

Original Article

Role out of CT scan in the Suspected Cerebral Ischaemic Stroke Patients Attended in the Department of Neurology in a Tertiary Level Hospital

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ABSTRACT

Introduction: Cerebral ischemic stroke remains one of the leading causes of disability and death worldwide, accounting for about 85% of the total stroke burden. The cornerstone of treatment involves early and accurate diagnosis to initiate timely treatment to reduce mortality and improve long-term outcomes. Among the diagnostic tools, CT scans have become the first-line imaging modality in stroke management because of their ready availability and fast provision of results. **Methods & Materials:** This was a descriptive type of cross-sectional study conducted at the Department of Neurology in Chittagong Medical College and Hospital, Chattogram, Bangladesh during December, 2023 to May, 2024. A series of 131 suspected ischaemic stroke cases irrespective of sex, aged above 32 years, were included in this study using consecutive sampling method. **Results:** A series of 131 suspected

ischaemic stroke cases were included in this study. The mean age of the patients was 60.34 ± 10.45 years and the most frequent age group was 62-71 years which includes 41(31.29%) patients. The majority of the patients 74 (56.48%) were male, and 57 (43.51%)

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were female. The majority of the patients 38(29.00%) were businessman and the most frequent 69 (52.67%), belonged to the lower socio-economic condition. **Conclusion:** This study investigated that the majority of the patients (73.28%) had ischaemic stroke, 26 (19.84%) patients had intracerebral hemorrhage, 3(2.29%) patients had subarachnoid hemorrhage and 6(4.58%) patients were diagnosed normal. The most common risk factors contribute to cerebral stroke were hypertension, diabetes mellitus, and the most prevalent clinical presentations included hemiplegia aphasia, and gait disturbances. These findings highlight the need for targeted interventions in high-risk groups.

Keywords: Role, CT scans, Suspected, Cerebral, Ischaemic, Stroke, Patients.

INTRODUCTION

Cerebral ischemic stroke remains one of the leading causes of disability and death worldwide, accounting for about 85% of the total stroke burden^[1]. The cornerstone of treatment involves early and accurate diagnosis to initiate timely treatment to reduce mortality and improve long-term outcomes^[2]. Among the diagnostic tools, CT scans have become the first-line imaging modality in stroke management because of their ready availability and fast provision of results^[3]. In this respect, CT scans are critical in distinguishing ischemic from hemorrhagic strokes and allowing rapid therapeutic decisions^[4]. CT scans generally remain the first line due to speed and availability in many emergency departments^[5,6]. In particular, the ability of CT scans to exclude hemorrhage in acute stroke patients is critical for determining eligibility for thrombolytic therapy^[2]. CT, however, has a rather limited diagnostic potential for ischemic stroke, especially during the hyperacute stage of the event. Ischemic changes may not be evident early and require follow-up studies for confirmation of infarction^[7]. Yet, early signs such as hyperdense artery, loss of

gray-white matter differentiation, and sulcal effacement can be subtle indicators of ischemic stroke^[8,9]. In the tertiary hospital where the management of stroke relies on quick decision analysis, CT gives useful information, CT scans provide valuable information for managing stroke patients. Studies show that while MRI might detect smaller infarcts earlier, CT remains the workhorse for initial stroke imaging due to its speed and ability to rule out hemorrhage^[10,11]. Moreover, advanced CT techniques like CT perfusion and CT angiography have further enhanced its diagnostic accuracy for ischemic strokes^[11]. The role of CT in stroke management extends beyond diagnosis. It is instrumental in guiding treatment plans, particularly for patients eligible for intravenous thrombolysis or endovascular procedures^[12]. Since the rapid initiation of treatment plays a pivotal role in reducing infarct size and therefore improving prognosis, the role of computed tomography in the treatment of stroke patients is indispensable^[13]. However, there are very few studies and limited data regarding the role of CT scans in the detection of cerebral stroke, especially

on the suspected cases of ischaemic stroke in southeastern region of Bangladesh. This paper aimed to determine the role of CT scans in the detection of cerebral stroke among the suspected cases of ischaemic stroke patients attended in the department of Neurology in a tertiary level hospital of southeastern Bangladesh.

