ORIGINAL ARTICLE

Clinical Spectrum and Treatment Outcomes in Cluster Headache: A Retrospective Study of 55 Patients from a Tertiary Care Center in South India

Arul Selvan VL[1], Revathy Vijayaraghavan[2], Dhanya Sureddy[3*], Madhuri Kankanala[4]

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Abstract

Background: Cluster headache (CH) is an extremely painful trigeminal autonomic cephalalgia causing significant disability. However, it is frequently misdiagnosed and mismanaged.

Objective: To study the demographic and clinical characteristics of patients with CH and their response to prophylactic treatment.

Materials and methods: A retrospective study of 55 patients diagnosed with CH as per ICHD-3 criteria, seen in the Neurology OPD of a tertiary care hospital in South India (2011–2020), was conducted. The figure shows the case selection and treatment pathway.

Results: Of the 55 patients, 76.3% were men (M: F ratio 3.3:1). Mean age of onset was 33 years (range 12–69). Episodic CH was present in 56.3%. Headache was right-sided in 63.6% and orbitofrontal in 60%. Autonomic symptoms were present in 92%, most commonly lacrimation (70%) and conjunctival injection (59%). Nocturnal symptoms were reported by 72%, periodicity by 65%. Aura occurred in 5%. Four patients had associated migraine, and one had cluster-tic syndrome. Patients were treated with steroids, verapamil, lithium, and topiramate in resistant cases.

Conclusion: CH causes severe pain attacks. Prompt recognition and initiation of appropriate treatment, particularly verapamil and steroids, provide significant relief.

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Introduction

Cluster headache (CH) is one of the most painful primary headache disorders, with a prevalence of 0.1–0.4% of the population.[1] This trigeminal autonomic cephalalgia is characterized by unilateral headache attacks lasting for 15–180 minutes and occurring up to eight times per day, associated with cranial autonomic symptoms with or without restlessness.[2] The hallmark of CH is its daily and seasonal rhythmicity.[3] The headache, often described as "suicidal headache" due to its severity, can cause significant personal, social, and economic distress.[4]

Though the presentation is stereotypical and easy to diagnose, it is often missed by many practitioners. The hypothalamus is postulated to play a fundamental role in triggering headache episodes, and effective treatment options are available.[5] Various newer drugs and neuromodulatory therapies are also being investigated.

There are very few studies on this rare primary headache disorder from India. We report a retrospective study of 55 patients with CH and their clinical characteristics.

Materials and Methods

Case Selection

The study was conducted between May 2021 and June 2021. A retrospective list of cases diagnosed with CH seen in the OPD from 2011 was retrieved from the medical records department. The diagnosis was verified according to the International Classification of Headache Disorders, 3rd edition (ICHD-3). After excluding incomplete records, 55 cases with full details were included.

Diagnostic Criteria

International Classification of Headache Disorders, 3rd edition (ICHD-3) defines CH as at least five attacks of severe unilateral orbital, supraorbital, or temporal pain lasting 15–180 minutes, associated with either cranial autonomic features (conjunctival injection, lacrimation, nasal congestion, rhinorrhea, eyelid edema, forehead/facial sweating, miosis, ptosis) or restlessness/agitation, occurring between once every other day and eight per day, not better accounted for by another diagnosis.[2]

Follow-up

Case records were reviewed for demographics, clinical features, and comorbidities. All patients underwent imaging to rule out other intracranial lesions. Patients received oral steroids for 3 days and were reviewed at day 3. Thereafter, steroids were continued for 10 days along with verapamil after ensuring a normal ECG. Patients were reviewed after 2 months. Those not responding to verapamil were started on lithium. Topiramate was used in resistant cases. Due to the retrospective nature, limited information on lifestyle and long-term follow-up was available.

Results

The cohort comprised 55 patients (42 men, 13 women; M:F ratio 3.2:1). Mean age of onset was 33 years (range 12–69) (Fig. 1 and Tables 1 to 3).

