

Emergency Low Oxygen-Responded Cluster Headache with Neurologists Oxygen-Negligence; Retrospective Observational Study (11-Report Cases)

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Abstract

Background: Cluster headache is an excruciatingly primary headache disorder. Cluster headache is called suicide headache. Favorably, oxygen therapy is generally accessible, safe, and inexpensive therapy. Unfortunately, using oxygen therapy was a prominent neglected therapy in cluster headache. However, neurologists oxygen-negligence was the main possible problem for the cases of the study. The drugs overusing with unawareness in cluster headache management were the suggested abnormal deviations.

Method of Study and Patients: My study was an observational retrospective eleven case report series. The author reported eleven cases of acute cluster headache through 24-months. Follow up for 6-months for each case had happened. All eleven cases were received inhaled oxygen at 100%, 5 L/min, delivered by nasal cannula, for 5 - 10 minutes. Long-acting verapamil was the prophylactic agent for all cases in the current study.

Conclusions: The novelty in this study was the dramatic response of acute cluster headache to low-O₂ dosage over a short duration using nasal cannula by oxygen generator. Using low-flow oxygen therapy over a short time of O₂ set revealed a dramatic effect in the acute cluster headache. The unique advantages of the study were avoidable of side effects for other drugs, absence of O₂ adverse effects, and time-saving. Antihypertensive drugs and cluster headache combined medications were the usual cause of negligence due to therapeutic deviations from inhaled oxygen therapy. Hypertension related-headache of was the most frequent cause of cluster headache misdiagnosis and negligence.

Keywords: *Low Oxygen-Responded Cluster Headache; Neurologists Oxygen-Negligence; Cluster Headache; Headache; Emergency*

Abbreviations

CH: Cluster Headache; HCRTR2 gene: Hypocretin Receptor 2 Gene; ICHD-II: International Classification Headaches Second Edition; ICHD-III: International Classification Headaches Third Edition; MOH: Medication-Overuse Headache; NSAIDs: Nonsteroidal Anti-Inflammatory Drugs; TTH: Tension-Type Headache

Introduction

Scoping and Statistics

Headache affects almost everyone at least infrequently [1]. It is one of the most common causes of consultation in both general practice and neurological clinics [1]. Headache is the most common reason for a secondary care neurological referral [2]. Headache is one of the most widespread complaints among all the health disorders [3]. Regarding consultations; Regarding consultations, the reported headache was 1 in 10 general practitioners consultations [4]. Nearly 1 in 3 neurology indicates referrals [5]. Headache was about 1 in 5 of all acute medical admissions [6]. Primary headache disorders comprise the highest majority of headache disorders, with migraine and tension-

type headache (TTH) being the most prevalent [7]. TTH affects 60 - 80% of the population while migraine has a prevalence of 15% [8]. Cluster headache is uncommon (0.1%) [9,10]. It is often practically missed [11]. Medication-overuse headache (MOH) is a secondary headache disorder [7]. It usually co-exists with other primary headache disorders [7]. Headache is one of the most common causes that propelling patients in seeking medical help [12]. The prevalence of headaches is extremely surprising [13]. In its various forms, headache represents an immense socioeconomic burden [13]. Approximately 50% of the adult suffers from a headache disorder worldwide [13]. About 95% of the general population have experienced a headache at some stage in their life with a one-year prevalence of almost one in two adults [7]. The prevalence for cluster headache (CH) is 0.15% to 0.3% [12,14] with a one-year prevalence of to be as high as 53 per 100,000 adults [15].

Headache, cluster headache, and significance

Headache disorders are the cause of much disability in populations throughout the world [3]. The World Health Organization includes headache among the top 10 causes of disability [7]. Women headache is among the top [5,7], with an impact similar to arthritis and diabetes and worse than asthma [16]. Cluster headache is a severely painful and disabling condition with rapid onset but validated treatment options are limited [17].

Definition, description of cluster headache, and associations

Cluster Headache is a primary headache disorder characterized by recurrent short-lasting attacks (15 to 180 minutes) of excruciating unilateral periorbital pain associated with ipsilateral autonomic signs (lacrimation, nasal congestion, ptosis, miosis, lid edema, redness of the eye) [14,15,18-21] (Figure 1).

