Journal of Affective Disorders 147 (2013) 186–191

Contents lists available at SciVerse ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research report

Comparative validity of depression assessment scales for screening poststroke depression

Hee-Ju Kang [a], Robert Stewart [b], Jae-Min Kim [a,*], Ji-Eun Jang [a], Seon-Young Kim [a], Kyung-Yeol Bae [a], Sung-Wan Kim [a], Il-Seon Shin [a], Man-Seok Park [c], Ki-Hyun Cho [c], Jin-Sang Yoon [a]

[a] Department of Psychiatry, Chonnam National University Medical School and Depression Clinical Research Center, Chonnam National University Hospital, Gwangju, Republic of Korea
[b] King's College London (Institute of Psychiatry), London, United Kingdom
[c] Department of Neurology, Chonnam National University Medical School, Gwangju, Republic of Korea

ARTICLE INFO

Article history:
Received 23 July 2012
Received in revised form
26 October 2012
Accepted 26 October 2012
Available online 17 November 2012

Keywords:
Poststroke depression
Assessment scale
Screening test
Validity
Longitudinal study

ABSTRACT

Introduction: This study aimed to compare screening properties of four assessment scales for poststroke depression (PSD) at 2 weeks and 1 year after index stroke, and investigated factors contributing to misclassification.
Methods: A total of 423 patients were evaluated 2 weeks after stroke and 288 (68%) were followed 1 year later, and were diagnosed as having major and minor PSD applying DSM-IV criteria gold standards. The Beck Depression Inventory (BDI), Hospital Anxiety and Depression Scale-depression subscale (HADS-D), Hamilton Rating Scale for Depression (HAMD), and Montgomery-Asberg Depression Rating Scale (MADRS) were administered. The balance of sensitivity and specificity was assessed using receiver operating characteristics (ROC) analysis.
Results: Discriminating abilities of all the scales for major and all PSD were good (area under ROC values 0.88–0.93 and 0.88–0.92 at 2 weeks; and 0.93–0.96 and 0.89–0.91 at 1 year, respectively). Misclassification was influenced by demographic characteristics and stroke severity particularly for the BDI and HAMD, was more marked for all PSD than for major PSD, and was more prominent at 2 weeks than at 1 year after stroke.
Limitations: Patients with only mild to moderate stroke severity were included.
Conclusions: Although there were no marked differences in the screening abilities for PSD between the scales, differences were found in factors influencing misclassification. Assessment scales with less somatic items may be recommended for the screening of PSD, particularly at the acute phase of stroke.

1. Introduction

Depression is common after stroke and has adverse effects on both course and prognosis. Identifying poststroke depression (PSD) is important in stroke management, although it is often under-recognized (Ruchinskas, 2002). Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) diagnostic criteria (American Psychiatric Association, 2000) are conventionally used for diagnosing PSD, yielding major and minor depressive disorders in this context. Of the instruments for screening and evaluating the severity of PSD, the Beck Depression Inventory (BDI), Hospital Anxiety and Depression Scale (HADS), Hamilton Depression Rating Scale (HAMD), and Montgomery Asberg Depression Rating Scale (MADRS) have been most commonly used (Salter et al., 2007). The screening ability of these instruments for PSD has been found to be acceptable, although there have been concerns raised about their low specificity (Salter et al., 2007). However, to date there has been no direct comparison between the most commonly used the four depression screening instruments in stroke patients.

Although the screening ability of these instruments has been found to be acceptable, there have been concerns raised about variations in performance associated with socio-demographic and clinical characteristics (Salter et al., 2007). Specifically, older age, female gender, and lower cognitive function have been found to be associated with lower screening abilities (Aben et al., 2002; Quaranta et al., 2008). Moreover, stroke has multiple physical consequences which may be difficult to differentiate from some somatic symptoms of depression and it remains controversial whether to choose instruments that include somatic symptoms

* Corresponding author at: Department of Psychiatry, Chonnam National University Medical School, 160 Baekseoro, Dong-Ku, Gwangju 501-746, Republic of Korea Tel.: +82 62 220 6143; fax: +82 62 225 2351.
E-mail address: jmkim@chonnam.ac.kr (J.-M. Kim).

0165-0327/$ - see front matter © 2012 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.jad.2012.10.035

(e.g. BDI or HAMD) or instruments that seek to avoid these (e.g., HADS or MADRS). However, there has been no previous study which has compared factors associated with misclassification between the commonly used depression screening instruments.

In a cohort of stroke patients recruited from Korean clinical services, this study aimed to (i) compare the screening ability of the two self-report (BDI and HADS) and the two observer-rated (HAMD and MADRS) instruments against clinical diagnosis of depression according to DSM-IV criteria, applied as a gold standard; and (ii) investigate the factors potentially contributing to misclassification with the clinical diagnosis both at 2 weeks and at 1 year after stroke.

