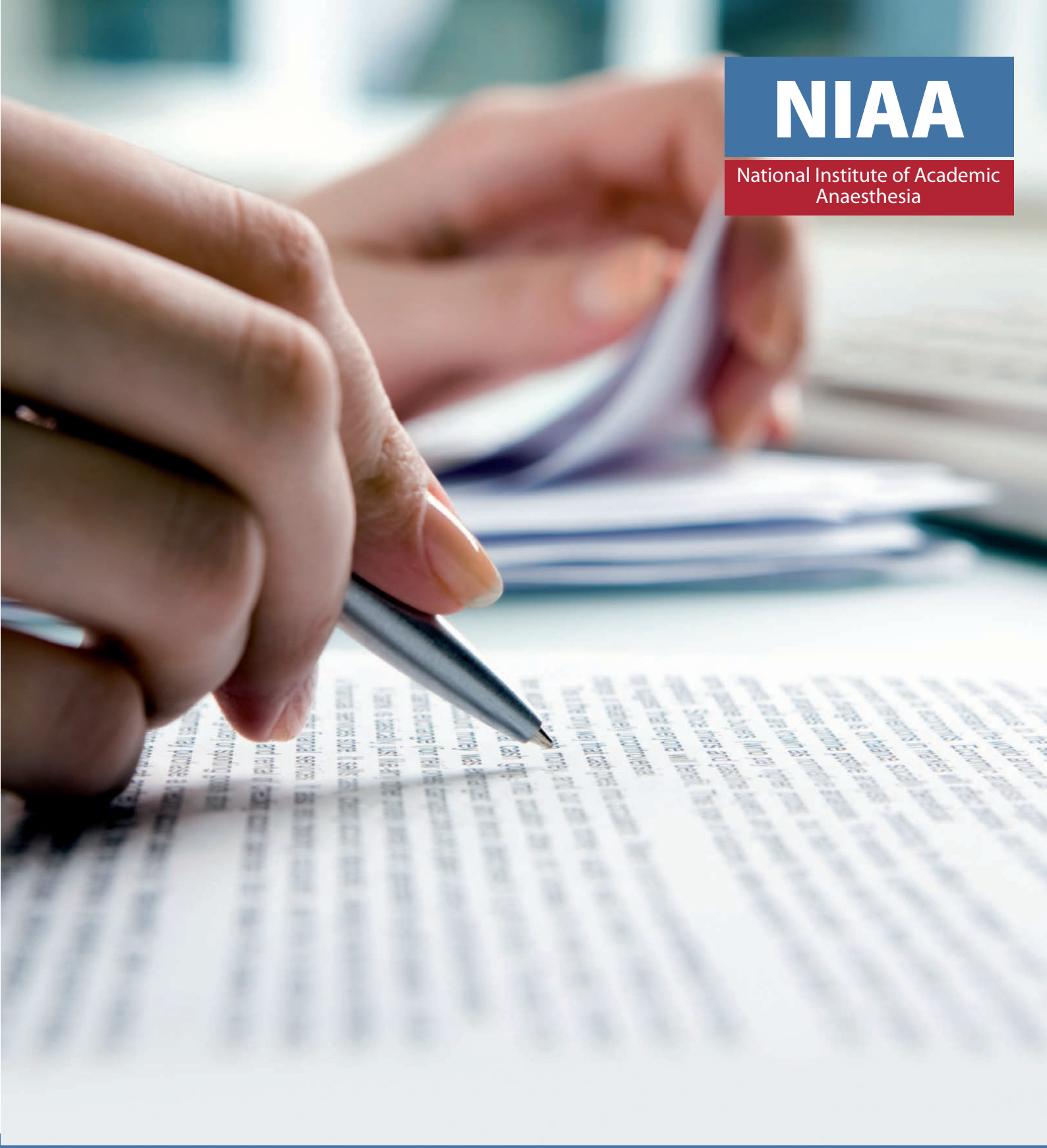

NIAA

National Institute of Academic Anaesthesia

NIAA Academic Training Report 2013–14

Prof Ravi Mahajan
NIAA Board Chair (2010-2013)

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NIAA Academic Trainee Coordinator

We are delighted to present the first National Institute for Academic Anaesthesia Annual Trainee Research Report.

The purpose of this document is to showcase the breadth and depth of research activity involving trainee anaesthetists in the United Kingdom. Some of the reports detail MD(Res) or PhD programme research and many others describe the wealth of activity from trainees taking some dedicated time out of clinical training to pursue shorter research posts attached to NHS hospitals or University departments.

We hope that this will provide some inspiration for more junior anaesthetists who are considering undertaking a period of research during their training, and that it will act as a resource which can be used for trainees to contact colleagues about research opportunities across the country.

We know that we have probably only captured a proportion of the actual research activity of anaesthesia trainees, but hope that future publications will be able to provide a more comprehensive representation of on-going work. If any trainees or supervisors who have not submitted contributions this year would like to do so in the future, please ensure that you are registered on the academic trainees database by contacting mhumphrey@rcoa.ac.uk

This year has seen a number of developments in the NIAA's efforts to promote academic endeavour and excellence. In September 2013, the NIAA and the London Academy of Anaesthesia jointly hosted a 2-day "Introduction to Academic Anaesthesia" course, aimed at specifically at trainees. A truly high class faculty of speakers was met with a full house of attendees and excellent feedback. The NIAA and London Academy are keen to support future meetings in London, and in particular, the NIAA is hoping that regional meetings, led by local trainees and researchers, will also start to take place.

The RCoA's Current Concepts symposium in October 2013 celebrated the Jubilee of the Royal College of Anaesthetists by featuring a faculty of "rising stars". The speakers were predominantly trainees and new consultants, and with a variety of clinical and academic interests which showcased the promising future for our specialty. Abstracts of some of the presentations from this meeting can be found on pages 2-23 of this brochure. It is hoped that future conferences will feature sessions which have a similar theme.

Finally, this year has seen the exciting development of a number of regional trainee research and audit networks. These "grass roots" organisations are being led by trainees for trainees, but with consultant support. The aspiration of these networks is to engage trainees who do not necessarily wish to pursue academic careers as consultants, but nevertheless want to contribute usefully to research and quality improvement both during and after their training. More information on these developments are provided on pages 24-25 by Gary Minto and Tom Clark, who have led the development of the SWARM group in the Peninsula region, and who are galvanizing research networks across the U.K. to work together in the Research and Audi Federation for Trainees (RAFT). We hope that 2014 will see further successes for these networks, and the development of more initiatives in all parts of the country.

So – there are exciting times ahead for academic training in anaesthesia. We hope you enjoy reading this summary, and look forward to comments and feedback in the future.

Ramani and Ravi

RISING STARS IN ANAESTHESIA, CRITICAL CARE AND PAIN MEDICINE

ABSTRACTS OF PRESENTATIONS FROM THE RCOA JUBILEE CURRENT CONCEPTS SYMPOSIUM

10-11 OCTOBER 2013

DR SIBTAIN ANWAR

PERSISTENT POSTSURGICAL PAIN (PPP): MECHANISMS AND PREVENTIVE STRATEGIES

Pain after surgery is common and expected. Patients may undergo surgery to treat pre-existing pain or present pain free to the hospital, and experience it during postoperative recovery. In both cases, pain pathways are activated leading to acute pain. Patients expect this pain to be short lasting. Fortunately, most patients do recover from surgery within weeks and return to normal life. However, a strikingly large proportion of the surgical population continues to describe persisting pain - beyond the expected duration of tissue healing. The definition of *persistence* of postsurgical pain is not clear in the literature and the duration can vary from two to three months, or even to six months and beyond.

The prevalence of this phenomenon is estimated to be as high as 40-70%, following surgery involving a high risk of nerve injury (e.g. breast surgery, lung surgery, limb amputation.) However, this remains significant, at 10–30%, for other forms of surgery such as joint replacement or bowel surgery (1).

Long term, persistent postsurgical pain (PPP) is the most common complication following surgery, and yet only within the last fifteen years has the problem been recognised (2). In the case of inguinal hernia repair, for example, it is not only the most common complication but also the most serious (3).

Persistent pain could represent a worse tissue injury at the time of surgery leading to difficulty in managing acute pain immediately after. Historically, this has been attributed to surgical technique and inadvertent intraoperative nerve damage, but evidence is gathering that nerve-sparing technique may not make a significant difference to long-term pain outcomes (4).

The evidence suggests that a smaller incision and less invasive techniques may improve analgesia in the recovery period. However the translation of this reduced acute pain into lower prevalence of persistent postsurgical pain is only seen in some procedures and certainly not all types of surgery (5, 6).

Patient related factors are perhaps more important. Age plays a significant role in the risk of developing PPP (7), whereas other factors such as gender and patient psychology are more complex, in terms of their contribution to the risk of developing persistent pain (8).

Past experiences of pain may predispose an individual to PPP. The effects of pre-existing pain and pain from local disease or other remote sites also shape the pain experience. These factors may explain the link between acute and chronic pain, with the same risk factors potentially predisposing to both (9).

Rising cancer and trauma surgery survivorship (10) is resulting in a cohort of patients liable to develop PPP which negatively impacts function and quality of life for many decades. Following breast cancer surgery, the pain symptoms last for at least five years and affect half of all patients (11).

Historically, acute and chronic forms of pain were viewed as separate disease processes. The study of PPP, in particular, has contributed to the view that these disease entities are more likely to represent a continuum, with a transition from one to the other over time. Therefore the unique feature of this pain model- where the onset is fixed and can be identified in advance- allows detailed study of the transition from acute to chronic pain states. In addition, there is potential for the controlled assessment of possible preventive strategies.

In this presentation I will discuss the risk factors for developing persistent postsurgical pain and describe potential preventive strategies.

I declare no conflict of interest relating to the material presented during this meeting.

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DR CHRIS BREARTON, DR DAVID CASTILLO, DR CLINT CHEVANNES

BLOOD CONSERVATION STRATEGIES IN OBSTETRIC ANAESTHESIA AND THE USE OF TECHNOLOGY IN OBSTETRIC ANAESTHESIA

Major Obstetric Haemorrhage (MOH) is an important worldwide issue, being the most common cause of maternal death. In the U.K. the mortality is much less, directly causing only nine deaths in the last triennial maternal mortality report (1). Morbidity from haemorrhage is still significant, and is the commonest reason for a recently pregnant woman to be admitted to critical care (2).

We present our system of management of MOH which, whilst including accepted standard management principles uses knowledge of pathophysiology and application of technology to help overcome significant local barriers to safe, rapid management of a difficult clinical issue.

Point of Care Coagulation Testing:
The pathophysiology of major obstetric haemorrhage is becoming better understood. A coagulopathy which involves an early fall in fibrinogen has been shown to exist, and is an early predictor of MOH (3).

Thrombelastography is an old technology which is being applied more recently outside its more common use in cardiac and liver surgery. The major perceived benefits are of shortened turn-around times (TAT) and directed blood product therapy. This is yet to be widely proven to improve patient outcome (4) or directly reduce cost outside of cardiac theatres.

However the versatility of the thromboelastogram and its ability to test specifically and rapidly for a "functional" fibrinogen deficiency make it potentially ideal in the early diagnosis of specific clotting abnormalities in MOH (5).

Cell Salvage
Despite extensive use in other specialties, including in some cancer surgery, there are potential barriers to its use in obstetrics. These include the generic problems of correct patient administration, hypotension onrapid re-transfusion, and cost. This is along with the specific potential issues within obstetrics of unpredictable blood loss, amniotic fluid embolus, rhesus immunisation, and cost (6). Haemorrhage can be difficult to predict, but we have shown that using cell salvage routinely in emergency obstetric haemorrhage cases can be cost neutral, with minimal side effects. Amount of blood returned varies, but with increasing use comes increasing return (7).

Anaesthesia Information Management Systems
Guidelines published by the College, the AAGBI and SCATA in 2008 declared that "Every anaesthetic machine should be equipped with a computerised anaesthetic record keeping system connected to the patient monitors. This should be linked with the main hospital administrative and clinical systems, so that all information held on the patient is available at the point of care." (8)
The purported benefits of an Anaesthetic Information Management System (AIM) include contemporaneity, impartiality, and an increase in the volume and frequency of data captured. Data can by digitally archived providing a research and audit tool. Enthusiasts claim that it Improves

workflow and theatre management and by reducing time spent on chart filling it increases the time available for direct clinical observation. (9),(10)
Nevertheless, despite such systems having been available for many years uptake in the UK has been slow. This may be related to difficulties with the NPfIT projects but in addition there are numerous concerns around such systems. In particular: the expense, the burden of training and the uncertainty of any clinical benefit. Detractors argue that it increases time spent looking at computer screen and reduces time spent looking at patient. Others fear that a lack of control over documentation will result in greater scrutiny and even litigation. (11), (12)

We describe a local configuration that allows for ease of documentation during complex and busy cases, fully integrated into the management of MOH. This includes hands free accurate recording; a template for commonly used drugs such as sequential uterotonics (thereby acting as a prompt or decision support); reminders for taking blood and equipment usage (e.g. cell salvage and ROTEM); quick documentation of procedures; barcode scanning of blood product ID. All complete with a legible and backed-up printout.

Massive Haemorrhage Pathways
These pathways have been developed locally, regionally, and nationally to provide guidance on acute management of generalised massive haemorrhage. An integrated management plan, specific for obstetric haemorrhage is an ideal.

Activation of the major haemorrhage pathway is on a clinical basis, but there is a significant number of inappropriate activations and wastage of product. ROTEM values appear to be predictive not only of blood product use, but also of Red Cell use.

In our audit of patients who had already activated our major haemorrhage pathway on clinical grounds we retrospectively assessed their actual blood product and red cell requirement based upon normal (13) or abnormal FibTEM results of 15mm MCF.

Fig 1: Blood and blood component requirements in those activating massive haemorrhage pathway

	Blood	**FFP**	**Cryo**	**Platelets**
Abnormal FibTEM	**3.7*** **[2.1 – 4.9]**	**2.6** **[1.3-3.3]**	**0.9** **[0.26-1.3]**	**0.3** **[0-0.5]**
Normal FibTEM	0.8* [0.2-1.1]	0 [0-0]	0 [0-0]	0 [0-0]

* P<0.001 (Mann Whitney U Test)

Red cell use in those who had clinically activated the massive haemorrhage pathway but normal FibTEM was a mean of 0.8 units.

The next step is to assume that early treatment with fibrinogen of the fibrinogen deficiency will improve management. Cryoprecipitate needs to be de-frosted prior to use and so is not always an early treatment. Fibrinogen concentrate is licenced for use in congenital hypofibrinogenaemia, not acquired, however it can be given rapidly as it requires reconstitution, not cross matching, and gives a defined dose. It has been used off licence on a named patient basis, and is currently the basis of a multi-centre randomised, placebo controlled trial sponsored by Cardiff University.

Summary

An integrated massive obstetric haemorrhage management system can embrace technology to aid management, overcoming significant barriers to safe management and potentially improve overall care.

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DR MICHAEL COUPE

PERFORMANCE POLYGONS: A METHOD FOR REPRESENTING

MULTIDIMENSIONAL PERFORMANCE DATA

Measurement of healthcare outcome is central to assessing quality and quality improvement. Its importance is increasing as a strategic focus of the Department of Health and for medical revalidation. Although healthcare performance is often presented in a single dimension (e.g. a 'post–operative pain audit') healthcare quality is more complex and often involves several related or conflicting outcomes: e.g. for tonsillectomy measures of quality include time taken for anaesthesia or surgery, time in theatre, blood loss, post-operative nausea and vomiting (PONV), pain, day case rate, hospital episode cost, % readmissions and % re-operations for bleeding, duration of post-operative pain and patient's time off school or work. The surgeon's focus (operative time, bleeding, readmission rate), the anaesthetist's (nausea, pain, day-case rate), the theatre manager's (total theatre time, cost), the hospital management's (cost, day-case rate) and the patient's (pain and nausea, readmission rate, time off school or work) may all differ.

Relying on single outcome measures encourages a 'silo mentality' and changes in practice intended to improve one outcome (e.g. pain on waking) may adversely impact others (e.g. PONV, time in recovery).
I introduce 'performance polygons' as a form of data representation reflecting the complexity of outcome measures. Examples are shown but I do not intend to define which outcome measures should be used when measuring anaesthesia (or other) quality.

Performance polygons
Performance polygons qualitatively represent multi-dimensional data making understanding of overall performance easier. They are derived from star charts, first proposed by Georg von Mayr's more than 100 years ago.

Comparator polygons can be internal (e.g. temporal changes in an individual's multidimensional performance) or external (e.g. pre-defined benchmarks) and may be used to represent the performance of individuals or groups (e.g. theatre team, hospital, whole healthcare organisation).

A Comparison with departmental performance.
Figure 1 shows an individual anaesthetist's performance with exemplar outcome measures recorded in recovery. Chosen outcomes are of interest to patients, surgeons, recovery staff, managers and anaesthetists and include measures of anaesthetic skill (regional block success), process variables (adherence with good prescription practice), efficiency measures (turnaround time) and patient-relevant outcomes (pain, PONV): all measures of anaesthetic performance. The comparator polygons here are the 5^{th} and 95^{th} centile of a reference group, (e.g the whole anaesthetic department).

