Menière's disease: Clinical aspects, diagnostic tests and interventions

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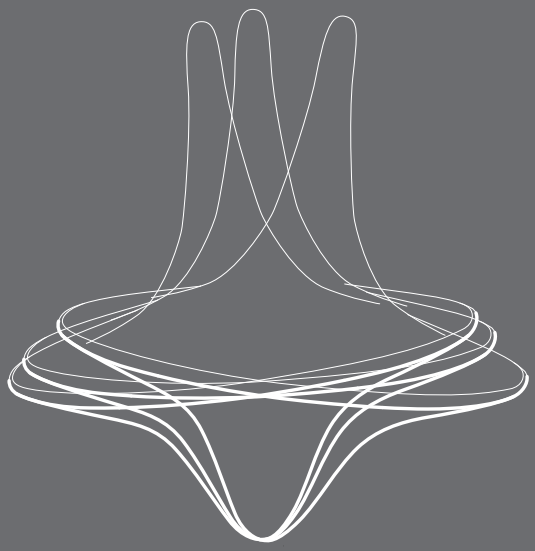
PART I

EVALUATION OF CLINICAL ASPECTS OF MENIÈRE'S DISEASE



2

AGE OF ONSET OF MENIÈRE'S DISEASE IN THE NETHERLANDS: DATA FROM A SPECIALISED DIZZINESS CLINIC

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ABSTRACT

Objective: To determine the age of onset of Menière's disease (MD) in patients who visited a specialized dizziness clinic. The second aim was to verify if the trend of a delayed age of onset of MD as reported for the Japanese population also occurs in the Netherlands.

Methods: We performed a retrospective data analysis of patients diagnosed with 'definite' Menière's disease who had visited our clinic between January 2000 and December 2013.

Results*:* Mean age of onset among the 296 MD patients was 53.0±14.1 years; 209 (71%) patients were diagnosed between the fifth and seventh decade of life. No trend towards a later onset of MD was found (regression coefficient ß: 0.03 for year of presentation; 95% confidence interval CI -0.34 to 0.61; p=0.58).

Conclusions*:* MD has a peak incidence between 40 and 69 years. We did not find a shift towards a later age of onset of MD.

Keywords*:* Menière's disease, age of onset, classification

INTRODUCTION

Patients with Menière's disease (MD) typically suffer from recurrent spontaneous episodes of vertigo, fluctuating hearing loss, tinnitus and aural fullness [1]. However, clinical symptoms vary widely and most findings are subjective and not specific. In the absence of diagnostic a 'reference' standard, the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS) has defined a set of diagnostic criteria for MD, which were originally published in 1972 and have been updated in 1995 [2]. The age of onset of MD symptoms is variable but generally the peak incidence lies in the fourth and fifth decade of life [3,4] as well as the seventh decade of life [5]. Recently, a 24-year retrospective survey in Japan [4] reported a progressive increase in the age at which MD manifests itself. This progressive shift towards a later age of onset is explained by the increase of the working elderly population, suggesting that work-related stress attributes to the development of MD [4,6]. To the best of our knowledge studies on the age of onset of MD in the Netherlands are lacking. As a result it is unknown whether a similar shift in age of onset towards an older age is also present in the MD population in the Netherlands.

In 2000, a multidisciplinary out-patient clinic for patients suffering from dizziness was established, the Apeldoorn Dizziness Centre (ADC). We retrospectively determined the age of onset in patients diagnosed with MD. Secondly, we analysed if there is evidence for a delay in the age of onset during the past 14 years in MD patients who visited our dizziness centre.

MATERIALS AND METHOD

Patients visiting the ADC between January 2000 and December 2013, and who were coded as having MD, were selected from our database. Data were analysed anonymously and under the supervision of the medical staff. The AAO-HNS diagnostic criteria for MD were used (see Table 1) [2]. No histopathological confirmation was sought in patients meeting the criteria for the diagnosis 'definite' MD, therefore we did not use the diagnosis 'certain' MD. A single attack of vertigo accompanied by unilateral hearing loss was regarded to be clinically more compatible with (viral) labyrinthitis, and therefore patients matching the criteria of 'probable' MD were not included into this analysis. 'Possible' MD represents a less well defined clinical entity and this population may as well contain vertigo related diseases (e.g. vestibular migraine) [7,8]. Therefore we only included patients with 'definite' MD in this retrospective analysis. Patients' data included sex, age, disease code, and dates of visit and referral status. Onset age, MD classification and unilateral or bilateral involvement were determined from the medical information processed in the electronic data handling system. In addition, we analysed audiometric test results, letters from the referring General Practitioner or specialist and discharge letters. The year at which vestibular and/

or audiological symptoms started was used to calculate the age of onset. The age of onset was classified as unknown if insufficient information was available, e.g. if the medical history was described as 'suffering from MD for many years'. We calculated the average degree of hearing loss (frequencies 0.5,1,2,4,6,8 kHz) and a low-Fletcher Index (FI low: mean over the frequency range 0.5 to 2 kHz) as measured by pure tone audiometry (PTA) [9]. The checklist for retrospective database studies reported by the International Society for Pharmacoeconomics and Outcomes Research was used as a guideline [10].

