

A report on patients with vertigo seen at a specialized vertigo outpatient clinic

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Objective: Although there are clinical data on vertigo, most are from specialized vertigo outpatient clinics of university hospitals, while data from studies of clinics are scarce. This is a retrospective study of patients visiting our outpatient clinic.

Methods: The examination of patients with vertigo included a detailed clinical history and general otolaryngological examination, among others. The diagnosis was based on the clinical history, examination findings, the guidelines of the Japan Society for Equilibrium Research, and the Clinical Practice Guideline of Meniere's Disease.

Results: The patients were classified into 4 groups: 1. peripheral vestibular disorders (50.3%), 2. diseases of the central nervous system (CNS) (36.9%), 3. generalized disorders (4.1%), and 4. symptomatic diagnosis (8.8%). The most frequent diagnoses were Meniere's disease (including atypical cases) in peripheral vestibular disorders and acoustic tumor in diseases of the CNS.

Conclusions: The frequency of vertigo linked to diseases of the CNS was relatively high compared with previous studies. However, because those studies were from otolaryngology clinics, the differences in diagnoses might not only be a reflection of the size of the individual clinic but also of the practice methodologies.

Key words: Vertigo, otolaryngology, outpatient clinic, central nervous system diseases, age

Introduction

With the rapid aging of the society and a surge in national awareness of health promotion, visiting local clinics appears to be becoming more and more common, even when symptoms are minimal. The number of patients complaining of vertigo and visits to otolaryngology clinics appears to be increasing year by year, and the workload of otolaryngologists seems to be expanding.^{1,2} Although there are clinical data on vertigo, most are from specialized vertigo outpatient clinics of university hospitals,¹⁻¹³ while data from studies on clinics are scarce.¹⁴ The specialized vertigo outpatient clinic, Hongo Neurosurgery Clinic, was established in April 2018. This is a retrospective study of patients visiting that clinic over a 3-year period.

Materials and Methods

The study population was recruited from patients who visited the specialized vertigo outpatient clinic, Hongo Neurosurgery Clinic, between April 2018 and March 2021. Medical examination of patients with vertigo included a detailed clinical history, general otolaryngological and neurological examinations, examination of the cerebellum, eye movement, pure-tone-audiometry, gaze nystagmus test, spontaneous, positional, and positioning nystagmus test using a charge-coupled device camera, stepping test, and stabilometry. In addition, the Schellong test was performed on suspicion of orthostatic dysregulation and head magnetic resonance imaging (MRI) and/or magnetic resonance angiography (MRA) in cases revealing abnormal findings on examination of the cerebellum and/or eye movement.

The diagnosis was based on a review of the detailed clinical history, the findings of these examinations, the

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guidelines of the Japan Society for Equilibrium Research,^{15,16} and the Clinical Practice Guideline of Meniere's Disease.¹⁷

The data was stratified by the number of patients seen per year, age distributions, gender, and diagnosis.

Results

Demographics

A total of 1,036 patients with vertigo visited the

specialized vertigo outpatient clinic, Hongo Neurosurgery Clinic, within the 3-year study period (Figure 1). There was a steady increase from 328 in 2018, 342 in 2019, to 366 in 2020. Patients' ages and sex distributions are shown in Figures 2 and 3. For both sexes, sexagenarians were the most common generation of patients. The number of patients increased per decade until the sixth decade, after which the number of patients decreased with each successive generation. Females represented 69% of the patients compared with 31% males.

