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Long-Term Survival in 1,931 Patients With Dizziness: Disease- and Symptom-Specific Mortality

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Objective: To evaluate mortality among patients referred for suspected vestibular disorder and to examine whether specific symptoms or disorders predict long-term survival among patients with dizziness or vertigo.

Study Design: Retrospective cohort study.

Methods: This retrospective cohort study analyzed long-term survival data. Consecutive patients examined for suspected vestibular disease at an otolaryngology clinic completed a detailed questionnaire regarding symptoms and comorbidities.

Results: The study included 1,931 patients. Their mean age (standard deviation) was 50.5 (16.5) years, and 60% were women. The mean follow-up period was 20.6 years (range, 15.3–27.5 years). The standardized mortality ratio for the entire cohort compared with the Norwegian age- and sex-matched population was 1.03 (95% confidence interval [CI]: 0.94–1.12), illustrating no difference in overall survival. Patients with a cerebrovascular cause of dizziness had higher mortality in adjusted Cox regression analyses (hazard ratio [HR] 1.56, 95% CI: 1.11–2.19), whereas patients reporting periodic or short attacks of dizziness had lower mortality (HR 0.62 [0.50–0.77] and 0.76 [0.63–0.93], respectively). Reported unsteadiness between dizziness attacks was associated with higher mortality with an HR of 1.30 (95% CI: 1.08–1.57).

Conclusion: This long-term study found comparable mortality rates between patients evaluated for suspected vestibular disorder and that of the general population. However, subgroup analyses showed reduced mortality in patients with periodic or short attacks of dizziness and increased mortality in patients with unsteadiness between attacks or cerebrovascular causes of dizziness. The time course of vestibular symptoms should be determined, and thorough evaluation including fall risk and comorbidities must be considered in patients with nonepisodic symptoms.

Key Words: Dizziness, vertigo, unsteadiness, vestibular symptoms, mortality.

Level of Evidence: 3

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INTRODUCTION

Vestibular symptoms include dizziness, vertigo, vestibulovisual symptoms, and unsteadiness.[1] The US National Health Interview Survey (NHIS) indicated that 23.8 million adult Americans (11.1%) had reported dizziness or balance problems during the last 12 months.[2] Those experiencing these symptoms had a twofold higher mortality rate (relative risk, 2.2; 95% confidence interval [CI], 1.8–2.8), a risk comparable to that of other leading causes of death such as diabetes mellitus, cardiovascular disease, and cancer.[2] It is less likely that the patient will be referred to clinics specializing in vestibular disorders if the referring physician finds other serious underlying disease to be the most likely cause of the patient's symptoms. However, the predictors of long-term survival have not been examined in patients with dizziness seen in otolaryngology or neurotology clinics. To what extent vestibular disorders such as Ménière's disease and benign paroxysmal positional vertigo (BPPV) are associated with survival is unknown; furthermore, whether specific vestibular symptoms such as unsteadiness or spinning vertigo are relevant for survival has also not been elucidated.

Although patient history is essential when diagnosing patients with dizziness, the diagnostic yield and prognostic value of various patient-reported symptoms remain uncertain. Differentiation based on the type of dizziness was previously advocated, and spinning vertigo was considered a typical feature of benign, peripheral vestibular disorders.[3,4] Van Vugt et al. reported lower mortality among older patients in primary care settings with vertigo compared with the mortality in those with presyncope, disequilibrium, or other types of dizziness.[5] However, patients are inconsistent when describing the types of dizziness they have experienced,[6] and differentiation based on the reported type of dizziness has been criticized.[4] An alternative differentiation is based on the time course and triggers of dizziness,[7,8] and categorization of acute, episodic, and chronic vestibular syndromes is included in the World

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Health Organization International Classification of Diseases (ICD-11).[9] The risk of falls increases with increasing numbers of patient-reported vestibular symptoms, and self-reported unsteadiness has been shown to predict falls and disability after 2 years.[10,11] These findings correspond well with several studies reporting that impaired balance in physical testing was associated with reduced survival in middle-aged and older persons.[12–14] Thus, as dizziness and balance problems are associated with a dramatic increase in mortality in the general population, it is also important to investigate this association in the otolaryngology setting. Furthermore, the identification of specific findings in the history or specific diagnoses that predict increased death risk is also important as such information could lead to individualized follow-up.

