Alvarez, J Aging Geriatr Med 2018, 2:1
DOI: 10.4172/2576-3946.1000118

Journal of Aging and Geriatric Medicine

Short Communication A SCITECHNOL JOURNAL

Patients with Cognitive Impairment and Falls: Characteristics of a Group of Elderly Patients

Marta Neira Alvarez*

Abstract

Cognitive impairment and falls are main geriatric problems, being falls 8 times more frequent in this group of patients. Our objective is to study differences in risk factors for falls in patients with cognitive impairment. Methods: A two year prospective study in a Fall Outpatient Clinic was carried out in patients.

Keywords

Cognitive impairment; Eldery patients; Dementia; Falls

Introduction

Dementia is one of the most prevalent illnesses in elderly, with an estimation of 42 million people with the diagnosis worldwide. It is well known that dementia is a risk factor for falls, being falls 8 times more frequent in this group of patients, and it is likely that they have a multi-factorial etiology; possibly with risk factors similar to those identified in general population [1].

Falls are a main geriatric problem in elderly, not only because its prevalence but also because their consequences [2]. They are the expression of a variety of elderly syndromes like gait disorders, polimedication, psychotropic drugs, sensory impairments, cardiovascular problems or cognitive impairment among others [3].

However, there may be other potentially modifiable factors in patients with cognitive impairment and these could be of interest to prevent falls in this group of patients.

The purpose of this study is to describe falls assessment in patients with cognitive impairment and to study differences to patients with no cognitive impairment who fall.

Methods

It is a prospective, observational study in patients aged 65 years and older evaluated in a Fall Outpatient Clinic of Infanta Sofia Hospital in Madrid between March 2014 and December 2016. All participants gave informed consent and the study protocol was approved by the Biomedical Investigation Committee of the Infanta Sofia University Hospital of San Sebastian de los Reyes (Madrid, Spain) in March 2014.

Inclusion criteria consisted in ≥65 year-old patients, who had fallen down in the last year with fall consequences that required medical assistance or those who had fallen two or more times in the past year. Patients with no mobility (classified 0 and 1 by Functional Ambulatory Classificator), severe dementia, severe sensory impairment or any other patients with terminal disease and life expectancy less than three months were excluded.

The fall assessment included medical history, medications, sensory impairment, functional, cognitive and social evaluation. Functional status was measured by Barthel Index [4] and Lawton y Brody Index [5] for basic and instrumental activities respectively. To evaluate cognitive status the clock test (TRO) [6] and Standardized Mini-Mental State Examination (MMSE) [7] were used. Nutritional screening was made by using Mini Nutritional Assessment (MNA) [8]. Anthropometric measurements were: body mass index, calf and mid-upper arm circumference. Fat Free Mass was assessed with bio-electrical impedance analysis with TANITTA BC-601 and the then calculated Fat Free Mass Index (FFMI) Kg/m^2.

Muscle mass strength was assessed by hand grip strength using a standard adjustable handle dynamometer KERN & SOHN GmbH Balingen (Model; Elect WOC11007248). All measurements were performed with the dominant hand with a standard protocol. Hand grip strength measurements <21 Kg in women and <31 Kg in men were considered cut-off point [9]. Assessment of physical performance included Time up and Go Test (TUG) using the better of two trials and being cut-off point 15 sec [10] and 4 meters walking speed, using the best of three trials and the standard cut-off of ≤0.8 m/s for slow gait speed [11].

Additional information was serum 25-hydroxyvitamin D levels that were measured by competitive enzyme immunoassay technique (ADVIA Centaur, Siemens Healthcare Diagnostics). Cognitive impairment was defined as patients with TRO <4 or MMSE <24 and a comparative analysis was made between these patients and those without cognitive impairment. Frailty was defined as a clinical syndrome in which three or more of the following criteria were present: unintentional weight loss (10 lbs in past year), self-reported exhaustion, weakness (grip strength), slow walking speed, and low physical activity (Fried criteria) [12].

