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A Study on Clinical Characteristics and Imaging in Posterior Circulation Stroke

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ABSTRACT

Introduction: Stroke is one of the leading causes of morbidity . Posterior circulation stroke(PCS) is a potentially life-threatening condition and accounts for about 20–25% of all ischemic strokes. Diagnosing PCS can be challenging due to wide range of—frequent non-specific—symptoms. This study was carried out to determine the various clinical features, imaging patterns , analyze the various risk factors with 6 weeks outcome of posterior circulation stroke.

Material and methods : The study was an observational study in 50 patients carried out in Chengalpattu Medical College and Hospital. Patients who presented with clinical features and imaging of posterior circulation stroke were included in the study.

Observation : Most common age observed were between 40- 60 years.72% were males with frequency of 36 and females 28%. Hypertension was found to be the most common risk factor (60%) and next common being diabetes with 48%. Headache (19%) and giddiness with vomiting (18%) was the most common clinical symptoms. Imaging features revealed combined cerebellar and brainstem regions of 36% and next being cerebellar strokes of 32% .

Conclusions:. **:** Our study demonstrated most common age group was between 40-60 years (64%) and male sex of 72%. Hypertension was the most common risk factor of 80% next being ischemic heart disease of 68% and 58% patients presented with giddiness and vomiting. On imaging cerebellar infarcts of 32% were observed next to 36% of combined regions involved. None of our patients presented within the window period to the hospital so a high level of public awareness of posterior circulation stroke symptoms and the need to seek immediate medical attention is crucial for effective acute stroke treatment.

Keywords: posterior circulation stroke, risk factors, clinical features, mRS.

I. INTRODUCTION:

Stroke is one of the leading causes of morbidity and ranks next only to coronary artery disease and malignancy as the leading cause of mortality worldwide. At least fifty percent of neurological disorders in a general hospital are due to stroke . Stroke syndromes of the posterior circulation account for approximately 20% all strokes, with unfavourable outcome in 20-60% of them. The common risk factors are hypertension, diabetes, smokers, and hyperlipidemia, alcohol consumption, elevated homocysteine levels, obesity, cardiac disease are quite prevalent and inadequately controlled; mainly because of poor public awareness and inadequate infrastructure . The posterior cerebral artery (PCA) supplies portions of the midbrain, the thalamus, the hippocampus, the medial temporal lobe, and the occipital lobe, including the visual cortex and is rich in potential collateral support . Posterior circulation ischemia can range from fluctuating brainstem symptoms, caused by intermittent insufficiency of the posterior circulation (VBI), to the 'locked-in syndrome' which is caused by basilar artery or bilateral vertebral artery occlusion [1-4]. Diagnosing PCS can be challenging due to wide range of frequently non-specific symptoms such as dizziness, headache, nausea, and vomiting these are usually not interpreted as potential stroke symptoms by prehospital care providers and subsequently not assessed in this context [5].

II. AIM AND OBJECTIVES:

1.To determine the various clinical features, imaging patterns , analyze the various risk factors of posterior circulation stroke.

2. To determine 6 weeks outcome of posterior circulation stroke.

Material and methods :

We studied 50 patients of posterior circulation stroke admitted at Chengalpattu medical college and hospital. This is a prospective observational study. Ethical approval was obtained from standard institutional ethical committee.

Patients who presented with features of posterior circulation stroke satisfying the inclusion and exclusion criteria as defined was enrolled in the study .We have taken written and informed consent from all patients.

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Inclusion criteria:

- Patients with symptoms and signs of posterior circulation stroke.
- Patients with imaging features of PCA stroke.
- Age group of above 18 yrs.

Exclusion criteria:

- Patients having evidence of infarcts in other areas i.e., territory of anterior circulation, border zone infarcts, venous infarcts, head injury, tumors.

2. Patient having hemorrhage in areas other than posterior circulation territory.
3. Patients who did not give consent

All patients were analysed using registered proforma for the demographics, stroke risk factors like systemic hypertension, diabetes mellitus, dyslipdemia, coronary artery disease ,smoking, alcoholism and others like rheumatic heart disease. Questioned for the symptoms of posterior circulation stroke like dizziness, vomiting, headache, dysarthria, limb weakness ,visual symptoms and sensory loss. A detailed clinical neurological examination was carried out along with examination of other systems and recorded in the case sheets. Concurrently the patients were investigated for basic biochemical, hematological parameters.

