Usefulness of the Japan Stroke Scale -Depression Scale- (JSS-D) for the Diagnosis of Post-stroke Depression

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Abstract

Background Post-stroke depression (PSD) has a great impact on the quality of life of patients with stroke. The Mini International Neuropsychiatric Interview (MINI) and the Hamilton Depression Scale (HAM-D₁₇) are considered the most reliable diagnostic tests for depression. However, both are difficult to conduct in a clinical setting since they require completion of a questionnaire in a limited time period. The Japan Stroke Scale -Depression Scale- (JSS-D) was established by the Japan Stroke Society to evaluate mood disorders following stroke, including PSD. Here, we correlated the results of HAM-D₁₇, MINI and JSS-D scores.

Methods We studied 100 stroke patients (mean age: 64.6±11.6 [±SD], range: 32-85 years) in the subacute phase (2-5 weeks after onset). We determined the correlations between HAM-D₁₇ and JSS-D scores. We used MINI to diagnose PSD, which represented major and minor depression, and compared the results with those of JSS-D.

Results JSS-D scores correlated with those of HAM-D₁₇ ($r=0.847$, $p<0.0001$). The cutoff value of JSS-D score for PSD was 2.40. The sensitivity and specificity were 0.950 and 0.988, respectively.

Conclusion JSS-D is the most valuable diagnostic test for PSD based on its ease of use and reliability for estimating PSD in Japan.

Key words: Post-stroke depression, Japan Stroke Scale-Depression Scale, Hamilton Depression Scale, MINI International Neuropsychiatric Interview

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Introduction

Recent studies indicate that cerebrovascular accidents (CVA) are associated with depression in elderly persons, and several investigators have examined poststroke depression (PSD) and vascular depression (1-3). Since it is generally accepted that PSD affects recovery from complications associated with CVA and results in increased mortality (4-6), early detection and appropriate response to PSD are essential (7). However, a simple and reliable method for the diagnosis of PSD is not available at present.

The Mini International Neuropsychiatric Interview (MINI) (8) and the Hamilton Depression Scale (HAM-D₁₇) (9) are the most reliable tools for the diagnosis of depression. MINI is a structured clinical interview based on the Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV) (10). On the other hand, HAM-D₁₇ is used glob-

ally as a well-validated tool for assessment of depression. In addition, HAM-D₁₇ is reported to be useful for the diagnosis of PSD (11), however it is difficult to use since it requires completion of a questionnaire in a limited time period.

On the other hand, the Japan Stroke Scale -Depression Scale (JSS-D) (12) was prepared by the Japan Stroke Society as part of a larger system that evaluates stroke patients (13-16), to assess poststroke mood disorders, including PSD (Table). The JSS-D is easier to use clinically compared with other tests for assessment of depression such as HAM-D₁₇. In the present study, we evaluated JSS-D for the diagnosis of PSD in Japanese patients.

Materials and Methods

Subjects

The study subjects were 100 patients (61 men and 39

Table 1. The Japan Stroke Scale (Depression Scale) (JSS-D).

1- Depressed Mood		
A: Normal with fine mood; no depressed mood	☐	A= -0.98
B: Depressed mood	☐	B= -0.54
C: Verbal report of clear observation of behavior indicative of depression, loneliness or sadness	☐	C= 1.52
2- Feelings of Guilt, Hopelessness, Worthlessness, or Suicide		
A: Hopeful about the future without any feelings of guilt	☐	A= -2.32
B: Hopelessness about the future along with feelings of worthlessness.	☐	B= -0.88
C: Apparent feeling of guilt (with thoughts of errors committed in the past and sinful deeds) or a wish to be dead.	☐	C= 3.19
3- Interest and Pleasure in Routine Activities (Work, Hobbies, and Amusement)		
A: A vivid interest in work and hobbies/amusement	☐	A= -1.17
B: Disinterest in work and hobbies/amusement	☐	B= -0.88
C: Absolute loss of interest and activities in work and hobbies/amusement	☐	C= 3.19
4- Retardation and Inhibition of Thoughts		
A: Voluntary conversation and self-activity with sufficient liveliness for a normal individual	☐	A= -0.84
B: Very little activity and loss of appetite	☐	B= -0.53
C: Absolute inactivity and complete stupor	☐	C= 1.37
5- Anxiety/Fret		
A: Neither anxiety nor fret	☐	A= -1.11
B: Observation of anxiety or fret	☐	B= -0.64
C: Observation of frequent restlessness/failure resulting from an inability to control annoyance	☐	C= 1.75
6- Somniphathy		
A: Able to sleep soundly	☐	A= -1.83
B: Incapable of sleeping soundly (early insomnia, middle insomnia, and late insomnia).	☐	B= -0.64
C: Nocturnal anxiety (including delirium)	☐	C= 2.75
Additional remark: Write circle in recognized items, if B selected. Selection of multiple items is allowed. Early insomnia (). Middle insomnia () and late insomnia ()		
7- Expression		
A: Frequent and cheerful expression	☐	A= -0.52
B: Infrequent and somber expression	☐	B= -0.79
C: Irrelevant expression of feelings (affective incontinence, etc.)	☐	C= 1.31
Subtotal score constant		+9.50
TOTAL SCORE		

women, mean age: 64.6 ± 11.6 years, $\pm$ SD) representing all those admitted consecutively to Dokkyo Medical University Hospital (Department of Neurology) from January 2004 to February 2005 for stroke in the subacute phase (2 to 5 weeks after onset) (Fig. 1).