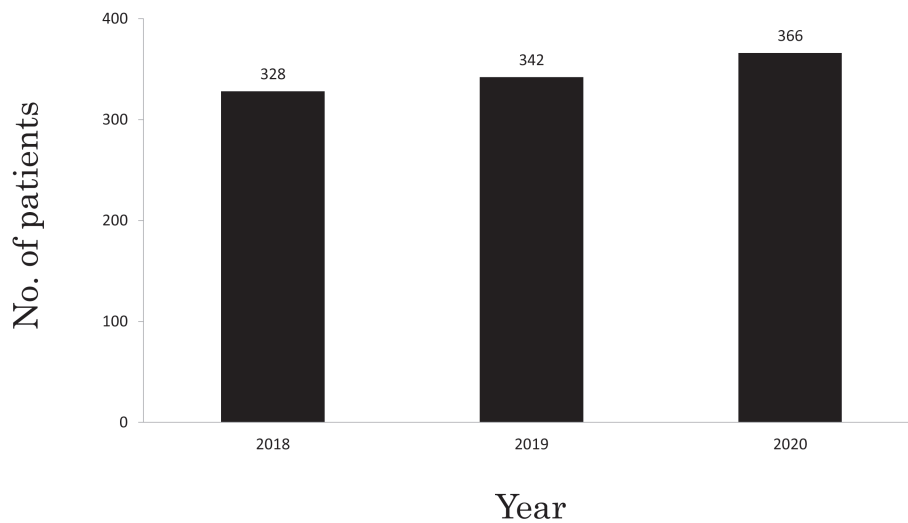


Figure 1. The number of patients visiting the specialized vertigo outpatient clinic, Hongo Neurosurgery Clinic, by year.

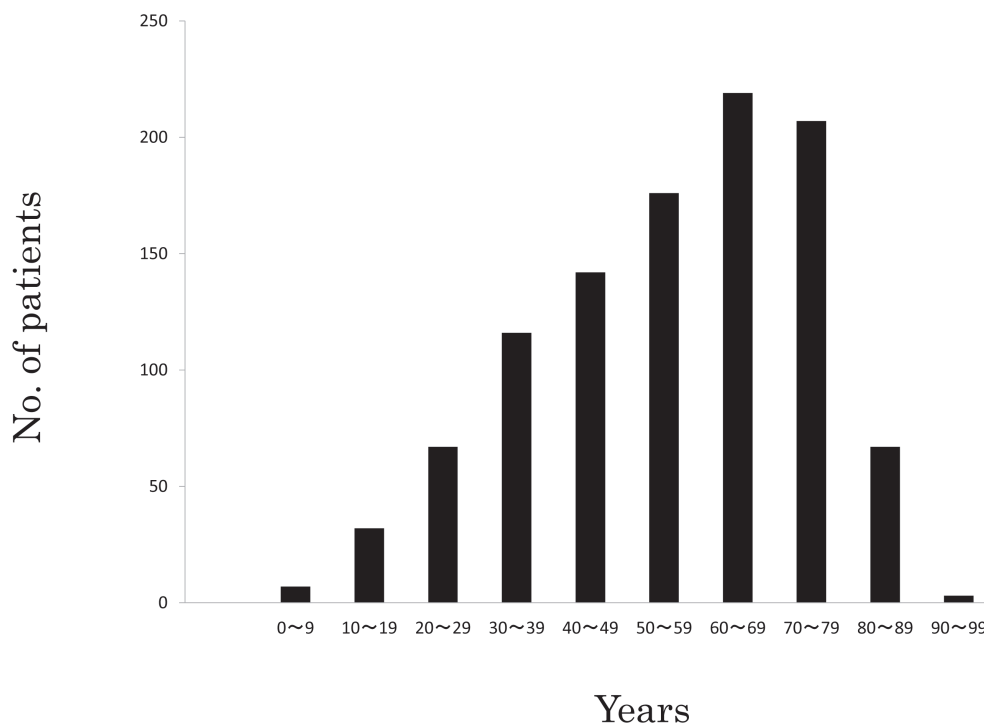


Figure 2. Age distribution of patients visiting the Hongo Neurosurgery Clinic.

Classification of diagnoses

Patient diagnoses are listed in Table 1. The patients were classified into 4 groups according to the classification of the Otolaryngology Department of Kitasato University as: 1. peripheral vestibular disorders, 2. diseases of the central nervous system (CNS), 3. generalized disorders, and 4. symptomatic diagnosis.³ The largest group reflected patients with peripheral vestibular disorders (n = 521 [50.3%]) followed by patients with diseases of the CNS (n = 382 [36.9%]), symptomatic diagnosis (n = 91 [8.8%]), and patients with generalized disorders (n = 42 [4.1%]).

Breakdown of diagnoses according to group (Table 1)

1. Peripheral vestibular disorders

The most frequent diagnosis was Meniere's disease (including atypical cases; n = 289 [27.8%]), followed by benign paroxysmal positional vertigo (BPPV; n = 203 [19.5%]), delayed endolymphatic hydrops (n = 18 [1.7%]), sudden deafness with vertigo (n = 5 [0.4%]), vestibular neuritis (n = 4 [0.3%]), labyrinthine concussion (n = 1 [0.09%]), and Ramsay Hunt syndrome (n = 1

[0.09%]).