This anaesthetist's outcomes are a mixture of above average and very good (compared to the reference group), but (s)he is slow. Criticism about slow service may be deflected by the high quality of patient-relevant outcomes. The anaesthetist might focus on improved turnover with maintenance of outcomes.

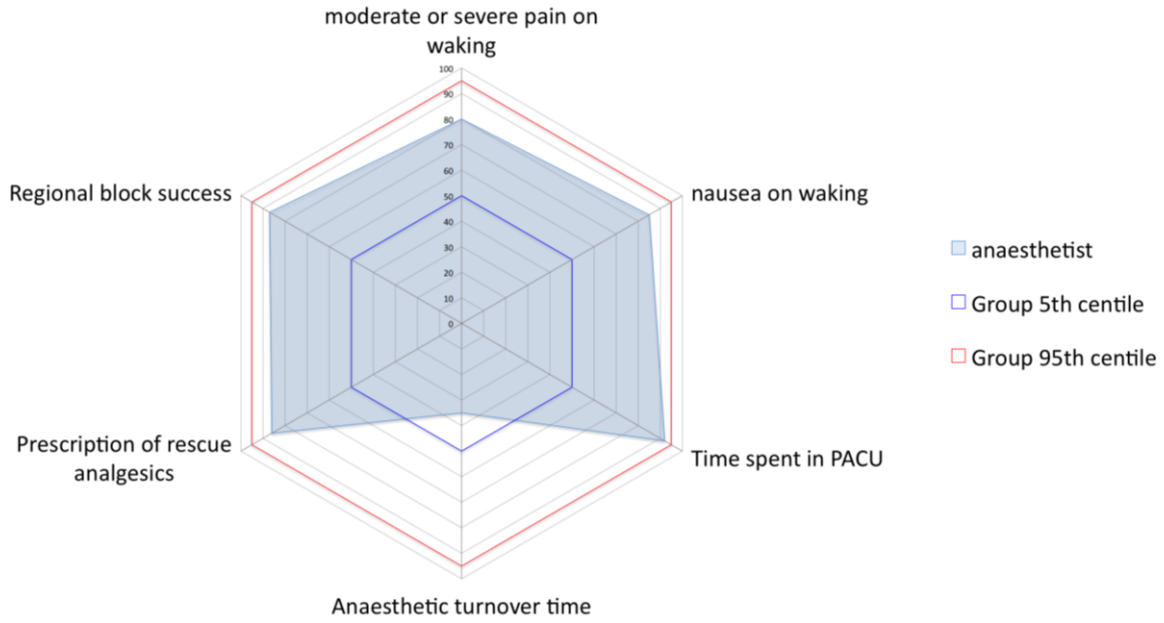

Figure 1. Performance polygon; individual anaesthetist's performance with 95th and 5th centiles as comparator.

B Comparison with own performance.

Figure 2 uses the same outcome measures to compare with historical performance (previous year's best and worst months). A large polygon suggests improved outcomes but at the cost of turnover speed. This anaesthetist has begun to use ultrasound for regional anaesthesia and remains on a learning curve. If scrutinized by a 'pain audit' they would be considered to be performing well, but an 'efficiency audit' might raise concerns. The multidimensional data allows a balanced assessment. Re-plotting after a suitable interval will show whether the good outcomes are maintained with improved speed.

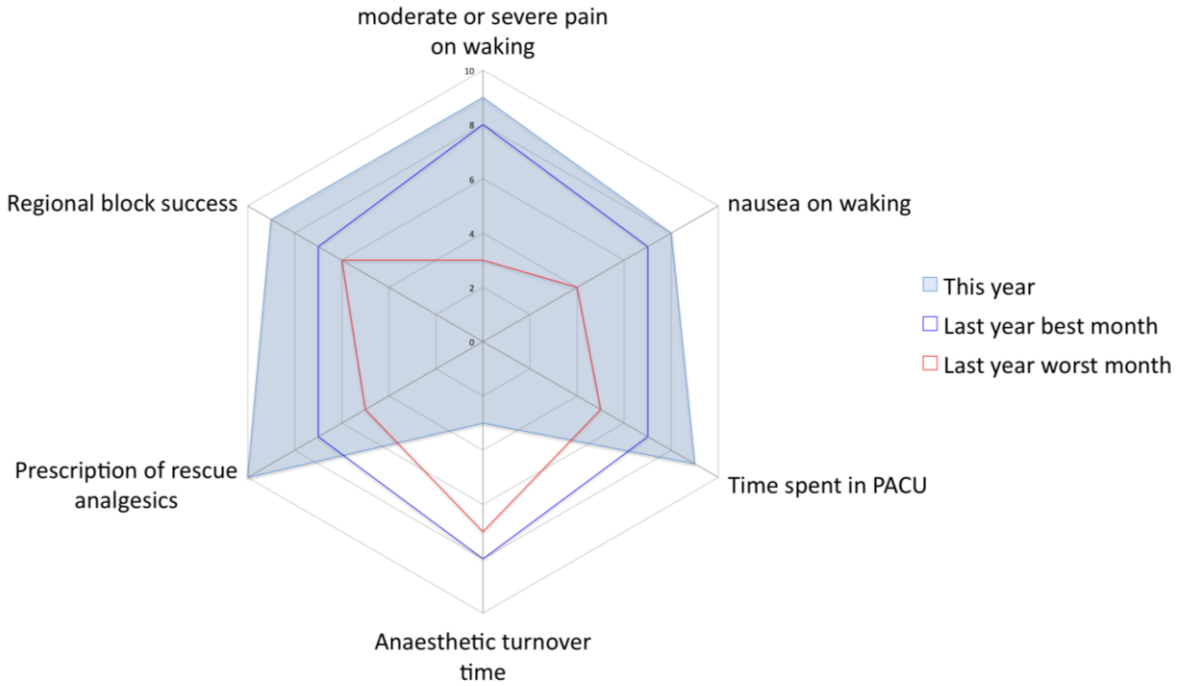

Figure 2 Performance polygon: individual anaesthetist's performance compared to own historical performance.

C 'Rank' as comparator.

In figure 3 using the same outcome measures departmental ranking is used as comparator for each outcome (9th, 5th and 1st decile). This polygon is small with low scores in several domains indicating overall 'relatively' poor performance. This anaesthetist ranks poorly in their department on most measures but has rapid turnover. Perhaps despite a happy surgeon, the anaesthetist might reflect on a need to slow down and do better!

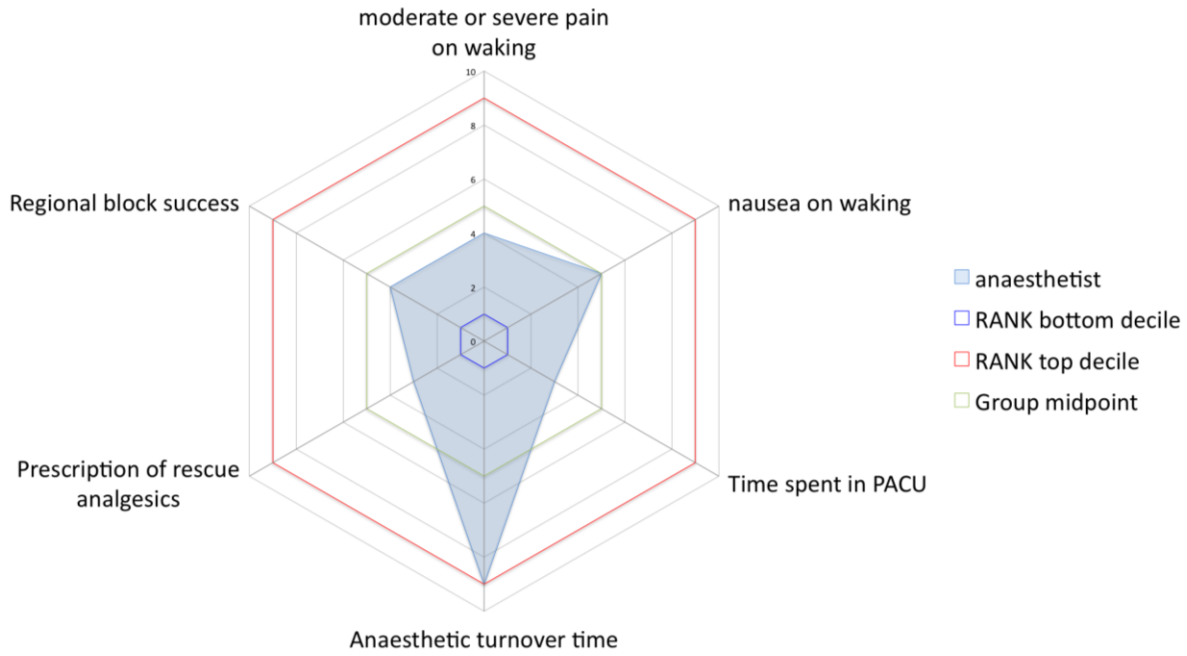

Figure 3. Performance polygon with rank as comparator.

D Comparison with a 'benchmark'.

In figure 4, the comparators are an upper benchmark of 'good performance' and a lower benchmark of 'unacceptable performance': perhaps generated from departmental data, published outcome data or consensus opinion. Using external 'benchmarks' overcomes the limitation of using colleagues' performance as a comparator (a whole department may perform well or poorly). Such a polygon might have a role in identifying poor performing trainees or as part of revalidation for trained anaesthetists.

This anaesthetist is quick and generates very comfortable patients who recover slowly with high rates of nausea, compared to the benchmarks. Perhaps this anaesthetist uses excessive amounts of opioids and minimal adjuncts or is not good at, or avoids, regional anaesthesia. A pain audit would rank this anaesthetist highly but recovery staff are unlikely to rate his/her performance as good.

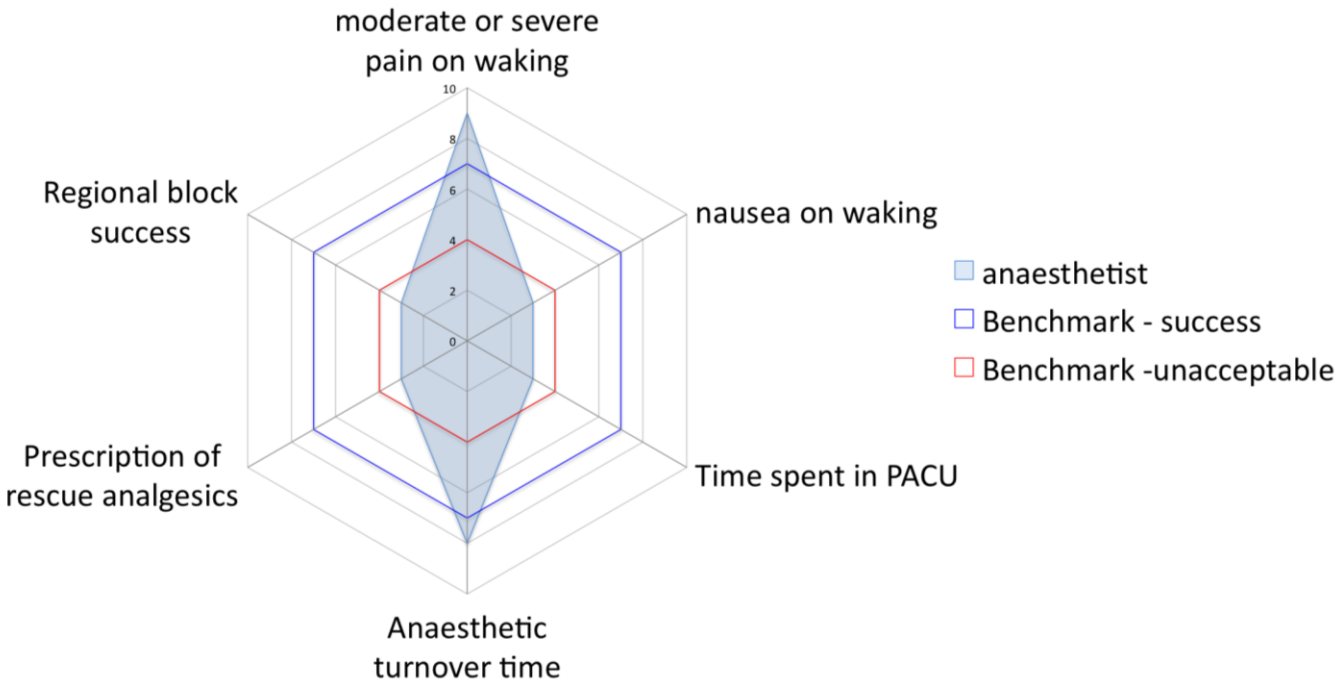

Figure 4 Performance polygon: individual anaesthetist's performance with 'benchmark' comparator.

Comment

Performance polygons might be used in a department as a useful starting point for an appraisal, to examine an individual's performance in the event of a complaint, and for revalidation (capturing data in 4 of 16 revalidation domains: i) colleague multi-source feedback ii) patient multi-source feedback iii) clinical outcomes data iv) evidence of clinical audit and quality improvement). If a database is large enough performance polygons might be used to examine team or individual performance for specific operations to determine perhaps who performs best (so they may educate others) or whether any individual is a lower outlier (so they may learn from others). If used continuously, capturing data from all anaesthetics, performance polygons would become increasingly valid and valuable. Widespread collection of similarly defined data could usefully contribute to national benchmarking: a process already being developed in the USA. Clearly the applicability of performance polygons need not be limited to anaesthesia but is suitable for examining other spheres of medicine. Performance polygons also have a role in representing change such as introduction of new techniques/procedures or in research to show both primary and secondary outcomes. Manipulating comparator polygons and axes length can enhance the value of performance polygons but is beyond the reach of this article.

Conclusion.

Performance polygons are a simple but powerful way to represent data over several domains; they provide a visual representation of data that is easily understood by observers. The use of comparator polygons can enhance their value and transform the polygons from simple graphical displays to a potential driver of change and quality improvement.

With thanks to Drs Tim Cook and Dr Terren Ku.

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DR MARK EDWARDS

WHO IS THE PERIOPERATIVE PHYSICIAN?

A 2011 report by the Royal College of Surgeons termed higher risk general surgical patients a "forgotten group". Focusing attention on this group should be a key healthcare priority for a number of reasons:

1. Outcomes in this group are much worse than in other areas traditionally considered to be "high risk", such as cardiac surgery. Mortality following emergency surgery in this group is particularly high.
2. High volume of surgery - worldwide estimates of 230 million surgical episodes annually mean that even small reductions in the incidence of postoperative disability or death will have a huge impact.
3. Postoperative mortality varies widely both internationally and between hospitals within a country, suggesting that there is room for improvement in perioperative care in many centres.

This talk will cover the following areas, examining both UK and international practice:

1. Why there is an unmet need within perioperative care
2. What modifications to care may benefit patients in the pre-, intra- and postoperative phases
3. Why anaesthetists are uniquely placed to take on the role of "perioperative physician"
4. The progress anaesthetists have already made in forming this role and possible future directions
5. The benefits to the profession of actively shaping this role, and the potential threats if we avoid it

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DR CHRISTOPHER GREEN

PERIOPERATIVE NEUROPATHIC PAIN

Nociception: Neural process of encoding and processing noxious or harmful stimuli [1]
Pain: Unpleasant ***sensory*** and ***emotional*** experience associated with actual or potential tissue damage, or described in terms of such damage.[2]
Neuropathic Pain: Pain arising as a ***direct consequence*** of a lesion or disease affecting the somatosensory system.[3]
(....this has implications for the diagnosis of CRPS type 1)

- *"this common type of pain is often under diagnosed and undertreated, and is associated with suffering, disability, impaired quality of life, and increased cost"* [4]
- Chronic NP – contributes to poor general health and QoL score similar to serious mental illness and severe heart disease. [5] [6]

Classification - typically by aetiology, body axis (site) of pain, or site of somatosensory lesion. Suggestions that future classification should involve the sensory modality involved as found on questionnaires and QST

How common is it?

- Most nerve injuries do not cause neuropathic pain [7]
- Incidence of acute neuropathic pain in the days after surgery 1-3% [8], but may be higher up to 10% given that.... [9]
- 1 year follow-up, 56% of patients with acute neuropathic pain continued to have pain [7]
- Perioperative np is a significant cause of chronic np in general
    - 25% of patients referred to chronic pain clinics having chronic post-surgical pain. [10]
    - Neuropathic *component* in persistent postsurgical pain is 6-68%, depending upon type of surgery. [11]

Concept of the component of pain that is neuropathic is becoming more popular.
Growing support for a spectrum of syndromes where pain is more or less neuropathic in nature [12]
Different mechanisms co-exist

Pathophysiology of Perioperative Neuropathic Pain - Plastic changes and sensitisation [13-16]

- ***Local trauma –*** neuroma and inflammatory soup → spontaneous activity, phenotypic switching, recruitment of silent nociceptors, induced inflammatory changes in DRG and CNS (up to 2 weeks post-surgery)

- ***Acts through -*** Chemokines, Membrane ion channels, Bidirectional signalling, Positive feed-back
- ***To produce -*** Primary afferent hypersensitivity → primary afferent barrage, abnormal neuronal sprouting and expanded receptive fields in DRG, Increased DH excitability, central neuronal sprouting.

Pain sensation determined by cortical response – integration of nociception, past experiences, cultural inputs and expectations.