METHODS & MATERIALS

This was a descriptive type of cross-sectional study conducted at the Department of Neurology in Chittagong Medical College and Hospital, Chattogram, Bangladesh during December, 2023 to May, 2024. Written informed consent was obtained from the patients' legal guardian or care givers and a series of 131 suspected ischaemic stroke cases irrespective of sex, aged above 32 years, were included in this study using consecutive sampling method. The diagnostic procedure involved neuroimaging (CT scans), which specified the type of stroke. The patients' demographic, clinical, laboratory records and CT scans reports were reviewed and the data were collected using a pre-structured questionnaire and a case record form. The collected data were methodologically arranged and entered into computer for analysis. The data were analyzed using Statistical Package for Social Sciences (SPSS) software, version 23.0. Descriptive statistical analysis was performed and the results were presented in tables and charts as frequency and percentage. The inclusion and exclusion criteria of this study were as follows:

Inclusion Criteria:

- Age: 32 years and above
- Gender: Both male and female
- Suspected cases of ischaemic cerebral stroke
- Willingness to participate in the study.

Exclusion Criteria:

- Non-diagnosed cases of cerebral stroke.
- Patients with incomplete medical records.
- Patients with previous stroke history.
- Age: Below 32 years.

RESULTS

Table I presents the demographic characteristics of the study patients. The most frequent 41(31.29%) patients were aged between 62-71 years, followed 36 (27.48%) 52-61 years, 29 (22.13%), 42-51 years, 17 (12.97%) 72-80 years, 8 (6.10%), 32-41 years. The mean age of the patients was 60.34±10.45 years. The majority of the patients 74 (56.48%) were male, and 57 (43.51%) were female. In terms of residential status, most frequent 86(65.64%) patients were from rural areas and 35 (26.71%) were from urban areas. Occupational status revealed that the majority of the patients 38(29.00%) were businessman and followed 31(23.66%) farmer 26(19.84%), self-employed, 26(16.03%) teacher, 15(11.45%) government employee. The majority of the patients, 69 (52.67%), belonged to the lower class followed 51 (38.93%) middle class, 11(8.39%) upper class.

Table – I: Distribution of Demographic Characteristic of the Study Subjects (n=131)

Age groups (years)	Frequency	Percent
32-41	8	6.1
42-51	29	22.13
52-61	36	27.48
62-71	41	31.29
72-80	17	12.97
Total	131	100
Mean age(years)	60.34±10.45	
Sex		
Male	74	56.48
Female	57	43.51
Total	131	100
Residential status		
Urban	35	26.71
Rural	86	65.64
Total	131	100
Occupation		
Government employee	15	11.45
Teacher	21	16.03
Self-employed	26	19.84
Farmer	31	23.66
Businessman	38	29.00
Total	131	100
Socio-economic status		
Upper	11	8.39
Middle	51	38.93
Lower	69	52.67
Total	131	100

Table II presents the risk factors associated with the study patients. The most common risk factor was hypertension (HTN), affecting 84 (64.12%) patients, followed diabetes mellitus (DM) 62 (47.32%) smoking 52 (39.69%), hypercholesterolemia 19 (14.50%), cardiovascular disease 8 (6.10%), hypercholesterol 2 (1.52%).

Table – II: Distribution of risk factors associated with the study subjects (n=131)

Risk factors	Frequency	Percent
Diabetes Mellitus (DM)	62	47.32
Hypertension (HTN)	84	64.12
Smoking	52	39.69
Hypercholesterolemia	19	14.5
Cardiovascular disease	8	6.1
Hypercholesterol	2	1.52
Total	131	100

Table III presents the clinical presentation of the study patients. The most common clinical feature was hemiplegia, observed in 114 (87.02%) patients, followed by aphasia affected 51 (38.93%), gait disturbance and vertigo were each reported by 28 (21.37%), vomiting 25 (19.08%), headache 11 (8.39%).

Table - III: Distribution of Clinical Presentation Associated with the Study Subjects (n=131)

Clinical Presentation	Frequency	Percent
Hemiplegia	114	87.02
Gait disturbance	28	21.37
Vertigo	28	21.37
Aphasia	51	38.93
Vomiting	25	19.08
Headache	11	8.39
Total	131	100

Table IV presents the diagnosis results of the study patients. The majority of the patients, 96 (73.28%), were diagnosed with infarcts, followed by 26 (19.84%) intracerebral hemorrhage, 3(2.29%), subarachnoid hemorrhage and normal 6(4.58%).

Table - IV: Distribution of Diagnosis Results by CT scan of the Study Subjects (n=131)

Diagnosis	Frequency	Percent
Infarcts	96	73.28
Intracerebral hemorrhage	26	19.84
Subarachnoid hemorrhage	3	2.29
Normal	6	4.58
Total	131	100

Table V presents the infarcts in the vascular territory of the study patients. The most affected area was the middle cerebral artery (MCA), with 42 (43.45%) patients, followed patient-controlled analgesia (PCA) 21(21.87%), lacunar

infarcts 19(19.79%), anterior cerebral artery (ACA) 8(8.33%), multiple infarcts 4(4.16%) and watershed infarcts 2(2.08%).