2. Diseases of the CNS

The most frequent diagnosis was acoustic tumor (AT; n = 173 [16.6%]), followed by cerebellopontine angle tumor (CPAT; n = 153 [14.7%]), vertebrobasilar insufficiency (n = 26 [2.5%]), cerebrovascular disease (n = 19 [1.8%]), head injury (n = 4 [0.3%]), multiple sclerosis (n = 2 [0.1%]), neurovascular compression (n = 1 [0.09%]), Parkinson's disease (n = 1 [0.09%]), spinocerebellar degeneration (n = 1 [0.09%]), syndrome of the median longitudinal fasciculus (n = 1 [0.09%]), and Wallenberg syndrome (n = 1 [0.09%]).

3. Generalized disorders

The most frequent diagnosis was psychogenic vertigo (n = 18 [1.7%]), followed by vestibular migraine (n = 8 [0.7%]), orthostatic dysregulation (n = 5 [0.4%]), benign recurrent vertigo (n = 2 [0.1%]), cervical vertigo (n = 2 [0.1%]), panic disorder (n = 2 [0.1%]), Costen's syndrome (n = 1 [0.09%]), dialysis disequilibrium syndrome (n = 1 [0.09%]), hypertension (n = 1 [0.09%]), iron deficiency anemia (n = 1 [0.09%]), and Mal de débarquement syndrome (n = 1 [0.09%]).