Chronification of neuropathic pain - ***a maladaptive change, becoming a disease in its own right far beyond when continuing tissue damage and inflammation has resolved.***

- The progression from acute to chronic post-surgical pain is a complex and poorly understood developmental process, involving biological, psychological and social-environmental factors.
- The activation of microglia, and the associated structural changes that occur in what has been termed second-phase central sensitisation, is thought to be a key part of chronicity. [17] [19]

What is the trigger? – the elusive black box

- Surgery represents the initiating stimulus for neuropathic pain
- Pain-related pathology becomes independent of the initiating process
- Long-term neurobiological changes occur within hours of acute injury, and further changes occur weeks later.
- Psychological and environmental factors are involved

Initial theory:

Preop. state---X---acute ---X--- > chronic
[black box]
(Changes occur within 24 hours and can last several weeks)
Risk factors [13] (black box):

Immune mediated	Genetic/epigenetic factors
Previous sensitisation	Pre-operative pain
Degree of tissue damage	Type of tissue damage (nerve)
Site	Reoperation
Female	Youth
Unrelieved pain	Pre-event distress/mental state **– anxiety**
Obesity [7]	(one of the biggest and consistent factors)

Current theory:

Same risk factor for acute and chronic pain [18]
Pt A→ (acute neuropathic pain) → resolution
Pt B→ (acute neuropathic pain) → persistent
Being A or B determined by events in pre-, peri- and post-operative periods
i.e. the same things that initiate np , also act to propagate np →meaning that management of acute and chronic np is part of a continuous duty of care

7. Management – Assessment

Aims of acute management of neuropathic pain are not the discrete separation of prevention, acute treatment management and treatment of chronic pain. Rather these concepts are inextricably linked as one for the ultimate aim for relieving painful symptoms and the prevention of chronicity.

1. **Risk assessment** – The identification of at-risk individuals allows early and aggressive management of patients. [7]

2. **Assessment of Sensory experience -** Low index of suspicion and identify potential patients – ***Pain (esp.*** **spontaneous pain with sensory loss)** ***distribution is neuroanatomically plausible and the history suggests a relevant lesion/disease*** [4.] Neuroanatomical plausibility must take into account frequent extraterritorial spread of neuropathic pain as it becomes progressive [20]
    - **Sensory loss** - heat sensitivity preservation may predict better outcome [21]
    - **Sensory gain** - mechanical allodynia responds better to Na channel blockers or pregabalin [22,23]
    - **Localise lesion**
    - **Autonomic involvement**

Determine likelihood of NP – revised NeuPSIG diagnostic algorithm five levels of certainty (unlikely, possible, probable, definite, unconfirmed) based on presence or absence of confirmed examination and/or confirmatory testing [3]

3. **Assessment of emotional experience -** Anxiety consistently associated with development of chronicity [24]**. ACT-UP** (screening) developed for chronic pain useful
    Activities (how is pain **affecting** life: sleep, appetite, physical activities, relationships?)
    Coping
    Think (do they think it will ever get better?) (**meaning** and understanding of pain, expectations)
    Upset (worried/**anxious**/depressed)
    People (how do others respond)(any Secondary gains?)

Management – Pre-emptive versus Preventative

Pre-emptive – focuses on the timing of a single intervention; many variations in trial design
Preventative – focuses on completeness [25 26]

- Understands that neuropathic (and persistent post-operative) pain is dependent upon a number of pre-, intra and postoperative events.
- Protective strategy for prevention; should ideally be continued for as long as the sensitising stimulus persists, i.e. well into the post-operative period. Requires the persistence of analgesic efficacy beyond its expected duration (5.5 half lives).

Evidence for "pre-emptive" analgesia is mixed, depending upon type of surgery - cannot predict who will benefit from its instigation.
Despite negative studies, some patients may still derive benefit (in terms of prevention of neuropathic pain), even though it is difficult to predict who.

Evidence so far supports use in operations where high rate of nerve damage (despite not specifying neuropathic pain). Interestingly other operations with lower incidences of np often failed to show any benefit). E.g. epidural in thoracotomy. [25 27] Limb amputation – inconclusive (pre-existing pain?)

Management – Acute Treatment

This should ideally be regarded as the acute instigation of a chronic management process, rather than a discrete treatment episode.

Few studies looking at the reduction in acute peri-operative neuropathic pain in isolation

- Aim is pain relief (acute symptom control) and functional rehabilitation
- REDUCE AS FAR AS POSSIBLE THE NOCICEPTIVE BARRAGE to the CNS
- Multimodal analgesia with afferent neural blockade:
    - Control of nociceptive component (adjacent sensitised neurons still transmitting) – WHO ladder primary analgesics
    - Control of neuropathic component (BPS guidelines) [21 28 29]

- multimodal combination pharmacotherapy: aim of suppressing multiple mechanisms and additive or synergistic effects, allowing lower drug doses and fewer side effects. [30]
- No single two-drug combination best for neuropathic pain.
- RA – studies look at "pre-emptive" or chronic use – none on acute postoperatively diagnosed neuropathic pain and its instigation in the postoperative period for rescue treatment.

Other strategies - newer agents, advanced techniques

Problems with trials: Design doesn't allow comparison – parallel, cross-over
Placebo effects
Psychological conditions not taken into account
Heterogenic pain conditions

Management – Follow-up and Chronic Treatment

Early referral to specialised services is recommended in chronic neuropathic pain management, and the same should be true for acute neuropathic pain.

Further management can seek to:
1. Give definite diagnosis of neuropathic pain.
2. Allow on-going full multimodal/MDT input – psychological support, ongoing regional techniques
3. Allow the early instigation of advanced neuromodulatory techniques:

Future strategies
- Pre-identificaton and aggressive early targeted treatment [21 32 33 34 35 36 37]
- Novel Agents
- Pain Care Bundles/Enhanced Pain Recovery Care
- Improved Pain Research – IMMPACT [38]

Summary:
Neuropathic Pain is a common cause of severe and persistent postoperative pain.
When chronic it becomes a neurodegenerative condition.
More work needs to be done on identifying at-risk individuals
Early and continued use of anti-neuropathic agents and regional anaesthesia with early neuromodulation where necessary.
Future targeting of neuropathic pain subtypes and immune responses may yield better response.

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DR FIONA KELLY

IMPLEMENTATION OF NAP4 IN A DGH

Summary:

1. Beware aspiration and obesity
2. Many NAP4 cases occurred following lack of detailed airway assessment and lack of planning for failure
3. Remember airway management in ICU and ED is high risk
4. Use of continuous capnography monitoring for ventilated patients can significantly improve safety
5. Regular training in airway management and human factors is essential - for consultants, junior doctors, ODPs and anaesthetic nurses and ICU/ED nurses

Measures in ICU and ED:

- Airway alert forms and RSI intubation checklist
- Algorithms for displaced tracheostomies and tracheal tubes and tracheostomy bed head signs
- Posh hats are good in Bath: 'hats and caps' capnography training
- Videolaryngoscopes

Measures in theatres:

- Revised anaesthetic charts
- Obesity – HELP pillows and Cmacs, SOBA single sheet guidelines, preop assessment
- Second generation supraglottic airways as default
- Standardised airway trolleys

Training and education

- Airway workshops
- Simulation
- ICU nurses

Top tips:

1. Find some friends – you can't do this on your own
2. Start small and work up
3. Give well defined projects to your trainees
4. Link up with other hospitals in the region
5. Airway workshops are definitely worth the effort

DR DAN MARTIN

"RESEARCH AT ALTITUDE VS IMPLEMENTATION OF ENHANCED RECOVERY?"

Mount Everest, the tallest mountain on Earth, stands at 8848m above sea level and its summit has been a goal for generations of climbers. George Mallory and Andrew Irvine were defeated in the 1920's but success came 60 years ago this May when Edmund Hilary and Tenzing Norgay reached its hallowed peak. The 1953 expedition was a phenomenal logistical achievement, led by John Hunt a British Army Officer, and since this time hopeful expeditions have been arriving at base camp in an ever increasing volume. This year saw approximately 1200 people camped at the foot of the mountain, with around 450 of them hoping to summit. Whilst the journey to Everest is considerably simpler than it was in Mallory's day, thanks mainly to the advent of commercial airliners, trekking to the southern access point of the mountain in Nepal remains a not inconsiderable challenge. With no road for 150 km, equipment and personnel travel in the traditional manner, by foot.

In 2007 I was privileged enough to be part of the largest ever research expedition to high altitude, Caudwell Xtreme Everest (CXE 2007), and have recently returned from leading a follow up study of similar magnitude, Xtreme Everest 2 (XE2 2013). The planning and logistics for these trips is overwhelming and never fails to impress the battle-hardened climbing teams that assemble at base camp. During CXE 2007, 26 metric tonnes of equipment was transported to Nepal and distributed through six laboratories, the highest of which was at 8000m on the South Col of Everest. Each lab had a completely independent electricity supply for the sensitive research equipment required within. Ten thousand plasma samples had to be kept in liquid nitrogen for three months, requiring over 100 gallons of it to be brought up to the various high altitude laboratories during their three months of activity. Our medical facilities at base camp would have permitted minor and major surgery under general anaesthesia, intubation, ventilation and inotropic support. The laboratories were equipped with sensitive research equipment that many laboratories struggle to operate at sea level. We were the first group ever to successfully take skeletal muscle biopsies at altitude, and this year we were able to perform complex mitochondrial metabolic analysis of muscle samples in situ at 5300m. Perhaps one of the most memorable achievements in 2007 was the conduct of a series of experiments including cardiopulmonary exercise tests at the South Col (Camp IV at 8000m), the final camp for climbers before making their bid for the summit. Following the completion of the research at the South Col 25 members of the CXE 2007 team, including myself, successfully summited Everest.

So what has this got to do with Enhanced Recovery? On the surface, very little. However, these expeditions serve as an example of what can be achieved with a motivated group of individuals all striving to achieve a common goal in a difficult environment. Whilst most people consider Everest one of the greatest of life's challenges, a modern NHS organisation is far greater beast. Its complexity is baffling and bureaucracy overwhelming. Understanding the internal workings of a single hospital can take years, it is no wonder that we fail to offer a uniform service across the country. As perioperative physicians what we attempt to achieve, or should be striving for, is the implementation of evidence based practices such as Enhanced Recovery that will improve the outcome of patients undergoing surgery. However, implementation of evidenced based practices can be challenging and frequently the larger the hospital the greater the challenge. A variety of implementation barriers prevent the spread of quality improvement in the NHS but it remains our duty to break down these barriers and see that research findings permeate into everyday practice.

Comparing these two great challenges serves to highlight achievements that can obtained through an organised programme that engages dedicated individuals but begs the question which is easier…?

DR SIMON MERCER

TRAINING FOR TRAUMA

The 2007 document entitled 'Trauma Who Cares' (1) highlighted the deficiencies in the trauma system in the United Kingdom. Since this report was published there have been significant developments in the way trauma services are arranged with the formal introduction of trauma networks and trauma teams.

This talk sets out to discuss the use of high fidelity simulation and simulation 'in situ' to train the whole trauma team. It will also discuss the key non-technical skills required for a successful 'trauma call' and scenarios that can be used to prepare the team and test existing standard operating procedures.

Reference

1. National Confidential Enquiry into Patient Outcome and Death. Trauma : Who Cares?

DR MATT MORGAN

SEPSIS RELATED IMMUNOSUPPRESSION & RISK MODELLING

Severe sepsis kills more people than breast cancer and traffic accidents combined. Many of these deaths will occur on an intensive care unit after prolonged and costly hospital stays. With the overwhelming failure of drugs designed to modulate the early pro-inflammatory phases of sepsis, focus has now moved to the sepsis related immunosuppression. γδ T-cells are unique to humans and primates and represent only a minor population in the peripheral circulation; yet they expand dramatically in many infections and may quickly exceed all other lymphocyte populations. They occupy a niche in microbial recognition as they are directly activated by (E)-4-hydroxy-3-methyl-but-2-enyl pyrophosphate (HMB-PP), an essential metabolite in most Gram– bacteria.

We show that infections caused by HMB-PP+ microbes have mortality rates double those of HMB-PP- infections. These infections are linked with excessive levels of pro-inflammatory cytokines and elevated numbers of γδ T-cells. By combining multiple cytokine and cell-surface markers, we show robust models that are predictive of patient survival and clinical outcomes. We show evidence of day one monocyte down-regulation of surface CD86, HLA-DR and responsiveness to LPS challenge that represents early immunosuppression. These changes may be reversed by activating γδ T-cells in the later stages of sepsis.

These conflicting findings highlight a new emerging picture of sepsis as a disease process where immune timing, balance and individualized targeted therapies are key concepts that should to be explored and embraced.

DR ROB SANDERS, LONDON

NEUROLOGICAL OUTCOME AFTER NON-CARDIAC SURGERY

While cognitive decline is common immediately following major non-cardiac surgery, it is typically short-lived. However severe neurological insults, such as stroke and delirium, have significant morbidity and mortality implications. Furthermore recent neuroimaging evidence suggests that the incidence of subclinical ischaemic brain events ("covert stroke") may be approximately 11%. The importance and impact of perioperative neurological outcomes, with a focus on sentinel perioperative events (such as delirium), will be discussed.

DR NEERAJ SAXENA

DEPTH OF ANAESTHESIA/ SEDATION: WHAT DOES NEUROIMAGING TELL US?

Mechanisms of anaesthesia and sedation are incompletely understood. A better understanding of anaesthetic mechanism is useful in not only being able to control it better, but also to develop cleaner anaesthetic drugs, more robust depth of anaesthesia monitoring and also understanding the disorders of consciousness such as epilepsy, dementia and postoperative delirium. Development in neuroimaging techniques provides a bridge between our understanding of microscopic activity of anaesthetic drugs and behavioural/ clinical effects.
This talk will briefly introduce the different neuroimaging techniques and then take you through the journey of how these techniques have added to our current knowledge of depth of sedation, anaesthesia and their various components.

THE RESEARCH AND AUDIT FEDERATION FOR TRAINEES (RAFT)

Research and Audit Federation for Trainees (RAFT) is a platform for trainee led research in Anaesthesia, Intensive Care and Pain in the UK.

The establishment of the NIHR and CCRN in 2006 provided a structure through which high quality clinical research has flourished. However centralisation of research priorities and funding in the UK has somewhat reduced research opportunities for the large majority of specialty trainees who are not in academic posts.

Trainee led regional networks are an elegant solution: harnessing the enthusiasm, manpower and energy of trainees across geographical areas, advised by experienced consultant mentors. Many such networks have emerged over the past 18 months with several notable successes:

- In a single week in March 2013, South West Anaesthesia Research Matrix, SWARM enrolled 586 patients (36 % of the total UK recruitment) into LAS VEGAS, an NIHR portfolio badged observational study
- South Yorkshire Hospitals Audit and Research Collaboration, SHARC surmounted numerous barriers to develop and implement a highly innovative “bring your own device” data capture solution at 7 centres across Yorkshire for their CEDOTS project
- North West Research & Audit Group, NWRAG have established a collaborative network across more than 19 centres
- At the time of writing there are at least 9 networks http://www.niaa.org.uk/article.php?newsid=925 on the NIAA website provides a detailed FAQ and links to the webpage of each

Through provision of a formal framework for communication and cooperation,
RAFT builds on these successes whilst consciously avoiding the inadvertent subversion of regional and local activity. It is desirable that the federation ultimately recruit into NIHR portfolio studies but the grassroots nature is fundamental: the primary purpose is to nominate and conduct high quality trainee-led projects simultaneously in centres across several participating schools of anaesthesia. The hope is for RAFT to recruit broadly and quickly - presenting people with research experience, national/regional leadership opportunities – and gaining credibility for trainee led research. Such credibility and senior support/relationships are key to being able to secure grant funding for homegrown projects in the future.

RAFT has found a natural home under the umbrella of the National Institute of Academic Anaesthetic (NIAA) – who will provide administrative & website support and mentoring.

The initiative has enjoyed high level support, being endorsed also by the NIHR, ICS, AAGBI and the Royal College of Anaesthetists who hosted the inaugural meeting in London, 2 December 2013.

Key outputs from this meeting of network research leaders:

1. National federation structure agreed, including linkmen from all regional groups.
2. Arrangements for ongoing group communication agreed. This will be chiefly via an internet platform; key members will meet again at the NIAA`s national QuARC forum in February 2014
3. Dragon`s Den style presentation of candidate initial project, immediate peer review & scoring and consensus achieved on project(s) to take forward

Hierarchy of Projects
Different projects have different degrees of suitability for networked approach; the easiest most attractive model is an "own account" observational audit/service evaluation. On this basis the group have selected as the first "proof of concept" projects:

- SNAP – sprint national anaesthetic project 1 presented by Eleanor Walker of UCL . This satisfaction survey + Brice questionnaire on awareness will run for 2 days in May 2014
- Use of prophylactic antibiotics for Out of Hospital Arrest. An Intensive Care project championed by Tom Clark, Exeter. A prospective audit to establish baseline practice

More complex multicentre projects studies are stacked up behind – later in 2014 RAFT may take on a short time window, individual patient consent observational study such as ESA`s POPULAR (POstanaesthesia PULmonary complications And Relaxants) and a randomised controlled trial such as RELIEF (REstricted or LIbEral crystalloid therapy For surgery)

We are aware that this is the second coming of RAFT – which initially flourished in the London schools but fizzled out when key personnel CCTed and moved on. One of our early challenges will be to build **resilience into the model:** succession planning is essential. Overall though, an exciting initiative with huge potential: a RAFT to sail on through a perfect storm of opportunities.

