

Evaluation of Risk Factors and Clinical Study in Patients with Medullary Infarct

Dr. Sailaja¹, Dr. M. Sriharibabu²

Abstract: *Introduction:* The posterior circulation consists of the paired vertebral arteries, the basilar artery, the paired posterior cerebral arteries, and their branches. Posterior circulation strokes represent approximately 20% of all ischemic strokes. *Methodology:* Patient selection was made after a thorough clinical examination by a physician according to a pre-designed study questionnaire prepared for medullary infarction. After routine hematological examination, all study subjects underwent MRI imaging of the brain. Chest x-ray, Echocardiogram, 4 Vessel Doppler, Fasting Blood Sugar, Post Prandial Blood Sugar, Fasting Lipid Profile, and Renal Profile were performed in all the subjects included in the study. *Results:* Among 22 patients with medullary infarct, The major clinical feature exhibited by medullary infarct patients was motor weakness seen in 16 patients. Three patients presented with symptoms of incoordination. Major clinical sign was lower cranial nerve involvement. *Conclusion:* All patients with brain ischemia, whether posterior need an extensive evaluation of risk factors. Rehabilitation is an integral part of all stroke survivors and should begin as soon as the patient is medically stable. Extensive cardiac workup and evaluation for hypercoagulable states are useful in identifying correctable causes.

Keywords: MRI- magnetic resonance imaging

1. Introduction

The posterior circulation consists of the paired vertebral arteries, the basilar artery, the paired posterior cerebral arteries, and their branches. These arteries supply the brainstem (medulla, Pons, and midbrain), the thalamus, the hippocampus, the cerebellum, and parts of the temporal and occipital lobes, including the visual cortex¹. Posterior circulation strokes represent approximately 20% of all ischemic strokes. A Posterior circulation stroke is classically defined by infarction occurring within the vertebrobasilar arterial system². Posterior circulation transient ischemic attacks may include brief brainstem symptoms and are more challenging to diagnose than anterior circulation ischemia. The risk of recurrence after posterior circulation stroke is at least as high as for anterior circulation stroke and there is a threefold increase in risk after vertebrobasilar stenosis. Posterior circulation stroke is diagnosed based on history and clinical- examinations assisted by imaging. MRI with diffusion-weighted imaging (MRI-DWI) is the brain imaging modality of choice for suspected posterior circulation stroke³.

Intravenous tissue plasminogen activator may be used in posterior circulation stroke patients who meet eligibility criteria within 4.5 hours of symptoms⁴.

Acute endovascular therapy was used in acute basilar occlusions⁵.

Neurosurgery (external ventricular drainage /decompression) used in large volume cerebellar infarction with a falling level of consciousness attributable to raised intracranial pressure or acute hydrocephalus⁶.

Aims and objectives of the study

- To study the different clinical features of medullary infarct.
- To analyze various risk factors for medullary stroke in these patients.

2. Materials and Methods

- Study Setting:** Inpatients of General Medicine Department, G S L Medical College, and General Hospital.
- Study Design:** Cross-sectional observation study
- Study Sample:** 22
- Study Period:** October 1st, 2017 to March 31st, 2019.

Study Subjects

Inclusion criteria

- Patients presenting with signs and symptoms of medullary infarct.
- Patients showing radiological evidence of medullary infarct on MRI imaging were included in the study

Exclusion criteria

Patients with clinical signs and imaging evidence suggestive of anterior circulation stroke and other patterns of posterior circulation stroke except medullary infarct.

3. Data Analysis

Gender Distribution in Study Population

Sex	Frequency	Percentage
Male	14	63.3
Female	8	36.3

The study group included 22 patients. There were 14(63.3%) males and 8(36.3%) female patients. The ratio of male to female was 1.7.

