BWT Ritchie Scholarship - Paediatric Anaesthesia Fellowship

Dr Chris Badenhorst was one of the 2019 BWT Ritchie Scholarship recipients and moved to Vancouver with his wife and three daughters to undertake a one-year paediatric anaesthesia fellowship. In his interim report, Chris writes about his experience including the differences he encountered between Canadian and New Zealand hospital systems.

I chose to undertake a fellowship outside of Australasia as I felt our training and my subsequent practice in New Zealand is very comparable to Australia. My hope was that working in a completely different health system would provide a different perspective to anaesthesia practice and healthcare delivery and potentially allow the acquisition of a different set of skills and practice to benefit our paediatric population in New Zealand.

British Columbia Children's Hospital (BCCH) is a highly regarded specialist paediatric hospital, which services the wider province of British Columbia and the Yukon. Hospital facilities are state-of-the-art following a recent $676 million upgrade. Anaesthesia is provided for all aspects of paediatric surgery including cardiovascular, transplant, general, ENT/airway, urology, orthopaedic and neurosurgery. BCCH is affiliated with the Women's Health Centre, the tertiary care obstetrical hospital for British Columbia, which is the largest maternal-fetal-newborn clinical service in Canada, hence the considerable volume of newborn surgery. A busy Paediatric Intensive Care Unit with over 20 beds and a 50 Neonatal Intensive Care Unit are also situated within the hospital.

Each year there are only two paediatric anaesthesia fellows at BBCH in contrast to the program at Sick Kids in Toronto where there are 10 fellows. As such, the clinical exposure and immersion is fantastic. A normal general anaesthesia week is Monday to Friday, 0700 to ~1700. Fellows do one 24-hour call shift per week, as well as a 1:6 weekend call. Every 6-8 weeks, for one week, you cover the pain service as well as out of theatre minor procedures e.g. radiotherapy, chemo, burns etc. During the general anaesthesia blocks you are rostered to each of the subspecialties. However, because there are only two fellows if there is an interesting case in another OR you are encouraged to swap lists. Outside of the general anaesthesia rotation you are allocated to cardiac anaesthesia for six weeks and a PICU rotation for four weeks.

When I began my fellowship there was close supervision from consultants, but over time this supervision has diminished and I'm now independently managing and running lists. The initial close supervision is multifactorial. Firstly, there's a requirement to ensure a degree of competence of the fellow, and secondly due to the "fee for service" funding structure consultants need to be onsite when any case is in the OR in order to bill for their time. Lastly, the medical training system is very different in Canada compared to New Zealand. After four years of medical school you directly enter your chosen specialty program. Anaesthesia is a four-year program, which has constant level 1-2 supervision. The first time many of the residents run a list independently, without a consultant in the OR, is after they've completed their training.

Stunning Vancouver

Also, residents may have only been exposed to one to three months of paediatric anaesthesia throughout their entire training because, unless you live in a remote location, adult anaesthetists do not anaesthetise children under the age of 16 unless in the case of an emergency.

My clinical exposure has been broad and varied ranging from routine cases (e.g. T&A's, hernia, simple orthopaedic procedure) to rarer cases either involving children with complex syndromes I had only come across in textbooks or complex surgeries e.g. tracheo-oesophageal fistula, congenital diaphragmatic hernia, congenital cardiac surgery, major scoliosis surgery, complex airway and neurosurgical procedures etc. My six weeks in the cardiac theatre was extremely valuable in finetuning procedural skills, such as caudally thread epidurals, invasive lines and vascular access. Despite feeling reasonably confident with US guided vascular access pre-fellowship, I have been shown useful tips and techniques which have come in handy when obtaining access in microperm babies weighing only 450g.

British Columbia Children's Hospital

Gaining further experience with neonatal anaesthesia was a priority for me on this fellowship as this experience can be difficult to obtain in a smaller country. Here in Vancouver, I've had a variety of neonatal cases ranging from the simple ROP laser to the more complex critical congenital tracheal stenosis, severe CDH, laparotomies for necrotising enterocolitis and PDA ligations. Due to the relatively high neonatal case load, the anaesthetic department is often exploring techniques which avoid airway instrumentation, minimise large haemodynamic changes and postoperative apnoeas in this fragile population. An example of this, which has recently been published by this department, is neonatal laparoscopic inguinal hernia repair. Here a caudal anaesthetic is administered, and the neonate is kept sedated with a low dose dexmedetomidine (+/- low dose propofol) infusion whilst maintaining spontaneous ventilation with supplemental 02 via nasal prongs. The surgeons work with low insufflation pressures and low flow which often means ventilation is minimally affected. The neonate appears to tolerate the pneumoperitoneum well with no significant desaturations, increased work of breathing or haemodynamic swings. The NICU has welcomed this technique as it negates the need for airway augmentation and subsequent ventilatory weaning in fragile neonates who may have only recently been extubated and weaned from a respiratory perspective. Patient selection is a key determinant in the success or failure of this technique. To date, the outcomes have been reassuring although with further case numbers the potential drawbacks of this technique may become more evident.