The present study aimed to evaluate overall survival among patients examined for dizziness in a tertiary otolaryngology clinic and to determine the survival prediction of dizziness diagnoses and the details of patient history such as dizziness type, symptom timing, and associated symptoms.

MATERIALS AND METHODS

This cohort study included consecutive patients examined between 1992 and 2004 at the vestibular and balance laboratory at the Department of Otorhinolaryngology and Head and Neck Surgery at Haukeland University Hospital, Norway. The clinic serves as a tertiary care clinic for vestibular disorders and also receives referrals from primary care physicians for patients with suspected vestibular disease.

Before examination, the patients completed a questionnaire containing questions on the symptom time course, dizziness description, dizziness triggers, accompanying symptoms, and how they felt between attacks of dizziness (not troubled, unsteady, or other [free text]). The questionnaire also included questions on previous and concurrent diseases, including diabetes mellitus and cardiovascular disease. The categories were not mutually exclusive, but for timing patients usually reported only one category. A more detailed description of the questionnaire and responses in various categories has been described in detail previously.[15]

The patients underwent laboratory testing including videonystagmography or electronystagmography, bithermal caloric testing, and audiometry.

The causes of dizziness were determined by an otolaryngologist after clinical examination. The inclusion of patients was performed over 12 years, and there were some changes in the diagnostic criteria over this period. To verify the accuracy of diagnoses, all diagnoses were reviewed by two of the coauthors (F.K.G. and S.H.G.N.) and categorized for the purpose of this study.

The study was approved by the Regional Committee for Medical and Health Research Ethics (REK 2012-1075) with requirement that patients still alive were informed of the study by mail and provided an opportunity to withdraw. All patients alive in 2016 were thus informed, and patients with unknown address were excluded from the study.

Date of examination in the clinic was regarded as start of observation time. Data on vital status and date of death if they had died were retrieved from the Norwegian National Registry on June 28, 2019; this represents the end of the observation period. Patients where it could not be determined whether they had died or were alive at this time were regarded as lost to follow-up and were excluded from the study. Person-years at risk were calculated from start of observation time until whichever occurred first June 28, 2019, or death.

Kaplan-Meier curves were used to illustrate survival in patients grouped by diagnoses and selected symptoms. Statistical differences between survival curves were tested by log-rank tests.

The standardized mortality ratio (SMR) was calculated by indirect standardization to compare mortality in the cohort with the mortality of the general Norwegian population. The SMR represents the relative mortality of the study population compared with the expected mortality in a reference population. The expected number of deaths was calculated as the total number of person-years at risk for each sex-specific age group with 5-year intervals multiplied by the corresponding death rate in the Norwegian population for the same groups. The sex-specific age group mortality was retrieved from Statistics Norway,[16] and mortality rates from 1999 were used as the reference mortality rate as this was the middle year of inclusion in the study.

Cox proportional hazards regression models were used to calculate crude and adjusted hazard ratios (HRs) for patient-reported symptoms and known comorbidities (diabetes mellitus and cardiovascular disease). HRs represent the ratio of probability of death depending on predictor variables. In this study, we report the HR between patients reporting specific symptoms compared with patients not reporting that specific symptom. Forward Cox-regression analysis adjusted for age, sex, former cardiovascular disease, and diabetes mellitus was performed to create a final model with a significance level set at $P < .05$. The assumptions of proportional hazards and specifications were checked using graphical methods, link tests, and tests based on Schonfeld residuals.

All statistical analyses were performed using Stata (StataCorp. 2017. Stata: Release 15. Statistical Software; StataCorp LLC, College Station, TX). Two-sided P-values < .05 were considered statistically significant.

RESULTS

Of the 2,058 patients with patient-reported symptoms of dizziness at baseline, 40 were lost to follow-up and 87 were missing consent; thus, this study included 1,931 patients. Of these, 1,154 (59.8%) were women and the mean age at examination was 50.5 years (standard deviation 16.5 years). The mean time interval from examination in the clinic until the end of observation was 20.6 years (range, 15.3–27.5 years). The most common vestibular diagnosis was vestibular neuritis (252 patients, 13.1%) followed by BPPV (235 patients, 12.2%), Ménière's disease (204 patients, 10.6%), and vestibular schwannoma (76 patients, 3.9%). A total of 151 patients (7.8%) were diagnosed with a cerebrovascular cause of dizziness without concurrent vestibular disease, whereas 715 patients (37.0%) were diagnosed with unspecified nonvestibular causes of dizziness.

