CASE REPORT

CYPRUS
JOURNAL OF MEDICAL SCIENCES

DOI: 10.4274/cjms.2023.2023-50
Cyprus J Med Sci 2023;8(6):449-452

Late-onset Brown-Vialetto-Van Laere Syndrome with Electrophysiological Findings

Ferda Selçuk[1], Mustafa Ertaş[2]

[1]Clinic of Neurology, Dr. Burhan Nalbantoğlu State Hospital, Nicosia, North Cyprus
[2]Department of Neurology, İstanbul University, İstanbul Faculty of Medicine, İstanbul, Türkiye

Abstract

Brown-Vialetto-Van Laere syndrome (BVVLS), a rare neurological disorder, can cause sensorineural hearing loss, bulbar palsy, and breathing problems at any age. Facial weakness, slurred speech, and neck, shoulder, and limb weaknesses are its other features. The prevalence of BVVLS is estimated to be less than 1 in 1,000,000. There are autosomal recessive cases in about half of the familial cases, while there are also sporadic cases. For diagnosis, the clinical presentation is assessed and many tests, such as cerebrospinal fluid analysis, muscle biopsy, brain magnetic resonance imaging, and neurophysiological examinations are also performed. In this report, we discuss the first instance of a 47-year-old male patient from North Cyprus who had sensorineural hearing loss and lower cranial nerve involvement along with electrophysiological abnormalities.

Keywords: Brown-Vialetto-Van Laere syndrome, electrophysiology, late-onset

INTRODUCTION

Brown-Vialetto-Van Laere syndrome (BVVLS) is characterized by progressive pontobulbar palsy with sensorineural deafness. Most frequently, the lower cranial nerves VII to XII are involved.[1-5] Brown[6] originally identified this syndrome in 1894, followed by Vialetto[7] in 1936 and Van Laere[8] in 1966. About half of all cases are sporadic, and its etiopathogenesis is still unknown.[9] There have also been reports of X-linked or autosomal dominant inheritance.[2] The earliest symptoms might appear at any age, from infancy to the third decade.[2] Although it has been proposed that males may be more seriously impacted than females,[1] reported cases show that females are affected more frequently than males.

Initial presenting signs, in addition to sensorineural hearing loss, include slurred speech,[4] facial weakness,[10] and weakness in the neck and shoulders. This condition is frequently regarded as one of the numerous motor neuron diseases.[11]

We present the clinical and electrophysiological findings of the first case of a late-onset sporadic BVVLS in North Cyprus.

CASE PRESENTATION

Clinical History

A 47-year-old male presented with slurred speech, numbness of the mouth, and difficulty with swallowing. He reported that his symptoms had arisen during the previous 6 months. His neurologic examination revealed bifacial weakness, an atrophic tongue with fasciculation, and a weak gag reflex. However, sensory tests and deep tendon reflexes were within normal ranges.

In the following months, difficulty in swallowing and choking progressed, which caused weight loss. Atrophy and the fasciculations in the tongue became apparent (Figure 1). After one year, he had developed hearing loss in the left ear. His hearing deteriorated within two years, leading to total hearing loss on the left side and sensorineural hearing loss on the right side. With medical and symptomatic treatment, it has been four years since the diagnosis.

To cite this article: Selçuk F, Ertaş M. Late-onset Brown-Vialetto-Van Laere Syndrome with Electrophysiological Findings. Cyprus J Med Sci 2023;8(6):449-452

ORCID IDs of the authors: F.S. 0000-0002-2170-4061; M.E. 0000-0003-0606-952X.

Address for Correspondence: Ferda Selçuk
E-mail: ferdaselcuk@yahoo.com
ORCID ID: orcid.org/0000-0002-2170-4061

Received: 17.05.2023
Accepted: 10.11.2023

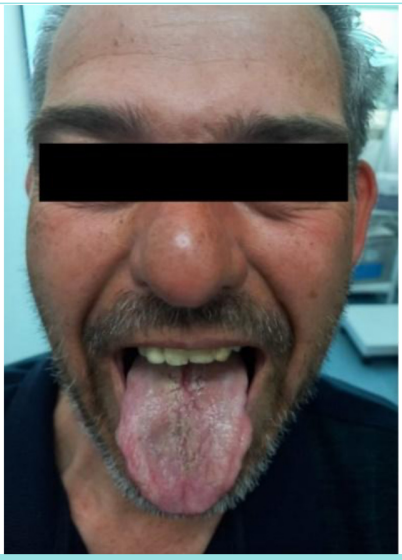

Figure 1. Atrophy of the tongue

Investigations

There were no abnormalities in the biochemical laboratory tests. Acetylcholine receptor antibody test was found negative. The results of the abdomino-pelvic sonography, chest computed tomography scan, and brain magnetic resonance imaging did not show any abnormalities.

