

Clinical Profile and Spectrum of Presentation in Patients with Cerebrovascular Accident: A Prospective Study from Tertiary Care Hospital in Coastal City of South India

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Abstract: Cerebrovascular accident is a global health problem and leading cause of mortality and morbidity worldwide including India. This study aims to identify the risk factors in Cerebrovascular accidents and associated prognosis with reference to these risk factors among 100 subjects was studied. Most of the patients belonged to 70 years and above age group (51%). CVA was more common in males (61%). Motor weakness was the common presenting symptom (64%). Hypertension was the predominant risk factor (70%) followed by Diabetes mellitus (39%), smoking (35%), dyslipidaemia (31%), alcohol (27%), heart disease (17%), carotid stenosis (14%), family history of stroke (11%), history of TIA (6%) and drug induced CVA (3%). Ischemic stroke (82%) was more common than haemorrhagic stroke (18%). One month mortality rate of 9% was observed in this study. Advancing age, male sex, hypertension, diabetes mellitus, smoking, dyslipidaemia, alcohol consumption, heart disease, carotid stenosis, family history of stroke, past history of TIA, drug induced CVA were the risk factors identified in this study. Low GCS, MCA territory infarct, Trans tentorial herniation, SAH, intraparenchymal haemorrhage with hematoma volume ≥ 30 cc and intraventricular extension were associated with poor prognosis. Ischemic stroke was more common than haemorrhagic stroke.

Keywords: Cerebrovascular accident, ischemic stroke, hemorrhagic stroke, risk factors, prognosis.

INTRODUCTION

Cerebrovascular accident is a global health problem and leading cause of mortality and morbidity worldwide [1]. Cerebrovascular diseases include: ischemic stroke, haemorrhagic stroke and cerebrovascular anomalies such as intracranial aneurysms and arteriovenous malformations (AVMs).

Cerebrovascular accident or stroke is defined as abrupt onset of a neurological deficit that is attributable to a focal vascular cause [2].

Stroke is a leading public health problem. Since the late 1990's there has been increase in the survival after stroke and therefore it has become a common cause of human suffering and leading cause of long term disability. Stroke and its sequel are important issues for health care planners in governments, insurance companies and medical services everywhere. Because the costs of treatment and the economic consequences of loss of productivity are so high, prevention of stroke will be a very cost effective strategy. An estimated 50% increase in the incidence of stroke is predicted by 2050 due to aging of populations in many industrialized societies[3].

Effective risk factor intervention offers a real hope of reducing stroke mortality and morbidity. Due to increase in burden of stroke in coming years and limited availability of stroke care in India, it would be better to study on preventive measures that will reduce incidence of stroke [1].

AIM AND OBJECTIVES

- To identify the risk factors in patients with Cerebrovascular accident.
- To find out the prognosis of Cerebrovascular accidents with reference to risk factors.
- To evaluate the etiology of Cerebrovascular accidents.

METHODOLOGY

Source of data

This study was carried out in 100 patients with Cerebrovascular accident (CVA) who were admitted in Intensive Care Unit (ICU) under the department of General Medicine, Kanachur institute of Medical Sciences,

Method of collection of data

100 patients with Cerebrovascular accident (CVA) admitted to ICU in Kanachur Institute of Medical Sciences were enrolled for the study.

Statistical methods

The data was entered in Microsoft Excel and was analysed using Stata13.1 version. In descriptive statistics: results were expressed in percentages and proportions and were represented by using tables, bar diagrams and pie charts. In analytical statistics: Two sample proportion test using Z value was applied.

TYPE OF STUDY

Inclusion criteria

- Patients of either sex with Cerebrovascular accident admitted to ICU with symptoms and signs suggestive of acute loss of focal or global cerebral function.
- Patients admitted within 24 hours after the onset of symptoms.
- Age greater than or equal to 50 years.
- Evidence of ischemia or hemorrhage on CT scan or MRI of brain.
- Patients with first episode of CVA.

Exclusion criteria

- Patients with history of epilepsy, migraine and head injury.
- Ischemia or hemorrhage on CT brain due to infection, connective tissue disorders and tumors.
- Patients with Cortical venous thrombosis.
- Patients presented with transient ischemic attack.
- Patients with metabolic encephalopathy.

