Depressive Symptoms Following Ischemic Stroke: A Study of 207 Patients

Liang-Po Hsieh and Hui-Ju Kao

Abstract- Depression is a frequent and important problem for patients who have experienced strokes. The purpose of this study was to assess the prevalence of depressive symptoms, their clinical correlations, and the effects of depressive symptoms on stroke recovery. A consecutive cohort of 207 ischemic stroke patients with a mean age of 64 years, were studied for ascertaining any correlation between potential risk factors and the incidence of post-stroke depression (PSD). Depressive symptoms were relatively common (34.3% Hamilton depression rating scale > 10), but the prevalence of severe depression (HDRS > 17) was only 7.7%. Patients with depressive symptoms were more likely to be female, have a family history of depression, and a poor functional outcome. There were no significant differences between depressive symptoms and age, marital status, location of stroke lesion, and duration after stroke onset. Our findings indicate that depressive symptoms occurred in about one third of post stroke patients. There is a negative correlation between depressive symptoms and functional status of the patients.

Key Words: Depression, Stroke, Hamilton depression rating scale, Barthel index, Modified rating scale

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INTRODUCTION

Depression is an important common problem for patients who have experienced strokes. Post-stroke depression is present in at least 30% of the survivors of strokes[1], and is observed from the acute phase to at least 2 to 3 years after the episode[2]. However, a consensus on the course and associated factors of depression has not been reached. Recently systematic review does not support the hypothesis that the risk of depression after stroke is affected by the location of the brain lesion[3]. Stroke severity or physical disability and functional impairment are important factors associated with depression[4,5]. Other possible risk factors include age, sex, living alone, lack of social support, and of psychiatric both patient and family history[6].

Study in the depressive symptoms after ischemic stroke in Taiwan has been inadequate. This prospective study was to assess the prevalence of depressive symptoms in a community hospital in Taiwan, and the relationships between depressive symptoms and patients' clinical and functional status.

From the Department of Neurology, Cheng-Ching Hospital, Taichung, Taiwan.
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Reprint requests and correspondence to: Liang-Po Hsieh, MD. Department of Neurology, Cheng-Ching Hospital, No. 118, Sec. 3, Chung-Kung Rd., Taichung, Taiwan.
E-mail: lphsieh624@yahoo.com.tw

SUBJECTS AND METHODS

Subjects were selected from consecutive outpatients in neurology clinic at Cheng-Ching hospital, a private community facility. The consecutive subjects who had suffered from first-ever ischemic stroke were interviewed and examined by a neurologist. All patients with a known history of alcohol abuse, dementia, psychosis, current antidepressant treatment, or severe concomitant disease were excluded. Patients with aphasia and difficulties for interview were also excluded. All selected patients had received CT or MRI scan during the acute stage of ischemic stroke.

Between July 2001 and September 2002, there were 207 patients available for assessment. The mean age of this group was 64.2±11.7 years (ranges: 43-87). Sixty percent were men and about three-fourth were married. Only 6.8% (14/207) of patients had reported that their parents or siblings had been diagnosed with depressive disorder. Lesion location was defined by CT or MRI during the stroke onset. Neurological examinations would help us localize the lesion if no definite acute ischemic stroke was seen by CT or MRI. The location was left-sided in 86 (41.5%), right-sided in 89 (43%), and a brain stem stroke in 32 (15.5%).

The post-stroke depressive symptoms were assessed by a neuropsychologist with the Hamilton Depression Rating Scale (HDRS). We defined patients as having depression if the HDRS score was above 10. Patients with an HDRS score between 10-13 were defined as having mild depression, 14-17 as moderate, and above 17 as severe.

Functional status was measured by a neurologist in the clinic with the Barthel's Index (BI) and Modified Ranking Disability Scales (MRS). The BI has scores between 0 and 100, with the top scores implying a complete functional independence in daily life activities. The MRS is an observer-rated global measure of handicap to assess limitation in the patient's social role. It is rated form 0 (no symptoms) to 5 (severe handicap, totally dependent).

Descriptive statistics were used to summarize data. Between-group comparisons were made with the t-test or ANOVA for continuous variables, and Chi-square test of independence for dichotomous variables. Multiple regression was used to test the strength for the association between depression and risk factors. Tests were two-tailed, and the results were considered significant at $P<0.05$. Univariate correlates were assessed with Pearson correlation. Analyses were conducted using SPSS version 10.0 for Windows (SPSS Inc.).

RESULTS

Seventy-one patients (34.3%) had depressive symptoms with 23 (32.4%) having minor depression, 32 (45.1%) moderate depression, and 16 severe depression. The prevalence of severe depressive symptoms was 7.7% (16/207). There were no differences in age, marital status, and duration from stroke onset. In contrast, depressed patients were more likely to be female ($P<0.01$), and to have family histories of depression ($P<0.01$). (Table 1)

Correlations between depression rating scale scores and functional outcome measured by the Barthel index ($r=-.38$, $P<0.001$) and the handicap level measured by modified ranking scale ($r=.33$, $P<0.001$) were significant.