Electromyography (EMG) and nerve conduction studies showed the electrophysiological findings of lower motor neuron damage affected tongue and upper limb muscles on both sides with normal sensory and motor conduction values and chronic neurogenic MUAP changes in tongue, hand and arm muscles together with severely decreased interference pattern and spontaneous denervation activity in the hand muscles, while needle EMG findings of all abdominal and leg muscles were normal, as can be seen in Table 1.

The audiometry test revealed mild sensorineural hearing loss on the right side at high frequencies. However, on the left side, there was severe sensorineural hearing loss with non-measurable speech reception thresholds.

Table 1. Electrophysiological findings

				Voluntary action				
Muscle (innervation)	**Interpretation**	**Fib**	**PSW**	**Amp**	**Dur**	**Polyphazic**	**Stable**	**IP**
Left Interosseous dorsalis I (ulnar ramus profundus, C8, T1)	Mild inactive neuropathy	4/10	4/10	++	++	Normal	Normal	—
Right Interosseous dorsalis I (ulnar ramus profundus, C8, T1)	Mild inactive neuropathy	4/10	4/10	++	++	Normal	Normal	—
Left triceps (radialis, C6, C7, C8)	Severe inactive neuropathy	0/10	0/10	+++	+++	Normal	Normal	—
Right triceps (radialis, C6, C7 C8)	Severe inactive neuropathy	0/10	0/10	+++	+++	Normal	Normal	—
Left deltoideus posterior (axillaris C5, C6)	Mild inactive neuropathy	4/10	4/10	++	++	Normal	Normal	—
Right deltoideus posterior (axillaris C5, C6)	Mild inactive neuropathy	4/10	4/10	++	++	Normal	Normal	—
Left rectus abdominis	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right rectus abdominis	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right biceps (musculacutaneous, C5, C6)	Severe inactive neuropathy	0/10	0/10	+++	+++	Normal	Normal	—
Left biceps (musculacutaneous, C5, C6)	Severe inactive neuropathy	0/10	0/10	+++	+++	Normal	Normal	—
Left gastrocinemius caput lateralis (tibialis, S1, S2)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right gastrocinemius caput lateralis (tibialis, S1, S2)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Left gastrocinemius caput medialis (tibialis, S1, S2)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right gastrocinemius caput medialis (tibialis, S1, S2)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Left ext hallucis longus (peroneus profundus L5, S1)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right ext hallucis longus (peroneus profundus L5, S1)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Left tibialis anterior (peroneus profundus, L4, L5)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right tibialis anterior (peroneus profundus, L4, L5)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Left vastus lateralis (femoralis, L2, L3, L4)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right vastus lateralis (femoralis, L2 L3 L4)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Left rectus femoris (femoralis L2, L3, L4)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right rectus femoris (femoralis, L2, L3, L4)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Left tensor fascia latae (gluteus inferior, L4, L5)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right tensor fascia latae (gluteus inferior, L4, L5)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Left iliopsoas (femoralis, Ll, L2, L3, L4)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Right iliopsoas (femoralis, Ll, L2, L3, L4)	Normal	0/10	0/10	Normal	Normal	Normal	Normal	Normal
Left glossus	Mild inactive neuropathy	4/10	4/10	++	++	Normal	Normal	—
Left glossus	Mild inactive neuropathy	4/10	4/10	++	++	Normal	Normal	—

Fib: Fibrillation, PSW: Positive sharp wave, Amp: Amplitude, Dur: Duration, IP: Interference pattern.

Medication

After the BVVLS diagnosis, the patient received intravenous immunoglobulin (IVIG) treatment at a dose of 0.4 g/kg for 5 days, followed by monthly repeated doses of 0.4 g/kg IVIG for one day for 6 months. However, this treatment did not result in any improvement in his symptoms.

He was also treated with 1,000 mg methylprednisolone for 10 days and continued to receive monthly steroid treatment after IVIG therapy. Although he experienced some improvement in swallowing and speech, it was limited.

In addition, he was prescribed riboflavin (B2) tablets at a daily dose of 300 mg. Supportive care and symptomatic treatment, such as botulinum toxin type A treatment for excessive salivation and a swallowing rehabilitation program were also administered. As a result, the patient's clinical condition stabilized.