Age distribution in study population

Age	Medulla Infarct
30-40	3
40-50	1
50-60	7
60-70	9
70-80	1
80-90	1
Total	22

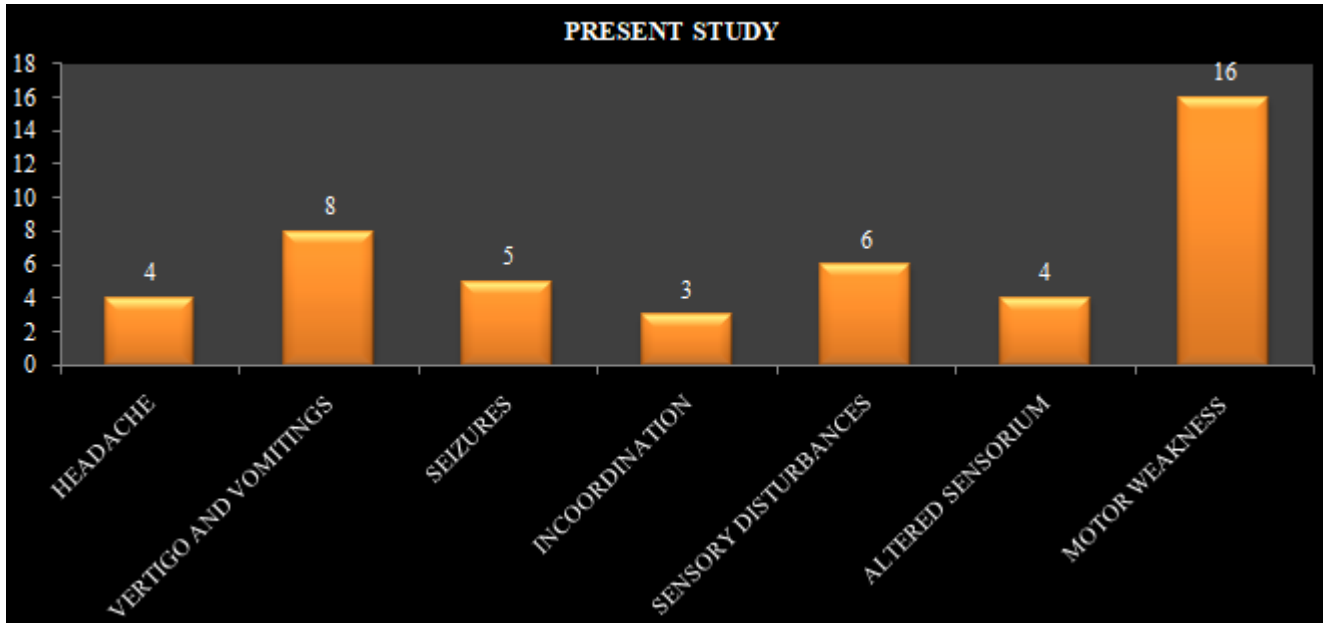
Medullary infarct was more prevalent among individuals between 60 and 70 years age group.

Risk Factors	Present	Absent
Hypertention	19(86.3%)	3(13.6%)
Diabetes Mellitus	11(50%)	11(50%)

Among 22 patients, 19(86.3%) were hypertensive and 3(13.6%) were non hypertensive. Diabetics constitute 11(50%), non diabetics constitute 11(50%).

Distribution of clinical symptoms in medullary infarct

Symptoms of medullary infarct	Frequency
Headache	4(18%)
Vertigo and Vomiting	8(36%)
Seizures	5(22%)
Incoordination	3(13%)
Sensory Disturbances	6(27%)
Altered Sensorium	4(18%)
Motor Weakness	16(73%)

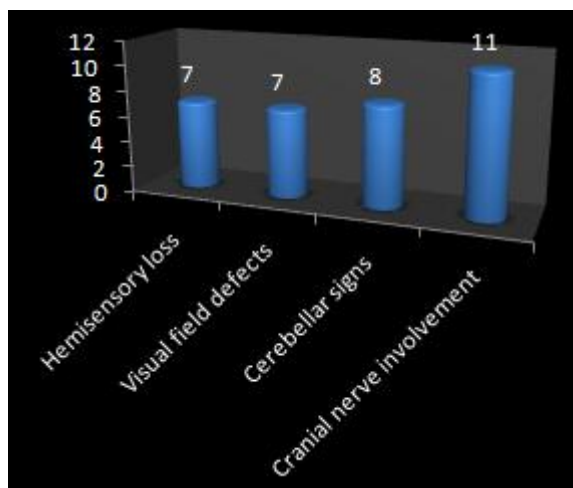


Distribution of clinical symptoms in medullary infarct

In this study 22 patients had medullary infarct. The major clinical feature exhibited by medullary infarct patients was motor weakness seen in 16 patients, vertigo and vomiting in 8 patients, sensory disturbances in 6 patients, 5 patients had seizures, 4 patients presented with altered sensorium & headache each.. Three patients presented with symptoms of incoordination.

Distribution of clinical signs in medulla infarct

Clinical signs in medulla infarct	Frequency
Hemisensory loss	7(32%)
Visual field defects	7(32%)
Cerebellar signs	8(36%)
Cranial nerve involvement	11(50%)



Distribution of clinical signs in medulla infarct

In This study 22 patients had medullary infarct. 11 of them had lower cranial nerve involvement, cerebellar signs were seen in 8 patients, visual field defects and hemi sensory loss were seen in 7 patients each.

