Research Article

Retrospective Study to Describe Clinical Characteristics of Patients with Balance Disorders

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Abstract

Objective: To describe the clinical characteristics of patients with balance disorders at Otolaryngology unit.

Subjects and methods: A retrospective study was conducted including patients between 4 to 96 years who consulted for balance disorders in the last three years. A univariate analysis and Two way-ANOVA tests were performed for statistical analysis.

Results: 2620 patients were assessed with a mean of 54.6 ± 9 years, female were the most affected (64.5%). As main non-neurotological comorbidities Depression, Otosclerosis, Fibromyalgia and Cardiac Arrhythmias were found. Vestibular Migraine (VM), Benign Paroxysmal Positional Vertigo (BPPV) and Vestibular neuritis (VN) were described as main neurotological comorbidities. BPPV percentage of presentation compared to VM showed a significant statistical difference. Moreover, similar findings were observed between BPPV and VN. The most frequent diagnosis done were VM (25%), Meniere’s Disease (21.6%), BPPV (16.2%), Multisensory Dizziness (6%) and VN (4%). VM presentation was inversely proportional to age in men and women, meanwhile BPPV showed it as directly proportional. Meniere’s Disease showed a similar distribution on age presentation.

Conclusions: We found similar results as European and American series, being female sex the most affected. However, in this population we found Multisensory dizziness as non-frequent diagnosis reported in other series.

Keywords: otoneurology, balance disorders, vertigo, epidemiology

Introduction

Balance disorders are defined as disturbances in equilibrium due to a disruption of the labyrinth, cerebellum or other causes as strokes and seasickness. They could result on acute and chronic disturbances in gaze and postural stability, affecting patient’s normal daily development [1,2].
Terms as unsteadiness and drops attacks have been used associated to the presentation of balance disorders, however vertigo and dizziness are related as main consultation reasons of balance disorders on emergency and outpatient’s departments [1-3].

The prevalence of vertigo has been estimated in 3-20% and dizziness has shown 4-50% [4]. Neuhauser reported that 29% of patients with vestibular symptoms had consulted a doctor regarding their symptoms of dizziness [5]. Even though, common consultation symptoms as vertigo and dizziness have been evaluated in several studies on balance disorders’s epidemiology, other items as neurotological and non- neurotological comorbidities as main diagnoses has been also described. Authors as Bisdorff, Langhagen and Moreira have reported higher prevalence of balance disorders in patients with migraine, depression, anxiety, cerebrovascular disease, multiple sensory deficits, diabetes mellitus, coronary heart disease and medication intake as contraceptive–related pills [3-5].

As neurotological comorbidities in patients with balance disorders, Benign paroxysmal positional vertigo, Meniere’s Disease and Vestibular Migraine has been described as the most common found [5,6].

Few neurotology studies about the clinical characteristics of patients with Balance disorders have been reported in North America and Europe [1-3,5], however in South America there are no previous reports on balance disorders’s clinical characteristics on Outpatients Otolaryngology consultation. For the healthcare services, information about main diagnoses and related diseases on patients with balance disorders could help on directed therapeutic schemes and organized planning attention. The aim of this study was to describe the clinical characteristics of patients with balance disorders, their comorbidities associated, and main diagnoses found in an Otolaryngology unit.

Materials and Methods

Design

A retrospective study was conducted using a database systematically collected from patients referred to Otorhinolaryngology consult of Hospital Británico, from January 2013 to January 2016.

Details from each patient were collected regarding age, sex, main consultation reason, non-neurotological comorbidities, neurotological comorbidities and diagnosis. The patient’s main diagnoses were performed according to established criteria explained on the paragraph Criteria used for Balance disorders diagnoses.

For neurotological comorbidities, the main diagnosis was checked after the first consultation where the criteria for each balance disorder were fulfilled. Later consultations that had described another balance disorder still having main diagnosis on following and treatment, was considered as comorbidity.

The protocol was approved by the Ethics and Review Committee at Hospital Británico of Buenos Aires in accordance with the ethical standards of the institutional research committee with the 1964 Helsinki declaration and its later amendment or comparable ethical standards.

Study Population

Consecutive patients from 4 to 96 years old were included. Patients with central vertigo and neurologic diseases were excluded. Patients were grouped according to gender and age ranges, in order to study the association of final diagnoses and gender as final diagnosis and age range.

