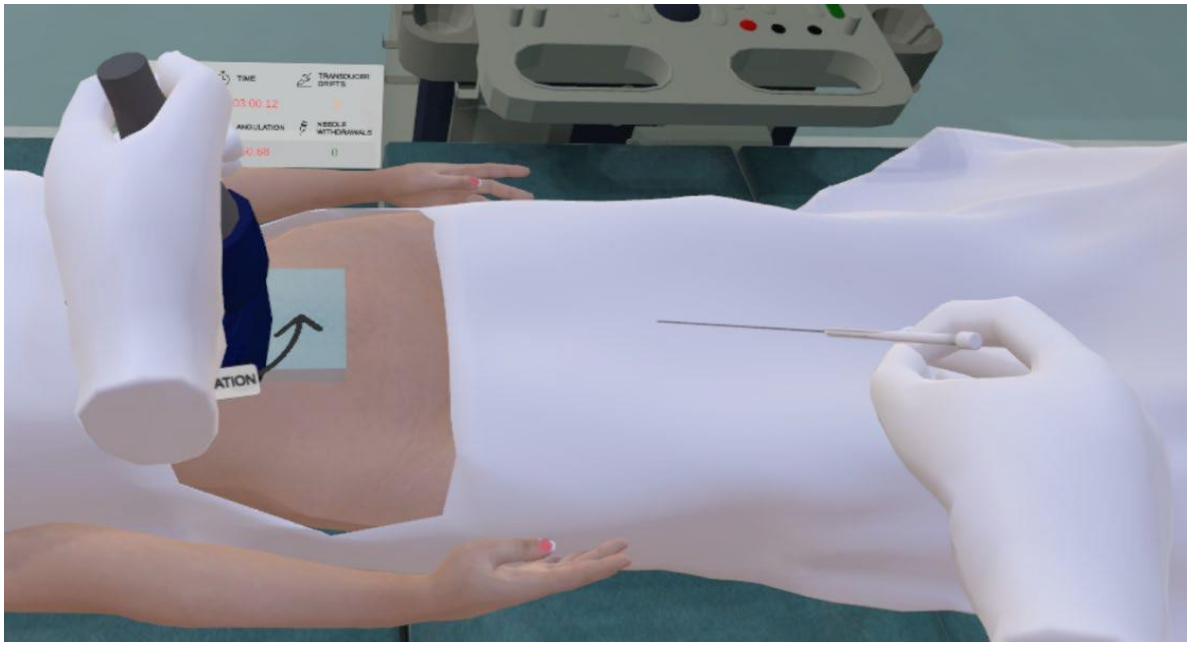

Figure 9. close up view of the iVR needling part-task simulator

We have since performed a RCT using the iVR simulator, comparing this to 1:1 deliberate practice (gold standard). While the iVR training did not show superiority, we found that faculty trainers were halved in the intervention group [25]. This finding will need further support in a non-inferiority trial that demonstrates that iVR can successfully substitute for faculty, with significant impact on reducing resources needed to teach UGRA. In my experience using iVR to teach UGRA, I have the following observations: (1) future generations of iVR should incorporate haptics to fully replicate the real-world experience of needling; (2) future studies need real world use cases and impact on educational outcomes and clinical outcomes; (3) nonetheless iVR provides an ideal opportunity to repetitively pre-train in dexterity, allowing novices to progress along the Dreyfus continuum towards competency and proficiency in a safe environment; (4) iVR simulators provide resource relief, allowing one faculty member to supervise more trainees at the same time during workshops.

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Obstetric anaesthesia update

Dr Emily Buddicom

Here's a brief overview of the recent changes and challenges we've been navigating:

1. Enhanced Recovery
Since 2014, we've implemented Enhanced Recovery After Surgery (ERAS) protocols to expedite patient recovery and reduce hospital stays. 10 years down the track and it's now time to look at "marginal gains".

2. NRFit Neuraxial Kits
Introduced in June 2021, NRFit neuraxial kits have proven valuable despite a learning curve. Their benefits in safety and efficiency are compelling, making them a worthwhile investment.
https://libguides.anzca.edu.au/safety/neuralconnectorchangeover

3. Support Persons in Theatre
One of our significant challenges is accommodating support persons during caesarean sections. Our policy allows only one support person in the theatre due to space constraints. We address special cases, such as diverse family structures and surrogacy, on an individual basis, using an adjacent room with a viewing window for additional support people.

2. Sip to Send
Our unit has introduced the "Sip to Send" initiative, allowing women awaiting elective caesarean sections to sip water until their surgery time. This practice improves patient comfort and is expected to be adopted more widely in adult surgeries.
https://www.anzca.edu.au/getattachment/897f5bf5-b665-4c99-a56f-e72678f19f7e/PG07(A)-Appendix-1-%E2%80%93-Fasting-guideline

3. Sustainability
Sustainability remains a priority. We continue our syringe recycling program despite contamination issues and are exploring options to reduce nitrous oxide wastage, with potential disconnection from piped systems in theatres.
https://libguides.anzca.edu.au/enviro/no2
https://greentheatres.online/a-model-for-facility-nitrous-leak-reduction/

4. BadgerNet
BadgerNet, our maternity care software, offers comprehensive patient note access but lacks integration with other hospital systems, posing some operational challenges.

“Way with Words” – practical tips to improve your communication skills

Dr Suyin Tan

Communication is fundamental to the practice of anaesthesia and particularly for anaesthetists who work with immense time pressure to form rapport and communicate effectively with patients and other team members.

There is very little explicit teaching of communication and even less assessment of communication skills which many people see as being innate. Most people do not realise that communication is predominantly a subconscious process. Expanding research in the field of neuroscience has given us increasing insight into how the brain processes language and allows us to consciously shape our communication to achieve therapeutic results such as reducing anxiety or even pain.

Suggestions are verbal or non-verbal communications that alter behaviour or perceptions. They may be direct (conscious) or indirect (subconscious). Humans naturally spend time in subconscious levels of processing e.g. when engrossed in music, driving a familiar route home, or in “the zone” whilst exercising. Similarly patients who are in pain, tired or fearful tend to reduce their conscious processing and in these altered levels of consciousness become more open to suggestions.

Suggestions can be positive or negative e.g. “This will help with the pain “ versus “This can make you feel sick”. Unfortunately, many clinicians adopt negative suggestions as part of their routine communication e.g. “The propofol does sting as it goes in”. These are referred to as nocebo communications. Identifying and then reframing nocebo suggestions to a more positive form helps improve patient’s experience and reduce pain. The brain can be hypervigilant for words with a high threat valency e.g. “sting”, “sharp” and this raises anxiety and increases pain especially in patients who may already be sensitised by previous experiences.

