



## CLINICAL PROFILE, COMPUTED TOMOGRAPHY FINDINGS AND OUTCOME OF STROKE PATIENTS IN A TERTIARY CARE HOSPITAL

### Neurology

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### ABSTRACT

**Background:** Stroke is a huge public health concern. Presenting clinical features and findings, time of onset and time taken to seek health care facilities, CT findings and treatment modalities either directly or indirectly affects the outcome of stroke. Though all these were known to have impact on the outcome, many times all these were brought to light. Hence, this study was planned.

**Objectives:** To assess, clinical profile, computerized tomography findings and treatment outcome among the patients with stroke.

**Methods:** Prospective study was conducted among patients admitted in department of Neurology and general medicine in Meenakshi Medical College Hospital and Research Institute, Kanchipuram during the period of November 2016 to November 2017. All patients above the age of 15 years, who presented with clinical features suggestive of stroke, were subjected to CT scan of brain and patients with evidence of acute ischemic infarct were included. Patients with hemorrhagic stroke and CT imaging showing venous infarcts were excluded. 490 patients were included and data was collected and analyzed using SPSS version 16.

**Results:** Mean age of participants was 54.6+11.4 years. Left hemiparesis, aphasia and dysarthria were noted in 55.46%, 29.8% and 39.7% of patients. 56.53% of patient had noted stroke on awakening. Only 4.4% of patients reached the hospital within three hours of onset of stroke. MCA, PCA and ACA were involved in 77.55%, 8.57% and 4.9% of total infarcts. 64.29% of patients had mild to moderate stroke (mRS grading). Mortality rate was 6.93% on tenth day of stroke onset.

**Conclusion:** Though clinical picture was similar to other studies, the time duration between onset of stroke and hospitalization and CT scan taken were poor. Also, the significant difference in outcome among the heparin group and non heparin group was noted only in patients with less severity grades of stroke.

### KEYWORDS

Stroke, Clinical Profile, Ct Findings, Outcome

#### Introduction

The World Health Organization defines the Stroke in an adult as “rapidly developing clinical symptoms and signs of focal (at times global) disturbance of cerebral function, lasting for more than 24 hours or leading to death with no apparent cause other than that of vascular origin” [2]

Stroke is a huge public health concern because of its high morbidity and disability. It is the second commonest cause of mortality and the most common cause of morbidity. The prevalence rate of stroke in India is 545 per 100,000 [3]. Also studies showed that the age-adjusted annual incidence rate in India is 105/100,000 in the urban community and 262/100,000 in a rural community [4] [5].

The Clinical features of the ischemic stroke depend upon the extent and severity of involvement of specific arteries. Time and Mode of onset of the stroke might help us to determine the etiology. A large number of risk factors for stroke have been described, a reflection of the heterogeneity of the disease. Only 2% of ischemic strokes enter into the medical attention with in the golden time window i.e. three hours of onset of stroke.

Neuro imaging, especially CT Scan Brain and MRI Brain helps to confirm the ischemic strokes, rule out the stroke mimics, to find out the involved arterial territory and its extent and the pattern of involvement. Another novelty is that stroke is no more considered as unavoidable and untreatable. There is now a clear consensus that stroke is an emergency and that specialized units and teams will improve the outcome and may lower the costs. Also with respect to treatment, the role of heparin in the management of acute ischemic stroke is still controversial. Many studies continue to show no proven benefits. Thus, this study was planned to assess the clinical profile, neuro imaging and outcome of stroke.

#### Aims of the study

To assess, clinical profile, computerized tomography findings and treatment outcome among the patients with stroke.

#### Subjects and Methods

This prospective observational study was conducted among the patients admitted in department of Neurology and general medicine in Meenakshi Medical College Hospital and Research Institute, Kanchipuram during the period of November 2016 to November 2017. All the patients above the age of 15 years, who presented with clinical features suggestive of stroke, were subjected to CT scan of brain and patients with evidence of acute ischemic infarct were included in this study. Patients with hemorrhagic stroke and CT imaging showing venous infarcts were excluded from the study. In total, 490 patients were included in this study. This study was approved by Institutional Ethical Committee of Meenakshi Medical College Hospital and Research Institute, Kanchipuram.