Mortality Compared With The General Population

The 5- and 10-year mortality rates in the entire cohort were 4.3% and 10.1%, respectively. The SMR was 1.03 (95% confidence interval [CI] 0.94–1.12) for the entire cohort, illustrating no difference in mortality compared with the expected mortality in the general Norwegian population matched for age and sex. Patients who reported periodic dizziness had a 17% lower mortality

rate with an SMR of 0.83 (0.70–0.98) compared with the age- and sex-matched general Norwegian population, whereas patients reporting constant dizziness had borderline significantly increased mortality with an SMR of 1.20 (1.00–1.43) compared with the age- and sex-matched Norwegian population.

Predictive Values of Selected Symptoms of Dizziness

Figure 1 shows the unadjusted Kaplan-Meier plots of survival based on selected symptoms. Survival analysis adjusted for age and sex (Table 1) showed the risk of mortality to be 27% lower in patients reporting periods of dizziness (HR 0.73, 95% CI: 0.60–0.89) compared with patients who did not report this symptom. In contrast, patients reporting constant dizziness had a 30% higher risk of mortality (HR 1.30 [1.05–1.60]) compared with patients who did not report constant dizziness. Patients who reported spinning vertigo or dizziness triggered by sound had a lower risk of mortality (HR 0.83 [0.69–0.99] and 0.61 [0.40–0.93], respectively), whereas dizziness triggered by medication was associated with a nearly twofold increase in risk of mortality (HR 1.85 [1.08–3.14]).

Cox regression analysis performed for each symptom adjusted for age, sex, diabetes mellitus, and cardiovascular disease showed that periodic dizziness was associated with a 30% lower risk of mortality (HR 0.70 [0.58–0.86]), whereas constant dizziness was associated with a 25% increased risk of mortality (HR 1.26 [1.01–1.55]). Spinning vertigo and dizziness triggered by sound were associated with a reduced risk of mortality in analyses adjusted for age, sex, and comorbidities (HR 0.80 [0.67–0.96] and 0.61 [0.39–0.93], respectively).

The results of stepwise Cox regression analysis of patient-reported symptoms adjusted for age, sex, cardiovascular disease, and diabetes mellitus are presented in Table 2. Among patient-reported symptoms, periodic or short attacks of dizziness were associated with reduced risk of mortality (HR 0.62 [0.50–0.77] and 0.76 [0.63–0.93], respectively). Unsteadiness between dizziness attacks was associated with increased risk of mortality (HR 1.30 [1.08–1.57]). Dizziness triggered by sound was associated with decreased risk of mortality (HR 0.59 [0.38–0.91]). Analysis without adjustment for cardiovascular disease and diabetes mellitus identified the same significant predictors (data not shown).

Survival According to Diagnosis

Unadjusted Kaplan-Meier plots of survival according to cause of dizziness are shown in Figure 2. Cox regression analysis adjusted for age, sex, and cause of dizziness showed increased risk of mortality among patients with cerebrovascular causes of dizziness 1.56 (1.11–2.19) compared with that in patients with BPPV (Table 3).

Survival According to Symptom Categories

Patient reports of one or more triggers of dizziness were associated with reduced risk of mortality in the unadjusted analysis (HR 0.71 [0.60–0.86]) compared with patients who did not report any triggers of dizziness. This was, however, no longer significant after adjusting for age, sex, and comorbidities (HR 0.83 [0.69–1.00]). After adding the numbers of responses by the patients in the categories of dizziness timing, dizziness type, associated symptoms, and dizziness triggers, the total number of responses was associated with reduced risk of mortality (HR 0.92 [0.89–0.95] in unadjusted analysis and 0.95 [0.92–0.99] in analyses adjusted for age, sex, and comorbidities).

