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Original research article

Study on risk factors, clinico-radiological profile and the outcome in acute cerebrovascular illness patients: Observational study

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Abstract

Background and Objectives: Stroke is a catastrophic and disabling cerebrovascular disease that leaves survivors with varying degrees of disability and often results in financial devastation. The purpose of this research was to examine the causes of acute cerebrovascular accidents in a high-level medical facility.

Material and Methods: 100 patients participated in this study, which was prospective and used descriptive observation. This research was performed between August 2022 and July 2023 at the Department of General Medicine, Shri Sathya Sai Medical College and Research Institute, Kancheepuram, Tamil Nadu. All eligible patients who presented with acute stroke during the study period and who were willing to take part in the study were included.

Results: This study employed an analytical methodology to evaluate the risk factors, clinical and radiological characteristics, as well as the result and factors that influence the outcome in individuals diagnosed with acute cerebrovascular illness. The data acquired from the chosen participants were internally compared and subjected to statistical analysis using descriptive and inferential statistics, in accordance with the study's defined objectives.

Conclusion: Hemorrhage is associated with a higher mortality rate and rate of presentation on CT than infarct. When compared to MCA/ACA vessel involvement, the risk and incidence of death are higher in patients who present with involvement of the posterior circulation.

Keywords: Clinico-radiological, acute cerebrovascular, observational study

Introduction

India's spectacular economic and demographic transformations in recent years have led to a shift from infectious and nutritional deficiency diseases associated with poverty to cardiovascular and cerebrovascular disorders associated with poor dietary and exercise habits. Stroke, also known as cerebro-vascular disease, is a non-communicable condition that is becoming more economically and socially significant in our nation's aging population [1, 2]. Stroke is still the second leading cause of death worldwide, according to the World Health Organization. The future stroke burden in South Asian countries will be fueled by population shifts, urbanization, and increased exposure to main risk factors [3, 4].

Stroke is a serious and disabling cerebrovascular illness that can leave some victims with permanent disabilities and a lifetime of financial hardships. The absolute numbers of persons experiencing a first stroke, stroke survivors, stroke-related fatalities, and disability-adjusted life years lost in 2010 were high and had increased dramatically since 1990, with the majority of the burden occurring in low-and middle-income countries. In 2010, 5.2 million, or 31%, of strokes were in children and young and middle-aged people; of these, roughly 74,000 and 4.0 million were in children and young and middle-aged adults from low income and middle income nations, respectively [5-7].

Stroke is expected to become a major health problem in India, with the National Commission on Macroeconomics and Health predicting that 1.67 million strokes will occur in the country by 2015. The rapidly shifting lifestyles and population reshaping may be to blame for this. Other contributing factors include the high rates of hypertension, diabetes and dyslipidemia [8, 9]. Stroke is a major contributor to health care expenses due to its prevalence and the high amount of money needed to treat each individual patient. As a result, stroke and its aftereffects should be considered seriously by policymakers, insurers, and providers of health care worldwide [10].

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Stroke prevention will be a very cost-effective technique due to the high costs of treatment and the economic ramifications of lost productivity. It has been proven time and time again that a sequence of assaults to the brain and the circulatory system leads to stroke. These indicators not only predict when a stroke will happen, but also which kind of stroke and how severe it will be. Stroke risk factors vary with age, gender and ethnicity and even within the same population. By analyzing these danger indicators, we can create effective stroke prevention plans. More research from developing countries like India is necessary because most studies are conducted on populations in developed countries. Different communities and areas inside India also have vastly different lifestyles from one another. If we want to confidently evaluate the stroke indices in our population, we need studies conducted in south India itself [11-13].

Stroke types also differ from one another in terms of their clinical manifestations. A hemorrhagic lesion is more likely to be the cause of symptoms including loss of consciousness and seizures. Furthermore, lesions at different sites result in distinct clinical manifestations. The purpose of this study is to characterize the stroke patient population from a clinical standpoint. The research population's eventual outcome will also be revealed. We can evaluate how different these data are from western data with the use of this information [14-16]. Examine the role of the vasculature in causing sudden CVA. In order to evaluate the variables that influence stroke recovery while in the hospital.

Materials and Methods

100 patients participated in this study, which was prospective and used descriptive observation. This research was performed between August 2022 and July 2023 at the Department of General Medicine, Shri Sathya Sai Medical College and Research Institute, Kancheepuram, Tamil Nadu. All eligible patients who presented with acute stroke during the study period and who were willing to take part in the study were included.

Inclusion criteria

- All patients over 20 years with new onset stroke symptoms which were confirmed by radiological investigations.

