Clinical Investigations

Frequent Mild Cognitive Deficits in Several Functional Domains in Elderly Patients With Heart Failure Without Known Cognitive Disorders

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ABSTRACT

Background: The objective of the present study was to investigate whether mild cognitive deficits are present in patients with heart failure (HF) despite absence of any known cognitive disorder.

Methods and Results: A well defined group of patients (n = 40) with heart failure completed a cognitive screening check list, a depression screening questionnaire, and a battery consisting of neuropsychological tests assessing 5 different cognitive domains: speed/attention, episodic memory, visuospatial functions, language, and executive functions. The neuropsychological results were compared with those from a group of healthy control subjects (n = 41). The patients with HF displayed cognitive impairment compared with the control group within the domains speed and attention, episodic memory, visuospatial functions, and language. Among them, 34 HF patients (85%) could be classified with mild cognitive impairment (MCI), the majority as nonamnestic MCI, ie, with no memory impairment.

Conclusions: Considering the high occurrence of mild cognitive deficits among HF patients without known cognitive disorders, closer attention should be paid to their self-care and compliance. Inadequate self-care and compliance could lead to more frequent hospitalizations. Furthermore, the HF patients may be at increased risk of dementia. (*J Cardiac Fail 2015;21:702−707*)

Key Words: Heart failure, cognition, mild cognitive impairment, self-care, compliance, dementia.

One of the most common age-related diseases that keeps increasing globally is heart failure (HF), which is characterized by decreased heart function as a consequence of a variety of cardiovascular diseases. During recent years, research has shown that cognitive impairment is prevalent in HF, although substantial variability in the pattern of deficits has been reported.[1,2] According to a review by Pressler[3], 25%−50% of HF patients experience cognitive impairment. Moreover, according to one study, hospitalized HF patients with cognitive impairment have a 5-fold increased mortality.[4] The mechanisms behind cognitive impairment in HF remain unclear but are assumed to be multifactorial.[5] The most likely etiology, however, seems to be cerebral hypoperfusion.[5,6]

Mild cognitive impairment (MCI) is another condition that becomes increasingly common with age, with the estimated prevalence in population-based studies ranging from 10% to 20% in persons >65 years old.[7] MCI differs from normal ageing in that the age-associated cognitive decline is more pronounced than expected, to a degree that causes some disturbance in everyday life. In MCI, the person is still broadly independent in activities of daily living (ADL), possibly with some disturbance of instrumental ADL. The decline can be within one cognitive domain alone or in multiple ones, making MCI a heterogeneous condition.[8] Research has identified patients with

impairment in all cognitive domains, in different constellations.[9,10] Based on this, 4 clinical subtypes have emerged that put focus on the amnestic (memory) aspect and whether there is impairment in a single or in multiple cognitive domains. The 4 types are amnestic MCI−single domain (aMCI-SD), amnestic MCI−multiple domains (aMCI-MD), nonamnestic MCI−single domain (naMCI-SD), and nonamnestic MCI−multiple domains (naMCI-MD).[11]

The reported annual conversion rate of MCI to dementia has in most studies been 10%−15%,[12,13] but conversion rates as high as 30%[14] and 40%[15] a year as well as 50% over 18 months[16] have been reported. Some studies indicate that aMCI-MD constitutes the highest risk of conversion to dementia.[13,17] Others have found similar conversion rates in aMCI-MD and naMCI-MD.[18] Results from some studies indicate that patients with MCI and impairment in ≥2 cognitive domains are at the highest risk of developing dementia.[10,18]

Recently, studies on the occurrence of MCI in HF have been published. In one study, the Montreal Cognitive Assessment (MoCA)[19] was used to identify MCI: 22% of HF patients fulfilled criteria for MCI. The impairments were mainly in the memory and executive domains.[20] In another study HF patients displayed memory, processing speed, and executive impairment, executive impairment being the most common impairment.[21] In a recent study, obesity was found to be associated with cognitive performance in men with HF, who showed attention and executive deficits.[22] A review of screening instruments for cognitive impairment in HF concluded that the most important cognitive domains to assess are speed, memory, and executive functions.[23] Thus, the overall picture is that speed, attention, memory, and executive deficits are associated with HF.

