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a cross-sectional study from primary health care

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Abstract

Background

Dizziness is seldom the only symptom among patients who develop stroke but patients, hospitalized for vertigo are at higher risk of stroke than the general population. The proportions of patients who have remaining dizziness after a stroke seem to be unclear.

Objectives

To study the frequency of dizziness among stroke patients referred to rehabilitation in primary health care and to study the relation between dizziness and gender, age, activity and self-rated health.

Methods

Patients with first-time stroke who were referred to rehabilitation in primary health care after the initial hospital stay were included. Dependence/independence in daily activities and self-rated health was measured. A question about whether the patient had experienced any dizziness or unsteadiness was asked.

Results

Sixty three patients were included in the study, (39 men, 24 women) aged 36–85 years. The majority of patients were dizzy (70%). Being female increased the risk of being dizzy substantially (OR 9.43). Patients with dizziness had poorer self-rated health than patients without dizziness (p=0.001).

Conclusion

Dizziness is a common symptom among patients with stroke, especially among female patients, and is associated with lower self-rated health. Therefore, it is important to address dizziness in the rehabilitation of stroke patients.

Keywords: Stroke, dizziness, gender, self-rated health.

Introduction

In Europe the incidence of stroke per 100 000 persons is calculated at 141.3 among men and 94.6 among women, and approximately 30 000 persons per year have a stroke in Sweden (Johansson 2004; Heuschmann, Di Carlo et al. 2009). These figures are well in accordance with those registered in Malmö, (population 300 000), where approximately 800 persons have a stroke every year (Asplund 2009). In Malmö, continuous work for improvement of the treatment and rehabilitation of patients with stroke is performed in cooperation between the Neurological Department at Skåne University Hospital, primary health care and municipal health care. This cooperation aims to facilitate treatment, rehabilitation and home care for patients with stroke (Pessah-Rasmussen 2003). As a result of this cooperation it was noted that rehabilitation for patients with stroke seemed to be neglected outside the hospital (Hansson, Beckman et al. 2012). Subsequently, stroke patients in Malmö are offered an appointment to a physiotherapist or an occupational therapist in primary health care, shortly after the initial hospital stay, if that is considered appropriate. On this occasion, activity is assessed. This way of providing rehabilitation outside the hospital also gives further possibilities of working with quality projects in the field.

Dizziness is often used as a non-specific term to describe many sensations, including vertigo, presyncope, disequilibrium and lightheadedness (Luxon and Davies 1997). It is a common symptom in all age groups and can cause reduced self-rated health and depression (Tinetti, Williams et al. 2000; Neuhauser, Radtke et al. 2008; Stevens, Lang et al. 2008; Mendel, Bergenius et al. 2010). The cause of dizziness is in most cases benign, and life-threatening conditions are rare (Kroenke, Lucas et al. 1992). Dizziness is seldom the only symptom among patients who develop stroke (Kerber, Meurer et al. 2008). However, patients who have dizziness severe enough to be hospitalized with the diagnosis vertigo are at higher risk of stroke than the general population (Lee, Su et al. 2010). Spinning sensations seem to

be unusual among patients with supratentorial lesions, but some hemispheric stroke patterns may be related to non-rotational dizziness (Anagnostou, Spengos et al. 2010). The risk of falling increases after stroke (Lim, Jung et al. 2012) and dizziness is also a risk factor of falling (Moreland, Richardson et al. 2003) but prevalence of remaining dizziness after a stroke is not known. Therefore, in order to offer proper treatment, it is important to identify stroke patients with dizziness.

The aims were to study the frequency of dizziness among stroke patients, referred to rehabilitation in primary health care and to study the relation between dizziness and gender, age, activity and self-rated health.

Method

Ethics statement

The regional ethical review board in Lund has reviewed the study and found that no ethical approval was necessary since the study was considered to be a quality project. All data were made anonymous before processing in the database.

Patients

Patients who needed continued rehabilitation after the acute phase were treated as in-patients at a specialized rehabilitation centre or went directly to rehabilitation in municipal health care in the patient's home, and/or by primary health care at a primary health care centre (as out-patients at the primary health care centre). Patients included in the study had been treated for first-time stroke at the Neurological Department of Skåne University Hospital during the period January 2011 to February 2012 and then directly referred to rehabilitation in primary health. Only patients living in the city of Malmö were included. Patients who were unable to speak or understand Swedish were excluded. All measurements were performed by either

physiotherapist or occupational therapist at the primary health care centre at the patient's first visit there.

