



ANAESTHESIOLOGY & PERIOPERATIVE SCIENCES Research in Focus

Greetings from ACP Chair



Dear all,

A year has passed since we launched the ACP newsletter. As I look back, I am pleased to note that we have made significant progress in our Academic Medicine journey. We have collectively published a total of 54 articles last year and have received \$1.63 million in competitive grant funding. One of our key priorities for this year is to continue to develop research talents in our ACP. The research pillar has made great strides in nurturing budding researchers within our ACP. Our key research focus areas in the coming year will be in health services research, medical technology development and pain research.

On the education front, May Mok has kindly taken on the newly created role of Director of Education Research and will focus on encouraging research in education, an area of growing interest. Evangeline and Chai Rick have planned for a full year faculty development series incorporating quality improvement lecture series and some research topics.

In late October, 15 of our faculty visited Duke University Health System. The study trip provided an opportunity to learn from an established academic medical centre, build relationships and explore potential collaborations. On the philanthropic front, we are engaging our alumni and some senior residents to help us create an Anaesthesiology Senior Resident Talent Development Fund. Contributions from our faculty continue to be appreciated particularly those who have donated their honorarium towards the ACP. We look forward to your continued support and participation in our academic medicine journey!

Warm regards,

Adj Associate Professor Ruban Poopalalingam
Academic Chair, ANAES ACP

Words from ACP Vice Chair (Research)

Welcome to 2018! A year has passed since the inaugural ANAES ACP newsletter with a Research Focus. In line with Academic Medicine research talent development, we feature 2 rising stars of ANAES ACP Clinician-Scientists, Hairil and Diana. As anaesthetists we are familiar with technology and innovation; a section is dedicated to the Innovators in Medical Technology, featuring their 'toys'! We also look at how ANAES ACP is developing Medical Students in clinical research, together with Duke-NUS Medical School. The ANAES ACP also hosted an international student from Duke University who studied perioperative music listening.

The year of 2017 has been a fruitful one for ANAES ACP research with several competitive grant funding, publications and research talent development. With your help, we can take ANAES ACP Research to even greater heights!

Regards,

Associate Professor Sng Ban Leong
Academic Vice Chair (Research), ANAES ACP



Adj A/Prof Sophia Chew

SingHealth Student Talent Development Award 2017—Student Joseph Wong



Dr Raymond Goy

AM.EI Education Grant 2017



Dr Patrick Wong

FY2017 Cycle 2 ACP

Education Support Programme Grant



A/Prof Sng Ban Leong

National Health Innovation Centre
(Innovation to Develop) Grant

SingHealth Student Talent Development Award 2017—Student Daryl Tan

FY2017 Cycle 2 ACP Clinical Innovation Support Programme Grant

The Exciting Future of Perioperative Medicine



Dr Hairil Rizal Abdullah, Clinical Director of SGH Perioperative Services & Consultant, SGH Department of Anaesthesiology, shared with us about his work in Perioperative Medicine (PoM) and his vision for the field in the local context.

Why Perioperative Medicine

Doing the subspecialty of Perioperative Medicine (PoM) was never in my mind. As a trainee back then, we were never formally exposed to PoM. After my exit, I wanted to do neuroanesthesia and went ahead with the fellowship and HMDP application process. Unfortunately, while I managed to secure a fellowship position in Germany, my HMDP funding application was rejected.

I was naturally disappointed, but Prof Ong Biau Chi, my HOD at the time, reassured me that whenever a door closes, another will open. She advised me to re-apply for the funding and consider the idea of doing PoM as my subspecialty – which is a niche area of need. It was then an unexplored area in SGH and I don't really know what to expect. It turns out that I really enjoy doing PoM and I have never looked back.

Similarly, I have never thought of being someone who would enjoy doing academic research. It was the influence of another mentor, Prof Frances Chung from University of Toronto, who planted the idea of academic medicine in my mind. She guided me through my thinking process and writing skills while making sure I understood the importance of my work. We ended up working on many projects

together, even until now – years after I am back in Singapore!

Building up the SGH Perioperative Service and learning to be a productive independent researcher at the same time is not easy. Fortunately, A/Prof Ruban provided me with a lot of support to pursue my ideas in the form of networking, advice and time – all the essential ingredients to be a productive researcher.

So, to answer your question on how I came about doing what I am doing - I had great mentors!

