

The use of botulinum toxin and epidural analgesia for the treatment of spasticity and pain in a patient with maple syrup urine disease

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ABSTRACT

A 7-year-old boy, weighing 18 kg, was diagnosed with maple syrup urine disease (MSUD). He suffered from spasticity of the lower limbs and pain that did not respond to oral medications. Injections of botulinum toxin A (BTX-A) at 10 sites and epidural analgesia with 0.125% bupivacaine were used to treat spasticity with good results. We conclude that BTX-A combined with epidural analgesia may be a useful treatment option for incapacitating, painful spasticity related to MSUD. This treatment modality allowed a comprehensive rehabilitation program to be completed and it lasted longer than 9 months.

Key words: Botulinum toxin, epidural analgesia, maple syrup urine disease, pain, spasticity

INTRODUCTION

Maple syrup urine disease (MSUD) is a rare autosomal recessive metabolic disorder caused by a deficit of oxidative decarboxylation of branched-chain amino acids.^[1] It leads to a buildup of leucine, isoleucine, valine, and toxic metabolites in the blood and urine, and progresses to acute and chronic brain dysfunction.^[1] The first symptoms appear in early childhood and are characterized by sweet-smelling urine, with an odor similar to that of maple syrup. At birth, infants seem healthy, but if untreated they may suffer from neurological deterioration, seizures, hypertonia, or ataxia.^[1] We report on a case of MSUD complicated by spasticity that was treated with botulinum toxin A (BTX-A) injections and epidural analgesia.

CASE REPORT

The case described here is a 7-year-old boy whose parents approved the publication of this case report. The child weighed 18 kg and was diagnosed with MSUD. He was

admitted with severe lower limb spasticity, contraction of both hip and knee joints, and dorsiflexion of both feet. His medical history included neurological deterioration, psychomotor delay, and previous hospital admission for the treatment of dehydration and a cerebrovascular accident. Correction surgeries included bilateral adductor tenotomies, lengthening of the Achilles tendons, and the application of a cast to the lower half of the body (Hip Spica). The cast was removed 1 month later, but the contraction of the right hip and knee joints remained; therefore, the cast was reapplied [Figure 1]. After this, the parents noticed that their child was unhappy and suffered from pain, and they struggled to control his disturbed moods and to relieve his pain. The patient was readmitted to the hospital with severe dehydration and in severe pain. The cast was removed and dehydration was corrected. Physical examination revealed an uncooperative child who avoided eye contact and had painful facial impressions. Benzodiazepine and baclofen were prescribed to relieve the contraction, while paracetamol and ibuprofen were administered to control his pain, but the effect was limited. Botulinum toxin (Botox Type A; Allergan Company, BOTOX[®]) was injected into the right lower limb under general anesthesia, using a 25-gauge needle; 200 units of BTX-A were diluted in 2 ml of saline and a total of 10 injections of 180 units (10 units/kg body weight) were injected at multiple sites in the right thigh and leg, with no complications. Three days later, an epidural catheter was inserted at the L4–L5 level to

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relieve pain. The catheter was threaded 3 cm into the epidural space and an infusion of 0.125% bupivacaine at a rate of 0.2 ml/kg/hour was initiated with the additional administration of 3 ml of 0.125% bupivacaine 30 min prior to the physiotherapy session. The epidural catheter was removed 5 days later with no complications. Muscle spasm was reduced, 12 days following BTX-A injection. Casting, orthotic management, and intensive physical therapy were initiated and led to an extended duration of extension of the hip and knee joints, muscle stretching, better pain control, and improved patient cooperation and social skills. The patient attended follow-up appointments every 3 months. The last visit was at 9 months from the discharge date. On each visit, the patient showed progressive improvement in lower limb strength, range of motion, and the ability to stand and walk with assistance [Figure 2].

DISCUSSION

The treatment of spasticity is an important part of the management of patients with MSUD. The increased muscle tone, muscular contracture, and bony deformity impaired the function of this patient and necessitated surgical treatment.^[2] In this case, the surgical corrections attempted did not resolve the problem and the patient's condition deteriorated. BTX-A has been used as an effective therapy in children and adolescents with cerebral palsy (CP) or those with acquired brain injuries to improve leg and arm function, comfort, and well-being;^[2,3] yet, a literature review did not reveal any previous use of BTX-A in MSUD patients. BTX-A is selectively taken up by endocytosis at the cholinergic nerve terminal, where it blocks the release of acetylcholine and leads to temporary muscular denervation with reduced spasticity. The whole process is reversible. Recovery occurs after the return of vesicle turnover to the original terminals.^[4-6] The lack of previous clinical experience or knowledge of the response of MSUD patients necessitated the use of small doses of BTX-A to avoid potentially lethal effects associated with higher doses, while achieving an adequate response. The doses recommended for treating patients with CP were considered in the calculation of our doses.^[2] The achieved result was acceptable, no adverse events were noticed, and the duration of the effects was similar to that reported among CP patients.^[7] Epidural analgesia was initiated to relieve pain, reduce spasm, and allow orthotic management and casting. Again, we found no previous reports of epidural use among MSUD patients. Lumbar epidural analgesia was used with plain bupivacaine. Opioids were avoided to reduce the side effects. Doses similar to those reported among CP patients were administered.^[8]



Figure 1: Flexion of right hip and knee joints, prior to BTX-A injection



Figure 2: Extension of both right hip and knee joints after initiation of treatment

In conclusion, BTX-A injections and epidural analgesia might be useful as complementary treatments to surgery in children with MSUD in whom the benefits of surgery are difficult to predict. Further studies are needed to define the contributions of BTX-A injections and epidural analgesia in the treatment of spasticity in MSUD patients.

REFERENCES

1. Kahraman S, Ercan M, Akkus Ö, Erçelen Ö, Erdem K, Coşkun T. Anaesthetic management in maple syrup urine disease. *Anaesthesia* 1996;51:575-8.
2. Molenaers G, Campenhout AV, Fagard K, De Cat J, Desloovere K. The use of botulinum toxin A in children with cerebral palsy, with a focus on the lower limb. *J Child Orthop* 2010;4:183-95.
3. Rhijn J, Molenaers G, Ceulemans B. Botulinum toxin type A in the treatment of children and adolescents with an acquired brain injury. *Brain Inj* 2005;19:331-5.
4. Aoki KR, Ranoux D, Wissel J. Using translational medicine to understand clinical differences between botulinum toxin formulations. *Eur J Neurol* 2006;13:10-9.

5. Aoki KR. Pharmacology and immunology of botulinum toxin type A. *Clin Dermatol* 2003;21:476-80.
6. Paiva A, Meunier FA, Molgó J, Aoki KR, Dolly JO. Functional repair of motor endplates after botulinum neurotoxin type A poisoning: biphasic switch of synaptic activity between nerve sprouts and their parent terminals. *Proc Natl Acad Sci USA* 1999;96:3200-5.
7. Molenaers G, Schörkhuber V, Fagard K, Van Campenhout A, De Cat J, Pauwels P, *et al.* Long-term use of botulinum toxin type A in children with cerebral palsy: Treatment consistency. *Eur J Paediatr Neurol* 2009;13:421-9.
8. Nolan J, Chalkiadis GA, Low J, Olesch CA, Brown TC. Anaesthesia and pain management in cerebral palsy. *Anaesthesia* 2000;55:32-41.

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