The brain has heightened alertness for certain words such as our names -hence the importance of using people’s names appropriately. Conversely negative constructions such as “don’t” or “won’t” are less well heard so it may be better to say “Remember the antibiotic” rather than “Don’t forget...”
The LAURS of communication provide an overarching framework to guide any interaction.
Listen -for content, meaning, use of metaphor, word choice, emotional content etc
Accept -the other person’s viewpoint, values and perceptions even if they radically differ from your own. This doesn’t mean you agree but does mean you are able and willing to work in a respectful way to achieve change and recognise we all have our own realities.
Utilise – what you have learnt about the other person’s views, preferences, strengths and experience to help shape your communication to be as effective as possible.
Reframe – turn nocebo suggestions into positive suggestions and help direct the patient to a more positive expectation.
Suggest – be aware of the power of suggestion and how communication often works at a subconscious level. Use suggestion to alter behaviour and perception thereby improving the patient’s experience.

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Blood Matters

Dr Jay Van Der Westhuizen

"The most valuable blood for your patient is their own blood" [1]

Blood management starts pre-operatively with consideration of optimising red cell mass, intra-operatively by applying processes to minimise blood loss and post-operatively optimising the ability to tolerate anaemia.
Each individual patient should be evaluated to identify opportunities at every stage to support blood management and ensure they are fully optimised. Blood is a valuable commodity, and we should value the sacrifice made by donors that support the availability of products to ensure patients have a safe surgical journey.
The decision to transfuse should not be taken lightly. In addition to blood being a valuable product it does come with risks to our patients. Having processes in place to modify this risk is very important. The main predictor for perioperative transfusion is preoperative anaemia, volume of surgical blood loss and failure to adopt a more restrictive threshold for transfusion.

The concept of *patient blood management* (PBM) introduced by the World Health Organisation (WHO) in 2011 is a systematic, evidence-based approach focused on patient requirements such as achieving the highest patient care, weighing the benefits of transfusion against the risk, with minimal transfusion-related adverse events.
Strategies to address these risks are referred to as the three pillars of PBM.
Reducing perioperative blood loss requires a multimodal and multidisciplinary approach. Although high-quality evidence exists in certain areas, the overall evidence base for reducing intraoperative blood loss remains limited.

Limiting transfusion in cancer surgery may matter too....
Perioperative factors and updates for specific situations:
Optimising iron

- pre-operative use of iron has now been well established therefore moving the spotlight or focus to post-operative anaemia for this discussion.

Post-operative IV iron to treat anaemia.
Diagnosis of postoperative iron deficiency can be even more difficult than that of preoperative deficiency since ferritin levels may be elevated as part of the acute phase response after surgery [2]

Post operative anaemia [2 & 3]
Evidence is scant, though as reference a consensus statement from workgroup of experts was published to help guide some decision making [2]:

Recommendations for best clinical practice:
All patients who have undergone major surgery (defined as blood loss > 500 ml or lasting > 2 h) and who had pre-operative anaemia or moderate-to-severe blood loss during surgery must be screened for anaemia after surgery.
Postoperative anaemia may be present in up to 80–90% of patients undergoing major surgery, although this prevalence varies widely according to different definitions.

Perioperative anaemia in non-pregnant women should be defined, as for men, as a haemoglobin concentration < 130 g.l.
During recovery from uncomplicated major surgery, haemoglobin concentrations should be

monitored, either by standard laboratory or point-of-care testing, on a regular daily basis, at least until the third postoperative day, to detect anaemia.
Postoperatively, iron deficiency should be defined by ferritin concentration < 100 µg.l−1, ferritin < 100–300 µg.l−1 and transferrin saturation < 20%, or reticulocyte haemoglobin (ret-he) content < 28 pg. Though the value of ret-he is more useful in monitoring EPO use in setting of renal failure (the STfR takes longer), neither is perfect, but it is a good place to start. Its use is encouraged for review of pre-operative intravenous iron and in the post-operative setting where ferritin may be less useful. High blood loss during surgery may also indicate the need for iron replacement in anaemic patients. In the postoperative period, when the administration of iron is necessary, early intravenous (i.v.) iron therapy is recommended, after considering contraindications. Where possible, it should be administered using a single high-dose preparation for the repletion of iron stores.

For non-cancer patients with severe postoperative anaemia and inflammation-induced blunted erythropoiesis, or those declining blood transfusion, consider additional treatment with an erythropoiesis-stimulating agent.
If patient blood management measures did not prevent the development of severe postoperative anaemia, the adoption of a restrictive transfusion threshold (haemoglobin level: 70–80 g.l−1, depending on patient comorbidities) is recommended in most adult, clinically stable hospitalised patients.

Recommendation to establish a patient blood management expert group in every hospital [4]

Consideration of post-operative Iron. Intravenous (IV) iron treatment is recommended in postoperative patients because oral iron is limited by its poor absorption and frequent intolerance.

Most benefit is seen in patients with pre-existing iron deficiency anaemia not treated pre-operatively.
Although multifactorial in origin, pre-operative anaemia, peri-operative blood loss (surgical bleeding, coagulopathy, phlebotomies, etc) and postoperative blunted erythropoiesis are the main contributing factors to postoperative anaemia after major surgery. Haemodilution due to excessive fluid administration, which may cause ‘dilutional’ anaemia or aggravate pre-existing anaemia, and other nutritional deficiencies (e.g. vitamin B12, folic acid) and pharmacological interactions are also contributing factors.
Iron therapy: oral vs. i.v. iron?

The National Institute for Health and Care Excellence in the UK (NICE) recommends offering oral iron after surgery to patients with iron deficiency anaemia. However, in the postoperative period, oral iron is often not tolerated or absorbed and has several limitations including frequent gastro-intestinal side-effects and, consequently, poor treatment adherence. Additionally, the inflammatory response induced by surgery stimulates hepcidin synthesis and release, which in turn inhibits intestinal iron absorption, making oral iron therapy largely ineffective. Various randomised placebo-controlled trials (RCT) in orthopaedic and cardiac surgery patients have demonstrated that oral iron therapy was not better than placebo in correcting postoperative anaemia and reducing transfusion requirements [3].

The ability of hepcidin to down-regulate ferroportin from the cell surface not only provides a molecular explanation for the regulation of iron homeostasis but also helps to explain the coordinated response producing the hypoferremia of inflammation and infection [6].

Manage anaemia or threshold for tolerating anaemia to avoid blood transfusion. Lessons learned from Jehovah’s Witness management has helped in this domain. Cross over in this section with

treatment of anaemia with optimising Iron, treatment of other nutritional deficiencies e.g Vit B12 and folate, supporting erythropoiesis and EPO treatment when indicated [3].