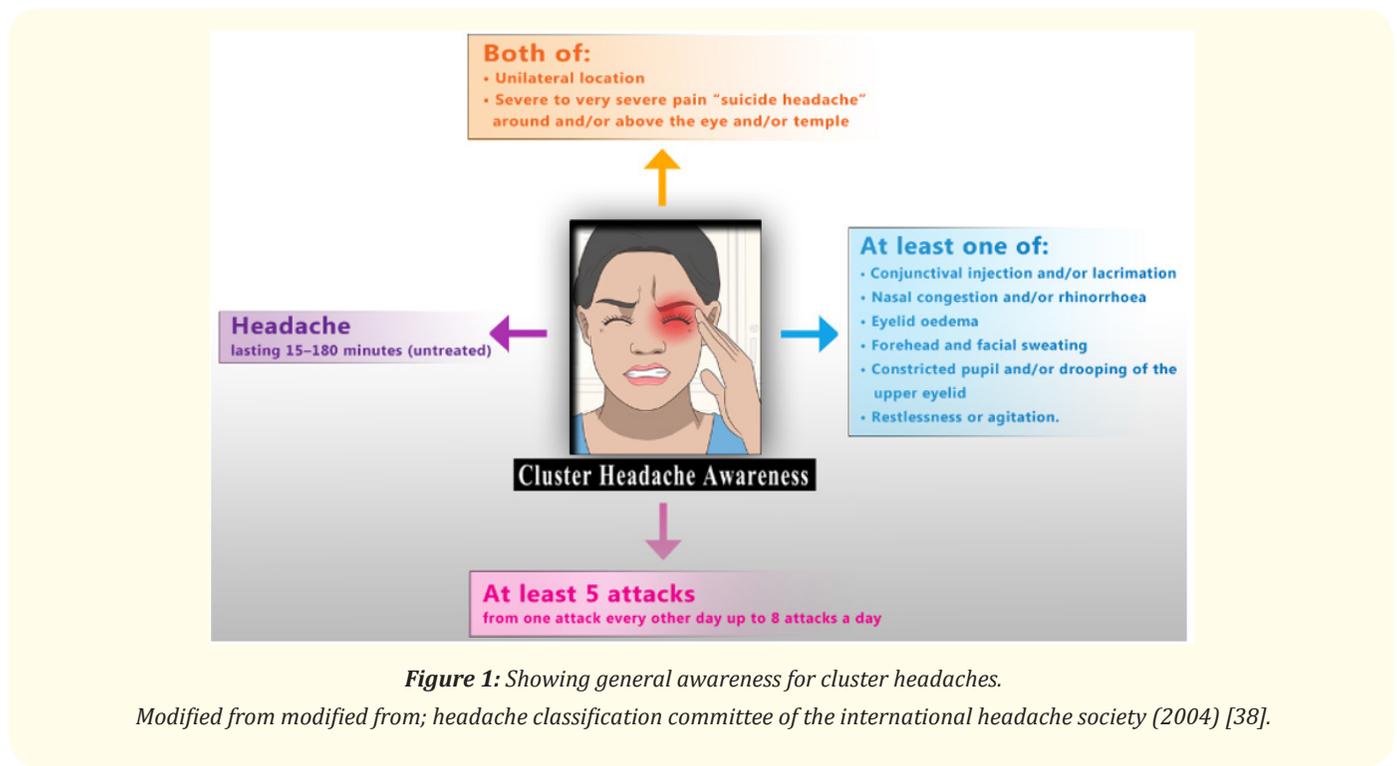


Figure 1: Showing general awareness for cluster headaches.

Modified from modified from; headache classification committee of the international headache society (2004) [38].

It affects young adults, predominantly males [14,15,18-20]. The age of onset is around the 30th year of life [3] but the typical age of CH onset is usually 20 to 40 years [14,15,21]. More men are affected than women, with a ratio of 3.5 - 4.3, but is much higher for chronic CH than for the episodic form [14,15]. Episodic CH is 6-times more common than chronic form [15] (Table 1).