Activity

The patients' dependence/independence in daily activities was measured using the Barthel Index (BI) (Mahoney and Barthel 1965). BI measures physical ADL and is a reliable instrument for assessing disability (Wolfe, Taub et al. 1991). The total maximum score for the test is 100, implying that the patient can eat, take care of personal hygiene, get dressed, go to the bathroom, walk at least 50 meters and use stairs. BI is often used as an outcome measure in stroke trials (Quinn, Dawson et al. 2009).

Self-rated health

To measure self-rated health, the generic instrument EuroQol-5D (EQ5D) was used (EQ5D). EQ5D consists of a descriptive system comprising five dimensions: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each dimension has three levels: no problems, some problems and severe problems. The patient indicates his/her state by marking the most appropriate statement. This result in a 1-digit number and the digits for the five dimensions can be combined in a five-digit number, generating 243 possible combinations of response. The EQ5D can be presented as a health profile or as a global health index with a weighted total value (British tariff used), with the minimum value being –0.594 and the maximum 1.0 (Dolan 1997). The EQ5D also consists of a Visual Analogue Scale (EQ5D-VAS), were the patient is asked to rate their health on a vertical scale, where the individual points can be used as a quantitative measure, with zero as worst rated health and 100 as best rated health (EQ5D). EQ5D has been tested for validity when measuring quality of life after a stroke (Dorman, Waddell et al. 1997).

Dizziness

An additional question was asked about whether the patient had experienced any dizziness or unsteadiness in the past year. Patients who reported dizziness also answered a question about type of dizziness (rotational or spinning; unsteadiness; other; or don't know). These questions have been used in other studies on incidence of dizziness (Gopinath, McMahon et al. 2009). To establish if dizziness were present before or after the stroke, a question addressing this was also asked.

Statistics

Mean values and standard deviation (SD) were used for descriptive data. Since BI and EQ5D had a skewed distribution, median values for these measures are also shown. Logistic regression was used to calculate the odds ratio (OR) for being dizzy among women and men. Since OR for female gender and dizziness was high, we also calculated other differences between women and men by using Wilcoxon's rank sum test (due to the skewed distribution of the data). Differences between the group with dizziness and the group without dizziness were also calculated using Wilcoxon's rank sum test. Proportions were calculated using chi square test. SPSS version 19.0 was used for the analysis (SPSS Inc, software location Lund University).

Results

Participants

A total of 63 patients were included in the study, 39 men and 24 women, aged 36–85 years (mean 63). Mean time between the stroke and the evaluation was 3.9 months (SD 3.5). Data for the study group are shown in table 1.

Insert table 1 about here

Dizziness

Forty-four patients (70%) had experienced dizziness the last year, of these, 24 (55 %) had been dizzy since the stroke and among 20 patients (45%) dizziness was also present before the stroke (figure 1). The most common form of dizziness was unsteadiness (31 patients, 70%) (table 1).

Insert figure 1 about here

Activity

Median BI was 95. Thirty five (55%) patients had BI 95–100, indicating independence in daily activities, 22 (35%) had BI 60–90, indicating moderate dependence and 6 (10%) had BI 0–55, indicating major dependence in daily activities (table 1).

Self-rated health

Median EQ5D index was 0.59 and median EQ5D VAS was 60 mm (table 1).

Differences between dizzy and non-dizzy patients

There were no differences in age, time since stroke or activity between dizzy and non-dizzy patients (table 2). Dizzy patients had statistically significantly lower self-rated health than non-dizzy patients (p=0.001).

Insert table 2 about here

Gender differences

The proportion of women who experienced dizziness was higher (92%) than the proportion of men (56%), (p=0.008) (table 1). More women than men had experienced dizziness before the stroke (42% and 26% respectively) although not statistically significant (p=0.18). Women had lower values on BI than men (p=0.036), indicating lower function among women than men. Being of the female gender increased the risk of being dizzy substantially (OR 9.43).

Discussion

The majority of patients in this study had been dizzy the last year (70%, 44 out of 63). Fifty six per cent of the patients who had not experienced dizziness before the stroke were dizzy after the stroke (n=24) and all patients who had experienced dizziness before the stroke were also dizzy after the stroke (n=20). Female gender increased the risk of being dizzy substantially and women had a lower activity than men, measured with BI. Patients with dizziness had worse self-rated health than patients without dizziness.

About 800 persons have stroke in Malmö every year. In another study from Malmö, 283 patients attended follow-up in primary health care, 12 months after onset of stroke (Hansson, Beckman et al. 2012). In that study, all patients were offered an appointment in primary health care; in our study the patients were offered an appointment only when it was considered appropriate (by the Neurologist and/or Physiotherapist and/or Occupational therapist at the Neurological department at the hospital). There was also a difference in follow-up time (12 months after onset and directly after the initial hospital stay). However, mean values in BI, EQ5D VAS and EQ5D index did not differ between the two study populations (Hansson, Beckman et al. 2012).