- *Subtype*: Episodic CH in 56.3% (31/55), chronic CH in 27.2% (15/55), first attack in 9 (16.3%).

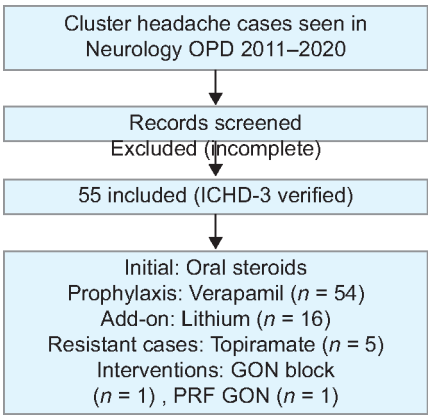

Fig. 1: Case selection and treatment pathway

[1]Senior Consultant; [2–4]Postgraduate, Department of Neurology, Apollo Hospitals, Chennai, Tamil Nadu, India;
*Corresponding Author

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Table 1: Clinical profile of patients with cluster headache ($n = 55$)

Characteristics	*Patients (%)*
Gender	
Men	42 (76.3)
Women	13 (23.6)
Type	
Episodic cluster headache	31 (56.3)
Chronic cluster headache	15 (27.2)
First attack	9 (16.3)
Pain site	
Orbitofrontal	33 (60)
Hemicranial	13 (23.6)
Orbitofrontotemporal	9 (16.3)
Side	
Right	35 (63.6)
Left	19 (34.5)
Alternating	1 (1.8)
Autonomic features	
Lacrimation	38 (69)
Redness	33 (60)
Horner's	7 (13)
Swelling of the eye	12 (22)
Rhinorrhea	12 (22)
Nasal block	11 (20)
Restlessness	23 (42)
Nausea/vomiting	12 (22)
Photo/phonophobia	24 (44)
Others	
Aura	3 (5)
Nocturnal periodicity	39 (71)
Associated migraine	4 (7)
Family history of migraine	1 (2)
Family history of CH	Nil

- *Side/site*: Right-sided in 63.6%; most common site orbitofrontal (60%).
- *Attack profile*: Cluster interval varied (6 months–4 years). Mean cluster duration 6 weeks. Mean attacks 2.7/day, maximum 8/day. Mean episode duration 80 min.
- *Autonomic features*: Present in 92%; most common lacrimation (70%), conjunctival injection (59%).

Other features: Nocturnal symptoms in 72.7%; periodicity in 65%. Aura in three patients (5%). Excess yawning in three. Migraine association in four; cluster-tic in one; overlap with paroxysmal hemicrania in one. Family history of migraine in one; none with a family history of CH.

- *Imaging*: Normal in most; incidental lesions: two meningiomas, one pituitary macroadenoma, one trigeminal neurovascular conflict.
- *Treatment and outcomes*: All patients received oral methylprednisolone. Verapamil was used in 54 (49 with steroids). 16 required lithium, 5 required topiramate. One underwent a greater occipital nerve block (GON), and the other underwent pulsed radiofrequency thermocoagulation of the GON.
- *Follow-up*: Available for 28 patients; 26 improved, 2 had persistent symptoms. 11 recurred after stopping therapy.
- *Adverse effects*: Constipation, pedal edema, verapamil-induced Parkinsonism (improved after stopping), and lithium-induced tremor.

Table 2: Treatment modalities and outcomes in patients with cluster headache ($n = 55$)

Treatment modality	*No. of patients*	*Response/outcome*	*Side effects*
Oral methylprednisolone (48 mg/day × ≥1 week)	55	Initial symptomatic relief	Not reported
Verapamil (120 mg BD, after ECG)	54	The majority improved; 11 recurred after stopping	Constipation ($n = 1$), pedal edema ($n = 1$), Parkinsonism ($n = 1$)
Verapamil + steroids	49	Most improved	As above
Lithium (400 mg/day, add-on)	16	Clinical improvement	Tremors ($n = 1$)
Topiramate (50 mg/day, resistant cases)	5	Some improvement	Not reported
GON block	1	Significant improvement	Nil
PRF of GON	1	Long-term improvement	Nil
Follow-up (available)	28	26 improved, 2 persistent symptoms	–

