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A STUDY OF POSTERIOR CIRCULATION ISCHEMIC STROKE IN 80 PATIENTS – CLINICAL MANIFESTATIONS, RISK FACTORS, IMAGING STUDIES AND OUTCOME

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Abstract

Background: Posterior circulation stroke accounts for approximately 20% of ischemic strokes with varied clinical presentation, which differ from strokes in anterior circulation, with reference to etiology, clinical features, and prognosis. Short penetrating and circumferential branches in the posterior circulation supply the brain stem, thalamus, cerebellum, occipital, and medial temporal lobes. **Materials and Methods**: We prospectively analyzed 80 participants of posterior circulation ischemic stroke patients in Government General hospital, Vijayawada. Patients were analyzed for demographics, stroke risk factors, clinical characteristics, neuroimaging, and stroke subtypes. **Results**: Posterior circulation ischemic stroke accounted for 80 cases of all ischemic strokes from January 2023 to February 2024. Fifty one were males with mean age group 60-70 yrs(35%). Hypertension was found to be the most common risk factor 42 (52.5%). Giddiness and vomiting was the most common clinical symptom reported in 52 (65%) cases. 58 (72.5%) patients had large artery disease, 6 (7.5%) had documented cardioembolic source. Topographically distal intracranial involvement was most frequent 36 (40%).Brain stem is most commonly involved area 32 (40%).**Conclusion**: Our study demonatrated the occurrence of posterior circulation stroke in older age group . We also found higher percentage of large artery disease, while cardioembolism as a less frequent cause of posterior circulation ischemic stroke. Distal territory involvement was most common in our study.

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 seventy percent of neurological disorders in a general hospital are due to stroke. Eighty percent of stroke is

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ischemic; twenty percent of ischemic events involve tissue supplied by posterior circulation. The paralysis of vertebrobasilar stroke can be devastating and some forms have high rates of death. Many cases of vertebrobasilar diseases remain undiagnosed or are incorrectly diagnosed. Formerly clinicians used the catchall term vertebrobasilar insufficiency to indicate a hemodynamic cause of all cases of posterior circulation ischemia.

The etiology of posterior circulation ischemia has been thought to be primarily due to local arterial atherosclerosis (large artery disease) and penetrating artery disease (lacunes). However there is increasing evidence that cardiogenic embolization is more common than previously suspected and is responsible for 20 – 50% of posterior circulation strokes.

The posterior circulation, unlike the intracranial portions of the anterior circulation, is prone to atherosclerosis much as other systemic arteries. In the case of one vertebral artery being occluded, collateral flow comes from the opposite vertebral artery, from muscular cervical artery branches, and from posterior communicating artery.

Now with better understanding of risk factors involved in stroke the emphasis should be prevention rather than management.

Aims of the Study

To evaluate the etiology in posterior circulation stroke.

To study the commonest mode of clinical presentation in posterior circulation ischemic stroke.

To evaluate the commonest anatomical area involved and the size of the infarct with the help of imaging modalities (CT and MRI).

To assess the outcome.

Materials And Methods

This study was carried out in patients who presented with posterior circulation ischemic stroke to the medicine and neurology department in Government General hospital, Vijayawada

The study was conducted during the period of January 2023 to February 2024.

All patients admitted with clinical features suggestive of posterior circulation stroke were taken. All were subjected to CT scan brain. Patients with evidence of posterior circulation stroke clinically and imaging wise were taken up for the study.

INCLUSION CRITERIA

All patients with clinical features suggestive of posterior circulation stroke imaging showing infarcts within the posterior circulation territory.

EXCLUSION CRITERIA

CT evidence of showing haemorrage

Patients having evidence of infarcts in other areas ie. , territory of anterior circulation, border zone infarcts.

Patients on ventilator, global aphasia, in coma were excluded from studies.

INVESTIGATIONS

Blood haemogram, peripheral smear, haematocrit, blood sugar ,lipid profile, and renal function tests were done

Echocardiogram was done to rule out intracavitary clots and vegetation. Imaging studies including CT, MRI and Doppler Studies were done to localize the anatomical area involved and to know the size of the area involved.

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Results

80 patients admitted with clinical features suggestive of posterior circulation stroke were enrolled in the study.

TABLE NO 1: SEX INCIDENCE OF POSTERIOR CIRCULATION ISCHEMIC STROKE IN 80 CASES

SEX	NO OF CASES	PERCENTAGE
MALE	51	63.75
FEMALE	29	36.25
TOTAL	80	100

Among 80 patients 51 patients were males (63. 75%) and 29 females(36. 25%).

