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Systematic review

Prevalence of Vestibulocochlear Diseases and Depression: A systematic review

Prevalencia de enfermedades vestibulococleares y depresión: Una revisión sistemática

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Key words: vestibulocochlear, vestibular schwannomas, neurofibromatosis, depression, otorhinolaryngology, psychiatry

Abstract

Background and purpose: Vestibular schwannomas (VS), along with conditions like neurofibromatosis type 1 (NF1) and type 2 (NF2), are studied in relation to the prevalence of depression in patients with vestibulocochlear disorders. This systematic review assessed depression using the Hospital Anxiety and Depression Scales (HADS) and the Beck Depression Inventory (BDI-IA).

Material and methods: A systematic review was conducted using the PubMed database with the search terms "Neurofibromatosis OR vestibular schwannoma OR acoustic neuroma AND depression." Inclusion criteria were case reports and series in English and Spanish, up to 2024, describing patients with NF1, NF2, or VS diagnosed with depression. Exclusion criteria included opinion articles, conference abstracts, reviews, and articles without relevant patient data. Depression was assessed using HADS and BDI-IA. Descriptive statistical analysis was performed using Microsoft Excel to calculate central tendency and percentages.

Results: Out of 66 initial articles, 25 met the inclusion criteria, with 8 selected for final analysis. These articles reported on a total of 2,443 patients from at least five countries. The prevalence of depression among patients with these conditions was found to be 40.90%. Other vestibulocochlear pathologies also manifested depressive symptoms, including Ménière's disease and vestibular neuritis.

Conclusions: The study highlights a significant prevalence of depression (40.90%) among patients with NF1, NF2, and VS. These findings underscore the substantial neuropsychological impact of eighth cranial nerve involvement and the necessity for psychiatric evaluations in this patient population. Future research should include previous psychiatric evaluations to provide a more comprehensive understanding of these diseases' neuropsychological effects.

Resumen

Antecedentes y propósito: Se estudian los schwannomas vestibulares (SV), junto con enfermedades como la neurofibromatosis tipo 1 (NF1) y tipo 2 (NF2), en relación con la prevalencia de depresión en pacientes con trastornos vestibulococleares. Esta revisión sistemática evaluó la depresión utilizando las Escalas de ansiedad y depresión hospitalaria (HADS) y el Inventario de depresión de Beck (BDI-IA).

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Material y métodos: Se realizó una revisión sistemática utilizando la base de datos PubMed con los términos de búsqueda "Neurofibromatosis OR vestibular schwannoma OR acoustic neuroma AND depresión". Los criterios de inclusión fueron informes de casos y series en inglés y español, hasta 2024, que describieran pacientes con NF1, NF2 o SV con diagnóstico de depresión. Los criterios de exclusión incluyeron artículos de opinión, resúmenes de congresos, revisiones y artículos sin datos relevantes de pacientes. La depresión se evaluó utilizando HADS y BDI-IA. Se realizó un análisis estadístico descriptivo utilizando Microsoft Excel para calcular la tendencia central y los porcentajes.

Resultados: De los 66 artículos iniciales, 25 cumplieron con los criterios de inclusión y se seleccionaron 8 para el análisis final. Estos artículos informaban sobre un total de 2.443 pacientes de al menos cinco países. Se encontró que la prevalencia de depresión entre los pacientes con estas afecciones era del 40,90 %. Otras patologías vestibulococleares también manifestaron síntomas depresivos, incluida la enfermedad de Ménière y la neuritis vestibular.

Conclusiones: El estudio destaca una prevalencia significativa de depresión (40,90 %) entre los pacientes con NF1, NF2 y VS. Estos hallazgos subrayan el impacto neuropsicológico sustancial de la afectación del octavo par craneal y la necesidad de evaluaciones psiquiátricas en esta población de pacientes. Las investigaciones futuras deberían incluir evaluaciones psiquiátricas previas para proporcionar una comprensión más integral de los efectos neuropsicológicos de estas enfermedades.

Palabras claves: vestibulococlear, Schwannomas vestibulares, neurofibromatosis, depression, otorrinolaringología, psiquiatría

Introduction

Vestibular schwannomas (VS) are benign intracranial tumors that, when they grow, can threaten other intracranial structures due to their mass effect, and have a low risk of malignant transformation (1). Although they are mistakenly called acoustic neuromas, most of these tumors originate in the vestibular part of the vestibulocochlear nerve and are formed by Schwann cells (2). Management of VS focuses on minimizing morbidity and preserving auditory function, balance, and the facial nerve (2,3). The prevention and rehabilitation of single-sided deafness is crucial due to its significant impact on quality of life, causing difficulties in voice recognition, lack of directionality of sound and daily fatigue (3,4,5).

