Methods

Objectives

To describe rehabilitation goals and attainment of upper (UL) and lower limb (LL) function in focal PSS patients, using goal attainment scaling.

Interventions

Subjects

Design

Results

Conclusions

Keywords: Post stroke spasticity; Goal setting; Goal attainment

Topic: New techniques of rehabilitation and assessment (TBC).

Objectives: To describe rehabilitation goals and attainment of upper (UL) and lower limb (LL) function in focal PSS patients, using goal attainment scaling.

Methods: Subjects were randomised to Botox® (BoNT-A) + standard care (SC) or placebo + SC for up to 2 treatment cycles, followed by an open-label phase up to a total of 52 weeks. Eligible patients were BoNT-A naïve, demonstrated preserved function in the limb to be treated, and were considered likely to benefit from the intervention. For each patient, a principal active functional goal was defined as well as a secondary active or passive goal and the principal goal attainment was measured at the end of the randomised period.

The intent-to-treat population comprised 273 patients recruited in Canada, Germany, Sweden and the UK (59% male; mean age: 61.5 years; median time since stroke: 22.8 months). In total, 165 patients had a principal or secondary active goal concerning UL function (respectively 116 and 49), 222 patients had either a principal or secondary active goal concerning LL function (respectively 157 and 65), and 158 patients had a secondary passive goal.

For patients with an active goal pertained to UL function, the main goal categories were: ability to grasp and hold objects with either gross or fine movements (31.5%), feeding (23.6%), dressing (16.4%), and improved upper limb range of movement (12.7%). For those patients whose principal active goal pertained to LL function, most were associated with walking/mobility (89.2%) including improvements in speed, distance, gait and ability to climb stairs.

Active goals pertaining to UL were achieved by 39.5% of patients receiving BoNT-A + SC and 30.7% of patients receiving placebo + SC and active LL goals were achieved by 41.9% of patients receiving BoNT-A + SC and 45.1% of patients receiving placebo + SC. Secondary passive goals were achieved by 60.6% of the patients receiving BoNT-A + SC and 38.6% of patients receiving placebo + SC.

Conclusion: More patients treated with Botox® + SC achieved their UL active goals and passive goals compared to placebo + SC.


CO16-006–EN
Highly paretic patients within four to six weeks after stroke: An early botulinum toxin A treatment may prevent a disabling finger flexor spasticity six months later
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Keywords: Spasticity; Hemiparesis; Stroke; Botulinum toxin

Objective: The study asked whether an early BTX-A injection in sub-acute stroke patients may prevent a disabling finger flexor spasticity six months later.

Design: A single-blind, randomized pilot study.

Setting: In-patient rehabilitation centre.

Subjects: Eighteen stroke patients, interval 4–6 weeks, non-functional upper limb (UL), Fugl-Meyer UL score (FM, 0–66) ≥ 20, beginning finger flexor spasticity, randomly allocated to group A or B.

Interventions: In A-patients 150 units BTX-A (Xeomin) injected into the deep and superficial finger (100 units) and wrist flexors (50 units), no injection in B-patients. Comprehensive rehabilitation in both groups.

Main measures: Primary variable was the modified Ashworth score (AS, 0–5) of the finger flexors, secondary the whole UL tonus with the REPAS, the UL motor control with the FM, and a disability scale, blindly assessed at T0 (begin), T1 (4 weeks) and T6 (6 months).

Results: Homogeneous groups at T0. Significantly less finger flexor tonus in the BTX-A group at T1 and T6, the mean (SD) AS scores in group A (B) were: 1.7 ± 0.5 (1.6 ± 0.5) at T0; 0.4 ± 0.5 (1.9 ± 0.7) at T1; and 1.4 ± 0.7 (2.4 ± 0.9) at T6. Among the secondary, the disability score, namely the items pain and passive nail trimming, was less in group A at T1 and T6.

Conclusions: The pilot character prohibits any conclusions, but the results indicated a probabilistic effect of an early BTX-A injection on finger flexor spasticity six months later. By minimizing involuntary muscle activity, the fingers were held in a less fixed position. It may have hindered contractions, usually rapidly developing.


