Clinical study of headache with special reference to ophthalmic cause

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Abstract

Background: Rapid modernization of the world requires more attention thereby aggravating eye strain in individuals, resulting into various types of headache disorders. Headache-related disorders are an important cause of disability worldwide, and ophthalmic causes for headache are well known.

Objectives: The aims of this study were: (i) to estimate the prevalence of headache disorders in patients attending the eye OPD; (ii) to evaluate the various causes of headache with special reference to ophthalmic conditions; and (iii) to study the correlation between location of headache and possible ocular causes.

Materials and Methods: A prospective study was carried out on 1520 patients from November 2006 to October 2009 at a tertiary eye care center. Detailed clinical history was taken with particular emphasis on onset, duration, location, intensity, character, diurnal variation, and exaggerating and relieving factors. Ocular examination included vision, slit-lamp examination, cycloplegic refraction, orthoptic evaluation, intraocular pressure measurement, and fundoscopy. Besides ocular examination, medical, ENT, dental, and neurological checkup along with investigations such as hemoglobin, blood sugar, X-ray of skull and paranasal sinuses, and CT scan of sinuses and brain were carried out whenever needed and treatment was advised accordingly. The data was entered on a Microsoft Excel spreadsheet and analyzed using SPSS software, version 14.0 (SPSS, Inc., Chicago, IL). P value < 0.05 was considered statistically significant.

Results: Our study included 1520 subjects complaining of headache. Maximum patients (47%) were in the age group of 16–30 years with female preponderance (56%). Ocular headache was found in 36% followed by primary headache (27%), ENT problems (17%), medical causes (12%), and miscellaneous causes (3%). Out of ocular causes of headache, refractive error (65%) was the most common cause followed by abnormalities of anterior part of eye (21%), muscles imbalance (18%), and posterior segment disorders (5%). Among various refractive errors, astigmatism was found in 41% cases, hypermetropia in 22%, and myopia in 12% patients. In our study, 64% cases were relieved of headache

Conclusion: Headache is multifactorial in origin. Possibility of ocular causes should be kept in mind during management of headache. An ophthalmologist may play a vital role in establishing the correct diagnosis of headache.

KEY WORDS: Headache, squint, glaucoma, refractive errors, muscle imbalance, migraine

Introduction

Headache is an important cause of disability worldwide.[1] It ought to be a huge public health issue, but receives little priority in the queue for health-care resources. It mainly affects the productive years and carrier-making period of life and has a tremendous socioeconomic impact. Although it is a common complaint, it is often misdiagnosed and inadequately treated. Differential diagnosis of headache is probably one of the longest in all of the diseases.[2] Headache may arise from conditions that range from benign to catastrophic. Rapid and accurate diagnosis is a crucial step for successful management of headache. The aims of this study were: (i) to estimate the prevalence of headache disorders in patients attending the eye OPD; (ii) to evaluate various causes of headache with special reference to ophthalmic condition; and (iii) to study the correlation between location of headache and possible ocular causes.

Materials and Methods

This prospective study carried out in the Department of Ophthalmology, SS Medical College and Gandhi Memorial Hospital, Rewa, Madhya Pradesh, India. It was conducted on 1520 patients complaining of headache during November 2006 and October 2009.

A detailed clinical history was taken with emphasis on onset, duration, location, intensity, character, diurnal variation, and exaggerating and relieving factors. Occupation of each patient was also recorded. Cases of manifest squint were excluded.

A comprehensive clinical examination including visual acuity of each eye for distance and near was conducted in all cases. Intraocular tension was taken with applanation tonometer and Humphrey visual field analysis were carried out to rule out any possibility of glaucoma.

All the patients were then subjected to thorough dark room investigations. Cover test (screen test) for distance and for near were conducted to rule out latent squint. Ocular movements were tested uniocularly and binocularly. Retinoscopic examination was carried out under appropriate cycloplegia. A postmydriatic test was done after 3 days if retinoscopy had been done under homatropine and after 2 weeks if it had been done under atropine. Orthoptic evaluation included measurement of the near point of convergence and power of accommodation. Maddox rod test was used for the measurement of heterophoria for distance and Maddox Wing test was used for near point of conversion. Near point of convergence and amplitude of accommodation were recorded by Royal Air Force ruler. Range of fusion and power of ductions were tested on the synoptophore in each patient. Examinations of the media and fundi were carried out under mydriasis. Patients whose diagnosis remained inconclusive on eye examination were referred to other departments such as medical, ENT, dental, neurology, or psychiatry, as required, and elicited by history and investigation. Besides these checkups investigations such as hemoglobin, blood sugar, skull X-ray and paranasal sinuses, and CT scan of sinuses and brain were carried out where needed and treatment was advised accordingly.

