

Syringomyelia: A New Phenotype of *SPG11*-Related Hereditary Spastic Paraplegia?



Ga Hye Kim, MD, Taeyoung Song, MD, Dae-Hyun Jang, MD, PhD

Department of Rehabilitation Medicine, Incheon St. Mary's Hospital
College of Medicine, The Catholic University of Korea

Background

- Hereditary spastic paraplegia (HSP) is a heterogeneous group of neurodegenerative diseases affecting motor neurons.
- HSP from *SPG11* pathogenic variants are linked to complex forms, which comprises a combination of cognitive deterioration, progressive spastic gait with weakness of the limbs, peripheral neuropathy.
- Typically on brain MRI, a thin corpus callosum is observed.
- Herein, we describe a patient with HSP type 11 with a newly seen phenotype.

Case Description

- An 8-year-old boy was referred for intellectual impairment.
- Birth, perinatal history:
 - Spontaneous vaginal delivery at 38 weeks of gestation with a birth weight of 3160 g (70th percentile)
 - No perinatal complications, non-contributory family history
 - Eyesight and hearing within normal ranges
- At time of referral:
 - Height: 140 cm (97th percentile), body weight: 45 kg (99th percentile)
 - No particular developmental problems until age four, after which his cognitive development seemed to lag.
 - Upon examination, he had a mild limping gait, and while he showed no apparent motor weakness, he had bilaterally increased knee jerk reflexes with an ankle clonus of 2-3 Hz.
 - Speech/language & intelligence evaluation was performed.
 - Preschool Receptive-Expressive Language Scale (PRES) scores: receptive language (5.5 years), expressive language (4 years)
 - Korean Wechsler Intelligence Scale-IV: borderline intellectual functioning level (FSIQ of 74)
- Laboratory test results were nonspecific.
- Brain MRI revealed a hypoplastic genu of his corpus callosum.
- Whole-spine MRI revealed diffuse extensive syringomyelia in the thoracic and lumbar levels of his spinal cord (Fig. 1).
- NGS analysis revealed two heterozygous variants in *SPG11*: a frameshift variant in exon 11 (NM_025137.3:c.2163dupT) and an intronic variant in intron 30 (c.5866+1G>A).
- Sanger sequencing showed his parents were heterozygous carriers of each variant (Fig. 2).



Figure 1. Whole-spine magnetic resonance imaging (MRI) of the patient, showing syringomyelia in the thoracic and lumbar levels of the spinal cord (marked by an arrow).

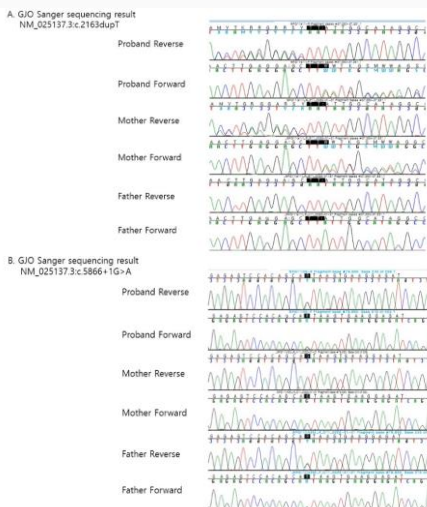


Figure 2. DNA sequence chromatography of the patient and his parents. (A) c.2163dupT. (B) c.5866+1G>A.

Conclusion

- This patient possessed biallelic variants of *SPG11* and showed marked delays in language and cognition along with mild gait impairment and upper motor neuron signs. Brain MRI revealed a hypoplastic corpus callosum.
- Although these features were generally consistent with the known phenotype of HSP type 11, a notable feature in this patient was the presence of syringomyelia that had no other possible explanations (Chiari malformation, spinal mass, etc.).
- Further studies are needed to identify the genotype-phenotype relationship of these variants.