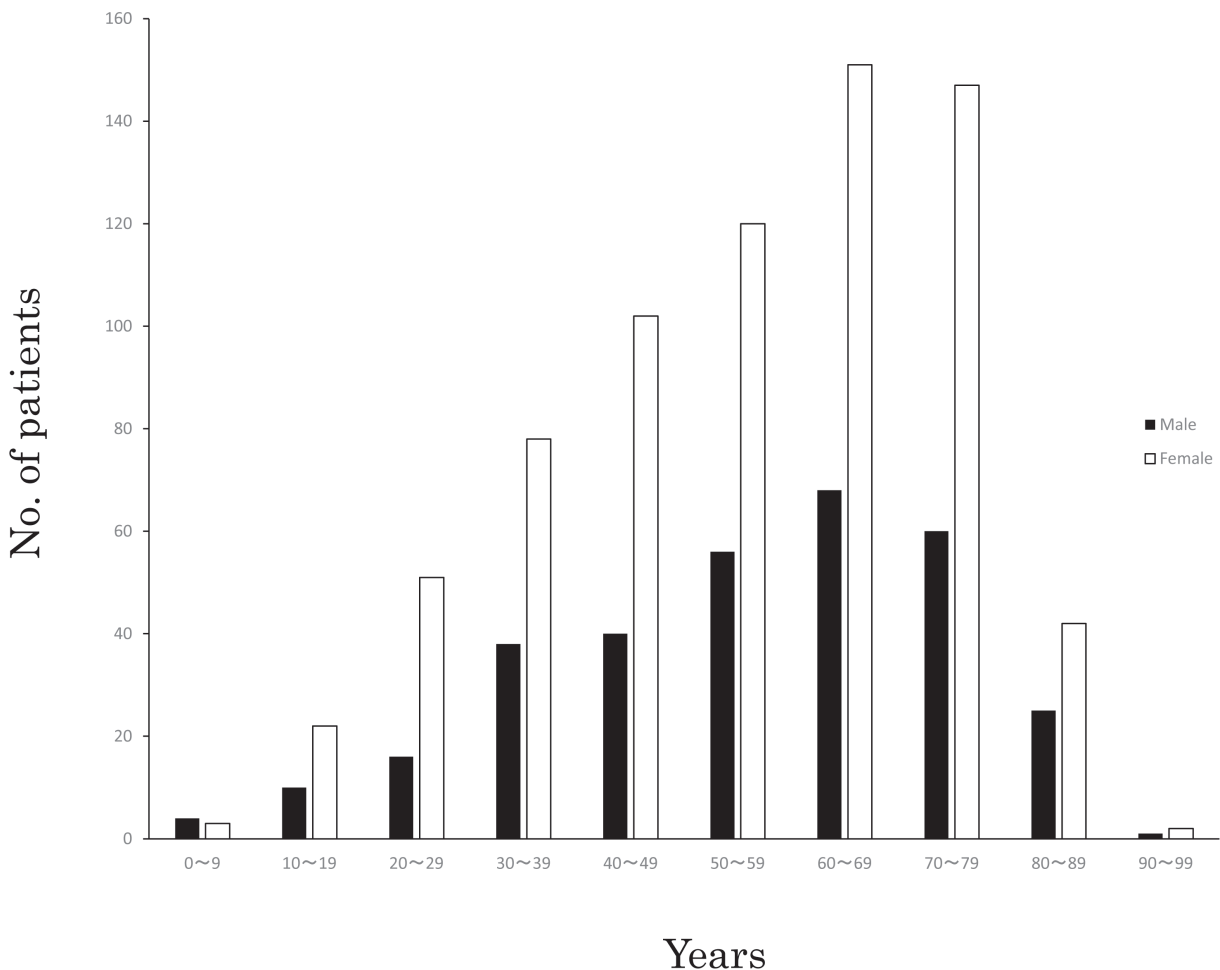


Figure 3. Gender distribution of patients visiting the Hongo Neurosurgery Clinic.

4. Symptomatic diagnosis

This group reflects undiagnosed cases and that were classified by vertigo attack durability, presence or absence of vertigo attack recurrence, and presence or absence of vertigo associated with cochlear symptoms (hearing loss or tinnitus).^{18,19}

Three main categories were established: provocative vertigo, recurrent attacks of vertigo associated with cochlear symptoms, and recurrent attacks of vertigo without cochlear symptoms. Although provocative

vertigo is a positional-type vertigo comparable to BPPV, it does not meet the diagnostic criteria of BPPV. And although recurrent attacks of vertigo associated with cochlear symptoms are reminiscent of Meniere's disease, it does not meet the diagnostic criteria of Meniere's disease. Provocative vertigo was most commonly seen (n = 60 [5.7%]) followed by recurrent attacks of vertigo associated with cochlear symptoms (n = 17 [1.6%]), and recurrent attacks of vertigo without cochlear symptoms (n = 14 [1.3%]).

Table 1. Diagnoses of the patients

Diagnosis	n (%)
Peripheral vestibular disorders	521 (50.3%)
Meniere's disease	289 (27.8%)
Benign paroxysmal positional vertigo	203 (19.5%)
Delayed endolymphatic hydrops	18 (1.7%)
Sudden deafness with vertigo	5 (0.4%)
Vestibular neuritis	4 (0.3%)
Labyrinth concussion	1 (0.09%)
Ramsay Hunt syndrome	1 (0.09%)
Diseases of the central nervous system	382 (36.9%)
Acoustic tumor	173 (16.6%)
Cerebellopontine angle tumor	153 (14.7%)
Vertebrobasilar insufficiency	26 (2.5%)
Cerebrovascular disease	19 (1.8%)
Head injury	4 (0.3%)
Multiple sclerosis	2 (0.1%)
Neurovascular compression	1 (0.09%)
Parkinson's disease	1 (0.09%)
Spinocerebellar degeneration	1 (0.09%)
Syndrome of median longitudinal fasciculus	1 (0.09%)
Wallenberg syndrome	1 (0.09%)
Generalized disorders	42 (4.1%)
Psychogenic vertigo	18 (1.7%)
Vestibular migraine	8 (0.7%)
Orthostatic dysregulation	5 (0.4%)
Benign recurrent vertigo	2 (0.1%)
Cervical vertigo	2 (0.1%)
Panic disorder	2 (0.1%)
Costen syndrome	1 (0.09%)
Dialysis disequilibrium syndrome	1 (0.09%)
Hypertension	1 (0.09%)
Iron deficiency anemia	1 (0.09%)
Mal de débarquement syndrome	1 (0.09%)
Symptomatic diagnosis	91 (8.8%)
Provocative vertigo	60 (5.7%)
Recurrent attacks of vertigo associated with cochlear symptom	17 (1.6%)
Recurrent attacks of vertigo without cochlear symptom	14 (1.3%)
Total	1,036 (100%)

Discussion

Vertigo can result from diseases in neurosurgery, orthopedics, ophthalmology, obstetrics and gynecology, psychiatry, otolaryngology, and internal medicine. Otolaryngologists not only treat peripheral vestibular disorders, but also diseases of the CNS and generalized disorders. Therefore, several institutions have developed specialized vertigo outpatient clinics. Dysequilibrium is part of a differential diagnosis and can be differentiated from vertigo by careful examination of equilibrium. Hence, a neurotological examination mainly focusing on the examination of equilibrium is useful combined with an audiological examination to detect any lesions of the brainstem, the cerebellum, the inner ear, and/or the eighth cranial nerve.