DISCUSSION

The main finding in this study was that patients examined in an otorhinolaryngological clinic for suspected

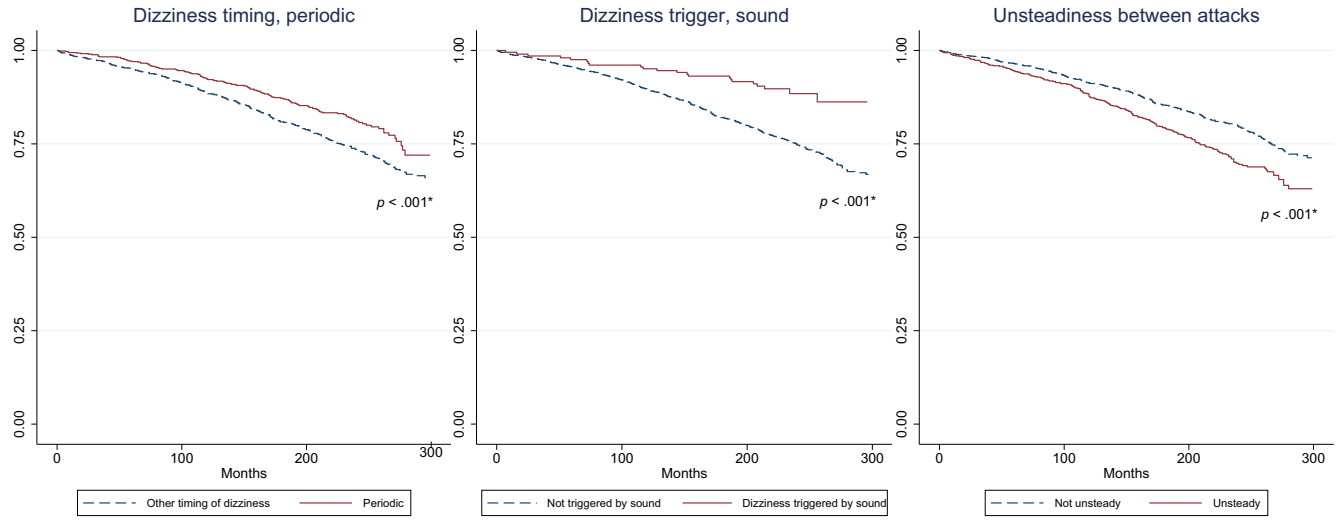

Fig. 1. Kaplan-Meier unadjusted survival estimates by patient-reported symptoms in 1,931 patients with dizziness. *P-value from log-rank test.

TABLE I.
Cox Regression Analysis with Hazard Ratios of Survival for Various Patient-Reported Symptoms and Comorbidities among 1,931 Patients with Dizziness.