ESPEN consensus statement was used to define malnutrition [13]. There are two options for the diagnosis: The first one requires body mass index (BMI, kg/m) <18.5 to define malnutrition. The second option requires the combined finding of unintentional weight loss (mandatory) and at least one of either reduced BMI or a low fat free mass index (FFMI). Weight loss could be either >10% of habitual weight indefinite of time, or >5% over 3 months. Reduced BMI <22 kg/m and low FFMI is <15 and <17 kg/m in females and males, respectively.

Descriptive statistics were calculated for the main variables. Categorical variables were expressed as percentages and the quantitative variables as medians with interquartile range [IQR] or as a mean ± standard deviation (SD). Differences between individual groups were compared using Fisher's Exact test for categorical data, Student's t test for normally distributed data and Mann-Whitney

***Corresponding author:** Marta Neira Alvarez PhD. Department of Geriatrics and Internal Medicine. University Hospital Infanta Sofía. S S Reyes. Madrid. Spain

Received: January 22, 2018 **Accepted:** February 22, 2018 **Published:** February 27, 2018

doi: 10.4172/2576-3946.1000118

U test for non-normally distributed data. A $p<0.05$ was considered statistically significant. All statistical analysis was performed using IBM SPSS 21.0(IBM Corp; Armonk, NY; USA).

Results

One hundred patients with falls were evaluated during this period and sixty one had cognitive impairment with a MMSE < 24 or TRO < 4. (30 patients had a previous diagnosis of dementia and 31 as a new diagnosis after falls assessment). The characteristics of the patients are shown in Table 1. There was a high prevalence of comorbidities, visual impairment, polymedication and vitamin D deficit in both groups.

When studying differences between patients with and without cognitive impairment we observed that diabetes was present in 31 (52.5%) patients with cognitive impairment and only in 6 (25.0%) patients without cognitive difficulties (p=0.022). Regarding nutritional assessment, 48 (80.0%) patients with cognitive impairment showed MNA screening below cut-off point of 24 meaning that they were at risk of malnutrition and only 14 (58.3%) patients without cognitive impairment (p=0.041). We have also seen that they have more difficulties in basic and instrumental performance measured by Barthel Index and Lawton index. Table 2 summarizes main functional and nutritional differences between the two groups.

Regarding main diagnosis, frailty syndrome was significantly more common in patients with cognitive difficulties (77.0%) than in the group with no cognitive difficulties (54.2%) (p=0.037). Table 3 shows diagnosis differences.

Discussion

In this paper we describe prevalence of falls in patients with cognitive impairment and risk factors related to falls in these patients. In dementia patients annual incidence rate of falls ranges from 60% to 80%, which doubles the incidence for age-matched older adults without Dementia. The study describes a high prevalence of some factors classically associated to falls as polymedication, high use of psychotropics, sensory impairment, vitamin D deficit or depression or Parkinson disease. Previous studies have published similar results [14-16]. But this study identifies differences in the group of patients with cognitive impairment such as diabetes, functional impairment, nutritional risk and frailty syndrome. The precise mechanisms underlying the increased fall risk in cognitively impaired older adults are not completely understood. Previous studies of falls in patients with cognitive impairment focused in cognitive aspects or deficits that could explain this increased risk. It has been shown that memory impairment, reduced attentional resource or executive dysfunction are associated with gait dysfunction and variability in gait speed that

Table 1: Characteristics of the study group.

Variables	Total	Cognitive Impairment	No cognitive Impairment
Age mean (SD)	84.4 (5.7)	85.0 (4.8)	83.4 (6.0)
Women n (%)	71 (71.0)	46 (75.4)	16 (66.6)
Pathologies n (%): Hypertension Parkinson Diabetes Mellitus Depression	 87 (90.6) 4 (4.2) 38 (39.6) 30 (31.3)	 52 (88.1) 2 (3.3) 31 (52.5) 22 (37.2)	 23 (95.8) 2 (8.3) 6 (25.0) 5 (20.8)
Visual impairment n (%)	34 (51.5)	18 (47.4)	10 (58.8)
Auditory impairment n (%)	19 (28.8)	11 (28.9)	3 (17.6)
Medications mean (SD)	8.3 (3.7)	8.7 (3.3)	7.9 (3.3)
Psychotropic medication mean (SD)	1.7 (1.4)	1.9 (1.5)	1.5 (1.2)
Home living n (%)	86 (86.0)	49.0 (80.3)	22 (91.6)
Vitamin D mean (SD)	24.8 (13.7)	24.6 (12.2)	26.2 (17.7)
Vitamin D <30ng/ml n (%)	50 (50.0)	30 (49.2)	14 (58.3)

Table 2: Nutritional assessment and functional performance.

