

## Original Research

# Analysis of Clinical and Radiological Profile of Patients Diagnosed as Acute Cerebrovascular Illness at a Tertiary Care Hospital

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Received: 17 April 2018

Accepted: 24 May 2018

## ABSTRACT

**Background:** Acute cerebrovascular illness is now a treatable condition that warrants urgent specialist attention. Drug treatment and specialist care both influence survival and recovery. The present study was undertaken for assessing clinical and radiological profile of patients with acute cerebrovascular illness patients.

**Materials & Methods:** A total of 50 patients with presence of acute cerebrovascular illness were enrolled. Complete demographic and clinical details of all the patients were obtained. Inclusion criteria for the present study included patients over 25 years of age with new onset stroke symptoms which were confirmed by radiological investigations. Clinical and radiological profiles of all the patients with acute cerebrovascular illness were analyzed. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Univariate analysis was done evaluation of level of significance.

**Results:** While assessing the onset of stroke, it was seen that onset was insidious in nature in 72 percent of the patients while it was sudden in the remaining 28 percent of the patients. Involvement of left middle cerebral artery, right middle cerebral artery and internal cerebral artery was seen in 62 percent, 30 percent and 8 percent of the patients respectively. Left anterior circulation was involved in 66 percent of the patients while right anterior circulation was involved in 34 percent of the patients.

**Conclusion:** From the above results, the authors conclude that the imaging protocol for stroke patients should combine plain CT, CT perfusion and CT angiography.

**Key words:** Acute Cerebrovascular Illness, Radiological.

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## INTRODUCTION

Acute cerebrovascular illness is now a treatable condition that warrants urgent specialist attention. Drug treatment and specialist care both influence survival and recovery. Stroke, a sudden neurologic deficit of presumed vascular origin, is a clinical syndrome rather than a single disease. A common and devastating condition, it causes death of one third of patients at 6 months and leaves another third permanently dependent on the help of others. Each year in the United Kingdom, 110,000 cases of first strokes and 30,000 cases of recurrent strokes occur; 10,000 strokes occur in people younger than 65 years and 60,000 people die of stroke. It is the largest cause of

disability, and more than 5% of National Health Service and social services resources are consumed by stroke patients. Correct management relies on rapid diagnosis and treatment, thorough investigation, and rehabilitation.<sup>1-3</sup>

The outcomes of cerebral ischemia are not isolated to the acute changes that occur on a tissue, cellular and molecular level, but also encompasses the resultant subacute and chronic lesion evolution. A number of imaging modalities may be utilized to reflect the pathophysiological changes and outcome of cerebral ischemia at the tissue level. The iterative refinement and versatility of these recent imaging techniques has expanded our understanding of cerebral ischemia as a

disorder from multiple perspectives. It has enabled the use of multiple modalities in the imaging of vascular lesions, blood flow and many facets of cerebral perfusion, as well as parenchyma changes demonstrating ischemic lesions, stages of evolving ischemia, consequences of ischemic injury and tissue repair that have been invaluable in advancing therapeutic management of stroke patients.<sup>4-6</sup> Hence; the present study was undertaken for assessing clinical and radiological profile of patients with acute cerebrovascular illness patients.

## MATERIALS & METHODS

The present study was undertaken for assessing clinical and radiological profile of patients with acute cerebrovascular illness patients. A total of 50 patients with presence of acute cerebrovascular illness were enrolled. Complete demographic and clinical details of all the patients were obtained. Inclusion criteria for the present study included patients over 25 years of age with new onset stroke symptoms which were confirmed by radiological investigations. Clinical and radiological profiles of all the patients with acute cerebrovascular illness were analyzed. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Univariate analysis was done evaluation of level of significance.

## RESULTS

A total of 50 patients were enrolled. The mean age of the patients was 43.9 years. Out of 50 patients, 66 percent of the patients were males while the remaining were females. While assessing the onset of stroke, it was seen that onset was insidious in nature in 72 percent of the patients while it was sudden in the remaining 28 percent of the patients. Involvement of left middle cerebral artery, right middle cerebral artery and internal cerebral artery was seen in 62 percent, 30 percent and 8 percent of the patients respectively. Left anterior circulation was involved in 66 percent of the patients while right anterior circulation was involved in 34 percent of the patients.

