Clinician's Commentary on Cheung et al.¹

Spasticity is a common symptom of both multiple sclerosis (MS) and stroke; because of its prevalence as a neurological condition in Canada, it has been the focus of many studies.^{2,3} While these studies have investigated medical and rehabilitation interventions for managing spasticity, they have not examined how people deal with spasticity in their daily lives. Prior studies have examined the triggering factors for spasticity in people with spinal-cord injury (SCI),⁴ and Cheung and colleagues chose to use the same approach with stroke and MS patients.¹

Cheung and colleagues examined the distribution of perceived spasticity, its severity, and its impact on activities of daily living (ADL). They also identified intrinsic and extrinsic triggers and investigated the association between time since diagnosis and the perceived impact of spasticity on ADL. Their study brings to light participants' own view of their spasticity, especially factors that hinder their function, which is crucial in opening the door for further speculation.

The definition of spasticity has evolved since Lance originally defined it in 1980.⁵ Cheung and colleagues define it as "a velocity-dependent increase in muscle resistance." Ward⁶ has suggested that a universal definition is elusive because spasticity shows considerable clinical variation among patients and is not a "single entity." Other scientists, however, have moved beyond a focus on the central nervous system to look at other contributing factors such as biomechanics, including intrinsic muscle changes.^{7,8}

Clinically, spasticity can be measured using clinical scales such as the Modified Ashworth Scale (MAS). Adding neurophysiological measures could provide a precise reading of the presence of spasticity. Malhotra and colleagues,⁹ for example, evaluated wrist spasticity using MAS and electrophysiological measures; they found that while MAS score indicated spasticity in only 44% of cases, the electrophysiological measures identified 87%.

Cheung and colleagues¹ used an 11-point numeric rating scale that has been correlated with the clinical assessment of spasticity in people with MS. To illustrate the effects of spasticity on ADL, they adopted six items from the daily activities subscale of the Patient-Reported Impact of Spasticity (PRISM), which is a reliable and valid tool for measuring the quality of life in people with SCI but has not been validated for stroke or MS.

Their study identifies common factors such as cold, muscle fatigue, and stress/anxiety that influence the perception of spasticity in both stroke and MS groups, as well as some factors specific to each group. The MS group identified a much longer list of factors affecting their perceived spasticity, including lying supine, tight clothing, and outside heat. Factors that affect SCI patients—such as spasticity due to sitting, having a full bladder, or needing to have a bowel movement—did not affect either group.

Addressing pain is essential in dealing with upper motor neuron lesions, because pain affects both quality of life and functional level. Neither the stroke group nor the MS group identified pain as a trigger for spasticity, although it has been reported as a factor in the literature. It may be that some of these patients were taking medication that masked their real pain level; future studies could address this issue by adding a

question about pain management medication to avoid skewed results.

Cheung and colleagues' study sheds light on the need for further research in several areas. The impact of environmental temperature on perceived spasticity was identified but requires further investigation. In daily life, people encounter more than one factor concurrently, and the cumulative impact on perceived spasticity needs to be examined. As we know, people with stroke and MS require different types of braces and splints for the wrist/hand and/or foot/ankle. Previous research indicates that these therapeutic interventions help patients to manage tightness through prolonged passive stretches.¹⁰ Patients' perceptions of the effect on spasticity needs to be examined. The use of power and manual wheelchairs, walkers, or canes for indoor and outdoor mobility is common in these populations, and the impact of these devices on perceived spasticity is another area that would be useful to investigate.

Cheung and colleagues' study will help professional health care teams to be diligent in acknowledging the personal and environmental factors that may contribute to spasticity and in educating patients and their family members on the role of these factors. This information can help people with stroke or MS to manage the exacerbation of their spasticity, reducing the number of episodes and improving their quality of life.

Parvin Eftekhari, OT, PhD Candidate
University of Toronto; Stroke—Spasticity Clinic,
UHN—Toronto Rehab

REFERENCES

1. Cheung J, Rancourt A, De Poce S, et al. Patient-identified factors that influence spasticity in people with stroke and multiple sclerosis receiving botulinum toxin injection treatment. *Physiother Can*. 2015;67(2):157–166. <http://dx.doi.org/10.3138/PTC.2014-07>
2. Heart and Stroke Foundation of Canada. Statistics [Internet]. Ottawa: The Foundation; 2012 [cited 2012 Sep 27]. Available from: <http://www.heartandstroke.com/site/c.iklQLcMWJtE/b.3483991/k.34A8/Statistics.htm>.
3. Multiple sclerosis society of Canada. About MS [Internet]. Toronto: The Society; c2012 [cited 2012 Sep 27]. Available from: <https://beta.mssociety.ca/about-ms>.
4. Fleuren JF, Voerman GE, Snoek GJ, et al. Perception of lower limb spasticity in patients with spinal cord injury. *Spinal Cord*. 2009;47(5):396–400. <http://dx.doi.org/10.1038/sc.2008.153>. Medline:19065149
5. Feldman RG, Young RR, Koella WP, et al. Symposium synopsis. In: Feldman RG, Koella WP, Young RR, et al, editors. *Spasticity: disordered motor control*. Chicago: Symposia Specialists; 1980. p. 485–94.
6. Ward AB. A literature review of the pathophysiology and onset of post-stroke spasticity. *Eur J Neurol*. 2012;19(1):21–7. <http://dx.doi.org/10.1111/j.1468-1331.2011.03448.x>. Medline:21707868
7. O'Dwyer NJ, Ada L, Neilson PD. Spasticity and muscle contracture following stroke. *Brain*. 1996;119(5):1737–49. <http://dx.doi.org/10.1093/brain/119.5.1737>. Medline:8931594

8. Gracies JM. Pathophysiology of spastic paresis. II: Emergence of muscle overactivity. *Muscle Nerve*. 2005;31(5):552–71. <http://dx.doi.org/10.1002/mus.20285>. Medline:15714511
9. Malhotra S, Cousins E, Ward A, et al. An investigation into the agreement between clinical, biomechanical and neurophysiological measures of spasticity. *Clin Rehabil*. 2008;22(12):1105–15. <http://dx.doi.org/10.1177/0269215508095089>. Medline:19052249
10. Pizzi A, Carlucci G, Falsini C, et al. Application of a volar static splint in poststroke spasticity of the upper limb. *Arch Phys Med Rehabil*. 2005;86(9):1855–9. <http://dx.doi.org/10.1016/j.apmr.2005.03.032>. Medline:16181954

DOI:10.3138/ptc.2014-07-CC