Exclusion criteria

- Under-20-year-old patient.
- Todd's palsy.
- Traumatic brain damage.
- Infectious etiology.

Methodology

A thorough clinical history and physical examination was performed on all research participants. Relatives were interviewed to collect clinical history when the patient exhibited symptoms of altered sensorium, loss of consciousness, and slurred speech. Risk factors, clinic radiological profile, and outcome in individuals with acute cerebrovascular illness were analyzed using an evidence-based method. With predetermined goals in mind, we compared and analyzed data from 100 study participants using descriptive and inferential statistics.

Statistical analysis

Both descriptive statistics and appropriate statistical tests for comparison were performed on all data. The categorical variables were analyzed using the chi-squared test while the continuous variables were analyzed using the Unpaired t test. The odds ratio and 95% confidence interval were determined by a regression analysis. P 0.05 was considered significant in all statistical analyses. The information was analyzed with SPSS 16. Charts were made in Microsoft Excel 2010.

Results

The study aimed to assess a cohort of patients diagnosed with acute cerebrovascular illness in order to identify and evaluate their risk factors, clinico-radiological profile, outcome, and factors that may influence their overall prognosis. In accordance with the planned objectives of the study, the data collected from the sampled participants were compared and subjected to statistical analysis utilizing both descriptive and inferential statistics. The subsequent results are derived from a study encompassing a collective of 100 participants.

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Table 1: Outcome of the study groups

Sr. No.	Outcome Study Groups	No.	(%)
1.	Complete Recovery	11	11.00
2.	Partial Recovery	80	80.00
3.	Death	9	9.00
	Total	100	100.00

In the current investigation, it was seen that 80% of the participants experienced partial recovery, while 11% achieved total recovery during their hospitalization. Additionally, 9% of the patients unfortunately succumbed to their condition while still in the hospital.

Table 2: Age of the patients

Sr. No.	Age	No.	%
1.	≤ 40 years	9	9.00
2.	41-60 years	38	38.00
3.	61-80 years	44	44.00
4.	81-100 years	9	9.00
	Total	100	100.00

Stroke was more likely among people aged 61 to 80 in the study. Young patients only accounted for 9% of those diagnosed with stroke. The table shows the age distribution of the individuals that were divided into groups according to the results. The majority of people in the full recovery group were middle-aged, with a mean age of 60.00 years. According to the results of a one-way analysis of variance (ANOVA), there is no statistically significant correlation between patients' ages and their outcomes in cases of acute cerebrovascular illness.

Table 3: Gender of the patient

Sr. No.	Gender	No.	%
1.	Male	61	61.00
2.	Female	39	39.00
	Total	100	100.00

This study found that the prevalence of stroke was higher among males compared to females, with 61% of patients being male and 39% being female.

Table 4: Onset of Stroke

Sr. No.	Onset	No.	%
1.	Sudden	33	33.00
2.	Insidious	67	67.00
	Total	100	100.0

Stroke was more likely to have a gradual onset than an immediate onset in this study. The sudden onset of stroke table illustrates the categorization of participants into categories according to the suddenness of stroke and symptoms. The data show that the vast majority of patients in the three treatment groups did not experience a quick onset of stroke symptoms.

Patients who experienced a sudden start of stroke were more likely to make a full recovery compared to those who made only a partial recovery, and to avoid death altogether if they made a full recovery compared to those who did not. Subjects were categorized into several outcome groups based on their clinical signs and symptoms, as shown in the clinical history table. The majority of participants in the death group, the partial recovery group, and the group that saw just a partial recovery all showed signs of motor weakness.

Discussion

The diagnostic status between the result groups in our study exhibited a statistically significant level of significance. This is demonstrated by the higher proportion of patients identified with hemiparesis in the complete recovery group as opposed to the partial recovery and death groups. The prevalence of hemiparesis was found to be 47% greater in the complete recovery group compared to the partial recovery group, and 69% higher in the complete recovery group compared to the death group. The statistical chi squared test was used to the data, which indicated a statistically significant correlation between CT diagnosis and outcome in patients with acute cerebrovascular illness. The occurrence of infarct type of stroke is lower in the complete recovery group compared to the partial recovery group, whereas it is higher in the complete recovery group compared to the death group [17, 18].