None of the patients suffered from disturbances of consciousness, and patients with scores less than 21 in the Mini Mental State Examination (MMSE) or with neuropsychological disorders such as aphasia (17) were excluded from this study.

Study protocol

We used three types of psychological tests for evaluation of PSD, namely, MINI, HAM-D₁₇ and JSS-D. The tests were independently conducted in Japanese language by the two authors. We analyzed the correlation between HAM-D₁₇ and JSS-D. In addition, we defined both major and minor depression in MINI as PSD, and compared the results with those of JSS-D. Since a clear cutoff score for minor depression is not available in MINI, minor depression was considered present when the HAM-D₁₇ score was higher than 10 points. It is reported that a few patients with PSD show depressed mood, feeling of guilt and suicide, compared with functional depression (18). Therefore, we sub-analyzed the correlation between HAM-D₁₇ and JSS-D in patients with PSD (n=69) but without depressed mood, feeling of guilt and suicide.

The MINI, HAM-D₁₇ and JSS-D tests were conducted in an isolated quiet room and each test required about 30 minutes for completion. The instructions used for the conduct of the tests were described previously (19, 20). Y.K. examined HAM-D₁₇ and K.H. examined MINI and JSS-D in all patients. Only data of patients who completed all three tests were

Figure 1. Profile and flow diagram for selection of subjects in the present study.

analyzed in this study. All procedures described in this study were approved by the Ethics Review Committee of Dokkyo Medical University.

Statistical analysis

Descriptive and analytical statistics were computed using Statcel 2a software (Saitama, Japan). To analyze the correlation between HAM-D₁₇ and JSS-D, we used Spearman's correlation coefficient. A p value <0.05 was considered significant. We determined also the cutoff value of JSS-D score for the diagnosis of depression using receiver operating characteristic (ROC) curve analysis, and considered this value as optimal for the diagnosis of PSD under MINI.

Figure 2. Correlation between HAM-D₁₇ and JSS-D scores.

Results

The results of HAM-D₁₇ correlated significantly with those of JSS-D ($r=0.847$, $p<0.0001$, Spearman's correlation coefficient) (Fig. 2). The HAM-D₁₇ score was >11 points in all patients diagnosed with major and minor depression. Based on our diagnostic criteria for PSD by MINI and HAM-D₁₇, the prevalence of PSD was 20.0% in patients with subacute stroke. In addition, the results of HAM-D₁₇ correlated significantly with those of JSS-D in cases of PSD without depressed mood, feeling of guilt and suicide ($r=0.724$, $p<0.001$, Spearman's correlation coefficient by rank test) (Fig. 3). Furthermore, based on ROC curve analysis of JSS-D, the estimated cutoff score for PSD by JSS-D was 2.40 points. The sensitivity based on this cutoff value was 0.950 and specificity was 0.988 (Fig. 4).

Discussion

This study was conducted mainly under DSM-IV (MINI). DSM-IV provides the diagnosis of depression while HAM-D allows assessment of severity of symptoms.

Several recent studies have investigated PSD (2, 3, 7), however the pathophysiological mechanism and prevalence of PSD remain unclear. In previous studies, various psychological tests, such as HAM-D (11), Beck Depression Inventory (BDI) (21, 22) and Zung Self-Rating Depression Scale (SDS) (4) were used for the assessment of PSD. However, these tests are used to evaluate depressive state only. On the other hand, JSS-D was established from various useful scales, mainly by eliminating seven items from HAM-D₁₇. JSS-D was established to distinguish PSD from complications related to stroke itself; in fact the seven deleted items are related to physical complaints such as general somatic symptoms. Finally, the items in JSS-D were statistically weighted (12) for stroke patients with neurological symptoms.

Figure 3. Correlation between HAM-D₁₇ and JSS-D for patients without depressed mood, feeling of guilt or suicide.

We evaluated and compared the results of MINI, HAM-D₁₇ and JSS-D in this study. Our results showed a significant correlation between HAM-D₁₇ and JSS-D scores in Japanese patients with stroke. Although calculation of the results of JSS-D seems difficult, the results can be computed by using a commercially available spreadsheet software, such as Excel. On the other hand, HAM-D₁₇ is difficult to use by clinicians since it requires completion of a questionnaire by patients in the outpatient department within a limited time period (20 minutes for the HAM-D₁₇, versus 3 minutes only for the JSS-D). In addition to the appropriateness of JSS-D for the diagnosis of PSD, our finding of the significant correlation between JSS-D scores with those of HAM-D₁₇ is important clinically because HAM-D₁₇ reflects symptom severity and JSS-D is easier to use than HAM-D₁₇.

It is reported that a few patients with PSD show depressed mood and feeling of guilt and are suicidal compared to patients with functional depression (18). The results of HAM-D₁₇ correlated significantly with those of JSS-D in cases of PSD without depressed mood, feeling of guilt and suicide in this study. These data suggest the appropriateness of JSS-D for the diagnosis of PSD rather than functional depression.

With regard to the cutoff level for the diagnosis of minor depression, we usually employ a score of >10 in the HAM-D₁₇ test. We selected this level based on the results of a previous study (23) in which a score <10 was considered remission of depression. In fact, in the present study, the HAM-D₁₇ score in all patients diagnosed with major and minor depression was >11 .

The wide use of JSS-D, including the ease of testing, should be promoted. In this pilot study, we found that a score of 2.40 was appropriate for the diagnosis of PSD

Figure 4. Receiver operating characteristic curve analysis.

based on ROC curve analysis of JSS-D. The limitations of this study are that the number of patients is small, it is a one-off study, and JSS-D has not been validated outside Japan.

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