Procedure of Study

- Detailed history taking (history was taken from the patient attenders if the patient was unconscious, not oriented or had speech disturbances).
- Complete clinical examination

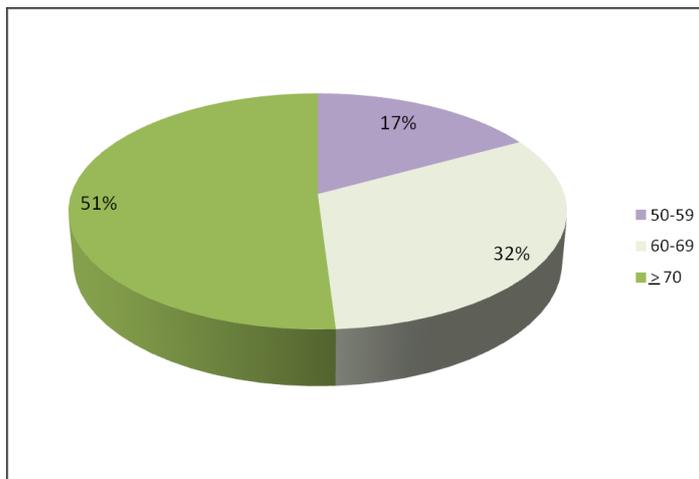
The prognosis was studied after one month of admission and a detailed neurological examination was performed on all survivors and prognosis was compared with the initial clinical examination for improvement, worsening or status quo[4]. The number of deaths was noted.

- Complete recovery (**CR**) – Improved without neurological deficits
- Partial recovery (**PR**) –Improved but had neurological deficits
- No recovery (no improvement) (**NR**) – patients with no improvement or worsening of neurological deficits.
- Death (**D**)

The risk factor profile of each patient was evaluated during the hospital stay. In this study:

- Patients with HbA1C \geq 6.5% [5] and patients who were on anti-diabetic medication were considered under risk factor for diabetes mellitus.
- Patients who were known hypertensives prior to the onset of CVA and newly detected patients with evidence of hypertensive retinopathy were considered under risk factor for hypertension.
- Dyslipidaemia was diagnosed as per American Heart Association (AHA) guidelines[6] (2011) as serum cholesterol $>$ 200 mg/dl, low density lipoprotein (LDL) $>$ 130 mg/dl, triglycerides $>$ 150 mg/dl and high density lipoprotein (HDL) $<$ 40mg/dl.
- Patients with ischemic heart disease, congestive heart failure, rheumatic heart disease, atrial fibrillation, corpulmonale, and cardiomyopathy were considered as suffering from heart disease.
- Smoking (who were currently smoking more than 10 cigarettes per day for more than 6 months¹) and alcohol intake (\geq 3 standard drinks/day⁷ for a minimum of 6 months¹) were based on clinical history of consumption of these substances.
- Family history of stroke was considered if the first degree relatives of the patient suffered from stroke.
- Past history of TIA was considered if the patient had any symptoms suggestive of TIA in the past[2].
- Carotid stenosis was considered as a risk factor if Carotid Doppler study showed more than 50 % stenosis in the carotid arteries [2].
- Drug induced Cerebrovascular accident was considered if patient was on drugs like cocaine, amphetamine, anticoagulants, thrombolytics or oral contraceptive pills[2].

RESULTS



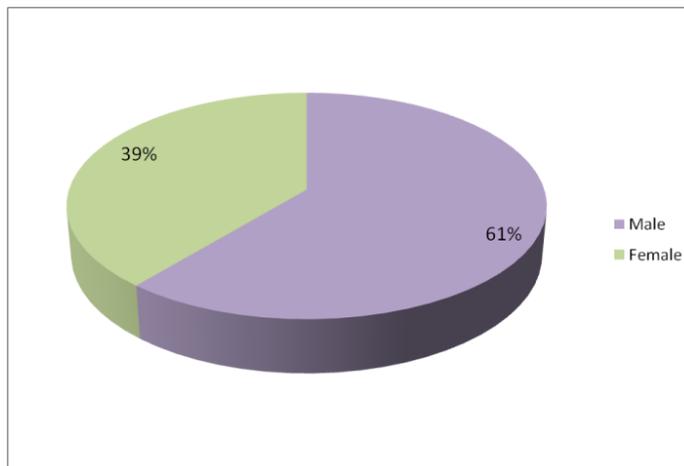
Graph-1: Age Distribution

In this present study patients were grouped into three age groups: 50-59 years, 60-69 years, and 70 years and above.

