



A comprehensive analysis of a patient with anterior interosseous nerve neuropathy

Análisis integral de un paciente con neuropatía del nervio interóseo anterior

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ABSTRACT

Introduction: Isolated anterior interosseous nerve paralysis, initially characterized by Parsonage and Turner in 1948, evolved with Kiloh and Nevin's 1952 identification, leading to the term "Kiloh-Nevin syndrome." Recent cases prompted a comprehensive review, emphasizing accurate differentiation for tailored therapeutic guidance and improved patient outcomes, incorporating advanced imaging techniques like magnetic resonance imaging.

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Objective: To present the clinical case of a patient with anterior interosseous nerve paralysis (Kiloh-Nevin syndrome).

Clinical case: A 44-year-old right-handed man, physically active, participates in functional training thrice weekly and amateur soccer. His perceived exertion ranges from "hard" to "very hard" on the Borg scale. He also works a sedentary office job. The patient suddenly exhibited an inability to flex his left thumb and perform an "OK" sign, with no identifiable preceding event.

Conclusion: The case of anterior interosseous nerve palsy in an active patient highlights the importance of recognizing peripheral nerve injuries in such individuals. Interactions between a sedentary job and physical activities suggest a multifactorial nature. Advanced diagnostic modalities aid in accurate diagnosis.

Keywords: cervical spine; diagnostic imaging; electromyography; nerve compression syndromes; peripheral nerve injuries; physical therapy modalities.

RESUMEN

Introducción: La parálisis aislada del nervio interóseo anterior, inicialmente caracterizada por Parsonage y Turner en 1948, evolucionó con la identificación de Kiloh y Nevin en 1952, lo que llevó al término "síndrome de Kiloh-Nevin". Casos recientes motivaron una revisión integral, enfatizando la diferenciación precisa para una guía terapéutica personalizada y mejores resultados en los pacientes, incorporando técnicas avanzadas de imagen como la resonancia magnética.

Objetivo: Presentar el caso clínico de un paciente con parálisis del nervio interóseo anterior (síndrome de Kiloh-Nevin).

Caso clínico: Hombre diestro de 44 años, físicamente activo, participa en entrenamiento funcional 3 veces por semana y en fútbol amateur. Su percepción del esfuerzo varía entre "duro" y "muy duro" en la escala de Borg. También trabaja en un empleo de oficina sedentario. El paciente presentó repentinamente una incapacidad para flexionar el pulgar izquierdo y realizar el signo de "OK", sin un evento precedente identificable.

Conclusión: El caso de parálisis del nervio interóseo anterior en un paciente activo resalta la importancia de reconocer las lesiones nerviosas periféricas en tales individuos. Las interacciones entre un trabajo



sedentario y actividades físicas sugieren una naturaleza multifactorial. Las modalidades diagnósticas avanzadas ayudan a un diagnóstico preciso.

Palabras clave: columna cervical; diagnóstico por imagen; electromiografía; síndromes de compresión nerviosa; lesiones de nervios periféricos; modalidades de fisioterapia.

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INTRODUCTION

Isolated anterior interosseous nerve paralysis, known as Kiloh-Nevin syndrome, is a rare neurological disorder initially characterized by Parsonage and Turner in 1948, who documented a single patient with this condition and five with neuralgic amyotrophy of the shoulder.⁽¹⁾ Kiloh and Nevin identified two more cases in 1952, coining the term "Kiloh-Nevin syndrome."⁽²⁾ Recently, a case of this condition was encountered, and the literature was reviewed. Accurate differentiation between paralytic brachial neuritis (Parsonage-Turner syndrome) and other similar conditions is crucial.⁽³⁾ Diagnosing involves ruling out trauma, infections, or autoimmune disorders. Imaging techniques like magnetic resonance imaging (MRI) are valuable for assessing neural involvement and excluding structural anomalies. Precise differentiation is essential for effective management, optimizing prognosis, and improving patient quality of life.

This report presents the clinical case of a patient with Kiloh-Nevin syndrome, detailing the diagnostic challenges and therapeutic strategies used.



CLINICAL CASE

A 44-year-old right-handed man maintains a physically active lifestyle, participating in functional training sessions three times a week at a perceived intensity of "hard" to "very hard" on the Borg scale. He also plays amateur soccer one to two times per week with a "somewhat hard" to "hard" intensity. Despite his active lifestyle, he has a sedentary office job, using a computer and cellphone 8 to 10 hours a day. Suddenly, he exhibited an inability to flex the interphalangeal joint of his left thumb and perform an "OK" sign, with no identifiable preceding event the weakness appeared abruptly (Fig 1).

His neurology specialist ordered comprehensive tests to assess neurological function, aiming to diagnose and treat potential neurological conditions. This case highlights the complexity of diagnosing and managing anterior interosseous nerve syndrome, especially with the sudden onset of symptoms in an active individual.



Fig. 1 - Left hand with an inability to make a pincer movement with the thumb and index finger.

Left forearm ultrasound: The flexor pollicis longus was in good condition. Discrete trophic changes and slight echogenicity increase in the pronator quadratus muscle were noted. Mild thickening of the median nerve fascicle was observed without significant changes in nerve caliber.

Nerve conduction study and electromyography: Both upper limbs showed normal motor and sensory nerve conduction, including F-wave responses. Needle electromyography revealed no active or chronic denervation in relevant muscles, suggesting no muscle damage or loss of innervation (table 1).