All patients with history and clinical features of stroke were investigated with CT brain plain and among them patients with evidence of acute ischemic infarct were contacted and after getting an informed and written consent from the patients or their relatives, patients were included in this study. Clinical history of the patients including age, sex, and history related to risk factors like hypertension, diabetes mellitus, past history of TIA, hypercholesterolemia, valvular heart disease, smoking and alcoholism were collected using a proforma. Also, history of the stroke including the time of onset of stroke, its relationship with activity and the mode of the onset were collected.

Each patient was examined thoroughly. The side of the Hemiparesis, associated facial weakness, presence of aphasia or dysarthria, sensory deficit, visual deficit, lower cranial nerve involvement, cerebellar involvement and the severity of the stroke based on the NIHSS were documented. All the details were collected and examinations were done by the principal investigator. Also the patients underwent serum lipid profile, blood glucose and cardiac evaluation with ECG, ECHO and MRI Brain was done if necessary.

Then a proportion of patients who did not have any medical or neurological contraindications for heparin were given a course of injection heparin 5000 IU intravenously or subcutaneously twice daily

was given for one week to 10 days.

The treatment outcomes of all patients were assessed on the 10th day of onset of stroke based on modified Rankin Score. This score assesses functional independence and impact on activities in daily living and grades patients from 0 (no symptoms) to 6 (death). Test of Proportion (Z test) was applied to look for any statistical significance between these two groups. Mortality rate was also assessed in all patients on or before tenth day of onset of stroke.

The data was entered using Microsoft excel and the analysis was done using Statistical Package for Social Sciences (SPSS) version 16. Descriptive statistics was done and presented in tables and z test was done to compare proportion of two groups.

## Results

The mean age of the stroke patients was  $54.6 \pm 11.4$  years. The maximum number of patients were in the age group between 51 and 60 years (36.94%) followed by the age group between 41 and 50 (24.48%), 61 and 70 years (24.29). There were 55.9% were males and 44.1% were females among the 490 patients. Also there were 65.71% and 44.08% were hypertensive and diabetic, respectively and 44.28% and 40.40% gave history of smoking and alcohol consumption, respectively.

Majority of the participants (56.53%) noticed the symptoms of stroke immediately on awakening and 22.04% and 21.43% of patients had stroke at rest and during activities, respectively. In this study, mode of onset of stroke was documented among those who had stroke while they were awake (during working and rest). Of the 213 patients, stroke onset was sudden and acute in 163 (76.53%) patients and stepwise gradual progression was reported by 41 patients (19.25%) and only 9 (4.22%) patients reported fluctuating weakness. It could not be defined clearly in the remaining 277 (56.53%) patients who noticed stroke immediately on awakening.

Majority of the patients (54.29%) presented to hospital between 12-24 hours after onset of stroke and 34.08% of patients presented less than 12 hours after onset of symptoms and 11.63% presented after 24 hours after onset of stroke symptoms. (Table 1)

Hemiparesis was the commonest clinical presentation seen in 422 (86.12%) patients. Among them, Right sided hemiparesis was reported in found in 188 (44.54%) patients and Left sided hemiparesis was reported in 234 (55.46%) patients. Also, facio brachial monoparesis was seen in 14 patients, of whom it affects, eight and six patients on right side and left sided, respectively.

UMN Facial paresis was reported among 402 (82.04%) patients and among them right UMN facial paresis was reported in 179 (44.5%) cases and Left UMN facial paresis was reported in 223 (55.5%) cases. Also, 95.2% of patients with Hemiparesis were found to have UMN facial paresis. None of the patients had isolated UMN facial paresis and 20 patients had isolated Hemiparesis.