A stepwise multiple regression with the HDRS as the dependent measure and the followings (age, sex, side of lesion, duration from stroke onset, family history of depression, BI and MRS scores) as potential predictors produced a significant model [$F(4,202)=16.15$, $P<0.0001$], which accounted for 24% of the variance. Low Barthel index scores, age of stroke onset, female gender and a family history of depression contributed significantly to the model (Table 2).

DISCUSSION

Our study suggests that depressive symptoms are common in patients with ischemic stroke. We found a significant relationship between depressive symptoms and functional status.

Our study had used reliable measures of depression and outcome. The Hamilton's Depression Rating Scale

Table 1. *Demographic, stroke, lesion and functional variables among different groups with depressive symptoms*

Variable	Depressive Symptoms		Statistics†	Overall
	Absent (HDRS < 10) (n=136)	Present (HDRS > 10) (n=71)		(n=207)
Age onset year	65 ±11 (36-84)	62 ±11 (36-82)	NS	64 ±11 (36-84)
Sex (male)	91 (67%)	34 (48%)	0.006**	125 (60%)
Marital status	105 (77%)	53 (75%)	NS	158 (76%)
Family history (depression)	4 (3%)	10 (14%)	0.006**	14 (7%)
Right hemisphere stroke	58 (43%)	31 (44%)	NS	89 (43%)
Left hemisphere stroke	54 (40%)	32 (45%)	NS	86 (42%)
Modified rating scale	1.2 ±0.9 (0-5)	1.8 ±1.4 (0-5)	0.000***	1.4 ±1.2 (0-5)
Barthel Index	93 ±15 (20-100)	78 ±31 (20-100)	0.000***	88 ±23 (20-100)

Values are mean ±SD (with range in parentheses) or number of patients (with percentage in parentheses), NS indicates not significant.
† Chi-square test for categorical data, t-test for continuous data.
* p<0.05 , **p<0.01,***p<0.001

Table 2. *Stepwise regression model of variables in their association with depressive symptoms assessed by the HDRS*

	B	R^2	F	p
Activities of daily living (BI)	-0.089	0.15	35.24	0.000
Age of stroke onset	-0.105	0.19	24.10	0.001
Family history of depression	3.661	0.22	19.12	0.006
Female gender	1.641	0.24	16.15	0.016

Dependent variable: HDRS.

has been previously applied in the post-stroke population and has demonstrated acceptable sensitivity, specificity, and predictive value[7]. A potential weakness of the present study is the lack of a structured diagnostic interview for depression. While studies have suggested that certain rating scales may overestimate the rates of depression disorder[4], we chose to measure the severity of depressive symptoms with reliable and easily administered rating scales.

The prevalence of PSD in different studies is difficult to compare because of different evaluation methods, diagnostic criteria, patient sources, and poststroke intervals. Past studies have found that depression is a frequent sequela of stroke, and the prevalence ranged from 12% to 64%[8]. Most of these studies were restricted to stroke patients admitted to hospital or seen at outpatient clinics. Those studies may have included patients with more severe and persistent disabilities. Conversely, community sampling methods, may include patients with mild deficits and/or no disabilities[9,10]. The rate of depressive symptoms in our study (34%) is almost identical to the prevalence of depressive disorder in the two community studies by House et al (32%)[10] and Wade et al (32%)[11], but the incidence of severe depressive symptoms (7.7%) was lower than these two studies (13% and 20%, respectively). The prevalences from all three studies are considerably lower than those reported from surveys from hospital inpatients and rehabilitation units[12,13]. One hospital survey of PSD among the Chinese population has been reported to be 43%. The study also showed that the depression scores were related to activities of daily living scores in patients with right -sided lesions[14]. Another community survey among Chinese population in Kinmen islets revealed that the frequency of stoke survivors' depressive disorder was significantly higher than that of nonstroke subjects. (62.2% vs 33.4%; p<0.01)[8].

Another potential confounder for variable results is the time of the assessment after the stroke . Some studies have noted that depressive disorder were significantly more common during 6 months to 2 years after stroke.

Between 2 and 9 years post-stroke, the prevalence was reduced, but after 10 or more years following the stroke it may increase again. These early and late types of depressions may arise from different mechanisms[15]. However, in this study there was no correlation between the depressed disorder and the time after stroke in this study.

The lack of a relationship between depressive symptoms and lesion laterality is consistent with most studies of depression in stroke patients regardless of the nature of the sample or the assessment measures utilized.

This study shows a negative correlation between the prevalence of depressive symptoms following ischemic stroke and their activities of daily living. These results should not be surprising, especially in view of the findings of the Medical Outcome Study which has demonstrated that patients with depressive symptoms had poor functioning[16]. The present study emphasizes the need to screen for depressive symptoms because it is related to the prognosis. Double-blind controlled trials have documented the efficacy of tricyclic antidepressants[17], trazodone[18], and selective serotonin reuptake inhibitors[19] in treating post-stroke depression. It is unclear whether the amelioration in depressive symptoms will be associated with improvement of functional status. Further studies are needed.

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