In our study 20 out of 63 patients were dizzy before the stroke. In a large cohort study from Taiwan, patients who were discharged from emergency rooms with a diagnosis of dizziness or vertigo, showed a three-year increased risk of subsequent vascular events compared to patients without a diagnosis of dizziness or vertigo (Lee, Ho et al. 2012). Consequently, when patients are assessed in the emergency room, dizziness seems to be a risk factor to consider for stroke, especially if the patient is female.

Other authors has shown that female gender is associated with dizziness (Sloane, Blazer et al. 1989; Grimby and Rosenhall 1995). Both these studies had less strong association than

our study, and include elderly persons living at home. Our study includes persons who had a stroke and then were referred to rehabilitation in primary health care, which might explain the difference in association. Other studies have also found gender differences in stroke patients; women seem to have poorer outcome of rehabilitation after stroke than men (Draca 2012), but men seem to be more inactive after stroke (Wolfe, Crichton et al. 2011). Also, women have better survival than men after primary intracerebral haemorrhages, a difference largely explained by higher mortality among older men (Zia, Engstrom et al. 2009). The women in our study showed poorer function and a higher proportion of dizziness than males, indicating that women perhaps survive but have more severe symptoms than men.

Knowledge about gender differences can be helpful when customizing rehabilitation programmes to the individual patient.

In this study, all patients who after the initial hospital stay went directly to rehabilitation in primary health care were included. However, we have no information about dizziness among those patients who were not referred to rehabilitation in primary health care. Some of those patients were probably not in the need of rehabilitation, some probably needed rehabilitation at another level. Also, since this is a quality project in primary health care, we have not retrieved information from the Neurological Department about other stroke characteristics such as stroke volume, location and type, issues not included in our aim. Also, we did not have the possibility to assess occurrence of nystagmus. The standardized questions about vertigo/dizziness have been used in other studies about incidence of dizziness and have not been modified for this specific study. Therefore, we do not know if the patients in our study had persistent dizziness or were dizzy from time to time or if the patient had fallen. There were differences in gender but not in age, time since stroke or function between dizzy and non-dizzy patients and we therefore chose to elucidate only gender differences by calculating OR.

The patients who were included in our study were all the patients who were referred to rehabilitation in primary health care during the period of inclusion. Hence, it is a group of patients who rehabilitation providers in primary health care can expect to meet. Therefore, it seems important that rehabilitation providers at this level have knowledge about rehabilitation of dizziness.

As in other studies, only a few stroke patients had rotational vertigo in our study (8/63) (Brandt, Botzel et al. 1995; Anagnostou, Spengos et al. 2010) and the majority reported unsteadiness (31/63). We do not know if the feeling of unsteadiness included fear of falling or was caused by the hemiparesis. However, mean values of BI was high and patients thus were independent in daily activities. Vestibular rehabilitation was originally developed for treatment of peripheral vestibular disorders, in which the patients usually have rotational vertigo (Cawthorne 1945; Cooksey 1946) but there are indications that vestibular rehabilitation can have any effect on neurological causes of dizziness and vertigo as well (Cowand, Wrisley et al. 1998; Brown, Whitney et al. 2006) and on conditions with unsteadiness (Kammerlind, Hakansson et al. 2001; Hansson, Månsson et al. 2004; Hansson, Mansson et al. 2008). However, further research is needed to find out whether vestibular rehabilitation can affect dizziness among patients with stroke.

This study shows that dizziness is a common symptom among patients with stroke, especially among female patients, and it is associated with lower self-rated health. Hence, it is important to also address dizziness in rehabilitation of stroke patients.

Declaration of interest

The authors declare that they have no competing interests

References

Anagnostou, E., K. Spengos, et al. (2010). "Incidence of rotational vertigo in supratentorial stroke: a prospective analysis of 112 consecutive patients." J Neurol Sci **290**(1-2): 33-36.

Asplund, K. (2009). "The Swedish Stroke Register(In Swedish)."   Retrieved 2009-03-02, from http://www.riks-stroke.org/index.php?content=start.

Brandt, T., K. Botzel, et al. (1995). "Rotational vertigo in embolic stroke of the vestibular and auditory cortices." Neurology **45**(1): 42-44.

Brown, K. E., S. L. Whitney, et al. (2006). "Physical therapy for central vestibular dysfunction." Arch Phys Med Rehabil **87**(1): 76-81.

