International Neurosurgery Rotation in New Zealand: Analysis of Operative Experience

Sir,

The duration of neurosurgical training in the United States is 7 years and includes 30 months of electives, which allows time for trainees to obtain research or additional clinical experience. The University of Virginia (Charlottesville, Virginia, USA) is one of only a handful of neurosurgical training programs in the United States which still integrates an international rotation. Every year, two residents from the University of Virginia are sent to Auckland City Hospital, and one resident is sent to Christchurch Hospital for a minimum of 12 months. During this yearlong rotation, the residents serve as the equivalent of senior neurosurgical registrars in the Surgical Education and Training program of the Royal Australasian College of Surgeons. The case volumes from the New Zealand rotation have previously been summarized.[1] However, detailed operative logs regarding the type of cases and lesions encountered during this rotation are absent. Therefore, the aim of this report is to critically analyze the operative experience of a 6th year University of Virginia neurosurgery resident who spent 12 months as a senior neurosurgical registrar at Auckland City Hospital.

A prospectively collected list of operating theater cases performed by a senior neurosurgical registrar at Auckland City Hospital from June 8, 2015, to June 3, 2016, was retrospectively evaluated. Lesions were classified by pathology, location, and presentation. Cases were categorized by the type of procedure performed.

A total of 334 cases were performed by the registrar, and they are summarized in Table 1. The cases included 35 pediatric (age <18 years) patients, ranging in age from 1 month to 16 years. More than 70% of procedures performed by neurosurgeons in the United States are spinal operations, primarily for the treatment of spondylosis. By comparison, <10% of cases in the present analysis were performed for a spinal disorder, which indicates the predominantly cranial bias of the procedures during this rotation. Significant advances in neuroendovascular technology and widespread adoption of endovascular approaches by the cerebrovascular community has substantially decreased the number of intracranial aneurysm patients undergoing surgical treatment in the United States.[2-5] The ramifications of this paradigm shift in aneurysm treatment include a more limited exposure of trainees to the microsurgical techniques necessary to perform safe and effective clipping of an aneurysm.

In this analysis, a total of 27 intracranial aneurysms were surgically clipped in 24 patients. Of the 24 aneurysm patients, 18 were treated in the setting of acute subarachnoid hemorrhage (75%). Of the 27 aneurysms, 12 were located on the middle cerebral artery (44%), nine were located at the anterior communicating artery (33%), three were located at the internal carotid artery terminus (11%), and one each were located at the anterior choroidal, distal anterior cerebral, and superior cerebellar arteries (4%). Of the five surgically resected brain arteriovenous malformations, four were ruptured (80%), and one was located in the posterior fossa (20%). The two remaining intracranial vascular lesions included a petrosal dural arteriovenous fistula and a premotor cavernous malformation. An additional 26

Table 1: Summary of 334 procedures performed during a 12 months international neurosurgery rotation at Auckland City Hospital from June 2015-June 2016

Procedure Classification	Number
Craniotomy for intracranial vascular lesion	31
Aneurysm†	24
Arteriovenous malformation	5
Cavernous malformation	1
Dural arteriovenous fistula	1
Craniotomy for tumor	78
Intra-axial	51
Extra-axial	27
Craniotomy for trauma or stroke	30
Decompressive craniectomy only	4
Epidural hematoma evacuation	5
Subdural hematoma evacuation	13
Intracerebral hematoma evacuation	8
Pain procedures	12
Microvascular decompression for trigeminal neuralgia	6
Microvascular decompression for hemifacial spasm	2
Posterior fossa decompression for Chiari I malformation	2
Balloon rhizotomy for trigeminal neuralgia	2
Functional procedures	5
Deep brain stimulator electrode implantation	1
Implantable pulse generator implantation or replacement	4
Craniotomy for epilepsy	3
Biopsy procedures	11
Craniotomy	6
Burr hole	5
Spine (vascular)	3
Spine (tumor)	9
Extradural	1
Intradural extramedullary	6
Intramedullary	2
Spine (degenerative)	10
Fusion (with instrumentation)	3
Decompression (without instrumentation)	7
CSF diversion	45
Primary shunt implantation	26
Shunt revision	14
Shunt explantation or externalization	4
Endoscopic third ventriculostomy	1
Miscellaneous procedures	61
Burr drainage of chronic subdural hematoma	25
Washout of postoperative hematoma or wound infection	17
Cranioplasty	4
Peripheral nerve	3
Osteoma	3
CSF leak repair	3
Other	6
Endovascular procedures	7
Aneurysm coil embolization	3
Aneurysm flow diversion	2
Diagnostic cerebral angiography	2
Minor procedures	29
External ventricular drain	24
Intracranial pressure monitor	5

†Denotes number of patients treated; a total of 27 aneurysms were treated. CSF: Cerebrospinal fluid

nonvascular skull base cases were performed, including 17 tumor resections, eight microvascular decompressions, and one repair of tegmen tympani defect.

In summary, the international neurosurgery rotation in New Zealand exposes residents at the University of Virginia to a wide range of intracranial pathology and affords invaluable operative experience in complex cranial surgery, particularly with regard to vascular and skull base procedures. The rotation sites in New Zealand are not accredited by the Accreditation Council for Graduate Medical Education, and therefore, these cases are not accounted for in the resident's official procedural log. However, the operative experience obtained during the New Zealand rotation considerably improves the resident's overall competency in both cranial neurosurgery and microsurgery.

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Conflicts of interest

There are no conflicts of interest.

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