Results

The maximum incidence of headache (46.84%) was found in the age group of 15–30 years, followed by in the age group of 31–45 years (29.07%) and in the age group 5–15 years (16.44%). The incidence was the lowest (i.e., 7.63%) in the age group of more than 45 years [Table 1]. The incidence was higher in females (56.44%) than males (43.55%). Males and females ratio (in percent) in age group of 15–30, 30–45, and > 45 years was 22:26, 12:18 and 3:5, respectively [Table 2]. Students were found to be most commonly affected (48%) followed by housewives (25%), clerks (11.0%), businessman (4%), technical personnel (7%), and farmers and laborers (4%)

Table 1: Distribution of cases according to age of the patients

Age (years)	No. of cases	Percentage
5–15	250	16.44
16–30	712	46.84
31–45	442	29.07
>45	116	7.63
Total	1520	100.0

Table 2: Sex distribution in cases of headache

Age Group (years)	Male		Female	
	No. of cases	Percentage	No. of cases	Percentage
5–15	116	7.63	134	8.81
15–30	228	21.57	384	25.26
30–45	176	11.57	266	17.5
>45	42	2.76	47	4.86
Total	331	43.55	858	56.44

Table 3: Occupation of the patients having headache due to ocular causes (*n* = 546)

Occupation	No. of cases	Percentage
Student	262	47.98
Housewife	134	24.54
Clerk	30	10.98
Businessman	24	4.39
Technical personnel	38	6.95
Laborer and farmer	22	4.29
Others	3	1.09

[Table 3]. The headache due to ophthalmic causes was found in 36% cases, followed by primary headache in 27%, ENT problems in 17%, medical causes in 12%, and miscellaneous causes in 9% cases [Table 4]. Among ophthalmic causes, refractive error including presbyopia was seen in 65% cases, followed by anterior segment abnormalities in 21%, muscles imbalance in 18%, and diseases of posterior segment in 5% cases [Table 5]. Out of the 36% (546) cases with ocular abnormalities, 64.83% (354) had refractive errors. The most common refractive error was astigmatism, which observed in

Table 4: Etiological factors of headache

Causes of headache	No. of cases	Percentage
Primary headache	404	26.57
Ocular abnormalities	546	35.92
ENT	252	16.57
Medical	188	12.36
Miscellaneous	130	8.55

42% cases followed anisometropia (25%) and hypermetropia (21.5%). The most common type of astigmatism was simple hypermetropic astigmatism (16%), simple myopic astigmatism (14.5%), compound myopic astigmatism (6.5%), compound hypermetropic astigmatism (3%) and mixed astigmatism (1%) [Table 6].

Amount of astigmatism less than 1 D was detected in 66% cases, whereas 23% cases had astigmatism between 1.5 and 2 D. Only 11% cases had astigmatism more than 2 D [Table 7]. Apart from astigmatism, other type of refractive errors comprised 51%. Of these refractive errors 1 D or less was seen in 62% cases. There were 26% cases having a refractive error between 1.25 and 2 D and 12% were having a refractive error of more than 2 D. The incidence of hypermetropia was more in case with headache (21.5%) [Table 8].

Headache is a symptom of anterior part of eye, glaucoma was found in 38% of the patients, followed by uveitis in 30%,

corneal lesion in 23.43%, and herpes zoster ophthalmicus in 9% of cases with headache [Table 9]. On orthoptic examination, 27% patients had exophoria for near convergence, 50% had convergence insufficiency or decreased convergence amplitude, and 23% had esophoria [Table 10]. Headache was aggravating more during near work in these subjects. Anterior headache was found in 68% cases, followed by posterior headache in 4% and combined headache in 12% of cases [Table 11]. The majority (64%) of the headache patients were relieved of the symptoms [Table 12].

Table 5: Various ocular causes of headache (*n* = 546)

Ocular causes	No. of cases	Percentage
Refractive errors and presbyopia	354	64.83
Anterior segment abnormalities	128	20.51
Muscles imbalance	44	17.94
Diseases of posterior segment	14	4.76
Others	6	2.19

Table 6: Type of refractive errors in headache (*n* = 354)

Type of refractive error	No. of cases	Percentage
Astigmatism	150	42.37
Simple hypermetropic astigmatism	56	37.33
Compound hypermetropic astigmatism	14	9.33
Simple myopic astigmatism	50	33.33
Compound myopic astigmatism	22	14.66
Mixed astigmatism	8	5.33
Hypermetropia	76	21.46
Presbyopia	60	16.94
Myopia	44	12.42
Mixed	24	6.77