**Table 1: Clinical profile**

Variable	Number	Percentage
Mean age (years)	43.9 years	
Males	33	66
Females	17	34
Rural residence	29	58
Urban residence	21	42
Insidious onset	36	72
Sudden onset	14	28

**Table 2: Perfusion CT findings**

Perfusion CT findings	Number	Percentage
Involvement of left middle cerebral artery	31	62
Involvement of right middle cerebral artery	15	30
Involvement of internal cerebral artery	4	8
Total	50	100

**Table 3: CT findings in relation to type of circulation**

Type of circulation	Number	Percentage
Left anterior circulation	33	66
Right anterior circulation	17	34
Total	50	100

## DISCUSSION

Stroke is a type of cerebrovascular disease that involves the vessels of the central nervous system. It usually occurs with sudden onset due to a burst of cerebral arteries, hemorrhage, or occlusion by a thrombus or other particles, leading to ischaemia and to focal brain dysfunction. Immediately, nerve cells depleted of oxygen in the involved vascular territory will be functionally disturbed and die if the circulation is not promptly restored. Two main mechanisms leading to ischaemic stroke are occlusion and haemodynamic impairment. These two situations decrease the cerebral perfusion pressure and eventually lead to cellular death. The brain blood flow can be maintained by autoregulation of cerebral arteries and collateral circulation within certain limits. When occlusion of an artery develops, blood flow in the periphery of the infarct core is usually reduced but there still remains sufficient to avoid structural damage, so that the functional modifications of cells may be reversible if circulation is restored. This ring-like area of reduced blood flow around the ischaemic center of infarct has been termed penumbra as an analogy of the half-shaded part around the center of a solar eclipse.<sup>6-10</sup> Hence; the present study was undertaken for assessing clinical and radiological profile of patients with acute cerebrovascular illness patients.

A total of 50 patients were enrolled. The mean age of the patients was 43.9 years. Out of 50 patients, 66 percent of the patients were males while the remaining were females. While assessing the onset of stroke, it was seen that onset was insidious in nature in 72 percent of the patients while it was sudden in the remaining 28 percent of the patients. Monteiro J et al evaluated the associated diseases and determined their prevalence and incidence in two different types of cerebrovascular disease: intracerebral hemorrhage (HI) and ischaemic events (AI). The studied population included 54 men and 52 women with a mean age of 66.8 +/- 10.3 years. A clinical examination was performed in all patients by different specialists and all were submitted to diverse complementary tests, including a computed tomography scan of the brain (TAC) and an echocardiogram (ECO). They found 24 (23%) HI and 82 (77%) AI. In the past history, previous strokes were more prevalent in AI (p less than 0.01). Heart disease was present in 87 (82%) patients but, among them, only atrial fibrillation which was found in 19 (18%) patients, was significantly more frequent in AI (p less than 0.02). Hypertension (HTA) existed in 79 (75%) patients, respiratory complications and periferic vascular disease in 9 (8%), diabetes in 44 (42%) and dyslipidemia in 31 (29%) patients. No significant difference was found between the two groups of strokes regarding these diseases; however, there was a tendency for HTA and diabetes to be more prevalent in HI and for periferic vascular disease in AI. In the blood tests, high haematocrit was found in 35 (33%) patients, anemia in 21 (20%), hypercholesterolemia in 17 (16%), hypertriglyceridemia in 18 (17%) and uremia or creatinemia or ionic alteration in 32 (30%) patients, without any difference in

their prevalence and incidence in the two groups of strokes. In conclusion, in this prospective study of patients with an acute stroke, there was 23% of HI and 77% of AI, a high prevalence of previous stroke, heart disease and HTA, but only the previous stroke and, within heart disease, the atrial fibrillation were significantly more frequent in the AI group.<sup>11</sup>

In the present study, involvement of left middle cerebral artery, right middle cerebral artery and internal cerebral artery was seen in 62 percent, 30 percent and 8 percent of the patients respectively. Left anterior circulation was involved in 66 percent of the patients while right anterior circulation was involved in 34 percent of the patients.

The advent of perfusion imaging has led to a further understanding of cerebrovascular physiology in the progression of neurologic disease, as functional perfusion deficits may often precede structural abnormalities currently associated with disease. The variable severity of cerebrovascular disease manifestation in elderly patients has generated interest in understanding predictors of resilience of the vascular tree, or cerebrovascular reserve (CVR) as often described in the literature. CVR is a term used to describe the capacity of the brain to maintain adequate cerebral blood flow in the setting of decreased perfusion pressure or decreased incoming blood volume. CVR can be evaluated by a number of functional imaging techniques, with the general principle requiring measurements of cerebral blood flow at baseline and after a vasodilatory challenge such as increased CO<sub>2</sub> inhalation or pharmacologic challenge with acetazolamide. Reduced or no increase in CBF after such a vasodilatory challenge implies exhaustion of the cerebrovascular reserve and has been associated with an increased risk of stroke or TIA in a number of prospective studies. TCD has been long used as surrogate marker of CVR, with changes in MCA velocity after vasodilatory stimulus (proportional to a patient's CVR). More recent techniques have utilized tissue level perfusion measures such as nuclear medicine flow studies as well as CT and MRI perfusion before and after a vasodilatory stimulus (Aliev G et al, Kuwabara Y et al).<sup>12-16</sup>

## CONCLUSION

From the above results, the authors conclude that the imaging protocol for stroke patients should combine plain CT, CT perfusion and CT angiography.

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