DISCUSSION

The rare neurological condition known as BVVLS, a type of motor neuron disorder, is characterized by bilateral hearing loss along with a number of other, primarily motor and cranial nerve dysfunctions.[10] No definitive biochemical or genetic defect has been described, and its diagnosis is primarily dependent on clinical characteristics and electrophysiological tests.[4] The clinical course of BVVL, which varies considerably from case to case, is one of the condition's most intriguing characteristics. It can be fatal[9,10] or it can take a very long time to progress, with some patients still alive 20 to 30 years after the onset of the initial symptoms.[5,12] Respiratory failure is the leading cause of death. The condition can appear at any age, from infancy[5] to the third decade,[13] but it tends to manifest more frequently in the first and second decades.[14] Our patient, however, had a late-onset of symptoms and was 47 years old. The disease can last from 0 (death at presentation) to 45 years.[14]

Nearly all instances begin with sensorineural deafness, which is typically severe and progressive over time. In our case, facial paralysis, slurred speech, and mouth numbness were the most prominent symptoms rather than hearing loss. The patient gradually lost his hearing. Although this is unusual, there have been a few instances where it has been documented in the literature. All of the cases[4,5,10,15,16] eventually developed hearing loss.

BVVL is frequently categorized among the vast array of motor neuron disorders. However, its erratic course and neurophysiological improvement contrast with the prevalent heredodegenerative disease of motor neurons' more stable advance (slow or rapid).[15]

When making a differential diagnosis for BVVL, numerous alternative diseases should always be taken into consideration because they closely resemble BVVL. Another potential diagnosis is amyotrophic lateral sclerosis (ALS). However, sensorineural deafness is not a symptom of ALS, and ALS typically does not present at young ages.[17]

BVVL and the madras motor neuron disease (MMND) are also closely connected medical conditions. Sensorineural deafness, multiple cranial nerve palsies mainly affecting cranial nerves VII, IX, and XII, and muscular atrophy and weakness are all symptoms of MMND. The cranial nerves III and VI have not been observed in MMND. Compared to 50% of BVVL cases, only 15% of MMND patients are familial.[16]

Neurophysiological studies have shown alterations of chronic[1,2,12,15,18-20] or active[1,13,17,21] denervation in muscles, but normal conduction velocities of the motor nerves. In our case, motor nerve conduction investigations were normal, but EMG showed persistent neurogenic alterations in the tongue, arm, and hand muscles along with active denervation.

A specific treatment for BVVL does not exist. In a few instances, steroids and immunoglobulins have been used. Two patients experienced brief stabilization. In the first, steroid treatment temporarily stabilized the situation for at least eight months.[1] Another patient who had IVIG had their illness stabilized for a year.[20] Two further patients who received IVIG did not, however, make any progress.[18] In our situation, steroids stabilized the patient's condition, while IVIG had no effect on the disease. The cornerstones of BVVL management are symptomatic and supportive care. However, the efficacy of the interventions can still be considered anecdotal when treating an uncommon ailment such as BVVL, since it is impossible to conduct randomized controlled trials with the insufficient number of patients available. Regardless, it is possible to generalize for BVVL from the experience of utilizing these treatments in other disorders which are similar, particularly ALS. For instance, in ALS, maintenance of nutrition and assisted ventilation have been shown to increase survival.[17]

It is critical that as BVVL instances are identified, these cases continue to be documented in the literature so that we can better understand this uncommon progressive neurological condition. Due to its rarity and similarities to other neurological illnesses, BVVLS is thought to be underdiagnosed and frequently misdiagnosed. We probably still do not fully understand the clinical range of BVVL. If more cases are reported in the literature, this will make it possible to give affected people and their families a better understanding of the clinical course, prognosis, and treatment of this crippling ailment. In order to contribute to the understanding of this disease, we described the clinical and neurophysiological characteristics of a patient with late-onset sporadic BVVLS in this case report. This is the first instance of BVVLS from Northern Cyprus to be reported.

MAIN POINTS

- The prevalence of BVVLS is estimated to be less than 1 in 1,000,000.
- Due to its rarity and similarities to other neurological illnesses, BVVLS is thought to be underdiagnosed and frequently misdiagnosed.
- The cornerstones of BVVL management are symptomatic and supportive care.
- This is the first instance of BVVLS from North Cyprus to be reported.

ETHICS

Informed Consent: It was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: F.S., M.E., Concept: F.S., M.E., Design: F.S., M.E., Data Collection and/or Processing: F.S., M.E., Analysis and/or Interpretation: F.S., M.E., Literature Search: F.S., M.E., Writing: F.S., M.E.