Table 1: Diagnostic criteria for cluster headache according to ICHD III [21].
 Modified from; headache classification committee of the international headache society (2018).
 ICHD III; The 3rd international classification of headache disorders.

Type of headache	Diagnostic criteria
Cluster headache	A. At least five attacks fulfilling criteria B-D B. Severe or very severe unilateral orbital, supraorbital and/or temporal pain lasting 15 - 180 minutes (when untreated) C. Either or both of the following: 1. At least one of the following symptoms or signs, ipsilateral to the headache: i. Conjunctival injection and/or lacrimation ii. Nasal congestion and/or rhinorrhoea iii. Eyelid oedema iv. Forehead and facial sweating v. Miosis and/or ptosis 2. A sense of restlessness or agitation D. Occurring with a frequency between one every other day and eight per day. E. Not better accounted for by another ICHD-3 diagnosis.
Episodic cluster headache	A. Attacks fulfilling criteria for 1.1 Cluster headache and occurring in bouts (cluster periods) B. At least two cluster periods lasting from seven days to one year (when untreated) and separated by pain-free remission periods of ≥3 months.
Chronic cluster headache	A. Attacks fulfilling criteria for 1.1 Cluster headache, and criterion B below B. Occurring without a remission, or with remissions lasting < 3 months, for ≥ 1 year.

CH accompanied by autonomic symptoms in the nose, eyes, and face [15,22]. CH attacks cause severe, strictly unilateral pain, located in one or a combination of orbital, supraorbital, or temporal regions [15,18]. Typical associated symptoms include ipsilateral lacrimation, conjunctival redness, rhinorrhea and or nasal congestion, miosis, and ptosis [14]. In remarkably rare cases, contralateral sweating has been noticed [14]. More than 90% of those affected display pronounced restlessness during the attack [14,19,21]. Autonomic findings of ipsilateral conjunctival injection with lacrimation, rhinorrhoea or nasal blockage, and ptosis of a partial Horner’s syndrome may not all be present [19]. But almost surely at least one or two establish the diagnosis [23]. Each attack starts and ceases abruptly, lasting 15 minutes to three hours. The patient is restless during an attack. The frequency of attacks varies from one every other day to eight per day. There is often a striking circadian rhythm. The attacks often occur at the same time each day and clusters occur at the same time each year [19]. Nearly, 80 - 90% of cases have episodic CH where the attacks “cluster” into periods lasting weeks to months, separated by periods of headache freedom [15,18]. The remaining 10 - 20% have chronic CH (no remission within one year or remissions last less than one month) [14,15,18,19].

Pathophysiology

The pathophysiology of CH is not fully understood. The current suggested mechanisms in cluster headache include; vascular dilation, histamine release, an increase in mast cells, trigeminal nerve stimulation, circadian effects, genetic factors, and autonomic nervous system (ANS) activation [15]. Acute CH attacks have been shown to involve activation of the posterior hypothalamic gray matter may inherit as an autosomal dominant (AD) condition in about 5% of patients [15,21]. Only one study showed an interrelation between cluster headache and the HCRTR2 gene (Protein Coding) [15]. CH is a disorder with increased hereditary risk [24]. Relationship between CH and polymorphism rs2653349 of the HCRTR2 gene have been described [29]. CH pathophysiology and pharmacotherapy change may be affected by genetic factors, signaling the considerable part of genotyping in the overall treatment effectiveness of cluster headaches [24].

Cluster headache; risk factors and triggers

Alcohol, nitroglycerin, histamine, sleep apnea, tobacco smokers, strong solvent odors, and men are common risk factors and triggers for CH [14,15,19,20,22]. Most people who develop cluster headaches are between ages 20 and 50 [20]. A family history having a parent or sibling who has had cluster headache might increase your risk [20]. Many of them are smokers [14,19,20]. Approximately, 50% was a smoker at the onset of cluster headaches with only about 18% have never smoked [22]. The most consistent inducer for CH attack is alcohol, specifically; beer [25]. The disease is familial in about 10% of cases [19]. Sleep apnea occurs in an estimated 30 - 80% of those with cluster headaches [22]. The cluster generator locates in the hypothalamus, which causing brain sleep-wake cycles. It is interesting that during sleep apnea episodes, there is a drop of oxygen to the brain, and that oxygen is such an effective treatment for cluster attacks [22]. CH has a prominent socioeconomic influence and linked with morbidity; about 80% of patients report limiting daily activities [15].