- 17 patients (17%) belonged to 50-59 years age group.
- 32 patients (32%) belonged to 60-69 years age group

- 51 patients (51%) belonged to 70 years and above age group.

Among 100 patients, 61 patients (61%) were males and 39 patients (39%) were females (Graph-2).



Graph-2: Sex Distribution

Table-1: Age and Prognosis

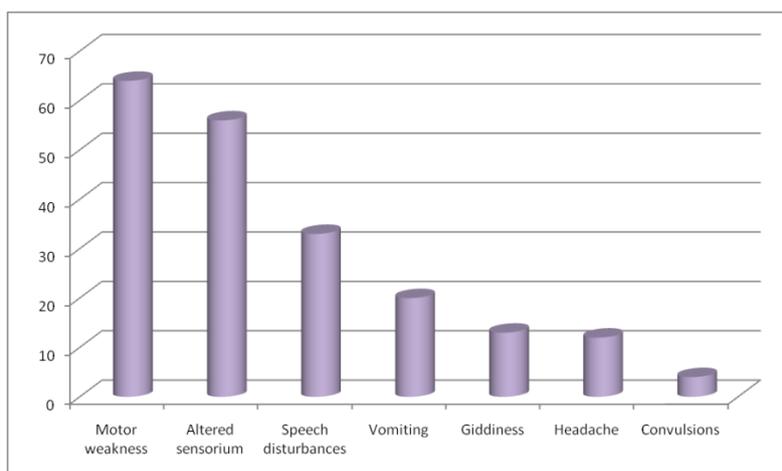
Recovery	Age	No. of Patients	Percentage
Complete Recovery	50-59	13	76.47%
	60-69	8	25%
	≥70	3	5.88%
Partial Recovery	50-59	1	5.88%
	60-69	19	59.38%
	≥70	14	27.45%
No Recovery	50-59	3	17.65%
	60-69	3	9.37%
	≥70	27	52.94%
Death	50-59	0	0%
	60-69	2	6.25%
	≥70	7	13.73%

- In 60-69 years age group: 8 patients (25%) had CR, 19 patients (59.38%) had PR, 3 patients (9.37%) had NR and 2 patients (6.25%) expired.
- In 70 years and above age group: 3 patients (5.88%) had CR, 14 patients (27.45%) had PR, 27 patients (52.94%) had NR and 7 patients (13.73%) expired.

Table-2: Sex and Prognosis

Recovery	Sex	No. of Patients	Percentage
Complete Recovery	Male	9	14.75%
	Female	15	38.46%
Partial Recovery	Male	22	36.06%
	Female	12	30.77%
No Recovery	Male	24	39.34%
	Female	9	23.08%
Death	Male	6	9.84%
	Female	3	7.69%

- Among 61 male patients, 9 patients (14.75%) had CR, 22 patients (36.06%) had PR, 24 patients (39.34%) had NR and 6 patients (9.84%) expired.
- Among 39 female patients, 15 patients (38.46%) had CR, 12 patients (30.77%) had PR, 9 patients (23.08%) had NR and 3 patients (7.69%) expired.



Graph-3: Clinical Presentation in CVA

Among 100 patients, 64 patients (64%) presented with motor weakness, 56 patients (56%) with altered sensorium, 33 patients (33%) with speech disturbances, 20 patients (20%) with vomiting, 13 patients (13%) with giddiness, 12 patients (12%) with headache and 4 patients (4%) presented with first episode of convulsions.