Furthermore, genetic disorders such as neurofibromatosis type 1 (NF1) and type 2 (NF2), caused by mutations in tumor suppressor genes located on chromosomes 17 and 22 respectively, can be inherited or result from de novo mutations (7,8,9). Among the diseases that generate alterations of the eighth pair, NF 1 and NF2, as well as SV, are among the most frequent. NF1 is one of the most common autosomal dominant disorders, with an estimated prevalence of 1 in 3,000 to 1 in 4,000 people and an incidence of 1 in 2,500 births (6,10,11,12). The overall incidence of VS is approximately 1 to 2 cases per 100,000 people per year, according to global epidemiological studies and medical publications (10,11,12,13).

However, both these and other vestibulocochlear diseases present psychiatric comorbidities in around 30-50% of patients (14,15,16). One of the most commonly presented is depression (17,18), which has a variable prevalence according to various studies (19). Due to the involvement of the eighth cranial nerve, neuropsychological impairments often occur (19), which are closely related to the deterioration of quality of life (18,20,21).

Material and methods

Data source and search strategy

A systematic review was carried out using PubMed databases where the search algorithm "Neurofibromatosis OR vestibular schwannoma OR acoustic neuroma AND depression" was used.

Inclusion criteria

Case reports and case series up to 2024 were selected, in English and Spanish, in which the course of patients diagnosed with a disease that affected the vestibulocochlear apparatus was described, specifically with: neurofibromatosis type 1 and 2 and vestibular schwannoma, which before or during their follow-up were also diagnosed with depression. The review and inclusion of the articles was carried out by the researcher of this work.

Exclusion criteria

Opinion articles, conference abstracts, literature reviews, systematic reviews, meta-analyses and articles without patients with vestibulocochlear disorders were excluded.

Hospital Depression Scale

Articles were selected in which mental well-being was assessed using the Hospital Anxiety and Depression Scales (HADS), as well as the Beck Depression Inventory (BDI-IA).

The HADS (22) is a 14-item self-report questionnaire with separate subscales for anxiety and depression disorders, developed for non-psychiatric hospital clinics. This has been approved in different environments and languages (23) including research and clinical environments. It is normally used to monitor psychological symptoms over a certain time, as well as to complement diagnosis in psychiatry. In the HADS, patients are asked to respond with written statements based on their perceived feelings from the previous week using a 4-point severity scale in which the anxiety and depression scale is calculated separately ranging from 0 to 21. Thus having a specificity of 0.79 and a sensitivity of 0.83 for depression (23). The qualitative scores are: 8 to 10 = mild anxiety or depression, 11-14 = moderate and 15-21 = severe anxiety or depression (23,24).

On the other hand, the presence of depression counted through the BDI-IA consists of 21 items which evaluate: Emotional, somatic and behavioral symptoms (25). For example, behaviors related to depression disorder, mood, among many others. The qualitative scores are: 1 to 10 points without evidence of depression; from 11 to 16 points there is a slight disturbance of mood; between 17 and 20 points it occurs in intermittent states of depression; from 23 to 30 points: there is moderate depression; between 31 and 40 points there is severe depression, and severe depression if there are more than 40 points (24,25).

Statistical analysis

Microsoft Excel was used for statistical analysis. Data on central tendency and percentages were collected.

Quality evaluation

Once the search was carried out, a second objective and critical review was performed to discard works that should not be included in the present review (not related to the objectives and/or methodological criteria). The PRISMA protocol was applied and it is shown in Figure 1.

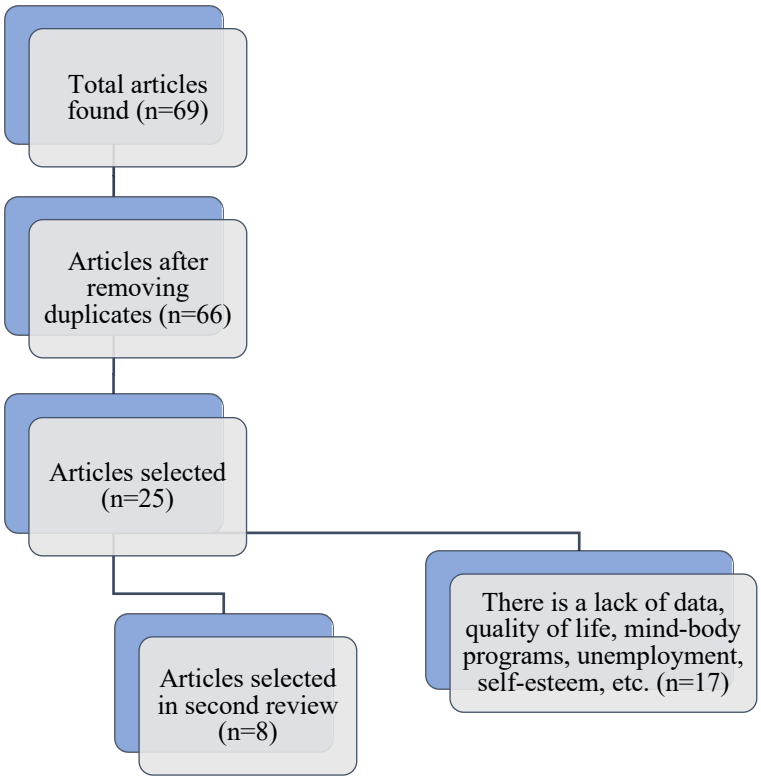

Figure 1. Flowchart of the bibliographic search. PRISMA diagram of the search process, review and final manuscripts included in the review.