Table 1 - Needle Electromyography summary

Summary	Spontaneous Activity					Motor Units			Effort		
	Insuf	Fibr	HPW	Fasc	BAD	Amp	Dur	PP	Rec	Pat	Eff
Left forearm 1st dorsal interosseous	N	No	No	No	No	5	N	No	N	Interference	Maximum
Right forearm 1st dorsal interosseous	N	No	No	No	No	8	N	No	N	Interference	Maximum

Insuf: Insufficient; Fibr: Fibrillations; HPW: High-Power Waves; Fasc: Fasciculations; BAD: Briefly Arrhythmic Discharges; Amp: Amplitude; Dur: Duratin; PP: Polyphasic Potentials; Rec: Recruitment; Pat: Pattern; Eff: Effort.

Magnetic resonance imaging of the cervical brain: The ventricular system and subarachnoid space were normal. No significant signal abnormalities were found except for a small isolated gliotic focus. The pituitary region and major intracranial vascular structures were unchanged.

Magnetic resonance imaging of the cervical spine: The cranio-cervical junction was normal. Mild uncovertebral joint degeneration was identified at C4-C5, C5-C6, and C6-C7. Degenerative discopathies were observed in the sagittal plane of the cervical spine (Fig. 2), with a 3 mm slice thickness and degenerative disc disease with protrusions potentially compressing nerve roots was detected.

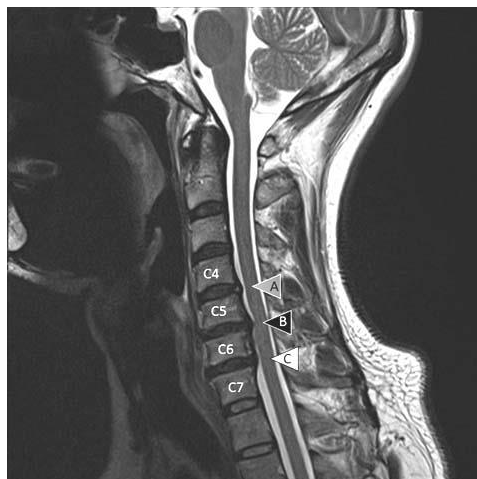


Fig. 2 - Sagittal plane of the cervical spine with a 3 mm slice thickness. Degenerative discopathies at C4-C5, C5-C6, and C6-C7, associated with uncovertebral joint arthrosis. Secondary foraminal stenosis is observed, notably severe at the right C5-C6 and significantly at the left C6-C7, potentially causing compression of the respective emerging nerve roots.



Ethical considerations

The patient from the case has approved and consented to the use of their medical history and associated images for publication in this journal.

COMMENTS

This case report highlights several noteworthy aspects with implications for clinical practice and further research. The development of anterior interosseous nerve palsy in a physically active patient engaged in functional training and amateur soccer emphasizes the importance of recognizing peripheral nerve injuries in such individuals, challenging the traditional view that these palsies are primarily associated with occupational or traumatic factors.

The absence of documented trauma or significant medical conditions prompts investigation into potential risk factors. The patient's sedentary office job combined with active physical activities suggests complex interactions contributing to the condition. Utilizing diagnostic tools like ultrasound, nerve conduction studies, electromyography, and MRI of the cervical spine provides a detailed approach, excluding mimicking conditions and facilitating accurate diagnosis.

Degenerative disc disease and uncovertebral joint degeneration in the cervical spine, along with disc protrusions, were identified but did not link to anterior interosseous nerve palsy. This warrants further research into the relationship between cervical spine disorders and peripheral nerve palsies. Alterations in the C7-C8 region could cause thumb flexion impairment. The patient reported a shoulder injury weeks before the thumb issue. While studies support that repetitive exercises may lead to the syndrome, improperly executed movements and poor posture affecting the cervical region are suspected.⁽⁴⁾

Other studies, such as those by *Caetano EB* et al.,⁽⁵⁾ emphasize the significance of the Gantzer muscle, observed in only 68% of dissected forearms.⁽⁵⁾ Investigations by *Spinner M*⁽⁷⁾ and *Lister G*⁽⁶⁾ suggest that the hypertrophied Gantzer muscle can play a role in developing anterior interosseous nerve syndrome. An unusual case of median neuropathy involving the anterior interosseous branch in a young patient with

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chronic kidney disease highlights the role of nerve ultrasound in diagnosing pseudoaneurysm nerve compression.⁽⁸⁾ In contrast, the patient did not undergo any treatment or surgical procedure that could have triggered the syndrome. The symptoms emerged weeks after a shoulder injury during a soccer match.

Rabaut V et al.⁽⁹⁾ investigated a patient with anterior interosseous nerve syndrome and excluded cervical injury based on MRI findings. Their study showed increased signal intensity in the thumb flexor muscles, indicating early-stage disease without fat infiltration or muscle atrophy. The current patient's left forearm ultrasound revealed subtle trophic changes and a slight increase in pronator quadratus echogenicity, suggesting minor muscle tissue modifications.

The patient received conservative treatment, rest, and physical therapy. After four months with no improvement, he opted for surgery. This case highlights the complex etiology of anterior interosseous nerve palsy in active individuals and the need for comprehensive diagnosis. Identifying cervical spine changes may reveal interactions with peripheral nerve disorders, encouraging research. Accurate diagnosis is crucial for optimizing treatment and preserving quality of life.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability

The data in this study are confidential due to the clinical nature of the examinations provided by the patient. Therefore, they cannot be publicly disclosed or shared without authorization. The data are stored at Clinica Alemana, Santiago Chile, and can be accessed with prior patient authorization.