Table-3: GCS Score at the Time of Admission and Prognosis

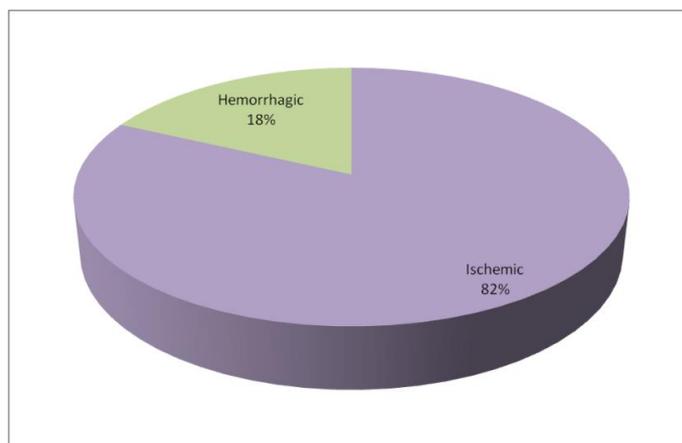
GCS Score		Complete Recovery	Partial Recovery	No Recovery	Death
13-15 (50 patients)	No. of Patients	18	30	2	0
	Percentage	36.0	60.0	4.0	0
5-12 (30 patients)	No. of Patients	6	4	18	2
	Percentage	20.0	13.33	60.0	6.67
3-4 (20 patients)	No. of Patients	0	0	13	7
	Percentage	0	0	65.0	35.0

- In this study 50 patients were admitted with GCS of 13-15, 30 patients with GCS of 5-12 and 20 patients were admitted with GCS of 3-4.
- Among patients admitted with GCS of 13-15, 18 patients (36.0%) had complete recovery, 30 patients (60.0%) had partial recovery, 2 patients (4%) had no recovery and no patients expired.
- Among patients admitted with GCS of 5-12, 6 patients (20.0%) had complete recovery, 4 patients

(13.33%) had partial recovery, 18 patients (60%) had no recovery and 2 patients (6.67%) expired.

- Among patients admitted with GCS of 3-4, 13 patients (65%) had no recovery and 7 patients (35%) expired.

- Among 100 patients, 82 patients (82%) had ischemic stroke and 18 patients (18%) had hemorrhagic stroke (Graph-4).



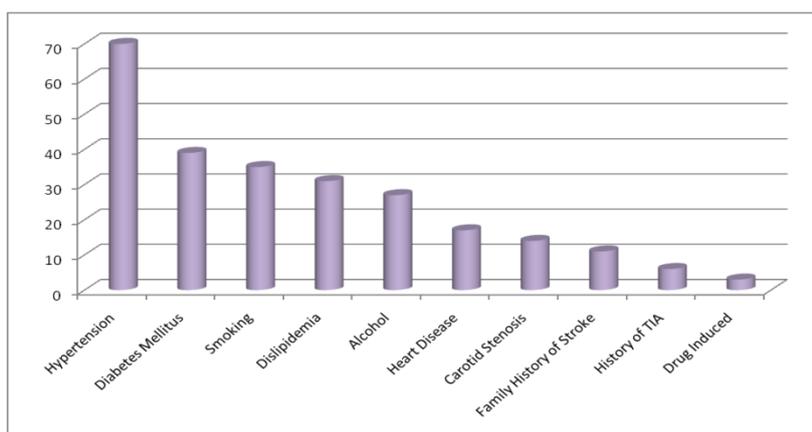
Graph-4: Type of Cerebrovascular Accident

Table-4: Etiology of Cerebrovascular Accidents

Etiology	No of patients	Percentage
Thrombotic Stroke	76	76%
Embolic Stroke	6	6%
Hypertensive Intraparenchymal Hemorrhage	14	14%
Drug Induced Intraparenchymal Hemorrhage	3	3%
SAH	1	1%

Among 100 patients with CVA, 76 patients (76%) had thrombotic stroke, 6 patients (6%) had embolic stroke (atrial fibrillation with left atrial clot), 14 patients (14%) had hypertensive intraparenchymal hemorrhage, 3 patients (3%) had drug induced

(warfarin, streptokinase) intraparenchymal hemorrhage and 1 patient (1%) had SAH. (CT angiography could not be done because patient with SAH expired within 4 hours after admission)



Graph-5: Risk Factors

Among 100 patients, 70 patients (70%) had hypertension, 39 patients (39%) had Diabetes mellitus, 35 patients (35%) had smoking, 31 patients (31%) had dyslipidemia, 27 patients (27%) had alcohol consumption, 17 patients (17%) had heart disease, 14

patients (14%) had carotid stenosis, 11 patients (11%) had family history of stroke, 6 patients (6%) had past history of TIA and 3 patients (3%) had drug induced cerebrovascular accident as risk factors.

