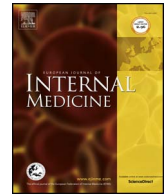




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Original Article

Differential diagnosis of unexplained falls in dementia: Results of “Syncope & Dementia” registry

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ABSTRACT

Background: Dementia patients have an increased risk of fall, and some of them might suffer from undiagnosed syncope. The present analysis aimed at identifying predictors of differential diagnosis between syncopal and non-syncopal fall in patients with dementia included in the “Syncope & Dementia” registry.

Methods: We enrolled patients aged 65+ with a diagnosis of dementia and a history of syncope and/or unexplained fall. All subjects underwent a comprehensive geriatric assessment, including the syncope protocol of the European Society of Cardiology. Subjects whose syncope diagnosis was confirmed were labeled as “Confirmed Syncope” (CS). Patients with unexplained fall were labeled as “Syncopal Fall” (SF), if a final diagnosis of syncope was performed, or as “Non-Syncopal Fall” (NSF), if syncope was excluded.

Results: We included 372 subjects (mean age 84, 61% females). Mini Mental State Examination score was higher among SF (18.5 ± 4.9) compared to NSF patients (15.6 ± 5.8 , $p = 0.02$). In a multinomial logistic regression model with NSF as the reference group, CS patients less often suffered injuries and more often reported history of syncope, while patients with SF had a better cognitive status and were more often exposed to precipitating factors, including postural changes and neck movements. The absence of prodromes and the intake of benzodiazepines and insulin was highest in NSF patients. A simple score including main clinical predictors showed an 82% sensitivity with a 56% specificity in discriminating SF from NSF patients.

Conclusion: Simple clinical markers can aid in the differential diagnosis of unexplained falls in dementia, separating syncopal from non-syncopal falls.

1. Introduction

Falling is a well-recognized multi-factorial geriatric syndrome [1]. Older subjects with dementia have an increased risk of fall [2] and fall-related hospitalizations [3]. Moreover, the occurrence of a fall is associated with an increased mortality and risk of nursing home admission in patients with dementia [4]. In clinical practice some falls are

clearly due to a medical or an accidental condition, while for others, that are defined “unexplained”, no cause can be readily identified [5].

Patients with dementia often experience syncope, which is one of the most frequent causes of Emergency Department admission in Alzheimer's disease [3]. Moreover, it has been recently reported that the occurrence of a syncope is independently associated with a worse cognitive performance in the general population [6]. Finally, it is

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increasingly recognized that several unexplained falls among older adults are actually due to a non-clinically apparent syncope [7], which has been recently defined as “syncopal fall” [8]. The identification of syncopal falls among unexplained ones might be difficult or even impossible, as the event is often unwitnessed and characterized by very short prodromes and/or retrograde amnesia [8]. This is even more striking among persons with dementia, who are traditionally considered as a separate group of fallers [5], typically with multiple risk factors, thus suggesting that the identification of specific causes is not feasible in this group of patients. Although we acknowledge the multifactorial origin of falls in older subjects with dementia [1], we feel that the concept of syncopal fall might be useful to identify subjects with dementia suffering from an unexplained fall that might be at least partially explained by a syncopal/hypotensive episode. In fact, the lack of recognition as syncope as a potential cause of falling might represent a preventable risk for these patients, who are often treated with drugs that are recognized risk factors for syncope [9].

The “Syncope & Dementia” (SYD) registry has evaluated subjects with dementia suffering transient loss of consciousness, including syncope or unexplained fall, revealing that unexplained fall may mask a diagnosis of syncope in almost the 50% of the cases [10]. Therefore, given the lack of published data on this issue, the aim of the present research is to identify predictors of syncopal versus non-syncopal fall in the SYD registry population, focusing on the characteristics of patients with unexplained falls.

2. Methods

The SYD registry include patients recruited from acute care settings or outpatient clinics of 11 geriatric wards. Methods and baseline data have been published elsewhere [10]. Briefly, the SYD registry has enrolled patients aged 65 + years, with a diagnosis of dementia (following the criteria of the Diagnostic and Statistical Manual of Mental Disorders - 4th edition, text revision - DSM-IV-TR) [11] and one or more suspected transient loss of consciousness and/or unexplained falls, during the previous 3 months. The only exclusion criterion was unwillingness/inability to provide informed consent by either the patient or his/her legal representative.