Cawthorne, T. (1945). "The physiological basis for head exercises." J Chartered Soc Physiother **30**: 106-107.

Cooksey, I. (1946). "Rehabilitation in vestibular injuries." Proc R Soc Med **39**(273-278).

Cowand, J. L., D. M. Wrisley, et al. (1998). "Efficacy of vestibular rehabilitation." Otolaryngol Head Neck Surg **118**(1): 49-54.

Dolan, P. (1997). "Modeling valuations for EuroQol health states." Med Care **35**(11): 1095-1108.

Dorman, P. J., F. Waddell, et al. (1997). "Is the EuroQol a valid measure of health-related quality of life after stroke?" Stroke **28**(10): 1876-1882.

Draca, S. (2012). "Gender and stroke lateralization: Factors of functional recovery after the first-ever unilateral stroke?" NeuroRehabilitation **30**(3): 247-254.

EQ5D.   Retrieved 2009-03-02, from http://www.euroqol.org/.

Gopinath, B., C. M. McMahon, et al. (2009). "Dizziness and vertigo in an older population: the Blue Mountains prospective cross-sectional study." Clin Otolaryngol **34**(6): 552-556.

Grimby, A. and U. Rosenhall (1995). "Health-related quality of life and dizziness in old age." Gerontology **41**: 286-298.

Hansson, E., A. Beckman, et al. (2012). "Rehabilitation after stroke - A retrospective study of satisfaction with rehabilitation in relation to health and function among patients with stroke." Scand J Caring Sci: In press.

Hansson, E. E., N. O. Mansson, et al. (2008). "Falls among dizzy patients in primary healthcare: an intervention study with control group." Int J Rehabil Res **31**(1): 51-57.

Hansson, E. E., N. O. Månsson, et al. (2004). "Effects of specific rehabilitation for dizziness among patients in primary health care. A randomized controlled trial." Clin Rehabil **18**(5): 558-565.

Heuschmann, P. U., A. Di Carlo, et al. (2009). "Incidence of stroke in Europe at the beginning of the 21st century." Stroke **40**(5): 1557-1563.

Johansson, L., Ed. (2004). Life-situatione two years after stroke. (In Swedish). Stockholm, National board of health and welfare.

Kammerlind, A. S., J. K. Hakansson, et al. (2001). "Effects of balance training in elderly people with nonperipheral vertigo and unsteadiness." Clin Rehabil **15**(5): 463-470.

Kerber, K. A., W. J. Meurer, et al. (2008). "Dizziness presentations in U.S. emergency departments, 1995-2004." Acad Emerg Med **15**(8): 744-750.

Kroenke, K., C. A. Lucas, et al. (1992). "Causes of persistent dizziness." Ann Intern Med **117**(11): 898-904.

Lee, C. C., H. C. Ho, et al. (2012). "Increased risk of vascular events in emergency room patients discharged home with diagnosis of dizziness or vertigo: a 3-year follow-up study." PLoS One **7**(4): e35923.

Lee, C. C., Y. C. Su, et al. (2010). "Risk of Stroke in Patients Hospitalized for Isolated Vertigo. A Four-Year Follow-Up Study." Stroke.

Lim, J. Y., S. H. Jung, et al. (2012). "Incidence and Risk Factors of Poststroke Falls After Discharge From Inpatient Rehabilitation." PM R.

Luxon, L. M. and R. A. Davies (1997). Handbook of vestibular rehabilitation. London, Whurr Publishers Ltd.

Mahoney, F. I. and D. W. Barthel (1965). "Functional Evaluation: the Barthel Index." Md State Med J **14**: 61-65.

Mendel, B., J. Bergenius, et al. (2010). "Dizziness: A common, troublesome symptom but often treatable." J Vestib Res **20**(5): 391-398.

Moreland, J., J. Richardson, et al. (2003). "Evidence-based guidelines for the secondary prevention of falls in older adults." Gerontology **49**(2): 93-116.

Neuhauser, H. K., A. Radtke, et al. (2008). "Burden of dizziness and vertigo in the community." Arch Intern Med **168**(19): 2118-2124.

Pessah-Rasmussen, H. (2003, 2008-07-04). "Stroke Malmö (In Swedish)." Retrieved 2013-04.19 from http://www.skane.se/upload/Webbplatser/H%C3%A4lso%20och%20sjukv%C3%A5rdsprogram/94-StrokeChecklistav9Hela.pdf.

Quinn, T. J., J. Dawson, et al. (2009). "Functional outcome measures in contemporary stroke trials." Int J Stroke **4**(3): 200-205.