Table-5: Hypertension and Prognosis

Risk Factor		Complete Recovery	Partial Recovery	No Recovery	Death
With Hypertension	No. of Patients	9	24	28	9
	Percentage	12.86	34.29	40.00	12.86
Without Hypertension	No. of Patients	15	10	5	0
	Percentage	50.00	33.33	16.67	0.00
P value		<0.01	0.926	0.023	<0.01

Among 100 patients, 70 patients (70%) had hypertension.

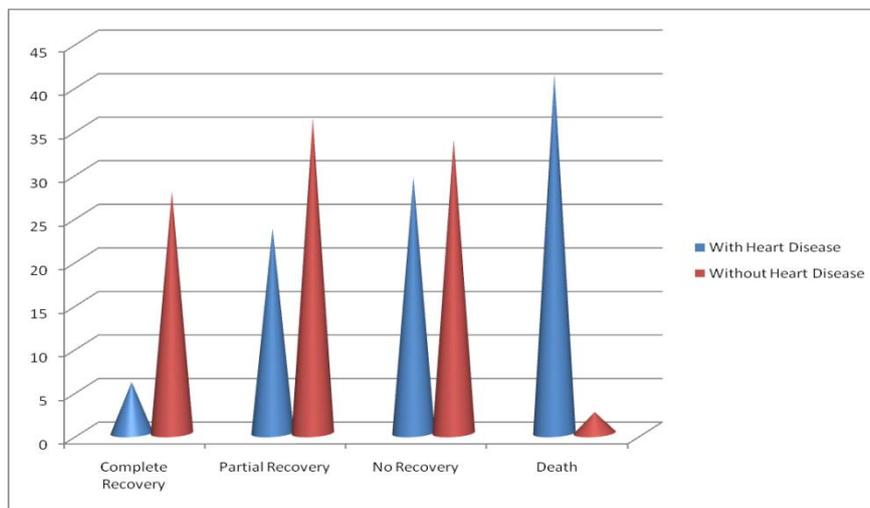
- Among 70 patients with hypertension, 9 patients (12.86%) had CR, 24 patients (34.29%) had PR, 28 patients (40.0%) had NR and 9 patients (12.86%) expired.
- Among 30 patients without hypertension, 15 patients (50%) had CR, 10 patients (33.33%) had PR, 5 patients (16.67%) had NR and no patients expired.
- P value is significant in complete recovery, no recovery and death.

Table-6: Diabetes Mellitus and Prognosis

Diabetes Mellitus		Complete Recovery	Partial Recovery	No Recovery	Death
With Diabetes	No. of Patients	5	12	15	7
	Percentage	12.82	30.77	38.46	17.95
Without Diabetes	No. of Patients	19	22	18	2
	Percentage	31.15	36.07	29.51	3.28
P value		0.036	0.58	0.35	0.01

Among 100 patients, 39 patients (39%) had Diabetes mellitus.

- Among 39 patients with diabetes mellitus, 5 patients (12.82%) had CR, 12 patients (30.77%) had PR, 15 patients (38.46%) had NR and 7 patients (17.95%) expired.
- Among 61 patients without diabetes mellitus, 19 patients (31.15%) had CR, 22 patients (36.07%) had PR, 18 patients (29.51%) had NR and 2 patients (3.28%) expired. P value is significant in complete recovery and death.



Graph-6: Heart Disease and Prognosis

Among 100 patients, 17 patients (17%) had heart disease (8 patients had dilated cardiomyopathy, 7 patients had ischemic heart disease, 2 patients had corpulmonale). Atrial fibrillation was present in 9 patients (in 7 patients with dilated cardiomyopathy and 2 patients with corpulmonale).

- Among 17 patients with heart disease, 1 patient (5.88%) had CR, 4 patients (23.53%) had PR, 5 patients (29.41%) had NR and 7 patients (41.18 %) expired.
- Among 83 patients without heart disease, 23 patients (27.71%) had CR, 30 patients (36.14%) had PR, 28 patients (33.73%) had NR and 2 patients (2.41%) expired.
- P value is significant in death.

Table-7: Dyslipidaemia and Prognosis

Dyslipidaemia		Complete Recovery	Partial Recovery	No Recovery	Death
With Dyslipidaemia	No. of Patients	6	8	10	7
	Percentage	19.35	25.81	32.26	22.58
Without Dyslipidaemia	No. of Patients	18	26	23	2
	Percentage	26.09	37.68	33.33	2.90
P value		0.4660	0.2463	0.9158	0.0015

Among 100 patients, 31 patients (31%) had Dyslipidaemia.

