



Challenges in Managing Severe Lower Limb Spasticity Associated with Bilateral Hip Joints Subluxation

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ABSTRACT

Management of severe spasticity in spinal cord injured patients is challenging especially when associated with bilateral hip joint subluxation. A 22-year-old paraplegic girl presented with very severe lower limbs spasticity and unstable hips. She was treated with botulinum toxin A injections to her lower limb muscles. This method of treatment was shown to be effective in a case of severe spasticity with unstable hips.

Key words: Botulinum toxin A, hip joints subluxation, spasticity, spinal cord compression

INTRODUCTION

Managing severe spasticity in patients with a spinal cord injury is challenging especially when it is associated with bilateral hip joint subluxation. This report highlights the effectiveness of low temperature thermoplastic knee back slab with abduction bar after botulinum toxin injections in a challenging case.

CASE

We report a case of a 22-year-old, T5 AIS A paraplegic female patient, with a body weight of 40 kg, who presented with severe lower limb spasticity with unstable hips. In 2010, she was diagnosed with thoracic spinal cord compression due to a tuberculous granulomatous mass. She underwent soft tissue mass resection and posterior spinal instrumentation. She had mild spasticity upon discharge. Seven months later, due to increasing spasticity, she was injected with botulinum toxin type A (BTX-A) in both hip adductors and in the iliopsoas and hamstring muscles. Although, she had completed the antitubercu-

İki taraflı Kalça Eklemi Subluksasyonu ile İlişkili Ciddi Alt Ekstremitte Spasite Tedavisindeki Zorluklar

ÖZET

Omurilik yaralanmalarında ciddi spastisite yönetimi özellikle iki taraflı kalça eklemi subluksasyon ile ilişkili olduğunda zordur. Bu olgu sunumunda 22 yaşında paraplejik bir bayan hastada meydana gelen çok ciddi alt ekstremitte spastisite ve instabil kalça sunulmaktadır. Bu hasta botiliyum toksininin alt ekstremitte kaslarına enjeksiyonu ile tedavi edildi. Bu yöntemin instabil kalçası olan spastisiteye sahip hastalarda etkili olduğu gösterilmiştir.

Anahtar kelimeler: Botiliyum toksini A, kalça eklemi subluksasyonu, spasite, spinal kord basısı

lous treatment, she was noncompliant with prescribed regular physiotherapy. She presented to our rehabilitation clinic 9 months after the botulinum injections with severe spasticity causing flexion in both hips and knees, which interfered with positioning of the patient (Figure 1). We were able to grade both lower limbs' spasticity as Modified Ashworth Score (MAS) 3. Modified Tardieu Scale showed R1-R2 difference of the hamstrings was 20° and the popliteal angle was 60° on both sides. End range contracture of both hamstrings was noted. Hip adductors R1-R2 difference was 15° on the right side and 20° on the left side with hip abduction angles of 25° (right) and 30° (left). A pelvic radiograph (AP view) showed bilateral subluxated hip joints (Figure 2).

The patient received low-dose oral baclofen, which was increased to 20 mg 3 times a day. However, her response to oral baclofen was not favorable, and she was prescribed BTXA injection. BTX-A was injected to both iliopsoas (50 units each), the hip adductors (50 units each) and to the medial (75 units each) and lateral (25 units each) hamstring muscles under ultrasound guidance. Although, we were able to reduce both hip joints 1 week

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Figure 1. Clinical photo of the patient on admission showing hip flexed, adducted and knee flexed posture



Figure 2. Pelvic radiograph (AP view) showing subluxated hip joints bilaterally

after the BTXA injections, both hips were easily dislocatable in flexion and adduction. The patient was put in a long leg serial cast that was changed every 5 days. After 2 weeks, a low temperature thermoplastic knee back slab with abduction bar was prescribed. It was applied after the subluxated hips were reduced through flexion and abduction. Two weeks later, the patient tolerated standing for a few hours without discomfort (Figure 3). Follow-up pelvic radiograph (AP view) showed both femoral heads well-contained within the respective acetabulum (Figure 4). At 2 week follow-up to the above treatment, the patient's hamstring R1-R2 differences were more than 30° on both sides and the popliteal angle was 30° on the right and 35° on the left. Hip adductor R1-R2 differences were $>25^\circ$ (right) and $>30^\circ$ (left) with hip abduction angles of 35° (right) and 45° (left). The patient was discharged with oral baclofen 20 mg 3 times a day and advised to do regular stretching and strengthening exercises and to do assisted standing with standing frame 2 to 3 times a day. Follow-up examinations (7 months after the injection) found her hip abduction angles and hamstrings popliteal angle improved to 45° and 30° respectively on each side.

