PHARMACOLOGICAL TREATMENT OF SPASTICITY IN CHILDREN AND ADOLESCENTS WITH CEREBRAL PALSY

This is a summary of the American Academy of Neurology (AAN) guideline (*Neurology*® 2010;74:336–343) regarding pharmacological treatment of spasticity in children and adolescents with cerebral palsy (CP).

Please refer to the full guideline at www.aan.com for more information, including the AAN's definition of the classification of evidence for studies of therapeutic intervention.

LOCALIZED OR SEGMENTAL SPASTICITY

What is the efficacy and safety of botulinum toxin type A (BoNT-A), botulinum toxin type B (BoNT-B), phenol, or alcohol injection for treating spasticity in children with CP?	
Strong evidence	For localized/segmental spasticity in the upper and lower extremities of children with CP that warrants treatment, BoNT-A should be offered as an effective and generally safe treatment (**Level A**†).
Insufficient evidence	There is insufficient evidence to support or refute the use of BoNT-A to improve motor function in this population (**Level U**). There is insufficient evidence to support or refute the use of BoNT-B, phenol, and alcohol injections as a treatment for spasticity in children with spastic CP (**Level U**).
Clinical context*	At the time of this writing, the US Food and Drug Administration (FDA) has not approved BoNT-A for the treatment of spasticity in children. BoNT-A is approved for the treatment of spasticity in children and adults in Canada and several other countries. Different formulations are not bioequivalent and may have different therapeutic efficacy and safety profiles. The FDA released a communication describing some systemic reactions after BoNT injection (A or B) for limb spasticity associated with CP.

GENERALIZED SPASTICITY

What is the efficacy and safety of diazepam for treating spasticity in children with CP?	
Good evidence	Diazepam should be considered as a short-term antispasticity treatment in children with CP (**Level B**).
Insufficient evidence	There is insufficient evidence to support or refute the use of diazepam to improve motor function in this population (**Level U**).
Clinical context*	The incidence of adverse events (AEs) associated with diazepam is an important limiting factor for long-term use. Experts caution that the prolonged use of this medication can produce physical dependence and recommend against abrupt discontinuation.
What is the efficacy and safety of dantrolene for treating spasticity in children with CP?	
Insufficient evidence	There is insufficient evidence to support or refute the use of dantrolene for the treatment of spasticity in children with CP (**Level U**).
Clinical context*	Dantrolene is rarely used in clinical practice to reduce spasticity in children with CP. This may be due to the lack of evidence in the literature to support its efficacy and the general concern regarding its potential frequent and/or serious AEs. Although dantrolene has been associated with hepatotoxicity, none of the studies reviewed reported this AE in children, perhaps due to the small number of subjects included in these investigations.
What is the efficacy and safety of oral baclofen for treating spasticity in children with CP?	
Insufficient evidence	There is insufficient evidence to support or refute the use of oral baclofen for the treatment of spasticity or to improve motor function in children with CP (**Level U**).
Clinical context*	Baclofen is widely used in clinical practice to treat spasticity in children with CP. Experts recommend starting baclofen at the lowest possible dose to minimize AEs. The dose is gradually tapered until discontinuing because abrupt discontinuation may cause withdrawal symptoms.

What is the efficacy and safety of tizanidine for treating spasticity in children with CP?	
Weak evidence	Tizanidine may be considered for the treatment of spasticity in children with CP (**Level C**).
Insufficient evidence	There is insufficient evidence to support or refute the use of tizanidine to improve motor function in this population (**Level U**).
Clinical context*	Tizanidine's antispasticity effect has been demonstrated in adults with multiple sclerosis and spinal cord injury. Little information is available to assist practitioners with the effective use of this drug to treat spasticity in children. Because tizanidine is extensively metabolized by the liver, hepatic impairment may have a significant effect on its pharmacokinetics. There are AEs related to tizanidine use in adults. Their incidence in pediatric patients has not been studied.
What is the efficacy and safety of intrathecal baclofen pump (ITB) for treating spasticity in children with CP?	
Insufficient evidence	There is insufficient evidence to support or refute the use of continuous ITB for the treatment of spasticity in children with CP (**Level U**).
Clinical context	In 1996, ITB received FDA approval to treat spasticity of cerebral origin. A major factor in the lack of Class I and II evidence may be the difficulty of performing a randomized control trial or crossover trial in subjects with ITB pumps. Catheter-related complications, pump pocket collections, and wound infections remain a concern, and ongoing efforts aim to reduce their incidence. One retrospective study of the safety of ITB in children (*N*=200) found that 11% had CSF leakage, 7% had catheter-related problems, and 5.5% developed infections.

*Clinical context slightly abridged. See the published guideline for the complete text.

†**Classification of Recommendations: A** = Established as effective, ineffective or harmful (or established as useful/predictive or not useful/predictive) for the given condition in the specified population. (Level A rating requires at least two consistent Class I studies.)** **B** = Probably effective, ineffective or harmful (or probably useful/predictive or not useful/predictive) for the given condition in the specified population. (Level B rating requires at least one Class I study or two consistent Class II studies.) **C** = Possibly effective, ineffective or harmful (or possibly useful/predictive or not useful/predictive) for the given condition in the specified population. (Level C rating requires at least one Class II study or two consistent Class III studies.) **U** = Data inadequate or conflicting; given current knowledge, treatment (test, predictor) is unproven.

**In exceptional cases, one convincing Class I study may suffice for an "A" recommendation if 1) all criteria are met, 2) the magnitude of effect is large (relative rate improved outcome >5 and the lower limit of the confidence interval is >2).

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