Diagnosis of cluster headache

History and physical examination

Diagnosis has relied on symptoms [15]. The most crucial aspect of headache diagnosis is history taking [7]. All of the headaches are usually diagnosed solely on history, with signs present in cluster headache patients if seen during attacks (occasionally, ptosis may persist between). Examination of the optic fundus is sometimes needed. Blood pressure measurement is recommended. Hypertension is a very rare cause of headache. Migraine prophylaxis drugs will affect blood pressure [23]. Examination of the head and neck (HN) for muscle tenderness (generalized or with tender “nodules”), stiffness, limitation in range of movement and crepitating is often revealing, especially in tension headache. Positive features may suggest a need for physical forms of treatment but not necessarily headache causation. It is uncertain whether the routine examination of the jaw and bite contribute to headache diagnosis but may reveal incidental abnormalities [23].

Investigations

Investigations, including neuroimaging, do not participate in the diagnosis of migraine or tension-type headache [26,27]. Some authors, but not all, request brain MRI in the newly-diagnosed CH patients [23]. The investigations are indicated in the following; papilledema, significant alterations in memory, confusion or coordination, new epileptic seizures, new onset cluster headache, headache with a history of cancer elsewhere, headache with abnormal neurological signs or relevant symptoms, headache aggravated by exertion or Valsalva-like maneuver, headache associated with vomiting, headaches that change significantly, new headache in a patient over 50 years, and headache that wake from sleep [28]. The main reason for the investigations was reassurance [2]. However, the effects of investigations in reducing anxiety in the long term produce conflicting findings [29-31]. The identification of incidental pathology, its clinical relevance and the unnecessary anxiety it incurs is well recognized and can be important [2]. About 3.7% of investigations showed abnormalities that were not clinically relevant [2].

Headache classifications and cluster headache differential diagnosis

Headache is universally categorized as primary and secondary, and these classifications are further subdivided into specific headache types [18]. Primary headache disorders are not associated with an underlying pathology and include migraine, tension-type, and CH. A secondary headache implicates in the underlying pathological condition. It usually includes any head pain of; infectious, toxic, neoplastic, rheumatic, vascular, or drug-induced origin in CH [18] (Table 2).

Table 2: Differential diagnosis of serious secondary headache [12,13].

ACS: Altered Mental Status.

Modified from; Singh., et al. (2012) and Becker., et al. (2015).

Class	Headache Causes	Keys
<ul style="list-style-type: none"> Neurologic 	<ul style="list-style-type: none"> Subarachnoid hemorrhage Hypertensive encephalopathy Subdural hematoma Intracerebral hemorrhage Cervical artery dissection Idiopathic intracranial hypertension Cerebellar infarction 	<ul style="list-style-type: none"> Thunderclap (sudden, severe onset) headache ACS, hypertensive, neurologic signs in non-anatomic distribution Trauma, coagulopathy Hypertension, cerebral aneurysm, arteriovenous malformation Neck pain, trauma, stroke symptoms, Horner syndrome Papilledema, worse when lying flat, obesity Ataxia, dysmetria, vertigo, vomiting
<ul style="list-style-type: none"> Infectious Rheumatic Toxic Ophthalmologic Hormonal 	<ul style="list-style-type: none"> Meningitis Temporal arteritis Carbon monoxide poisoning Acute glaucoma Pituitary apoplexy 	<ul style="list-style-type: none"> Fever, neck stiffness, immunosuppression Jaw claudication, vision changes, polymyalgia rheumatica Waxing and waning headache, cluster of cases Unilateral vision change, eye pain, and redness Hypotension, hypoglycemia, hyponatremia, visual field deficit, history of pituitary tumor
<ul style="list-style-type: none"> Pregnancy 	<ul style="list-style-type: none"> Pre-eclampsia Venous sinus thrombosis 	<ul style="list-style-type: none"> Hypertension, proteinuria, nondependent edema, pregnancy Pregnancy, postpartum, hypercoagulable, oral contraceptive use
<ul style="list-style-type: none"> Neoplastic 	<ul style="list-style-type: none"> Intracerebral tumor 	<ul style="list-style-type: none"> Chronic progressive headaches, papilledema, history of malignancy

