HEMISPHERIC DISTRIBUTION OF MIDDLE CEREBRAL ARTERY ISCHEMIC STROKES IN PATIENTS ADMITTED TO MILITARY HOSPITAL RAWALPINDI

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ABSTRACT

Objective: To determine the difference in the frequency of middle cerebral artery (MCA) ischemic strokes between left and right cerebral hemispheres in the adult patients admitted to the Military Hospital (MH) Rawalpindi.

Study Design: A descriptive study.

Place and Duration of Study: MH Rawalpindi from 01 Dec 2013 to 30 Mar 2014.

Patients and Methods: Seventy eight adult patients admitted to MH Rawalpindi with neurologic deficits consistent with MCA strokes and having no evidence of intracerebral haemorrhage on Computed Tomographic (CT) scan of brain. Descriptive Statistics were calculated using SPSS version 17.

Results: A total of 78 patients met the inclusion criteria of the study; 35 (45%) patients had right MCA stroke while 43 (55%) had left MCA stroke.

Conclusion: Left MCA ischemic strokes are more common than right MCA ischemic strokes.

Keywords: Ischemic stroke, Left middle cerebral artery, Right middle cerebral artery.

INTRODUCTION

The stroke is a rapidly developing clinical syndrome of focal and sometimes global loss of brain function lasting more than twenty four hours or leading to death with no apparent cause other than vascular origin. The brain is only 2% of total body weight consuming about 20% of inspired oxygen. This rich blood supply is provided by the two internal carotid and two vertebral arteries which anastomose at the base of the brain to form the circle of Willis. The internal carotid artery (ICA) bifurcates into the anterior cerebral artery and the larger MCA. The MCA supplies the lateral parts of the cerebral hemispheres. Its lenticulostrate branches supply the basal ganglia and internal capsule.

Approximately 80% strokes are due to ischemic cerebral infarction and 20% are due to brain hemorrhage. Among the ischemic strokes 50% involve the anterior circulation, 25 to the posterior circulation and the remaining 25% are lacunar infarcts. Occlusion of the MCA usually results from cardio embolism or proximal atherothrombosis.

Lateralization of MCA strokes is important in post stroke rehabilitation due to functional differences between the two hemispheres. The main purpose of this study was to determine the difference in the frequency of MCA ischemic strokes between left and right cerebral
hemispheres in the adult patients admitted to our hospital.

**PATIENTS AND METHODS**

This is a descriptive observational study conducted at MH Rawalpindi from 01st Dec 2013 to 30th March 2014. Adult patients consecutively admitted to MH Rawalpindi with clinical features consistent with MCA stroke (table) and no evidence of intracranial hemorrhage in the initial CT scan of brain were included in this study. Patients with clinical features suggestive of transient ischemic attack (TIA), intracranial hemorrhage, lacunar infarcts, bilateral infarcts, multiple infarcts, anterior cerebral artery territory infarcts and posterior circulation strokes were excluded from the study. A total of 78 patients were included in the study through non probability consecutive sampling.

A detailed history was taken at presentation and physical examination was done. In addition to an initial plain CT scan of the brain, to rule out intracranial hemorrhage at presentation, other baseline investigations including ECG, complete blood count, blood sugar, Lipid profile, LFTs, RFTs were carried out. More detailed investigations including Echocardiography, Carotid Doppler studies and in selected cases CT angiography, magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) of the brain were performed after admission. Data was analyzed using SPSS version 17 and descriptive statistics were used to describe the results.

**RESULTS**

A total of 78 patients (66 males, 12 females) met the inclusion criteria of the study. Their ages ranged from 32 years to 95 years. A total of 45% patients had right MCA stroke while 55% had left MCA stroke.

Thus left-hemispheric ischemic strokes (55%) were more common than right hemispheric ischemic strokes (45%) in the distribution of MCA in our patients.

**DISCUSSION**

The consequences of stroke range from physical disability to death and accompanying psychological, social and economic burdens. These consequences not only affect the individual and his family but also have their impact on the whole society. The sequelae of left MCA ischemic strokes differ from those of the right MCA ischemic strokes.

Without any differences in stroke severity and in the volume of the lesions, the outcome of strokes of the right MCA territory has been reported to be less favorable with higher case fatality rates than in controls. Ween et al also reported poor outcome with right hemispheric damage. One study showed that patients with right hemispheric strokes presented later to an emergency department than the left. Studies in infants and children suggest that the left hemisphere has greater metabolic demands than the right. These asymmetrical hemispheric
metabolic demands may influence neuroplasticity during the post stroke recovery.

It has been found that cerebrovascular disease has a predilection for left side resulting in more frequent left MCA infarctions than infarctions in the territory of the right MCA. The left common carotid artery is a direct branch of the aorta and cardiogenic emboli may prefer left MCA. The hemodynamic differences between the right and left carotid arteries may also result in greater atherosclerotic changes in the left carotid artery leading to more left MCA ischemic strokes.

We aimed to establish whether left and right MCA ischemic strokes are unequally distributed in our patients. In our study population 45% had right MCA strokes while 55% had left MCA strokes. Our results are comparable to data from a large hospital based stroke registry in Germany which revealed that 56% had left MCA events and 44% had right-sided lesions. DiLegge et al reported that 59% of their patients had left MCA ischemic strokes while 41% had right MCA events. In their patients right hemispheric stroke had worse clinical outcomes than left hemispheric stroke.

Naess et al reported that the patient records of young adults from five hospital registries in western Norway revealed that 58% had left hemisphere infarctions and 42% had right hemisphere infarctions. This difference was due to the higher incidence of infarction in the left MCA territory compared with the right MCA territory. Ito et al found that among their department based records of 383 cases between April 2003 and March 2006, 52% patients had left hemispheric stroke and 48% had right hemispheric stroke. These comparative data of the most common stroke groups are important in functional prognosis, rehabilitation and healthcare planning.

An increase in carotid artery intima-media thickness (IMT) coincides with risk factors such as hypercholesterolemia, hypertension and diabetes mellitus. It also correlates independently with peripheral atherosclerosis. There exists a difference between IMT of the left and right common carotid artery, with higher values on the left side which may explain predilection for cerebrovascular disease at the left side.

Aphasia is a common symptom after left hemisphere stroke. Most of the natural and traditional speech therapy facilitated recovery from aphasia occurs within the first 6 months of a stroke. The affected individuals often experience incomplete recovery even after receiving intense speech therapy.

CONCLUSION

The incidence of left MCA territory ischemic strokes is higher than the right MCA distribution in our population. Aphasia is a common symptom of left MCA stroke and affected individuals often need intense speech therapy after the acute stroke phase. There is an increasing need to develop new interventions that enhance the recovery from chronic aphasia after a stroke.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

REFERENCES