Chron Precis Med Res 2023; 4(1): 107-109
DOI: 10.5281/zenodo.7708923

CASE REPORT
OLGU SUNUMU

Hereditary Spastic Paraparesis Accompanied by Sensorimotor Axonal Polyneuropathy-A Case Report

Sensorimotor Aksonal Polinöropatiye Eşlik Eden Herediter Spastik Paraparezi-Olgu Sunumu

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ABSTRACT

Hereditary Spastic Paraplegias (HSP) are rare, genetically transferred diseases, usually presented with impairment in walking. The coexistence of HSP and polyneuropathy (PNP) in the same patient is much rare and individualized treatment should be taken into account. Here, the rehabilitation results of a case who applied for gait and balance rehabilitation with a combination of HSP and PNP will be presented in light of the literature. A 29-year-old man presented with gait difficulty and balance disorder. The patient had a spastic gait. He had bilateral pes cavus and hammer toe deformities in his feet and tibialis anterior muscles were atrophic bilaterally. Deep tendon reflexes were hypoactive in the upper limbs and hyperactive in the lower extremities. Babinski's sign was bilaterally positive. He also had mental retardation, dysarthria, and bilateral horizontal nystagmus. With all the findings, and examinations the patient was diagnosed with HSP and PNP. After the rehabilitation program, the patient's walking distance and the time to maintain his balance increased. Patients with HSP can be difficult to diagnose because of the diversity in both genetic inheritance and clinical presentation; accompanying sensory symptoms should not be overlooked and treatment should be individualized.

Keywords: Hereditary spastic paraparesis; polyneuropathy; rehabilitation

ÖZ

Herediter Spastik Parapareziler (HSP), genellikle yürüme bozukluğu ile ortaya çıkan, genetik olarak aktarılan nadir hastalıklardır. Aynı hastada HSP ve polinöropati (PNP) birlikteliği çok nadirdir ve kişiye özel tedavi dikkate alınmalıdır. Burada HSP ve PNP birarada saptanan, yürüme ve denge rehabilitasyonu için başvuran bir olgunun rehabilitasyon sonuçları literatür eşliğinde sunulacaktır. 29 yaşında erkek hasta yürüme güçlüğü ve denge bozukluğu ile başvurdu. Hastanın spastik yürüyüşü vardı. Ayağında bilateral pes kavus ve çekiç parmak deformiteleri vardı ve tibialis anterior kasları bilateral atrofikti. Derin tendon refleksleri üst ekstremitelerde hipoaktif, alt ekstremitelerde hiperaktifti. Babinski bulgusu bilateral pozitifti. Ayrıca zeka geriliği, dizartri ve bilateral horizontal nistagmus vardı. Tüm bulguları ve tetkikleri ile hastaya HSP ve PNP tanısı konuldu. Rehabilitasyon programından sonra hastanın yürüme mesafesi ve dengesini koruma süresi arttı. Hem genetik kalıtımdaki hem de klinik prezentasyondaki çeşitlilik nedeniyle HSP'li hastaların teşhisi zor olabilir; eşlik eden duyusal semptomlar gözden kaçırılmamalı ve tedavi bireyselleştirilmelidir.

Anahtar Kelimeler: Herediter spastik paraparezi; polinöropati; rehabilitasyon

INTRODUCTION

Hereditary Spastic Paraplegias (HSP) are a heterogeneous group of neurodegenerative diseases caused by damage to the pyramidal tract (1). Although HSP is usually inherited in autosomal dominant (AD) form (%70), it can also be inherited as autosomal recessive (AR), X-linked (XL), or mitochondrial (1). HSPs exist in isolated forms (pure HSP), or combined forms associated with neurological or non-neurological manifestations (complex HSP) (2). The features of this syndrome are lower extremity muscle weakness, spasticity, and extensor plantar response. In complicated HSP cases mental retardation, ataxia, amyotrophy, optic atrophy, pigmentary retinopathy, extrapyramidal findings, dementia, deafness, ichthyosis, peripheral neuropathy, and epilepsy can be seen (1,2). HSP is diagnosed by the exclusion of possible acquired causes or the presence of family history in addition to the characteristic clinical features (2).