Weakness in upper and lower limbs were equal in 68.16% of patients and in 10.82% of patients upper limb was found to be weaker than lower limb and 7.14% of patients lower limb was weaker than upper limb on the affected side. Among the 422 patients with Hemiparesis, 386 (91.47%) of cases were due to anterior circulation infarct and 36 (8.53%) patients were due to posterior circulation infarct. (Table 2)

Aphasia was reported in 146 (29.8%) patients among the 490 patients. Of these 146 patients, 133 patients (91.1%) had right hemiparesis and 7 patients (4.8%) had left hemiparesis and 6 patients had aphasia as the only clinical manifestation. Broca's aphasia was the commonest type of aphasia followed by global aphasia, wernicke's apasia, transcortical motor aphasia and transcortical sensory aphasia. Dysarthria was reported by 195 (39.77%) patients. Among them anterior and posterior circulation was involved in 160 and 35 patients, respectively. Hemi sensory loss was noted in among 234 (47.75%) patients. Unilateral hemi sensory loss was reported in 228 patients and crossed hemisensory loss in 6 patients. (Figure 1)

Only 2.45% of stroke patients underwent CT scan brain within three hours of onset of stroke. More two-third of stroke patients underwent CT brain only after 12 hours of stroke onset. Based on the NIHSS criteria, among the total 490 patients, 64.29 % had mild to moderate stroke, followed by 27.14% of moderately severe stroke. Severe and

very severe stroke were seen in 5.1% and 8.57% of patients, respectively.

Based on the CT findings, with respect to arterial territory involved, internal carotid territory and vertebrobasilar territory was involved in 410 and 74 patients, respectively and in six patients both internal carotid and vertebrobasilar territories were involved.

Also territories of MCA involvement, ACA involvement and both MCA and ACA involvement was noted in 380, 24 and 6 patients, respectively. PCA involvement and PICA involvement was noted in 42 and 17 patients, respectively. Basilar artery involvement, SCA involvement and AICA involvement was noted in 9, 4 and 2 patients respectively. Involvement of multiple arteries was noted in six patients.

Among the 380 patients, in whom MCA territory involvement was noted, the areas involved was cortex, sub cortical white matter matter (Corona radiata & Centrum semiovale) and ganglio capsular region in 143, 110 and 127 patients respectively.

Lacunar infarcts were reported in 105 (21.4%) patients. Among them involvement of gangliocapsular region, sub cortical white matter, thalamus and pons were noted in 74, 23, 6 and 2 patients respectively. Among the gangliocapsular infarcts, 65 patients had internal capsule infarcts and 9 patients had basal ganglia infarcts.

Border zone infarcts were noted in 43(8.77%) patients. Among them involvement of external border zone and internal border zone was noted in 28 and 15 patients, respectively. Among the external border zone infarcts, 9 cases reported involvement of MCA & ACA and the remaining 19 cases reported involvement of MCA & PCA.

In the anterior circulation, cortex was most commonly involved followed by gangliocapsular region and sub cortical white matter. Both cortex and sub cortical white matter was involved in 48 patients out of the total 253 patients. Both sub cortical white matter and deep gray matter (basal ganglia) were affected in 37 patients out of the total 227 patients. In the Vertebrobasilar territory, medial occipital cortex was the commonest region affected followed by cerebellum and thalamus with equal frequency. (Table 3)

## Treatment outcome on 10th day

Hundred and fifty one (30.8%) patients, who were not having any neurological and medical contraindications to heparin, were administered with injection heparin 5000 IU intravenously or subcutaneously twice daily was given for one week to 10 days. Remaining 339 (69.2%) patients were treated with antiplatelets. In the heparin subgroup, 12 patients worsened after heparin because of hemorrhagic transformation, leading to withdrawal of heparin. (Figure 2)

## Modified ranikin score (mRS) on 10th day

mRS was applied in all patients on 10th day or at the time of discharge or death, whichever was earlier to assess the treatment outcome. According to mRS, majority of stroke patients (34.08%) were belongs to grade 3 followed by grade 2 (28.98%) and grade 1 (18.78%). Also there were 6 (1.22%) patients with grade zero. Grade 4, grade 5 and grade 6 were reported among 4.9%, 5.1% and 6.94% of patients with stroke, respectively. The proportion of patients in heparin group and non heparin group with respect to scores were given in the table 4.