There is a higher occurrence of involvement in the middle cerebral artery among those participating in

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recovery groups, both in whole and partial forms, as opposed to those in the death group. Conversely, there is a greater prevalence of involvement in the posterior inferior cerebellar artery among individuals in the death group in comparison to those in the recovery groups. The incidence of stroke was found to be higher among individuals aged 61 years and above, with this age group accounting for 44% of all cases within the study population. The incidence of stroke in young individuals was seen to be limited to a mere 9% of the patient population. This finding has resemblance to a study conducted by Vaidya CV *et al*., wherein the age group of 61-70 years emerged as the most prevalent. The mortality rate was higher among males, however, there was no statistically significant difference observed between genders in relation to stroke outcomes [18-20].

The current study found that the occurrence of stroke with gradual onset was more prevalent compared to stroke with abrupt onset. There is a higher prevalence of patients experiencing sudden onset of stroke in the complete recovery group when compared to both the partial recovery group and the death group. Additionally, the complete recovery group also exhibits a higher incidence of sudden stroke onset compared to the death group. The most often seen symptom at presentation in my study was motor weakness. The aforementioned study conducted by Nagaraja *et al*., [21] proposed that motor weakness was the most prevalent clinical characteristic in around 82% of the patients, therefore bearing resemblance to the current investigation. The study findings indicate a lower occurrence of motor weakness in the complete recovery group compared to the partial recovery group, and a higher occurrence of motor weakness in the complete recovery group compared to the death group. A study conducted by Vaidya CV *et al*., colleagues yielded comparable results in 72.6% of the patient population. Patients who exhibit a clinical history characterized by symptoms such as headache, vomiting, dizziness, and gait disruption are at a higher risk and experience a greater rate of mortality as compared to individuals presenting with symptoms of numbness and slurring of speech [22, 23].

The complete recovery group exhibited a higher prevalence of atrial fibrillation compared to both the partial recovery and death groups, therefore indicating an elevated risk factor for this condition. In the present investigation, it was shown that 33.5% of the patients exhibited a normal Body Mass Index, whereas Kuriakose *et al*., reported a prevalence of 20.3% for normal BMI in their study. The current study found a prevalence of obesity in 32.5% of patients, although Kuriakose *et al*., reported a greater prevalence in their study. However, the findings indicated a lack of substantial correlation between the distribution of BMI and patient outcomes [19, 20, 24].

The current study observed a prevalence of tobacco usage among males at 41.8%. This finding exhibits a level of similarity to the research conducted by Nagaraja *et al*., The prevalence of alcohol consumption among males in the study was found to be 27.5%, which aligns with the findings reported by Nagaraja *et al*., The analysis demonstrated a statistically significant correlation between the combined impact of smoking and alcohol consumption and the outcome in individuals diagnosed with acute cerebrovascular illness [25, 26].

The study observed that a significant proportion of the patients exhibited cerebral infarction. A prevalence rate of 19.5% was noted for hemorrhagic stroke among patients diagnosed with intraparenchymal bleed and subarachnoid hemorrhage. The research conducted by Pandian *et al*., revealed that 68% of the participants experienced an infarct, whereas the remaining 32% suffered from a hemorrhagic stroke [27, 28].

Patients who are diagnosed with hemorrhage on CT scans exhibit a higher risk and occurrence of mortality in comparison to those diagnosed with infarct. The results of this study closely align with the data reported by Vaidya CV *et al*., where 74.6% of participants exhibited ischemic stroke and 22.9% experienced hemorrhagic stroke. This finding has resemblance to the research conducted by Nagaraja *et al*., wherein 73.8% of the participant's experienced ischemic stroke, 13.7% suffered from intra-cerebral hemorrhage, and 1.4% encountered subarachnoid hemorrhage [29, 30].

In the current study, it was observed that participation of the MCA territory was more prevalent, which was similar to the majority of cases where MCA territory involvement was present. The analysis of the data indicated a higher occurrence of involvement of the middle cerebral artery in recovery groups, as compared to the death group. Additionally, there was a higher incidence of involvement of the posterior inferior cerebellar artery and posterior cerebral artery in the death group, as compared to the recovery groups [30-32].

Conclusion

The following was determined by comparing the outcomes of the full-recovery, partial-recovery and death groups using a matched-pairs approach. There is a higher mortality rate among hemiplegic patients compared to hemiparetic ones. Patients who report symptoms like headache, vomiting, dizziness, and gait instability upon presentation have a higher risk and incidence of death compared to those who report symptoms like numbness and slurring of speech. Patients with comorbidities such as atrial fibrillation have a better chance of making a full recovery. The mortality and CT presentation rates are both higher in cases of hemorrhage than in cases of infarct. Patients who present with posterior circulation involvement have a higher risk of and incidence of death compared to those who present with

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MCA/ACA vascular involvement. The prototypical high-risk patient is one who has suffered an acute cerebrovascular event.

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