Migraine is a unilateral throbbing headache [7,15,32]. It often occurs with sudden onset. It more common in women. Migraine onset is typically in adolescence or young adulthood. A migraine headache usually occurs in lying in a dark room, medication. It happens in sleep with fatigue, nausea, photo- or phonophobia, vomiting. About, 50 percent of patients have bilateral autonomic symptoms, and worse with activity [7,15,32]. Tension headache is a gradually developing, constant bilateral dull ache or squeezing band-like headache [7,15]. It slightly more common in women, analgesics, stress relief, fatigue, pericranial muscle tenderness, sleep disturbance, and typically starts midday [7,15]. Medication-overuse headache (MOH) is a secondary headache disorder and often co-exists with primary headache disorders [4]. Diagnostic criteria and definition MOH33 according to the IHS is:

- a) Headache present on ≥ 15 days per month.
- b) Regular overuse for > 3 months of one or more acute/symptomatic treatment drugs.

- i) Ergotamine, triptans, opioids or combination analgesics medications on ≥ 10 days per month on a regular basis for > 3 months.
- ii) Simple analgesics or any combination of ergotamine, triptans, analgesics, or opioids on ≥ 15 days per month on a regular basis for > 3 months without overuse of any single class alone.
- c) Headache has developed or markedly worsened during medication overuse.

Headache may pass undiagnosed. Atypical features of undiagnosed headache occur in a small minority of headaches which do not meet recognized criteria, even after the keeping of a diary cannot reliably be diagnosed [23]. So, differential diagnosis is an essential part of the diagnosis of types of headache. Chronic sinusitis is not a validated cause of headache unless there is an acute exacerbation. Errors of refraction may be associated with migraine [34]. The associated headache is mild, frontal and in the eyes themselves, and absent on waking. The headache should not be considered secondary to conditions affecting the ears, temporomandibular joints or teeth unless other symptoms are indicative of these [23]. Serious secondary headache disorders should always be kept in mind during diagnostic enquiry [23]. Awareness for red-flags for critical headaches is essential for diagnosis [12,13,18,23] (Table 3).

Table 3: Red-flags and warning features for serious headaches.

HIV: Human Immunodeficiency Virus.

Class Severity	Red-Flags
Emergency Red flags (address immediately) [7,12,13,18,23]	<ul style="list-style-type: none"> • Thunderclap onset; Maximal intensity within minutes of onset (thunderclap headache) • Fever and meningism us; Posterior headache with neck pain or stiffness • Papilledema with focal signs or reduced level of consciousness • Acute glaucoma • Change in vision • Change in consciousness • Syncope • History of neurosurgery or cerebral shunt • Headache with seizure • Pregnancy or postpartum
Urgency Red flags: (address within hours to days) [7,12,13,18,23]	<ul style="list-style-type: none"> • Temporal arteritis • Papilledema without focal signs or reduced level of consciousness • Relevant systemic illness • Elderly patient New headache in patient older than 50 years of age with cognitive change • New onset headache in a patient younger than 10 years • History of HIV or immunocompromise • History of malignancy
Less Urgent Possible Indicators For Secondary Headache [7,12,18,23]	<ul style="list-style-type: none"> • Unexplained focal signs • Atypical headaches • Unusual headache precipitants • Unusual aura symptoms • Onset after age 50 year • Aggravation by neck movement; abnormal neck examination findings (consider cervicogenic headache) • Jaw symptoms; abnormal jaw examination findings (consider temporomandibular joint disorder)

Cluster headache overlapping with other headache

In 25% of patients, cluster headache coincides with other headache types. Overlaps with migraine are known as cluster migraine; the simultaneous occurrence of cluster headache with trigeminal neuralgia is as cluster-tic syndrome [14,35]. Surprisingly, CH patients do not develop medication-overuse headache (MOH) with triptans as often as migrainers do [14,36].

