Central effects of botulinum toxin: Neurophysiological study in post-stroke patients with lower limb spasticity

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Keywords: Stroke; Botulinum toxin; Spasticity; H-reflex

Background.—The therapeutic effects of intramuscular injections of botulinum toxin type A (BTx) on spasticity can be largely explained by its blocking action at the neuromuscular junction. BTx is assumed to also have a central action by affecting the functional organization of the CNS. The aim of the present study is to assess the action of BTx on spinal motor networks by investigating the post-activation depression (post-AD) of the soleus H-reflex in post-stroke patients presenting lower limb spasticity.

Methods.—Soleus H-reflex was investigated in chronic hemiplegic patients before and 3, 6, 12 weeks after BTx-injections in soleus. H-reflex amplitude was analyzed in response to electrical stimulation of the tibial nerve at 0.1 Hz and 0.5 Hz. Post-AD was quantified as the ratio H0.5 Hz/H0.1 Hz.

Results.—The post-AD was significantly reduced in the affected side compared to the non-affected side before BTx injection. Three weeks after injection, the post-AD was reinforced in the parietic leg and significantly higher than in the pre-injection condition. Conclusions.—BTx-treatment restores the post-AD of soleus H-reflex in post-stroke parietic patients. As post-AD amount is correlated to the severity of spasticity, it can be assumed that BTx’s effectiveness in post-stroke rehabilitation is also due to induced-changes in spinal motor networks.

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Passive mechanical obstacles vs impairment of neurological command in infant vs adult-acquired spastic paresis

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Background.—Compare muscle length, spasticity angle and active range of motion in adult parietic syndromes due to lesions acquired in infancy vs adult-acquired lesions.

Methods.—Cross sectional study from a retrospective chart review.

Population.—Convenience sample of 2 groups of clinic patients with spastic paresis due to an infant lesion (IL, n = 11) or to an adult-acquired lesion (AL, n = 11).

Evaluation.—Muscle length (XV1), angle of catch (XV1), spasticity angle (X = XV1 – XV1), active range of motion (A) and angle of weakness (XV1 – A) in soleus, gastrocnemius, gluteus maximus, hamstrings, vastus and rectus femoris muscles at the initial evaluation (pre-toxin).

Conclusions.—This suggests that BoNT-A induces spinal plasticity leading to the recovery of reciprocal inhibition, which is likely to be due to the withdrawal of inhibitory control from Renshaw cells directly blocked by BoNT-A. This could help in limiting ankle muscle cocontractions in the transition phase from stance to swing, to assist dorsiflexion.

Further readings


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Safety profile of 400 U onabotulinumtoxinA for the treatment of upper limb spasticity

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Keywords: Botulinum toxin; Safety

Background.—The safety profile of onabotulinumtoxinA for treatment of upper limb spasticity (ULS) was assessed across a range of doses to evaluate treatment with ≥ 400 U.

Methods.—Integrated data from 18 studies of onabotulinumtoxinA for ULS were evaluated by 4 dose groups (< 150 U, 150–250 U, 251–399 U, ≥ 400 U). Treatment exposure, incidence of adverse events (AEs), serious AEs, and possible distant spread of toxin (PDSOT) were assessed, together with the safety profile of patients who received 4 consecutive onabotulinumtoxinA ≥ 400 U treatments.

Results.—Overall, 1342 patients received ≥ 1 onabotulinumtoxinA treatment; 183 received ≥ 400 U, with 6.6% (88/1330), 12.3% (115/936), 23.3% (113/486), and 31.2% (96/308) in treatment cycles 1–4, respectively. AE rates were similar across dose groups, with no consistent increase in incidence of any individual AE/serious AE and no evidence of PDSOT at doses ≥ 400 U across treatment cycles. The overall AE rate among the subset of patients (n = 51) with 4 consecutive ≥ 400 U treatments was similar (43.1%, 43.1%, 43.1%, 41.2%), without any overall change in profile for AEs/serious AEs with increasing treatments.

Conclusions.—OnabotulinumtoxinA at doses ≥ 400 U was well tolerated in ULS patients, with no consistent pattern of increase in AEs at doses ≥ 400 U, reported systemic AEs, or change in safety profile over consecutive treatments.

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Interests of medical hypnosis during toxin botulinic injections: Preliminary study

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Keywords: Toxin; Spasticity; Hypnosis; Pain

Background.—Our study concerns the efficiency of hypnosis during the injections of botulinum toxin. Hypnosis is widely used in medicine to decrease the anxiety and the painful felt, but few publications are appeared in physical medicine and rehabilitation.

Methods.—In this bi-centrique study, the injections are practised at 30 patient’s spasics. Two groups are constituted: the group “hypnosis” (standards analge-
sic + hypnosis) and the group “witness” (standards analgesic). The patients gave their agreement to participate in the study and participate in the choices of the analgesic methods. The evaluation was performed at the end of the session and during follow-up.