CO16-007–EN
Validation study of subjective spasticity questionnaire
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Objective: To test the validity and reliability of a subjective questionnaire for evaluation of spasticity during daytime, sleep and activities of daily living (ADL).

Subjects and methods: Our sample consisted of 50 subjects (30 male) with mean age 48.2 ± 15.3 years (ranging from 21 to 84 years). The questionnaire was constructed based on the functional classification of disability according to WH0, in 2001 and it is self-administered. It consists of 12 domains (Likert scale) for evaluation of the effect of pain, involuntary movement and spasticity on ADL, such sleep quality, hygiene, routine activities, social life, driving, orthosis wear and gait. Reliability was tested via Cronbach’s a coefficient. The item discriminant validity test was performed according to the severity of complaints based on clinical evaluation of spasticity via modified Ashworth scale. The construct validity was tested via item-scale correlations.

Results: More than half of the patients reported that spasticity, accompanying pain and involuntary movements were getting more intense during night. Medium to severe spasticity, accompanying pain and involuntary movements were reported by 80.4%, 52.9% and 60% of the subjects, respectively. Most of the complaints were noted during walking. Internal consistency was measured by Cronbach’s a, which was found 0.96 for questions concerning pain, 0.98 for questions concerning involuntary movements and 0.97 for spasticity. The more severe the clinical grade of spasticity, the more troublesome complaints were reported by the patients in a number of questions. The Pearson correlation coefficients ranged mostly from medium (r>0.4) to high (r>0.6), indicating medium to high reproducible scales, respectively.

Conclusion: The questionnaire is a promising, new instrument for evaluation of the subjective feeling of spasticity during night and ADL. It comes up forward to fill in the gap in the field of spasticity and it is useful for recording the effectiveness of spasticity treatment outcome and rehabilitation program.


CO16-008–EN
Botulinum toxin for the treatment of spastic equinovarus foot in adults: Effect on gait parameters. Comparative randomized double-blind trial versus placebo
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Stroke is the leading cause of disability for adults in France. After stroke, equinovarus foot is the main cause of gait abnormalities. The efficiency of botulinum toxin in decreasing spasticity has been demonstrated but the effects on gait parameters (gait velocity… are still conflicting. The purpose of this study was to assess the effects of an injection of botulinum toxin type A, compared with placebo, on gait parameters.

Methods: This was a multicenter, randomised, double-blind, versus placebo study. To be included, patients had to suffer from a hemiplegia with an equinovarus foot due to stroke. A medical examination (physical examination, gait analysis using a GAITRite® system…) was performed before and 4 to 6 weeks after the injection.

Results: We included 49 patients, randomised in two groups: treatment with botulinum toxin type A (n = 23) and placebo (n = 26). No significant difference
was shown between the two groups for gait velocity, step length, step width, or simple support time.

Conclusion.– It seems that quantified gait parameters are not relevant evaluation criteria to assess the efficiency of a treatment with botulinum toxin type A. This evaluation must be done using satisfaction scales fulfilled by the patient, linked with therapeutic objectives that are well specified before the treatment, with the PRM doctor.


CO22-001–EN

Neurophysiological features of motor imagery with applications in motor rehabilitation

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Keywords: Motor imagery; Quadriplegia; Grasping; Motor rehabilitation; Tenodesis

Introduction.– Motor imagery is the mental representation of a movement without any concomitant execution. One of the main features of motor imagery is to share the same properties with actual execution, in particular, the principle of isochrony. Therefore, the aim of this presentation is to describe how motor imagery can be incorporated into the rehabilitation process of patients with tetraplegia. For over 10 years, the literature describes significant advances in the rehabilitation of motor functions through motor imagery, whether concerning central (brain, spinal cord) or peripheral lesions.