Management

For many people with troublesome but benign headache, reassurance is very much part of successful management. The physical examination adds to the perceived value of reassurance. The time spent will likely be saved several times over, hindering many future consultations by a still-worried patient [23]. Triptans and supplemental oxygen (O₂) are first-line effective therapies for acute cluster headache [7,12,14,15,17,19,25]. Zolmitriptan and sumatriptan are useful in the acute treatment of cluster headaches with a better safety and tolerability profile than ergotamine [7,17]. First-line drugs for attack prophylaxis include verapamil and cortisone; alternatively, lithium and topiramate can be given [7,14,15,18,20]. Shortly, inhaling 100% O₂ using a mask at a minimum rate of at least 12 liters a minute gets dramatic relief for most CH7. O₂ is generally safe, inexpensive, and without side effects [20]. The great hindrance of O₂ is the need to carry an O₂ cylinder which can make the treatment inconvenient and inaccessible at times [20]. Small, portable units are available, but some people still find them impractical [20]. A double-blind, randomized, placebo-controlled crossover trial showed that inhaled high-flow oxygen (12L per minute) was more effective than placebo in eliminating pain at 15 minutes [12,15,20,25,28]. Complete pain relief occurs in about 78% of patients. Verapamil at a minimum dosage of 240 mg per day is first-line prophylaxis for CH [12,15,25,28]. Surgical and other invasive procedure using occipital nerve stimulation may produce improvement in selected cases [15]. Patient education is essential. Focusing on managing or avoiding triggers will be including smoking cessation, alcohol counseling, and lifestyle modification [15,37].

Case Presentations

I had reported eleven cases of cluster headache. Clinically, cluster headache initially diagnosed for all patients. The study conducted over 24-months with follow up for 6-months for each case. Primary headache disorders otherwise CH include migraine, tension-type, and secondary headache disorders which implicated in differential diagnosis were excluded (Table 2). ESR for the eleven cases was showing no significant abnormalities. Brain CT was showing no abnormalities for the total cases. No reports for other workups. All eleven cases were received Inhaled oxygen at 100%, 5 L/min, delivered by nasal cannula, for 5 - 10 minutes at the start of an attack of CH. The dramatic response had happened post-oxygen therapy for the cases. The duration of response varied from 5 - 10 minutes. Duration interval among attacks/day range was; 7 - 15. The number of attacks that received inhaled oxygen varied from case to case. Calcium channel blocker; Verapamil (240 mg, once daily) was given and continued for all patients as a CH prophylaxis. For more details see (Table 4).

Table 4: History, clinical, and management data for the study cases.
 BP: Blood Pressure; RF: Risk Factor; Sat; Saturation.

Case No.	Age	Sex	BP mg Hg	O ₂ Sat. %	Associated RF	O ₂ Dose	Duration of O ₂ Set	No. of attacks	Duration among attacks/day	Prophylactic therapy
1	27	M	140/80	99	Male sex-Smoker	5 L/min	7 min	4	8,11,13	Verapamil 240 mg
2	42	F	130/70	96	Stress	5 L/min	5 min	2	7	Verapamil 240 mg
3	33	M	150/90	97	Male sex	5 L/min	4 min	3	9,14	Verapamil 240 mg
4	22	M	130/80	98	Male sex-Smoker	5 L/min	7 min	2	8	Verapamil 240 mg
5	30	M	130/70	99	Male sex-Caffeine	5 L/min	10 min	3	5,12,15	Verapamil 240 mg
6	37	F	130/80	95	Caffeine	5 L/min	6 min	3	8, 10, 14	Verapamil 240 mg
7	43	M	150/90	97	Male sex-Stress	5 L/min	7 min	2	9	Verapamil 240 mg
8	25	F	120/80	98	Caffeine	5 L/min	5 min	2	8	Verapamil 240 mg
9	24	F	130/80	98	Stress- Family history	5 L/min	7 min	3	7, 10	Verapamil 240 mg
10	27	M	140/80	100	Male sex-Smoker	5 L/min	6 min	3	8,13	Verapamil 240 mg
11	29	M	120/80	96	Male sex-Smoker	5 L/min	10 min	2	8	Verapamil 240 mg