## Discussion

The mean age of patients with stroke in this study was  $54.6 \pm 11.4$  years whereas according to Lausanne stroke registry in 1988, mean age was  $60.7 \pm 13.9$  years for the entire group [12] and Marti-Vilalta et al reported [39] mean age as  $66.4 \pm 13$  years. This difference could be due to the fact that Indian population develop stroke early, because of early atherosclerosis and increasing number of young hypertension and diabetes patients.

In this study, males constituted 55.9% of the total and 44.1% were females which consistent with the reports of Barcelona stroke registry (57.3%- males and 42.7% - females) [39] and Bogousslavsky et al reported, 61.5% of stroke patients were males and 38.5% were females [12]

### **Hemiparesis**

In this study, motor deficit in the form of Hemiparesis was the commonest presentation and seen in 86.12% of patients. Left Hemiparesis was more common (55.5%) than Right Hemiparesis (44.5%), which is similar to Lausanne stroke registry [12], in which 83.2% of patients had a motor deficit. But right hemiparesis was more common (56%) than left hemiparesis in that study (44%). But our study showed the reverse results that left hemiparesis was more common than the right hemiparesis for unknown reasons. Caplan and Mohr et al reported 58% of right Hemiparesis and 42% of Left Hemiparesis. [45]

In our study, Upper and lower limbs were equally involved in 68.2% of patients, Upper limb was more involved in 10.82% and Lower limb was more involved in 7.14%. All the 30 anterior cerebral artery infarcts showed more LL involvement and 5 patients with MCA infarcts also manifested with predominant LL involvement. Facio brachial monoparesis was seen in 14 patients (2.5%).

According to Bogousslavsky et al, Upper and Lower limbs were equally involved in 44.4% of patients, Upper limb was more involved in 13.4 % of patients and Lower limb was more involved in 2% of patients. Facio brachial monoparesis was seen in 32% of patients. [12] Whereas Herman et al 1982 reported that hemiparesis with uniform weakness of upper and lower limbs was seen in two-third of patients with motor deficit, almost similar to our study. [29]

In our study, aphasia was found in 146 patients (29.8%) out of 490 patients similar to Julien Bogousslavsky et al reported that aphasia was noted in 33.6 % of patients. The commonest type was motor aphasia in 12.7%, followed by global aphasia in 11.2% and sensory aphasia in 9.7% [12]. Also Laske et al documented that 25% of stroke patients had significant aphasia. [46]. In this study, Dysarthria was documented in 39.77% and Arboix et al in his stroke series reported that aphasia or dysarthria was seen in 50% of patients. [39]

In our study, sensory disturbances were found in 234 patients (47.75%) of patients, which is similar to Lausanne stroke registry [12] and Marti Vilalta et al [39] reported 46.4% and 47% of patients had sensory deficit, respectively.

Homonymous hemianopia was seen in 3.67% of patients in our study whereas Barcelona stroke registry [39] and Julien Bogousslavsky et al [12] reported hemioanopia in 23% and 13.6% of patients, respectively. It is one of the significant complications of several stroke syndromes. Gordon et al [47] and Wade et al [48] reported 45% and 43% of patients had dysphagia, respectively whereas this study reported only 14.89%.

### **Onset of stroke**

In our study, 56.53% of patients noted symptoms of stroke on awakening. Circadian changes in catecholamine levels, blood pressure, platelet aggregability, blood coagulability and fibrinolytic activity could explain the increased strokes noted on awakening. In this study, among 213 patients who noted symptoms of stroke when they were awake, the onset was sudden and acute in 163 patients (76.53%), stepwise and gradual progression in 41 patients (19.25%) followed by fluctuating course in 9 patients (4.22%). It could not be defined clearly in the remaining 277 patients who noticed stroke immediately on awakening. Arboix et al in 1998 reported that stroke onset was sudden in 46.6% of cases, while it was gradual or stepwise over hours in 37.1% and fluctuating in 11.7% [39]. According to Mohr and Louis Caplan in Harvard Co-operative stroke registry, deficit was sudden at onset in 53%, stepwise or gradual in 38% and fluctuating in 9% of patients. [45]

