Research Report

POST STROKE DEPRESSION AND LESION LOCATION: A HOSPITAL BASED CROSS-SECTIONAL STUDY

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ABSTRACT

Introduction: Depression is seen in about 40% of patients with stroke and is a common neuropsychiatric consequence. Post-stroke depression (PSD) can be related to the site and side of infarct and psychological stressors. There are conflicting results in this area of research and dearth of studies from India. Thus the study aims to assess the prevalence of PSD in stroke patients and the relation between site and side of stroke with PSD. **Methodology**: A cross-sectional study was done among 40 stroke patients recruited by consecutive non-random sampling in Pushpagiri Institute of Medical Sciences and Research Centre, Thiruvalla. A semi-structured proforma was used to collect the socio-demographic, illness-related and neuroimaging details. Hamilton depression rating scale was used to assess the severity of depression. SPSS 20.0 was used for statistical analysis. **Results:** 64% of the patients with left-sided lesion had PSD, whereas only 20% had PSD among the right-sided group which was significant with a p-value of 0.005.PSD was seen in 64% (N=9) of patients with subcortical lesions which were significantly high (p=0.006) when compared to 14% (N=2) of the patients with PSD among the cortical group. **Conclusion:** This study showed a high prevalence of PSD and its association with left-sided cortical and subcortical lesions. Eliciting the relationship between the lesion and depressive symptoms may help shed light on the neurobiology of depressive disorders.

Keywords: Post-stroke depression, stroke, lesion location

INTRODUCTION

Stroke is a significant public health problem, the incidence of which varies dramatically over the life course. In the age group 55 to 64, the incidence rates between 10 to 20 per 10,000. Individuals, while the rate increases to 200 per 10,000 individuals for those above 85 years.[1] It is the third common cause of death.[2]

Post-stroke depression is a common sequel of stoke, and approximately 85 per cent of stroke patients suffer these symptoms, which causes delayed rehabilitation outcomes.[3] Even though there is a high chance to develop post-stroke depression early years after stroke, it can last up to 10years.[4]

Stroke is the sudden loss of blood supply to the brain leading to permanent tissue damage caused by thrombotic, embolic, or hemorrhagic events. Almost 85% of strokes are ischemic, while 12% are hemorrhagic.[1] Norepinephrinergic and serotoninergic systems are disrupted in basal ganglia and frontal lobe lesions which causes post-stroke depression.[2]

The prevalence of disability among stroke survivors is between 24–54%.[5] The progressive decline in stroke mortality and the subsequent rise of survivors with residual impairments have been accompanied by a rising interest in the factors that could interfere with functional

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outcome and quality of life. Depression is considered as a robust predictor of poor quality of life among stroke survivors.[2]

Post-stroke depression (PSD) is one of the common emotional disorders troubling stroke survivors. Former studies have reported prevalence rates that have ranged from 18% to 61%, depending upon methodological differences. PSD often remain unrecognized and undertreated as the diagnosis is challenging. It's often associated with cognitive impairment, increased mortality and risk of falls causing increased disability and poor rehabilitation outcome.[6] There are several studies which showed the location of the lesion could influence the risk of depression after stroke[4] some studies showed there is the relationship between the left-sided lesion and post-stroke depression. Still, some showed it is related to right hemisphere lesions.[3] There is a paucity of data in this area of research from India.[2] Correlation of the mood changes with the type, location and severity of stroke may provide useful information for improving patient management.

In this study, we aimed to assess the prevalence of post-stroke depression and its association with lesion side and site.

MATERIAL AND METHODS

This is a cross-sectional study conducted among inpatients, admitted following a stroke in the Department of Neurology at Pushpagiri Institute of Medical Sciences and Research Centre, Thiruvalla. The study period was from September 2019 to December 2019.

Patients with a definite history of recent onset stroke (> 2weeks but <6months), who could communicate verbally to the investigator and who gave the informed consent, were recruited for the study. Patients with altered sensorium/aphasia/significant cognitive disturbances (MMSE <24)and those with a history of stroke, neurological disorders and psychiatric illnesses were excluded. The diagnosis of stroke was based upon the consultant neurologist's opinion based upon the imaging studies. Forty patients were recruited by consecutive non-random sampling. A semi-structured proforma was used to collect the socio-demographic, illness-related and neuro-imaging details. Hamilton depression rating scale (17 items) was used to assess the severity of depression.