Current areas of interest in PoM

I currently have 3 main research areas in PoM – Preoperative anemia, surgical risk stratification models and elderly with frailty undergoing surgeries. They are all part of the 3 pillars for preoperative care ie. Risk assessment, risk counselling and risk mitigation. I think I will be concentrating on these 3 for the next couple of years and move on once the findings has been successfully translated to clinical care.

Beyond that, I would love to learn and explore other determinants of perioperative risks (Figure 1) and how we can improve on them. I'm inviting everyone to work together on these, just give me a call!

Vision of perioperative care improvement in 5 years, as the results of your research findings

We have started our preoperative anemia management pathway, incorporating outpatient treatment with intravenous iron and postoperative follow up with internal

medicine specialists in August 2017. This came about from our own academic work in the area. From December 2017, the PAC in SGH have also started screening frailty in our elderly patients. We aim to research the best outpatient modality to identify frailty in our population and follow that up with the most effective risk mitigation strategies. Currently, we are looking at the impact of nutritional optimization, as well as home prehabilitation treatment. This is what I believe the Perioperative Service should be, where there is rapid and active translation of academic findings to clinical care. Such culture will ensure we are improving outcomes by providing cutting edge clinical care, at the best value for our patients. I hope more trainees will take up the challenging but very rewarding subspecialty of PoM. I believe in 5 years' time, together, we will be able to have a world-class perioperative unit with good academic output and clinical outcomes.

Highlights about perioperative care

I love PoM because it is both challenging and extremely rewarding at the same time. I have a good mix of providing one-to-one care for my patients (when I am practicing clinical anaesthesiology in OT), engaging patients and their family with meaningful discussions in the clinic, as well as driving change and improving care to many when writing guidelines, protocol and doing research. PoM is a very fulfilling subspecialty!

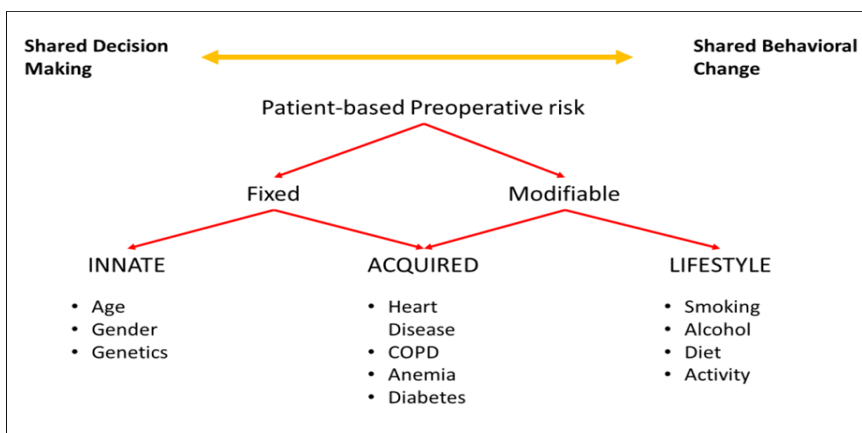


Figure 1: Some examples of the determinants for Preoperative risks... obviously there are many more, hence the research opportunities are endless!

Medical Technology in Anaesthesiology

EPIVA: The Smart Pain Relief System

Excerpt from KKH Special Delivery

Childbirth is a significant event in a woman's life. Women can now look forward to responsive and personalised labour pain relief with an innovative epidural delivery system, EPIVA, pioneered by the Department of Women's Anaesthesia, KK Women's and Children's Hospital (KKH).

EPIVA provides customised maintenance regimens based on KKH's patented algorithms including variable frequency automated mandatory bolus and computer integrated patient controlled epidural analgesia. This project is a collaborative effort between KKH and Innovfusion, a medical device Singapore start-up.

A clinical trial, Collaborative Outcomes with Labour Epidural Use Study (COLEUS), funded by the National Medical Research Centre Clinical Trials Grant (Late Phase), is currently underway. COLEUS aims to further investigate the clinical efficacy of the effect of automated mandatory bolus and variable basal infusion rate during the maintenance of labour epidural analgesia.

"Women who experience increased pain during labour may also experience lower successful patient bolus demands when using PCEA, and may be at higher risk of dysfunctional labour, requiring obstetric intervention such as Caesarean section or instrumental delivery," says Associate Professor Sng Ban Leong, Head and Sen-



A/Prof Sng Ban Leong, Head and Senior Consultant, Department of Women's Anaesthesia, KKH, demonstrates the use of the EPIVA smart infusion pump to deliver epidural pain relief to a patient.

ior Consultant, Department of Women's Anaesthesia, Director of KK Research Centre, KKH, and Principal Investigator for COLEUS.