### **Time interval from stroke onset to hospitalization and first CT Brain scan**

In this study, only 22 patients (4.4% of total) had reached the hospital within the golden period of stroke (<3 hrs), which necessitated the importance of public awareness about stroke. Around 65% of patients reached the hospital only after 12 hours of stroke onset. In Kay et al series, among the 773 patients with stroke admitted in one year, 63% arrived at hospital within 12 hours, 76% within 24 hours, and 85% within 48 hours of ictus [51]. In the United States Stroke Data Bank, conversely, about half of the patients were admitted by 12 hours and two thirds by 24 hours after onset. [53]

### **Neuroimaging**

In this study, CT scan was done only in 2.45% of total patients within three hours of the stroke onset. This constituted only 50% of those patients who reached hospital within 3 hrs. This necessitated the importance of stroke awareness among medical personnel. More than two thirds of the patients underwent CT scan after twelve hours of the onset.

### **Distribution of arterial territory involvement**

In our study, Carotid territory (Anterior circulation) was affected in 83.67% of patients (410/490), vertebrobasilar territory (Posterior Circulation) was involved in 15.1% of patients (74/490) and both were affected in 1.2% of patients (6/490) whereas in Harvard Stroke series, anterior circulation infarcts were seen in 63.5% and posterior circulation infarcts were seen in 26.5% of patients [45] Our study showed more involvement of anterior circulation which could be due to intracranial stenosis of anterior circulation being more common in Southeast Asian population.

### **Distribution of individual artery involvement**

In this study, MCA was affected in 77.55% of total patients, followed by PCA in 8.57% of total, ACA in 4.90% and PICA in 3.48% of patients. Basilar artery was involved in 1.84%, SCA in 0.81% and AICA in 0.41% of the total patients. Two patients had bilateral ACA infarcts and six patients had both MCA and ACA infarcts. Two patients had both MCA and PCA infarcts.

According to Barcelona stroke registry, MCA was the most common vascular territory affected by infarction in 66.5% followed by PCA in 6.6% and ACA in 2.8% of patients. [39] Louis Caplan and Mohr et al documented that MCA was involved in 75% followed by PCA in 11%, ACA in 3% and basilar artery in 5% of cases [45]. Our study shows almost similar results to this series.

In our study, among the MCA territory infarcts, 37.6%, 33.4% and 29% of patient reported involvement of cortex, gangliocapsular area and sub cortical white matter, respectively. Of the gangliocapsular infarcts, 25.26% had internal capsule infarct and 8.16% had basal ganglia infarct whereas in Lausanne stroke registry, cortex involvement was seen in 51% of patients and involvement of deeper structures including sub cortical white matter and gangliocapsular areas was seen in 32% of patients. [12] According to Marti-Vilalta et al, cortex was commonly involved in 52% of patients and deeper structures including sub cortical white matter and gangliocapsular involvement was seen in 25.5% of patients [39]. But our study showed increased proportion of involvement of deeper structures could be due to increased incidence of hypertension and intracranial arterial stenosis commonly occurring in Asian population.

In our study, 21.43% of patients were found to have lacunar infarcts with 15.1% of patients whereas Barcelona Stroke Registry [39], Harvard Stroke Registry [45] 10% and 19%, respectively. In our study, Border zone infarcts were noted in 8.77% of patients which is similar to the study done by Bladen et al [28] and Jorgensen et al [60] reported border zone infarcts as 6% and 10%, respectively.

In this study, 29.18% of total infarcts involved frontal, parietal and lateral temporal cortex in various combinations. It was followed by gangliocapsular region involvement in 25.92% (Internal capsule: 19.6%, Basal ganglia: 6.32%) and sub cortical white matter in 22.45%, which involved frontal, parietal and temporal white matter. Among Vertebrobasilar artery infarcts, medical occipital cortex was most commonly involved in 30 patients (6.12% of total 490 patients), followed by cerebellum in 26 patients (5.3% of total) and thalamus in 25 patients (5.1%). Midbrain (2.8%), medulla (2.24%) and pons (2.04%) were the other regions involved.

