



A STUDY ON POST STROKE HEADACHE IN ISCHEMIC STROKE PATIENTS

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ABSTRACT Stroke is a leading cause of death and disability worldwide, with a particularly high burden in India where younger adults are disproportionately affected. Post-stroke headache (PSH) is a common but under-recognized complication of ischemic stroke, with variable frequency and clinical presentation across populations. This study was conducted to assess the prevalence, gender distribution, clinical characteristics, frequency, and severity of PSH in ischemic stroke patients using the International Classification of Headache Disorders, 3rd edition (ICHD-3) criteria. Among 50 patients, 68% experienced PSH, predominantly of tension-type pattern, with most reporting moderate to severe pain. These findings emphasize the importance of early recognition and management of PSH to reduce morbidity and improve quality of life in stroke survivors.

KEYWORDS : Post-stroke headache, Ischemic stroke, ICHD-3, Headache features

INTRODUCTION

Globally, stroke is the second most frequent cause of death, while in India it ranks fourth in mortality and fifth in disability causes^{1,2}. Alarmingly, strokes in India are reported at a younger age than in Western populations, affecting the working-age group and leading to considerable socioeconomic loss³.

According to the American Stroke Association, stroke is defined as neuronal injury of the brain, spinal cord, or retina attributable to ischemia, confirmed either by imaging/pathology or by persisting focal symptoms beyond 24 hours when alternative causes are excluded⁴.

Headache is a well-recognized symptom in ischemic stroke, but its incidence and characteristics vary widely across studies⁵. These headaches can be transient (acute) or long-lasting (persistent). The ICHD-3 provides diagnostic criteria:

Acute post-stroke headache (6.1.1.1): Headache directly attributed to ischemic stroke, resolving within three months after stabilization⁶.

Persistent post-stroke headache (6.1.1.2): Headache that continues for more than three months following stroke stabilization⁶.

Most published literature focuses on Western populations, while studies among Asian and Indian cohorts are limited⁷. Hence, this study aims to address this gap by evaluating PSH among Indian ischemic stroke patients.

AIMS AND OBJECTIVES

1. To determine the prevalence and sex distribution of PSH in ischemic stroke patients.
2. To study the clinical features of PSH.
3. To assess the frequency and severity of PSH.

REVIEW OF LITERATURE

Post-stroke headaches are a common complication of ischemic stroke, affecting a significant number of patients of stroke. Headache associated with ischemic stroke is researched and reported previously in several studies. Incidence and prevalence of the headache associated with ischemic stroke varied widely among different studies with some studies suggesting that it affects up to 44% of stroke patients⁸.

A study of 550 patients done by Kumar et al, with ischemic stroke found that approximately 14.9% experienced a headache at stroke onset, with 60-65% of headaches being unilateral⁹.

Prevalence, mean age and gender predilection of patients with headache associated with ischemic stroke reported by various studies.

Reference study	Geographic area	Sample size	Female (%)	Age (mean / average)	Headache cases	Prevalence	95% CI
Puustjarvi et al ¹⁰	Europe	1,196	42.1	-	77	0.06	0.05-0.08
Chen et al ¹¹	Other (east Asia)	11,523	37.1	-	848	0.07	0.07-0.08
Lutski et al ¹²	Other (middle east)	3,579	42.9	-	316	0.09	0.08-0.10
Abadie et al ¹³	Europe	1,185	53.9	-	160	0.14	0.12-0.16
Manio et al ¹⁴	Europe	2,473	35.0	-	420	0.17	0.16-0.19
Ahmadi et al ¹⁵	Other (middle east)	263	47.4	76.4	49	0.19	0.14-0.24
Van O et al ¹⁶	Europe	284	38.4	68.0	109	0.38	0.33-0.44
Kroop et al ¹⁷	Europe	4431	40.6	44.7	1395	0.32	0.30-0.33
Lisabet et al ¹⁸	North America	461	48.6	67.0	59	0.13	0.10-0.16
Rathore et al ¹⁹	North America	402	47.3	62.5	90	0.22	0.18-0.27
Vestergaard et al ²⁰	Europe	214	52.9	69.0	56	0.26	0.21-0.32
Trentschner et al ²¹	Europe	2196	44.6	66.0	588	0.27	0.25-0.29

CI = confidence interval

A review of 22 studies on post-stroke headache found that unilateral headaches were more common than bilateral headaches, with a pooled prevalence of 55.6% done by Choi et al²².

In a study done by Felipe AA de Oliveira et al, the incidence rate of persistent headache attributed to past ischemic stroke was (10.1%). The most frequent pattern presented was a migraine-like pattern 58.3% patients²³.

Persistent headache after ischemic or hemorrhagic stroke affects up to 23% of patients and these persistent headaches tend to have tension-type features and are more frequent and severe than acute stroke-related headaches²⁴.

A recent study done in 2023 estimates the prevalence of Persistent Post Stroke Headache to be somewhere between 1 and 23% of patients and presentation is variable, but most often mimics tension-type headache²⁵.

MATERIALS AND METHODS

This cross-sectional study was conducted in the Neurology OPD of Dr. Pinnamaneni SIMS & RF over two months. Fifty ischemic stroke patients were enrolled.

Inclusion Criteria:

Patients >18 years with ischemic stroke confirmed by CT/MRI.

Exclusion Criteria:

Patients <18 years, hemorrhagic stroke, large infarcts with mass effect, stroke mimics, and patients with speech/cognitive impairments preventing reliable history.