Variables	Cognitive impairment	No cognitive impairment	p
Barthel Index, mean (SD)	82.2 (16.7)	93.1 (6.8)	0.003
Lawton Index, mean (SD)	1.0 (1.9)	3.2 (2.8)	0.000
MNA screening , mean (SD)	20.0 (4.8)	23.2 (4.4)	0.007
MNA<24, n (%)	48 (80)	14 (58.3)	0.041
Body Mass Index, mean (SD)	27.1 (3.7)	26.6 (4.9)	0.643
Fat Free Mass Index, mean (SD)	16.6 (2.0)	16.7 (2.1)	0.727
0.727 up and go Test, mean (SD	19.6 (8.0)	17.0 (6.9)	0.100
Gait speed , mean (SD)	0.7 (0.4)	0.7 (0.2)	0.199
Grip strength <cut point* n (%)	55 (93.2)	23 (95.8)	1.000

*<21 Kg en women and <31 Kg in men

Table 3: Diagnosis.

Variables	Cognitive Impairment	No cognitive impairment	p
Malnutrition, n (%)	22 (36.0)	11 (45.8)	0.406
Frailty, n (%)	47 (77.0)	13 (54.2)	0.037
Prefrailty, n (%)	8 (13.1)	5 (20.8)	0.504

leads to fall. One specific early change in gait seen among older adults with mild to moderate dementia is decrease in gait velocity [17,18].

It has been also described other risk factors that could be involved as psychotropic medication, neurocardiovascular instability, environment or extrinsic factors, and type of dementia (Parkinson dementia or Lewy body dementia have greater risk for falls or instability) [14]. However, we have observed that frailty syndrome is more frequent in the group of patients with cognitive impairment. It is well known that frailty syndrome is related to falls [12,19] but it´s interesting that cognitive impairment patients who fall are more frail than non-cognitive impairment ones. Malnutrition is also related to falls and frailty. Neyens and Vellas both describe this relationship between falls and nutrition but we have found that nutrition is a differential risk factor in cognitive impairment fallers [20-22]. Diabetic patients have more risk of cognitive impairment but also they are in special risk of falls and related fractures [23,24]. So frailty, malnutrition risk and diabetes make cognitive impairment patients at special risk for falls.

There are limitations to our study. It is a small sample, patients were collected only from one single center and the analysis was mainly descriptive, but it provides a deep analysis of falls assessment and has allowed us to focus on these three aspects in future evaluations.

The results highlight the high prevalence of diabetes, frailty and malnutrition among fall patients with cognitive impairment and therefore the utility of functional and nutritional assessment in falls evaluation.

Acknowledgement

The author sincerely thank the rest of the Geriatric team (Estefania Arias, Rafael Bielza, Adoración Morales y Cristina Moreno) and Israel J. Thuissard and David Sanz-Rosa from Universidad Europea de Madrid for their support during the study.