The aim of the present study was to examine if patients suffering from HF, without a known cognitive disorder, display cognitive symptoms to such an extent that they could be considered to fulfill criteria for MCI. The hypothesis was that MCI is common in HF.

Method

The study was conducted in accordance with the principles outlined in the Declaration of Helsinki. The study was approved by the Regional Ethical Review Board at the University of Gothenburg.

Participants

Clinical data were collected during the spring of 2011, and all patients with HF were tested at Sahlgrenska University Hospital, Gothenburg, Sweden. The sample was derived randomly from a 1-year follow up of an HF study at the hospital, as previously described.[24] Inclusion criteria were age >65 years and validated either HF with reduced ejection fraction (HFrEF) or HF with preserved ejection fraction (HFpEF). Exclusion criteria were 1) known stroke, dementia, or depression; 2) too ill to cooperate in cognitive assessment; and 3) not willing to participate in the study. HF in the elderly is characterized by the presence of comorbidities. Therefore, to make the patient sample representative for HF, no comorbidity caused exclusion. A total of 40 patients with HF were included. Among them 19 had HFrEF and 21 HFpEF. According to the New York Heart Association (NYHA), all patients had functional class III or IV. The patient sample has been described in detail in a previous publication, in which the criteria defining HFrEF and HFpEF also were presented.[24]

The healthy control group consisted of 41 individuals who originally were tested in the validation of the Cognitive Assessment Battery (CAB) in 2010.[25] The control subjects were healthy control subjects in the Gothenburg MCI study.[8] They were mainly recruited from senior citizen organizations and via information meetings on dementia. A few control subjects were spouses of subjects in the study. Inclusion criteria for control subjects were that they should be physically and mentally healthy and not experience or exhibit any cognitive impairment. All control subjects were thoroughly interviewed about their somatic and mental health by a research nurse before inclusion in the study. Two psychologists did all testing of control subjects, each testing about one-half of the control subjects. The sessions lasted 15−25 minutes. To achieve as high a consistency as possible, scoring of CAB was done together. The control group completed CAB and Mini Mental State Examination (MMSE),[26] but not the Geriatric Depression Scale (GDS).[27]

Mini Mental State Examination

MMSE[26] is one of the most widely used checklists for quick and easy cognitive screening. The MMSE is easy to administer and consists of 2 sections, the 1st of which requires verbal responses only and covers orientation, memory, and attention; the 2nd part tests ability to name, follow verbal and written commands, write a sentence spontaneously, and copy a polygon. The total score of MMSE is 30 and there is no time limit to complete it. Scores ≤26 are considered to indicate cognitive impairment.[6,28]

Geriatric Depression Scale

GDS is a questionnaire that originally consisted of 30 items related to mental and physical health with a maximum score of 30, a higher score indicating a higher degree of depression.[27] In this study, a Swedish version modified by Gottfries et al[29] was used. The modified version consists of 20 items assessing symptoms such as sleep disturbance, anxiety, and pain. Because depression is known to affect cognition, and this study focused on how HF affects cognition, patients scoring >10 were excluded from the study.

Cognitive Assessment Battery

CAB is a battery developed by Nordlund et al[25] as a rapid test of cognitive domains. CAB consists of 8 tests comprising the domains speed and attention (Symbol Digit Modalities Test [SDMT]), learning and episodic memory (a Text recall test), visuospatial functions (Clocks and Draw a Cube), language (Token Test, short version, and Naming 30 items), and executive functions (Stroop). The SDMT tests the ability to enter as many numbers as possible correctly under specific symbols for 90 seconds. Text recall consists of a short story that the patient first is to recall verbatim immediately and then once more after ∼15 minutes. Clocks and Draw a Cube is a test where the patient 1st is asked to draw a clock spontaneously, then to copy a clock, and finally to copy a 3-dimensional cube that is presented on a sheet of paper.