# Acute Poststroke Depression Is Associated with Thalamic Lesions and Clinical Outcomes: A Case–Control Study

Tomoko Omura, MD,* Mahito Kimura, MD, PhD,† Kyongsong Kim, MD, PhD,* Masahiro Mishina, MD, PhD,‡ Takayuki Mizunari, MD,PhD,* Shiro Kobayashi, MD, PhD,* and Akio Morita, MD, PhD§

*Background:* We investigated the role of acute-phase stroke lesions and patient characteristics in poststroke depression (PSD) and its effect on the clinical outcome. *Patients and Methods:* Five and 30 days after admission, 175 patients self-reported their depressive symptoms on the Patient Health Questionnaire-9. We compared the clinical characteristics and outcomes in patients with (n = 41) and without PSD (n = 134). Stroke severity was assessed with the National Institutes of Health Stroke Scale (NIHSS); the modified Rankin Scale (mRS) was used to determine the functional outcome. *Results:* There was no significant difference between patients with and without PSD in the age, gender ratio, lesion side, and the history of hypertension, diabetes mellitus, alcohol and tobacco use, and previous stroke. Thalamic lesions were significantly associated with PSD ($P = .03$), although there was no significant difference in both the NIHSS score and the final mRS score of patients with thalamic lesions. Backward stepwise logistic regression analysis showed that a higher NIHSS score and thalamic lesions were independent predictors of PSD. Total hospitalization was significantly longer in patients with PSD. At the time of admission, the NIHSS score was significantly higher in patients who developed moderate to severe PSD than in those with mild PSD or without PSD. *Conclusions:* PSD in the acute phase was associated with thalamic lesions and severe stroke. Hospitalization was significantly longer in patients with PSD and their functional disability was more severe, suggesting that PSD played a role in the unsatisfactory results of poststroke rehabilitation. **Key Words:** Depression—stroke—stroke care—lesion location.


## Introduction

The mechanisms eliciting depression as a sequel of cerebral stroke[1] remain unclear. Poststroke depression (PSD) affects the patient prognosis in the short and long term.[2-6] PSD in the early poststroke period negatively affects the ability to resume the activities of daily living (ADLs),[4] and PSD is associated with a higher rate of 10-year poststroke mortality.[3]

We investigated the effect of the stroke lesion site and of the patient characteristics on the manifestation of PSD in the acute phase and of its impact on the clinical outcome.

From the *Department of Neurosurgery; †Department of Neuropsychiatry, Nippon Medical School Chiba Hokusoh Hospital, Inzai-city, Chiba, Japan; ‡Department of Neuropathophysiological Imaging, Graduate School of Medicine, Nippon, Medical School, Tokyo, Japan; and §Department of Neurological Surgery, Nippon Medical School, Bunkyo-ku, Tokyo, Japan.

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Address correspondence to Tomoko Omura, MD, Department of Neurosurgery, Nippon Medical School Chiba Hokusoh Hospital, 1715, Kamagari, Inzai-city, Chiba, Japan. E-mail: tomura@nms.ac.jp.

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## Patients and Methods

### *Evaluation of PSD*

Five days after stroke onset and again 30 days after admission, the patients self-reported their depressive symptoms on the Patient Health Questionnaire (PHQ)-9, which includes 9 items; each is based on the diagnostic criteria of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) for depressive disorders.[7,8] After the PHQ-9-based screening, the diagnosis of depression was based on the DSM-IV and was recorded as depression due to stroke with major depressive-like episodes or as minor depression. The PHQ-9 was used to assess the severity of depression. The total PHQ-9 score ranges from 0 to 27; each item is scored on a 4-point scale, where 0 = no depressive episodes and 3 = almost daily episodes. Based on the standardized cutoff scores of the PHQ-9, the 41 patients were classified into 5 categories as having no depressive symptoms (score 0), and mild, moderate, moderately severe, and severe depressions (scores 5, 10, 15, and 20, respectively). The highest scores of 1 or several questionnaire responses were used for categorization.[8] We repeated the PHQ-9 evaluation at 1- to 2-week intervals. When several evaluations were performed within 30 days, we recorded the maximum score.

### *Patient Population*

This prospective study was approved by our institutional ethics committee. All patients gave their prior informed consent for inclusion in the study.

Between November 2014 and October 2015, 348 patients with cerebral stroke but no transient ischemic attack were hospitalized at Nippon Medical School Chiba Hokusoh Hospital. Excluded initially were 173 patients due to the severity of their condition (Fig 1).

To focus on the effect of depression in the acute phase of stroke, all 175 included patients were enrolled within 7 days after stroke onset. These patients were 108 men and 67 women ranging in age from 19 to 93 years (mean 68.2 ± 13.0 years). Of these, 138 presented with cerebral infarcts, 25 with intracerebral hemorrhage, and 12 with subarachnoid hemorrhage.

We recorded the PHQ-9 scores with a mean of 13.5 ± 5.9 days (range 5-30 days) after admission, that is, 13.9 ± 5.8 days (range 5-30 days) after stroke onset. In 41 of the

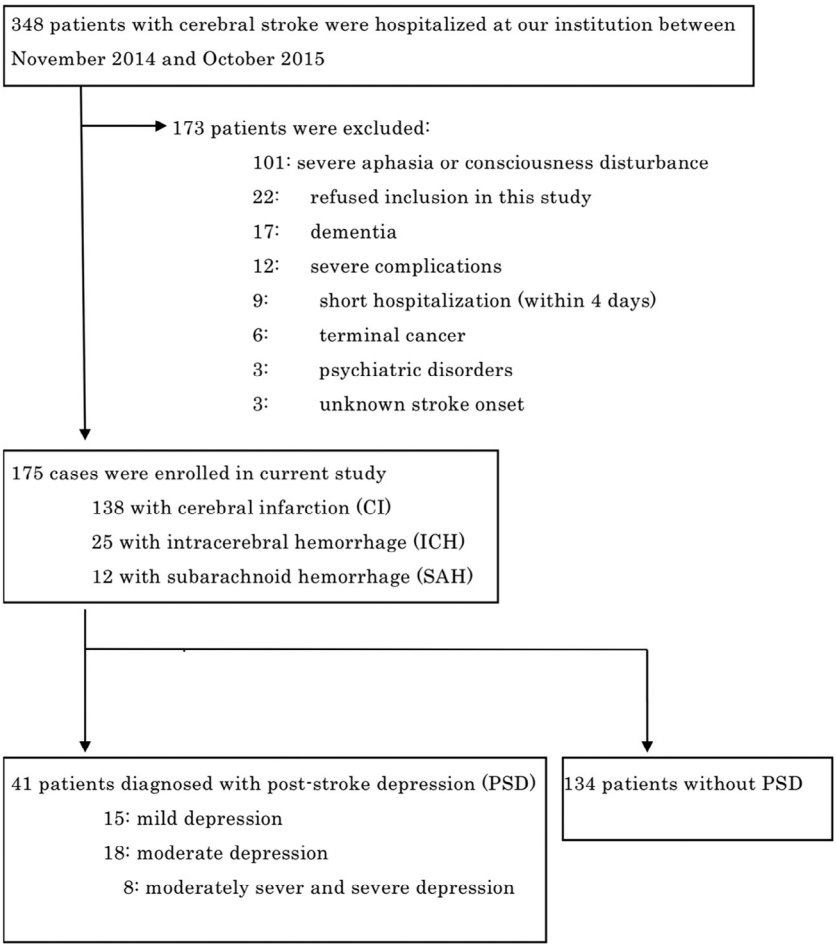


**Figure 1.** *Workflow diagram of patient recruitment.*