			Adjusted for Age and Sex		Adjusted for Age, Sex, Diabetes Mellitus, and Cardiovascular Disease	
		Number of Patients Reporting the Condition or Symptom (%)	Hazard Ratio[†] (95% CI[‡])	*P*-Value*	Hazard ratio[†] (95% CI[‡])	*P*-Value*
Other diseases	Diabetes mellitus	49 (2.5%)	2.40 (1.80–3.38)	**<.001**	2.37 (1.68–3.33)	**<.001**
	Cardiovascular disease	156 (8.1%)	1.60 (1.27–2.00)	**<.001**	1.58 (1.26–1.98)	**<.001**
Dizziness timing	Short attacks	874 (45.3)	0.85 (0.71–1.02)	.081	0.87 (0.72–1.04)	.131
	Periods	706 (36.6)	0.73 (0.60–0.89)	**.002**	0.70 (0.58–0.86)	**.001**
	Constant	399 (20.7)	1.30 (1.05–1.60)	**.014**	1.26 (1.01–1.55)	**.033**
	Other, free text	7 (0.4)	2.65 (0.85–0.26)	.093	2.30 (0.73–7.20)	.154
Dizziness type	Spinning	933 (48)	0.83 (0.69–0.99)	**.038**	0.80 (0.67–0.96)	**.017**
	Rocking	596 (30.9)	1.08 (0.88–1.22)	.453	1.06 (0.86–1.30)	.577
	Other, free text	401 (20.8)	1.07 (0.86–1.33)	.529	1.03 (0.83–1.28)	.799
	Walking on pillows or floating	375 (19.4)	0.80 (0.61–1.05)	.113	0.82 (0.63–1.08)	.165
	Drop attacks/ vestibular falls	213 (11.0)	1.18 (0.89–1.56)	.240	1.15 (0.87–1.51)	.335
Accompanying symptoms	Syncope	132 (6.8)	1.05 (0.74–1.49)	.772	1.11 (0.78–1.58)	.547
	Headache	550 (28.5)	0.91 (0.74–1.12)	.053	0.90 (0.73–1.11)	.333
	Nausea	1,049 (54.3)	0.89 (0.75–1.07)	.205	0.86 (0.72–1.03)	.109
	Vomiting	507 (26.3)	0.96 (0.78–1.17)	.676	0.95 (0.78–1.16)	.633
	Visual disturbances	560 (29.0)	0.96 (0.77–1.18)	.673	0.92 (0.74–1.14)	.452
	Near-fainting	289 (15.0)	0.99 (0.76–1.28)	.921	0.91 (0.70–1.19)	.491
	Other, free text	241 (12.5)	0.84 (0.61–1.15)	.271	0.83 (0.61–1.14)	.262
	None	473 (24.5)	1.10 (0.91–1.35)	.324	1.19 (0.97–1.45)	.099
Tinnitus	During dizziness attacks	153 (7.9)	1.07 (0.77–1.50)	.670	0.97 (0.69–1.36)	.866
	Independent of dizziness attacks	543 (17.5)	0.89 (0.72–1.10)	.276	0.90 (0.73–1.11)	.329
Hearing loss	During dizziness attacks	93 (4.8)	1.14 (0.77–1.70)	.512	1.18 (0.79–1.76)	.411
	Independent of dizziness attacks	338 (17.5)	0.96 (0.77–1.20)	.715	0.96 (0.76–1.20)	.696
Dizziness triggers	Positional change	678 (35.1)	1.03 (0.85–1.24)	.789	1.00 (0.83–1.20)	.964
	Sleep deprivation	278 (14.4)	0.87 (0.61–1.24)	.440	0.86 (0.60–1.23)	.408
	Neck movements	555 (28.7)	0.93 (0.76–1.14)	.474	0.39 (0.75–1.12)	.392
	Light or darkness	138 (7.1)	0.94 (0.60–1.45)	.764	0.88 (0.57–1.38)	.579
	Sound	204 (10.6)	0.61 (0.40–0.93)	**.022**	0.61 (0.39–0.93)	**.022**
	Psychological factors	115 (6.0)	1.03 (0.67–1.57)	.909	0.93 (0.60–1.43)	.728
	Medication	35 (1.8)	1.85 (1.08–3.14)	**.024**	1.64 (0.96–2.81)	.071
	Infection/fever	66 (3.4)	1.04 (0.54–2.02)	.900	1.05 (0.54–2.05)	.878
	Other, free text	344 (17.8)	0.82 (0.63–1.08)	.162	0.84 (0.64–1.11)	.220
Unsteadiness between attacks		687 (35.6)	1.20 (1.00–1.44)	.050	1.19 (0.99–1.43)	.060

[†]Hazard ratio represents the ratio of risk of mortality between patients reporting a specific symptom or disease compared with patients not reporting the specific symptom or disease.
[‡]CI = confidence interval.
*$P < .05$ (bold text).

vestibular disorder had a long-term overall mortality rate similar to that of the general population after adjusting for age and sex. However, we observed major differences within the group, with reduced mortality among patients with short attacks or periodically fluctuating dizziness and increased mortality in patients with constant symptoms or unsteadiness between attacks.

Our main findings are consistent with those of a Swedish population-based study that observed no increased mortality in patients on sick leave or disability

TABLE II.
Cox Regression Analysis Adjusted for Age and Sex Including All Significant Variables for Survival with Hazard Ratios for Patient-Reported Symptoms among 1,931 Patients with Dizziness.