TABLE NO 2: AGE INCIDENCE

AGE IN YEARS	<40	41-50	51-60	61-70	>70
NO OF CASES	4	14	20	28	14
PERCENTAGE	5	17.5	25	35	17.5

The age group ranges from 40 to 70 years. Maximum numbers of cases were in the age group 60 to 70.

TABLE NO 3: RISK FACTORS

RISK FACTORS	NO OF CASES	PERCENTAGE
HYPERTENSION	42	52.5
DIABETES	30	37.5
DYSLIPIDEMIA	16	20
CAD	17	21.25
SMOKING	25	31.25
ALCOHOL	12	15
TIA	8	10
CARDIOEMBOLIC	8	10
HAEMATOCRIT	18	22.5
UNCERTAIN	14	11.2

42 patients had hypertension and 30 patients had diabetes mellitus. 25 patients had h/o smoking.

TABLE NO 4: CLINICAL FEATURES

Sr. No	CLINICAL FEATURES	NO OF PATIENTS
1.	Giddiness and vomiting	52
2.	Headache	22
3.	Seizures	8
4.	Altered sensorium	14

Most of our patients presented with giddiness and vomiting. Headache was present in 22 patients. 14 patients had altered sensorium at onset. 8 patients had seizures at the onset.

TABLE NO 5: CLINICAL FEATURES

CLINICAL FEATURES	NO OF PATIENTS	PERCENTAGE
Visual field defect	20	25

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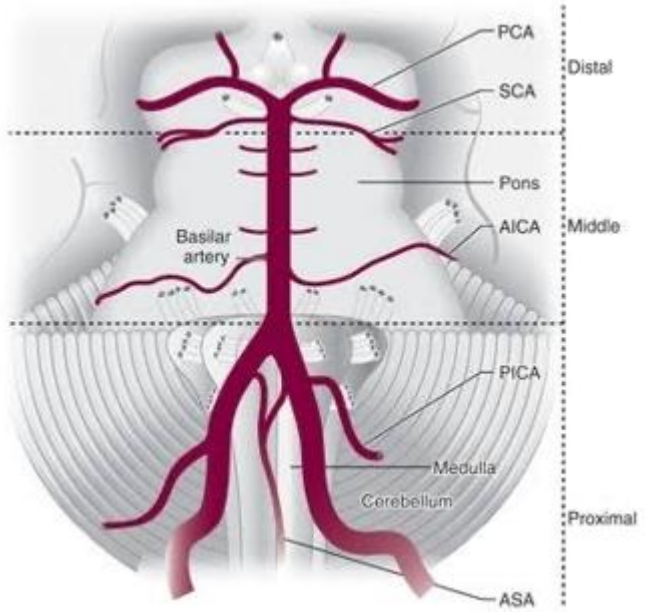
Cerebellar signs	30	37.5
Weakness	38	47.5
Hemisensory loss	12	15
Cranial nerve involvement	28	35
Combination	45	55

The other clinical features that were present in this study were according to the territory involved and this included homonymous heminanopia, temporal lobe signs, cerebellar signs, weakness, sensory disturbances, cranial nerve disturbances (III, IV, V, VII, IX and X) most of these were combination of clinical.



FIGURE

TABLE NO 6: LOCATION OF INFARCTION

LOCATION OF INFARCTIONS	NO OF PATIENTS	PERCENTAGE
DISTAL ONLY	36	40
PROXIMAL ONLY	9	11.25
MIDDLE ONLY	12	15
PROXIMAL AND MIDDLE	3	3.75
PROXIMAL AND DISTAL	11	13.75
MIDDLE AND DISTAL	12	15
PROXIMAL,MIDDLE,DISTAL	8	10

Among these 80 patients we found that distal territory involvement was more common. Isolated middle and proximal territory infarcts were less in this study. In other patients we had varying combination of either proximal middle or distal territory infarcts.

TABLE NO 7: AREAS INVOLVED

AREAS INVOLVED	NO OF CASES	PERCENTAGE
CEREBELLUM	29	36.25
BRAIN STEM	32	40
THALAMUS,MEDIAL	19	23.75

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TEMPORAL,OCCIPITAL		

Cerebellum is involved in 36. 2% of patients. Brain stem involvement seen in40% and in 23. 75% of patients area involved included are thalamus, medial temporal and occipital. Combined lesions involving more than one area is seen in around 19% of patients.

