Surgical decompression not only improves function in patients suffering from cervical spondylotic myelopathy (CSM) through relieving pressure on the spinal cord but could also help patients recover by allowing for the growth of new nerve fibres (axons), according to Neurosurgery Trainee Dr Rana Dhillon.

Dr Dhillon spent 2014 conducting research into the pathophysiology of CSM at the prestigious Anne McLaren Neurosurgery Training Unit at the University of Cambridge, England, working under the supervision of Dr Mark Kotter from the Department of Clinical Neurosciences.

CSM is a neurological condition that arises when the spinal cord becomes compressed due mainly to the effects of aging and is believed to be the most common spinal disorder in patients over 55 years of age.

Typically, CSM develops over years causing gait changes, numbness and weakness in the upper limbs and impairment of bowel and bladder function.

However, Dr Dhillon said that although CSM was a relatively common disease, it had not been widely studied.

“W e found that compression impairs function and causes axonal injury and that decompression improves function and promotes serotonergic sprouting,” he said.

“Surgical decompression increases spinal cord blood flow and results in changes in the metabolic milieu, changes which may result in immediate improvements of cellular and axonal function. “However, we know from experience that decompressed CSM patients can take months after the operation to demonstrate functional recovery,” Dr Dhillon said.

The most common treatment for CSM was surgical decompression with or without fusion through an anterior or posterior approach.

However, he said a sub-set of patients with poor functional status pre-operatively often did not show significant improvement following surgery and that surgeons needed a better understanding of the mechanisms underpinning functional recovery.

“This disease occurs when degenerative cascade affecting the vertebral column leads to narrowing and hypermobility, which ultimately damages the spinal cord as it runs through the vertebral column,” he said.

“Many people present late because they mistake the disease as part of the ageing process.

“Yet, we know that those patients who experience better outcomes from cervical spine surgery are those who have had a shorter duration of symptoms, are younger and have single, rather than multiple, areas of spinal cord involvement.

“This means that timely intervention is required to maximise benefits which suggests that we may need to raise awareness that the neurological deficits caused by CSM are not simply functions of aging but a disease that can be treated well if treated in time,” Dr Dhillon said.

Dr Dhillon said it was exciting to find that a degree of plasticity does occur post operatively.

He said this could enable scientists to begin to investigate novel therapies to promote axonal sprouting.

“The current practice is to pre-operatively treat patients with those who do not do well after surgery and treat them with therapies which enhance plas ticity such as Rho Kinase Inhibitors which we believe could enhance the mechanism of repair that already happens after surgery,” he said.

“This research will take time but it is important because CSM is a common and debilitating disease that affects a large number of people and while the economic burden of the disease has not been calculated, it is likely to be large.

“With continued aging of the populations in the industrial world, the incidence and prevalence of CSM is expected to increase so that concentrated efforts are therefore required to develop therapeutic options for promoting functional recovery following decompression surgery.”

Dr Dhillon’s research, for which he was awarded a Master of Philosophy in Clinical Neurosciences, was supported by RACS via a Foundation for Surgery Reg Worcester Research Fellowship.

Now in his final year of training and working at the Monash Medical Centre in Melbourne, he said he hoped to receive his FRACS within the next few months and he thanked the College for the support that allowed him to take up the research Fellowship at the University of Cambridge.

“It was a fantastic experience and very humbling to work alongside such talented and hardworking scientists and researchers,” he said.

“It was wonderful to have the opportunity to gain exposure to the work done in major laboratories and to see how rigorous the scientists and researchers are in producing their data and the integrity they bring to their work.”

The Scholarship provided to Dr Dhillon was funded from a gift by the late Alan Worcester, FRACS, to memorialise his brother Reg, a great educator, doctor and humanitarian. It is open to both Fellows and Trainees enrolled in, or intending to enrol in, a higher degree which incorporates research of relevance to the surgical care of patients.

- With Karen Murphy

CAREER HIGHLIGHTS

- Master of Philosophy, Clinical Neurosciences, University of Cambridge
- 2013: RACS Foundation for Surgery Reg Worcester Research Fellowship
- 2013: Neurosurgical Society of Australasia Research Scholarship
- 2010: RACS Research Prize for Trainees