

Does intramuscular botulinum toxin A injection improve upper-limb function in children with hemiplegic cerebral palsy?

Jason Wasiak, Brian J Hoare and Kim M Hender



Clinical question

“Does intramuscular botulinum toxin A injection improve upper-limb function in children with hemiplegic cerebral palsy?” An occupational therapist requested information about the efficacy of botulinum toxin A injection in the upper limb in the light of its success in reducing spasticity and improving gait and range of movement in the lower limb.



Search question

The patients relevant to this search were children under 18 years of age with hemiplegic cerebral palsy. The intervention was the use of intramuscular botulinum toxin A and the outcome was improved motor function in the upper limb. The ideal study design to answer this clinical question would be a randomised-controlled trial comparing the effect of intramuscular botulinum toxin A with a control treatment or placebo.



Search

The search terms “cerebral palsy”, “muscle spasticity”, “botulinum toxin”, “Botox” and “Dysport” were combined to identify all relevant English language articles published between 1966 and June 2001. Databases searched included the *Cochrane Library*, *Best Evidence*, *MEDLINE* and *CINAHL* (Cumulative Index to Nursing and Allied Health Literature). The search identified two randomised-controlled trials. Non-randomised studies were excluded.



Summary of findings

Corry et al¹ compared the effects of intramuscular botulinum toxin A (either Botox [Allergan] 90–250 U at 4–7 U/kg or Dysport [Ipsen] 160–400 U at 8–9 U/kg) with normal saline on the hemiplegic upper limb in 14 patients with cerebral palsy (mean age, 9 years). Outcome assessments were performed at baseline, two weeks and 12 weeks.

At the two-week assessment, the group receiving intramuscular botulinum toxin A had increased maximum active elbow ($P = 0.026$) and thumb ($P = 0.036$) extension and reduced tone at the wrist ($P = 0.003$) and elbow ($P = 0.01$) than those in the placebo group. There was no significant change at either 2 or 12 weeks in wrist and metacarpophalangeal extension.

In a single-blind study, Fehlings et al² compared the use of intramuscular botulinum toxin A (Botox 2–6 U/kg) with occupational therapy (treatment group) or occupational

therapy alone (control group) in 29 children aged 2.5–10 years. Primary outcome measures at baseline, 1, 3, and 6 months included the Quality of Upper Extremity Skills Test (QUEST) and a caregiver-completed Pediatric Evaluation Disability Inventory (PEDI).

At the four-week assessment, the treatment group scored significantly better on QUEST than the control group on a two-way analysis of variance ($F = 4.69$; $df = 1, 83$; $P = 0.039$). A statistically significant improvement was also found in the raw scores of the caregiver-completed PEDI ($F = 3.22$; $df = 1$; $P = 0.04$). No significant differences between the treatment and control groups were found in outcome measures such as grip strength, modified Ashworth scores (measuring muscle tone) or passive goniometry measurements.



Outcome

Our report to the requesting clinician stated that one study found that botulinum toxin A decreased muscle tone, but that its effect on range of movement and function in the upper limb was not significant;¹ and that another study showed a clinical and significant improvement in function one month after botulinum toxin A injection and moderate improvements up to six months.² In the light of differing opinions, we could not support or refute the efficacy of botulinum toxin A in improving upper-limb function in children with cerebral palsy. It was recommended that the use of botulinum toxin A in the upper limb should remain part of a clinical trial until the evidence is clearer.

Jason Wasiak

Research Officer
Centre for Clinical Effectiveness
Southern Health/Monash Institute of Public Health, Melbourne, VIC
Jason.Wasiak@med.monash.edu.au

Brian J Hoare

Occupational Therapist
Southern Health/Monash Medical Centre, Melbourne, VIC

Kim M Hender

Research Officer
Centre for Clinical Effectiveness
Southern Health/Monash Institute of Public Health, Melbourne, VIC
<http://www.med.monash.edu.au/publichealth/cce>

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