He added, "By improving our abilities to detect, intervene and hopefully prevent a mother's pain during labour, in the long term, we hope to be able to reduce maternal distress and anxiety."

Throwing Light on a Blind Procedure - Cricoid Pressure Force Sensor

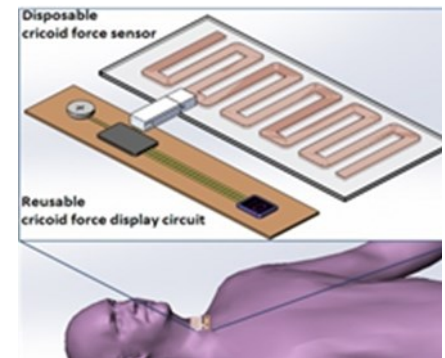
An article by Dr Hee Hwan Ing, Senior Consultant, Department of Paediatric Anaesthesia, KKH and Director for Device Development, ANAES ACP

Cricoid force sensor

"How can application of cricoid pressure be optimised in practice – can WE do that and how? ". Those were amongst many questions that came into discussion during a surgical case with my former medical officer, Dr Yvonne Wong in 2013.

Uncertainties eclipsed the use of cricoid pressure in clinical practice lending it in the limelight of intense debate and research in the last decade with both critics as well as advocates. The TRUTH is that the evidence for safety and effectiveness of cricoid pressure is inconclusive and any noteworthy randomized control trial is not forthcoming. The FACT is that cricoid pressure is still widely practiced globally and remains a crucial pillar in RAPID SEQUENCE INDUCTION, the gold standard in airway protection for patients at risk of regurgitation.

We are in an ethical dilemma, to apply or not to apply, each with its potential harm, there are no united stand. The right thing to do now is to make it safer.

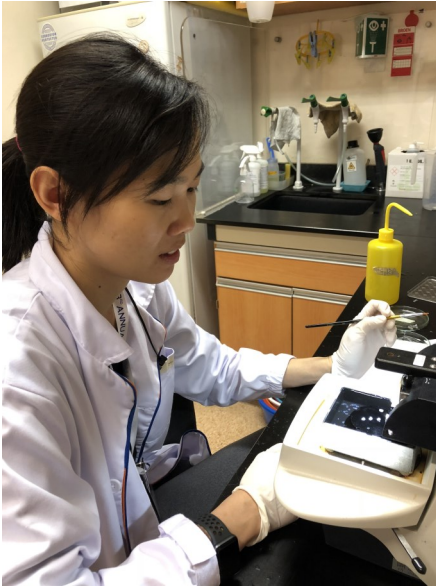


My discussion with Yvonne led to further brainstorming, literature search, a limited survey of clinical practice and conversation with nurses. We reviewed commercially available force sensors in the market and experimented on manikin using the sensors we procured with a team of nurses. The magnitude of force applied is often incorrect and inconsistent when applied blind. It became apparent that blind application of cricoid pressure is not optimal and is a long overlooked problem, one weak link in cricoid pressure science. Our vision was having a thin, flexible conformal disposable sensor to give real time feedback of performance to the cricoid operator and guide the force delivered. In 2015 with grant funding, a prototype force sensor was developed with Dr Olivia Wijeweera, Consultant, Department of Paediatric Anaesthesia and Associate Professor Sng Ban Leong, Head and Senior Consultant, Department of Women's Anaesthesia, KKH. We have since tested our prototype with 22 nurses on manikin; the preliminary results showed that the integrated sensor and real time feedback monitor enabled nurses to achieve consistent and target cricoid pressure.

Knowing the force applied is only the start – to lift the veil on the blind nature of the procedure. There are more to learn and understand about the science of cricoid pressure, this is a new beginning.

"We are in an ethical dilemma, to apply or not to apply, each with its potential harm, there are no united stand. The right thing to do now is to make it safer."

The Pain Pathway and an MCI Journey: A Conversation with Dr Diana Chan



We spoke to Dr Diana Chan, Consultant at SGH Department of Pain Medicine about her MCI journey and her work in Pain research.

ACP: How did your decision to embark on the MCI programme come about?