Outside of clinical theatre time I have a post call day devoted to research and non-clinical activities. Being an active research group with staff frequently publishing in major paediatric journals, there is an expectation that fellows should submit, or make significant progress towards, a research publication during their fellowship. I am involved in two research projects and a quality improvement project. One of the research projects is an extension of a survey colleagues and I conducted in Australasia, which explored current views and practices surrounding cricoid pressure amongst adult and paediatric anaesthetists. The second project is comparing a novel bronchial blocker, designed by staff at BCCH, to existing methods of bronchial blocker placement in the paediatric population. We hope to present an abstract of this study at a conference in San Francisco in May. My quality improvement project involves developing a distraction free induction and extubation environment. I am enthusiastic about this project because these are two critical times where the anaesthetist's full attention is required, however, for the rest of the theatre staff this is the time they are engaged in other activities such as setting up instruments, dictating operation notes and discussing patients, all of which can cause major distraction to the anaesthetist. If we can develop a working model this project could reduce distractors and improve patient safety and clinician satisfaction in many other hospitals in Canada and New Zealand.

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There have been clinical and non-clinical differences at BCCH compared to my previous experiences back home, which I thought would be interesting to reflect on.

The role of the Anaesthesia Assistant (AA) in Canada is different to Anaesthetic Technicians in NZ. Most have an undergraduate degree in "respiratory therapy" followed by a further three years of specific training to become an AA. In Canada, respiratory therapists manage all patients who require some degree of respiratory support i.e. Non-invasive ventilation on the wards and ventilators in PICU/NICU. AAs perform all the valuable tasks of an anaesthetic technician, but most are also competent at intubation, vascular access, and arterial lines. Despite being such an asset there are only three to four anaesthesia assistants on site on any given day.

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Chris and family experiencing the great outdoors of British Columbia.

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AAs are spread across the 14 ORs and four procedural rooms at the hospital. Beyond a full machine check in the mornings and being available for complex cases, they are not involved with routine operating lists. It is up to the anaesthetist, in between cases, to set up the anaesthetic machine, circuit, airway and vascular access equipment and all monitoring equipment for each case. For induction you are mostly alone; occasionally a nurse is available however they are often a circulating nurse with no specific anaesthesia skill or experience. I learnt this the hard way in my first week. After a routine gas induction, I asked the nurse if she would hold the face mask whilst I placed a cannula. She replied, "I've never held a mask before, but I can hold the patient's hand back towards you so that you can perform your cannulation." It was awkward but worked, surprisingly! Despite this I am in no hurry to incorporate this technique into my regular practice and am more appreciative of anaesthetic technicians back home. This arrangement has not been all bad. Having to be more self-sufficient has meant I am now much more vigilant and better prepared for each case. The lack of an ever-present AA forced me to evaluate the entire process from the moment the patient enters the room until they leave for the PACU. Through this process I have developed, and finetuned a safe system that works when I am by myself.

Another point of difference is in the predominant anaesthetic technique. The default technique at BCCH is an awake intravenous induction followed by TIVA for maintenance. This contrasts to previous hospitals I have worked at where the predominant routine technique was gas induction followed by placement of a cannulae. BCCH's statistics from last year showed that over 72% of cases had an awake IV cannula placed, followed by an IV induction and TIVA maintenance and a less than 6% premedication rate.

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As a trainee I recall that paediatric IV induction always seemed to be a high anxiety situation for all involved. However, the system at BCCH works extremely well. Considering that you are often working unassisted, this technique makes more practical sense over an inhalational technique. I believe the system is successful here because a) families arrive with the expectation that "Plan A" is an IV induction, b) topical local anaesthetic is applied as soon as the child enters the department, c) play therapists run through the IV routine prior to the child arriving in the OR and, d) there are great distraction tools in the OR.

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I have found parental expectations to be a significant factor which can influence the type of anaesthetic you deliver. There is a perceived fear by parents that having a cannula placed is far more traumatic than a face mask. I respect that there will be differences in opinion but personally I think it is far more traumatic having someone apply a mask and "forcefully" prevent you from removing it compared with having a small cannula placed. The above is especially true if you have a system that works as well as it does at BCCH where most children are hardly aware the cannulae has been placed as the local anaesthetic cream has ample time to work, the child has some idea what to expect and is distracted, and the parents are on board with the plan. After my experience, I prefer the practice of an awake IV insertion and induction, unless there is a clear indication for a gas induction.