Gary Minto*, Derriford Hospital, Plymouth*
Tom Clark, *Royal Devon and Exeter Hospital, Exeter*
South West Anaesthesia Research Matrix

Trainee Networks across the UK

ACADEMIC TRAINEE RESEARCH REPORTS

DR DANIEL ASTON

DEANERY: London

ACADEMIC SUPERVISOR NAME: Prof Derek Terrar

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Professor of Cardiovascular Pharmacology, University of Oxford

ACADEMIC SUPERVISOR LOCATION: Pharmacology Department, Oxford

BRIEF DESCRIPTION OF RESEARCH AREA

Mechanisms of the negative inotropic action and the cardiac preconditioning effects of general anaesthetics.

DR SEBASTIAN BROWN

DEANERY: Peninsula

ACADEMIC PLACEMENT: ACF: beyond 3 years of appointment

ACADEMIC SUPERVISOR NAME: Prof Robert Sneyd

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia

ACADEMIC SUPERVISOR LOCATION: Derriford Hospital, Plymouth

BRIEF DESCRIPTION OF RESEARCH AREA

Education ACF with clinical research- Currently running a pharmacokinetics study but with interest in immunology/virology and immune response to sepsis.

Introduction to Academic Anaesthesia Event, September 2013

DR DAVID CAIN

DEANERY: London

ACADEMIC SUPERVISOR NAME: Dr Gareth Ackland & Prof Mervyn Singer

ACADEMIC SUPERVISOR LOCATION: University College London

PROJECT TITLE

Postoperative innate immune impairment

DESCRIPTION OF PROJECT

Postoperative complications prolong surgical admission times and increase the consumption of finite health care resources. The development of apparently minor complications, such as wound infections, are associated with an elevated mortality rate for many years after the return of otherwise normal health(1). The broad range of postoperative complications that are observed clinically may be the product of a much smaller number of incompletely understood pathophysiological processes.

The repeated failure of clinical sepsis trials of immune modulating therapies may be explained by an incomplete understanding of the human septic immune phenotype. Over the course of my investigations I have observed that that the study of major elective surgery provides an opportunity for a methodological rigour that is not achievable during the study of spontaneous inflammatory illnesses such as sepsis and trauma. I have reviewed the recent clinical literature concerning human immune function to determine whether major elective surgery should be considered a valid in-vivo model of human critical illness.

Neutrophils possess powerful immune effector functions(2) - ineffective or exaggerated responses may predispose to infection or tissue damage respectively. Using flow cytometry based assays of bacterial ingestion, killing and apoptosis I am investigating mechanism(s) that underlie alterations in postoperative neutrophil mitochondrial function.

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2. Nathan C. Neutrophils and immunity: challenges and opportunities. Nat. Rev. Immunol. [Internet]. 2006 Mar [cited 2012 Jul 12];6(3):173–82.

DR JEREMY CAMPBELL

DEANERY: Peninsula

POST: Obstetric Anaesthetic Fellowship, Chelsea and Westminster Hospital NHS Foundation Trust

ACADEMIC SUPERVISOR NAME: Dr Steve Yentis

PROJECT TITLE

An evaluation of the ability of leucocyte depletion filters to remove components of amniotic fluid from blood salvaged at caesarean section

DESCRIPTION OF PROJECT

Haemorrhage remains an important cause of maternal mortality worldwide [1]. Intra-operative cell salvage might be an option, but it carries a theoretical risk of amniotic fluid embolus syndrome and is too expensive for use in many parts of the world. We have previously shown that a leucocyte filter alone is efficient at removing cellular components from amniotic fluid uncontaminated with blood [2], suggesting its possible use as a cheaper option. In this study, we investigated the efficacy of leucocyte filters at removing components of amniotic fluid from blood salvaged at elective caesarean section. With REC approval and written informed consent, samples of blood contaminated with amniotic fluid were taken from the suction bottles at 10 elective caesarean sections. Half of each sample was passed under gravity through a LeukoGuard® RS filter (Pall Biomedical, UK), and pre- and post-filtration samples were compared in the laboratory for several amniotic fluid markers. The leucocyte filter was very efficient at removing cellular and particulate components of amniotic fluid (fetal squames, lamellar bodies, hair, meconium and vernix) but had no effect on α-fetoprotein, as shown previously [2]. Cell salvage using filtration alone may yet prove to be useful in dire situations of maternal haemorrhage in the developing world where no alternative exists.

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GRANT

This project was funded by a Small Project Grant of £4,491, awarded by the Obstetric Anaesthetists' Association (OAA) via the National Institute of Academic Anaesthesia (NIAA).

PRESENTATION

It was presented orally at the OAA's Annual Meeting in Liverpool in May 2012 and published as an abstract in the International Journal of Obstetric Anesthesia:

PUBLICATION

Campbell JP, Mackenzie MJ, Yentis SM, Sooranna SR, Johnson MR. Efficacy of leucocyte filters with unwashed blood salvaged at caesarean section. *Int J Obstet Anesth*; **21**/S1: S7.

DR ELEANOR CARTER

DEANERY: South West Peninsula

ACADEMIC PLACEMENT: MD Research (OOPR- research higher degree & masters medical education)

ACADEMIC SUPERVISOR NAME: Professor David Menon /Dr Jonathan Coles

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Intensive Care/Anaesthesia

ACADEMIC SUPERVISOR LOCATION: Cambridge

BRIEF DESCRIPTION OF RESEARCH AREA
Traumatic brain injury pathophysiology.

DR ABHIJOY CHAKLADAR

DEANERY: KSS

ACADEMIC PLACEMENT: I am a clinical trainee doing work in my own time. I completed a one year research fellowship in 2009/10.

ACADEMIC SUPERVISOR NAME: Project 1 Dr Stuart White, Project 2 Dr Mark Harper

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia

ACADEMIC SUPERVISOR LOCATION: BSUH NHS Trust, Brighton

PROJECT 1 TITLE
Various projects studying hip fracture management and creation of a comprehensive perioperative database.

DESCRIPTION OF PROJECT 1
An analysis of perioperative anaemia, complications, white cell count, blood transfusion, AF, and thyroid function in patients presenting with proximal femoral fractures. The cost of regional vs. GA for PFF fixation.

Analyses of:

- renal dysfunction
- perioperative anaemia
- complications
- white cell count
- blood transfusion
- AF
- thyroid function
- the cost of regional vs. GA

in patients presenting with proximal femoral fractures.

PRESENTATIONS

- Chakladar A, Balani N, White SM. Atrial fibrillation and the risk of 30 day post-operative mortality after hip fracture. British Society of Orthopaedic Anaesthetists 16th Annual Scientific Meeting, the Royal Society of Medicine, London, 2011. Highly commended.

- Lynskey DM, Chakladar A, White SM. Clinical outcomes associated with anaemia and perioperative blood transfusion amongst 1,017 hip fracture patients. Royal College of Anaesthetists Congress, 2011. Winner of the RCoA President's 1st Prize for a poster presentation.

PUBLICATIONS

- White SM, Sanghera P, Chakladar A. Leukocytosis increases length of inpatient stay but not age-adjusted 30 day mortality, after hip fracture. *Age & Ageing* 2010; **39**(5): 650-653. DOI: 10.1093/ageing/afq078 . PMID: 20682518. Data collection, author.
- Chakladar A, White SM. Cost estimates of spinal versus general anaesthesia for fractured neck of femur surgery. *Anaesthesia* 2010; **65**(8): 810-814. DOI: 10.1111/j.1365-2044.2010.06382.x. PMID: 20528835. 1st author, research. 3rd most down loaded article from Anaesthesia in 2010/11.
- White SM, Rashid N, Chakladar A. An analysis of renal dysfunction in 1511 patients with fractured neck of femur: the implications for peri-operative analgesia. *Anaesthesia* 2009; **64**: 1061-1065. doi: 10.1111/j.1365-2044.2009.06056.x. PMID: 19735395. Data collection, co-author
- Balani N, Chakladar A, White SM. Atrial fibrillation and the risk of 30-day postoperative mortality after hip fracture. *Anaesthesia* 2012; **67**: 686.

PROJECT 2 TITLE

A study to determine the effectiveness of a warming mattress in preventing inadvertent peri-operative hypothermia in patients undergoing elective caesarean section.

DESCRIPTION OF PROJECT 2

A randomised controlled trial to determine the effectiveness of a resistive polymer warming mattress in preventing inadvertent peri-operative hypothermia in patients undergoing elective Caesarean section.

PRESENTATIONS

- Chakladar A, Dixon MJ, Crook D. Harper CM. Using a resistive warming mattress during elective caesarean section reduces the incidence of hypothermia & fall in haemoglobin. AAGBI Annual Congress, Bournemouth, 2012. Winner of the 2nd prize for oral, free paper, original research presentation.

Chakladar A, Dixon MJ, Harper CM. A warming mattress to prevent inadvertent peri-operative hypothermia and shivering during elective Caesarean section. Royal College of Anaesthetists Congress, 2011.

PUBLICATIONS

- Chakladar A, Dixon MJ, Crook D. Harper CM. Using a resistive warming mattress during elective caesarean section reduces the incidence of hypothermia & attenuates fall in haemoglobin. *Anaesthesia* 2013; **68**: 314.
- Chakladar A, Dixon MJ, Harper CM. A warming mattress to prevent inadvertent peri-operative hypothermia and shivering during elective Caesarean section. *BJA*, 2011; **107**(2): 290P-291P.
- Chakladar A, Harper CM. Peri-operative warming in Caesarean sections: some guidance would be NICE. *Anaesthesia* 2010; **65**: 212-213, doi: 10.1111/j.1365-2044.2009.06218.x, PMID: 20402853, 1st author.
- Chakladar A, Harper CM. Keeping the right temperature during surgery – anaesthetists are warming to advice on inadvertent hypothermia. *Hospital Healthcare Europe 2010*, Campden Media. Author.

DR ANDREW CONWAY MORRIS

DEANERY: South East Scotland

ACADEMIC PLACEMENT: SCREDS Clinical Lecturer

ACADEMIC SUPERVISOR NAME: Prof Timothy Walsh

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Critical Care

ACADEMIC SUPERVISOR LOCATION: Centre for Inflammation Research, University of Edinburgh

BRIEF DESCRIPTION OF RESEARCH AREA

Immune dysfunction in critical illness; nosocomial infection – pathogenesis, prevention and diagnosis, with a particular focus on ventilator-associated pneumonia. Post-doctoral research, currently preparing applications for intermediated fellowships.

CURRENT PROJECTS

- Immunophenotyping in sepsis. Technology Strategy Board funded project in collaboration with Newcastle University, Kings College, London and Becton Dickinson to develop novel panels of cellular biomarkers for use in sepsis. This work involves running two clinical studies, one looking at early sepsis in the emergency department and a second examining the role of immune defects and immune suppression in patients in the ICU. This work is based on previous publications from our group[1,-3]
- Regulatory T-cells in sepsis. AAGBI/NIAA funded project examining phenotype of regulatory T-cells and sub-groups in sepsis and their interactions with other immune cells. Based on a previous publication[1]
- Rapid diagnostics in ventilator-associated pneumonia (VAP). Hospital Infection Society funded project on the role of PCR in the diagnosis of VAP.
- Biomarker guided therapy in ventilator-associated pneumonia. Wellcome Trust/Department of Health health-innovations challenge fund study into the role of soluble biomarkers in guiding antibiotic therapy in VAP. Collaborative project being led by Professor Simpson of Newcastle University based on publications from our group[4,5]

PUBLICATIONS

- Conway Morris A, Anderson N, Brittan M et al. Combined dysfunctions of immune cells predict nosocomial infection in critically ill patients. *Br J Anaesth*, published on-line June 10th 2013 [1]
- Conway Morris A, Brittan M, Wilkinson TS, et al. C5a-mediated neutrophil phagocytic dysfunction is RhoA-dependent and predicts nosocomial infection in critically ill patients. *Blood* 2011; **117**:5178-88 [2]
- Conway Morris A, Kefala K, Wilkinson TS, et al. C5a mediates peripheral blood neutrophil dysfunction in critically ill patients. *Am J Respir Crit Care Med.* 2009; 180:19-28 [3]
- Conway Morris A, Kefala K, Wilkinson TS, et al. Diagnostic importance of pulmonary interleukin-1 beta and interleukin-8 in ventilator-associated pneumonia. *Thorax* 2010; **65**: 201-207. [4]
- Wilkinson TS, Conway Morris A, Kefala K, O'Kane et al. Ventilator-associated pneumonia is characterized by excessive release of neutrophil proteases in the lung. *Chest* 2012;**142**(6):1425-32. [5]

DR ESTHER COOK

DEANERY: London

ACADEMIC SUPERVISOR NAME: Dr Annie Hunningher

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia

ACADEMIC SUPERVISOR LOCATION: Royal London Hospital

BRIEF DESCRIPTION OF RESEARCH AREA

The research project has been set up around the implementation of teamwork training in theatres at RLH. As the Education and Research Fellow I have helped to write the research protocol and I will collect observational data in theatre pre and post implementation of the new training programme. Multidisciplinary teams will be trained in the use of briefing and debriefing tools and educated in human factors and communication skills. The aim is to improve communication in theatres and therefore improve patient safety, theatre efficiency and staff morale.

The post is funded for 6 months partly by the Deanery and partly by a charitable award. There is no funding in place past February 2014.

DR NICHOLAS JOHN COWLEY

DEANERY: Birmingham – West Midlands

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Dr Tom Clutton-Brock, Prof Julian Bion

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia (TCB) Critical Care (JB)

ACADEMIC SUPERVISOR LOCATION: Queen Elizabeth Hospital Birmingham, University of Birmingham

PROJECT 1 TITLE

Anaesthesia Research (and MD project): Point of Care propofol measurement in anaesthesia

DESCRIPTION OF PROJECT 1

Maintenance of anaesthesia using the intravenous agent propofol has markedly increased following the development of pharmacokinetic models for drug delivery. Validation work was undertaken on a propofol analyser, with the novel capability of measuring blood propofol concentrations in near real time. Studies were performed in intensive care correlating blood propofol concentrations with depth of sedation, and demonstrating a correlation with level of organ failure. Studies in the operating room were performed in which measured propofol concentrations were compared with those using the Marsh model of Target Controlled Anaesthesia. Results demonstrated significant inaccuracies of the model. A method of Marsh model bias correction using a single blood propofol measurement was tested.

Point of care propofol concentration testing, pharmacokinetics of propofol TCI,
Second project – running NIHR critical care trial of antiviral prophylaxis against CMV reactivation (PI J Bion)

PROJECT 2 TITLE

Critical Care Research: Anti-viral Prophylaxis for Prevention of CMV Reactivation in Immunocompetent Patients in Critical Care

DESCRIPTION OF PROJECT 2

CMV is a common herpes virus. Once contracted, the virus is never completely cleared, and may reactivate when the immune system is suppressed. There is a body of evidence supporting the prophylactic use of antivirals for patients with compromised immune systems. Critically ill patients have been found to have compromised immune function. There is increasing evidence linking CMV reactivation with poor outcomes in patients in critical care. Although there may be a rationale for prophylaxis in critically ill patients, this has not yet been assessed in a clinical trial and is not routine clinical practice. We designed, gained funding for and have nearly completed a prospective, randomised, open-label single centre study designed to assess the efficacy of antiviral prophylaxis to prevent reactivation of latent Cytomegalovirus (CMV) virus in critically ill patients, aiming to recruit 141 patients.

GRANT

2011-2014 NIHR RfPB grant for £282,000 to support critical care antiviral prophylaxis trial.

