Original Article

Pattern and Localization of Ischemic Cerebral Stroke in Patients Who were not Using Antiplatelets Drugs, Presenting to Tertiary Care Hospital Peshawar

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ABSTRACT

Objective: To determine the patterns and localization of ischemic cerebral stroke in patients who are not using antiplatelets drugs, presenting to tertiary care hospital.

Study Design: Cross-Sectional Study

Place and Duration of Study: This study was conducted at the Department of Medicine, KTH, Peshawar from 15th January 2021 to 15th July 2021.

Materials and Methods: A total of 101 patients of both gender with Ischemic stroke, who were not using any antiplatelets drugs were included in the study. All patients were sent to CT scan and patterns and localization of ischemic stroke was noted.

Results: Age range in this study was from 40 to 70 years with mean age of 58.435±4.79 years, mean duration of stroke 15.584±2.51 hours and mean weight was 87.604±5.25 Kg. Single lesion was seen in 45.5% patients, two lesion 9.9%, three lesion 35.6%, corona radiata infarct 31.7%, large hemispheric 13.9%, internal capsule 7.9%, Striatocapsular junction 3%, cerebellum 5% and pons was 22.8%.

Conclusion: Single lesion (Pattern 1) was more prevalent and Corona radiata localization was mostly observed in our study.

Key Words: Ischemic stroke, Patterns, Localization

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INTRODUCTION

There are three different major causes for ischemic stroke in human beings, where "about 50% of cases are due to progressive large vessel atherosclerosis and unexpected rupture of an atherosclerotic plaque, while about 20% are caused by cardio embolism"[1].

On the other hand, "about 25% manifest as lacunar infarcts due to small vessel disease and probably occlusion of deep perforating arteries".

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Apart from the above, there may be some additional rare causes, like small and large vessels vasculitis or dissection of extracranial artery, which account for the remaining 5% cases[2]. In the above-mentioned causes, the percentages represent mean values over all age and gender groups of such patients but change is possible depending on the age and gender of stroke patients. In elderly patients, both male and female, the cardioembolic stroke is considered the most frequent subtype, while the small vessel disease like vasculitis due to autoimmune conditions is usually responsible in young age people[3]. Furthermore, ethnicity may play role in the distribution of stroke in different age and gender groups[4].

By Localizing the pattern of ischemic stroke will help in establishing the severity of disease, the risk of recurrence, and will help in determining the prognosis of the patient. It will also help to identify the involved vessels supplying the affected area. More than five hundred studies are published on stroke internationally and at least ten studies in last four years in Pakistani journals. As it is evident that the results of all international studies cannot be generalized and applied on our local population due to difference of epigenetic, genetic makeup and confounding factors. Therefore, this detail study was planned to determine identify the

frequency and report the patterns and localization in patients with ischemic stroke, who were not using any antiplatelet drugs, presenting to tertiary care hospital in Peshawar Khyber Pakhtunkhwa, Pakistan.

MATERIALS AND METHODS

Study design: Cross Sectional Study.
Setting: Department of Medicine and allied specialty, KTH, Peshawar.
Duration of study: This study was conducted from 15th January 2021 to 15th July 2021.
Sample size: Sample size was 101. It was calculated using the WHO formula for sample size with following assumptions,
Anticipated frequency of two lesion (pattern II) ischemic stroke: 7%
Confidence level: 95%
Absolute precision: 5%
Sampling technique: Non-probability, consecutive sampling
Inclusion Criteria:

- Age 40-70 years
- Both gender
- Ischemic stroke as per operational definition

Exclusion Criteria:

- Stroke in the subacute or chronic stage
- Those who were using antiplatelet drugs
- Patients with disturbance of consciousness
- H/o dementia
- H/o aphasia
- H/o dysarthria

Data Collection Procedure: A total of 101 cases, who were fulfilling the inclusion as well as the exclusion criteria from indoor department of medicine and allied specialty, KTH, Peshawar were included in the study. Prior proper permission from ethical committee was taken. After detailed explanation to the patient attendant/care givers, informed consent was obtained explaining the risk/benefits of the study. The basic demographics of the patients, like age, gender, duration of stroke and family history of stroke was properly recorded.
All patients were sent to CT scan and patterns and localization of ischemic stroke was noted as per operational definition on especially designed proforma.
Data Analysis: Data was analyzed, using latest statistical analysis program (IBM-SPSS-version:22). Mean ±SD was presented for quantitative variables like age, duration of stroke and weight. The frequency and percentage were computed for qualitative variables like gender, side of stroke, single lesion, two lesion, three lesion, corona radiata, large hemispheric, internal capsule, striatocapsular junction, cerebellum and pons.