Discussion and Results

Overview

The author reported eleven cases of acute cluster headache in the study. The study conducted over 24-months in the author specialized outpatient clinic. Each case followed for 6-months for recurrent episodes. 63.64% of the cases were male. The remaining 36.36% were female. Age range was; 22 - 43-(mean; 30.8, median; 29, mode; 27). No. of CH attacks for each case range was; 2 - 4 (Mean; 2.64, Median; 3, Mode; 2). All eleven cases of acute cluster headache received both therapeutic low-flow oxygen therapy (5 L/min) in a more short time of O₂ set (5 - 10 minutes) and prophylactic long-acting verapamil drug (240 mg, once daily). Duration of each O₂ Set range was; 5 - 10 minutes (mean; 5.69, median; 7, mode; 7). Duration interval among attacks/day range was; 7 - 15. The associated risk factors in the study were:

- Male sex 63.64%
- Smoking 36.36%
- Stress 27.27%
- Caffeine 27.27%
- Family history 9.09%
- And double RF
- (Male sex + Smoking) 36.36%
- (Male sex + Caffeine) 9.09%
- (Stress + Family history) 9.09% (Figure 2).

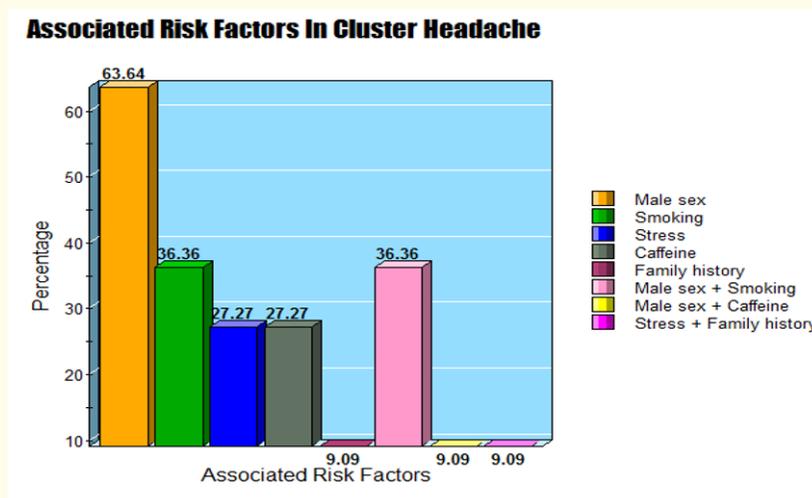


Figure 2: Showing associated risk factor in the study.

The study was an observational retrospective case report series

I can't compare the current case with similar conditions

There are no similar or known cases with the same management for near comparison. Indeed, no previous study had used the low-flow oxygen therapy dose (5 L/min) in a more short time of O₂-set (5 - 10 minutes). But the prophylactic long-acting verapamil drug (240 mg, once daily) in the current study shared with other studies.

Study question here

Can the physician use a low dose with short duration of oxygen therapy effective for the treatment of acute cluster headache? What are the suggested causes for neurologists oxygen-negligence in the cluster headache?

The primary objective for the current study was the accurate diagnosis for cluster headache.

The secondary objective for the study was the excitation for the actual dramatic response of all included eleven cases of acute cluster headache to low-flow oxygen therapy (5L/min) in a more short time of O₂-set (5-10 min) with effective the prophylactic long-acting verapamil drug.