In this study, the peak age was in the sixth decade. A similar observation was made in 2007.⁹ In general, the age distribution observed here mirrors the aging society as a whole, with most of the patients with vertigo and disequilibrium issues being older than 60 years of age. Females comprised 69% of patients, which was also similar to findings in a previous study.¹²

Harmonization of diagnoses using diagnostic criteria is necessary to classify patients with vertigo.²⁰ However, when one patient has multiple diseases, classification by diagnosis is not straight-forward. A comparison among previous studies^{9,10,12,13} and the data from this study is presented in Table 2. Classification by diagnosis was attempted according to the harmonization used in previous studies.^{9,10,12,13} Peripheral vestibular disorder accounted for 50% or more and was the most common of the four types of manifestations in all those studies.

Interestingly, Meniere's disease, including atypical cases, was the most frequent diagnosis. Hashimoto et al.⁹ reported that the number of Meniere's disease patients in 1994 was 13, while there were 69 in 2002, reflecting a five-fold increase. This increase might reflect changes in the living and working environments in the community,

including increases in stress levels. In particular, an increase in Meniere's disease in females may be explained by an increase in the female workforce.²¹ In the present study, atypical cases were defined on the basis of the Clinical Practice Guideline of Meniere's Disease.¹⁷

Age and gender distribution for BPPV was also similar to that in a previous study.¹² More elderly women than men were affected by BPPV. BPPV and osteoporosis caused by a decrease in estrogen due to menopause may have similar pathogenetic mechanisms associated with calcium metabolism in both otoconia and bone.²²⁻²⁷

The frequency of CNS diseases (36.9%) was relatively high compared with previous studies.^{9,10,12,13} The high proportion of CNS diseases might reflect the following circumstances. 1. This clinic is a neurosurgery clinic. 2. It has an MRI examination capability. 3. When neurosurgeons in the area see patients with vertigo symptoms asking for specialized vertigo outpatient clinics, they typically refer those patients to this clinic for an equilibrium examination. And 4. Follow-up of patients with AT and CPAT does not require a clinic with surgical personnel and equipment. It should also be mentioned that differences in practice methodologies (e.g., otolaryngology vs. neurotology) may in part reflect the differences seen in the proportion of patients with vertigo linked to diseases of the CNS.

The proportion of vertigo patients with symptoms rooted in generalized disorders was similar to that reported previously.^{9,10,12,13} The most frequent diagnosis was psychogenic vertigo diagnosed due to: the head-MRI/MRA disclosed no abnormal findings, none of the physical examinations revealed abnormal findings, and a severe feeling of malaise that was relieved with a stabiliser. Regarding vestibular migraines, it is imperative that patients are asked to see a neurosurgeon.

The rationale for including the category of symptomatic diagnosis was mainly to enable the exclusion of Meniere's syndrome and to promote studies of the causes of the symptoms.^{18,19} This group of patients

Table 2. A comparison between the data from this study with data previously published

Author	Number of cases	Peripheral vestibular disorders % (n)	Diseases of the CNS % (n)	Generalized disorders % (n)	Others % (n)
Hashimoto et al. ⁹	380	59.5% (226)	5.8% (22)	6.3% (24)	28.4% (108)
Matsuyoshi et al. ¹⁰	294	53.7% (158)	28.6% (84)	10.9% (32)	6.8% (20)
Taura et al. ¹²	612	62.4% (382)	10.0% (61)	6.4% (39)	21.2% (130)
Yahata et al. ¹³	254	69.3% (176)	2.8% (7)	7.9% (20)	20.1% (51)
Ochiai	1,036	50.3% (521)	36.9% (382)	4.1% (42)	8.8% (91)

CNS, central nervous system

accounted for slightly less than 10%, highlighting the difficulty of establishing the diagnosis and etiology of vertigo. Although provocative vertigo is reminiscent of BPPV, and the course of recurrent attacks of vertigo associated with cochlear symptoms is comparable to Meniere's disease, they do not meet the diagnostic criteria. It is expected that many patients stop visiting the clinic when their symptoms of vertigo diminish, which results in incomplete follow-up data.

Particularly, patients with provocative vertigo, which accounts for more than half of the symptomatic diagnoses, are candidate for vertigo rehabilitation programmes. Because these patients would receive vertigo rehabilitation²⁸ and, therefore, enjoy good outcomes,²⁹ it was thought that they would be less prone to visit the clinic on a follow-up basis.

Conflicts of Interest: None

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