RESULTS

Age range in this study was from 40 to 70 years with mean age of 58.435±4.79 years, mean duration of stroke 15.584±2.51 hours and mean weight was 87.604±5.25 Kg as shown in Table-1.
Frequency and %age of patients according to gender and side of stroke are shown in Table-2 and 3 respectively.
Single lesion was seen in 45.5% patients, two lesion 9.9%, three lesion 35.6%, corona radiata infarct 31.7%, large hemispheric 13.9%, internal capsule 7.9%, striatocapsular junction 3%, cerebellum 5% and pons was 22.8% as shown in Table-4 and figure-1.

Table No.1: Mean ± SD, of patients according to age, duration of stroke and weight. n=101

Demographics		Mean±SD
1	Age(years)	58.435±4.79
2	Duration of Stroke (hours)	15.584±2.51
3	Weight (Kg)	87.604±5.25

Table No.2: Frequency and %age of patients according to gender. n=101

Gender	Frequency	Percentage
Male	80	79.2%
Female	21	20.8%
Total	101	100%

Table No.3: Frequency and %age of patients according to side of stroke. n=101

Side of Stroke	Frequency	Percentage
Left	88	87.1%
Right	13	12.9%
Total	101	100%

Table No.4: Frequency and Percentage of patients according to the number of lesions. N= 101

Finding	Single lesion	Two lesions	Three lesions
Present	46 (45.5%)	10 (9.9%)	36 (35.6%)
Absent	55 (54.5%)	91 (90.1%)	65 (64.4%)
Total	101 (100%)	101(100%)	101(100%)

Table No.5: Frequency and %age of patients according to the site of lesions. N= 101

Site	Number of Patients	Percentage
Corona Radiata	32	31.7%
Large Hemispheres	14	13.9%
Internal capsule	8	7.9%
Striatocapsular Junction	3	3%
Cerebellum	5	5%
Pons	23	22.8%
Other areas	16	15.7%
Total	101	100%

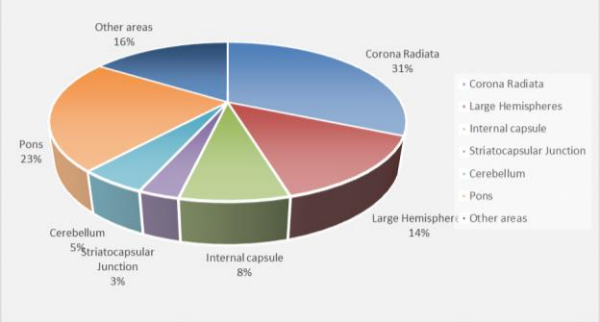

Figure No.1: Stroke pattern on the basis of area of involvement.

DISCUSSION

In our study single lesion was seen in 45.5% patients, two lesions 9.9%, three lesions 35.6%. Corona radiata infarct 31.7%, large hemispheric 13.9%, internal capsule 7.9%, striatocapsular junction 3%, cerebellum 5% and pons was 22.8%. Results of our study are consistent with a study by Canbaz DH, et al who showed that frequency of Corona radiata was 36.5%, Large hemispheric 14.5%, Internal capsule 7.3%, Striatocapsular junction 3.6%, Cerebellum 5.45% and Pons was 25.45% in patients with ischemic stroke[5].

In another study by Singhal AB, et al. has showed that frequency of single lesion was 22% (pattern 1) two lesion was 7% (pattern 2), three lesion was 30% (pattern 3) in patients with ischemic stroke[6].

In one recent study, the supratentorial infarcts were found more in the striatocapsular region (46.8%) and the lower motor cortex (14.5%)[7]. In another recent study "common lesions on DW1 were reported in the corona radiata (n=18), middle cerebral artery territory, including the motor cortex and/or insular cortex (n=13), striatocaudate nuclei (n=11), primary motor cortex (n=10) and internal capsule (n=7)"[8]. In the Urban's study, which was conducted to identify lesions in infratentorial region, it was found that the brainstem was affected in 33.8% of patients, which include lesions involving the cerebral peduncle in 1.5% cases, pontine base in 30.9% cases, and ventral pontomedullary junction in 1.5% cases[9]. In Kumral's study, brainstem regions including pons (n=25), pontobulbar junction (n=5), and the thalamomesencephalic junction (n=4) were reported[8]. In Urban and one more study, the isolated cerebellar infarcts was reported in 14.5% and 5.94% of the patients[7,9].