Unfortunately, she regressed as she stopped participating in regular physiotherapy due to a lack of motivation. As a consequence, 1 year after undergoing treatment, she again presented to our clinic with bilateral contracture of the hip adductor and hamstring muscles for which bilateral hip adductor and hamstring muscle lengthening surgery were recommended. Oral baclofen 20 mg 3 times a day, low temperature thermoplastic knee back slab with abduction bar and regular physiotherapy (minimum 2 times/day) were continued after the surgery, and her hip abduction angles and popliteal angles were well maintained at 50° and 30° , respectively on each side through

her most recent follow-up examinations in early 2015. She is now compliant with a regular physiotherapy and standing program after receiving counseling and is coping well with her higher education for a career.

DISCUSSION

Although spontaneous dislocation of the hip joints secondary to paralysis is common in children (1), which is attributable to the relative shallowness of the immature acetabulum (2), it is rare in adults with paraplegia or spinal cord injury even when associated with severe muscle imbalance (1). Hip instability has been observed in almost all children who were injured when they were younger than 5 years of age and in more than 80 % of those injured when they were younger than 10 years of age (3). Severe hip flexors and adductors spasticity can lead to hip joint subluxation and eventual dislocation.

Early and effective intervention to control spasticity and maintain proper lower limb position is mandatory to prevent these complications. Injection with BTX-A to the spastic muscles is one of the treatment options that is common for the treatment of spasticity. BTXA, which is a potent neurotoxin, is the product of the anaerobic bacteria *Clostridium botulinum*. It was first used in 1980 to treat involuntary contractions and spasms of the eyelid muscles and crossed-eyes. In 1989, it was proposed for the treatment of spasticity (4,5) due to its ability to block cholinergic transmission at the neuromuscular junction. A low dose is suggested, and the patient's weight, muscle bulk, disease severity, post-injection excessive weakness and results of previous therapy must be considered (6).

Sobolewski (7) reported that BTX-A is efficient in reducing pain in spastic paraparetic patients. The author found



Figure 3. Day 17 Post-Botox injection-Patient on knee back slab with abduction bar, standing on the tilt table

that only high doses of BTX-A (bilaterally 400 units of BOTOX or 2000 units of Dysport) injected into hip adductors resulted in spasticity relief in lower extremities and increased hip abduction angles. However, in our patient, satisfactory results were noted after injection with low dose BTX-A to the hip adductors (50 units each). The response was very promising with significant improvement in MAS score, which was noted as MAS 1 after injection. Hip abduction angles became 35° on the right and 45° on the left 2 weeks after BTX-A injection.

Hyman et al. (8) studied the effects of Dysport in hip adductors spasticity in patients with multiple sclerosis. They found that Dysport treatment was well tolerated, with no major side effects seen at doses up to 1500 Units. The optimal dose for hip adductor spasticity was 500-1000 Units for both hip adductors. Severe hip adductor and flexor spasticity led to bilateral hip joint subluxation in our patient.

Strong pulling effect of both hamstrings muscle caused knee flexion that in turn aggravated hip flexion posture. Injection of BTX-A to both hip flexors, adductors and hamstring muscles at the same setting showed promising results. Post-botulinum toxin serial casting is mandatory, and thermoplastic knee back slab with abduction bar is crucial to maintain the hip in abduction and prevent further subluxation/ dislocation of the hip joints.

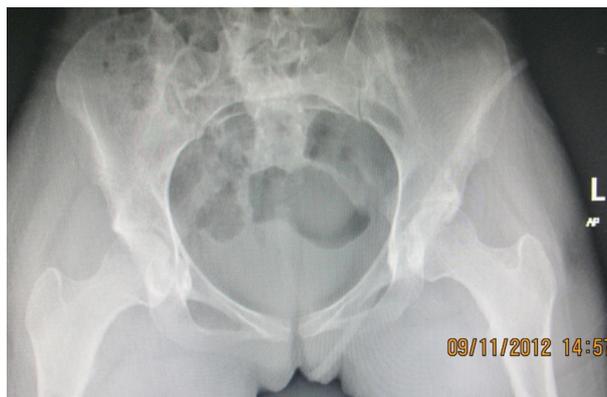


Figure 4. Check pelvic radiograph with patient on bilateral knee back slab with abduction bar, showing femoral heads well-contained within the acetabulum

Low temperature thermoplastic knee back slab with abduction bar should be considered after BTX-A injection in patients with severe hip adductor and hamstring spasticity with unstable hip joints as it is cost-effective and has proven satisfactory outcome. In addition, regular physiotherapy is mandatory for all patients with spasticity to improve the clinical outcome.

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