2. Methods

2.1. Study overview

This analysis was carried out as a component of a larger parent study, which seeks to investigate mental disorders in stroke survivors using a naturalistic prospective design. The detailed design has been published (Kim et al., 2012). Participants were consecutively recruited from all patients with recent ischemic stroke hospitalized within the Department of Neurology of University Hospital, South Korea. Assessments are made at 2 weeks and 1 year after the stroke to investigate stroke outcome and consequences from acute to chronic stages. The recruitment period for the initial 2 week assessment was from 2006 to 2010 and for the follow-up evaluation was 1 year thereafter.

2.2. Participants

All patients with acute stroke hospitalized at the study site were approached regarding participation. Inclusion criteria were: (i) confirmed ischemic stroke by brain magnetic resonance imaging; and (ii) ability to complete the necessary investigations and questionnaires. Exclusion criteria were: (i) severe physical illnesses; (ii) communication difficulties due to dysphasia or dysarthria; (iii) comorbid neuropsychiatric conditions: dementia, Parkinson's disease, brain tumor, epilepsy, psychoses, alcohol or substance dependence; and (iv) Mini-Mental State Examination (MMSE) (Folstein et al., 1975) score of <16. All participants gave written informed consent and the study was approved by the Chonnam National University Hospital Institutional Review Board.

2.3. Socio-demographic and clinical characteristics

Age, gender, and education years were recorded according to information obtained from the participant or their caregiver, as appropriate. Stroke severity was measured using the National Institutes of Health Stroke Scale (NIHSS) (Kasner et al., 1999); the score from this instrument ranges from 0 to 42, and higher values indicate more severe pathology. Physical disability was measured by the Barthel Index (BI) (Mahoney and Barthel, 1965) the score of which ranges from 0 to 100, with lower values indicating more severe disability. Cognitive function was evaluated by MMSE, the score of which ranges from 0 to 30 with lower values indicating worse cognition.

2.4. Diagnosis of PSD

For the purpose of these analyses, DSM-IV criteria for depressive disorder were taken to represent a 'gold standard' for PSD, and were determined by a psychiatrist, applying these criteria using the Mini International Neuropsychiatric Interview (MINI), a structured diagnostic psychiatric interview for DSM-IV giving rise to major or minor depression categories as outputs (Sheehan et al., 1998). According to these criteria, patients were diagnosed as having major depression if they had at least one core symptom (i.e., depressed mood or loss of interest) and at least four other symptoms of depression. A diagnosis of minor depression was made if patients had at least one core symptom and at least two others but less than five symptoms in total. Patients were further re-categorized into 'all PSD' (both major and minor depression) and major PSD.

2.5. Assessment scales for depression

The two observer rating scales (HAMD and MADRS) were administered by two research nurses blinding to the MINI results and trained and supervised by the project psychiatrist. The HAMD consisted of 17 items with a total score ranging from 0 to 52 (Hamilton, 1960). The MADRS consisted of 10 items with a total score ranging from 0 to 60 (Montgomery and Asberg, 1979). Patients were also asked to fill out two self-report questionnaires (BDI and HADS) after the interview. In those unable to self-complete because of visual or praxis problems, the research nurses assisted. The BDI consisted of 21 items with a total score ranging from 0 to 63 (Beck et al., 1961). The HADS consists of 14 items with a total score ranging from 0 to 42 (Zigmond and Snaith, 1983), and two subscales: the 7 item anxiety subscale (HADS-A) and the 7 item depression subscale (HADS-D). Total scale scores may be indicative of psychological distress rather than depression *per se* and the extent of correlation between HADS-A and HADS-D has been controversial (Johnston et al., 2000); therefore only the HADS-D scale was used in this study. In all four instruments investigated, higher scores indicate more severe depressive symptoms. The MADRS and HADS-D include fewer somatic items than the HAMD and BDI.

2.6. Statistical analyses

The internal consistencies of the four assessment scales were measured by Cronbach's α. Receiver operating characteristics (ROC) analysis was used to determine the optimal cut-off points of the instruments against major and all PSD, and areas under the ROC curves (AUCs) were used to quantify the balance between sensitivity/specificity across the range of potential cut-offs. Additional AUCs analyses were carried out to investigate the consistency of the scales to identify the patients who remained depressed over 1 year follow-up period. To identify the extent to which socio-demographic characteristics (age, gender, and education) and stroke severity (scores on NIHSS, BI, and MMSE) contributed to misclassification, binary variables for the four assessment scales using the determined optimal cut-off points were modeled against these characteristics adjusted for each other to assess their mutual independence in logistic regression models having adjusted for the presence/absence of DSM-defined PSD (major or all). Persisting associations in these models imply influences of other factors beyond the gold standard. Statistical analyses were carried out using SPSS 13.0 software.

3. Results

3.1. Recruitment and descriptive data

A total of 801 stroke patients were hospitalized during the recruitment period, of whom 465 (58%) met the inclusion and exclusion criteria. Of these potentially eligible people, 423 (91%) consented to participate and formed the baseline sample. There were no significant differences between participants and