The anamnestic assessment of index event was conducted with the support of proxy information and included: history of previous syncope, precipitating factors (postural changes, neck movements, pain, fear), predisposing conditions (event occurred in crowded or warm environments, prolonged standing, fever, dehydration, prolonged confinement to bed), situational causes of syncope (post-voiding, post-defecation, post-prandial, post-effort), neurovegetative prodromes (pallor, sweating, nausea, epigastric discomfort), and consequent injury. The assessment also included: a complete physical examination, including the presence of any gait and balance disorder; the assessment of functional disability one month before the event, measured with Activities of Daily Living (ADL, range 0–6 with 6 indicating complete disability: bathing/showering, dressing/undressing, using WC, in-home mobility, bowel and bladder control, feeding) [12] and Instrumental Activities of Daily Living (IADL, range 0–8, with 8 indicating complete disability: using telephone, shopping, cooking, house-keeping, washing clothes, transportation, management of money and medications) [13]; cognitive assessment with Mini Mental State Examination (MMSE) [14]. Patients with a MMSE score > 16 have been evaluated for the presence of depressive symptoms through the 15-items Geriatric Depression Scale (GDS) [15]. Comorbidity has been assessed with the Cumulative Illness Rating Scale (CIRS-comorbidity), objective quantitative measure of physical illness burden in which a cumulative score is obtained from ratings of impairment severity of single organ systems [16]. Pharmacological treatment before the index event was also recorded.

All participants underwent the initial evaluation protocol proposed by the European Society of Cardiology (ESC) guidelines on syncope [17], including blood pressure measurement in the supine and standing

position, 12-leads electrocardiogram (ECG) and carotid sinus massage, when not contraindicated, in the supine position under ECG monitoring [17]. A second level neuro-autonomic (Tilt Test and upright CSM), neurologic or cardiologic evaluation, when needed according to the ESC guidelines [17], was undertaken in those patients in whom a reliable diagnosis could not be achieved after the initial evaluation.

After the application of the protocol, each subject was assigned to three mutually exclusive group according to index event (syncope or fall) and final diagnosis:

- “Confirmed Syncope” (CS) if the initial suspicion of syncope was confirmed (index event syncope, final diagnosis syncope);
- “Syncopal Fall” (SF) if the index event was a fall but a final diagnosis of syncope was performed (index event fall, final diagnosis syncope);
- “Non-Syncopal Fall” (NSF) if a diagnosis of syncope was excluded at the end of the diagnostic work-up (index event fall, final diagnosis fall).

Among subjects in whom diagnosis of syncope was performed, this was defined according to the current pathophysiological classification [17] as “cardiac syncope”, if an arrhythmic or structural heart disease could be identified as the cause of the index event; “syncope due to orthostatic hypotension”, if a blood pressure drop upon standing was deemed to be the main cause of the event; and “neurally mediated syncope” if a reflex mechanism (a vasovagal reflex, a situational cause, or a carotid sinus syndrome) was identified as a significant contributor to the index event.

By June 2012 to November 2015, 431 patients have been enrolled: 225 with syncope, 196 with unexplained falls and 10 with both syncope and unexplained falls as index event. The latter group was excluded from the present analysis, which was specifically focused on unexplained falls. Among the remaining 421, 49 subjects with a diagnosis different from syncope or fall at the end of diagnostic work-up were excluded (including stroke, epilepsy, metabolic disorder, drop attack, psychogenic attack and unexplained transient loss of consciousness). The remaining 372 subjects were included in the present analysis (see Fig. 1).

2.1. Ethics

The study was approved by the Research Ethics Committee at the University of Naples School of Medicine, and subsequently by the institutional review boards of all participating centers. A written consent was obtained from all participants.

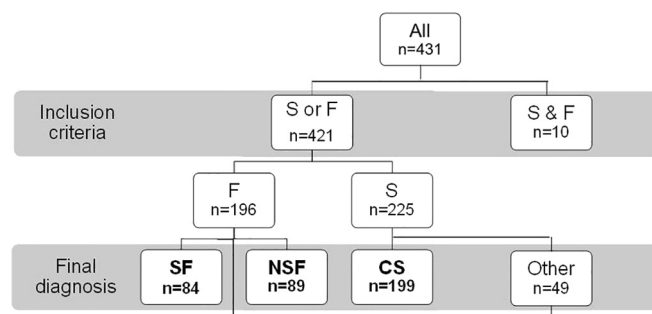


Fig. 1. Flow chart of selection of patients groups according to index event (syncope or unexplained fall) and final diagnosis.

Legend: F = unexplained fall, S = suspected syncope, S & F = coexistence of syncope and fall; SF = Syncopal Fall; NSF = Non-Syncopal Fall; CS = Confirmed Syncope; Other = stroke, epilepsy, metabolic disorder, drop attack, psychogenic attack and unexplained transient loss of consciousness.

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