Table 3: Comparison of clinical features with published literature

Feature	*Present study ($n = 55$)*	*Bahra et al., ($n = 230$)*	*Schürks et al., ($n = 246$)*	*Chakravarty, (India, $n = 44$)*
Male proportion	76.3%	72% (M: F 2.5:1)	77.6%	100%
Episodic CH	56.3%	79%	74.8%	86.4% (38/44)
Chronic CH	27.2%	21%	16.7%	13.6% (6/44)
Age of onset/diagnosis	33 yrs (mean)	28.4 yrs (ECH), 37 y (CCH)	Diagnosis 36.9 yrs; enrollment 44.8 yrs	Late 20–30s
Predominant site	Orbitofrontal 60%	Retro-orbital 92%, temporal 70%	NR	Orbitofrontal boring pain
Laterality	Right 63.6%	Right 60%, left 38%	Unilateral 97.2% (strictly 78.5%; side-changing 18.7%)	Right > left
Autonomic features	92%	≥90%	98.8%	"Classical" features are common
Restlessness	NR	93%	67.9%	NR
Aura	5%	14%	23%	NR
Nausea/vomiting	22%	50% nausea; 23% vomiting	27.8%	NR
Photo/phonophobia	44%	56%/43%	61.2%	NR
Attack duration	80 min (mean)	72–159 min	45–180 min in 67.9%	15–180 min
Attacks/day	2.7/day (mean)	4.6/day (max)	NR	~5/day
Bout duration	6 weeks	8.6 weeks	NR	~6 weeks
Nocturnal predictability	72.7%	73%	NR	More common

Discussion

Our study of 55 patients with cluster headache showed male predominance (76.3%), a mean onset age of 33 years, and predominance of episodic CH. These findings align with prior reports. Schürks et al.[6] reported 77.6%, Bahra et al. reported 72% men,[7] and Chakravarty's Indian series included only men.[8]

The proportion of episodic CH was lower in our study (56.3%) compared with Bahra (79%)[7] and Schürks (74.8%),[6] but closer to Chakravarty (86%).[8] Chronic CH was relatively higher (27.2%).

Autonomic features were common (92%), in line with Bahra[7] and Schürks.[6] Aura was reported in 5%, lower than Bahra (14%)[7] and Schürks (23%).[6] Nocturnal periodicity was present in 72.7%, almost identical to Bahra's 73%.[7]

Chronobiological differences between men and women have been demonstrated, though the overall clinical phenotype remains consistent.[9] Gender differences in CH have also been emphasized, with women showing distinct clinical characteristics,[10] and survey data from the US, revealing broader gender-specific variations.[11] Sleep and hypothalamic mechanisms are thought to play a central role in pathophysiology.[12] Regional data from Kuwait support the generalizability of the CH phenotype across Middle Eastern populations.[13] Comparative data are summarized in Table 3.

Management with verapamil and steroids was effective in most cases. Lithium and topiramate were used for refractory cases. Interventional procedures (GON block, PRF) were helpful in resistant patients. These findings are similar to those of Schürks et al., in which verapamil (70.3%) and glucocorticoids (57.7%) were the most frequently used preventive medications.[6] For acute therapy, subcutaneous sumatriptan remains an established option.[14]

Limitations

This was a retrospective study with limited follow-up and incomplete documentation of social and lifestyle factors. Treatment outcomes were not assessed with standardized scales.

Conclusion

Any patient with a side-locked headache should be evaluated for cluster headache. Attacks are easy to diagnose due to their characteristic features and must be differentiated from migraine. Education of physicians regarding timely diagnosis and appropriate treatment is essential to avoid misdiagnosis and undertreatment.

Orcid

Dhanya Sureddy https://orcid.org/0000-0002-3148-9721

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