Results. – Certain are in progress: anxiety, pain felt during the injection, and reactivity to needle seems better in the group hypnosis. The comfort of the practitioner is globally improved, function of its experience in hypnosis

Conclusions. – Hypnosis has its place in our practice concerning the pains cause by interventions, which is common in PRM practice. It requires one, however, one unwound by the different care including information around the hypnosis and an induction of the latter. Profits with regard to these arrangements are discussed.

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P204-e
Effect of onabotulinumtoxinA on patient-related outcomes for lower limb spasticity
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Keywords: Botulinum toxin; Patient-related outcomes

Background. – Spasticity is a disabling consequence of stroke and traumatic brain injury and contributes to other conditions, such as pain, impairment in daily activities and gait. OnabotulinumtoxinA has been shown to reduce muscle tone in patients with lower limb spasticity (LLS). We sought to assess whether reducing muscle tone is associated with clinically meaningful improvements in patient-related outcomes.

Methods. – Data from 3 published placebo-controlled LLS trials (AGN/HO/SPA/001-191622 (BOTOX Economic Spasticity Trial [BEST]), BTX-702-8051, BTX108512) using onabotulinumtoxinA and the Patient Registry Outcomes in Spasticity (PROS) World registry were indirectly compared for patient-related outcomes.

Results. – A total of 599 patients were identified with LLS involving the ankle. The patient clinical global impression scale was significantly> correlated with modified Ashworth scale scores in BTX108512. Eighty percent of patients in PROS were satisfied with their injections. BEST was significant for the proportion of patients reporting 50% reduction in pain. Significant improvements in spasms, cramps, and patient-rated injection benefit were demonstrated in BTX-702-8051 with strong trends in gait speed. Functional goal attainment was significant in BEST with improvements in PROS.

Conclusions. – Reductions in muscle tone after onabotulinumtoxinA treatment are beneficial to patients as demonstrated by improvement in patient-related outcomes.

* P<.05 vs placebo for ≥ 1 post-treatment time point.

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P205-e
Development of a picture guide to identify common postures of spasticity
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Keywords: Spasticity; Patient reported outcome; Clinician reported outcome

Background. – An illustrative picture guide to identify common postures of upper and lower limb spasticity was developed for use by clinicians and patients.

Methods. – Five specialists in spasticity management provided guidance on the most common postures observed in patients with spasticity. A photo shoot with patients was held to capture photos of these spasticity postures across four etiologies (stroke, traumatic brain injury, multiple sclerosis, and cerebral palsy). Initially, clinicians separately ranked the most representative photo for each posture. Subsequently, the group reached a consensus on the best photo for each posture. A medical illustrator converted the posture photos into representative sketches for inclusion into the picture tool.

Results. – Fifteen patients with spasticity representing each etiology participated in the photo shoot. All postures were photographed from various angles, resulting in at least five unique photos per posture. Fifteen common postures were identified and converted into representative sketches.

Conclusions. – The spasticity common postures guide will be a useful tool for determining the prevalence of spasticity postures and gaining a better understanding of the treatment goals of spasticity presentations. Additionally, the guide may reduce the heterogeneity of spasticity evaluation among clinicians. Patients’ understanding of the guide will be evaluated in future interviews.

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P206-e
Satisfaction with botulinum toxin treatment in post-stroke spasticity: Results from two cross-sectional surveys of patients and physicians
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Keywords: Botulinum toxin; Spasticity; Stroke; Cross sectional survey; Patient satisfaction

Background. – Botulinum toxin (BoNT) injections are first-line treatment for post-stroke spasticity (PSS). However, some patients may experience re-emergence of symptoms before re-injection with a standard 12-weekly injection regimen.

Methods. – Structured patient and physician surveys in Canada, France, Germany, and USA. Patients had received ≥ 2 BoNT-A treatments for PSS. Physicians had ≥ 3 years’ experience injecting BoNT for PSS. Information regarding treatment satisfaction was collected from both groups.

Results. – Sixty-one of 79 patients (77%) received onabotulinumtoxinA, 15/79 (19%) abobotulinumtoxinA and 3/79 (4%) incobotulinumtoxinA. Most patients were very (40.5%) or somewhat (48.1%) satisfied with BoNT treatment. Satisfaction was highest at time of peak effect and lowest before re-injection. Injection intervals ≤ 12 or ≤ 10 weeks were preferred by 78.9% or 43.4% of patients, and received by 45.6% or 6.3%, respectively. Mean (standard deviation) injection interval received was 13.7 (3.5) weeks. Physicians (n = 105) were moderately (57.7%) or very (36.5%) satisfied with treatment, but felt that 16.2% or 24.6% of patients would benefit from shorter intervals or higher doses, respectively.

Conclusions. – Patient and physician satisfaction with BoNT treatment for PSS is high, although patient preference is for shorter injection intervals. Physicians believe shorter intervals and higher doses may confer additional benefit in some patients.

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