Table 7: Amount of diaptoric power in various type of astigmatism in headache (*n* = 150)

Type of astigmatism (A)	Astigmatism up to 1 D		Astigmatism 1.25–2 D		Astigmatism >2 D	
	No. of cases	%	No. of cases	%	No. of cases	%
Hypermetropic A (*n* = 70)	44	29.33	20	13.33	6	4.00
Myopic A (*n* = 72)	52	34.66	12	8.00	8	5.33
Mixed A (*n* = 8)	4	2.66	2	1.33	2	1.33
Total 150	100	66.66	34	22.66	16	10.66

Table 8: Amount of diaptoric power in various type refractive error in headache (*n* = 180)

Type of refractive error	Amount of refractive error					
	Up to 1 D		1.25–2 D		2.25–5 D	
	No. of cases	%	No. of cases	%	No. of cases	%
Hypermetropia (*n* = 76)	52	28.88	16	8.88	8	4.44
Presbyopia (*n* = 60)	36	20.00	18	10.00	6	3.33
Myopia (*n* = 44)	24	13.33	12	6.66	8	4.44
Total 180	112	62.22	46	25.55	22	12.21

Table 9: Distribution of various types of anterior segment/adenaxal abnormalities (*n* = 128) that were found in causing headache

Abnormalities of anterior segment	No. of cases	Percentage
Herpes zoster ophthalmicus	12	9.37
Glaucoma	48	37.5
Corneal ulcer/keratitis	30	23.43
Uveitis	38	29.68

Table 10: Incidence of muscles imbalance (*n* = 44) on cover test in patients with headache

Muscles imbalance etiology	No. of cases	Percentage
Exophoria	12	27.2
Esophoria	10	22.72
Defective convergence	22	50.0

Table 11: Location of headache in various ocular abnormalities (*n* = 546)

Location of headache	No. of cases	Percentage
Anterior headache	370	67.76
Posterior headache	110	20.14
Combined headache	66	12.08

Table 12: Results obtained after treatment and on follow-up of cases of headache

Treatment outcome	No. of patients	Percentage
Cases completely relieved of headache	972	63.94
Cases partially relieved of headache	334	21.97
Cases did not turn up for subsequent checkup	214	14.07

Discussion

Although headache is a common complaint, it has significant impact on public health as well as personal health. Though headache management is not always easy but it is often rewarding. The contribution of ophthalmologist in the diagnostic evaluation of a patient with headache is outlined. When asthenopia or an organic eye disease is the cause of the headache, the ophthalmologist can not only diagnose the etiology but also cure the patient by adequate therapy. When the headache is a sign of a central nervous system disease, the ophthalmologist can provide valuable information regarding nature and localization of the process to the neurologist.[3]

This study was carried out on 1520 patients experiencing headache and attending the Department of Ophthalmology, Gandhi Memorial Hospital, Rewa, between November 2006 and October 2009.

Age Incidence

In our study population, the maximum incidence of headache (i.e., 46.84%) was found in the age group of 15–30 years. In the age group of 30–45 years, the incidence was found to be 29.07%. The incidence was the lowest (i.e., 7.63%) in the age group of >45 years. Similar findings were reported by Dhir[4] and Ahmed and Zuberi[5] who found the maximum incidence of headache in the age group of 20–30 and 15–20 years, respectively. Marasini et al.[6] also observed in their study that every six patients out of ten have headache in the non-presbyopic adult group. Headache prevalence in this particular age group might be because of the psychological stress caused by educational pressures for career development, emotional factors, and family conflicts.

Sex Incidence

In our study, the incidence of headache was found to be higher in females (56.5%) than in males (43.55%) in all age groups. Our findings are consistent with findings of Lanchner,[7] Donahue,[8] and Dhir[4] who reported incidence of headache in females to be 58.3%, 56%, and 57% in their respective studies. Marasini et al.[6] also reported females outnumbering males in their study. The higher incidence of headache in females may be due to their higher emotional instability and psychological stress in male-dominated society.

Occupation in Headache Cases Regarding Ocular Cause

In our study headache due to ocular causes was mostly seen in students (52%). Brown and Kronfeld[9] also reported 60% of student group having headache in their study.

Various Causes of Headache

In our study, the headache due to ophthalmic causes was found in 36% cases, followed by primary headache in 27%, ENT in 17%, medical causes in 12%, and miscellaneous in 9% cases. Queiroz et al.[10] found the prevalence of primary headache in general population as 37.2% and rest were having secondary causes. Our findings are discordant with their study because their study was population based whereas in our study, the cases were recruited from ophthalmic OPD.