Table.1. Severity of depression

HAM-D score (17 item)	N =13
Mild (8-16)	2 (15.38%)
Moderate (17-23)	8 (61.5%)
Severe (>24)	3 (23.07%)

HAM-D – Hamilton Depression

Descriptive statistics were used to summarize the socio-demographic, illness-related and radiological variables. Chi-square/ Fischer Exact test was used to find the significance of study parameters on a categorical scale between two or more groups. Nearly 95% confidence interval has been computed to find the significant features. P-value was set at ≤ 0.05. Data collected were analyzed using SPSS 20.

RESULTS

Table 2: Association between study variables and PSD

Study Variables	PSD	No PSD	Chi-square	p-value
Age				
<50 years	0	2	1.014	0.314
>50 years	13	25		
Gender				
Male	9	20	3.42	0.559
Female	4	7		
Marital status				
Married	14	3		
Unmarried	2	2	3.067	0.216
Widow	11	8		
Site of the Lesion**				
Cortical(N=14)	2	12		
Subcortical(N=14)	9	5	-	0.007*
Both (N=12)	2	10		
Side of the lesion**				
Left (N=14)	9	5		
Right (N=15)	3	12	-	0.005*
Both (N=11)	1	10		

*p<0.05; **Fisher's Exact Test; PSD- Post-stroke depression

Forty patients were included in the study. 29 (72.5%) were males, 17 (42.5%) and 19(47.5%) individuals were married and divorced respectively, and 38 individuals belonged to the age group above 50 years.

Fourteen individuals had cortical lesions, 14 had subcortical, and 10 had both cortical and subcortical lesions. Left-sided lesions were present in 14 patients, 15 had right-sided lesions, and 11 patients had lesions on both sides.

Thirteen individuals had PSD. Among them, two were found to have severe depression, eight individuals had moderate and 3 with mild depression based on HAM D scale. (Table 1)

PSD was seen in 64% (N=9) of patients with subcortical lesions which were significantly high (p=0.006) when compared to 14% (N=2) of the patients with PSD among the cortical group. (Table 2)

64% of the patients with left-sided lesion had PSD, whereas only 20% had PSD among the right-sided group which was significant with a p-value of 0.005(Table 2)

Association of age, gender and marital status with PSD were not statistically significant. (Table 2)

DISCUSSION

A clear understanding about the site of lesion and probability to develop stoke may provide information into the neurobiology of mood disorders.[1]

In our study, there is a statistically significant association between post stoke depression and left hemisphere lesion during the subacute phase of stroke which is similar to the study done by Ying Zhang and et al.[3], but in our study, there is no significant increase in PSD among female gender as shown in the above study that result can be explained by the higher prevalence of female depressive disorders in the general population. According to an Indian study done by Pooja Rajashekaran et al.[2], the prevalence of left-sided lesion is only during the acute phase of the stroke. After three months there is no such association. A study done by Na Wei and et al. [7] showed there is a high prevalence of PSD among left-sided cortical and subcortical lesions This study was conducted in a tertiary care centre on hospitalized patients study done of depressive disorders in hospitalized patients.[4] Major depression in post-stroke period showed abnormal dexamethasone suppression test in this study 50 per cent of patients presented with PSD in first two months of stroke. According to some studies, there is no significant association between stoke and side of the lesion.[7] The current study showed a significant association between the subcortical lesions compared with the cortical lesions [Table 2] Yin Zhang et al. had shown PSD is associated with left frontal and left basal ganglia lesions during the acute phase of the stroke. According to some other studies, there was no significant association between stoke and side of the lesion.[3]

There is overlap between symptoms of stoke and depressive disorders. Fatigue, language dysfunction, sleep impairment and appetite impairment can be present in both the conditions.[3]

A German study showed there are some methodological limitations while conducting study on stroke patients. According to them, available modern techniques of lesion analysis like voxel-based symptom lesion mapping (VLSM) have to be used for PSD studies. VLSM involves the registration of individual brain images to standard space and voxel-based statistical methods. Exclusion of aphasic patients in the study of PSD can cause selection bias.[4]

Conclusion

Our study results show the high prevalence of PSD and its association with left-sided cortical and subcortical lesions. Better understanding from relationships between neurological damage and post-stroke depression may throw light on the neurobiology of mood disorders and help in prophylactic treatment. Research relating clinical features, neurotransmitters, and lesion location can shed light on the aetiology of depressive disorder.

Limitations of the study

Small sample size and excluding patients with aphasia are the main limitations of the study.

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None declared.

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