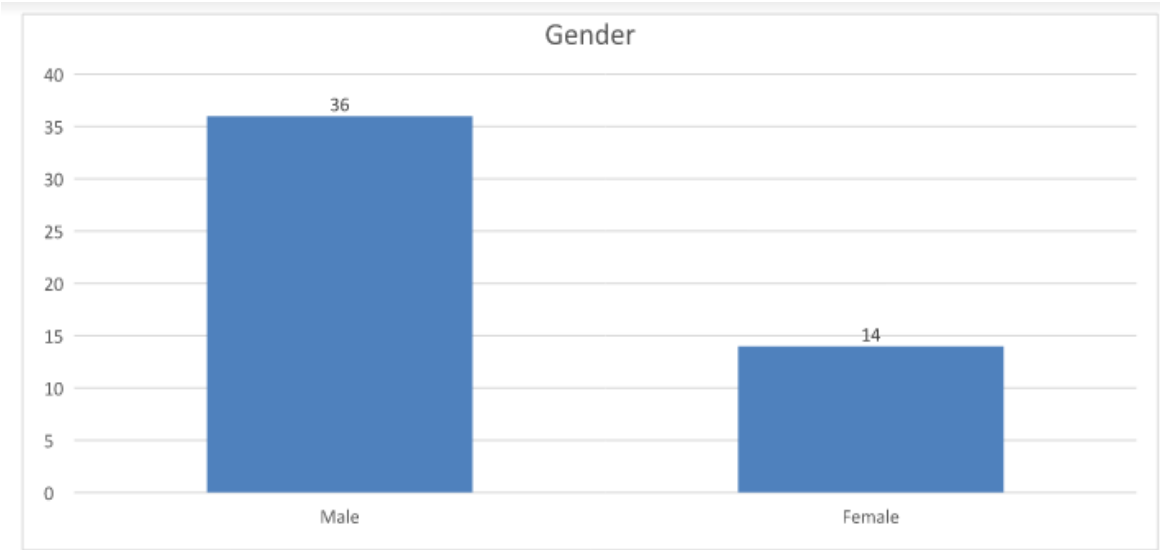
Special emphasis was given for clinical evaluation of cardiovascular system with ECG,Chest –X- ray and Echocardiogram. Imaging studies like CT and MRI brain were done to localize the anatomical area involved. modified Rankin Scale was taken to determine the 6 weeks outcome.

Statistical analysis and p-value calculation was done by chi square test and z test. SPSS software was used for statistical analysis.

III. RESULTS:

The study group included 50 patients of posterior circulation stroke. There were 36(72%) male and 14(28%) female patients.

Chart -1 Sex distribution



Most common age observed were between 40- 60 years(64%), followed by >60years age group (24%), with mean age of 55+/- 12years.

Young age group of 20-40 years were seen in 12 % patients of posterior circulation stroke.

Table -1 Age wise distribution

	Range	Frequency	Percentage
	20-40	6	12%
	40-60	32	64%

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Age category	>60	12	24%
Age (mean±SD)	55±12		

Risk factors : Hypertension was found to be the most common risk factor (80%) and next common being Ischaemic heart disease and alcohol consumption with each being 68%. Diabetes mellitus(58%) was the next common risk factor. 68% of Alcohol patients and 62% were observed in this study.