Iatrogenic loss: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8470754/

During a hospital stay, 25% of patients develop relevant anaemia. This is called Hospital-Acquired Anaemia (HAA). It is very common that patients having normal haemoglobin values upon admission develop anemia over the course of hospitalisation. The incidence ranges from approximately 25–75% prior to discharge using the nadir haemoglobin values during hospitalisation. Potential aetiologies for HAA are iatrogenic blood loss from phlebotomy or "anaemia of chronic disease" induced by acute phase reactions stimulated by interleukins activating hepcidin synthesis. HAA has been postulated to be a hazard of hospitalisation that is potentially preventable. Early diagnostic of anaemia in critical care units is needed, to differentiate between HAA and other causes of anaemia.

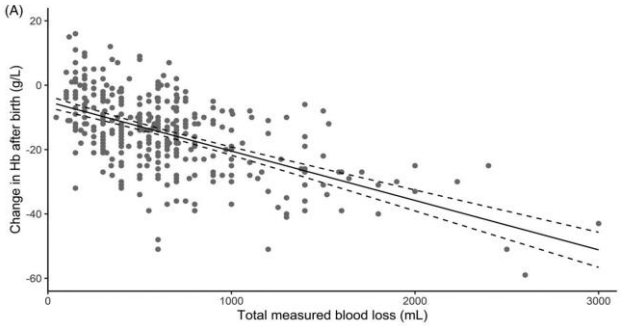
Consideration of side effects for all treatments needs to be considered. Ferrinject does potentially cause hypophosphatamia though the clinical significance of this is likely low [7].

Tranexamic acid [8]:
Interest in tranexamic acid ballooned in recent years after publications of specifically CRASH-2, WOMAN and POISE-3 trials. Development of interest was slow considering that it's use was first recognised by two Japanese doctors Drs Utako and Shosuke Okamoto shortly after World War 2 ended. The initial drive for development was to help prevent women bleeding to death due to post-partum haemorrhage which was a major killer of women in Japan at the time. They invented a new chemical entity called Epsilon-aminocaproic acid (EACA) that inhibited the enzymatic breakdown of fibrin by plasmin in 1962. Tranexamic (more potent) was developed later by them though its full potential was not recognized for decades. Initially adopted mostly by dentist in the first instance it's use slowly crept into current practice. Poise-3 reported that tranexamic acid reduces major bleeding by 25% and reduces the need for blood transfusion, without the risk of thromboembolic events. Wider TXA acid use will improve surgical safety, avoid unnecessary blood use, reduce the risk of transfusion and save funds for other health care purposes. Recommend TXA should be considered in all adults having in-patient surgery.

ATACAS trial found TXA also reduces the risk of reoperation because of major bleeding and reduced receipt of a blood transfusion.

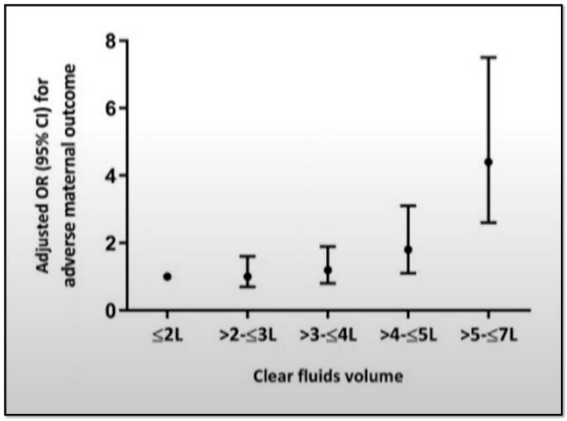
Elective TXA (most benefit urological procedures i.e prostatectomies and orthopaedic surgery i.e. hip and knee surgery) is now commonly used.

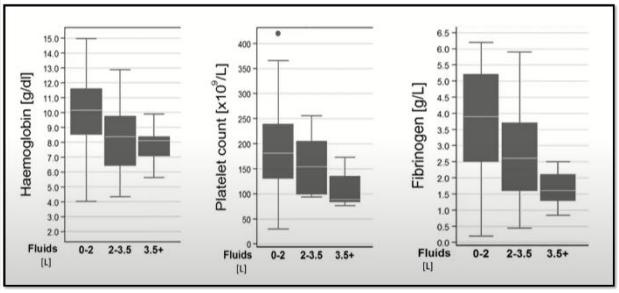
The only trial that was adequately powered for primary safety outcomes is POISE-3 though not achieved non-inferiority to placebo but stated that there is 96% probability it is safe to use as indicated [9].
New in obstetric bleeding?
Quantitative blood loss (QBL) is moderately correlated with adjusted change in Hb for all volumes of bleeding and gives clinicians more accurate knowledge of blood loss than visual estimation. This low-cost, low-fidelity intervention can influence the timely escalation of clinical care and therefore patient outcome [10].



15 g/L drop in Hb per 1000mls of blood loss.

Dilutional factors ... excessive crystalloid fluid therapy?
Clear fluids volume >4 L was independently associated with adverse maternal outcome in women with persistent postpartum haemorrhage [11 & 12].





Calcium as a factor [13] ?

Among high-risk patients with PPH low Ca^{2+} at PPH diagnosis was associated with a higher risk for severe bleeding independently of other laboratory and clinical indicators. Thus, Ca^{2+}, as a standalone parameter or when combined with fibrinogen level, can aid in identifying women with high-risk PPH.

Furthermore calcium may play a role in uterine contraction...[14]
Trauma bleeding (Credit to Dr Nadia Forbes for summaries)
MHP, what is new?
ITACTIC[15]

Summary: Study to inform whether using point-of-care coagulation testing, referred to in the paper as viscoelastic haemostatic assays (VHA) to direct massive haemorrhage protocol use, as opposed to standard practice (conventional coagulation tests, CCT) would improve mortality and reduce the need for massive transfusion (10+ units of blood in the first 24h after injury).

Outcomes • Primary: No difference in mortality at 24hrs: 67% vs 64% (95% CI 0.76-1.73) • Secondary outcomes: No significant difference in 28day mortality or median time to haemostasis • Subgroup Analysis: Significant reduction in 28-day mortality in severe TBI group (44% vs 74%) p=0.016
And Coagulopathic (by PTr) patients: CCT 55%; VHA 41% OR: 0.56 (0.26-1.24) (note not powered to detect these differences though)

CRYOSTAT 2 [16]
Does transfusion of early and empirical high-dose cryoprecipitate in addition to standard care improve survival in bleeding patients with trauma who require activation of a major haemorrhage protocol?

