DOI: 10.1308/147363507X248415

It is always nice to hear from trainees in the smaller surgical specialties. This month's author gives us an insight into a specialised branch of neurosurgery about which many readers will know very little. He also demonstrates some of the great advantages of undertaking a fellowship abroad; something that since the Postgraduate Medical Education Training Board took control of medical training, is becoming increasingly difficult to organise before the certificate of completion of training.

Matt Freudmann, series editor

We welcome orginal articles for the Trainees' Forum on any subject of interest to surgical trainees (maximum 1,500 words). We will also consider letters commenting on articles published in the Trainees' Forum. Please email articles to bulletin@rcseng.ac.uk.

Ann R Coll Surg Engl (Suppl) 2007: **89:**354–356

Move it!

Fellowship in stereotactic and functional neurosurgery, Vancouver

Hu Liang Low

Functional neurosurgery refers to the branch of brain surgery that involves the modulation of nervous tissue activity. This form of surgery is mainly used in the treatment of movement disorders, epilepsy and pain. Traditionally, this was achieved by injuring key structures in the central or peripheral nervous system. More recently, electrical stimulation has been used to alter the activities of different neuronal groups and deep brain stimulation is now an established treatment option for Parkinson's disease.

Recent advances in the understanding of the neurophysiological basis of many neurological disorders, together with improvements in neuroimaging, drug delivery methods, genetics and the miniaturisation of electronic devices, has raised the possibility of better ways of neuromodulating nervous tissue activity. Continuing progress in the field of stem cell research raises the possibility that clinicians may one day replace or even enhance damaged tissue in the central nervous system. The list of neurological conditions that may benefit from functional neurosurgery continues to grow.

I had been interested in the control of movement since medical school. However, it was not until I did research in nerve regeneration that I decided that I wanted to do functional neurosurgery and this eventually led me to pursue a one-year functional neurosurgical fellowship in Vancouver, Canada.

The fellowship

The fellowship in stereotactic and functional neurosurgery is based at the surgical centre for movement disorders, Vancouver General Hospital (VGH) and is headed by Dr Christopher Honey. The bulk of patients treated at this centre have Parkinson's disease. The VGH is the second largest hospital in Canada and an integral part of the University of British Columbia (UBC). The functional neurosurgery programme is the only one in the province of British Columbia and is probably the busiest in western Canada.

This international fellowship is open to all neurosurgeons in their final year of training although the majority of previously successful candidates were fully accredited neurosurgeons. In my case, I did the fellowship as the final year of my recognised neurosurgical training.

The fellowship is divided into two parts: in the first half, I was the junior fellow and was made responsible for the running of the deep brain stimulation (DBS) clinics. In addition, I was the first assistant during any surgical procedure. Prior to starting, I spent six weeks at the movement disorder clinic at the UBC hospital attached to Dr Jon Stoesl, an eminent neurologist specialising in movement disorders, especially Parkinson's disease. Among the things I learnt while being there was how to differentiate the many forms of movement disorders from idiopathic Parkinson's disease, how to adjust patients' medications, the various non-surgical treatments for movement disorders and the limitations of surgery. These were particularly useful in the latter half of my fellowship when I participated in patient selection.

Vancouver General Hospital

Running the DBS clinic was probably the most challenging part of the fellowship. There are three clinics per week where new, returning and potential patients are seen. The clinics run concurrently with the 'main' functional neurosurgery clinic and there is easy access to the supervisor. The basics of DBS programming are relatively simple as there are only four parameters that can be altered once the electrodes are implanted. However, there are more than a hundred different permutations and achieving the right settings requires logic, good communication skills, patience and some luck.

Many patients, especially those with Parkinson's Disease or dystonia, harbour the hope that their condition will instantly improve when the device is turned on. We had to gently let them know that the effects of DBS take time, sometimes up to six months. During the period of adjustment (usually 12 weeks), they may experience bradykinesia or dyskinesia several times a day.

As a fellow, you are on call for all functional neurosurgical patients in British Columbia at all times. The patients and physicians from local hospitals have direct access to your pager and I had calls in the middle of the night from patients asking for advice. The province is large – some patients fly to Vancouver for their outpatient review. I quickly learnt to make telephone assessments and to give advice to both patient and physician. Many patients were extremely well informed about their condition and some engaged me in a debate about the merits of my choice of treatment – even after midnight! It is at times like these that you need a sense of humour.

Was the hassle worth it? What price do you place on the sight of a young lady who, but four months ago, was bent double because of her generalised dystonia but could now walk upright and thank you for your 'good work'? Or the middle aged Hell's Angel who stopped riding his bike four years ago because of severe bradykinesia but could now do star-jumps in your office and gleefully tell you that he recently got a ticket for speeding? Of course not all patients experienced such dramatic improvements but the majority reported some improvement in symptoms after surgery. All knew that their symptoms would return as the disease progressed but, for a while, surgery had opened a door through which they could step back to a time when they were more mobile, less tremulous or had less pain.

The clinic was also a laboratory of sorts. Different settings elicit different responses. For instance, we found that stimulating the internal capsule just superior to the subthalamic nucleus caused a patient to cry inappropriately and different stimulation frequencies could elicit either anxiety or crying. This formed the basis of our paper on possible supranuclear pathways for the control of emotional expression. The opportunity to run and organise my own clinic also provided managerial experience that should prove useful to me in more senior roles.

During the latter half of the fellowship, I was made senior fellow and received precedence during operations. I was involved in 175 functional neurosurgical cases of which I was the principal surgeon in 116 of them. The bulk of our operations were for movement disorders. We performed lesioning procedures and deep brain stimulation on the thalamus, globus pallidus interna and subthalamic nucleus.

In addition, I inserted intrathecal drug pumps, performed microvascular decompressions for trigeminal neuralgia, hemifacial spasm and glossopharyngeal neuralgia, inserted motor cortex stimulators for central deafferentation pain and performed bilateral anterior capsulotomies. During my time at Vancouver, we were involved in a multicentre trial investigating the

Dr Honey in theatre

treatment of refractory depression by stimulating a region of the brain known as Brodmann area 25. The results of this trial will be made known in the near future but, if successful, might revolutionise the management of this condition.

I performed 'general' neurosurgical cases as well when on call, such as the removal of brain tumours and intracranial haematomas but due to the degree of subspecialisation within the unit, most of these cases were referred to another team. The beauty of this fellowship was that I spent most of the time doing the discipline of my choosing and had ample opportunity to reflect on my findings and pursue a topic in greater detail. This was indeed a luxury after working in the more 'general' neurosurgical environment in the UK.

Fellows were strongly encouraged to develop research topics and present or publish our work. We had easy access to a well-stocked library, renowned neuroscientists and clinicians and research facilities as well as an excellent referencing and retrieval service, which made writing papers a relatively painless experience. I published several papers while at Vancouver and had the opportunity to present at the Canadian Congress of Neurological Sciences.

Conclusion

This is a comprehensive and well-organised fellowship in movement disorder surgery. It significantly increased my knowledge and experience in this field and, I believe, was instrumental in my eventual appointment as a consultant neurosurgeon. I would strongly recommend it to any aspiring functional neurosurgeon.

Acknowledgements

I thank The Royal College of Surgeons of England, the Worshipful Company of Barbers and the department of neurosurgery, University Hospital of Wales, for their generous support.

You can read an article published in *The Vancouver Sun* on the Vancouver programme at the following url: http://www.canada.com/vancouversun/story.html?id=95063f09-57c5-4d26-8570-1fd859b91503.