TABLE I

AAO-HNS 1995 CRITERIA FOR MÉNIÈRE'S DISEASE [2]

Certain Ménière's disease
– Definitive Ménière's disease
– Histopathological confirmation
Definite Ménière's disease
– ≥2 definitive spontaneous vertigo episodes of 20+ mins duration
– Audiometrically documented hearing loss on 1 occasion
– Tinnitus or aural fullness in treated ear
– Other causes excluded
Probable Ménière's disease
– 1 definitive spontaneous vertigo episode of 20+ mins duration
– Audiometrically documented hearing loss on 1 occasion
– Tinnitus or aural fullness in treated ear
– Other causes excluded
Possible Ménière's disease
– Episodic vertigo of Ménière's disease type, without hearing loss, or,
– Fluctuating or fixed SNHL, with disequilibrium but with no definitive episodes
– Other causes excluded

AAO-HNS = American Academy of Otolaryngology-Head and Neck Surgery; mins = minutes; SNHL = sensorineural hearing loss

Statistical analysis

We calculated frequencies for sex and bilateral involvement. Means and standard deviations were calculated for the PTA results and the age of onset for the 'definite' MD cases. Differences between groups were assessed by cross-tabulation and carried out using the chi-square test and *t*-test. To assess the relation between the year of presentation and the age of onset, we visually inspected the data and graphs and, if a linear trend was observed, univariate linear regression was used to assess the strength of the relationship. A p-value of less than 0.05 was considered significant. SPSS (version 20) was used for performing the statistical analyses.

RESULTS

Among a total of 7756 patients who had visited the ADC in the study period, 469 (6%) patients were identified as MD. Of these patients, 67% (n=314) met the criteria for 'definite' MD as defined by the AAO-HNS. Slightly more women (n=169, 53%) than men (n=145, 47%) were diagnosed with 'definite' MD. Six out of these 'definite' MD patients (2%) had bilateral involvement; in two patients we could not define if the disease was unilateral or bilateral. In both patients the attacks of vertigo had started only a few months before the visit and they suffered from tinnitus in both ears. Since these patients had previously experienced hearing loss, we could not determine which ear was affected. In the patients with unilateral 'definite' MD, the average hearing loss was 39±14.6 dB and the low-Fletcher index was 40.0±14.7 dB.

We could not determine the age of onset of MD in 18 (6%) patients. The mean age of onset of the included patients (n=296) was 53.0±14.1 years (Figure 1). Most patients (n= 209, 71%) had their first symptoms of MD in the fifth, sixth or seventh decade.

Both visual inspection and linear regression analysis revealed no relationship between the year of consultation at the ADC and the age of onset (regression coefficient ß: 0.03 for year of presentation; confidence interval -0.34 to 0.61; p=0.58) (**Figure 2**).

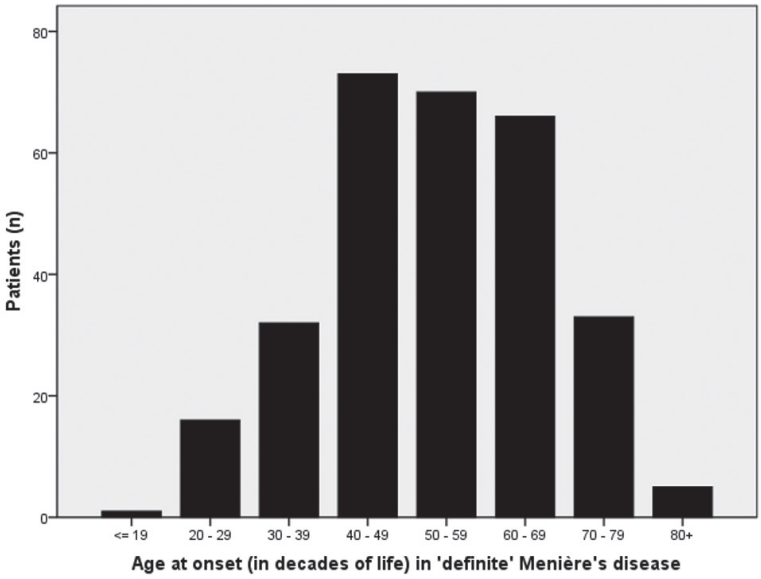

Figure 1. Age of onset of 'definite' Menière's disease.