- Among 31 patients with dyslipidaemia, 6 patients (19.35%) had CR, 8 patients (25.81%) had PR, 10 patients (32.26%) had NR and 7 patients (22.58%) expired.

- Among 69 patients without dyslipidaemia, 18 patients (26.09%) had CR, 26 patients (37.68%) had PR, 23 patients (33.33%) had NR and 2 patients (2.90%) expired.
- P value is significant in death.

Table-8: Carotid Stenosis and Prognosis

Carotid Stenosis		Complete Recovery	Partial Recovery	No Recovery	Death
With Carotid Stenosis	No. of Patients	1	4	5	4
	Percentage	7.14	28.57	35.71	28.57
Without Carotid Stenosis	No. of Patients	23	30	28	5
	Percentage	26.74	34.88	32.56	5.81
P value		0.08	0.51	0.97	0.01

Among 100 patients, 14 patients (14%) had Carotid stenosis.

- Among 14 patients with Carotid Stenosis, 1 patient (7.14%) had CR, 4 patients (28.57%) had PR, 5 patients (35.71%) had NR and 4 patients (28.57%) expired.

- Among 86 patients without Carotid Stenosis, 23 patients (26.74%) had CR, 30 patients (34.88%) had PR, 28 patients (32.56%) had NR and 5 patients (5.81%) expired.
- P value is significant in death.

Table-9: Prognosis Associated with Single and Multiple Risk Factors

No. of Risk Factors		Complete Recovery	Partial Recovery	No Recovery	Death
With Single Risk Factor	No. of Patients	14	13	4	0
	Percentage	45.16	41.94	12.90	0.00
With Multiple Risk Factors (> 1 Risk Factor)	No. of Patients	10	21	29	9
	Percentage	14.49	30.43	42.03	13.04
P value		0.0009	0.2615	0.0042	0.0350

- Among 31 patients with single risk factor, 14 patients (45.16%) had CR, 13 patients (41.94%) had PR, 4 patients (12.90%) had NR and no patients (0%) expired.
- Among 69 patients with more than one risk factor (multiple risk factors), 10 patients (14.49%) had

- CR, 21 patients (30.43%) had PR, 29 patients (42.03%) had NR and 9 patients (13.04%) expired.
- P value is significant in complete recovery, no recovery and death.

Table-10: Prognosis in Ischemic and Haemorrhagic Stroke

Type of stroke		Complete Recovery	Partial Recovery	No Recovery	Death
With Ischemic Stroke	No. of Patients	21	32	24	5
	Percentage	25.61	39.02	29.27	6.10
With Haemorrhagic Stroke	No. of Patients	3	2	9	4
	Percentage	16.67	11.11	50.00	22.22
P Value		0.4211	0.0236	0.0903	0.0304

- Among 82 patients with ischemic stroke, 21 patients (25.61%) had CR, 32 patients (39.02%) had PR, 24 patients (29.27%) had NR and 5 patients (6.10%) expired.
- Among 18 patients with haemorrhagic stroke, 3 patients (16.67%) had CR, 2 patients (11.11%) had PR, 9 patients (50.0%) had NR and 4 patients (22.22%) expired.
- P value is significant in partial recovery and death.

Table-11: Single Territory Infarct and Prognosis

<u>Single Territory Infarct and Prognosis</u>		<u>Complete Recovery</u>	<u>Partial Recovery</u>	<u>No Recovery</u>	<u>Death</u>
<u>ACA territory (17 patients)</u>	<u>No. of Patients</u>	<u>14</u>	<u>3</u>	<u>0</u>	<u>0</u>
	<u>Percentage</u>	<u>82.35</u>	<u>17.65</u>	<u>0</u>	<u>0</u>
<u>MCA territory (40 patients)</u>	<u>No. of Patients</u>	<u>4</u>	<u>12</u>	<u>21</u>	<u>3</u>
	<u>Percentage</u>	<u>10.0</u>	<u>30.0</u>	<u>52.5</u>	<u>7.50</u>
<u>PCA territory (23 patients)</u>	<u>No. of Patients</u>	<u>3</u>	<u>17</u>	<u>2</u>	<u>1</u>
	<u>Percentage</u>	<u>13.04</u>	<u>73.91</u>	<u>8.69</u>	<u>4.35</u>