		Hazard Ratio[†] (95% CI[‡])	*P*-Value	Stepwise Analysis[§]
Other diseases	Diabetes mellitus	2.31 (1.64–3.26)	<.001	1
	Cardiovascular disease	1.66 (1.32–2.08)	<.001	2
Timing of dizziness	Periodic	0.62 (0.50–0.77)	<.001	3
	short attacks	0.76 (0.63–0.93)	.006	4
Between attacks of dizziness	Unsteady	1.30 (1.08–1.57)	.005	5
Dizziness trigger	Sound	0.59 (0.38–0.91)	.017	6

The model for survival from forward Cox regression with a significance level of $P < .05$, adjusted for age, sex, self-reported symptoms, and comorbidities.
[†]Hazard ratio represents the ratio of risk of mortality between patients reporting a specific symptom or disease compared with patients not reporting the specific symptom or disease.
[‡]CI, confidence interval.
[§]Indicating inclusion sequence in forward stepwise regression analysis, with age and sex included in the model *a priori*.

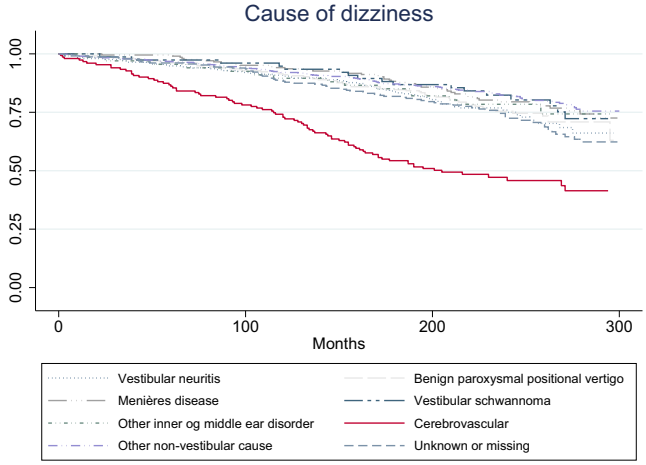

Fig. 2. Kaplan-Meier unadjusted survival estimates according to the cause of dizziness in 1,931 patients.

pensions due to vestibular disorders[17] but are not in line with those in the NHIS study in which patients with dizziness or balance problems had twofold increased mortality.[2] Other studies have reported increased risks of stroke and vascular events among emergency department patients with dizziness[18–20] and hypertensive patients with recurrent vertigo.[21] However, our present cohort comprised mainly outpatients referred to an ENT clinic due to suspected vestibular disorder. We, therefore, infer that our patients had been screened by the referring physicians for major nonvestibular causes, such as evident cardiovascular or cerebrovascular disorder, and were usually not referred in cases of severe comorbidity or an obvious nonvestibular cause of their vestibular symptoms.

The findings in the present study should not be directly generalized to patients with dizziness in acute or subacute setting. We found that patients with cerebrovascular causes of dizziness had a higher risk of mortality compared with patients with BPPV. This may not be surprising as cerebrovascular causes includes ischemic and hemorrhagic strokes known to be among the leading causes of death globally.[22] We expect that patients with cerebrovascular cause of dizziness are overrepresented in emergency departments compared with the otolaryngological outpatient clinic. In addition, the increased mortality among patients with dizziness in emergency departments is most pronounced during the

TABLE III.
Cox Regression Analysis with Hazard Ratios of Survival for Various Causes for Dizziness among 1,931 Patients, Adjusted for Age, Sex, and Cause of Dizziness.

	Number of Patients (%)	Hazard Ratio[†] (95% CI)	*P*-Value[*]
Cause of dizziness			
BPPV	235 (12)	Reference	
Vestibular neuritis	252 (12)	1.10 (0.77–1.57)	.599
Ménière's disease	204 (11)	0.89 (0.60–1.32)	.566
Vestibular schwannoma	76 (4)	0.87 (0.51–1.48)	.595
Other inner- or middle-ear disorder	67 (3)	1.29 (0.74–2.25)	.365
Cerebrovascular	151 (8)	1.56 (1.11–2.19)	**.011**
Other nonvestibular cause	715 (37)	1.05 (0.77–1.43)	.744
Unknown or missing	231 (12)	1.18 (0.83–1.68)	.352

[†]Hazard ratio represents the ratio of risk of mortality between patients with a specific diagnosis compared with patients with BPPV.
[*]$P < .05$ (bold text).
BPPV = benign paroxysmal positional vertigo; CI = confidence interval.

first few months after discharge.[18–20] The population in our study comprised mainly patients with long-lasting symptoms.