DISCLOSURES

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

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

REFERENCES

1. Gallai V, Hockaday JM, Hughes JT, Lane DJ, Oppenheimer DR, Rushworth G. Ponto-bulbar palsy with deafness (Brown-Vialetto-Van Laere syndrome). J Neurol Sci. 1981; 50(2): 259-75.
2. Hawkins SA, Nevin NC, Harding AE. Pontobulbar palsy and neurosensory deafness (Brown-Vialetto-Van Laere syndrome) with possible autosomal dominant inheritance. J Med Genet. 1990; 27(3): 176-9.
3. Koul R, Jain R, Chacko A, Alfutaisi A, Hashim J, Chacko J. Pontobulbar palsy and neurosensory deafness (Brown-Vialetto-van Laere syndrome) with hyperintense brainstem nuclei on magnetic resonance imaging: new finding in three siblings. J Child Neurol. 2006; 21(6): 523-5.
4. Sathasivam S, O'Sullivan S, Nicolson A, Tilley PJ, Shaw PJ. Brown-Vialetto-Van Laere syndrome: case report and literature review. Amyotroph Lateral Scler Other Motor Neuron Disord. 2000; 1(4): 277-81.
5. Voudris KA, Skardoutsou A, Vagiakou EA. Infantile progressive bulbar palsy with deafness. Brain Dev. 2002; 24(7): 732-5.
6. Brown CH. Infantile amyotrophic lateral sclerosis of the family type. J Nerv Ment Dis 1894; 19(11): 707-16.
7. Vialetto E. Contributo alla forma ereditaria della paralisi bulbare progressiva. Riv Sper Freniatr. 1936; 40: 1-24.
8. Van Laere J. Paralysie bulbo-pontine chronique progressive familiale avec surdité. Un cas de syndrome de Klippel-Trenaunay dans la même fratrie. Problèmes diagnostiques et génétiques [Familial progressive chronic bulbo-pontine paralysis with deafness. A case of Klippel-Trenaunay syndrome in siblings of the same family. Diagnostic and genetic problems]. Rev Neurol (Paris). 1966; 115(2): 289-95.
9. Mégarbané A, Desguerres I, Rizkallah E, Delague V, Nabbout R, Barois A, et al. Brown-Vialetto-Van Laere syndrome in a large inbred Lebanese family: confirmation of autosomal recessive inheritance? Am J Med Genet. 2000; 92(2): 117-21.
10. Dipti S, Childs AM, Livingston JH, Aggarwal AK, Miller M, Williams C, et al. Brown-Vialetto-Van Laere syndrome; variability in age at onset and disease progression highlighting the phenotypic overlap with Fazio-Londe disease. Brain Dev. 2005; 27(6): 443-6.
11. Descatha A, Goddet S, Aboab J, Allary J, Gergereau A, Baer M, et al. Cardiac arrest in a patient with Brown-Vialetto-Van Laere syndrome. Amyotroph Lateral Scler. 2006; 7(3): 187-8.
12. Alberca R, Montero C, Ibañez A, Segura DI, Miranda-Nieves G. Progressive bulbar paralysis associated with neural deafness. A nosological entity. Arch Neurol. 1980; 37(4): 214-6.
13. Piccolo G, Marchioni E, Maurelli M, Simonetti F, Bizzetti F, Savoldi F. Recovery from respiratory muscle failure in a sporadic case of Brown-Vialetto-Van Laere syndrome with unusually late onset. J Neurol. 1992; 239(6): 355-6.
14. Nafissi S, Yadegari S, Salimipour H. Review of Brown-Vialetto-Van Laere syndrome and differential diagnosis (In Persian). Tebbe Jonub. 2011; 14: 193-8.
15. Abarbanel JM, Ashby P, Marquez-Julio A, Chapman KR. Bulbo-pontine paralysis with deafness: the Vialetto-Van Laere syndrome. Can J Neurol Sci. 1991; 18(3): 349-51.
16. Summers BA, Swash M, Schwartz MS, Ingram DA. Juvenile-onset bulbospinal muscular atrophy with deafness: Vialetta-van Laere syndrome or Madras-type motor neuron disease? J Neurol. 1987; 234(6): 440-2.
17. McDermott CJ, Shaw PJ. Diagnosis and management of motor neurone disease. BMJ. 2008; 336(7645): 658-62.
18. Davenport RJ, Mumford CJ. The Brown-Vialetto-van Laere syndrome: a case report and literature review. Eur J Neurol. 1994; 1(1): 51-4.
19. Francis DA, Ponsford JR, Wiles CM, Thomas PK, Duchen LW. Brown-Vialetto-Van Laere syndrome. Neuropathol Appl Neurobiol. 1993; 19(1): 91-4.
20. Sztajzel R, Kohler A, Reichart M, Djientcheu VP, Chofflon M, Magistris MR. Syndrome de Brown-Vialetto-Van Laere. Un cas avec anticorps anti-ganglioside GM1 et revue de la littérature [Brown-Vialetto-Van Laere syndrome: a case with anti-ganglioside GM1 antibodies and literature review]. Rev Neurol (Paris). 1998; 154(1): 51-4.
21. Rosemberg S, Lancellotti CL, Arita F, Campos C, de Castro NP Jr. Progressive bulbar paralysis of childhood (Fazio-Londe disease) with deafness. Case report with clinicopathologic correlation. Eur Neurol. 1982; 21(2): 84-9.