Other clinical differences I briefly alluded to previously is that of procedural sedation with spontaneous breathing +/- nasal prongs.

Procedural sedation is by no means a new technique and most anaesthetists are comfortable with it. The differences I am referring to, here at BCCH, is procedural sedation for procedures which I would have previously performed under general anaesthesia in children in New Zealand. Some examples, unless contraindicated are: most upper GI endoscopies (starting at the neonatal age), ophthalmology procedures such as ROP laser and congenital cataract surgery in neonates, cardiac catheterisations, imaging procedures e.g. MRI, ultrasound/CT guided interventions.

An area where procedural sedation has impacted waitlist times for British Columbia has been in the MRI suite where less than 10% of children receive a general anaesthetic.

The system here involves a preop simulation MRI experience with a child play therapist. If tolerated, they proceed with a non-sedated MRI. If sedation is required children receive an intranasal dose of dexmedetomidine 30-45 minutes pre-procedure which is successful most of the time. If further sedation is required a low dose dexmedetomidine or propofol infusion is started and spontaneous ventilation maintained with nasal prong 02. It would be uncommon for an LMA or endotracheal tube (ETT) to be inserted. Prior to leaving Wellington this was not our routine practice and most children would have a general anaesthetic with either an LMA or ETT. Clearly, this is not as simple as just adopting a different anaesthetic technique and there will be logistical and infrastructure differences which will contribute to this process being successful in a different institution. However, this topic will be worth exploring on my return to Wellington as it has potential benefits for patients in avoiding a general anaesthetic and for our hospitals to reduce waitlist times and improve access to high demand technologies.

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With regards to non-clinical differences the healthcare model in Canada is paternalistic. This may be different in an adult hospital, however, in the children's hospital, it often appears that patients and families are less involved in decisions surrounding their care. Also, there is no separate consent for anaesthesia as occurs in New Zealand. Anaesthetic consent is implied based on the patient signing a surgical consent with the surgeon. I have found this has mostly negative effects with patients misinformed or ill-informed of potential risk and complications associated with the anaesthetic. It undermines the role of the anaesthetic team in a patient's care when the anaesthetic may pose more risk than the surgical procedure being performed. Obtaining the perspective of the patient and their family and involving them in decision making is something we do very well in New Zealand.

My six months in Vancouver has not been all work and no play. We have explored what Vancouver and British Columbia have to offer during weekends and public holidays. Sampling some of the world class mountain biking in the North Shore and Whistler has been a highlight. Vancouver is a multicultural city and we have felt very welcomed by people in our neighbourhood. Our children are enjoying school but also missing family and friends back home.

I am very appreciative of the opportunity to undertake a fellowship at BCCH. Many of my senior colleagues here are at the forefront of paediatric anaesthesia in North America and it's been invaluable being able to benefit from their expertise and skills. The department has a genuine interest in providing the best possible care to patients and this is evident in the enthusiasm they bring to work on a daily basis. This enthusiasm, along with the skills and knowledge I am acquiring, will be returning with me to Wellington Hospital, where I will be taking up a paediatric anaesthetist role at the completion of my fellowship. I am acutely aware that without the financial assistance of the BWT Ritchie Scholarship, this year would have been substantially more difficult and potentially not even possible. Vancouver is a beautiful city but also significantly more expensive than Wellington. Thank you to the Ritchie family and the ANZAEC for this opportunity. It is my hope and intention to return as a more competent clinician, researcher and member of the wider paediatric anaesthesia community.

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Trainee well-being

With the ongoing uncertainty, it is important to keep looking out for each other. For trainees and Anaesthetists, there is a well-being section on the ANZCA website: http://www.anzca.edu.au/resources/doctors-welfare.

The New Zealand Mental Health Foundation addresses mental health specific to COVID-19. Their website can be found here: https://www.mentalhealth.org.nz/get-help/getting-through-together/

Despite these tough times, COVID-19 has brought out some of the best qualities in our colleagues. Many trainees have covered shifts at short notice or taken on extra duties. As trainees we have seen why anaesthesia is such a great profession, as demonstrated by our SMOs. We have seen anaesthetists across our hospitals pull extra hours and sacrifice time away from their families to help do research, write up protocols from scratch, do extra presentations, simulations and intranet/website updates. This has helped ensure theatre complexes, and in fact entire hospitals, are safe and ready for the pandemic. As trainees, we have seen our anaesthetic consultants as confident leaders in hospital-wide responses, and as role models to emulate in the future.

Hoping everyone stays safe for the remainder of the pandemic. Kia Kaha.