ASSESSMENT OF UPPER LIMB ACTIVE MOVEMENT FACILITATION AND NEUROMUSCULAR PLASTICITY INDUCED BY ABOBOTULINUMTOXINA IN CHRONIC POST-STROKE: A STUDY PROTOCOL

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Introduction: Muscle overactivity, including spasticity and spastic cocontraction (SCC), is an involuntary motor unit recruitment that contributes to spastic paresis and motor impairment.[1] Recent evidence suggests that SCC contributes to limited active elbow extension and motor impairment. SCC is therefore of interest as a factor restricting movement.[2] AbobotulinumtoxinA ([Dysport®] aboBoNT-A) is indicated for the symptomatic treatment of focal spasticity in upper limbs in adults. However, only a few studies have examined the effects of aboBoNT-A on SCC and its link with active function in the upper limb.[3,4] This communication aims to present a multimodal protocol designed to: i) evaluate the effects of aboBoNT-A injections in elbow flexors on movement facilitation and SCC during active elbow extensions in poststroke patients, and ii) investigate the central mechanisms involved in aboBoNT-A–induced plasticity over time.

Methods: This protocol includes 40 chronic, poststroke patients able to actively extend the paretic elbow with an indication requiring injection of aboBoNT-A in elbow flexors, and compares patients with age-matched healthy controls. Patients attend 6 standard-care visits (T0:T5) and 5 inter–aboBoNT-A injection visits (I1:I5) (Figure). At each visit, patients perform a multimodal motor assessment including clinical and instrumental evaluation during repetitive active elbow extensions. Movement limitation is assessed through 3D kinematics of the upper limb, elbow SCC through electromyography, and cortical activity through electroencephalography.

This protocol offers the unique opportunity to investigate the link between SCC and limited active movement throughout the theoretical maximal period of aboBoNT-A efficacy and over repeated injection cycles. This study may offer clinical and fundamental implications for improving diagnosis and identifying aboBoNT-A–induced central plasticity associated with improved active motor function.

Keywords: Stroke; Muscle overactivity; Spasticity; Spastic cocontraction; Upper extremity; Botulinum toxin

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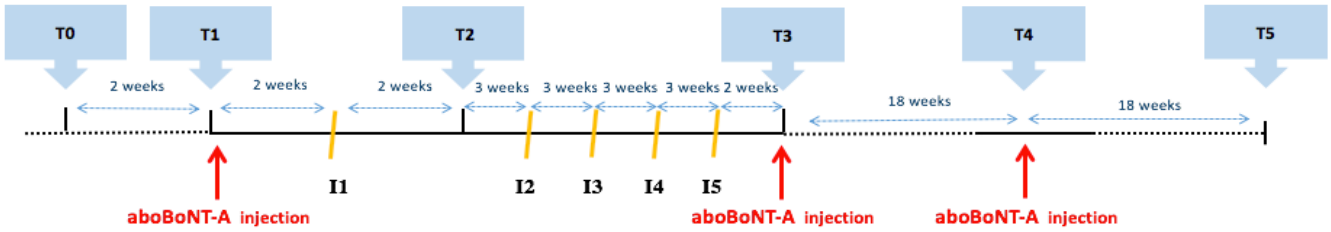

Fig. Study design showing standard-care visits at T0, T1, T2, T3, T4, and T5 (blue boxes), aboBoNT-A injections at T1, T3 and T4 (red arrows), and inter–aboBoNT-A injection visits at I1, I2, I3, I4, and I5.