Commentary

Commentary on: Upper Limb Spasticity Surgery in Adults: What We Learnt in 5 Years of Practice

Spasticity results from disease or injury involving the central nervous system and manifests with weakness, muscle hypertonia and increased responsiveness to muscle stretch. For those living with spasticity, a limb may be rendered non-functional due to the absence of volitional control, profound weakness or high tone. In others, potentially useful function may be impacted by dystonic spontaneous muscle activation. Cerebral palsy results from injury to the developing brain, and although the neurological insult does not progress, the abnormal tone acting on the growing skeleton may cause torsional and flexion deformities of the bone with functional deterioration apparent during growth spurts. In the adult, stroke remains the most common cause of acquired spasticity, and the neurological injury is usually static; however, high tone may result in progressive shortening or musculotendinous structures and secondary joint contractures may follow. Early treatment strategies involve therapy management to encourage functional use of the affected limb with stretching and splints to prevent progression of high tone to muscle-tendon shortening and joint contractures. Early chemo-denervation with botulinum toxin injection of spastic muscles may facilitate therapy and unmask volitional function in antagonists. Surgery may be considered when physiotherapy has failed to maintain a functional limb position, and interval botulinum toxin administration results in fluctuations of function that impedes further rehabilitation. The aim of surgery is to restore agonist–antagonist balance. Fractional lengthening of spastic shortened muscles or selective neurectomy in muscles with high tone but minimal shortening can improve limb posture and allow antagonist recruitment.[1] Total neurectomy may be considered in non-functional muscles with limited

muscle-tendon shortening without joint contractures. Tenotomy may be contemplated for non-functional muscles with high tone and shortening of the musculotendinous unit. Joint release can be considered when a contracture limits limb movement and splint treatment is inadequate. Tendon transfers may be used for joint re-balancing; however, the results are unpredictable due to the loss of normal motor control. A severe deformity may be corrected with an arthrodesis. The decision-making process is challenging and patients should be reviewed by a multi-professional team. Response to chemo-denervation and clinical assessment after neuromuscular blockade with local anaesthetic injections are valuable in guiding management. The integration of an anaesthetist expert in regional nerve blockade is critical to the success of any service.

The authors of the paper from Cyprus report their early experience of surgery for spasticity after establishing a new service. The case series is limited, but the importance of thorough repeated assessment and multilevel multimodality surgical intervention is demonstrated. They limit their intervention at the shoulder to tenotomy, but consideration should be given to neurectomy in appropriate cases. Total motor neurectomy of the deep branch of the ulnar nerve is a useful technique for improving digital flexion and extension when there is spasticity of the hand intrinsic muscles, but a positive response to a local anaesthetic block of the deep ulnar nerve must be obtained before contemplating this intervention. A uniform approach to outcome reporting is essential for monitoring response to different interventions and for comparing results between treatment centres.

Neurectomy of the C7 root on the affected side has been reported in a recent case series,[2] with transfer of the contralateral C7 root providing a potential route for axons to repopulate the distal C7 nerve stump and re-innervate muscles with some volitional control. The evidence base is limited, and the widespread partial denervation affected through C7 sectioning may be of greater importance than the re-innervation given the early reported improved function.[3]

The future treatment options for patients with spasticity are promising; however, the potential for improvement through the surgical management of spasticity is currently limited by inadequate provision of services and frequently late referral for salvage when physiotherapy has failed or when complications occur. Early involvement of specialist teams for surgical rehabilitation of the spastic upper limb will require development of services, a change to current referral practice and closer working between rehabilitation and surgical teams.

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Quick Response Code:

Website: www.journalmsr.com

DOI: 10.4103/jmsr.jmsr_5_19

How to cite this article: Power DM. Commentary on: Upper limb spasticity surgery in adults: What we learnt in 5 years of practice. J Musculoskelet Surg Res 2019;3:84-5.