Results

A total of 66 articles were identified for screening after exclusion of the 3 duplicates found. After peer review of the abstracts, 66 full-text articles were evaluated for determination of inclusion and exclusion criteria, after such initial review and conflict resolution, 25 articles met the inclusion criteria. Of these and after the second peer review, only 8 studies meet a sufficient level of evidence (Figure 1). The data presented a total of 2,443 patients in at least 5 different countries (Table 1).

Table 1. Shows the basic demographic data of the patients.

Total patients with vestibulocochlear involvement	2443
Total patients with Depression	999.3
Average age	45.9 years
Age range	25.25-54.46 years
Gender	
Female	1421
Male	1032

The prevalence of the total number of patients with depression was 40.90% in patients with any disease affecting the eighth cranial nerve.

In addition to the selected conditions neurofibromatosis type 1 and 2 and vestibular schwannoma, other pathologies were also identified which manifest depressive symptoms, such as: Ménière's disease, central vestibular disorders, vestibular neuritis, unilateral peripheral vestibulopathies, postural-perceptual dizziness, vestibular migraine and benign paroxysmal postural disorder (BPPV) (Table 2).

Table 2. Shows the data of patients with vestibulocochlear disease.

Vestibulocochlear disease	*Patients*
Vestibular Schwannoma	157
Neurofibromatosis type 1	1913
Neurofibromatosis type 2	77
Others	
Meniere's disease	101
Central vestibular disorders	67
Vestibular neuritis	39
Unilateral peripheral vestibulopathies	18
Postural-perceptual dizziness	16
Vestibular migraine	8
Benign paroxysmal positional vertigo	47
Total others	296
TOTAL PATIENTS WITH VESTIBULOCOCHLEAR CONDITION	2443

Discussion

The present study analyzes a variety of vestibulocochlear diseases evaluating their impact on psychiatric health and quality of life. The diagnostic distribution was very variable, but the most prevalent disease in this analysis was NF1, followed by VS and Ménière's disease in third place. Of all the patients with a disease that affected the vestibulocochlear nerve such as NF1, NF2, SV, central vestibular disorders and other vestibulopathy, 40.90% manifested symptoms of mild, moderate or severe depression according to the HADS and BDI-IA scales.

The results suggest that the severity of vestibulocochlear symptoms is not directly related to quality of life or depressive symptoms, but I was able to determine that involvement of the eighth cranial nerve presents neuropsychological impairments at a moderate frequency (19). These findings are consistent with previous studies which evaluate the impact on the mental health of patients with diseases such as NF2 (27,28).

It is vital to consider that the classic symptoms of eighth nerve conditions such as vertigo or dizziness can directly influence daily life and can manifest negatively in the psychosocial sphere (18,20,21,29).

A retrospective study of 189 patients evaluated clinical outcomes and quality of life after surgical treatment of VS. In 86 patients with microsurgery and 103 with radiosurgery, it was confirmed that quality of life is closely related to the disease and the treatment used (30) and therefore treatment decisions usually take into account the hearing status, age, lifestyle of the patient, location and size of the tumor as well as the risk of damage to the facial nerve, since each of these has been associated with depression in various studies (19,20,34, 35).

It must be taken into consideration that for each type of affectation of the eighth cranial nerve, there are multiple pathognomonic complications that must be taken into account when providing treatment (30,31,32,33).

Although most of the literature focuses on the final clinical outcome, it is important to recognize the factors that influence the quality of life and mood of patients with these types of diseases. In summary, studies indicate the importance of providing mental health assessments to individuals with vestibulocochlear conditions. These findings are extremely valuable for the branch of otorhinolaryngology, psychiatry, as well as for patients with these diseases, in addition to serving as inspiration for future research within the medical and clinical field.

A limitation of the present study may be that the results of previous psychological and psychiatric examinations were not considered. Therefore, it was not investigated whether the patient manifested any other manifestations of a psychiatric nature.

Conclusion

Psychiatric comorbidities such as depression are frequently observed in patients with vestibulochlear diseases. This study highlights the high prevalence of depression in patients with conditions such as NF1, NF2, and SV. The findings indicate that, although the severity of vestibulocochlear symptomatology is not directly related to quality of life or depressive symptoms, involvement of the eighth cranial nerve causes significant neuropsychological impacts. These results are consistent with previous studies and underscore the importance of performing mental health assessments in patients with vestibulochlear conditions.

The inclusion of psychiatric considerations in the clinical management of these patients can significantly improve their quality of life. However, future research should consider previous psychological and psychiatric evaluations for a more complete understanding of the neuropsychological impact of these diseases. Assessing and addressing factors that influence quality of life and mood in patients with these conditions is crucial for comprehensive and effective treatment.

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Conflict of interest declaration

None.

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