Comments.– We focus on grasping illustrated by two clinical cases where motor imagery was integrated into conventional physiotherapy and occupational therapy management. The first patient had a level C6-C7 lesion and was able to re-learn to grasp objects with the tenodesis effect. The motor imagery work was mainly focused on motor function of daily life. We showed an improvement in movement time, precision and range of motion. The second patient exhibited a C5-C6 spinal cord lesion, leading to the impossibility of arm extension. After surgery, i.e. the transfer of the distal insertion of the biceps tendon on the triceps, the rehabilitation of the extension of the forearm on the arm and the seizure of an object by tenodesis effect was undertaken with a protocol comparable to the first patient. We observed an improvement in kinematic parameters with decreased movement times and reduced variability of arm trajectory. Progress remained stable during a retention test at 1 month.

Discussion.– The role of motor imagery is beneficial in addition to conventional rehabilitation. It strengthens motor programs through brain plasticity and also helps to learn new ones. Physical workload could thus be reduced, especially when eliciting fatigue and pain. The quality of the imagery work remains to be evaluated. A set of tests is used to evaluate the vividness of the mental image, the maintenance of attention during the work session and a level of physiological arousal consistent with a sustained mental work. We currently work on a larger population and study cortical reorganization induced by motor imagery, using magnetoencephalographic recordings.


CO22-002–EN

Constraint induced therapy and functional imaging

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Keywords: Stroke; Constraint induced movement therapy (CIMT); Functional imaging

After a stroke, constraint induced movement therapy (CIMT) improves upper-limb motor performances of selected hemiparetic patients. What is the neural substrate of this therapeutic effect in terms of brain plasticity? Using functional imaging, equivocal results have been reported regarding the implication of motor areas from both hemispheres [2,4–7].

Lesion topography could play a key role to explain these apparent contradictory results. Schaechter et al. (2002) showed a decrease of brain damaged motor cortex activity after CIMT for the two patients who sustained a cortical lesion and an increased CIMT-related activity in the ipsilesional motor cortex for the two other patients who sustained a sub-cortical lesion. In another study performed in 6 hemiparetic patients included at a chronic stage, Hamzei et al. (2006) suggested that an intact cortico-spinal tract, improves synaptic efficiency of the ipsilesional sensori-motor cortex. Otherwise, motor improvement requires the involvement of motor associated areas of the damaged hemisphere or motor regions of the intact hemisphere.

It is also possible that intensive rehabilitation and constraint—the two components of CIMT—elicit specific and distinct brain plasticity mechanisms. We studied this hypothesis using fMRI in a case-control study (Bellaiche 2009). Results showed that constraint of the less affected hand favored a lateralized pattern of activation towards the ipsilesional motor cortex. Additional improvement after intensive rehabilitation was correlated with a bilateral increased activity of the pre-motor cortex and the cerebellum.

References


CO22-003–EN

Isokinetic program in stroke survivors with chronic upper limb hemiparesis

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Keywords: Stroke; Chronic hemiparesis; Isokinetic muscular strengthening; Upper limb

Purpose.– To evaluate the effects of isokinetic strength training combined with conventional rehabilitation on hemiparetic arm motor function in patients with chronic stroke.

Patients and methods.– Eight patients with persistent hemiparesis 6 months after stroke were included in a 6 weeks rehabilitation program. Rehabilitation sessions occurred 3 times a week during 6 weeks. The program involved isokinetic muscle strengthening in CPM mode of flexor and extensor muscles of the elbow and wrist, associated with a conventional neurological rehabilitation of the affected upper limb. The evaluation was made before and just after the program (18 sessions) bearing on 3 points: clinical evaluation, isokinetic test and functional evaluation (Fugl-Meyer upper limb scale [FMS] and Block and Box test [BBT]).

Results.– At the beginning of the study, the isokinetic evaluation highlighted a speed-dependent muscular deficit on the muscular groups tested. After 18 rehabilitation sessions we noted a significant increase in FMS upper limb scale (+18%, P<0.01) and in BBT score, an increase in muscle strength without any increase in upper arm spasticity.

Discussion.– The loss of strength is considered as a major limiting contributor to disability after stroke (Canning, 2004). Some studies present arguments in favour of an isokinetic training of the paretic upper limb, by highlighting deteriorations of the characteristics of the muscular contraction. It is expected that isokinetic training could improve both magnitude and time-dependent