Botulinum toxin enhancement of postoperative immobilization in patients with cervical dystonia

Technical note

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Postoperative immobilization in patients with cervical dystonia requiring fusion presents a unique management problem. Two patients with severe degenerative cervical spine disease secondary to chronic repetitive motion are reported. Both required a surgical fusion and postoperative immobilization. Botulinum toxin was injected intramuscularly to assist in immobilization. The technique used is described.

Key Words • botulinum toxin • cerebral palsy • cervical dystonia • spinal fusion • torticollis

Patients with cervical dystonia may develop cervical spondylosis and subsequent compressive myelopathy or spinal instability. Because of the high risk of instability, treatment of these individuals with a decompressive procedure should be performed in conjunction with fusion. In addition, there are other circumstances in which individuals with spasmodic torticollis require surgical fusion. The constant neck motion in these patients (which may often be the underlying cause of their cervical spine disease) makes postoperative immobilization exceptionally difficult.

Botulinum toxin has been reported to be effective in the primary treatment of cervical dystonia. We have used perioperative intramuscular injections of botulinum toxin to facilitate postoperative external stabilization in two patients, whose course is reported here.

Case Reports

Case 1

This 34-year-old severely retarded man had suffered from cervical dystonia since infancy. He developed cervical subluxation (at C4-5, C5-6, and C6-7) and worsening myelopathy, which increased the difficulty of providing daily care. Specifically, he lost control of bowel and bladder function and the ability to feed himself. He underwent spinal realignment and was treated with a posterior cervical fusion using articular mass plates and autogenous bone. Because of his cervical dystonia, he was immobilized postoperatively in a halo vest. Following placement of the halo device, loosening of the pins occurred and he developed soft-tissue erosion around the pin sites. The halo was readjusted and the patient was treated with botulinum toxin injections to the left sternocleidomastoid muscle (60 U) and the right splenius capitis muscle (35 U).

It was difficult to evaluate the patient fully during the course of his treatment because he could not speak and would not follow commands. We noted no specific change in his ability to swallow. The cervical dystonia appeared to lessen in severity, however, and we were able to immobilize him for a total of 15 weeks in a halo vest.

Case 2

This 64-year-old woman had a 15-year history of spasmodic torticollis with increased tone in both sternocleidomastoid muscles as well as the right trapezius muscle. She developed symptomatic nonrheumatoid cranial settling due to erosion of the lateral masses of the atlas vertebra. She had excruciating posterior cervical headaches which were relieved with manual cervical traction. A dorsal occipitocervical fusion was proposed once the "cranial settling" was reduced. In preparation for this, both sternocleidomastoid muscles
Botulinum toxin for immobilization

and the right trapezius muscle were injected with botulinum toxin. A total of 130 U was injected without complication (40 U into each sternocleidomastoid muscle and 50 U into the right trapezius muscle). This resulted in a decrease of her torticollis and neck pain within 2 weeks, and the effect lasted for 3 months. Preoperatively, identical botulinum toxin injections were performed with excellent results but the procedure was complicated by transient dysphagia. Two weeks later she underwent spinal realignment with traction and dorsal occipitocervical fusion was performed. She was immobilized postoperatively in a halo vest.

At 10 weeks after surgery the patient developed a recurrence of torticollis with occipital pain and cervical paravertebral spasms, now worse on the left side. A third course of botulinum toxin injections was administered with a total of 100 U injected into both sternocleidomastoid muscles and the left trapezius muscle. Three months later, 150 U botulinum toxin was distributed into both sternocleidomastoid muscles and both trapezius muscles for recurrent symptoms. The patient tolerated 6 months of halo immobilization, after which she underwent a solid bony fusion with relief of her headaches. Her tolerance of cervical immobilization was markedly enhanced by the botulinum toxin injections.

Discussion

Botulinum toxin is a presynaptic neurotoxin that disrupts the calcium-mediated release of acetylcholine. Botulinum toxin has been used to treat strabismus, blepharospasm, spasmodic dysphonia, and hemifacial spasm. Reports of its use to treat spasmodic torticollis and cervical dystonia have been encouraging. Jankovic and Schwartz treated 205 patients suffering from cervical dystonia with intramuscular botulinum injections, and 71% of them improved substantially with this therapy. Of those individuals who had experienced pain in association with torticollis, 76% had complete relief of pain with intramuscular botulinum toxin injections. Most patients reported an improvement by the 1st week after injection; however, some had a latency of symptomatic relief of up to 8.5 weeks. The average duration of benefit was 11.2 weeks. The most frequent complication was dysphagia, which occurred in 17% of patients. This was usually mild and often resolved in a few days to weeks.

Patients with cervical dystonia (the most common form of which is torticollis) may develop symptomatic degenerative cervical spine disease. If cervical fusion is required, chronic repetitive neck motion may make adequate postoperative immobilization difficult. Because of the recent success in treating spasmodic disorders with botulinum toxin, we have used this therapy in conjunction with surgery to maintain immobilization in the postoperative period.

Initial doses of 100 U per muscle have been used to treat cervical dystonia, and up to three muscles have been injected per session with safety. Single doses of 500 U or greater should be avoided. The appropriate muscle for injection can often be determined by palpation. If, by physical examination, there is uncertainty as to which muscles are most involved, electromyography can be used to assist in the selection of muscles to be injected. Although in the first case we used botulinum injections after surgery, it is probably preferable to inject patients before surgery. Ideally this could be done well in advance of surgery, as was the case in our second patient. Preoperative botulinum treatment gives one the opportunity to monitor the clinical response in terms of efficacy, onset of action, duration of action, and potential side effects without the multiple confounding factors that are present in the postoperative period. The injections may be repeated as necessary.

In conclusion, we believe that intramuscular botulinum toxin injection is a relatively safe procedure which enhances tolerance to postoperative immobilization in patients with cervical dystonia.

References


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