DC: There is still a huge knowledge gap in medical science and as a clinician I still have many questions that I cannot answer. While basic stats is taught in our anaesthesia exam syllabus I felt not well equipped to conduct good quality research and analysis. Under the encouragement of seniors who have had past experience, I decided to enroll myself into the MCI programme to train the scientific thinking skills and also to see if I really do like the research work.

I've had a bit of experience in research

prior to MCI – it started from junior college days when we had a stint in the Science Research Programme and I also spent 6 months in an A-star institute working on cancer cell apoptosis, so the experience helped me with understanding some of the basic science exposure I had during MCI.

ACP: What made you choose Pain subspecialty?

DC: In anaesthesia there is often limited patient contact – after the operation is done we probably see them one or 2 times in the ward then we don't follow them up, and most patients probably do not remember us. Pain is different – we talk to patients for 15min up to an hour in the clinic, there is patient rapport and we follow through their progress and that gives me a sense of patient ownership and continuity of care. Doing pain and anaesthesia together lets me strike a balance between being in OT and out of OT and patient care. I get a lot of satisfaction when I see some of my patients get better either through the medical treatment or after procedures (even though some do not get better) and I enjoy the patient rapport and contact. I also find it an intriguing subspecialty – there is really no set protocol to treating the pain syndromes; different patients respond to different types of medications and procedural treatment. This is what makes it challenging.

ACP: What are your areas of interest in Pain research?

DC: 1. Translational pain research - Currently honing my basic science skills in the lab looking at the neurophysiology of chronic pain. We experiment on rats and mice the influence of neuropathic pain on behavioral and psychological consequences. Yes we can measure depression in animals! We

look to discovering new pathways in the mechanisms leading to chronic pain development that can in turn lead to new drug discovery (which is the translational part of the research).

2. Clinical – we are interested to look at risk prediction of development of persistent postsurgical pain (PPP) – which is even more relevant since PPP is the 2018 Global pain topic of the year.

Since I am doing the diploma of acupuncture as well I've been interested to do studies on the effect of acupuncture in pain relief.

ACP: Can you tell us some interesting facts/or your findings of Pain management?

DC: Chronic pain affects > 76.2 million of Americans, more than cancer, diabetes and heart disease combined, and therefore a source of healthcare economic burden. The health care cost associated with chronic pain in US alone is >\$600billion in 2012 and is on the increase.

The presence of psychological factors such as depression and anxiety is a risk for chronic pain development in patients and is also a consequence of chronic pain, therefore leading to a vicious cycle. Pain also leads to cognitive dysfunction and affect higher abstract thinking and decision making.

Pathways involved in learning and memory, and in affect and cognitive behavior, such as the forebrain septohippocampal network, are involved in chronic pain behavior. The lab that I am working in focuses on the medial septum in the forebrain as a target area for pain management modalities.

Calcium channel receptors are involved in both central and peripheral hypersensitivity. Thus, understanding this mechanism provides an attractive approach for designing the next generation of pain medications that are more target-specific and have fewer side effects.

“Pathways involved in learning and memory, and in affect and cognitive behavior, such as the forebrain septohippocampal network, are involved in chronic pain behavior”



Dr Diana Chan, her MCI lecturers and class mates

Medical Student Fellowship Features

The Duke-NUS Medical Student Fellowship (Duke-NUS MSF) is an AM-ETHOS initiative which provides funding for clinical and translational research projects for Duke-NUS Medical Students who are doing their Year 3 project with an approved ACP Research Mentor. The Duke-NUS MSF hopes to spur the Duke-NUS Medical Students' academic interest and experience, and at the same time, strengthen the Medical Student-ACP Research Mentor and ACP engagement. This is important for Duke-NUS as an academic medical school and for the SingHealth Duke-NUS Academic Medical Centre to identify student talents early on for medical pipeline development. We feature 2 Duke-NUS students who are currently mentored by ANAES ACP.



Zach Tan Ze Yan, Duke-NUS Year 3, MSF Awardee 2017

Mentor: Prof Alex Sia

Project title: Assessing women's willingness to pay for epidural anaesthesia regimens: a discrete choice experiment

"Research in Anaesthesiology has provided many opportunities for involvement in a wide range of research topics. The exposure to work alongside different research and healthcare team members has enriched my research experience, and also enabled deeper understanding of Anaesthesiology as a career. "

Wang Yijun, Year 3, Duke-NUS, MSF Awardee 2017

Mentor: A/Prof Sng Ban Leong

Project title: The association of pain catastrophizing and Angle labour pain questionnaire with postnatal depression and persistent pain development.