- Among 82 patients with ischemic stroke, 80 patients had single territory infarct and 2 patients had infarct involving more than one territory.
- Among 80 patients with single territory infarct, 17 patients had ACA territory infarct, 40 patients had MCA territory infarct and 23 patients had PCA territory infarct.
- Among 17 patients with ACA territory infarct, 14 patients (82.35%) had complete recovery, 3 patients (17.65%) had partial recovery and no patients died.
- Among 40 patients with MCA territory infarct, 4 patients (10%) had complete recovery, 12 patients (30%) had partial recovery, 21 patients (52.5%) had no recovery and 3 patients (7.5%) died.
- Among 23 patients with PCA territory infarct, 3 patients (13.04%) had complete recovery, 17 patients (73.91%) had partial recovery, 2 patients (8.69%) had no recovery and 1 patient (4.35%) died.
- Among 2 patients who had infarct involving more than one territory, 1 patient (50.0%) had no recovery and 1 patient (50.0%) died.
- Among 82 patients with ischemic stroke, 3 patients had transtentorial herniation and all those 3 patients expired.

Table-12: Hematoma Volume in Intraparenchymal haemorrhage and Prognosis

<u>Hematoma Volume</u>		<u>Complete Recovery</u>	<u>Partial Recovery</u>	<u>No Recovery</u>	<u>Death</u>
<u>< 30 cc (12 patients)</u>	<u>No. of Patients</u>	<u>3</u>	<u>2</u>	<u>7</u>	<u>0</u>
	<u>Percentage</u>	<u>25</u>	<u>16.67</u>	<u>58.33</u>	<u>0</u>
<u>≥ 30 cc (5 patients)</u>	<u>No. of Patients</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>3</u>
	<u>Percentage</u>	<u>0</u>	<u>0</u>	<u>40</u>	<u>60</u>
<u>P Value</u>		<u>0.2179</u>	<u>0.3311</u>	<u>0.4902</u>	<u>0.0031</u>

- Among 17 patients with intraparenchymal haemorrhage, 12 patients had hematoma volume < 30 cc and 5 patients had hematoma volume ≥ 30 cc.
- Among 12 patients with hematoma volume < 30 cc, 3 patients (25%) had CR, 2 patients (16.67%) had PR, 7 patients (58.33%) had NR and no patients expired.
- Among 5 patients with hematoma volume ≥ 30 cc, 2 patients (40.0%) had NR and 3 patients (60.0%) expired.
- P value is significant in death.

DISCUSSION

In this study, male predominance was present and similar findings were observed in Anand *et al.* Nagaraja *et al.* and Marwat MA *et al.* [8, 4] study.

Table-13: Risk Factors associations in different studies

Risk Factors	Marwat MA <i>et al.</i> [4]	Vijaya Sorganvi <i>et al.</i> [1]	Pandiyan U <i>et al.</i> [9]	Smith study [10]	Present study
HTN	75%	62%	71.9%	87%	70%
DM	54.5%	38%	49.8%	50%	39%
Smoking	13.6%	49%	-	35.2%	35%
Dyslipidemia	13.6%	66%	21.6%	22.95%	31%
Alcohol	-	32%	-	-	27%
HD	-	-	37%	-	17%
Family history of stroke	-	31%	-	39.30%	11%
History of TIA	-	32%	-	-	6%

In this study, hypertension was the most common risk factor and similar findings were observed in Marwat MA *et al.* Pandiyan U *et al.* and Smith study. In this study, patients with hypertension as a risk factor had poor prognosis and in Turkey AM *et al.* study [11], hypertension was the commonest risk factor for in-hospital mortality rate.

In this study, 39 patients (39%) had Diabetes mellitus and it correlates with Vijaya Sorganvi *et al.* study (38%). In this study, patients with diabetes had poor prognosis and similar findings were present in Pandiyan U *et al.* study.

In this study, 35 patients (35%) had smoking as a risk factor and similar finding was observed in Smith study. In this study, patients with smoking as a

risk factor had poor outcome and similar findings were observed in Pandiyan U *et al.* study.