Sloane, P. D., D. Blazer, et al. (1989). "Dizziness in a community elderly population." J Am Geriatr Soc **37**: 101-108.

Stevens, K. N., I. A. Lang, et al. (2008). "Epidemiology of balance and dizziness in a national population: findings from the English Longitudinal Study of Ageing." Age Ageing **37**(3): 300-305.

Tinetti, M. E., C. S. Williams, et al. (2000). "Health, functional, and psychological outcomes among older persons with chronic dizziness." J Am Geriatr Soc **48**(4): 417-421.

Wolfe, C. D., S. L. Crichton, et al. (2011). "Estimates of outcomes up to ten years after stroke: analysis from the prospective South London Stroke Register." PLoS Med **8**(5): e1001033.

Wolfe, C. D., N. A. Taub, et al. (1991). "Assessment of scales of disability and handicap for stroke patients." Stroke **22**(10): 1242-1244.

Zia, E., G. Engstrom, et al. (2009). "Three-year survival and stroke recurrence rates in patients with primary intracerebral hemorrhage." Stroke **40**(11): 3567-3573.

included in the study
n=63

Stroke and dizziness
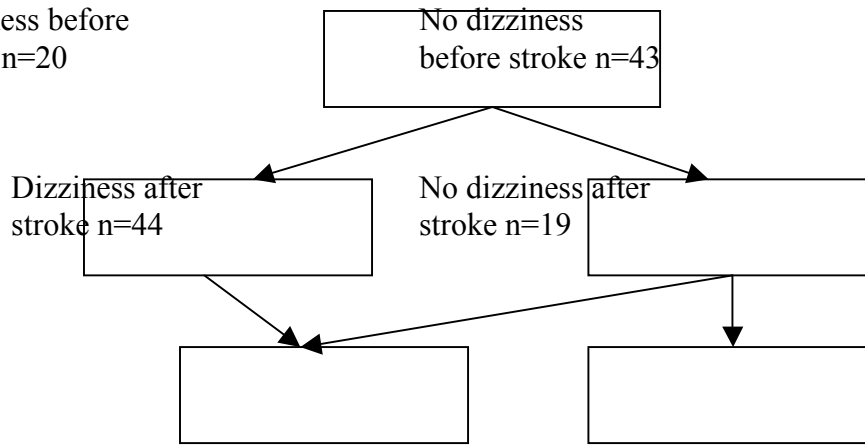
Dizziness before
stroke n=20

No dizziness
before stroke n=43

Dizziness after
stroke n=44

No dizziness after
stroke n=19

Figure 1. Dizziness before and after a first-time stroke.

Table 1. Background data and measures for the whole study group and for women/men. P-value for difference between gender.

		All	Women	Men	
		(n=63)	(24)	(39)	p
Age (mean, (SD), min-max)		63 (11.2) 36-85	61 (11.3) 36-82	64 (11.0) 42-85	0.30
Dizziness yes/no (%)		44/19 (70/30)	22/2 (92/8)	22/17 (56/44)	**0.008**
Type of dizziness	Rotational	8	2	6	
	Unsteadiness	27	14	13	
	Both	4	2	2	
	Other	1	1	0	
	Don't know	4	3	1	
Dizziness before stroke (%)		20 (32)	10 (42)	10 (26)	0.18
Time between the stroke and the evaluation, mean months (SD)		3.9 (3.5)	4.8 (3.3)	3.3 (3.4)	0.09
BI* mean/median** (SD)		87/95 (20)	80/95 (26)	90/100 (14)	**0.036**
EQ5D index mean/median (SD)		0.56/0.59 (0.21)	0.55/0.59 (0.20)	0.57/0.66 (0.21)	0.064
EQ5D VAS mean/median (SD)		60/64 (19)	59/60 (18)	59/64 (20)	0.685

*Barthel Index **Due to skewness, median values are also displayed.

Table 2. Background data and measures for the study group divided into dizzy/non-dizzy patients.

	Dizzy (44)	Not dizzy (19)	p
Age (mean, (SD), min-max)	62 (11.3) 36-85	65 (10.7) 42-85	0.20
Time since stroke, mean months (SD)	3.6 (3.5)	4.2 (3.7)	0.32
BI* mean/median** (SD)	87/95 (17)	92/100 (17)	0.46
EQ5D index mean/median (SD)	0.51/0.59 (0.22)	0.63/0.66 (0.15)	0.13
EQ5D VAS mean/median (SD)	53/52 (17)	71/70 (17)	**0.001**

* Barthel Index **Due to skewness, median values are also displayed.