RCT at 26 UK and USA trauma centres of adult traumas who triggered MHP • Standard care (MHP) vs MHP plus 3 pools cryo (6g fib) within 90 min Outcomes • Primary: No difference in 28 day mortality (26.1% vs 25.3%) • Secondary: No difference in mortality at 6 hrs (7.1% vs 8.6%) or 24hrs (11.2 vs 12.2%) • Secondary: No difference in proportion of deaths from bleeding at 6 or 24hrs • Prespecified subgroup analysis of pt. penetrating trauma, 28 day mortality was significantly HIGHER for the cryo group (16.2% vs 10%; OR 1.74 (95% CI 1.2-2.51) P=0.006

The results from this trial do not support empiric cryoprecipitate therapy in trauma patients with major haemorrhage

PATCH [17]
In adult patients with major trauma, who are at risk for trauma-induced coagulopathy does early administration of 1g of tranexamic acid (TXA) followed by an infusion of 1g over 8 hours, compared with placebo, increase survival with a favourable functional outcome at 6 months?

Pragmatic, double blinded, placebo-controlled trial .36 trauma centres in Australia, NZ and Germany. Adult pt. assessed as high risk of coagulopathy (COAST score >3)
• 1g TXA at scene and 1g over next 8hrs vs placebo Outcomes
• Primary: No significant difference in survival with a favourable functional outcome at 6 months (GOS-E>5) • Secondary:

Significant reduction in mortality at 24hrs (9.7% vs 14.1%) and 28 days (17.3 vs 21.8%) but no difference in mortality at 6-months

Among adults with major trauma and suspected trauma-induced coagulopathy who were being treated in advanced trauma systems, prehospital administration of tranexamic acid followed by an infusion over 8 hours did not result in a greater number of patients surviving with a favourable functional outcome at 6 months than placebo, though mortality was significantly reduced at 24 hours and at 28 days in the TXA group.

PROCOAG
Double blinded, randomised, placebo-controlled superiority trial in 12 French level 1 trauma centres
• Adult trauma pt. at risk of massive haemorrhage • 1ml/kg of 4F PCC vs 1ml/kg saline Outcomes • Primary: No significant difference 24hour blood product consumption (12u vs 11u) P=0.72
• Secondary: Significant increase in thromboembolic events (Arterial and Venous) 35% vs 24%: RR 1.48 (95% CI 1.04-2.1) P=0.03
RePHILL[18]

THE BACKGROUND • Early transfusion in traumatic haemorrhage increasingly moving to the pre-hospital space
• Two RCT's of pre- hospital plasma in traumatic haemorrhagic shock with discordant results:
• PAMPER (2018) 2u FFP vs crystalloid. Lower 30day mortality (23% vs 30%) $p<0.05$ and lower admission INR. (largely blunt with long transport times)
• COMBAT (2018) 2u FFP vs crystalloid. No difference 28day mortality (15% vs 10%) $p>0.05$ (v short transport times: mean 16 min)

Multicenter RCT: 4 prehospital services in UK in adult trauma pt. with systolic < 90mmHg • Prehospital administration of 2u RBC's and 2u Lyoplas (Lyophilised (Freeze dried) plasma vs 4 250ml bags NaCl • No significant difference in mortality (43% vs 45%) • No difference in failure to clear lactate (50% vs 55%) vital signs, or INR on arrival to ED • Did however have higher Hb on arrival (133g/L vs 118g/L) p< 0.0001 • Did receive higher total of blood products at 24hrs - RBC 6.34 vs 4.42 (p=00.4) - Plasma 5.04 vs 3.37 (p=0.002)

TORRES ET AL: 2023 [19]

• Retrospective Cohort of 2785pt with severe haemorrhagic shock from American College of Surgeons T-QIP database • Looked at whole blood adjunct MHP (WB-MHP) vs standard component based (CT-MHP) Outcomes • Lower 24hr mortality (HR 0.63; CI 0.41-0.96; P=0.03) • Lower 30day mortality (HR 0.53; 95% CI 0.31-0.93; P=0.02)

Cancer and blood [20]

Impact of transfusion worth considering perioperatively.

Other interesting blood related titbits

Waste of blood[21]

Making every drop count: reducing wastage of a novel blood component for transfusion of trauma patients.

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Training and practice of cardiac ultrasound in non-cardiac surgery

Dr Vik Singh

Cardiac ultrasound is becoming an intricate part of the perioperative pathway, covering all aspects from risk stratification, intraoperative management and complications post operatively. Anaesthetists play an increasing role in the delivery of this service.

In 2014, An ANZCA professional document was created around the training and practice of perioperative cardiac ultrasound in adults. This document highlights the criteria for usage, training, and competency in cardiac ultrasound. We review this document, and this information is then compared to the various qualifications and examinations in echocardiography around the world. This essentially is the pathway to becoming a credentialled non cardiac echocardiography anaesthetist.

Almost a decade has passed since the creation of the ANZCA guideline and there remains limited evidence around the usage of echocardiography in non-cardiac surgery and the diagnostic indications, complication rates and practical aspects of its implementation. We look at position statement around the usage of echocardiography in non-cardiac transplant surgery by the Society for Advancement for Transplant Anaesthesia.

Finally, we finish with a homegrown example of a perioperative echocardiography service created using the above principles to improve accessibility of echocardiography for non-cardiac anaesthetists.

Future Nostalgia: Trauma Care in 2029

Dr William Law
Specialist Anaesthetist, Auckland City Hospital

In the talk *"Future Nostalgia: Trauma Care in 2029,"* we explore the evolving landscape of trauma care, reflecting on the challenges and recent advancements shaping practice today. We'll assess the current state of play, look forward to what the next five years for trauma care may hold, highlight some innovative clinical trials currently recruiting, and imagine what trauma care may look like in 2029.

Looking back over the previous five years, major randomised controlled trials have produced some disappointing outcomes.[1–7] Despite this, high performing trauma systems across the world continue to excel in delivering quality care for their communities. We will discuss the limitations of traditional trial designs and explore how next generation adaptive platform trial designs combined with Bayesian analysis are poised to accelerate trauma research.[8,9]

A case study of a 73-year-old trauma patient illustrates the current hurdles in trauma care, such as cumbersome patient transfers, decision making around treatment priorities, and the complexities of an aging trauma population.

