

considering the risks of surgery and post-operative adverse effects. Patient values and preferences vary because patients might be reluctant to undergo a surgical procedure when other non-invasive rehabilitative options are feasible and potentially effective. Thus, the Work Group made the following recommendation: There is insufficient evidence to recommend for or against vagus nerve stimulation as an adjunct intervention for rehabilitation of acute and chronic motor deficits.

c. Spasticity

Recommendation

24. We suggest botulinum toxin for patients with focal spasticity, depending on patient characteristics and preferences.

(Weak for | Reviewed, New-replaced)

Discussion

Botulinum toxin can improve spasticity in patients with a history of stroke.[\(131, 132\)](#) Since the publication of the 2019 VA/DoD Stroke Rehabilitation CPG, additional evidence has become available for both upper and lower limb spasticity as well as comparative evidence to other standard treatments such as oral baclofen. An NMA by Hsu et al. (2022) (n=1,930) demonstrated significant improvement in upper and lower limb spasticity, measured by the MAS, up to the 6th week after injection of botulinum toxin compared with control (which included any of the following: saline injections, sham extracorporeal shockwave therapy, physical therapy, and oral antispastic medications).[\(132\)](#) The magnitude of effect waned between the 7th and 12th weeks after the intervention. Between-group differences remained statistically significant for the upper limb MAS scores; however, the singular study within the NMA that evaluated the lower limb did not show a difference between groups during this period. Overall improvements in spasticity were observed over a variety of protocols in this NMA. Toxin used varied between onabotulinumtoxinA, incobotulinumtoxinA, or abobotulinumtoxinA.

A small (n=29) RCT by Güntürk et al. (2022) compared the efficacy of botulinum toxin 100–300 IU (from a predetermined diagram for dosing) with oral baclofen 30–80 mg per day (in multiple doses titrated to effect and tolerance) on multiple upper and lower limb spasticity outcomes, including the MAS and Brunnstrom stages of recovery.[\(131\)](#) No significant difference was found between botulinum toxin and oral baclofen in any outcome except ankle spasticity, which favored botulinum toxin (treatment difference of 1 point on the MAS). The totality of the evidence supports botulinum toxin as an effective treatment option for spasticity but also asserts that botulinum toxin might not have a dramatically different place in therapy compared with oral antispasmodics based on efficacy alone. The Work Group determined that the use of botulinum toxin should depend on patient characteristics and preferences. For example, patients with focal spasticity that is painful, impairs function, reduces their ability to participate in rehabilitation, or compromises proper positioning or skin care might be candidates for the targeted approach that botulinum toxin treatment offers.