Ocular Causes of Headache

In our study, the incidence of headache was a slightly higher in refractive errors including presbyopia in 65% cases, followed by muscles imbalance 18% and anterior segment abnormalities 21% cases. Similar findings were also observed by Cogan[11] and Foster.[12]

Types of Refractive Errors in Headache

In our study the most common refractive error was astigmatism, which occurred in 42.37% cases followed by hypermetropia (21.46%) and myopia (12.42%). There was also a higher incidence of anisometropia (25%). Ahmed and Zuberi[5] also found astigmatism in 59% and hypermetropia in 11% patients with headache. Marasini et al.[6] found highest incidence of headache associated with refractive errors in 44% cases, among these astigmatism was observed in 63.63% subjects, hypermetropia in 27.27%, and myopia in 9.09% cases. Mechanism of headache from ciliary muscles contraction in hypermetropia of equal or different degrees where patients accommodate to see clearly and in astigmatism, especially of low degree or moderate degree, where muscles contract irregularly may cause more severe headache.

Amount of Refractive Errors in Headache

In our study, 150 cases of headache had astigmatism in which 114 cases had astigmatism less than 1 D and 16 cases had astigmatism between 1.5 D and 2 D .Only six cases had astigmatism more than 2 D. Similar observations were reported by Griffith [13], who stressed that small astigmatism errors were responsible for more severe ocular asthenopia. Cogan[11] also stated that small refractive errors, especially hypermetropia and astigmatism, may cause headache. Akinci et al.[14] also reported higher prevalence of headache in compound and mixed astigmatism. The reason for the higher incidence of headache in hypermetropic astigmatism and mixed astigmatism may be that involuntary, sustained excessive accommodative efforts put the eyes under strain.

Anterior Segment/Adenaxal Abnormalities in Headache

We observed incidence of headache among the diseases of anterior part of eyes. Glaucoma was found in 38% patients, followed by uveitis in 30%, corneal ulcer/keratitis in 23%, and herpes zoster ophthalmicus in 9% cases. Usui et al.[15] also found 51% cases of glaucoma having migrainous headache.

Muscular Imbalance in Headache Cases

In our study, we found 44 cases of muscle imbalance with normal vision, of these 27% cases were exophorics and 23% were esophorics, and 50% cases were having defective convergence. These findings are in accordance with those reported in the study conducted by Dragomir et al.[16] and Gupta et al.[17] The authors reported that roughly (60.4%) of young adult patients complaining of blurring of vision at near work and headache had convergence insufficiency. Dhir[3] also noticed muscle imbalance for near (mainly exophoria) to be more important in causing headache. Possible explanation is that binocularity and parallelism are maintained by the extraocular muscles under the controlling influence of fusion. In muscle imbalance, this might put a strain on the extraocular musculature that is richly supplied with pain-sensitive nerve endings and lead to ocular asthenopia and headache.

Location of Headache Regarding Ophthalmic Cause

In our study, the anterior headache was found in 67% cases, followed by posterior headache in 20% of cases and combined headache in 12% of cases. Our findings are in accordance with those of Lanchner[7] who found 56% of cases to have anterior headache and 14% to have posterior headache. Foster [12] found cases of posterior headache in 12% of cases. Posterior headache was most common in cases of presbyopia, myopia, and convergence insufficiency. The occurrence of posterior headache in presbyopia may be because of abnormal posture (like titling back of the head) stimulating the pain-sensitive endings in the neck and back of the head. Griffith [13] also explained occipital pain on account of eye strain, which may lead to screwing of the eyes and contraction of the orbicularis and frontalis which in turn pulls on epicranial fascia and occipital muscles leading to contraction of these. Mechanism of anterior headache from contraction of ciliary muscles in hypermetropia of equal or different degrees where patients accommodate to see clearly, screwing of lids in myopia, and also iris muscle contraction and dilatation in flicker light, may cause more severe headache.

Relief of Headache in Study Group

We found that 64% cases were completely relieved of the symptoms. Approximately 14% cases did not turn up. Although there is no consensus about the headache management, but on conducting a statistical study of probable causes of ocular headache it was found that occurrences of anterior headaches were more common.

Conclusion

Headache, which is one of the most common symptom, may occur due to innumerable causes and sometime it is difficult to establish its mechanism in many cases. Proper headache management needs complete understanding of all agonies of patients. Sufficient time committed to a systematic headache history is the key to effective diagnosis and successful management. Ophthalmic disorders responsible of headache are many. An ophthalmologist has a vital role in the management of headache. A detailed clinical history and a multidisciplinary approach in a stepwise manner will greatly help in exploration of the cause of headache. It also provides an opportunity to establish a good doctor–patient rapport and decreases the burden of disorder rather than shunting patient from doctor to doctor.

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