We introduce the concept of a hybrid emergency resuscitation room, combining CT scanning, interventional radiology and surgical facilities in a single room, down in the ED, at the point of patient reception.[10,11] This capability brings together multiple services needed to diagnose and stop bleeding in one place, creating a harmonious trauma resuscitation and definitive management team. Early data from trauma centres in Japan suggest a reduction in time to haemostasis, and impressive improvements in clinical outcomes with this model.[12]

Our discussion also covers advancements in pre-hospital care, particularly the use of freeze-dried plasma and whole blood for trauma patients. Freeze-dried plasma has recently been proven to be feasible and safe in Victoria, Australia,[13] but we await a local RCT to show its treatment effect. On the other hand, the SWIFT randomised controlled trial aims to determine the efficacy and cost-effectiveness of civilian pre-hospital whole blood, with recruitment scheduled to finish in 2026.[14]
We further explore innovations in traumatic brain injury (TBI) management, specifically brain tissue oxygenation (PbtO2) monitoring.[15–17] This promising technology has the potential to become a new standard of care, with the ongoing trials BOOST-III and BONANZA expected to confirm whether PbtO2 monitoring is effective in reducing brain tissue hypoxia and improving neurological outcomes.[18] TBI protocols are expected to become refined and individualised, informed through big data and multi-centre collaboration (PRECISION-TBI).[19] Looking even further ahead, artificial intelligence may enhance neuro-prognostication, helping to guide treatment decisions for TBI patients (PREDICT-TBI).[20]
And most importantly, as we look toward 2029, we envision a more central role for anaesthetists, intensivists, and perioperative physicians in trauma care. With the trauma patient population aging and becoming more medically complex, cross-specialty trauma services are poised to lead the way in patient-centred trauma care. By embracing innovation and interdisciplinary collaboration, anaesthetists are not just confined to the operating room but are integral throughout the entire patient journey, from initial resuscitation to post-discharge care. Trauma care is increasingly moving out of the operating room – will you keep up?

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Feedback conversations

Prof Kirsty Forest
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Feedback conversations in clinical settings are not just about ticking a box or following a procedure—they are a vital part of professional growth, patient care, and overall improvement in healthcare. Think of feedback as the fuel that keeps the engine of clinical practice running smoothly, helping everyone from junior doctors to seasoned clinicians refine their skills and deliver the best possible care.

In healthcare, feedback isn't just nice to have; it's a must. It's how we keep our skills sharp, stay up to date with best practices, and, most importantly, ensure our patients are getting the care they deserve (Archer, 2010). But for feedback to really make a difference, it needs to be more than just a quick pat on the back or a stern lecture. It should be clear, specific, and balanced—think of it as a mix of constructive criticism and positive reinforcement (Ende, 1983). The goal is to help clinicians feel both supported and challenged in the right ways.

Stone and Heen (2014) break feedback down into three main types: **Appreciation**, **Coaching**, and **Evaluation**. These aren't just fancy terms; they're practical tools you can use to shape your feedback. **Appreciation** is all about recognizing and valuing someone's efforts, which is crucial in healthcare where the work is tough and often thankless. **Coaching** is the feedback that helps someone get better—whether it's improving a specific skill or learning something new. Finally, **Evaluation** is where you measure someone's performance against a standard or expectation. Each type has its place, and knowing when and how to use them can make your feedback much more effective.

Of course, giving feedback isn't always a walk in the park. One of the biggest hurdles is dealing with the emotional reactions that feedback can trigger. Stone and Heen (2014) talk about three types of feedback triggers that can make someone defensive: **truth triggers**, **relationship triggers**, and **identity triggers**. A truth trigger kicks in when the feedback feels off or unfair. Relationship triggers are all about the dynamics between the person giving the feedback and the person receiving it—if there's tension or a lack of trust, it's tough to take feedback well. Identity triggers happen when the feedback seems to threaten who we are as professionals, which can make it hard to take anything in without feeling defensive.

So, how do we get past these triggers? One key strategy is to foster a growth mindset, a concept popularized by Dweck (2006). In a nutshell, a growth mindset means seeing abilities as something that can be developed with effort and learning, rather than as fixed traits. When clinicians adopt this mindset, they're more likely to see feedback as a tool for growth rather than a judgment on their competence. This shift in thinking can make feedback feel less like a threat and more like an opportunity.

How you deliver feedback also makes a huge difference. Kluger and DeNisi (1996) suggest focusing on tasks rather than the person's character. In a clinical setting, this means zeroing in on specific behaviours or outcomes. For example, instead of saying, "You're not responding to emergencies quickly enough," you might say, "In the last emergency, it took seven minutes to initiate the critical

intervention. Let's talk about how we can reduce that time." This approach makes the feedback actionable and less likely to provoke a defensive reaction.

Timing is another critical element. In healthcare, where quick adjustments can save lives, the sooner the feedback, the better. Shute (2008) points out that immediate feedback allows for quick course corrections and helps reinforce good habits before mistakes become ingrained. That said, it's also important to pick the right moment—sometimes, giving someone a bit of time to reflect before diving into feedback can lead to a more productive conversation.
And let's not forget that feedback should be a conversation, not a monologue. Engaging in a two-way dialogue encourages clinicians to ask questions, share their perspectives, and work together on developing a plan for improvement (Watling et al., 2014). This kind of collaboration doesn't just deepen understanding; it also increases buy-in, making it more likely that the feedback will actually lead to change.

Creating a culture where feedback is a regular, natural part of the workflow is also key. Carless (2006) points out that feedback is most effective when it's part of an ongoing dialogue, rather than a one-time event. In clinical practice, this might mean incorporating feedback into daily routines like morning rounds, post-operative debriefs, or case reviews. When feedback becomes a regular part of the conversation, clinicians are more likely to engage with it and use it to improve their practice.

In the end, feedback conversations are a crucial part of clinical practice. They're not just about pointing out mistakes or handing out compliments—they're about helping each other grow, improving patient care, and making sure we're all doing the best job we can. By delivering feedback clearly, thoughtfully, and in a way that encourages dialogue, we can make a real difference in how clinicians perform and how patients are treated. And as the healthcare world keeps changing, the ability to give and receive feedback well will continue to be a vital skill for anyone who wants to provide top-quality care.

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Management of acute stroke

Prof Alan Barber

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This talk will focus on new research and changes in clinical practice that of interest to anaesthetists or which impact your practice.

1. Tenecteplase to replace alteplase as stroke thrombolytic agent of choice

Alteplase has been the stroke thrombolytic agent of choice since the publication of the NINDS trials in the mid-1990s. Alteplase is used in ischemic stroke patients out to 4.5 hours from symptom onset, or 9 hours in patients who wake up with stroke and have salvageable tissue on perfusion imaging. However, alteplase has to be given as a 10% bolus with the remainder as an infusion over an hour. This need for an infusion ties up nursing time and can slow transfer patients for thrombectomy.

