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Motor end plate targeted Botulinum toxin type A injections of the gracilis muscle in children with cerebral palsy

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Abstract

Intramuscular Botulinum toxin type A (BTX) injections reduce spasticity in children with cerebral palsy (CP) by blocking neurotransmission at the motor end plates (MEP). Goal of this study is to find the most optimal injection technique of the gracilis muscle by comparing two injection methods: the current proximal injection versus a MEP targeted injection method.

In a prospective, randomized study 34gracilis muscles in 27 children with CP (8.5±2.5y) were injectedwith Botox® (fixed dosage and dilution): 17 muscles by proximal (at 25% of the length of the upper leg) and 17 muscles by MEP targeted injections (half the dosage at 30 and half at 60% of the upper leg). Clinical (modified Ashworth scale MAS) and instrumented spasticity assessments using surface electromyography (EMG) during passive motion at different velocities were performed before and after the injections. The difference of the averaged root mean square (RMS) EMG at low versus high velocity was calculated and normalized to the pre-injection EMG at maximal voluntary isometric contraction.

MEP targeted injections showed a significantly better decline in pathological EMG signal compared to the conventional proximal injections, demonstrated by a higher reduction of the median normalized RMS-EMG parameter: MEP targeted injections6.38% (IQR 3.77) versus proximally injected gracilis muscles 1.26% (IQR 8.13%), p=0.04. This difference could not be demonstrated using the MAS.

BTX injection in the gracilis muscle at the sites with a high concentration of MEPs resulted in improved spasticity reduction. Using instrumented spasticity assessment, different injection protocols can objectively and sensitively be compared.

Biography

Anja Van Campenhout, MD is a paediatricorthopaedic surgeon. In the University Hospitals Leuven (Belgium) she is involved in the care of children with neuromuscular disorders. This study is part of her PhD doctoral thesis. She already published 16 articles in peer-reviewed international articles and presented papers and courses at the European and North American pediatric orthopaedic societies, European society of Motion analysis, EFORT and international gait courses.