SBNS Elective Report

Zheqing Zhang, University of Oxford
Neurosurgery Elective, National Neuroscience Institute, Singapore

I had the privilege of undertaking a two-week neurosurgery elective at the National Neuroscience Institute (NNI) in Singapore, based at Tan Tock Seng Hospital. During my elective, I participated in a variety of activities, including operating theatres, clinics, ward rounds, and neurocritical care in the intensive care unit (neuro ICU). As a student, attending the morning handover and weekly departmental meeting was educational as they provided a summary of cases for the day or week, often with neuroimaging scans and discussions on management. Additionally, I learned from presentations by the neurosurgery trainees on brain tumour markers and cranial nerve anatomy in relation to clinical symptoms and microvascular decompression, in greater depth than my medical school curriculum. Through these and my clinical experiences, I became more confident in neuroanatomy and neuroimaging.

Mostly, I spent a substantial amount of time attending theatre lists, exposing myself to a wide range of neurosurgical operations. Among the memorable cases was the opportunity to observe intraoperative magnetic resonance imaging (iMRI), for which there was a dedicated theatre with an MRI machine next door. The case I observed was an endonasal transsphenoidal excision of a pituitary tumour, with preoperative and intraoperative MRI and Brainlab neuronavigation. It was exciting to witness in real life how such technology could be utilised to enhance precision and maximise tumour resection.

Another technology that I observed is intraoperative neurophysiological monitoring (IONM), whereby motor evoked potentials (MEPs) and somatosensory evoked potentials (SSEPs) are monitored throughout the operation to prevent damage to nerves and critical structures. In one operation involving microvascular decompression of the trigeminal nerve, I was impressed to learn that the NNI was pioneering IONM of the trigeminal hypoglossal reflex as an adjunct to determine the adequacy of decompression and reduce the risk of postoperative complications. This reinforced to me the importance of trying new things and conducting research to continuously advance the field and improve patient outcomes.

Other operations I attended include tumour resections, endoscopic spine cases, anterior cervical discectomy and fusion (ACDF), artificial disc replacement, endoscopic thoracic sympathectomy, superficial temporary artery to middle cerebral artery bypass, craniotomy and aneurysm clipping, and cranioplasty. In particular, I was impressed by how minimally invasive some of the spine operations were, assisted by endoscopic techniques and neuronavigation. I also marvelled at the finesse and patience needed to perform microsurgery on tiny vessels in the brain, where even a few millimetres could mean the difference between life and death, recovery and paralysis. Neurosurgery requires not only a steady pair of hands, but also courage and composure. One consultant would banter with his residents to lighten the atmosphere before a challenging operation, but would become hyper-focused once he enters the most difficult part, to maximise accuracy and minimise error. Perhaps more than any other specialty, neurosurgery has taught me that the honour of carrying such heavy responsibility for a patient's life should not be taken lightly.

To balance theatre experiences with patient-facing activities, I attended various clinics, including neurovascular, spine, neuro-oncology, and general neurosurgery. It was especially beneficial to learn from consultations done in Mandarin. As a multicultural society, Singapore has residents of different ethnicities, including Chinese, Malay, Indian, and other races. Most Singaporeans are bilingual, being fluent in English and another language, whilst some of the older generation prefer their native language such as Mandarin or dialects. This has made me further appreciate the advantage of being bilingual and has inspired me to work on improving my medical terminology in Mandarin, alongside adopting patient-friendly explanations. The doctors I sat in with demonstrated this well, reminding me that neurosurgery is not just about having a skilled pair of hands, but also about navigating difficult conversations with patients and their loved ones.

To supplement my clinical attachment, I worked on a case report and literature review on the role of intraoperative ultrasound in dural arteriovenous fistula (DAVF). Despite the challenge of familiarising myself with a topic I had no previous exposure to, it was an enriching learning experience. Though I would have liked to contribute to more projects, two weeks was too short, and unfortunately it encompassed my entire summer break. Nonetheless, I managed to learn a lot within this time, and it has been truly eye-opening to immerse myself in a healthcare system outside of the UK. Besides applying my learning to future placements and electives, I hope to return to Singapore someday. I am extremely grateful to my supervisors and the neurosurgery department at the NNI, as well as to the SBNS for this elective bursary.