PUBLICATIONS (IN PREVIOUS 12 MONTHS)

- Cowley, N.J., Hutton, P., Clutton-Brock, T.H. Assessment of the performance of the Marsh model in effect site mode for target controlled infusion of propofol during the maintenance phase of general anaesthesia in an unselected population of neurosurgical patients. *European Journal Anaesthesiology* 2013 [in press]
- Cowley, N.J., Owen, A., Bion, JF. Interpreting arterial blood gas results. *BMJ* **346**: f16. 2013
- Cowley, N. J., P. Laitenberger, et al. (2012). "Evaluation of a new analyser for rapid measurement of blood propofol concentration during cardiac surgery." *Anaesthesia*. **67**: 870-4, 2012
- Rosser D, Cowley NJ, Ray D, Nightingale PG, Jones T, Moore J, Coleman JJ. Institution wide quality improvement programme, focusing on error reduction and impact on short-term mortality. *Journal of Royal Society Medicine*, Short Reports. 2012
- Cowley NJ, Murphy N. Continuous veno-venous haemofiltration in the management of severe hyponatraemia associated with transurethral resection of prostate syndrome *Journal Intensive Care Society*, Jan 2012

DR NEIL CROOKS

DEANERY: West Midlands

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Professor Fang Gao, Professor Peter Hawkey

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia/Critical Care (FG), Microbiology (PH)

ACADEMIC SUPERVISOR LOCATION: University Hospital Birmingham/Heart of England NHS Foundation Trust

BRIEF DESCRIPTION OF RESEARCH AREA
Probiotics in critical care

DR TIM DAWES

DEANERY: London

ACADEMIC PLACEMENT: ACF, PhD

ACADEMIC SUPERVISOR NAME: Dr Declan O'Regan, Professor Martin Wilkins, Professor Stuart Cook

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Radiology – Cardiovascular MR

ACADEMIC SUPERVISOR LOCATION: Hammersmith Hospital, London

PROJECT TITLE
The anthropometric, environmental and genetic determinants of right ventricular structure and function

DESCRIPTION OF TITLE
Right heart dysfunction is common in critical care, determines outcome and appears to be reversible although it currently has no specific treatments. I am an anaesthetic registrar interested in the large variation seen clinically in the response of the right ventricle to pulmonary hypertension. I work with Dr. Declan O'Regan, Professor Martin Wilkins and Professor Stuart Cook at Imperial College, London to use three-dimensional MRI images, pooled to create a single model, against which images can be compared. Pooling of data allows quantification of the variation in a population (whether that population is defined clinically, by haemodynamics or by genetic variants), and vastly increases statistical power for subsequent comparisons. This technique ("atlasing") has already been used successfully in neuroimaging and by our group in the left ventricle. The use of three-dimensional MRI allows high-definition quantification (2mm3) of several tissue parameters such as wall thickness, fibrosis and infarction. When combined with fully-automated analysis this provides rapid, objective, highly-detailed mapping of the regional variation of these parameters within the right ventricle and how this progresses over time. By looking for rare and common genetic variants we aim to determine the effects of genetic variation on the right ventricle and how this may influence myocyte dynamics and right ventricular physiology. Ultimately, we aim to elucidate pathways amenable to intervention, and bring targeted treatments to a clinical problem.

GRANT: I am a Wellcome/GSK Translational Medicine Training Fellow, based in the Department of Medicine, Imperial College.

DR JOHN-OLIVER CHARLES DUNN

DEANERY: Wessex

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Professor Mike Grocott, Professor Monty Mythen, Dr VikkiGoss

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia & Critical Care Medicine (MG/MM), Translational Scientist – Lipid Biochemistry (VG)

ACADEMIC SUPERVISOR LOCATION: University Hospital Southampton Trust/University of Southampton (MG), University College London (MM) NIHR Southampton Respiratory Biomedical Research Unit (VG)

BRIEF DESCRIPTION OF RESEARCH AREA

"The Role of the Lung in Multiorgan Failure".

Forthcoming study:"Investigation into the GENeration of OXIdised Phospholipid Species in Critical Illness – a Prospective Observational Study (OXIGEN)"

PhD research topic:

"The Lung as a Driver of Multiple Organ Dysfunction Syndrome"

Research study:

"Central Hypoxaemia and Pulmonary Phosphatidylcholine Production: a Pilot Study."

We are researching the role of the lung in critical illness. Specifically, we aim to identify, classify and quantify the production of lung-specific phosphatidylcholine species in humans with organ dysfunction and multiple organ failure due to critical illness. Phosphatidylcholines (especially oxidised phosphatidylcholines) are known to affect endothelial barrier function and therefore may be implicated in the development of organ dysfunction.

Secondary goals include determining whether lung-specific phosphatidylcholine species production is associated with: central hypoxaemia; microcirculatory dysfunction; nitric oxide biology/oxidative stress and ultimately outcome from critical illness and multiple organ dysfunction syndrome (MODS).

Alterations in lung surfactant lipid composition have been demonstrated in critically unwell patients with acute lung injury and acute respiratory distress syndrome. Animal studies (rodent models) have shown that lung injury occurs early in MODS and that the lung may in fact initiate the development and progression of MODS by promoting extra-pulmonary organ dysfunction. The mechanism behind MODS has yet to be ascertained, though at a cellular level evidence has pointed towards a derangement in tight junction formation and/or function. These processes are typically associated with systemically impaired nitric oxide signalling, presenting as vascular endothelial dysfunction, which is thought to contribute to the pathogenesis of MODS.

DR ALAN FAYAZ

DEANERY: London

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Sir Liam Donaldson, Professor Richard Langford

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Surgery and Cancer (SLD) Pain and Anaesthesia (RL)

ACADEMIC SUPERVISOR LOCATION: Imperial (SLD) QMUL (RL)

BRIEF DESCRIPTION OF RESEARCH AREA
MD in Chronic Pain Epidemiology undergoing registration at ICSM; OOPR in conjunction (PT) with Pain Fellowship (clinical) over 2 years commencing August 2013

DR RICHARD GEORGE

DEANERY: London

ACADEMIC PLACEMENT: 1 year fellowship

ACADEMIC SUPERVISOR NAME: Dr Steve Yentis

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics

ACADEMIC SUPERVISOR LOCATION: Chelsea and Westminster Hospital, London

BRIEF DESCRIPTION OF RESEARCH AREA
2-3 projects in obstetric anaesthesia

Introduction to Academic Anaesthesia Event, September 2013

DR EDWARD GILBERT-KAWAI

DEANERY: North-Central

ACADEMIC PLACEMENT: PhD

ACADEMIC SUPERVISOR NAME: Primary: Dr Daniel Martin, Secondary: Prof Monty Mythen, Prof Mike Grocott

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics and Intensive Care Medicine

ACADEMIC SUPERVISOR LOCATION: Royal Free Hospital (DM), UCLH (MM), Southampton (MG)

BRIEF DESCRIPTION OF RESEARCH AREA
The role of microcirculation in hypoxia. A translational approach using high altitude's hypobaric hypoxia to replicate the hypoxic setting of intensive care.

PROJECT TITLE
Hypoxia and the microcirculation

DESCRIPTION OF PROJECT
Recent work at UCL Centre of Altitude, Space and Extreme Environment (CASE) Medicine has focused on the paradigm which suggests that the physiological and pathophysiological responses to an extreme hypobaric hypoxic environmental challenge may be similar to those seen in critical illness. By studying healthy individuals progressively exposed to hypoxia in the high altitude setting, we are able to monitor persons' adaptive processes and translate them into the clinical care setting.

Whilst traditional opinion would suggest beneficial adaptive processes to a hypoxic stressor occur at the macrocirculatory level, I hypothesise that the answer lies in the microcirculation. In the advent of recent technological advances that have facilitated visualisation of the human microcirculation, I aim to assess the microcirculatory changes in response to a hypoxic environment, both in hypobaric chambers and in field studies (Xtreme Everest 2). My work will also focus specifically on one particular race of people – Sherpas. Anecdotal evidence suggests that this race demonstrates remarkable tolerance to hypobaric hypoxia, and I aim to see which physiological / genetic adaptations make this possible.

DR NICK GODDARD

DEANERY: Wessex

ACADEMIC PLACEMENT: Masters in Research (MRes Clinical Research) via University of Southampton + 1 year fellowship (self-organised)

ACADEMIC SUPERVISOR NAME: Dr David Smith

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Senior Lecturer, Department of Anaesthesia

ACADEMIC SUPERVISOR LOCATION: University Hospital Southampton NHS Foundation Trust

BRIEF DESCRIPTION OF RESEARCH AREA
Depth of anaesthesia and possible effects of red hair gene (MC1R).

DR VIMAL GROVER

DEANERY: London

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Dr Suveer Singh and Dr Peter Kelleher

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Resp /ICM Cons (SS), Immunology (PK)

ACADEMIC SUPERVISOR LOCATION: Chelsea and Westminster Hospital/Imperial College London

PROJECT TITLE

The use of soluble and surface TREM-1 as markers of Ventilator-associated pneumonia in Intensive Care

DESCRIPTION OF PROJECT

Ventilator associated pneumonia (VAP) causes significant morbidity in Intensive Care Patients. We hypothesised that measuring multiple biomarkers of bacterial inflammation (surface and soluble Triggering Receptor Expressed on Myeloid Cells-1 (TREM-1), IL-1, IL-6, IL-8, CD11b, L-selectin) in both lung and peripheral blood would allow a faster and more accurate diagnosis of VAP. Preliminary data obtained from ventilated ICU patients suggested that differential expression of both surface and soluble TREM-1 in paired blood and bronchoalveloar lavage fluid (BALF) samples show promise in diagnosing VAP and differentiating it from non-pulmonary infection.

GRANTS AND AWARDS

- Joint Research Committee Award, Westminster Medical School (2009)
- National Institute of Academic Anaesthesia Project Grant (2009)
    - www.niaa.org.uk/article.php?newsid=213
- Westminster Medical School Trust Fund Academic Fellowship (2010)

PUBLICATIONS

- Grover, V, Soni, N, Kelleher, P and Singh, S., Biomarkers in the diagnosis of Ventilator-associated pneumonia. *Current Respiratory Medicine Reviews* 2012; **8**: 184-192

ABSTRACTS

- Intensive Care Society Winter Meeting 2011:
    - Gold Medal finalist
    - British Thoracic Society Care Group, Free Paper presentation co-winner
    - Research Poster winner
    - Abstracts in the Journal of the Intensive Care Society, 13 (1) 2012
- The bronchoalveolar lavage/blood ratio of surface TREM-1 on CD14-positive monocytes is diagnostic of ventilator-associated pneumonia. Grover V, Kelleher P, Henderson D, Pantelidis P, Gotch F, Soni S and Singh S. *Critical Care* 2011; **15** (suppl 1): P281
- Use of an inflammatory biomarker panel in the diagnosis of Ventilator-associated pneumonia. Grover V, Singh S, Henderson D, Pantelidis P, Soni N, Kelleher P and Gotch F. *Immunology* **131** (suppl S1) Abstract 416
- Compartmentalisation of surface Triggering Receptor Expressed on Myeloid Cells-1 (TREM-1) in Ventilator-Associated Pneumonia (VAP). Grover V, Kelleher P, Henderson D, Soni N and Singh S. *Thorax* 2010; **65**:A36-A37 doi:10.1136/thx.2010.150938.28
- Use of soluble and surface triggering receptor expressed on myeloid cells-1 as markers of ventilator-associated pneumonia in intensive care. Grover V, Kelleher P, Soni S and Singh S. Proceedings of the Anaesthetic Research Society Meeting: RCoA, London, UK. December 3–4, 2009. *BJA* 2010; **104**(4): 517-531. doi:10.1093/bja/aep362

DR DANIEL HARPER

DEANERY: Yorkshire and the Humber

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Prof John Macfie

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Colorectal Surgery / ERAS / nutrition / gut function

ACADEMIC SUPERVISOR LOCATION: Scarborough General Hospital

BRIEF DESCRIPTION OF RESEARCH AREA

Comparing anaesthetic techniques for colorectal surgery within and ERAS protocol

DR STEVE HARRIS

INSTITUTION: London School of Hygiene and Tropical Medicine

ACADEMIC SUPERVISOR NAME: Prof Kathy Rowan (ICNARC), Prof Colin Sanderson (LSHTM) and Prof Meryvn Singer (UCL)

PROJECT TITLE

Timing the delivery of critical care

DESCRIPTION OF PROJECT

Objectives

- To describe the incidence, severity of illness and the survival of the deteriorating ward patient.
- To estimate the effect of early delivery of critical care timed from the first bedside assessment for the deteriorating ward patient.
- To examine the effect of pre-admission trajectory on survival for the deteriorating ward patient admitted to critical care.

Design and patients

A two-arm prospective observational cohort study of the deteriorating ward patient was implemented between 2010--2011 in 96 acute NHS hospitals in England, Wales and Northern Ireland. In the *All-referrals* arm (11,639 patients at 45 hospitals), sociodemographic, physiological and diagnostic data on consecutive new referrals to critical care were collected de novo. In the *All-admissions* arm (5,477 admissions at 60 hospitals), the same data were collected for the subset of patients admitted to critical care. All records were linked to the national audit programme of admissions to critical care, and national death registrations.

RESULTS

All-referrals

Referrals to critical care were common, had a poor prognosis, and admission was frequently delayed. Analytic approaches (proportional hazards survival, and propensity matching) that dichotomised time to admission showed no evidence of an effect on survival. However, using the measured delay as a continuous time-varying co-variate showed benefit for early admission.

Patients were less likely to be admitted to critical care when the unit was fully occupied, and using occupancy as an instrument also showed significant benefit.

All-admissions

The global acute physiology score was more commonly improving than worsening at admission to critical care. Pre-admission trajectory had no effect on survival after adjustment for the severity at admission.

Conclusions

This study has defined a vulnerable cohort of patients, and significant delays to admission to ICU. Early admission is probably associated with improved survival, but significant sources of bias complicate this conclusion. Using pre-admission trajectory as an alternative perspective on timing does not help improve understanding of risk.

Introduction to Academic Anaesthesia Event, September 2013

DR DANIELLE HUCKLE

DEANERY: Welsh

ACADEMIC PLACEMENT: PhD

ACADEMIC SUPERVISOR NAME: Prof Judith Hall & Dr Chris Allender

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Head of Department, Anaesthetics, Intensive Care and Pain Medicine, School of Medicine, Cardiff University (JH). Senior Lecturer, Head of Molecular Recognition Research Unit, Cardiff School of Pharmacy and Pharmaceutical Science, Cardiff University. Organic Chemist, expert in molecular imprinting (CA)

ACADEMIC SUPERVISOR LOCATION: Cardiff Institute of Infection & Immunity (JH). School of Pharmacy & Pharmaceutical Science, Cardiff University (CA).

BRIEF DESCRIPTION OF RESEARCH AREA

Sepsis, the overwhelming result of severe infection, affects 20-30 million people worldwide each year. The true potential of circulating biomarker detection and surveillance in patients with sepsis is yet to be elucidated. Focus of this project is lipopolysaccharide (LPS), a major constituent of gram negative bacteria outer cell walls, and its use as a sepsis biomarker. The overarching hypothesis is the detection of circulating LPS will facilitate the early diagnosis of sepsis, thus aiding the clinical management of patients with the potentially fatal physiological manifestations of severe infection. Subsequently, we also hypothesise that potential *in vivo* sequestration of circulating LPS in patients with sepsis may prove clinically beneficial. Using molecular imprinting, a method of 'imprinting' a target molecule functional template into a polymer matrix, a synthetic receptor that displays high affinity for LPS can be generated. Integration of this synthetic receptor into a biosensing device could be used to detect circulating LPS.

Part of the molecular imprinting process requires the use of functional monomers that interact with your target molecule (LPS). The peptide antibiotic polymyxin b (PMB) is used as a surrogate functional monomer. Part of this project is the structural manipulation of PMB to aid its integration into a polymer matrix or to facilitate PMB attachment to a resin surface.

DR ANDREW JACQUES

DEANERY: Oxford

ACADEMIC PLACEMENT: 1 year fellowship

ACADEMIC SUPERVISOR NAME: Dr Duncan Young

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics & Intensive Care Medicine

ACADEMIC SUPERVISOR LOCATION: Oxford University Hospitals NHS Trust

BRIEF DESCRIPTION OF RESEARCH AREA

Study of incidence of left ventricular dysfunction in critically ill adults and reversibility over time, as assessed by echocardiography. Prospective observational study.

DR NIGEL JENKINS

DEANERY: Wales

ACADEMIC PLACEMENT: 6 month research associate post as advanced training

ACADEMIC SUPERVISOR NAME: Prof Judith Hall

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics

ACADEMIC SUPERVISOR LOCATION: University Hospital of Wales, Cardiff

PROJECT TITLE
Measuring cerebrovascular response to respiratory challenges using functional MRI

DESCRIPTION OF PROJECT
I have spent 6 months as a research associate at Cardiff University Brain Research Imaging Centre (CUBRIC) who are world leaders in the field of neuroimaging. Whilst there I have engaged in several projects but my main area of interest has been functional MRI of the brainstem.

Functional MRI (fMRI) is an imaging modality that measures neuronal activity indirectly by its coupling with regional blood flow. One method of doing this is by measuring the blood oxygen level dependent (BOLD) signal. However, although BOLD signal is dependent on cerebral blood flow (CBF) it does not directly measure it. Further advances in fMRI have created advanced techniques for measuring CBF such as arterial spin labelling (ASL). ASL is a way of measuring regional blood flow by magnetically labelling arterial blood water as it enters the brain. The brain is then imaged as the labelled water perfuses it, giving a measure of blood flow.

Brainstem perfusion is particularly difficult to measure. This is due to physiological noise from movement with both arterial pulsation and breathing; signal drop out from surrounding air cells and the contribution of the macrovascular compartment to the signal. We used pulsed ASL with multiple inversion times (repeated imaging as the magnetic label enters the brain) to successfully image the brainstem blood flow.

It has previously been shown by Kastrup *et al.* that an increase in end tidal CO_2 ($EtCO_2$) of 5mmHg results in an increase in CBF of 20-30%. However, this relationship has never been shown in the brainstem using fMRI. We have shown that by providing a 8mmHg increase in $EtCO_2$ there was a resulting increase in brainstem blood flow. This allowed calculation of the cerebral vascular response of the brainstem to hypercapnoea.

Other projects I have been involved in whilst at CUBRIC include fMRI neuroimaging of hypoxic and hypocapnic respiratory challenges; setting up, ethics application and trialling the use of a lower body negative pressure device in fMRI and magnetoencephalographic imaging of both ketamine and propofol sedation.