Tenecteplase is a genetically engineered tissue plasminogen activator that has a longer half-life and slower plasma clearance than alteplase, which can be given as an intravenous push. Studies have confirmed that tenecteplase is;

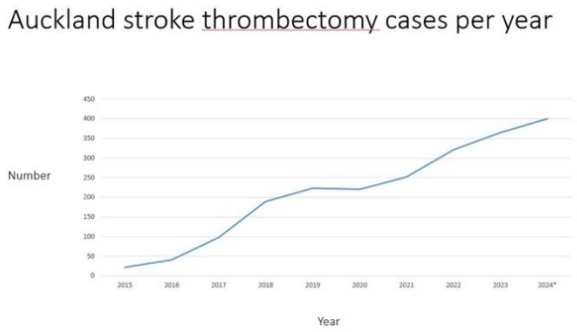
- Non-inferior to alteplase in ischemic stroke patients up to 4.5 hours from onset
- Superior to alteplase in stroke patients with large vessel occlusion
- Can be given out to 24 hours in patients with large vessel occlusion

This means that tenecteplase will replace alteplase when world-wide production problems are resolved in the next six months. This will reduce the need for nursing and ICU transfer teams, and delays for stroke thrombectomy.

2. Expanding indications for stroke thrombectomy

Since 2015 when the pivotal stroke thrombectomy trials were published, there has been a significant increase in the number of patients treated per year. In Auckland, our thrombectomy cases have increased from 22 in 2015 to a projected 400 plus this year, with similar increases in Wellington and Christchurch, the two other thrombectomy centres. In the first years, this was due to expansion of the treatment catchment area from metropolitan Auckland in 2015, to Northland, Waikato and Bay of Plenty in 2017.

However, in the last few years, this increase in numbers has also been due to an expansion of indications for thrombectomy. In 2018, the DAWN and DEFUSE studies showed that CT perfusion imaging, could identify patients with salvageable penumbral brain tissue, and that these patients clearly benefit from thrombectomy out to 24 hours from symptom onset. These patients are ‘slow progressors’ with good collateral blood flow keeping the penumbra alive for longer.



Then in 2023, three large randomized-controlled trials showed that patients with extensive infarction on baseline CT scans in emergency departments but who have larger areas of hypoperfused tissue at risk of infarction (penumbra) also benefit from thrombectomy. The numbers of patients with an independent outcome is smaller than those with smaller infarct cores but the benefit is real and significant. For every 100 patients with a large infarct core treated with thrombectomy, there are 16 who more achieve functional independence and 16 fewer who require hospital level care.

We're still coming to terms with the implications of these large core studies. Patients are more likely to have complications, require ICU admission, and a quarter will still die. But the bottom line is that the numbers of patients we're treating continues to increase and since an anaesthetic team is required for all thrombectomy cases (almost all of whom are treated with general anaesthesia in New Zealand) this has significant implications for anaesthetic services.

3. Pre-hospital blood pressure management

In acute stroke patients, physicians take a permissive view of blood pressure in those with ischemic stroke but tightly control blood pressure in the 15% who present with intracerebral haemorrhage. The evidence base for this practice is surprisingly scant.

The INTERACT 4 study was a pre-hospital (ambulance) study that randomized 2404 suspected stroke patients within two hours of symptom onset to with intensive BP lowering to a systolic 130-140 mmHg with urapidil, or standard care. The baseline blood pressure was 178/98, and by hospital arrival this had reduced to 159 mmHg in the intervention group and 170 mmHg in the standard care group.

There was no difference in outcome between the early intensive blood pressure lowering and usual care patients in the group as a whole. However, there were differences depending on stroke type with better outcomes in patients with hemorrhagic stroke, and worse outcomes in patients with ischemic stroke with a number needed to harm of 25.

This study has significant implications. The practice of acutely lowering blood pressure with intracerebral haemorrhage patients, and being more permissive with ischemic stroke patients is confirmed. For anaesthetists, the study emphasizes the importance of not dropping blood pressure acutely in patients undergoing thrombectomy.

4. **Research update**

MASTERSTROKE

We'll have further guidance of exactly what blood pressure to aim for during thrombectomy when the MASTERSTROKE study, run by Doug Campbell in Auckland, is published. This multicentre randomized-controlled trial aims to test if patients treated with endovascular thrombectomy will benefit from induced hypertension. Thrombectomy patients treated with general anaesthesia are randomized to a systolic blood pressure target of 140mmHg or 170mmHg from procedure initiation until recanalization. Methods to maintain the blood pressure are at the discretion of the procedural

anaesthetist. The primary efficacy outcome is improvement in disability measured by modified Rankin Scale score at 90 days. The primary safety outcome is all-cause mortality at 90 days. We've currently randomized around 450 of the planned 500 patients so the results shouldn't be too far off.

COOLHEAD 2 study

Almost all thrombectomy centres around the world work on a hub and spoke model, with most patients transferred for treatment from other hospitals. This is certainly the case in New Zealand with 80% of patients treated in Auckland transferred from another hospital, 30% via air ambulance. This leads to inevitable delays that in turn lead to an expansion of the infarct core before blood flow can be restored.

The aim of COOLHEAD-2 is to determine the feasibility of using a cooling cap as a potential neuroprotective strategy in patients undergoing thrombectomy for ischaemic stroke. We have already published a pilot study, COOLHEAD-1, where we demonstrated that head cooling is well-tolerated in awake healthy volunteers and patients with chronic stroke. With advanced MRI techniques, we showed that head cooling reduces brain temperature by approximately 1 degree celsius within 80 minutes.

COOLHEAD 2 is a feasibility and safety study that tests adherence to the intervention, complications, and recruitment rates. A cooling cap is placed on arrival to the emergency department and kept on until recanalization occurs. In the first two weeks of the study we've recruited six of a planned 40 acute stroke patients. All going well, this is the next step in the program before carrying out a phase III randomized controlled trials in patients presenting to spoke hospitals.

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Paediatric update

Dr Ben Blaise
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Case 1:

A 4-month-old 6-kg infant is referred for elective bilateral inguinal hernia repair via laparoscopy. Parents ask you about the risks associated with general anaesthesia on neuro-development. Based on the results of the GAS trial,[1] you reassure them saying that a single and short exposure to sevoflurane (less than one hour) is not associated with negative neurocognitive effects. Further results are expected from the Trex study.
You proceed to consent, but parents ask you to describe the complications/risks associated with anaesthesia. You explain that a wide range of complications can occur. They want to know more about the risk of dying. You explain that this risk in healthy children is evaluated at 0.4/100,000. According to the GMC, 'any risk of serious harm, however unlikely it is to occur' should be discussed.[2] Some lawyers would discuss that a consent taken on the day of a procedure is not valid.
You induce the infant using sevoflurane and, after inserting a cannula, you decide to measure the blood glucose of your patient. Result is 2.5mmol/l. You inject 12ml of glucose 10% and start a glucose 5% in saline infusion to correct this hypoglycaemia.[3]
You then move to secure the airway. You follow the recently published guidelines.[4] However, the patient presents a grade 4 view (quite rare in an infant). You proceed with a video laryngoscopy assisted fiberoptic intubation.
You get ready for a caudal block. Although there are no official guidelines, you follow the recent trend advising anaesthetists to use ultrasound guidance to insert their caudal blocks.[5] You use 2mg/kg of ropivacaine and 1mcg/kg of clonidine for a total volume of 1ml/kg.
The rest of the procedure is uneventful.