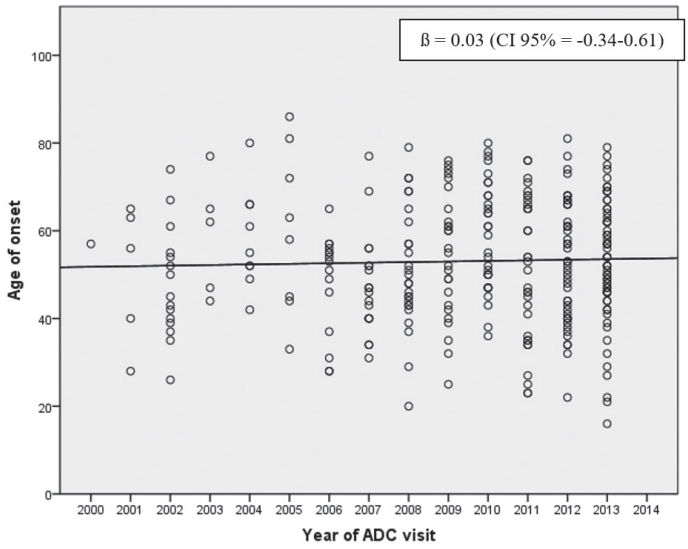

Figure 2. Scatter plot showing the correlation between year of ADC visit and age of onset. There is no linear relationship between the independent variable, i.e. year of ADC visit, and the dependent variable, i.e. age of onset exists (regression coefficient ß: 0.03 for year of presentation; 95% confidence interval CI -0.34 to 0.61; p=0.58).

DISCUSSION

This study aimed to investigated the age of onset in 'definite' MD patients who visited a specialized dizziness centre in the Netherlands from 2000 thru 2013. The peak incidence was found in the fifth to seventh decade of life, which is in line with previous publications [3-5, 11]. Our results do not support the suggestion of a progressive delay in age of onset in MD as reported by Shojaku et al [4]. Several factors may explain our contradictory results. First and foremost, the population aged ≥65 years grew more extensively and more rapidly in Japan than in the Netherlands. Based on Stattline rates [12] the Japanese population increased by 10.6% during the period 2000-2013 (from 25.5% to 36%). During the same period, the Dutch population grew only by 3.0%, from 20% to 23%. The population aged ≥65 years is smaller in the Netherlands and increase of this group was less extensive, and this may explain the absence of a trend for a forward shift in the peak incidence. Second, work-related fatigue inducing delayed onset of the disease does not apply to the Dutch population. The percentage of working elderly is significantly smaller in the Netherlands than in Japan, in the year 2000 this percentage numbered 6% [10] and 22% [4], respectively. Parallel to the increase of the population aged ≥65 years, the percentage of working elderly

grew only by 3% in the Netherlands 2000-2010 [13]. Although the life span considerably increased in Japan [12], it remains disputable to which extent work-related stress could cause the later onset of MD. Third, Shojaku *et al.*[4] performed a retrospective analysis based upon a 24-year survey starting in 1980. Our data registration started in 2000 and covered a period of only 14 years. The trend for a shift in onset of disease towards a later age could have already taken place prior to our study or our time window might have been too narrow to elicit a shift in age of onset. Finally, the Japanese Society for Equilibrium Research (JSER) criteria for MD published in 1988 considerably differ from those of the AAO-HNS 1995. When applying the JSER criteria, a threshold shift of >10 dB for the frequencies between 0.5 and 2 kHz as compared to the contralateral side, is required for the diagnosis of unilateral 'definite' MD. Consequently, 'possible' MD patients according to the AAO-HNS 1995 criteria might have been included as 'definite' MD patients in the Japanese study. In our study males and females appeared to be equally affected. This is in line with findings in the USA and Italy [3,5].

Bilateral involvement amounted to only 2% in the present study whereas previous studies reported involvement in 2 to 72% of the patients [14]. For instance, Huppert *et al.* reported bilateral involvement in up to 35% of the MD cases within 10 years [15]. Disparities in the frequency of bilateral involvement between studies may be explained by variation in diagnostic criteria and duration of disease at the time of study participation [14]. Bilateral MD rarely starts in both ears simultaneously but rather consecutively, in cases of long-standing disease [14,15]. One should bear in mind that our retrospective study design should be regarded as a less favourable method to analyse this variable and prospectively longitudinal assessments were not carried out.

The findings of this study further underscore that several problems are encountered when investigating the age of onset of MD. The onset of disease may be monosymptomatic, i.e. spells of vertigo only whereas the manifestation of other symptoms may be evident after months to several years [16]. This makes it difficult to determine the exact age at which the complete triad of symptoms starts. Furthermore, fluctuation of hearing loss can be particularly present in the early stage of the disease [17]. As the diagnostic criteria for MD were redefined over time and may vary between continents, establishing the age of onset in MD can be a complex undertaking.

We investigated the age of onset in MD patients in the Netherlands. MD is generally diagnosed in the fifth to seventh decades of life and onset of disease at a later age is uncommon. We did not find a trend for a forward shift of peak incidence of MD. A generally accepted and uniform set of diagnostic guidelines as to how to report epidemiological MD characteristics is required for comparison of research data. A prospective population-based study is recommended to identify actual incidence and prevalence rates as well as rates of bilateral involvement in Dutch MD patients.

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The age of onset of Menière's disease in the Netherlands was investigated
Menière's disease generally manifests itself in the fifth to seventh decades of life
No trend for an increase of onset of disease at an older age was found
Bilateral involvement occurred in 2% of the Menière's disease population

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