DR HATEM JLALA

DEANERY: East Midlands

ACADEMIC PLACEMENT: PhD

ACADEMIC SUPERVISOR NAME: Dr Jonathan Hardman, Dr Iain Moppett, Dr Nigel Bedforth

ACADEMIC SUPERVISOR LOCATION: University of Nottingham/Nottingham University Hospitals NHS Trust

BRIEF DESCRIPTION OF RESEARCH AREA

The project represents an effort to improve the patient's experience with regional anaesthesia and to evaluate and improve the techniques and devices used.

DR ALASDAIR JUBB

DEANERY: South East Scotland

ACADEMIC PLACEMENT: PhD

ACADEMIC SUPERVISOR NAME: Prof Wendy Bickmore and Prof David Hume

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: WB is head of chromosomes and gene expression at MRC Human Genetics unit. DH is director of the Roslin Institute with a background in macrophage biology, transcriptomics and transgenics amongst other things

ACADEMIC SUPERVISOR LOCATION: University of Edinburgh

BRIEF DESCRIPTION OF RESEARCH AREA

Examining the role of higher order chromaint structure in the mechanisms of action of glucocorticoids. Also comparative GC transcriptional response in mouse and humans working in macrophages as a model system.

DR VIKAS KAURA

DEANERY: Yorkshire

ACADEMIC PLACEMENT: ACF: within 3 years of appointment

ACADEMIC SUPERVISOR NAME: Dr Sean Bennett (Project 2) & Prof Alyn H Morice (Project 1)

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: SB (Anaesthetics- NIRS in Cardiac Anaesthesia). AHM (Respiratory Medicine- cough/COPD/TRP channels)

ACADEMIC SUPERVISOR LOCATION: Castle Hill Hospital, Cottingham.

PROJECT 1 TITLE
Investigating the mechanism of action of Hydrogen Sulfide.

PROJECT 1 DESCRIPTION
Hydrogen sulfide (H_2S) is a colourless flammable gas that has the characteristic odour of 'rotten eggs'. At high concentrations it is a very poisonous gas, however at low doses it has been shown to be a biologically relevant signalling molecule; a gasotransmitter. Imbalances in the synthesis of H_2S have been implicated in an increasing number of physiological/pathological processes including inflammation, cardioprotection, haemorrhagic shock, and pulmonary hypertension.
Furthermore, there is growing evidence to suggest H_2S plays a key role as an oxygen sensor/transducer in the response to tissue hypoxia. However the molecular mechanism(s) through which H_2S triggers some of these changes has not been fully elucidated. I am investigating whether the transient receptor potential (TRP) channels are a putative site of action of H_2S.

PROJECT 2 TITLE
Identifying biomarkers that can help predict the neurological outcomes of patients following cardiac surgery.

PROJECT 2 DESCRIPTION
As part of an on-going study exploring the utility of Near Infrared Spectroscopy in improving neurological outcomes in cardiac surgery, I am investigating the feasibility of utilising biological markers of cerebral injury as predictors of post-operative neurocognitive dysfunction.

PUBLICATIONS IN ACF
- Garrett R, Kaura V, Kathawaroo S. Intravenous lipid emulsion therapy – The fat of the land. Trends in *Anaesthesia and Critical Care* – Article in press (10.1016/j.tacc.2013.04.001)
- Kaura V, Bonner S. Subarachnoid haemorrhage: Early clinical indicators and biomarkers. Trends in *Anaesthesia and Critical Care*. 2012; **2** (11): 42-47.

PREVIOUS PUBLICATIONS
- Gartside SE, Griffith NC, Kaura V, Ingram CD. The neurosteroid dehydroepiandrosterone (DHEA) and its metabolites alter 5-HT neuronal activity via modulation of GABAA receptors. *J Psychopharmacology*. 2010; **24**(11):1717-24.
- Kaura V, Ingram CD, Gartside SE, Young AH, Judge SJ. The progesterone metabolite allopregnanolone potentiates GABA(A) receptor-mediated inhibition of 5-HT neuronal activity. *Eur Neuropsychopharmacol*. 2007; **17**(2):108-15

DR FIONA KING

DEANERY: East of Scotland

ACADEMIC PLACEMENT: PhD

ACADEMIC SUPERVISOR NAME: Professor Tim Hales

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia

ACADEMIC SUPERVISOR LOCATION: University of Dundee

PROJECT TITLE

Targeting opioid receptor signal transduction to produce sustained analgesia

DESCRIPTION OF PROJECT

Analgesic opioids remain the drugs of choice for treating severe pain despite debilitating side effects including respiratory depression, tolerance, constipation and hyperalgesia. Tolerance, a phenomenon that leads to the requirement for escalating doses in order to sustain analgesia, is arguably the most problematic aspect of opioid use. Dose increases required to overcome tolerance lead to a greater likelihood of additional opioid side effects. The β-arrestins, proteins involved in opioid receptor trafficking and signalling, are implicated in tolerance. A lack of β-arrestin2 in β-arr2-/- mice leads to negligible tolerance and the appearance of basal opioid-independent analgesia[1,2]. Our lab demonstrated that basal analgesia is associated with constitutive opioid receptor coupling to voltage-activated Ca^{2+} channels (VACCs) in β-arr2-/- dorsal root ganglion (DRG) neurons[2,3]. The latter can be recapitulated in wild type neurons by directly inhibiting c-Src activity implicating tyrosine kinase-mediated phosphorylation[3]. While opioid receptor signalling becomes persistent in pain circuitry of β-arr2-/- mice, conditioned place aversion studies reveal normal hedonic homeostasis[2]. These findings led to the hypothesis that β-arrestin2 signalling through c-Src can be modulated to produce sustained analgesia without affecting reward circuitry. We will use molecular, cellular and behavioural approaches to explore differential opioid signalling in pain and reward pathways.

PUBLICATIONS

1. Bohn LM, Lefkowitz RJ, Gainetdinov RR, Peppel K, Caron MG, Lin FT. Enhanced morphine analgesia in mice lacking beta-arrestin2. *Science* 1999; **286**: 2495–8.
2. Lam H, Maga M, Pradhan A, Evans CJ, Maidment NT, Hales TG, and Walwyn W. Analgesic tone conferred by constitutively active mu opioid receptors in mice lacking beta-arrestin2. *Mol Pain 2011*; **7**: 24.
3. Walwyn W, Evans CJ, Hales TG. beta-Arrestin2 and c-Src regulate the constitutive activity and recycling of mu opioid receptors in dorsal root ganglion neurons. *J Neurosci* 2007; **27**: 5092–104.

FUNDING

The Wellcome Trust clinical PhD Programme

DR SIMON LAMBDEN

DEANERY: London

ACADEMIC PLACEMENT: Clinical Research Fellow

ACADEMIC SUPERVISOR NAME: Dr James Leiper, Prof Mervyn Singer

BASE SPECIALTY/SCIENTIFIC BACKGROUND: MRC Chair, Nitric Oxide Signalling group (JL), Professor of Intensive care, University College London (MS)

ACADEMIC SUPERVISOR LOCATION: MRC Clinical Science Centre London

PROJECT TITLE

The role of endogenous regulators of Nitric Oxide Production in critical illness

DESCRIPTION OF PROJECT

Nitric Oxide(NO) is a key mediator of numerous physiological processes however dysregulation of NO production in critical illness contributes to organ dysfunction and mortality. NO is produced by three isoforms of Nitric Oxide synthase (NOS), two constitutive and one inducible.

NOS activity is regulated endogenously a group of methylarginines. Asymmetric Dimethyl Arginine (ADMA) and L-NG-monomethylarginine (L-NMMA). These derivatives of protein synthesis competitively inhibit arginine binding with NOS to reduce NO production. ADMA is found in much higher concentrations than L-NMMA in the cell and as such is the key regulator of NOS activity.

ADMA is metabolised by dimethylarginine dimethylaminohydrolase (DDAH), two isoforms of DDAH exist which convert ADMA to Dimethylamine and Citrulline. Modulation of the DDAH1 isoform has been shown to modify the vascular response to septic shock without immune or cardiac impairment and may have potential as a therapeutic agent in sepsis. The second isoform DDAH2 is the only one found in immune cells and an immune role has been postulated for it.

Our study will explore the role of this regulatory pathway using cell culture, animal models and observational human studies to determine how changes in the endogenous regulation of Nitric Oxide in response to acute pathophysiological stress contributes to morbidity and mortality in critical illness.

GRANT

NIAA RCoA/BJA project grant - 2013

UNRELATED GRANT FUNDING

Health Education for England's Inspire Improvement project grant - 2013

DR MARK LAMBERT

DEANERY: London

ACADEMIC PLACEMENT: 1 year fellowship

ACADEMIC SUPERVISOR NAME: Dr Rob Stephens

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia

PROJECT TITLE

Education Fellow in Anaesthesia

DESCRIPTION OF PROJECT

This year-long post has been a great mixture of project work and clinical work. The focus of my work this year has been on:

- Post-graduate Certificate in Medical Education Course delivered by Dundee University
- Organisation and delivery of an SSC in Anaesthesia for final year medical students
- Set up and delivery of a mentoring programme for core trainees in Anaesthesia
- Creating an internet channel containing anaesthesia podcasts for medical students
- Working within a team looking at patient satisfaction with anaesthesia. Posters of this work accepted at the American Society of Anesthesiologists and association of Paediatric Anaesthetists of Great Britain and Ireland conferences.
- Facilitation of simulator-based training for anaesthetists and foundation year doctors.
- Investigator looking at vascular events in non-cardiac surgery patients (VISION study)

In addition I was also able to experience a wide variety of clinical work and achieve several units of higher training in anaesthesia.

DR HELEN LAYCOCK

DEANERY: London

ACADEMIC PLACEMENT: Academic Clinical Fellowship/PhD

ACADEMIC SUPERVISOR NAME: Dr Istvan Nagy, Dr Carsten Bantel, Professor Masao Takata

ACADEMIC SUPERVISOR LOCATION: Chelsea & Westminster Hospital, Imperial College London

PROJECT TITLE

Inflammatory mechanisms of burn injury-associated pain

DESCRIPTION OF PROJECT

My work commenced during my Academic Clinical Fellowship at Imperial College and will continue as my PhD. It focuses on using high-resolution cytokine immunoassay and metabolomic mass spectrometry techniques to analyse the burn inflammatory milieu for algogenic compounds in human volunteers and evaluate the responses these candidate algogens generate in primary sensory neurons.

GRANT

Wellcome Trust Clinical Research (PhD) Fellowship

PUBLICATIONS/ABSTRACTS

Peripheral mechanisms of burn injury associated pain. Laycock H, Valente J, Bantel C, Nagy I. *Eur J Pharmacol.* 2013 Mar 13 doi:pii: S0014-2999 (13) 00170-2. [Epub ahead of print]

The potential use of biomarkers and new diagnostic tools in the management of acute pain. Bantel C, Laycock H, Nagy I. *Pain Manage* 2012; **2**(3) 187-190.

Introduction to Academic Anaesthesia Event, September 2013

DR YORK-MUI LIU

DEANERY: North Central London School of Anaesthesia

ACADEMIC PLACEMENT: 1 year fellowship

ACADEMIC SUPERVISOR NAME: Dr Adi Stewart/ Dr John Dick/ Dr Roshan Fernando

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Obstetric anaesthesia

ACADEMIC SUPERVISOR LOCATION: University College London Hospital

CURRENT PROJECTS

- **Obstetric Bleeding Study 2 (OBS2)** – a multi centre, prospective, double blind randomised control trial led by Cardiff University and South East Wales Trials Unit looking into the use of fibrinogen concentrate during the management of major obstetric haemorrhage.
- **Phenylephrine-ephedrine trial** – a study conducted by UCLH to compare the incidence of ECG changes during elective caesarean section under a spinal anaesthesia, in patients receiving either a phenylephrine or ephedrine infusion to maintain their baseline systolic blood pressure.
- **FRC study** – a study conducted by UCLH to compare the changes in FRC in different positions in parturients with normal BMI and BMI greater than 35.
- **MRiADP study** – a multi centre, prospective, double blind, quasi observational study in association with Central Manchester University Hospitals looking at MRI findings following accidental dural puncture occurring during the provision of labour analgesia and comparing the findings with clinical symptoms.

PUBLICATIONS

- T Husain, YM Liu, R Fernando, V Nagaratnam, M Sodhi, P Tamilselvan, S Venkatesh, A England, M Columb. How UK obstetric anaesthetists assess neuraxial anaesthesia for caesarean delivery: National surveys of practice conducted in 2004 and 2010 *Int J Obstet Anesth 2013;* ***22****: 298-302*
- Roshan Fernando, Mui Liu, Tauqeer Husain. Assessing blocks after spinal anaesthesia for elective caesarean section: how different questions affect findings from the same stimulus – an article recommendation, http://f1000.com/prime/718079002
- YM Liu, T Husain, R Fernando. The economic benefits of cell salvage in obstetric haemorrhage – a commentary for *Obstetric Anaesthesia Digest;* **33**(4), due to be published December 2013

DR DAFYDD LLOYD

DEANERY: London

ACADEMIC PLACEMENT: PhD

ACADEMIC SUPERVISOR NAME: Dr Daqing Ma and Dr Marcela Vizcaychipi

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Academic Anaesthesia, neuroprotection, neuroinflammation.

ACADEMIC SUPERVISOR LOCATION: Imperial College London, Chelsea and Westminster Hospital, London.

BRIEF DESCRIPTION OF RESEARCH AREA

Effect of surgery and anaesthesia on neuroinflammation in Alzheimer's disease model.

DR JUSTINE SHUHUI LOH

DEANERY: Oxford

ACADEMIC PLACEMENT: ACF: within 3 years of appointment

ACADEMIC SUPERVISOR NAME: Dr Liza Keating

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Emergency Medicine/Intensive Care Medicine

ACADEMIC SUPERVISOR LOCATION: Royal Berkshire NHS Foundation Trust

BRIEF DESCRIPTION OF RESEARCH AREA
In the process of undertaking a research area

DR MICHAL LUNIEWSKI

DEANERY: West Yorkshire

ACADEMIC PLACEMENT: ST4 anaesthetic trainee doing research in free time, hoping to register PhD from September 2013

ACADEMIC SUPERVISOR NAME: Prof Phil Hopkins

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Consultant Anaesthetist / Molecular Biology

ACADEMIC SUPERVISOR LOCATION: Leeds Institute of Molecular Medicine

BRIEF DESCRIPTION OF RESEARCH AREA
Molecular biology of MH

DR AMER MAJEED

DEANERY: North West

ACADEMIC PLACEMENT: ST7 Anaesthesia, no time allocated or granted for research by my deanery

ACADEMIC SUPERVISOR NAME: Dr Roshan Fernando

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics

ACADEMIC SUPERVISOR LOCATION: UCLH, London

BRIEF DESCRIPTION OF RESEARCH AREA
Obstetric Anaesthesia – post dural puncture headache after accidental dural puncture … prediction of severity using MRI

DR AHMED MESBAH

DEANERY: West Midlands Deanery

ACADEMIC PLACEMENT: 1 year Fellowship

ACADEMIC SUPERVISOR NAME: Prof Fang Gao-Smith

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia and Critical Care

ACADEMIC SUPERVISOR LOCATION: Birmingham Heartlands Hospital/University of Birmingham

BRIEF DESCRIPTION OF RESEARCH AREA

Chronic Post-Thoracotomy Pain

DR VIDHI MISRA

DEANERY: Wales

ACADEMIC PLACEMENT: 1 year Fellowship/Clinical Lecturer post

ACADEMIC SUPERVISOR NAME: Prof Judith Hall

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia

ACADEMIC SUPERVISOR LOCATION: Cardiff University

BRIEF DESCRIPTION OF RESEARCH AREA

One year as simulation fellow – education research in simulation
6 months as Clinical lecturer – manikin study on a new Bronchial Blocker

Introduction to Academic Anaesthesia Event, September 2013

DR ADRIAN MORRISON

DEANERY: Mersey

ACADEMIC PLACEMENT: ST6 Anaesthesia. No affiliation

ACADEMIC SUPERVISOR NAME: Dr Arnab Banerjee, Professor Jennifer Hunter

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia

ACADEMIC SUPERVISOR LOCATION: Royal Liverpool University Hospital

PROJECT TITLE

Effect of intrathecal magnesium in the presence and absence of local anaesthetic with and without lipophilic opioids: a systematic review and meta-analysis

PROJECT DESCRIPTION

A meta-analysis was conducted by the researchers to look at whether adding intrathecal magnesium to other intrathecal drugs used to facilitate spinal anaesthesia primarily increases the duration of spinal anaesthesia. Other variables investigated were the onset and time to maximal sensory blockade, onset of motor block, and duration of motor and sensory blockade. The RevMan 5.1.0 statistical program was used to transcribe and analyse the data, using random effects modelling to calculate standardised mean difference for continuous variables, and the odds ratio for dichotomous variables. There were 980 eligible patients across 15 randomized control trials that were used within the analysis.

Our results showed that duration of spinal anaesthesia was significantly increased when intrathecal magnesium was added to lipophilic opioids ± local anaesthetic or local anaesthetic alone. However, there was no significant difference in duration of anaesthesia when analysing obstetric patients alone. There was no evidence of a delay in sensory or motor blockade, or any increase in hypotension or pruritis.