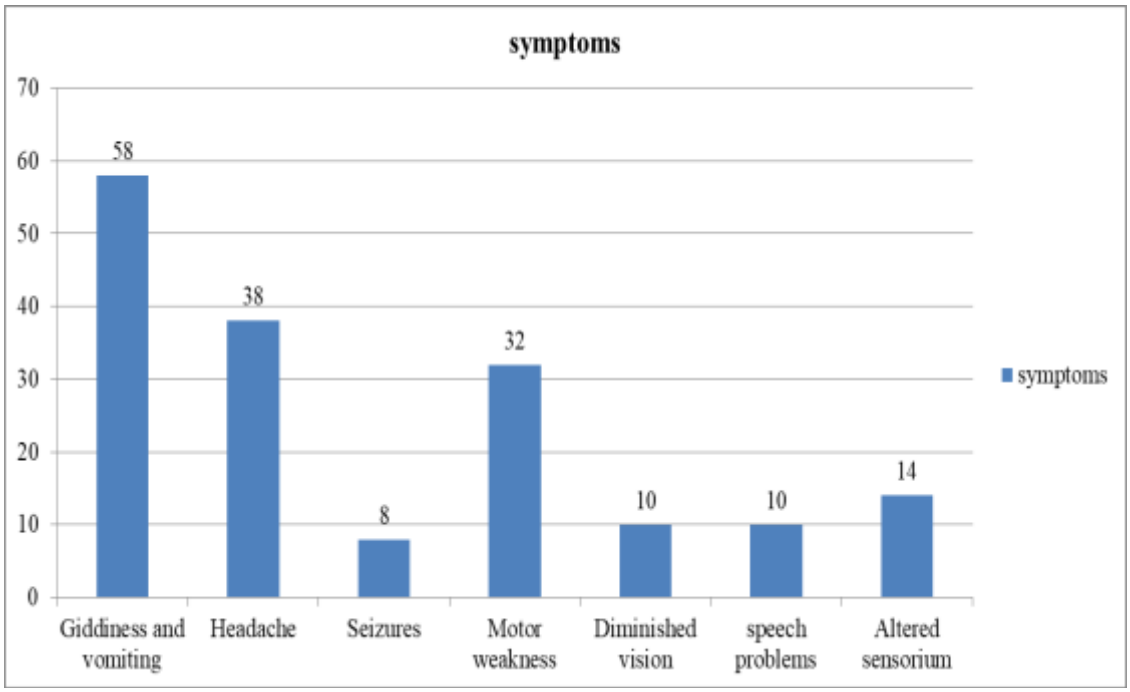
Table-2 Risk factors

Risk factors	Frequency (%) n=50
DM	29 (58%)
HTN	40 (80%)
IHD	34 (68%)
Lipids	32 (64%)
Smoke	31 (62%)
Alcohol	34 (68%)

In the 50 patients with posterior circulation stroke the symptoms and signs analysis revealed the following clinical characterstics ;

Dizziness and vomiting were the most common symptoms found in patients with posterior circulation stroke and were present in 58% patients next common symptoms being headache in 38% .least common symptoms were seizures diminished vision,(10%) speech problems(10%) and seizures (8%).

Chart -2 Symptoms



Imaging features revealed combined cerebellar and brainstem regions of 36% and next being cerebellar strokes of 32%.

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Table -3 Imaging features

Radiological findings	Frequency
Cerebellar infract	16 (32%)
Medullary infract	7 (14%)
Cerebellar hemorrhage	3 (6%)
Occipital hemorrhage	9 (18%)
Brain stem infracts	10 (20%)
Combination of above	18 (36%)

Ischaemic strokes(76%) were more common than haemorrhagic strokes(24%).

Table-4 Types of stroke

Number of Ischemic stroke	38 (76%)
Number of Hemorrhagic stroke	12 (24%)

mRS scores: mRs score with no to slight disability accounts for most cases (52%).Moderate to moderately severe cases account for 42% and severe disability account for 6percent.

Table-5 modified Rankin score

mRS score	No. Of patients (Frequency)	Percent
0-2	26	52.0
3-4	21	42.0
5	3	6.0
Total	50	100.0

DM * MRS Crosstabulation

Count

		MRS			Total	P value
		0-2	3-4	5		
DM	No	5	13	3	21	0.022
	Yes	16	13	0	29	
Total		21	26	3	50	

HTN * MRS Crosstabulation

Count

		MRS			Total	P value
		0-2	3-4	5		
HTN	No	2	6	2	10	0.048
	Yes	14	25	1	40	
Total		16	31	3	50	

IHD * MRS Crosstabulation

Count

		MRS			Total	P value
		0-2	3-4	5		
IHD	No	10	5	1	16	0.033
	Yes	10	22	2	34	
Total		20	27	3	50	

Smoking * MRS Crosstabulation

Count

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		MRS			Total	P value
		0-2	3-4	5		
Smoking	No	8	9	2	19	0.04
	Yes	18	12	1	31	
Total		26	21	3	50	

The risk factors such as hypertension, diabetes, alcohol, smoking and lipids were found to be statistically significant with p values less than 0.05.