Data regarding demographics, stroke history, and headache details (type, duration, laterality, frequency, severity) were collected via interview and records. Headaches were classified per ICHD-3 criteria. Pain severity was graded using the Visual Analogue Scale (VAS): mild (1–3), moderate (4–6), and severe (≥7).

ICHD-3 CRITERIA

Acute headache attributed to ischaemic stroke (cerebral infarction)

Diagnostic criteria:

- Any new headache fulfilling criteria C and D
- Acute ischemic stroke has been diagnosed
- Evidence of causation demonstrated by either or both of the following: 1. headache has developed in very close temporal relation to other symptoms and/or clinical signs of ischemic stroke, or has led to the diagnosis of ischaemic stroke 2. headache has significantly improved in parallel with stabilization or improvement of other symptoms or clinical or radiological signs of ischaemic stroke
- Either of the following: 1. headache has resolved within three months 2. headache has not resolved in 3 months
- Not better accounted for by another ICHD-3 diagnosis.

Persistent Headache Attributed To Past Ischemic Stroke

Diagnostic criteria:

- Headache previously diagnosed as 6.1.1.1, and fulfilling criterion C
- The ischemic stroke has stabilized, spontaneously or through treatment
- Headache has persisted for >3 months after stabilization of the ischemic stroke
- Not better accounted for by another ICHD-3 diagnosis

Visual Analogue Scale

In this study scale of 1-3 is considered mild headache pain
4-6 is considered as moderate pain
7 or above is considered as severe headache

DATA ANALYSIS

Categorical data is presented in the form of frequency and percentages. Continuous data is presented in the form of Mean +/- SD.

RESULTS

This study includes 50 patients diagnosed with ischemic stroke. The age of the study population ranges from 27 to 74, with mean age being 54.6 ± 10.4 yrs. Number of patients less than or equals to 50 years of age are 17 which comprises of 34 percentage of study population with their mean age being 43.2 ± 6.1 . Number of patients above 50 years of age are 33 which are about 66 percent of study population with mean age of 60.2 ± 6.9 . Males comprise of 68 percent of total study population while females are about 32 percent.

Of all the study population, 34 patients have headache associated with ischemic stroke comprising 68 percent of total study group. Number of males with post stroke headache are 24 (48 % of total study population) and number of females with post stroke headache are 10 (20 % of total study population)

PREVALENCE OF POST STROKE HEADACHE



■ developed post stroke ■ no post stroke

Fig 1: Prevalence of post stroke headache among ischemic stroke patients.

Among the patients with post stroke headache, prevalence of acute headache associated with ischemic stroke is 58.8 % (no of patients = 20) of which males are 15(44.1 %) and females are 5 (14.7 %) in number and prevalence of persistent headache associated with ischemic stroke is 41.2 % (number of patients = 14) of which number of males are 9 (26.5 %) and females are 5 (14.7 %).

In post stroke headache patients, when evaluated about the type of headache results came out as, migraine-like headache is seen in 11.8 % (4 patients), tension type headache-like headache is seen in about 82.3 % (28 patients) and 5.9 % (2patients) doesn't fall in either of the above categories.

The patients with migraine-like post stroke headache have equal distribution among males and females with 50 percent being males (2 patients) and 50 percent being females (2 patients).

TYPES OF POST STROKE HEADACHE



■ Migraine-like ■ Tension type headache ■ Other

Fig 5: Prevalence of different types of headaches in post stroke headache patients

Severity/Intensity of headache is analyzed using visual analogue scale. Scale of 1-3 is considered mild, 4-6 is considered as moderate pain and 7 or above is considered as severe headache. Based on the above consideration, 8.8 % (3 patients) with post stroke headache reported mild pain, 50 % (17 patients) reported moderate pain and 41.2 % (14 patients) reported severe pain.

In terms of number of headache days per month, among patients with post stroke headache, 20.6% has reported ≤ 5 headache days per month, 29.4% has reported 6-10 headache days per month, 17.7 % has reported 11-15 headache days per month and 32.3% has reported > 15 headache days per month.

Lateralization of post stroke headache is described as unilateral or bilateral. Massive 76.5 % of patients with post stroke headache reported the headache to be unilateral, right side in 41.2% patients and left side in 35.3 %.

DISCUSSION

Our study revealed a remarkably high PSH prevalence (68%) compared to global estimates (6%–38%).^{10,16} This suggests potential population-specific variations or under-recognition in earlier work.

Acute headache was more frequent than persistent headache, consistent with Hussein et al²⁶. The mean age of ischemic stroke patients in our study (54.6 years) was lower than reported internationally, suggesting a younger age of onset in India.

Contrary to most literature showing female predominance²⁷, we observed higher prevalence among males. The reasons may include demographic differences or sample bias.

Tension-type headache-like features were most common (82.3%), aligning with prior reports²⁸. The high frequency of attacks (>10 days/month in 50% of cases) raises concerns about long-term disability and medication over use.

CONCLUSION

- PSH was observed in 68% of ischemic stroke patients.
- Males were more frequently affected than females.
- Acute headaches were more common than persistent ones.
- Tension-type headache-like features predominated, with most patients reporting moderate to severe pain.
- Half the patients had frequent headaches (>10 days/month), and unilateral headaches were more frequent than bilateral.

Recognition of PSH is vital, as it significantly contributes to post-stroke morbidity. Early diagnosis and targeted management may improve patients' functional outcomes and quality of life.

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