PUBLICATIONS

- Published as manuscript in *British Journal of Anaesthesia*, May 2013.
- Published as an abstract from the *Anaesthetic Research Society in British Journal of Anaesthesia*, Nov 2011.
- Published as an abstract in the *European Journal of Anaesthesiology*, Jun 2011.
- Published as an abstract in the *International Journal of Obstetric Anaesthesia,* May 2011.

FUNDING

No grant or funding was sought for the research.

DR BEN MORTON

DEANERY: Mersey

ACADEMIC PLACEMENT: 1 year Fellowship

ACADEMIC SUPERVISOR NAME: Professor Stephen Gordon

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Respiratory physician – interest in pneumococcal disease

ACADEMIC SUPERVISOR LOCATION: Liverpool School of Tropical Medicine

BRIEF DESCRIPTION OF RESEARCH AREA

Examining whether augmented passive immunotherapy improves macrophage activity in critically ill patients

Clinical translation of augmented passive immunotherapy using P4

I am working as part of a research group examining augmented passive immunotherapy (API) as a novel potential treatment strategy to combat fulminant bacterial infections. API consists of two components (a) a peptide (P4) that enhances bacterial uptake and killing by phagocytes and (b) exogenous antibody (provided with intravenous immunoglobulin, a licensed medicinal product) which optimizes the phagocytosis. We are currently examining the ex vivo effects of P4 in patients with severe community acquired pneumonia and are developing a research proposal looking at the wider effects in patients with sepsis admitted to critical care areas. This work builds on positive findings in murine models and ex vivo healthy human phagocytes. Success in this project will lead to applications to NIHR for product development and phase 1 testing.

The group is also using experimental human pneumococcal carriage as a means of testing vaccine protection. Pneumococcal disease is a major global health threat for which new vaccines are urgently needed, particularly those that will protect vulnerable children and adults against pneumonia. Developing and testing of new vaccines using current methods is costly in both time and money. If successful this model will be used in testing of new candidate vaccines in the future.

DR MATT OLIVER

DEANERY: London

ACADEMIC PLACEMENT: MD (research)/ HSRC fellow

ACADEMIC SUPERVISOR NAME: Dr Ramani Moonesinghe / Prof Mike Grocott

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia/ICM

ACADEMIC SUPERVISOR LOCATION: UCLH/NIAA

PROJECTS

- National Emergency Laparotomy Audit: Project Team

Contribution to the design and content of both the organisational audit and patient dataset, incorporating the findings of a Systematic Review of the literature.

- Emergency Laparotomy Network follow-up study: Principal Investigator

This study has now gained HRA and REC approvals. Follow up data from this cohort will inform understanding of outcomes in individuals undergoing non-elective laparotomy.

- UCLH Surgical Outcomes Research Centre: Research Fellow

Analysis of this large dataset of colorectal patients demonstrated that the prompt diagnosis and management of postoperative complications was vital to improving postoperative outcomes.

- Systematic Reviews
  - Large review of risk tools to inform the NELA dataset
  - A review informing a colleague's original research paper. Awaiting publication

PUBLICATIONS AND PRESENTATIONS

- CM Oliver, M Narayanan. Out-of-hospital CPAP in the treatment of cardiogenic pulmonary oedema. *J. Int Care Soc*, 2013. **14**(2). p 176-177.
- CM Oliver, SR Moonesinghe. Simple Preoperative Risk Stratification Systems Are at Least as Good as Complex Systems Requiring Operative Data. Abstract accepted for presentation at the ASA annual meeting 2013
- CM Oliver, SR Moonesinghe. Setting rate, volume and time. Oxford Textbook of Critical Care (awaiting publication)
- CM Oliver, M Johnson. Poor provision of airway rescue equipment in non-theatre environments. Abstract accepted for presentation at the ICS winter meeting 2013

DR ANDREW OWEN

DEANERY: West Midlands

ACADEMIC PLACEMENT: ACF: within 3 years of appointment

ACADEMIC SUPERVISOR NAME: Prof Julian Bion

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Intensive Care Medicine

ACADEMIC SUPERVISOR LOCATION: Queen Elizabeth Hospital Birmingham

PROJECT TITLE

Cellular interactions underpinning the anti-inflammatory action of MSC in DCD liver injury

PROJECT DESCRIPTION

I am in an Academic Clinical Fellowship in Intensive Care Medicine and have just completed my first year in post. I have recently secured a dual training programme with anaesthetics, maintaining my academic time at 25%. My clinical training so far has been at the Queen Elizabeth Hospital Birmingham. I am also based in the Liver Laboratories at the University of Birmingham and my main research area is a basic science project looking at the cellular interactions that underpin the anti-inflammatory action of Mesenchymal Stromal/Stem Cells and their potential use to improve outcomes from Donation After Cardiac Death (DCD) liver transplantation. My research involves isolation of rare PαS cells from murine bone marrow using Fluorescence-activated cell sorting (FACS) and reinfusion into models of hepatic injury. Currently I am applying for clinical research training fellowship funding in order to continue this research and work towards a higher degree.

I am assisting in a clinical trial looking at control of cytomegalovirus in critical care (CCCC) and have designed and implemented a trial database, utilising my background in computer science prior to medicine.

I am also involved in leading a resuscitation research group at the University of Birmingham. We have a small group of medical students and junior doctors who carry out mainly non clinical educational based research. As a group we have published and presented consistently over the last 2 years.

RECENT PUBLICATIONS

- Peer-led training and assessment in basic life support for healthcare students: Synthesis of literature review and fifteen years practical experience. P.R. Harvey, C.V. Higenbottam, A. Owen, J. Hulme, J.F. Bion. *Resuscitation;* 2012 **83**(7):894-899
- Rational Testing. Interpreting arterial blood gas results. Cowley N, Owen A, Bion J. *BMJ* 2013; **346** doi: http://dx.doi.org/10.1136/bmj.f16 (Published 16 January 2013)
- Comparison of the quality of basic life support provided by rescuers trained using the 2005 or 2010 ERC guidelines. Jones C, Owen A, Thorne C, Hulme J. *Scandinavian Journal of Trauma*, Resuscitation and Emergency Medicine 2012, **20**: 53
- An analysis of the introduction and efficacy of a novel training programme for ERC basic life support assessors. Thorne CJ, Jones C, Harvey P, Hulme J, Owen A. *Resuscitation*. 2012 Oct 3.

DR JAIMIN PATEL

DEANERY: West midlands

ACADEMIC PLACEMENT: PhD

ACADEMIC SUPERVISOR NAME: Prof Fang Gao, Dr David Thickett and Dr Elixabeth Sapey

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia/Respiratory Medicine/Respiratory Medicine respectively

ACADEMIC SUPERVISOR LOCATION: University of Birmingham

PROJECT TITLE

Dysfunctional neutrophil function in sepsis

Exaggerated Neutrophil Immunosenescence in Sepsis and its Modification with StatinTherapy.

PROJECT DESCRIPTION

Sepsis is increasing in incidence, especially among the elderly and remains one of the commonest causes of admission to intensive care units. With age the efficiency of the been implicated in the increased morbidity and mortality seen from sepsis in the elderly. and altered neutrophil function has been postulated as a one of mechanism by which multi-HMG-CoA Reductase inhibitors, statins, can modulate the immune response and may improve The aim of our research is to quantify neutrophil function in the healthy elderly and patients therapy with physiologically relevant doses of simvastatin can correct any defects seen. chemotaxis, superoxide burst, phagocytosis, neutrophil extracellular trap formation and simvastatin and neutrophils functions reassessed. In addition, a cohort of twenty healthy where they received 80mg simvastatin or placebo for 2 weeks. Their neutrophil function was quantified before and after treatment.

Our goal is to determine whether statins can be used as adjuvant therapy in sepsis and are currently in the process of recruiting to a clinical trial to assess whether treatment with 80mg simvastatin in elderly patients admitted with pneumonia improves neutrophil function (SNOOPI Trial).

GRANTS

BJA/RCoA PhD studentship 2011

PUBLICATIONS

Patel JM, C Snaith, D R Thickett, L Linhartova, T Melody, P Hawkey, A Barnett, T Hong, A Jones, T Hong, M W Cooke, G D Perkins and F Gao. Atorvastatin for preventing the progression of sepsis to severe sepsis (ASEPSIS Trial): a randomised double-blind placebo controlled trial. *Critical Care* 2012; **16**: R231.

PRIZES

Drager Research Paper Prize for best publication. European Society of Anesthesiology, Barcelona, May 2013.

DR JOHN PORTER

DEANERY: London

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Prof Masao Takata, Dr Suveer Singh, Dr Kieran O'Dea

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia and Critical Care

ACADEMIC SUPERVISOR LOCATION: Chelsea and Westminster Campus, Imperial College London

BRIEF DESCRIPTION OF RESEARCH AREA

Inflammatory response following severe burn injuries

DR KATHRYN PUXTY

DEANERY: West of Scotland

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Dr Tara Quasim/ Dr David Morrison

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics/ ICU

ACADEMIC SUPERVISOR LOCATION: Glasgow University/ Glasgow Royal Infirmary

PROJECT TITLE

Outcome of cancer patients with critical illness requiring Intensive Care admission

PROJECT DESCRIPTION

During the course of their cancer care, some patients will receive Intensive Care Unit (ICU) support. ICU may be necessary to deal with the after effects of modern anti-cancer therapy such as surgery or the complications of high dose chemotherapy (e.g. neutropenic sepsis, renal failure). Therefore, ICU is potentially part of the wide armamentarium of support measures available to oncologists to optimise the care of the cancer patient. Whilst these patients may have increased mortality following ICU admission compared to non cancer patients, some will derive benefit. The challenge is to identify those patients for whom there is benefit and those for whom it is futile

Our project will examine survival among cancer patients who receive ICU care and compare their survival to similar ICU patients who do not have cancer to determine the effect of malignancy on ICU outcomes and longer term survival. Furthermore, we will compare the group of ICU patients with cancer to a matched cohort of cancer patients who do not require ICU to assess the impact of critical illness necessitating ICU on outcome in cancer patients. We will identify prognostic markers of survival by examining demographic factors (including socio-economic circumstances), cancer type, cancer stage and other clinical risks (such as biochemical markers of inflammation or disease severity). In addition to survival, we will examine the impact that critical illness and an ICU admission have on subsequent cancer treatment.

This is a retrospective observational study using routine data. We have combined the ICU clinical databases from 12 West of Scotland hospitals with the national cancer registry database and death registry. This has allowed us to identify a cohort of patients with cancer who have been admitted to ICU. The aim of our project is to determine which cancer patients are likely to benefit from ICU care. This information will complement the clinical decision regarding the benefits of ICU admission.

FUNDING
CRUK Population Health Project Grant

BMA TP Gunton Grant

DR DANIELLE REDDI

DEANERY: London

ACADEMIC PLACEMENT: 1 year fellowship

ACADEMIC SUPERVISOR NAME: Dr Brigitta Brandner

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Acute pain

ACADEMIC SUPERVISOR LOCATION: University College London Hospital

BRIEF DESCRIPTION OF RESEARCH AREA
Acute pain

DR BARRY MARTIN SCHYMA

DEANERY: South East Scotland

ACADEMIC SUPERVISOR NAME: TBD

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Clinical Investigation

ACADEMIC SUPERVISOR LOCATION: University of Singapore

BRIEF DESCRIPTION OF RESEARCH AREA
MSc in Clinical Investigation at National University of Singapore. Research in Pre-hospital Airway management.

DR MARTA SERETNY

DEANERY: South East Scotland

ACADEMIC PLACEMENT: ACF: within 3 years of appointment

ACADEMIC SUPERVISOR NAME: Prof Marie Fallon, Dr Lesley Colvin, Prof Irene Tracey, Dr Neil Roberts, Dr Stephen Lawrie

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Palliative Care, Anaesthetics, Neuroimaging, Neuroimaging Physics, Psychiatry

PROJECT TITLE

Investigating Chemotherapy Induced Peripheral Neuropathy using functional magnetic resonance imaging

PROJECT DESCRIPTION

I currently hold a Wellcome Trust Clinical Academic PhD Fellowship awarded through the Scottish Translational Medicine and Therapeutics Initiative (see: http://stmti.mvm.ed.ac.uk/scheme.htm). My PhD project, which I started in August 2012, is utilising functional magnetic resonance imaging (fMRI) to assess the importance of descending inhibitory pathways in the development and treatment of chemotherapy induced peripheral neuropathy (CIPN). Prior to my PhD I gained formal research training by completing an MSc in Public Health Research at Edinburgh University, which included modules in Basic & Extended Epidemiology and Advanced Statistics. For my MSc dissertation I used the Intensive Care Study of Coagulopathy (ISOC) data set, to gain greater understanding of blood transfusions in ICU.

PUBLICATIONS

https://www.ncbi.nlm.nih.gov/pubmed/23925630

https://www.ncbi.nlm.nih.gov/pubmed/23782967

https://www.ncbi.nlm.nih.gov/pubmed/22037224

https://www.ncbi.nlm.nih.gov/pubmed/18624697

DR PRADEEP SHANMUGASUNDARAM

DEANERY: Oxford Deanery

ACADEMIC PLACEMENT: 1 year Fellowship, OOPE: 1 year simulation fellowship (50% clinical whole time equivalent, 50% fellowship)

ACADEMIC SUPERVISOR NAME: Prof Debbie Rosenorn-Lanng

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetic Consultant/Director of Simulation and Health Quality Improvement/Professor of Health Informatics

ACADEMIC SUPERVISOR LOCATION: Royal Berkshire Hospital, Reading

PROJECT TITLE

Quality improvement project for NHS South of England (Central) to improve anaesthetic simulation training

PROJECT DESCRIPTION

During 2012, I was a NHS South of England (Central) Clinical Simulation Fellow based at the Royal Berkshire Hospital in Reading. My role was to improve the quality of patient care using clinical simulation in the Oxford and Wessex regions. My specific remit was to map the RCOA 2010 anaesthetic curriculum to simulation.

I accomplished this project by developing a generic simulation scenario template that included a novel graphical algorithm-based approach to scenario progression. I used the template to produce a library of around 35 scenarios that mapped specifically to the Basic Level Curriculum, but which could be delivered to anaesthetists of any level of experience, or potentially used for anaesthetic teams training.

The generic template was also utilised by the other simulation fellows for their projects, and to date at least 200 scenarios have been written using the template and delivered to a wide variety of healthcare professionals around the country. The template has since been adopted by a number of simulation centres around the country, and was competitively selected for use by the Faculty of Intensive Care Medicine to design scenarios that map to the 'top 30 diagnoses' in the 2011 FICM curriculum. The work on developing the template was presented orally at the Association of Simulated Practice in Healthcare (ASPiH) conference in December 2012.

During the Fellowship I also ran the Foundation and anaesthetic simulation training, helped embed simulation training into ICU trainee induction and helped launch simulation training for ODPs and Outreach nurses at the Royal Berkshire Hospital.

I designed and lead the simulation training component of the Readiness for the Initial Assessment of Competency Training (RIACT) course for novice anaesthetic and ACCS trainees in the Oxford Deanery. Elements of the RIACT course were presented at the ASPIH conference 2012 and the Difficult Airway Society (DAS) meeting 2012. The RIACT course also won first prize for poster and oral presentation at the recent RCOA College Tutors' Meeting 2013.

FUNDING

This Fellowship was made possible by funding from NHS South of England (Central), and from support from the Royal Berkshire NHS Foundation Trust, and the Oxford School of Anaesthesia.

PUBLICATIONS AND PRESENTATIONS

- Thinking inside the box: A new approach to scenario design. Shanmugasundaram P, Rosenorn-Lanng D. Oral Short Communication, ASPiH Conference. Nov 2012
- Piloting simulation-based assessment of failed intubation in novice anaesthetists. Shanmugasundaram P, Snyders S, Rosenorn-Lanng D. Poster Presentation, ASPiH Conference. Nov 2012 & DAS Meeting Nov 2012.
- The RIACT Course. Skog A, Shanmugasundaram P, Shiels SA, Ankers A, Snyders S, Wright J. RCOA College Tutors Meeting 2013 (Abstract published in RCOA Bulletin July 2013)

DR BEN SHELLY

ACADEMIC SUPERVISOR NAME: Professor John Kinsella (University) /Dr Alistair Macfie (Clinical)

ACADEMIC SUPERVISOR LOCATION: University of Glasgow Academic Unit of Anaesthesia, Pain and Critical Care, West of Scotland Heart and Lung Centre / Golden Jubilee National Hospital

PROJECT 1 TITLE

Endogenous Antioxidant Capacity and Oxidative Stress, Nitrosative Stress and Endothelial Dysfunction after Thoracic Surgery

PROJECT 1 DESCRIPTION

This observational study explores the interaction between a patient's endogenous antioxidant mechanisms and the pathogenesis of acute lung injury after thoracic surgery.

FUNDING

2011 NIAA / RCoA - Nuffield Award
2009 NIAA - Association of Cardiothoracic Anaesthetists Project Grant
2009 Intensive Care Society Young Investigators Award

PUBLISHED ABSTRACTS

Shelley B, Macfie A, Talwar D, Kinsella J. Plasma dimethylarginines in a post-surgical model of the acute inflammatory response. *British Journal of Anaesthesia* 2012; 109(4): 667-8P.