Case 2:

A 4-year-old Māori female patient (15kg) is referred for bilateral pelvic osteotomies for developmental dysplasia of the hips. She seems really upset and doesn't engage with you. Family refuses any neuraxial anaesthesia arguing of a risk of meningitis. They seem extremely stressed.
You use the recent pre-operative fasting guidelines in children to limit her discomfort,[6] and even the Sip Til Send (5ml/kg).[7]
You discuss a premedication with the parents. Unfortunately, the preop nurses ring you as they are unable to administer it. The child is even more upset than when you met her, and you try to disrupt her internal focus.[8] After a long chat, your first attempt uses oral midazolam (0.3mg/kg) in a juice that she refuses to drink, you suggest buccal midazolam (0.3mg/kg) but unfortunately it is not sufficient. She is however calm enough to tolerate a dexmedetomidine intranasal administration (2-3mcg/kg, max 0.3ml per nostril). You are glad you don't have to use an IM injection (ketamine 2mg/kg and dexmedetomidine 2mcg/kg).
Considering the opposition to an epidural from the family, you decide to use PENG blocks.[9,10] The blocks provide efficient perioperative pain relief. In children, sonoanatomy and block insertion under general anaesthesia are usually associated with a better success rate.
The rest of the procedure is uneventful.

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Cannabis in acute pain management

Dr Charlotte Hill

Day surgery anaesthesia update

Dr Ben Kave

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Day surgery has emerged as a crucial component in the modern healthcare landscape, especially in the post-pandemic era of constrained healthcare resources. The shift towards outpatient surgical procedures offers numerous benefits, including reduced hospital stay, cost savings, and optimized patient recovery. This lecture delves into the comprehensive anaesthetic considerations essential for the success of day surgery programs, highlighting recent trends, best practices, and critical challenges.

Current Context and Utilization Trends

The COVID-19 pandemic significantly impacted elective surgery waiting lists, leading to a backlog of cases and increased demand for day surgery. In Australia, day surgery is a significant contributor to surgical productivity, with standalone day hospitals accounting for 22% of all private hospital separations. However, the adoption of day surgery varies significantly within the public system, and there are international jurisdictions that have had more success in aggressively expanding their day surgery programs, which we will examine in this lecture.

Perioperative Medicine Framework

A multidisciplinary, team-based approach is pivotal in optimizing the uptake of day surgery. The Australian and New Zealand College of Anaesthetists (ANZCA) has introduced a new qualification in Perioperative Medicine, which it defines as managing surgical patients from the time that surgery is contemplated, through to the realization of an optimal outcome. The evolution of this emerging subspecialty comes at an opportune time for the acceleration of day surgery programs, as successful day surgery depends on rigorous assessment of patient suitability, streamlined perioperative care pathways, and evidence-based management of comorbidities. Day surgery can only be truly successful when practiced in a framework of outstanding multidisciplinary perioperative care.

Preoperative Considerations

Preoperative preparation is crucial for the success of day surgery. Key aspects include:

- Patient Education: Ensuring patients are well-informed about their day surgery status at the time of booking.

- Assessment and Optimization: Dedicated pre-operative assessments by the anaesthesia team to identify and manage comorbidities early.
- ERAS Pathway Development: Establishing procedure-specific guidelines and separating day surgery pathways from inpatient and emergency surgery to prevent delays and cancellations.

Patient Selection and Optimization

Traditional exclusion criteria based on BMI, ASA, and age are being re-evaluated to expand the eligible population for day surgery. Instead of rigid exclusion criteria, a case-by-case assessment approach is recommended, considering social factors and the patient's ability to manage post-operative care at home. The preadmission assessment clinic plays a crucial role in optimizing patients with chronic conditions and ensuring they are fit for day surgery.

Intraoperative Considerations

Efficiency in scheduling and minimization of tissue trauma and anaesthesia duration are key to successful day surgeries. Important intraoperative considerations include:

- Short-acting Anaesthetic Agents: Preference for agents that allow quick recovery and minimal side effects.

- Multimodal Analgesia: Utilizing a combination of analgesics to manage pain effectively without relying heavily on opioids.

- Minimizing Fasting: Allowing free access to clear fluid pre-operatively has been shown to reduce patient discomfort without increasing adverse outcomes.

Postoperative Management

Effective postoperative management ensures timely discharge and patient satisfaction. Critical elements include:

- Criteria-led Discharge: Empowering nursing teams to discharge patients based on predefined criteria.
- Postoperative Analgesia: Ensuring prescriptions are ready for discharge and pain management protocols are in place.
- Ambulatory Care Pathways: Providing patients with adequate information and a dedicated pathway to seek postoperative advice and care.

Challenges and Future Directions

The expansion of day surgery faces several challenges, including patient selection complexities, managing comorbidities, and ensuring adequate follow-up care. Future directions involve the use of telehealth for perioperative assessments, novel remote monitoring devices, and continuous benchmarking and quality assurance to improve outcomes and patient satisfaction.

In conclusion, the evolution of day surgery requires a collaborative, evidence-based approach to anaesthesia and perioperative care. By addressing the current challenges and adopting standardized practices, perioperative teams can enhance the efficiency and safety of day surgery, ultimately benefiting patients and the broader healthcare system.

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Future directions in RA

Assoc Prof. Alwin Chuan

Pathways to health equity and cultural safety

Dr Mataroria Lyndon

Senior Lecturer in Medical Education, The University of Auckland, and Co-Founder and Director of Health Equity, Tend Health

Cultural safety is a crucial pathway to health equity for Māori. It is also intended to be applied across various dimensions, including ethnicity, gender, age, Tāngata whaikaha/disability, and Rainbow/Takātapui communities. The Council for Medical Colleges' Cultural Safety Training Plan for Vocational Medicine provides a framework for developing cultural safety among medical practitioners.

The training plan identifies crucial proficiencies for medical practitioners, including the ongoing development of critical consciousness, addressing power imbalances, committing to transformative action, and ensuring that 'safety' is determined by patients and communities. Additionally, it guides colleges in implementing the plan, emphasising the creation of culturally safe environments and integrating training into curricula tailored to the needs of specialist colleges.

Ensuring cultural safety among clinical educators is paramount to effectively implement the plan. This presentation will provide an overview of cultural safety and delve into the key components of the training plan. It will also underscore the need to extend cultural safety proficiencies beyond patient care and integrate them into teaching, clinical supervision, assessment, and culturally safe learning environments.