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Başvuru Tarihi/Received: 29.09.2022
Kabul Tarihi/Accepted: 24.10.2022

Here, a case of HSP accompanied by sensorimotor axonal polyneuropathy (PNP) will be presented since they are rarely observed in the same patient.

CASE REPORT

A 29-year-old male patient was admitted to our clinic for gait and balance rehabilitation. The patient had significant dysarthria and bilateral horizontal nystagmus that started in childhood. He had bilateral pes cavus and hammer toe deformities in his feet (**Figure 1**). Tibialis anterior muscles were atrophic bilaterally. The sensorial deficit was absent. Deep tendon reflexes were hypoactive in the upper extremities and hyperactive in the lower extremities. Babinski's sign was bilaterally positive.

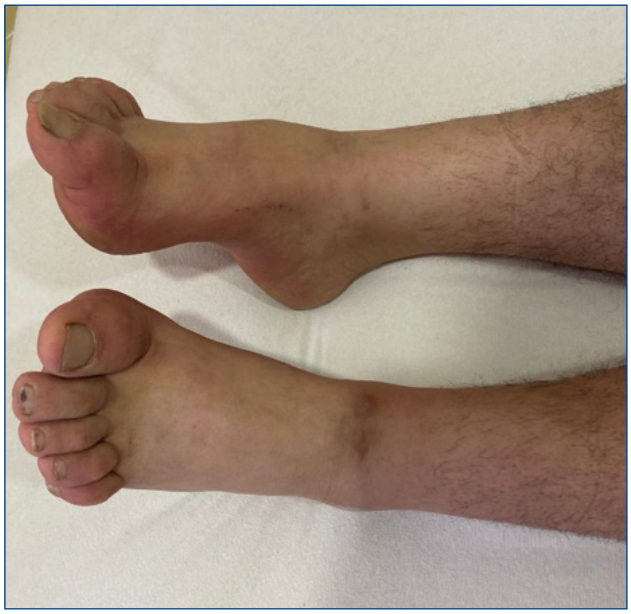

Figure 1. Bilateral pes cavus and hammer toe deformities

He had a scissor-like spastic gait. The patient was able to walk 2-3 meters under the supervision and lost his balance in a short time. The patient did not have a high palate. There was no hearing loss. The patient was evaluated by an ophthalmologist and no pathology was found. Cranial nerve functions were evaluated as normal. Corticobulbar tract involvement and autonomic involvement were not detected. There were no urinary difficulties, defecation difficulties and sexual impairment.

He had no known systemic disease. The patient started walking at the age of four and had gait disturbance and ataxia that started at the age of seven and gradually increased. He had described a slowly progressive deterioration in fine dexterity in the hands. The Intelligence Quotient test of the patient with a learning disability was compatible with moderate mental retardation.

The patient's parents were first-degree relatives and there were no relatives with similar complaints. Cranial and spinal MRIs were normal. Abdominal ultrasonography and blood parameters were normal. All genetic and metabolic tests performed for the differential diagnosis of Friedreich ataxia, Autosomal Recessive Spastic Ataxia of Charlevoix-Saguenay (ARSACS), Fragile X, and Niemann Pick Type C were found to be negative. In the electromyography (EMG) test, sensory nerve response amplitudes were found to be low in the sural, ulnar, and median nerves, while no pathology was found in the motor conductions examined. Needle EMG showed long-term motor unit action potentials with a reducing pattern in the bilateral tibialis anterior and gastrocnemius muscles. It has been reported that the findings obtained are compatible with an axonal polyneuropathy syndrome in which sensory and motor fibers are affected.

With all the findings, the patient was diagnosed with HSP and PNP. The patient was included in the rehabilitation program. A pair of orthopedic insoles were prescribed.

After a three-week rehabilitation program, it was seen that the patient was able to ambulate approximately three hundred and forty meters under supervision in the six-minute walking test. He was able to maintain his balance longer. The patient was discharged to be re-evaluated at the follow-up examination.