Shelley B, Macfie A, Kinsella J, Galley HF. The novel biomarker pentraxin 3 may aid risk stratification in the early post-operative period following lung resection. *Journal of Applied Cardiopulmonary Pathophysiology* 2012; 16(Supp I):222-3.

Shelley B, McSharry C, Macfie A, Kinsella J. Biomarkers of Acute Lung Injury after Lung Resection. *Anaesthesia* 2012; 67:554.

PROJECT 2 TITLE

Precision and Validity of Trans-pulmonary Thermodilution after Lung Resection

PROJECT 2 DESCRIPTION

This observational study explores the utility of extra-vascular lung water measurement by trans-pulmonary thermodilution after lung resection.

FUNDING
Hardware on loan and consumables provided by Edwards Lifesciences.

PUBLISHED ABSTRACTS
Shelley B, Tanner O, Macfie A, Kinsella J. Adjustment of extravascular lung water calculation for volume of resected lung does not improve construct validity in thoracic surgical patients (abstract). *British Journal of Anaesthesia*. (2013) 110(5): 860P-885P.

PROJECT 3 TITLE
The Pulmonary Vascular – Right Ventricular Response to Lung Resection

PROJECT 3 DESCRIPTION
Commencing in August 2013, this is an observational cohort study using Cardiac Magnetic Resonance Imaging and 2D – Speckle Tracking Echocardiography to characterise the right ventricular response to lung resection.

Funding:
2009 NIAA - Association of Cardiothoracic Anaesthetists Project Grant

DR CLIFFORD SHELTON

DEANERY: North Western

ACADEMIC PLACEMENT: ACF: within 3 years of appointment

ACADEMIC SUPERVISOR NAME: Prof Andrew Smith, Dr Maggie Mort

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Consultant Anaesthetist, Patient Safety, Qualitative Research, Cochrane Reviews.

ACADEMIC SUPERVISOR LOCATION: Royal Lancaster Infirmary

PROJECT TITLE
An observational study of ultrasound-guided central venous access by anaesthetists.

PROJECT DESCRIPTION
Despite the introduction of NICE guidelines supporting the use of ultrasound in central venous access over a decade ago, and the recent explosion in the popularity of ultrasound use amongst non-radiologists, little is understood about the way anaesthetists use this technology in practice.

This dual-centre qualitative study aims to build on the previous work of the Lancaster Patient Safety Research Unit to understand the ultrasound techniques that have been developed by anaesthetists to facilitate the insertion of central venous catheters. It will employ a purposive sampling strategy to target a variety of clinical situations and levels of expertise, and focus on observing and documenting the range of sociotechnical skills displayed by operators, including communication, teaching and learning, and the physical elements of the procedure itself.

Particular attention will be paid to the way ultrasound is used to help anaesthetists deal with difficult clinical situations, which are typically excluded from the sample populations in the randomised controlled trials on which the evidence base for ultrasound is founded.

It is anticipated that this study will inform the current debate about the utility of ultrasound in central venous access, and provide a valuable resource for trainers and trainees. It is hoped that it will provide a basis for further related study as a doctoral project.

Data collection commenced in June 2013 and is due to conclude in September 2013. Outputs have so far included the presentation of a literature review describing the development of procedural ultrasound at the History of Anaesthesia Society Annual Summer Meeting.

This project is funded as part of an NIHR Academic Clinical Fellowship in anaesthesia.

Outputs have so far included the presentation of a literature review describing the development of procedural ultrasound at the History of Anaesthesia Society Annual Summer Meeting.

This project is funded as part of an NIHR Academic Clinical Fellowship in anaesthesia.

DR WILLIAM SHIPPAM

DEANERY: KSS

ACADEMIC PLACEMENT: Research project during ST3

ACADEMIC SUPERVISOR NAME: Dr H Wakeline

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics

ACADEMIC SUPERVISOR LOCATION: Royal Lancaster Infirmary

BRIEF DESCRIPTION OF PROJECT AREA
Investigating oxygen consumption

DR JOANNA SIMPSON

DEANERY: London

ACADEMIC PLACEMENT: One year perioperative fellowship

ACADEMIC SUPERVISOR NAME: Dr Ramani Moonesinghe

ACADEMIC SUPERVISOR LOCATION: University College London Hospital

PROJECT TITLE

Enhanced Recovery in England: An observational multicentre cohort study
Development of a novel surgical risk scoring tool

BRIEF DESCRIPTION OF RESEARCH AREA

- Enhanced Recovery in England: An observational multicentre cohort study
  This involved analysis of the national enhanced recovery database from a 2.5 year period looking at compliance with enhanced recovery protocols and the effect of this on length of hospital stay in 4 surgical specialties.
- Development of a novel surgical risk scoring tool
  This involved the analysis of the 'Knowing the Risk' dataset collected by NCEPOD, in collaboration with the team at NCEPOD, with the aim of constructing our own surgical risk model, based on preoperative variables.

Review of the evidence for Post-anaesthetic care units

- Simpson and Moonesinghe, Introduction to the post-anaesthetic care unit, *Perioperative Medicine* 2013, 2:5 http://www.perioperativemedicinejournal.com/content/2/1/5

DR CHARLOTTE SMALL

DEANERY: West Midlands

ACADEMIC PLACEMENT: MD Research

ACADEMIC SUPERVISOR NAME: Prof Julian Bion

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Intensive Care Medicine

ACADEMIC SUPERVISOR LOCATION: Queen Elizabeth Hospital Birmingham

BRIEF DESCRIPTION OF RESEARCH AREA

Use of interactive technology for patient use within critical care

DR THOMAS SMITH

DEANERY: Oxford

ACADEMIC PLACEMENT: NIHR Academic Clinical Lectureship

ACADEMIC SUPERVISOR NAME: Prof Jaideep Pandit

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics

ACADEMIC SUPERVISOR LOCATION: Queen Elizabeth Hospital Birmingham

BRIEF DESCRIPTION OF RESEARCH AREA
Hypoxia physiology

DR ZOE SMITH

DEANERY: Wessex

ACADEMIC PLACEMENT: MSc

ACADEMIC SUPERVISOR NAME: Prof Mike Grocott and Dr Dan Martin

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: GICU and Ophthalmology retrospectively

ACADEMIC SUPERVISOR LOCATION: Southampton Hospital

BRIEF DESCRIPTION OF RESEARCH AREA
Acute mountain sickness and optic nerve sheath diameter.

DR AARJAN SNOEK

DEANERY: London

ACADEMIC PLACEMENT: 1 year fellowship

ACADEMIC SUPERVISOR NAME: Dr Anil Visram

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Paediatric anaesthesia

ACADEMIC SUPERVISOR LOCATION: The Royal London Hospital

BRIEF DESCRIPTION OF RESEARCH AREA
Paediatric anaesthesia and paediatric critical care.

DR PERVEZ SULTAN

DEANERY: North Central Thames

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Dr Gareth Ackland, Prof Monty Mythen,

ACADEMIC SUPERVISOR LOCATION: University College Hospital, London

PROJECT TITLE
Moleculeclar mechanisms of post-operative lymphopaenia

DESCRIPTION OF PROJECT
Given that infective complications are more prevalent following surgery, the immune system may be a causative factor for the development of post-operative morbidity.
Post-operative lymphopaenia is a well reported phenomenon. The precise mechanism responsible for lymphopaenia following surgery is not clear. In my thesis I firstly examine the change in absolute and relative lymphocyte counts in the peri-operative period in 220 colorectal patients and also relate presence of pre-operative lymphopaenia to increased length of hospital stay.
After identifying a relationship between lymphopaenia and increased length of stay I interrogated pre- and post-operative isolated lymphocytes taken from the same patients and compared bio-energetic function using an extracellular flux analyzer; intracellular cytokine production using flow cytometry; mitochondrial reactive oxygen species production and mitochondrial membrane potential using flow cytometry and finally propose a potential mechanism for change in lymphocyte function in the post-operative period.

GRANT
60,000 GBP OAA Grant - Molecular mechanisms of epidural related maternal fever

PUBLICATIONS DURING MD(Res):

- Sultan P, Butwick A. Platelet and coagulation testing in pre-eclamptic patients prior to anaesthesia. *Clin Appl Thromb Hemost*. 2013 Oct; **19**(5):529-534
- Sultan P, Arulkumaran N, Rhodes A. Provision of critical care services for the obstetric population. *Best Pract Res Clin Obstet Gynaecol*. 2013 Aug:Epub
- Sultan P, Murphy C, Halpern S, Carvalho B. Comparison of ultra-low and higher-concentration epidural local anaesthetic solutions in labour: a meta-analysis. *Can J Anaesth.* 2013 Aug; **60**(9):840-854
- Carvalho B, Tan J, Macario A, El-Sayed Y, Sultan P. A cost-analysis of neuraxial anesthesia to facilitate external cephalic version for breech fetal presentation. *Anesth Analg.* 2013 Jul; **117**(1):155-9
- Fernandez-Caballero S, Becic D, Bouras I, Walker D, Sultan P. Experiences and challenges in achieving sustainable quality improvement in two UK hospitals. *Br J Hosp Med* 2013 Jul: **74**(7):347-352
- Evans S, Almahdi B, Sultan P, Sohanpal I, Brandner B, Collier T, Shergill SS, Cregg R, Averbeck BB. Performance on a probabilistic inference task in healthy subjects receiving ketamine compared with patients with schizophrenia. *J Psychopharmacol*. 2012 Sep; **26**(9):1211-7

DR NEETA TAILOR

DEANERY: Wales

ACADEMIC PLACEMENT: Prof Judith Hall

ACADEMIC SUPERVISOR NAME: 6 months as part of Advanced Training in Research (in program)

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia

ACADEMIC SUPERVISOR LOCATION: University Hospital of Wales/Cardiff University

BRIEF DESCRIPTION OF RESEARCH AREA

Neuroimaging & Functional MRI.

DR KATE TATHAM

DEANERY: London

ACADEMIC PLACEMENT: PhD

ACADEMIC SUPERVISOR NAME: Dr Kieran O'Dea, Dr Nandor Marczin, Prof Masao Takata

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Critical Care

ACADEMIC SUPERVISOR LOCATION: Chelsea & Westminster Hospital

PROJECT TITLE

Role of monocytes in Acute Lung Injury

DESCRIPTION OF PROJECT

My PhD focuses on the cellular and molecular mechanisms responsible for the acute lung injury seen in response to the donor inflammation and subsequent ischaemia-reperfusion, endured during lung transplantation. I have developed *ex vivo* and *in vitro* models of ischaemia in which we are able to directly assess the role of neutrophils and other key leukocytes in the propagation of this inflammatory injury and the resultant activation of the pulmonary capillary endothelium.

GRANTS

Wellcome Trust Clinical Research (PhD) Fellowship

PUBLICATIONS

- Wakabayashi K, Wilson MR, Tatham KC, O'Dea KP, Takata M., Volutrauma, but not atelectrauma, induces systemic cytokine production by lung-marginated monocytes. *Crit Care Med* (in press)
- O'Dea KP, Dokpesi JO, Tatham KC, Wilson MR, Takata M., Regulation of monocyte subset proinflammatory responses within the lung microvasculature by the p38 MAPK/MK2 pathway. *Am J Physiol Lung Cell Mol Physiol.* 2011 Nov; **301**(5):L812-21. Epub 2011 Aug 26.

- Tatham KC, Xiao W, O'Dea KP, Takata M. Neutrophil-Dependent Shedding Of Heparan Sulfate From The Pulmonary Endothelium In An In Vitro Model Of Simulated Ischemia. *Am J Respir Crit Care Med* **187**;2013: A2745.
- Tatham KC, O'Dea KP , Wakabayashi K, Marczin N, Takata M. Marginated monocytes play a central role in lung ischaemia-reperfusion injury in mice: Implications for lung transplantation. *Eur Respir J* (in press)
- Wakabayashi K, Wilson M, Tatham K, O'Dea K, Takata M. High-stretch, but not atelectasis, causes systemic cytokine release by lung-marginated monocytes. *Eur Respir J* (in press)

DR KATE TEARE

DEANERY: Southwest Penninsula

ACADEMIC PLACEMENT: Research within clinical training programme

ACADEMIC SUPERVISOR NAME: Dr Catherine Ralph

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia. Blood conservation lead. Previously published research on cell salvage in obstetrics.

ACADEMIC SUPERVISOR LOCATION: Royal Cornwall Hospital

BRIEF DESCRIPTION OF RESEARCH AREA

Working as a small team studying whether cell salvage of vaginal blood loss in obsetrics is suitable for reinfusion.

DR BRANISLAV TELGARSKY

DEANERY: Welsh

ACADEMIC PLACEMENT: 6 months between May and November 2012 as In-Training academic placement

ACADEMIC SUPERVISOR NAME: Prof Judith Hall / Prof RG Wise

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthetics / Physics

ACADEMIC SUPERVISOR LOCATION: University Hospital of Wales Cardiff / CUBRIC Cardiff

BRIEF DESCRIPTION OF RESEARCH AREA

Functional MRI

DR KATHERINA TOBER

DEANERY: Peninsula (in West of Scotland deanery at present)

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Prof John Kinsella

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia/Burns/ITU

ACADEMIC SUPERVISOR LOCATION: University of Glasgow/Glasgow Royal infirmary

BRIEF DESCRIPTION OF RESEARCH AREA

Biomarkers and first diagnosis atrial fibrillation post operatively

DR ANDREW TONER

DEANERY: Health Education South London (St. George's School of Anaesthesia)

ACADEMIC PLACEMENT: MD (research)

ACADEMIC SUPERVISOR NAME: Dr Gareth Ackland

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia and Intensive Care/ PhD – Clinician Scientist

ACADEMIC SUPERVISOR LOCATION: UCH/ Wolfson Institute for Biomedical Research

PROJECT TITLE

Parasympathetic function and postoperative morbidity. The influence of vagal function over haemodynamic performance and postoperative recovery is being investigated in an RCT of goal directed therapy.

DESCRIPTION OF RESEARCH AREA

During two years of self-funded research I have been investigating the protective role of vagal transmission in the face of surgical stress. Animal models and clinical data indicate that parasympathetic pathways mediate resilience to cardiac arrhythmias, tissue ischaemia, left ventricular dysfunction and excessive inflammation. In large population cohorts the strength of vagal reflexes, such as heart rate recovery after exercise, are independently predictive of long-term survival. We therefore hypothesized that vagal function is mechanistically important in the development of postoperative complications.

Within a multi-centre, NIHR approved, randomized trial of postoperative goal directed therapy, we have validated an approach to vagal monitoring based upon quantification of the baroreceptor reflex from routinely collected haemodynamic data. This metric of vagal function is now being explored in relation to cardiac performance, perioperative interventions and surgical complications. In setting the scene for this work, I have published a number of review articles and textbook chapters (see below). Over the next 12 months we aim to disseminate some novel findings with respect to the mechanisms of postoperative morbidity. This work is registered and will hopefully lead to the award of an MD Degree.

PUBLICATIONS

- Toner A, Hamilton M, Cecconi M (in-submission) Chapter in 1st Edition of Oxford Textbook of Anaesthesia; Postoperative Complications
- Toner A, Hamilton M (2013) The long-term effects of postoperative complications. *Curr Opin Crit Care;* **19**(4): 364-8;
- Toner A, Whittle J, Ackland G (2013) *Yearbook of Intensive Care Medicine* 2013; Autonomic dysfunction is the motor of critical illness
- Toner A, Quinton P (2012) Fluids for volume expansion: e-Learning Anaesthesia (Royal College of Anaesthetists) http://www.e-lfh.org.uk/projects/ela/index.html
- Hamilton M, Toner A, Cecconi M (2012); Troponin in critically ill patients. Minerva *Anesthesiologica;***78**(9):1039-45
- Toner A (2012) Fluid physiology, tissue compliance, and colloids. *British Journal of Anaesthesia* Correspondence; *108*(6): 1035-1036

DR JOHN WHITTLE

DEANERY: London Deanery

ACADEMIC PLACEMENT: MD Research

ACADEMIC SUPERVISOR NAME: Dr Gareth Ackland

ACADEMIC SUPERVISOR BASE SPECIALTY/SCIENTIFIC BACKGROUND: Anaesthesia. Blood conservation lead. Previously published research on cell salvage in obstetrics.

ACADEMIC SUPERVISOR LOCATION: University College London

PROJECT TITLE

The influence of Autonomic Dysfunction on outcome from critical illness

DESCRIPTION OF PROJECT

Work has focused on bench to bedside (and back again) models of autonomic function and dysfunction and its influence on outcome after sepsis or controlled trauma (e.g. surgery). These have included the use of various techniques to measure autonomic function in patients around the time of pre-operative exercise testing and peri-operatively. Perioperative physiology and outcomes are related to autonomic function or dysfunction. Basic science techniques are applied to patient samples to explore the mechanisms underlying detrimental post-operative outcomes.

Laboratory models of autonomic dysfunction have been used to corroborate and explore further the biological mechanisms driving critical illness related organ dysfunction.

Data has been presented by Dr Ackland at ESCICM in Brussels this year and is currently being prepared for publication.