" With the help of MSF award, I am privileged to have the opportunity to participate in overseas conferences that allow me to present my project to a wide audience and receive constructive feedback from them to improve my work. "



The role of a mentor is to create a research enriched environment for the student and to mentor the student to be able to generate a hypothesis driven research question, design and carry out a research project with the goal of publishing a paper.

To apply to be a mentor, please contact the ACP admin team at anaes_acp@singhealth.com.sg or ha.truong@sgh.com.sg for the application forms.

DukeEngage : A Project with KK Women's and Children's Hospital

Under the mentorship of A/Prof Sng Ban Leong, and Dr. Karthik Raghunathan MD MPH and Dr. Charles Belden Ph.D from Duke and the Durham VAMC, Duke University junior Breanna Polascik traveled from Durham, NC, USA to Singapore from May to July 2017 to collaborate with A/Prof Sng and his team to implement Perioperative Music Listening at KK Women's and Children's Hospital.

Their project was selected for funding by DukeEngage, which supports select undergraduates at Duke University in NC, USA to participate in an 8-week immersive volunteering service experience with travel, lodging and other expenses included. It is also funded in part by The Gates Foundation and The Duke Endowment.

Perioperative music has been shown to significantly reduce patients' pain, anxiety, and analgesic use, as well as increase patient satisfaction and outcomes. Together, A/Prof Sng, Breanna, Duke-NUS medical student Daryl Tan, and (remotely) Dr. Raghunathan and Dr. Belden designed and conducted an Organizational Readiness for the Implementation of Change (ORIC) Survey to assess readiness for the delivery of music by healthcare providers and the receipt of music by female patients undergoing minor gynecological surgeries in KKH.

Music therapists designed playlists from which patients could select the music that they wanted to hear and the patients were offered the option to listen to music before and after surgery. The project was a success! Breanna thoroughly enjoyed her time in Singapore and wants to thank everyone who helped her with the project and made KKH a welcoming place to be.



Breanna (on the right) with Daryl

ANAES ACP Simulation Educator Training Workshop

The two-day workshop is customised for ANAES ACP and is open to all aspiring educators, faculty, residents and nurses who are interested in designing and running high quality simulation-based programs. Participants will work in small groups with close instructor interaction and will have the opportunity to conduct a simulation exercise followed by debrief.

To register, please click [here](#).

Date: 21 & 22 April 2018
(Saturday & Sunday)

Time: 8.00am – 5.30pm

Venue: Academia, L2-T2

For more information, click [here](#).

Academic Day 2018 Abstract Call

You are invited to submit a scientific abstract to showcase the strength and quality of Anaesthesiology research during Academic Day 2018.

Abstract category:

- Clinical and Translational Research
- Medical Education Research
- Clinical Quality Improvement, Patient Safety and Innovations

Important dates:

1 January — 30 March: Abstract submission

24 May: Pre-judge presentations

30 Jun: Oral presentation competition

More information at: <https://shanaesacp.wixsite.com/acpday2018>



Faculty Development Schedule (Feb —Apr 2018)

Month	Date	Venue	Topic	Speaker
February	2 February (Fri) 7.15am	SGH Anaesthesia Conference Room	Building a QI Culture—Leading a Powerful Coalition to Transform Care	Pang Nguk Lan
	7 February (Wed) 7.15am	KKH OT Seminar Room, Women's Tower, Level 2		
	12 February (Mon) 7.30am	CGH Boardroom, Level 2 (Beside the U-Clinic)	Making Sense of the Use of Portfolios for Anaesthesia Training	Raymond Goy
	20 February (Tue) 7.30am	CGH OT Tutorial Room, Level 3	Building a QI Culture—Leading a Powerful Coalition to Transform Care	Pang Nguk Lan
March	7 March (Wed) 7.15am	KKH OT Seminar Room, Women's Tower, Level 2	Clinical Teaching: 1 Minute Preceptor & Other Models	Tan Li Hoon
	8 March (Thurs) 7.15am	SGH Anaesthesia Conference Room		
	12 March (Mon) 7.15am	CGH Boardroom, Level 2 (Beside the U-Clinic)		
April	3 April (Tues) 7.15am	SGH Anaesthesia Conference Room	QI using 3-Step Model	John Wong, Sam Koh
	4 April (Wed) 7.15am	KKH OT Seminar Room, Women's Tower, Level 2		
	9 April (Mon) 7.15am	CGH Boardroom, Level 2 (Beside the U-Clinic)		