

Cognitive impairment in heart failure: towards a consensus on screening

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The evidence that patients with heart failure (HF) experience cognitive impairment is compelling.¹ Cognitive impairment occurs in one- to three-quarters of HF patients² and leads to poor health outcomes including reduced activities of daily living,³ inadequate engagement in HF self-care,² clinical instability,⁴ and premature death.⁵ The escalating number of research papers investigating cognitive impairment in HF patients attests to the significance of this co-morbidity.^{1–5} Even so, inconsistencies in the operationalization of cognitive impairment are widespread, resulting in a variety of screening methods⁶ and conflicting estimates of its severity and prevalence in HF populations.⁷ This point is highlighted by four studies published in the past 2 years in this journal, whereby cognitive impairment has been assessed with: brief screening questionnaires of global cognitive functioning;^{8,9} a more comprehensive screening recognized to diagnose mild cognitive impairment and primary degenerative dementia;¹⁰ and a battery of neuropsychological tests, that included a global cognitive screening questionnaire.¹¹

It is acknowledged that HF patients typically exhibit cognitive impairment in domains of memory (working and delayed recall), attention, processing speed, and executive function;¹² yet, to date, studies have been limited by use of only screening questionnaires rather than a gold standard neuropsychological battery of tests. This is reflected in two studies published recently in this journal. In the TIME-CHF study,⁸ cognitive impairment was classified as severe if HF patients scored ≤ 7 on the Hodkinson Abbreviated Mental Test. This screening questionnaire has been used in general ageing populations to screen for dementia. From the 611 patients enrolled in the study, 56 (9%) were classified with severe cognitive impairment on the basis of the screening questionnaire, with no other neuropsychological assessment.⁸ Likewise, Davis and colleagues⁹ had used the classification of mild cognitive impairment as the study inclusion criterion for a cognitive training intervention aimed at improving self-care behaviours. The Montreal Cognitive Assessment had been applied, and only HF patients who had scored between 17 and 25 were invited to participate in the study. Once again, no other neuropsychological assessment had been used to characterize cognitive impairment among the 125 HF patients who participated in the study.⁹

In the instances when neuropsychological tests have been administered, comparison data between HF patients and appropriate age- and education-matched control groups have not always been employed, and cognitive impairment has not been specified as being within the seventh percentile (>1.5 SD) below normative data.¹¹ In a study to determine whether HF patients experience greater loss in grey brain matter than patients with ischaemic heart disease who were HF free,¹⁰ temporal changes in cognition were compared using the Cambridge Cognitive Examination of the Elderly Revised (CAMCOG). No specified cut-off score on the CAMCOG had been used to characterize the presence, or absence, of cognitive impairment and, over time, the cognitive functioning of HF patients did not differ significantly from that of the control groups. Conversely, Hjelm and colleagues¹¹ examined cognitive impairment of 137 HF patients with and without sleep-disordered breathing. Cognitive impairment was assessed using the Mini-Mental State Examination (MMSE) and the administration of a battery of neuropsychological tests to assess psychomotor speed, visual–spatial perception, and memory. These cognitive domains are often impaired in HF.⁵ According to the cognitive assessment using the MMSE,¹¹ 18% were characterized as having mild cognitive impairment and 4% potentially suffered dementia. However, it is difficult to draw any firm conclusion of cognitive impairment from the neuropsychological battery assessment, as the performance of HF patients had not been compared with published norms or a healthy control. The discrepancies among these studies highlight the variations that have been used to screen and characterize cognitive impairment in HF patients, and imply the need for consensus guidelines in screening for this. However, in order to reach consensus on cognitive screening practices for HF patients, two fundamental questions need to be addressed: ‘when (to screen)?’, and ‘what [questionnaire(s)] to use?’.

The most widely used cognitive screening questionnaire, the MMSE,¹³ has been brought into question regarding its diagnostic accuracy (sensitivity and specificity) for screening for mild cognitive impairment in general¹⁴ and in HF populations.¹⁵ Of note, the MMSE is now licensed, and the cost of purchase may be prohibitive to many HF management programmes. Additionally, several other

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screening questionnaires are publicly available that have satisfactory sensitivity and specificity for determining, or ruling out, mild cognitive impairment in other population groups.^{14,16} A recent systematic review of cognitive screening questionnaires utilized in HF studies⁶ concluded that the veracity of these measures in accurately screening for both mild cognitive impairment and more severe impairments in HF populations is questionable, and appropriate thresholds need to be established.

In addition to issues of sensitivity and specificity, ethical issues in cognitive screening of HF patients need to be considered. Weighing of potential benefit vs. risk, or harm, is essential when assessing the value of patient screening. Potential risks from screening for any disease or disorder include false negatives that consequently delay treatment, or false positives that may result in inappropriate labelling, with potential psychological manifestations and adverse legal and economic outcomes.¹⁷ Social and fiscal ramifications for HF patients may extend to a loss of their driver's licence or full employment, and an increase in their health insurance premiums. On the basis of a cognitive screening score, which indicates the need for further evaluation, careful consideration should be given when referring patients for a formal neuropsychological assessment as this can impose a substantial burden on HF patients already sleep deprived,¹¹ not to mention an already overburdened healthcare system. Ultimately, the value of screening for cognitive impairment in HF patients should be determined by its effect on morbidity, mortality, and disability.¹⁸

Mild cognitive impairment, a syndrome defined by a set of clinical, cognitive, and functional criteria,¹⁹ also has serious adverse outcomes, including progression to dementia and death.²⁰ Importantly, consensus on the conceptualization and diagnostic criteria of mild cognitive impairment (that does not meet the severity for Alzheimer's disease or other dementias) was recently achieved: concern regarding a change in cognition; impairment in one or more cognitive domains; preservation of independence in functional abilities; and absence of dementia.¹⁹ The immediate practical implications of gaining consensus will lead to improvements in screening practice, diagnosis, and management of cognitive impairment among HF populations.

Research is only just emerging in regard to interventions such as cognitive training strategies to identify whether the impairment exhibited by HF patients is amenable to interventions.²¹ Currently, there is insufficient evidence to develop recommendations for strategies that improve cognitive impairment for HF patients. Nonetheless, cognitive training strategies are an emerging science in the ageing and psychology field.²² Many lessons could be learnt through establishing an interdisciplinary approach to research addressing this fundamental aspect of the management of cognitive impairment in HF patients.

There is compelling evidence that HF patients are vulnerable to cognitive impairment, which has serious consequences for patient outcomes and healthcare resources. It is imperative that cognitive screening measures administered to HF patients be psychometrically evaluated.⁶ Such an approach could include the administration of two or three screening questionnaires and a neuropsychological battery of tests, to both HF patients and age- and education-matched control individuals. In this manner, the

diagnostic test accuracy of the cognitive screening questionnaire could be examined. With up and coming research investigating strategies directed at improving the cognitive functioning of HF patients, the evidence on which cognitive measures to use and when best to screen is far overdue. It is now time to inform clinical practice guidelines on how and when cognitive screening should be undertaken.

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