Criteria used for balance disorders diagnoses: Benign Paroxysmal Positional Vertigo has been defined using the classification of Vestibular Disorders of the Barany Society [7]:

- Recurrent attacks: 1 of positional vertigo or positional dizziness provoked by lying down or turning over in the supine position
- Duration of attacks <1 min
• Positional nystagmus elicited after a latency of one or few seconds by the Dix-Hallpike maneuver or side-lying maneuver (Semont diagnostic maneuver). The nystagmus is a combination of torsional nystagmus with the upper pole of the eyes beating toward the lower ear combined with vertical nystagmus beating upward (toward the forehead) typically lasting <1 minute

• Not attributable to another disorder

**Defined Vestibular Migraine** has been defined using the criteria of the Committee for the classification of Vestibular Disorders of the Barany Society and International headache society [8]:

• At least 5 episodes with vestibular symptoms of moderate or severe intensity lasting 5 min to 72 hours

• Current or previous history of migraine with or without aura according to the International Classification of Headache Disorders (ICHD)

• One or more migraine features with at least 50% of the vestibular episodes: – headache with at least two of the following characteristics: one sided location, pulsating quality, moderate or severe pain intensity, aggravation by routine physical activity – photophobia and phonophobia, – visual aura

• Not better accounted for by another vestibular or ICHD diagnosis

**Defined Meniere's disease** has been defined used the criteria from the Consensus document of the Bárány Society, The Japan Society for Equilibrium Research, the European Academy of Otology and Neurotology the American Academy of Otolaryngology-Head and Neck Surgery and the Korean Balance Society [9]:

• Two or more spontaneous episodes of vertigo, each lasting 20 minutes to 12 hours

• Audiometrically documented low- to medium-frequency sensorineural hearing loss in the affected ear on at least one occasion before, during or after one of the episodes of vertigo.

• Fluctuating aural symptoms (hearing, tinnitus or fullness) in the affected ear

• Not better accounted for by another vestibular diagnosis

**Vestibular neuritis:** No major medical organization has proposed specific guidelines for the diagnosis and treatment of vestibular neuritis. However, these following diagnoses criteria has been widely cited and utilized for its diagnosis [10].

• An episode of severe prolonged vertigo without auditory manifestations

• Spontaneous nystagmus to affected side

• Decreased caloric response in contralateral ear detected by Videonystagmography

**Multisensory dizziness:** No major medical organization has proposed specific guidelines for the diagnosis and treatment of multisensory. However, these following diagnoses criteria has been widely cited and utilized for its diagnosis [11,12]. Depressive symptoms, impaired balance or gait, postural hypotension, use of multiple medications.

**Statistical analysis**

The methodology including statistical planning and analyses has been presented in detail elsewhere. All analyses were calculated using commercially available software: GraphPad release versión 7.0 (© GraphPad 2017 GraphPad Software, Inc, La Jolla, CA, https://www.graphpad.com/). A univariate analysis was performed including age, gender, main consultation reason and non otoneurological and neurotological comorbidities and final diagnoses. Other diagnoses with fewer frequency were also included for statistical purposes.

For final description results, patients were gathered in age and gender groups and main diagnoses. To determine the frequency of Balance Disorders Two way- ANOVA test was used. In order to estimate correlations...
between associated neurotological and non-neurotological frequencies and to describe absolute and relative frequencies, Fisher test was used considered statistically significant at p<0.05.

**Results**

**General characteristics and comorbidities**

We analyzed 2620 clinical records of patients examined for balance disorders, 64.5% of them were women. The mean age of studied population was $54.6 \pm 9.0$ years; range: 4 to 96 years old. We did not find significance differences between age of women compared to men ($58 \pm 6.1$ vs. $54.1 \pm 0.6$; p=0.3).

Main consultation reasons were dizziness (38%) and vertigo (34%). Other consultation reasons and the onset of the symptoms related for patients was on 72% major than 6 months at consult time (p<0.05).

Non-neurotological and neurotological comorbidities were reported. We found significant increase of BPPV compared to Vestibular Migraine (58% vs. 25%; p>0.05 respectively). Moreover, similar findings were observed between BPPV and vestibular neuritis (58% vs. 17%; p<0.05) (Figure 1A). On the other hand, we found no significant differences between non-otoneurological comorbidities (Otosclerosis, Depression, Fibromyalgia, and Arrhythmias with similar percentages) (Figure 1B).

![Figure 1: Findings in (A) Neurotological and (B) Non-neurotological comorbidities](image)

**Main diagnoses**

Findings of our study have shown that Vestibular Migraine was the main diagnosis for men and women (25%, n=656); being the most representative diagnosis in young patients, this is represented on Figure 2 where a progressive decrease is seen with the increase of age.

Findings of our study have shown that Vestibular Migraine was the main diagnosis for men and women (25%, n=656); being the most representative diagnosis in young patients, this is represented on Figure 2 where a progressive decrease is seen with the increase of age.
Meniere’s Disease was the second common diagnosis in the studied population in both gender (21.6%, n=567). It was observed later onset of age in men; although a similar distribution was reported between 40 to 70 years old in both gender (Figure 2).

Benign Paroxysmal Positional Vertigo (BPPV) was the third common diagnosis found (16.2%, n=426) it showed a proportional increase with age. Its beginning was observed in early ages for women and men. Multisensory dizziness (6%, n=179) was found in both gender after 70 years old with similar distribution, being representative only for late ages. Men showed a major percentage of presentation of this disease over 80 years old than women (Figure 2). Finally, Vestibular Neuritis (4%, n=117) showed a different presentation between both gender according to age range, we did not find a similar distribution like other balance disorders in this study. We found in men between 30 to 50 years old major percentage of presentation compared to other ages in the same gender and compared to same age range in women (Figure 2).