The emphasis on cultural safety training in medical education represents a significant step towards promoting health equity for Māori and addressing systemic barriers in healthcare delivery. By embracing the principles of cultural safety, medical practitioners and educators can aspire to create inclusive and culturally safe environments that prioritise the well-being and autonomy of all patients, irrespective of their cultural backgrounds.

Laughing gas in a land of little laughter

Dr Graham Knottenbelt

Humanitarian aid provides logistical and material assistance to reduce suffering, maintain dignity and preserve the life of those in need, often during armed conflict, natural disasters and other emergencies. Humanity, impartiality, neutrality, independence and voluntary service are it's fundamental principles.

The talk gives an outline of medical humanitarian aid using the context of South Sudan as example and my experience with MSF to show some of the challenges, rewards and practicalities of being an anaesthetist on assignment.

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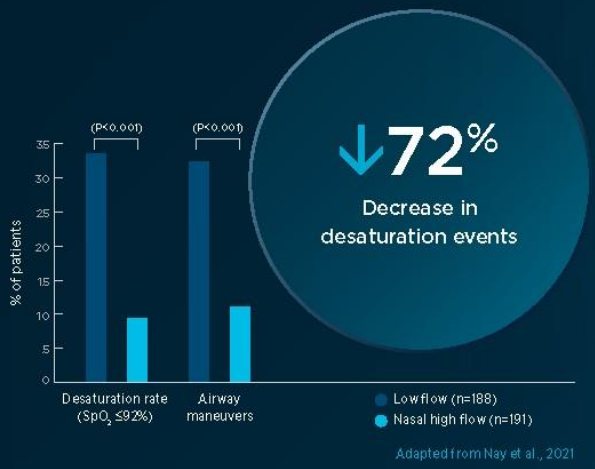
Nasal high flow (NHF) for airway management during procedural sedation. NHF has been shown to reduce the risk of desaturation[1-4] and resulting airway interventions[1,4,5], improving patient safety[4].

Nay et al., 2021 | High risk GI endoscopy patients[5]



Adapted from Nay et al., 2021

Lin et al., 2019 | Low risk GI endoscopy patients[1]

Adapted from Lin et al., 2019

Positive airway pressure[6-8]

Corley et al., 2011

↑26%

Increase in end-expiratory lung volume compared to low-flow cannula[6]

Low flow | Nasal high flow

Low flow vs Nasal high flow

Adapted from Corley et al., 2011

1. Lin Y et al., Gastrointest Endosc. 2019. 2. Hung KC et al., J Clin Anesth. 2022. 3. Su CL et al., PLoS One. 2021. 4. Thiruvenkatarajan V et al., Anaesthesia. 2023. 5. Nay MA et al., Br J Anaesth. 2021. 6. Corley A et al., Br J Anaesth. 2011. 7. Parke RL et al., Respir Care. 2015. 8. Parke RL et al., Respir Care. 2011.

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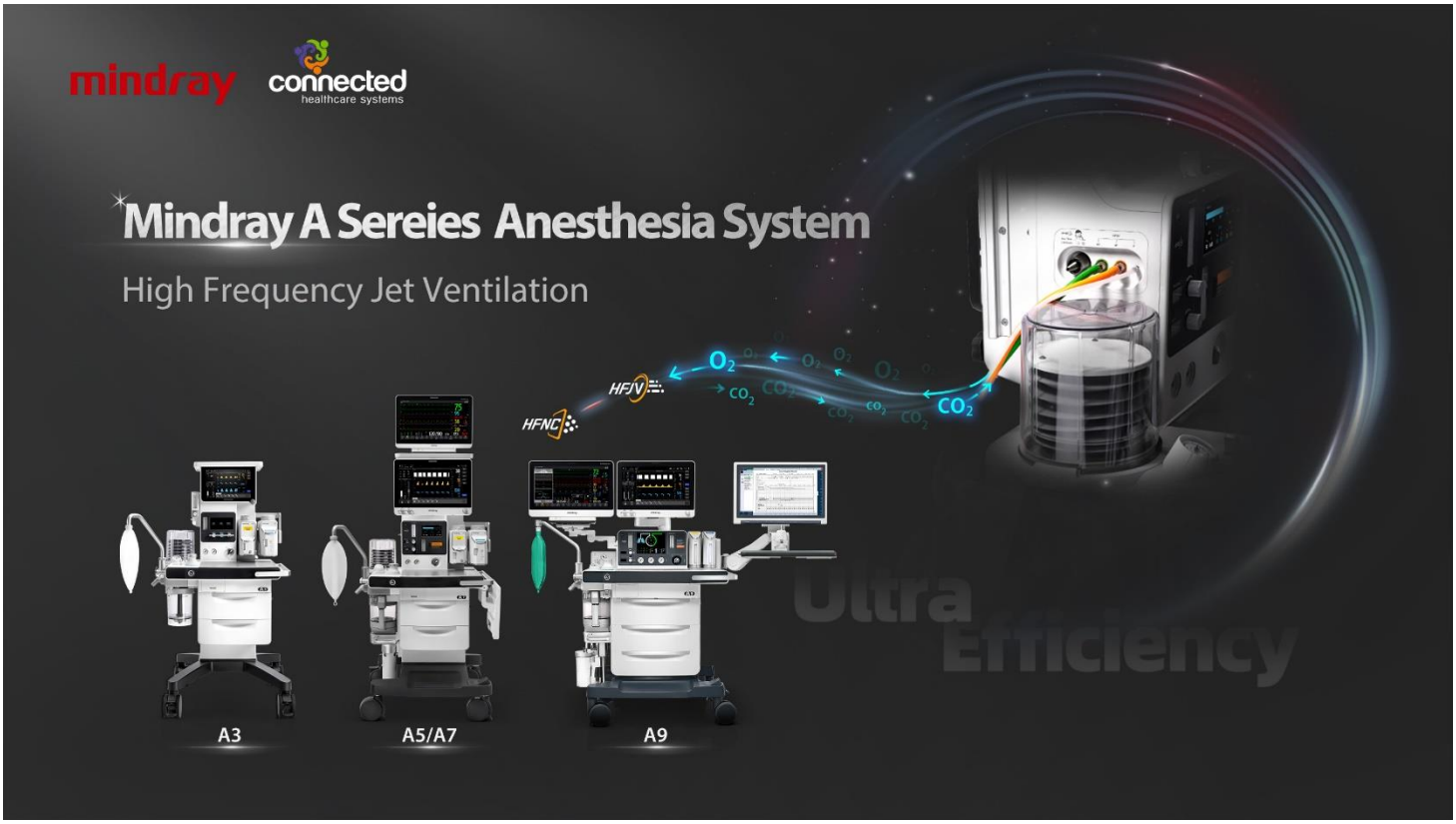
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