Region * MRS Crosstabulation						
Count						
		MRS_6			Total	P value
		0-2	3-4	5		
Region	Cerebellum	12	5	0	17	0.0001
	Occipital lobe	9	0		9	
	Brain stem	5	16	3	24	
Total		26	21	3	50	

The p value (p=0.0001) shows statistical significance between the region and MRS at 6 weeks.

IV. DISCUSSION:

PCA strokes remains more difficult to recognise and treat effectively than other stroke types. Delayed or incorrect diagnosis may have devastating consequences, including potentially preventable death or severe disability, if acute treatment or secondary prevention is delayed. The study group included 50 patients of posterior circulation stroke. There were 36(72%) male and 14(28%) female patients. Male dominance was seen in posterior circulation strokes in T.N.Dubey et al[6] study 78% . The ratio of male to female in our study was 3: 1 in TUFTS[7] posterior circulation register showed 1:1where as T.N.Dubey et al[6] ratio and Corrado Argentino,et al[8] observed was 4:1.this difference may due to more stroke cases in their study. Most common age observed were between 40- 60 years(64%), followed by >60years age group (24%) in our study compared to Umasundar, et al[9] majority were in age group of 40-55 years. Mean age of 55+/- 12years was observed in our study. Similar results were seen in Mehndiratta, et al[10] study with a mean age of 51.7 +/- 14.4 years and T.N dubey study [6] (61.7 years) also in Chengdu stroke registry[11] in which the mean age was 61.4 years.

The ischemic and hemorrhagic stroke cases of 76% and 24% was studied in our study where as Umasundar, et al[9] showed 77.7% and 22% of ischemic and hemorrhagic stroke respectively. Hypertension was the most common risk factor in our study in 80% where as in study conducted by Nizam's institute Hyderabad[12] showed 52.5% in another study showed 71%. Subramanian, et al[13] study observed diabetes mellitus was associated with increased odds of posterior circulation stroke , we had 58% of diabetes in our study . A study from China by Shi et al[14] that analyzed clinical characteristics and found dizziness in 33.8% which were less as compared to our observations 38%. In a study by R.B.Libman, et al[15] it was found that headache was more common among posterior circulation stroke in 15 % of patients and in our study we noted headache in 38% of patients this may be due to more cases of cerebellar strokes leading to raised intracranial pressure. In posterior circulation stroke headache and vomiting are more frequently seen than in anterior circulation strokes[16-18]. Motor weakness in study by Huan, et al[19] showed 58%and Mehndiratta, et al[10] in 42.5% which differs with our study 32%. We observed 4% cases of alexia without agraphia without splenium involvement and in 2% showed a very rare involvement of artery of percheron. Imaging features revealed combined cerebellar and brainstem regions of 36% and next being cerebellar strokes of 32% while in T.N.Dubey[6] study cerebellar infarcts(30%) were more common.

mRs score with no to slight disability accounts for most cases (52%).Moderate to moderately severe cases account for 42% and severe disability account for 6percent were seen in our study compared to Umasundar, et al[9] showed 62% slight disability. None of the cases presented within window period for thrombolysis in our study.

V. CONCLUSIONS:

Our study demonstrated most common age group was between 40-60 years (64%) and male sex of 72%. Hypertension was the most common risk factor of 80% next being ischemic heart disease of 68% and 58% patients presented with giddiness and vomiting. On imaging cerebellar infarcts of 32% were observed next to 36% of combined regions involved. None of our patients presented within the window period to the hospital so a high level of public awareness of posterior circulation stroke symptoms and the need to seek immediate medical attention is crucial for effective acute stroke treatment.

Keywords: posterior circulation stroke, risk factors, clinical features, mRS.

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