![Figure 2: Vestibular Migraine diagnosis in (A) Women and (B) Men](image)

**Discussion**

The diagnosis of Balance disorders has been described as complex, mainly for their patient’s description associated to linguistic and cultural factors that are likely account for some of the difference in descriptions of an inherently subjective symptom, other reasons for diagnosis complexity are the different types of loss of balance and the use of particular care in characterising the disorder both by the patients and between physicians themselves. However, some common findings have been described in several studies in North America and Europe [13-16] in patients with balance disorders as the main consultation reasons, affected gender and age ranges as diagnoses and comorbidities. According to authors as Murdin [13], epidemiologic reviews on Balance disorders has been found in
Great Britain, West Europe, Asia, Africa and the United states, however no studies from South America, Sub-saharan africa and Australasia have been reported.

The significance of balance disorders lies in the impact on quality of life and ability to work and can be a cause of long term incapacity, also they are recognized as risk factor for falls with high associated economic costs, morbidity and mortality [13,15].

The acknowledgment of characteristics of balance disorders in different regions, allows directioned therapeutics and for planning strategies on health services. According to findings on age, Cherchi and Murdin [14,15] described that balance disorders occur in people between 8 and 90 years of age with approximate mean age values from 48 to 53. This study found a similar age range as the authors mentioned above with a mean age of 54.06 years old. Women were the most affected population in this work, previous findings in Great Britain, United States and west Europe [15-17] also described it, all age ranges for this gender are affected with balance disorders.

Main consultation reasons related to balance disorders were described as vértigo and dizziness in our study, being dizziness the most common. Our finding is different to some results described by Lopez-Gentili [18] in his largest sample of patients, there is described major proportion of vértigo than dizziness and other consultation reasons are listed as presyncope, that we do not find in our study.

Otosclerosis, arrhythmia, depression and fibromialgia were the most common non-otoneurological comorbidities found in this study. Bisdorff and Brevern [17,19], besides found in European population hypertension, stroke, dyslipidemia, multiple sclerosis, psychiatric diseases, metabolic disorders and heart disease.

Von Brevern [19], has described as main neurotological comorbidities, Benign Paroxysmal Positional Vertigo, Vestibular Migraine and Meniere’s Disease. In according to the mentioned study, our findings were similar. However, we found significant increase of Benign Paroxysmal Positional Vertigo compared to Vestibular Migraine and also between Vestibular Neuritis and BPPV.

Vestibular Migraine, Meniere’s Disease, Benign Paroxysmal Positional Vertigo, Vestibular Neuritis and Multisensory dizziness, were principal diagnoses findings in the studied population. Despite differences described between gender in other studies We did not find significant differences. Our proportion of Vestibular Migraine and Meniere’s disease are different to Findings of Guerra-Jiménez [20], being one similar population Spanish population to Argentinian population due to cultural and race similarities, where our Meniere’s disease percentage were 21.6% and Vestibular Migraine 25% meanwhile BPPV percentage was 16.2% being the third most common diagnosis. In the mentioned study, BPPV was stood out for its frequency and Meniere’s disease was only 5.5%. Just one similar result was the percentage of Vestibular Neuritis 4%, the same value found on ours [20].

We found a proportional decrease in Vestibular Migrane presentation with the age increment. Paradoxically; Von Brevern [19] has suggested an association Vestibular Migraine association in younger ages as a precursor of Migraine in adulthood.

Meniere’s disease became as the second most common diagnoses in our study. Several authors 18-21 have described it as one of the most common balance disorders in seventh decades of life. In spite of these findings, we observed onset of Meniere’s disease presentation around 30-40 years old.

Benign paroxystic peripheric vertigo was the third most common diagnoses found in this work [21]. A proportional increase with the age was seen in studied population. Froehling and Von Brevern [19,22] also found in their studies an increment of presentation with age being coincident with our findings. Nevertheless, Iwasaki found that this disorder is more common in patients over age 72 [23].
Multisensory dizziness was found as a prevalent diagnosis in women and men in our study, affecting mainly patients after 70 years old. In according with our results, Neuhauser [5] and Lai [21] observed that multisensory dizziness was also prevalent among the elderly.

Finally, Vestibular neuritis was founded in our patients, main in subjects between 30 to 50 years old. It has been previously reported that vestibular neuronitis in young adults (18-35 years of age) only in emergency rooms departments. Only one report found on outpatient’s attention’s result about Vestibular Neuritis was found, with similar percentage as ours [20].

To understand epidemiological data related with the main balance disorders characteristics in outpatients from otolaryngology departments, would contribute to optimize clinical management, quick diagnosis and treatment improving.

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References