TABLE NO 8: SIZE OF THE INFARCT

SIZE OF THE INFARCT	NO OF CASES	PERCENTAGE
LARGE VESSEL	58	72.5
LACUNAR	16	20
CARDIOEMBOLIC	6	7.5

72. 5% of patients had large vessel disease. 20% had lacunar infarct, cardioembolic stroke is seen in 7. 5% of patients.

TABLE NO 10: OUTCOME AT 30 days

STATUS OF PATIENTS	FREQUENCY
NO DISABILITY	30
MINOR DISABILITY	48.3
MAJOR DISABILITY	16.3
DEATH DUE TO CEREBROVASCULAR CAUSES	2.5
DEATH DUE TO OTHER CAUSES	1.9

No disability 30%, minor disability 48. 3%, major disability 16. 3%, death due to cerebrovascular disease 2. 5%, death due to other causes 1. 9% is seen in this study.

Discussion

Cerebrovascular disease was more common in men in the age group of >60 years. In 'tufts posterior registry' 52% were male and 48% were females.In this study 63. 75% were males. Though the above mentioned study showed sexual equality our study showed a male preponderance. Mean age of pts in our study was 60 years which was similar to other studies. The risk factors in stroke are classified as modifiable and non modifiable. Male sex and older age are non-modifiable risk factors.

Hypertension is the most common risk factor associated with stroke. In our study 52. 5% were hypertensives.

Diabetes mellitus, hypercholesterimia, smoking, obesity, ischemic heart disease, atrial fibrillation, heamatocrit elevation are other modifiable risk factors. Smoking was found in 31. 25%. Diabetes 37. 5%, dispidimia 20%, cardio embolic strokes 10%.

Clinical features at the onset of stroke in our study were giddiness and vomiting. The other presentation in our study included headache, altered sensorium, and seizures.

Vertigo occurs both in small vessel and large vessel disease.

In this study, vertiginous onset was present in 60% patients with distal territory infarct and also in all patients with two or more territories involvement. of the persons with multiple territory involvement if middle territory involvement is also there, vertiginous onset was more common. Only in 25% of patients with isolated proximal territory infarct vertigo at onset was present. We found that all patients who had middle territory infarcts (pons and AICA supplied cerebellum) had vertigo onset.

The vertigo in middle territory infarct could be explained by involvement of vestibular nucleus and its connections in the pontine region.

Altered sensorium at the onset is seen in 17. 5% of patients in this study.

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In this study among the 14 patients, with altered sensorium at the onset, distal territory was involved in 8 out of 14 patients, middle territory involved in 7 patients. Patients who had proximal territory infarcts did not have altered sensoruim.
In this study 47% had pyramidal and 36. 2% had cerebellar signs. Visual field defects were seen in 25%, 35% had cranial nerve involvement, 15% had hemi sensory loss and 20% had temporal lobe signs. CT brain was normal in 25 pts in our study. MRI brain was done in 50 pts. Among them 2 pts who had clinical features suggestive of lateral medullary syndrome had normal study of CT and MRI brain. Regarding the vascular territory involvement in this study we have found that 40% had isolated distal territory involvement. The other territory involvement and multiple territory involvement was less. Cerebellum is involved in 36. 2% of patients. Brain stem involvement seen in 40% and in 23. 75% of patients area involved included are thalamus, medial temporal and occipital. Combined lesions involving more than one area is seen in around 19% of patients. 72. 5% of patients had large vessel disease. 20% had lacunar infarct, cardioembolic stroke is seen in 7. 5% of patients. No disability 30%, minor disability 48. 3%, major disability 16. 3%, death due to cerebrovascular disease 2. 5%, death due to other causes 1. 9% is seen in this study.

Conclusion

In my study I found that

- Males were affected more than females
- Age group commonly involved was above sixty yrs.
- Hypertension, diabetes and smoking contributed the major risk factors followed by cardio embolic source
- Giddiness was commenest symptom at the onset
- Most of the patients had clinical signs of cerebellum and brainstem lesions.
- The territory commonly involved was mid-brain, cerebellum, thalamus, occipital and temporal lobes.
- MRI was found to be more sensitive than CT in identifying brain stem lesions
- Outcome in posterior circulation stroke was found to be better than anterior circulation stroke.

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