According to Barcelona Stroke Registry, the main locations, either isolated or in combination, of cerebral infarcts were parietal (33.6%), temporal (29%), frontal (29%), internal capsule (18.5%), occipital cortex (9%), basal ganglia (7%), thalamus (5.5%), pons (9%), medulla (4.5%) and the midbrain (3.5%) [39].

### **Treatment outcome based on mRS**

Modified Rankin score was applied to assess the treatment outcome on 10<sup>th</sup> day or at the time of discharge whichever was earlier. Among the 490 patients in our study, 1.22% of patients had no symptoms (mRS - Zero) at all on 10th day of stroke, 18.78% of patients were able to

carry out their usual daily activities and 28.98% of patients had mild disability in doing their daily chores. A significant proportion of patients (34.08%) had moderate disability and 10% had moderately severe and severe disability. 6.94% of patients were dead on or before 10<sup>th</sup> day. According to Marti Vilalta et al, the functional limitation at the time of discharge was absent in 28% of patients, followed by mild disability in 22%, moderate disability in 12% and the severe disability was seen in 8%. [39]

**Treatment outcome between heparin and no heparin groups**

In our study, 151 patients received heparin out of the total 490 patients (30.82%) and the remaining 339 patients received antiplatelets (69.18%). Among the heparin group, 12 patients (7.95 %) worsened because of hemorrhagic transformation. Modified Ranikin Score was applied to assess any difference in the outcome between the two groups. Heparin subgroup showed statistically significant benefits (p <0.05) in preventing the deaths (mRS grade 0 and grade 1), compared to those who were not given heparin. But there was no statistically significant benefit in improving the disability on tenth day between the two groups, in rest of the grades 2 to grade 6. Overall heparin might have helped in reducing the mortality in this study without influencing the disability.

In our study, 34 patients were dead on or before tenth day and the mortality rate was 6.93%. The commonest cause of death was infection (Pneumonia, Urinary tract infections and Septicemia), which was responsible for 35% of total deaths followed by cerebral oedema in 23.5% and myocardial infarction in 20.5%. Respiratory failure was responsible in 11.77% and metabolic encephalopathy in 8.82% of deaths. In this study, cerebral oedema, as a cause of death was proved by the follow up CT scans which showed transtentorial herniation.

According to Barcelona stroke registry, 30 day mortality rate for ischemic stroke was 12% and the most frequent complication was infection seen in 14.5% of patients [39]. 30 day mortality rate was 14% in Pilot Stroke data Bank [64], 10.3% in Hamburg Stoke data Bank [44] and Besancon Stroke registry reported 13.6% stroke mortality rate [65].

**Conclusion**

In this prospective study, the clinical picture and CT findings to stroke patients were briefly explored with special attention to grade the patients on day 10 following the occurrence of stroke, using Modified Ranikin score. Overall, though the clinical picture was similar to other studies, the time duration between onset of stroke and hospitalization and CT scan taken were to be noted. Because of practical difficulties in reaching the hospital in time, the proportion of patients reaching hospitals during the golden time was very less which in turn impact on the outcome of the disease and thus measures to be taken for patients to get prompt treatment even at peripheral health care centers. Also, in this study the difference in outcome among the heparin and non heparin group was noted only in patients with less severity whereas among the patients with high grades of severity of stroke it was not found to be significant, which suggests further in depth analysis of antiplatelet agents in treatment of stroke.

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**Table 1: Clinical history of the patients with stroke**

Variables	No. of Patients	Percentage
<b>Age group</b>		
15 – 40 years	46	9.38
41 – 50 years	120	24.48
51 – 60 years	181	36.94
61 – 70 years	119	24.29
> 70 years	24	4.9
<b>Sex</b>		
Males	274	55.9
Females	216	44.1
<b>Time of onset</b>		
Noted on awakening	277	56.53

During activities	105	21.43
During rest	108	22.04
<b>Mode of onset</b>		
Sudden & Acute	163	76.53
Gradual progression	41	19.25
Fluctuating	9	4.22
<b>Time interval</b>		
0-3 hours	22	4.49
3-6 hours	62	12.65
6-12 hours	83	16.94
12 – 24 hours	266	54.29
> 24 hours	57	11.63