DISCUSSION

HSP is a clinically and genetically heterogeneous disease. In Europe, the prevalence of HSP is approximately 3~10/100.000 (2).

The first sign of HSP is expressing difficulty in walking. Children may have a walking delay. In addition to clinical features, it can be classified as early-onset (onset age 35 and below) and late-onset (onset age greater than 35) according to the time of onset of symptoms (3).

In pure-type HSP, symmetrical lower extremity spasticity is seen, resulting in a characteristic scissor gait (1-3). Foot deformities such as pes cavus and hammer toe can be seen in 30% of patients. Mild distal weakness and muscle atrophy may be seen in the later stages of the disease (1-3). The upper extremity is typically normal, while the lower extremity has increased tendon reflexes and Babinski sign. However, hyperactive reflexes can be obtained in the upper extremities in some patients (3). Similarly, in our case, there were hyperactive deep tendon reflexes in the lower extremities, whereas hypoactive reflexes were present in the upper extremities. This confirmed the presence of concomitant PNP.

Various genetically transmitted diseases are included in the differential diagnosis of HSP. Arginase deficiency due to spastic paraparesis; ARSACS, in which ataxia, spastic paraparesis and sensorimotor polynoropathy can be seen together, and Friedreich ataxia and Niemann Pick Type C Syndromes due to ataxia are included in the differential diagnosis (1). Brain and spine magnetic resonance imaging, complete ophthalmologic examination and full metabolic screening for inherited neurometabolic disorders, very long chain fatty acid analysis in plasma, serum

vitamin E, cobalamin, copper, ceruloplasmin levels, plasma lipoprotein and amino acid profiles, serological tests for Human Immunodeficiency Virus (HIV), Human T Cell Leukemia Virus Type I (HTLV-I), and Treponema pallidum and all exon genetic examination tests can be used to differentiate HSP from other diseases (1).

Sensory findings such as a mild decrease in vibration sense and paresthesia in the lower extremities can be found in typical HSP patients (1-3). EMG is found to be normal in most of these patients (4). This clinical finding suggests central axonopathy rather than peripheral nerve involvement. Peripheral neuropathy has been described in complicated HSPs, but it can also be detected in electrophysiological pure HSPs (5). Clinically, the level of neuropathy can vary from asymptomatic to severe neuropathy (6). Axonal neuropathy was found in nerve biopsies performed on patients with neuropathy (6). Dyck and Lambert described a form of hereditary motor and sensory polyneuropathy (HMSN) associated with HSP and classified it as "HMSN type V" (7). The loci for HSP and HMSN were analyzed considering the possibility that different mutations in the same gene might cause these two clinical tables, but a clear relationship could not be demonstrated (8). Symptoms usually begin in the second decade of life or later, and the course is usually slow. Similarly, our case underwent an EMG study that was indicative of a motor and sensory peripheral neuropathy of axonal type at the age of 28. It was thought that our patient had early-onset and complex-type HSP accompanied by ataxia, mental retardation, and PNP.

When clinical appearance and genetic features are examined together, it is seen that cases with only spasticity are mostly inherited from AD, and complicated cases are generally inherited from AR. The recessive model of inheritance is known to be common in populations with high rates of consanguineous marriages like our case (9).

There is no treatment to prevent or stop the disease process. The aim of treatment in HSP patients is to reduce spasticity, correct gait disturbance, and increase the functional gain and quality of life of the patient. Antispastic agents or surgery may be beneficial for the symptomatic treatment of HSP (10).

CONCLUSION

In cases presenting with spastic paraplegia during childhood, HSP should also be considered in the differential diagnosis, even at an early stage, consanguineous marriage, family history of walking difficulties, weakness and spasticity should be questioned, and if necessary, they should be referred for further examination and treatment. In conclusion, patients with HSP can be difficult to diagnose because of the diversity in both genetic inheritance and clinical presentation; accompanying sensory symptoms should not be overlooked and treatment should be individualized.

ETHICAL DECLARATIONS

Informed Consent: The patient signed the informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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