In our study, the supratentorial infarcts were found almost equally on the right and the left side. Like others studies, it was proposed and identified in our study that right sided infarcts are more frequently associated with dysarthria in these patients[9,10]. The equal distribution on the right and the left side has also been reported in other studies[11,12]. As commonly expected the right-side dominance, however has not been proven in our study not from literature thus far[13]. As the number of cerebellar infarcts in our study is small, so it is difficult for us to say more about it.

CONCLUSION

The present study shows the contribution of patterns and localization in patients with ischemic stroke who are not using any antiplatelets drugs. Single lesion (Pattern 1) was more prevalent and Corona radiata localization was mostly observed in our study. The studies including high number of patients from different centers, with different lesion localization by functional imaging and symptoms evaluation will definitely contribute more to our understanding about ischemic stroke and its prognosis.

Author's Contribution:

Concept & Design of Study:	Bughdad Khan, Imran Khan
Drafting:	Qandeel Sultan, Samiullah
Data Analysis:	Aamir Khan
Revisiting Critically:	Bughdad Khan, Imran Khan
Final Approval of version:	Bughdad Khan, Nizamuddin

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Banerjee C, Chimowitz MI. Stroke caused by atherosclerosis of the major intracranial arteries. Circ Res 2017;120(3):502–13.
2. Mas-Rodriguez MF, Berrios RA, Ramos E. Spontaneous bilateral vertebral artery dissection during a basketball game: a case report. Sports Health 2016;8(1):53–6.
3. Starby H, Delavaran H, Andsberg G, Lövkvist H, Norrving B, Lindgren A. Multiplicity of risk factors in ischemic stroke patients: relations to age, sex, and subtype—a study of 2,505 patients from the Lund Stroke Register. Neuroepidemiol 2014; 42:161–8.
4. Goldmann E, Roberts ET, Parikh NS, Lord AS, Boden-Albala B. Race/ethnic differences in post-stroke depression (PSD): findings from the stroke warning information and faster treatment (SWIFT) study. Ethn Dis 2016;26(1):1–8.
5. Canbaz DH, Celebisoy M, Ozdemirkiran T, Tokucoglu F. Dysarthria in acute ischemic stroke: localization and prognosis. J Neurological Sci 2010;27:22(1):20-7.
6. Singhal AB, Topcuoglu MA, Buonanno FS. Acute ischemic stroke patterns in infective and nonbacterial thrombotic endocarditis: a diffusion-weighted magnetic resonance imaging study. Stroke 2002;33(5):1267-73.

7. Urban PP, Rolke R, Wicht S, Keilmann A, Stoeter P, Hopf HC, et al. Lefthemispheric dominance for articulation: a prospective study on acute ischaemic dysarthria at different localizations. Brain 2006; 129: 767-777.
8. Kumral E, Çelebisoy M, Çelebisoy N, Canbaz D, Çallı C. Dysarthria due to supratentorial and infratentorial ischemic stroke: A diffusionweighted imaging study. Cerebrovascular Diseases 2007; 23:331-338.
9. Urban PP, Wicht S, Vukurevic G, Fitzek C, Fitzek S, Stoeter P, et al. Dysarthria in acute ischemic stroke: lesion topography, clinicoradiologic correlation, and etiology. Neurol 2001;56: 1021-1027.
10. Ackermann H, Vogel M, Petersen D, Poremba M. Speech deficits in ischaemic cerebellar lesions. J Neurol 1992;239:223-227.
11. Amarenco P, Chevrie-Muller C, Roullet E, Bousser MG. Paravermal infarct and isolated cerebellar dysarthria. Ann Neurol 1991;30:211-213.
12. Gironelli A, Arboix A, Marti-Vilalta JL. İsolated dysarthria caused by aright paravermal infarction. J Neurol Neurosurg Psychşartr 1997;61: 205-206.
13. Urban PP, Marx J, Hunsche S, Gawehn J, Vucurevic G, Wicht S, et al. Cerebellar speech representation: lesion topography in dysarthria as derived from cerebellar ischemia and functional magnetic resonance imaging. Arch Neurol 2003; 60(7):965-72.