**Table 2: Clinical findings of the patients with stroke**

Variables	No. of Patients	Percentage
<b>Side of hemiparesis</b>		
Right	188	38.36
Left	234	47.76
<b>Side of UMN facial Paresis</b>		
Right	179	36.53
Left	223	45.51
<b>Hemiparesis in relation to arterial territory</b>		
Anterior Circulation	386	78.77
Posterior Circulation	36	7.35
<b>Proportion of aphasia</b>		
Global aphasia	38 (26.02%)	7.78
Broca's aphasia	44 (30.14%)	8.98
Wernicke's aphasia	29 (19.86%)	5.92
Transcortical motor aphasia	24 (16.44%)	4.89
Transcortical sensory aphasia	11 (7.54%)	2.25
<b>Distribution of dysarthria</b>		
Anterior Circulation	195	39.77
<b>Side of Hemi sensory loss</b>		
a. Left Hemiparesis	151	30.81
b. Right Hemiparesis	09	1.82
Post Circulation	35	7.14
<b>Side of Hemi sensory loss</b>		
Right side	103	21.02
Left side	125	25.51
Crossed	6	1.22

**Table 3: CT findings and NIHSS scoring of stroke**

Variables	No. of Patients	Percentage
<b>Stroke onset to CT brain Time interval</b>		
0-3 hours	12	2.45
3-6 hours	47	9.59
6-12 hours	97	19.79
12 – 24 hours	186	37.97
> 24 hours	148	30.20
<b>NIHSS</b>		
Mild Stroke (score < 6)	137	27.96
Moderate (score 7-10)	178	36.33
Moderately severe (score 11-15)	133	27.14
Severe (score 16-22)	25	5.10
Very severe (score > 23)	17	3.47
<b>Arterial Territory involved</b>		
Internal Carotid territory (ICA)	410	83.67
Vertebrobasilar territory (VBA)	74	15.10
Both ICA and VBA	6	1.23
Pattern of MCA territory	380	77.55
MCA	143	29.18
Lacunar infarcts	105	21.42
Border zone infarcts	43	8.77
<b>Areas affected</b>		
Cortex (Frontal, Parietal and lateral temporal)	143	29.18

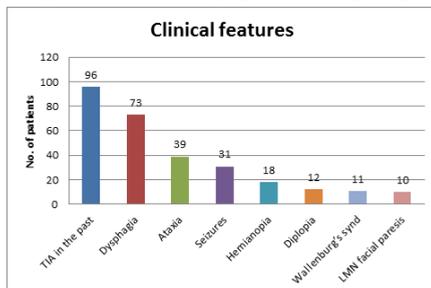
Occipital cortex	30	6.12
Medial temporal cortex	8	1.63
Sub cortical white matter	110	22.45
Gangliocapsular	127	25.92
Thalamus	25	5.10
Midbrain	14	2.86
Pons	10	2.04
Medulla	11	2.24
Cerebellum	26	5.31

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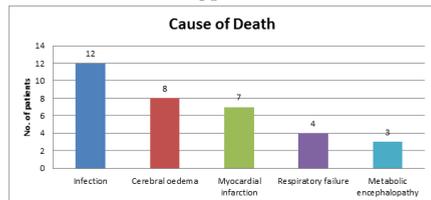
**Table 4: mRS grading of patients with stroke in heparin and non heparin groups**

mRS grading	Heparin group (%)	Non Heparin group (%)
Grade 0	4(2.64%)	2(0.59%)
Grade 1	35(23.18%)	57(16.81%)
Grade 2	44(29.14%)	98(28.91%)
Grade 3	48(31.79%)	119 (35.11%)
Grade 4	7 (4.64%)	17 (5.01%)
Grade 5	8 (5.30%)	17 (5.01%)
Grade 6	5 (3.31%)	29 (8.55%)
Total	151 (100)	339 (100)

**Figure 1: Proportion of clinical symptoms among the patients with stroke**



**Figure 2: Cause of death among patients with stroke**



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