4. Discussion

The study group included 22 patients. There were 14(63.3%) males and 8(36.3%) female patients. The ratio of male to female was 1.7. IN Takuya Fukuoka et al. study, Out of 29 medullary infarct patients, 24 were men and 5 were women. In Kameeda et al study, Among 167 patients with medullary infarct, 122 were men and 45 were women.

Medullary infarct was more prevalent among individuals between 60 and 70 years age group. In Takuya Fukuoka et al. study group 18 to 83 age group (60± 15 mean age) people were more predominantly affected. In kameeda et all study, mean age was 60.7±121.4.

Among 22 patients, 19(86.3%) were hypertensive and 3(13.6%) were non hypertensive. Diabetics constitute 11(50%), non diabetics constitute 11(50%). In Takuya Fukuoka et al. study group, among 29 patients, 26 patients were hypertensive and 8 patients were diabetics.

Comparison of clinical symptoms and signs in medullary infarct with other studies:

In the present study 22 patients had medullary infarct. The major clinical feature reported was motor weakness (73%)

followed by vertigo and vomiting (36%), sensory disturbances (27%), seizures (22%), altered sensorium (18%) and headache (18%). In coordination was seen in 13% of the patients.

In Kameeda et al. study⁷, Motor weakness constituted 93%, sensory disturbances 89%, vertigo and vomiting constituted 73% in coordination constituted 69%, headache constituted 13%. In Katsuhiko Ogawa et al. study⁸, significant symptoms were sensory disturbances and in coordination,

which constituted 82%, each followed by vertigo and headache, which constituted 53%. Motor weakness represented 18%. In Yuji shono et al. study⁹, the predominant symptom was a motor weakness (90%) followed by sensory disturbances (63%) followed by in coordination (23%) and altered sensorium (17%). In Takuya Fukuoka et al. study¹⁰, predominant symptoms were vertigo & vomiting and sensory disturbances (65%) followed by motor weakness (55%), headache (34%).

Symptoms Of Medulla Infarct	Present Study	KAMEEDA et al. study ⁷ n=214	Katsuhiko Ogawa et al. study ⁸ n= 17	Yujshono et al. study ⁹ n=30	Takuya Fukuoka et al. study ¹⁰ n=29
Headache	4(18%)	13%	9(53%)	-	10(34%)
Vertigo And Vomiting	8(36%)	73%	9(53%)	-	19(65%)
Seizures	5(22%)			-	-
Incoordination	3(13%)	69%	14(82%)	7(23%)	
Sensory Disturbances	6(27%)	89%	14(82%)	19(63%)	19(65%)
Altered Sensorium	4(18%)	24%		5(17%)	
Motor Weakness	16(73%)	93%	3(18%)	27(90%)	16(55%)

In the present study among patients with medullary infarct cranial nerve involvement was seen in 50%, cerebellar signs were seen in 36%, visual field defects, and hemisensory loss was viewed in 32% each.

In Kameeda et al. study⁷, cerebellar signs constituted 69%, cranial nerve involvement constituted 30%, visual field defects constituted 6%. In Katsuhiko Ogawa et al. study⁸,

cranial nerve involvement constituted 70% and cerebellar signs represented 59%. In Yujshono et al. study⁹, the primary symptom was visual field defects (47%) followed by cranial nerve involvement constituted 47%, cerebellar signs were seen in 30%. In Takuya Fukuoka et al. study¹⁰, cerebellar signs constituted 55%, cranial nerve involvement represented 10%.

Clinical signs in MEDULLARY infarct	Present Study	KAMEEDA et al study ⁷	Katsuhiko ogawa et al study ⁸	Yujshono et al study ⁹	Takuya Fukuoka et al study ¹⁰
Visual field defects	7(32%)	6%		14(47%)	
Cerebellar signs	8(36%)	69%	10(59%)	9(30%)	16(55%)
Cranial nerve involvement	11(50%)	30%	12(70%)	14(47%)	3(10%)

5. Conclusion

Following conclusions were made:

- Medullary infarct was more common in males (63.3%).
- Medullary infarct was more prevalent among individuals between 60 and 70 years age group.
- Hypertensive (86.3%) and Diabetics (50 %) were affected by medullary infarct.

The major clinical symptom exhibited by medullary infarct patients was motor weakness and most common sign was lower cranial nerve involvement .

All patients with brain ischemia, whether posterior need an extensive evaluation of risk factors. Rehabilitation is an integral part of all stroke survivors and should begin as soon as the patient is medically stable. Extensive cardiac workup and evaluation for hypercoagulable states are useful in identifying correctable causes.

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