



ORIGINAL ARTICLE

Biobehavioural analysis of the vestibular system and posture control in patients with cervicogenic dizziness. A cross-sectional study[☆]



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KEYWORDS

Neck pain;
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Posture control;
Vestibulo-ocular reflex;
Disability

Abstract

Background: Cervicogenic dizziness is a musculoskeletal disorder mainly characterised by dizziness and disequilibrium associated with neck pain. The pathophysiology is unclear and the neurophysiological basis remains to be ascertained. The aim of this study is to compare the vestibulo-ocular reflex and postural control between patients with cervicogenic dizziness and asymptomatic subjects, and to assess the association between debilitating dizziness and other psychosocial variables.

Materials and methods: A total of 20 patients and 22 asymptomatic subjects were selected. Vestibulo-ocular reflex was assessed by performing the head impulse test. Computerised dynamic posturography was used to evaluate the postural control by means of the sensory organisation test. In addition, subjects self-reported their degree of disability due to dizziness, cervical disability, kinesiophobia, and state of anxiety and depression.

Results: There were no differences in the vestibulo-ocular reflex ($P > .05$). However, we found differences with a medium-to-large effect size ($d > 0.60$) in variables related to proprioception and visual information integration; the former variable set was related to disability due to dizziness. Disability due to dizziness presents strong-to-moderate associations with cervical disability, kinesiophobia, and anxiety.

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PALABRAS CLAVE

Dolor de cuello;
 Mareo;
 Sistema vestibular;
 Control postural;
 Reflejo
 vestibulo-ocular;
 Discapacidad

Conclusion: Our data rule out changes in the vestibular system in cervicogenic dizziness, but they do point to proprioceptive impairment. According to our results, the association between dizziness-related disability and other psychosocial factors in cervicogenic dizziness is very relevant for clinical medicine and for future research projects.

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Análisis bioconductual del sistema vestibular y el control postural en pacientes con mareo cervicogénico. Estudio observacional transversal

Resumen

Introducción: El mareo cervicogénico es una afección que se caracteriza por mareos y desequilibrio que se asocia a dolor de cuello. La fisiopatología no está clara, y es necesario conocer la base neurofisiológica del trastorno. El objetivo de estudio es comparar la actividad del reflejo vestibulo-ocular y el control postural entre pacientes que presentan mareo cervicogénico y sujetos asintomáticos; además, se pretende evaluar la asociación entre la discapacidad por mareo con otras variables psicosociales.

Material y métodos: Se seleccionaron un total de 20 pacientes y 22 sujetos asintomáticos, a los que se realizó una valoración del reflejo vestibulo-ocular con el test del impulso cefálico y una valoración del control postural mediante posturografía dinámica y el test de organización sensorial, además se evaluaron mediante autoinforme la discapacidad por mareo, la discapacidad cervical, el miedo al movimiento y el estado de ansiedad y depresión.

Resultados: No se encontraron diferencias en la actividad del reflejo vestibulo-ocular ($p > 0,05$); a nivel del control postural se encontraron diferencias con un tamaño del efecto mediano-grande ($d > 0,60$) en variables relacionadas con la propiocepción e integración de la información visual, asociándose esta variable a la discapacidad por mareo. La discapacidad por mareo presentó asociaciones moderadas-fuertes con la discapacidad cervical, el miedo al movimiento y la ansiedad.

Conclusión: Los resultados obtenidos descartan una alteración del sistema vestibular en el mareo cervicogénico, aunque sí se comprueba la existencia de una alteración propioceptiva. La asociación de la discapacidad por mareo con otras variables psicosociales a la vista de nuestros resultados debe tomarse en cuenta en la clínica y en futuras investigaciones.

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Introduction

Cervicogenic dizziness is a disorder characterised by dizziness and imbalance associated with neck pain¹ and rigidity. The condition is aggravated by movements or particular positions of the neck.^{1–3} Some authors suggest that cervicogenic dizziness is a common symptom in patients with degenerative cervical spine disorders, trauma (e.g. whiplash injury),^{1,4,5} or idiopathic neck pain.⁶ Cervicogenic dizziness has been observed in 25% to 50% of patients with whiplash injury.⁷

Basic research has shown that the upper cervical region contains large numbers of muscle spindles and more connections with the visual and vestibular systems, and contributes to reflex activity to a greater extent than other regions of the cervical spine.^{8,9} It has also been suggested that proprioceptive alterations in neck muscles may cause asymmetrical functioning of the vestibulo-ocular reflex (VOR), which may in part explain the pathogenesis of cervicogenic dizziness.¹⁰

Some studies of patients with traumatic neck pain have found hyperactive VOR and low head movement velocity in

tasks requiring gaze stability and head-eye coordination.^{11,12} In a recently published study, L'Heureux-Lebeau et al.¹³ compared sensorimotor variables in patients with cervicogenic dizziness and patients diagnosed with benign paroxysmal positional vertigo using a range of clinical tests. According to their results, patients with cervicogenic dizziness were more likely to experience a subjective feeling of drunkenness and lightheadedness, alterations in cervical proprioception, and pain induced during the physical examination of the upper cervical vertebrae and paravertebral muscles.

Despite mounting evidence that cervicogenic dizziness is a distinct clinical entity, the diagnosis and definition of the condition are debated, with supporters and detractors in the clinical and research fields.^{14,15} It should be noted that some studies have found no significant neuro-otological differences between patients with cervicogenic dizziness and asymptomatic patients.¹⁶ Furthermore, there is no expert consensus on the most suitable test battery to determine cervical dysfunction in patients with dizziness.¹⁷ We therefore deem it necessary to gain deeper understanding of

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