In this study, Dyslipidaemia was 31% and it was 22.95% in Smith study. In this study, patients with dyslipidaemia as a risk factor had poor prognosis. In this study, 27 patients (27%) had alcohol consumption as a risk factor and it was 32% in Vijaya Sorganvi *et al.* study.

In this study, incidence of heart disease was 17% and it was 37% in Pandiyan U *et al.* study. In this present study, patients with heart disease had poor prognosis and it was similar to Pandiyan U *et al.* study. In this study, 11 patients (11%) had family history of stroke and it was 31% in Vijaya Sorganvi *et al.* (31%) and 39.30% in Smith study.

Table-14: Type of Cerebrovascular Accident

Type	Turkey AM [11]	Zhang <i>et al.</i> [12]	Roy <i>et al.</i> [13]	Present study
Ischemic	68%	71.6%	71%	82%
Hemorrhagic	32%	28.4%	29%	18%

In this study, Ischemic stroke was more common than haemorrhagic stroke and similar findings were observed in Turkey AM, Zhang *et al.* and Roy *et al.* study. In this study, incidence of ischemic stroke was more and hemorrhagic stroke was less than Turkey IS, Zhang *et al.* and Roy *et al.* study.

In this study, Cardio embolic stroke was 6% and it was 19.5 % in Somay G *et al.* study [14]. Small sample size in the present study may be the reason for this difference.

Table-15: Mortality in Cerebrovascular Accident

	Turkey AM [11]	Zhang <i>et al.</i> [12]	Present study
CVA	23.1%	22.4%	9%
Ischemic stroke	15.7%	12.5%	6.10%
Hemorrhagic stroke	33.3%	47.4%	22.22%

In this study mortality was more in hemorrhagic stroke than in ischemic stroke and similar findings were seen in Turkey AM and Zhang *et al.* study. Hemorrhagic stroke is associated with increased

mortality and in this study incidence of hemorrhagic stroke was less compared to other studies.

Early hospitalization, maximum patients with GCS score of 13-15 at the time of admission and less

number of patients with hemorrhagic stroke could be

the reason for low mortality rate in the present study.

Table-16: Prognosis among cases with cerebrovascular accident

Prognosis	Marwat MA <i>et al.</i> [4]	Present study
Complete recovery	13.6%	24%
Partial recovery	34%	34%
No recovery	25%	33%
Death	27.2%	9%

In Marwat MA *et al.* study, prognosis was studied after one week of admission and in this present study prognosis was studied after one month of onset of symptoms. This may be the reason for increased number of patients with complete recovery in the present study.

In Marwat MA *et al.* study, incidence of haemorrhagic stroke was 40.8% and it was 18% in the present study. Low mortality rate in this study could be due to less number of patients with haemorrhagic stroke. In Zhang Y *et al.* study of outcome of stroke after one month, 24.6 % of patients improved without neurological deficits and it correlates with the present study.

Low GCS score was associated with poor prognosis and similar findings were seen in Zhang Y *et al.* study. Presence of multiple risk factors had poor prognosis and Pandiyan U *et al.* study showed multiple risk factors increased the morbidity and mortality of stroke.

In this study ACA territory infarct had good prognosis and similar findings were present in Kumral *et al.* study[15]. In this study MCA territory infarct was associated with increased mortality and similar findings were observed in Zhang Y *et al.* study.

In this study, poor prognosis in primary intraparenchymal bleed was due to hematoma volume \geq 30 cc and intraventricular extension of bleed. Similar findings were present in Nag *et al.* study[16].

CONCLUSION

- Advancing age, male gender, hypertension, diabetes mellitus, smoking, dyslipidaemia, alcohol consumption, heart disease, carotid stenosis, family history of stroke, drugs and past history of TIA were identified as risk factors for Cerebrovascular accidents.
- Increasing age, male sex, low GCS at the time of admission, hypertension, diabetes mellitus, dyslipidaemia, heart disease, smoking, carotid stenosis, presence of multiple risk factors, MCA territory infarct, presence of transtentorial herniation, SAH, intraparenchymal bleed with intraventricular extension were associated with poor prognosis.

- Ischemic stroke was more common than haemorrhagic stroke and haemorrhagic stroke was associated with poor prognosis. Public awareness of the risk factors and their management may lead to primary prevention of Cerebrovascular accidents.
- Early hospitalisation of patients and their management reduces the mortality and disability in CVA.

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