Patients who reported chronic dizziness and unsteadiness showed increased risk of mortality. These patients may be less socially and physically active due to vestibular symptoms, with further negative consequences for their health. Falls are also among the leading causes of injury and death among older US citizens.[23] Therefore, a causal influence may exist between chronic vestibular symptoms and mortality. In addition, chronic dizziness and unsteadiness are associated with numerous medical, neurologic, and cardiovascular disorders, many of which are linked to increased mortality.

Reports of dizziness attacks or periodic fluctuations were associated with better survival. This can be explained by this time course being typical for benign vestibular disorders such as BPPV, Ménière's disease, and vestibular migraine. These disorders were prevalent in our study population. However, episodic dizziness can also be associated with orthostatic hypotension, mass lesions in the posterior fossa, and transient ischemic attack.[7] These findings indicate that the more serious causes of episodic dizziness were outnumbered by benign disorders in this cohort and that the episodic disorders have better survival compared with patients reporting chronic dizziness. Therefore, a differentiation between episodic and chronic symptoms is clinically important as this may represent two groups of patients with different mortality.

Our findings strongly support the new categorization of vestibular syndromes based on the time aspect of symptoms, as suggested in the ICD-11 and the International Classification of Vestibular Disorders (ICVD).[9,24] Most population-based studies combine dizziness and unsteadiness. We recommend that future studies on vestibular symptoms and mortality distinguish unsteadiness from dizziness and vertigo.

Our analyses showed that triggered dizziness, particularly that triggered by sound, was associated with a reduced risk of mortality compared with those patients who did not report this symptom. Vertigo and dizziness triggered by sound, that is, the Tullio phenomenon,[25] are distinct symptoms in the ICVD[1] and are reportedly associated with defects in the labyrinth, such as superior semicircular dehiscence syndrome.[26] However, in our study, 10% of patients reported dizziness triggered by sound, indicating this to be a less-specific finding that should be confirmed by clinical examination and further imaging and laboratory testing, as needed. Nevertheless, patient-reported dizziness triggered by sound generally represents benign conditions. The present study supports former findings that patient-reported triggers of dizziness should be confirmed by clinical testing.[15]

Although spinning vertigo was associated with reduced risk of mortality after adjusting for age, sex, and comorbidities, it failed to reach significance in the final model (stepwise inclusion) when other symptom characteristics, including timing, were included. Van Vugt and colleagues found vertigo to be associated with a more favorable outcome than other types of dizziness among elderly patients in primary care,[5] whereas Newman-Toker and colleagues found that the type of dizziness was inconsistently reported by patients in an emergency department.[6] Our findings indicated that the time course of symptoms such as short attacks or episodic dizziness was more relevant to survival than the quality of symptoms, such as spinning vertigo.

The main strength of this study was the very long follow-up of a large cohort with well-documented vestibular diagnoses and patient-reported baseline data. The results are especially relevant to clinics receiving referrals due to chronic or episodic vestibular disorders, and this study provides valuable clinical indicators of more serious underlying disorders. We found that patients in this cohort did not have a higher mortality rate than the general population, but patients with episodic symptoms had better survival compared with the other patients in the cohort. A limitation of the study is that we did not have data on cause of death or on falls. Such information could have provided additional information on what causes the increased mortality among certain groups and may determine if chronic dizziness were associated with falls or if the increased mortality were associated with other disorders such as cardiovascular disease. In addition, several commonly assigned diagnoses were not included in the analyses as these were not defined by diagnostic criteria when the study was designed, including vestibular migraine and persistent postural-perceptual dizziness.

CONCLUSION

In this long-term follow-up of patients with vestibular symptoms evaluated in an otolaryngology clinic, overall mortality was comparable with that in the general population. However, periodic or short attacks of dizziness were associated with better survival, whereas chronic dizziness and unsteadiness between attacks were associated with increased mortality. These results underscore the importance of classifying patients based on the timing of symptoms. Patients reporting chronic symptoms should be examined for specific risk factors and fall risk.

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