Results

- The study was done over 24-months in the physician outpatient clinic from February 2017 to March 2019. The study had included 11 patients of acute cluster headache. The mean age was; 30.8, with male sex (63.64%). All eleven patient received low-flow oxygen therapy dose (5 L/min) in a more short time of O₂ set (5 - 10 minutes) with using the prophylactic long-acting verapamil drug (240 mg, once daily).
- The dramatic response had happened with O₂ for all 11 cases of acute cluster headache.
- Regards the neurologists oxygen-negligence, the author classified the negligence reasons based on history into;
 1. Negligence due to true therapeutic deviations (Figure 3):
 - Use NSAIDs e.g. ibuprofen, diclofenac: 2 cases (18.18%)
 - Use triptans e.g. sumatriptan, zolmitriptan: 1 case (9.09%)
 - Use ergots derivatives: 2 cases (18.18%)
 - Antihypertensive drugs e.g. captopril, furosemide: 6 cases (54.55%). So, antihypertensive drugs and mixed medications for the treatment of acute cluster headache were the most common cause of negligence due to true therapeutic deviations.
 - Mixed medications: NSAIDs + ergots + antihypertensive medications: 6 cases (54.55%).

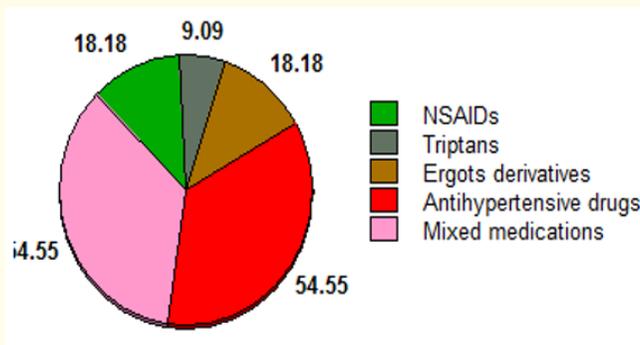


Figure 3: Showing negligence due to true therapeutic deviations.
NSAIDs: Nonsteroidal Anti-Inflammatory Drugs.

2. Negligence due to headache misdiagnosis (Figure 4):
 - Hypertensive headache; 7 cases (63.64%)
 - Migraine; 4 cases (36.36%)
 - Ophthalmic; 1 case (9.09%)

Thus, the hypertensive headache was the most common cause of negligence due to headache misdiagnosis.

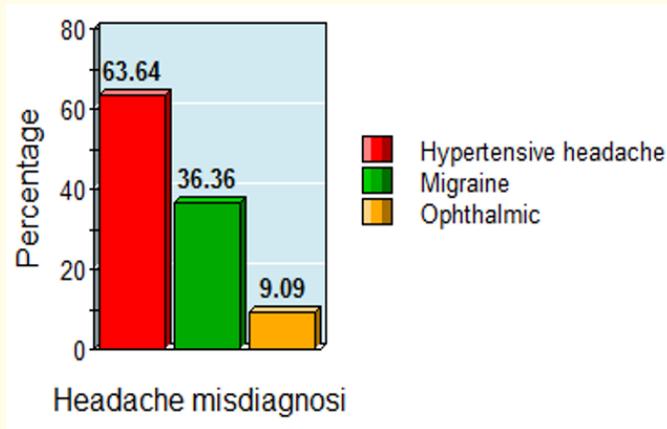


Figure 4: Showing negligence due to headache misdiagnosis.

Limitations of the Study

There are no known limitations in the study. But, contraindications of oxygen therapy are possible limitations.

Recommendations

- It is recommended to the acute cluster headache with low oxygen flow (5L/min) in a more short time of O₂ set (5 - 10 minutes). With using the prophylactic long-acting verapamil drug (240 mg, once daily).
- Also, it is recommended to refreshment the impact of diagnosis and differential diagnosis for the cases of headache.

Conclusions

- Using of low dose oxygen therapy (5 L/min) in a more short time of O₂ set (5 - 10 minutes) has shown dramatic effect in the acute cluster headache with no side effects rather than time-saving.

Antihypertensive drugs and cluster headache combined medications were the usual cause of negligence due to therapeutic deviations from inhaled oxygen therapy.

- Hypertensive headache was the most common cause of negligence due to cluster headache misdiagnosis.
- Awareness of the accurate diagnosis of cluster headache is the essential target for this study.
- The prophylactic long-acting verapamil drug (240 mg) in the current study shared with other studies in its effectivity.

Conflicts of Interest

There are no conflicts of interest.

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