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Short Communication

The use of Cerebrolysin in Pediatric Charcot Marie Tooth Disease

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Abstract

Charcot Marie Tooth disease is a very chronic progressive hereditary motor and sensory neuropathy characterized by progressive weakness and loss of touch sensation across various parts of the body. There are no curative or effective medical therapies that can ameliorate the disability associated with Charcot Marie Tooth disease. The aim of this paper is to describe the safe novel use of cerebrolysin in an Iraqi patient with Charcot Marie Tooth disease.

Patients and Methods

A boy who was born on the seventh of November, 2009, and was first seen on 29th of January, 2018 at the Children Teaching Hospital of Baghdad Medical City and had Charcot Marie Tooth disease was observed. He had difficulty in walking and abnormal gait that made him leave first grade primary school.

The nerve conduction study and electromyography study supported the clinical diagnosis of chronic symmetric sensori-motor polyneuropathy of moderate severity.

The boy was treated with a safe novel therapy for one month. He received ten doses of 3 ml intra-muscular cerebrolysin every three days.

Results

The short term effect of the therapy was dramatic with noticeable improvement that has never been reported before with this condition.

Conclusion

Further studies enrolling more patients are highly recommended.

Keywords:
Charcot-Marie-Tooth disease; treatment; cerebrolysin

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Introduction

Charcot Marie Tooth disease is a very chronic progressive hereditary motor and sensory neuropathy characterized by progressive weakness and loss of touch sensation across various parts of the body. However, the severity of symptoms is generally variable, and the progression of the disease can also vary. Currently the disorder is regarded incurable [1].

The aim of this paper is to describe the safe novel use of cerebrolysin in an Iraqi patient with Charcot Marie Tooth disease.

Patients and Methods

A boy who was born on the seventh of November, 2009, and was first seen on 29th of January, 2018 at the Children Teaching Hospital of Baghdad Medical City and had Charcot Marie Tooth disease was observed. He had difficulty in walking and abnormal gait that made him leave first grade primary school.

The parents were relatives and the boy had a healthy older sister aged eleven years who was doing well at fourth grade of primary school, and two younger sisters; one was aged seven years and had the same illness. The youngest sister has early symptoms of the disorder, but her condition has not been evaluated yet.

In this case, the affection of a brother and sister suggests an autosomal recessive form of the disorder.

The boy was considered normal until the age of two, but the parents thought that after the age of two the boy was rather clumsy and falling things from hands. Weakness of the lower and upper limbs progressed slowly, and his gait gradually deteriorated. CT scan of the brain was performed on the first of April, 2013 and showed normal findings.

Creatine phosphokinase was 183 u/L which is a little above the upper limit as the normal range is 38-174 u/L.

When the boy was examined, he was cooperative and can walk with difficulty (Figure 1). He was unable to stand up when sitting on the ground or from the squat position without holding the nearby chair.

He had weakness of the upper and lower limbs with diminished tendon reflexes and also had impairment of touch sensations on the lower and upper limbs suggesting polyneuropathy.

He was glad when asked to write something (Figure 1). He started writing despite having difficulty in holding the pen. He tried to draw a circle and an easy word, but he couldn't draw a straight line (Figure 2).



Figure 1. The boy was walking with difficulty and he was cooperative and was glad when asked to write something

A nerve conduction study was performed on the right and left median nerves, right and left ulnar nerves, right and left sural nerves and right and left common peroneal nerves by surface and needle electrodes.

The Nerve Conduction Study Showed

1. Dispersed sensory response with prolonged distal sensory latencies with reduced amplitude and conduction velocities.

2. Prolonged distal motor latencies, lower border and reduced motor conduction velocities with prolonged F wave latencies.

3. Reduced amplitude of compound motor action potentials, on proximal and distal stimulation sites.

4. There was no evidence of conduction block.

Needle Electromyography Study was Performed on the Deltoid, Biceps, Vastus Medialis, and Right and Left Tibialis Anterior Muscles and Showed

1. Spontaneous activity grade 1.



Figure 2. The boy started writing despite having difficulty in holding the pen. He tried to draw a circle and an easy word, but he couldn't draw a straight line



Figure 3. After treatment, the boy showed improvement in his ability to hold the pen as he could draw a more straight line

2. Increased mean duration, amplitude, and percentage of polyphasia.

3. Thirty to forty percent polyphasia of long duration and high amplitude.

4. Reduced recruitment pattern of high amplitude.

The nerve conduction study and electromyography study supported the clinical diagnosis of chronic symmetric sensori-motor polyneuropathy of moderate severity.

The uniform involvement, absence of conduction block, and the degree of conduction slowing in conjunction with electromyography study suggested the diagnosis of type II hereditary sensory neuropathy which is consistent with the familial pattern observed in the patient and his sister.

The boy was treated with a safe novel therapy for one month. He received ten doses of 3 ml intramuscular cerebrolysin every three days.

Results

The short term effect of the therapy was dramatic with noticeable improvement that has never been reported before with this condition:

1. He was no longer falling.

2. He was able to cross the step of the door of the home (about 20 cm) without falling as always before starting the treatment.

3. Marked improvement of the sensory examination.

4. Improvement in his ability to hold the pen as he could draw a more straight line (Figure 3).

Discussion

The use of cerebrolysin has been shown to be beneficial and safe in the treatment of various childhood neuro-psychiatric disorders including developmental and pervasive developmental disorders including autism and mental retardation, brain atrophy, cerebral palsy, Rett syndrome and myelomeningocele [2,3,4,5,6,7].

Cerebrolysin is a peptidergic therapeutic agent containing mainly biologically active neuro-peptides including brain-derived neurotrophic factor, glial cell line-derived neurotrophic factor, nerve growth factor, and ciliary neurotrophic factor. It has a nerve growth factor like activity on neurons, and growth promoting efficacy in different neuronal populations from peripheral and central nervous system.

Cerebrolysin has a direct neurotrophic effect, and neuroprotective properties against many types of lesion in vitro and in vivo.

The therapeutic effects of cerebrolysin have been thought to be similar to the pharmacological activities of naturally occurring nerve growth factors [2,3,4,5,6,7].

The Neuroreparative Effects of Cerebrolysin in Various Neuro-Psychiatric Disorders may Result from [2,3,4,5,6,7]

1. Inhibition of apoptosis.

2. Improving synaptic plasticity and induction of neurogenesis.

3. Augmenting the proliferation, differentiation, and migration of adult subventricular zone neural progenitor stem cells, contributing to neurogenesis.

4. Induction of stem-cell proliferation in the brain.

This study suggested that intramuscular cerebrolysin is a promising agent for a new effective treatment of Charcot Marie tooth disease.

Conclusion

Further studies enrolling more patients are highly recommended.

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Competing Interests

The authors have declared that no competing interests exist.

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