References

1. Allan ML, Ballard CG, Rowan EN, Kenny RA (2009) Incidence and Prediction of fall in Dementia: A Prospective Study in Older People. PLOS One e5521.
2. Tinetti ME (2003) Clinical practice: Preventing falls in elderly persons. N Engl J Med 348: 42-49.
3. Gillespie LD, Robertson MC, Gillespie WJ, Lamb SE, Gates S, et al. (2012) Interventions for preventing fall in older people living in the community. Cochrane Database Syst Rev: CD007146.
4. Mahoney FI, Barthel DW (1965) Functional evaluation: the Barthel Index. Maryland Stale Med J 14: 61-65.
5. Lawton MP, Brody EM (1969) Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist 9: 179-186.
6. Freedman M, Leach L, Kaplan E, Winocur G, Shulman KI, et al. (1994) Clock-drawing: a neuropsychological analysis. New York: Oxford University Press.
7. Lobo A, Ezquerra J, Gómez F, Sala JM, Seva A (1979) El Mini-Examen Cognoscitivo: un test sencillo, práctico, para detectar alteraciones intelectivas en pacientes médicos. Actas Luso-Esp Neurol Psiquiatr 3: 189-202.
8. Guigoz Y, Vellas B, Garry PJ (1994) Mini Nutritional Assessment: a practical assessment tool for grading the nutritional state of elderly patients. Facts Res Gerontol 4: 15-59.
9. Bahat G, Tufan A, Tufan F, Kilic C, Selçuk Akpinar T, et al. (2016) Cut-off points to identify sarcopenia according to European Working Group on Sarcopenia in Older People (EWGSOP) definition. Clinical nutrition 35: 1557-1563.
10. Podsiadlo D, Richardson S (1991) The timed "Up & Go": A test of basic functional mobility for frail elderly persons. J Am Geriatr Soc 39: 142-148.
11. Buchner DM, Larson EB, Wagner EH, Koepsell TD, de Lateur BJ (1996) Evidence for a non-linear relationship between leg strength and gait speed. Age Ageing 25: 386-391.
12. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, et al. (2001) Frailty in older adults: Evidence for a phenotype. J Gerontol A Biol Sci Med Sci 56: M146-56.
13. Cederholm T, Bosaeus I, Barazzoni R, Bauer J,Van Gossum A, et al. (2015) Diagnostic criteria for malnutrition. An ESPEN Consensus Statement. Clinical Nutrition 34: 335-340.
14. Gale CR, Cooper C, Sayer A (2016) Prevalence and risk factors for falls in older men and women: The English Longitudinal Study of Ageing. Age and Ageing 45: 789-794.
15. Peterson A, Mattek N, Clemons A, Bowman GL, Buracchio T, et al. (2012) Serum Vitamin D concentrations are associated with falling and cognitive function in older adults. J Nutr Health Ageing 16: 898-901.
16. Woolcott JC, Richardson KJ, Wiens MO, Patel B, Marin J, et al. (2009) Meta-analysis of the impact of 9 medication classes on falls in elderly persons. Arch Int Med 169: 1952-1960.
17. Montero-Odasso M, Verghese J, Beauchet O, Hausdorff JM (2012) Gait and Cognition: A Complementary Approach to Understanding Brain Function and the Risk of Falling. J Am Geriatr Soc 60: 2127-2136.
18. Kearney F, Harwood R, Gladman J, Lincoln N, Masud T (2013) The Relationship between Executive Function and Falls and Gait Abnormalities in Older Adults: A Systematic Review. Dement Geriatr Cogn Disord 36: 20-35.
19. Kojima G, Kendrick D, Skelton DA, Morris RW, Gawler S, et al. (2015) Frailty predicts short-term incidence of future falls among British community-dwelling older people: a prospective cohort study nested within a randomized controlled trial. Geriatrics 15: 155.
20. Neyens J, Halfens R, Spreeuwenberg M, Meijers J, Luiking Y, et al. (2013) Malnutrition is associated with an increased risk of falls and impaired activity in elderly patients in Dutch residential long-term care (LTC): A cross-sectional study. Archives of Gerontology and Geriatrics 56: 265-269.
21. Vellas B, Conceicao J, Lafont CH, Fontan B, Garry PJ, et al. (1990) Malnutrition and falls. Lancet 336: 1447.
22. Vellas B, Baumgartner RN, Wayne SJ, Conceicao J, Lafont C, et al. (1992) Relationship between malnutrition and falls in the elderly. Nutrition 8: 105-108.
23. Yang Y, Hu X, Zhang Q, Zou R (2016) Diabetes Mellitus and risk of falls in older adults: a systematic review and meta-analysis. Age and Ageing 45: 761-767.
24. Schwartz AV, Hillier TA, Sellmeyer DE, Resnick HE, Gregg E, et al. (2002) Older women with diabetes have a higher risk of falls: A prospective study. Diabetes Care 25: 1749-1754.

Author Affiliations

Top

Department of Geriatric and Internal Medicine. University Hospital Infanta Sofia. S S Reyes, Universidad Europea Madrid, Madrid. Spain.