Table - V: Infarcts in vascular territory of the study subjects (n=96)

Infarcts in vascular territory	Frequency	Percent
MCA	42	43.45
PCA	21	21.87
ACA	8	8.33
Watershed infarcts	2	2.08
Lacunar infarcts	19	19.79
Multiple infarcts	4	4.16
Total	96	100

MAC: Middle Cerebral Artery; **PAC:** Patient Controlled Analgesia; **ACA:** Anterior Cerebral Arter

DISCUSSION

This study employed a series of 131 suspected ischaemic stroke cases to determine the cerebral stroke by CT scans. This study found that the most frequent age group was 62-71 years which includes 41(31.29%) of the study subjects and the mean age of the patients was 60.34±10.45 years. The majority of the patients 74 (56.48%) were male and most frequent 86(65.64%) patients were from rural areas. This study revealed that the majority of the patients 38(29.00%) were businessman and the majority of the patients, 69 (52.67%), belonged to the lower class. These demographic features of the study subjects revealed that most of the people

aged post 60 years are vulnerable to have ischaemic stroke symptoms and the male dominance more than that of their counterpart female. Moreover, the country people are more affected to ischaemic stroke than that of city people and the businessman and people belong to the lower class suffered much by ischaemic stroke comparably than that of other occupation and socio-economic condition in the society. Another study conducted in Bangladesh found that out of 100 patients 29% were in between 51-60 years age group & 72% were male and 28% were female patients, 20% businessman, and 63% patients were from low income socio-economic society which are in the lineage of this present study^[14]. This study found that the most common risk factor was hypertension (HTN), affecting 84 (64.12%) patients, followed diabetes mellitus (DM) 62 (47.32%) smoking 52 (39.69%), hypercholesterolemia 19 (14.50%), cardiovascular disease 8 (6.10%), hypercholesterel 2 (1.52%). Another study found that the majority of the stroke patients had hypertension (79.2%), followed by dyslipidemia (38.9%), tobacco use in any form (37.2%), diabetes (28.8%), and ischemic heart disease (20.1%) which are persistent with this present study^[15]. This present study observed that the most common clinical feature was hemiplegia, observed in 114 (87.02%) patients, followed by aphasia affected 51 (38.93%), gait disturbance and vertigo were each reported by 28 (21.37%), vomiting 25 (19.08%), headache 11 (8.39%). Another study found that the most common clinical presentation was

headache complained by 75.0% of the patients followed by aphasia 60.3% and hemiparesis 53.4%^[16] which is comparably higher ratio to some extent of our findings. This may be happened due to our purposive small sample size. Among the suspected cases this present study finally revealed that by CT scans reports, the majority of the patients, 96 (73.28%), had infarcts, followed by 26 (19.84%) intracerebral hemorrhage, 3(2.29%), subarachnoid hemorrhage and 6(4.58%) patients were diagnosed normal and among the infarcts cases(n=96), the most affected area was the middle cerebral artery (MCA), with 42 (43.45%) patients, followed patient-controlled analgesia (PCA) 21(21.87%), lacunar infarcts 19(19.795), anterior cerebral artery (ACA) 8(8.33%), multiple infarcts 4(4.165) and watershed infarcts 2(2.08%). Almost similar observation was noted in some other studies^[17-20].

Limitations of the Study

This s was a single center study with a limited sample size conducted over a short study period. Therefore, the results of this study may not reflect of the whole country.

Conclusion

This study investigated that the majority of the patients (73.28%) had ischaemic stroke, 26 (19.84%) patients had intracerebral hemorrhage, 3(2.29%) patients had subarachnoid hemorrhage and 6(4.58%) patients were diagnosed normal. The most common risk factors contribute to cerebral stroke were hypertension, diabetes mellitus, and the most prevalent clinical presentations

included hemiplegia aphasia, and gait disturbances. These findings highlight the need for targeted interventions in high-risk groups.

Recommendations

To decrease stroke rates and improve recovery, it's important to better manage high blood pressure and diabetes, especially in middle-aged adults. Providing more rehabilitation for stroke survivors and raising awareness about stroke risks factors may also help improve stroke patients' outcomes.

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Conflict of Interest

The authors declare no conflict of interest.

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