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Systematic Review Article

INCIDENCE OF ALARM CRITERIA AND ATTITUDE TOWARDS HEADACHE PATIENTS SEEN IN PRIMARY CARE

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Abstract

Introduction: The alarm criteria make it possible to identify people who consult for severe secondary headaches in the primary care services.

Objective: To determine the sociodemographic characteristics of patients who come to the emergency room due to headache, the incidence of alarm criteria, treatment and diagnosis after one year of follow-up.

Patients and methods: Retrospective and observational cross-sectional study of people treated in the primary care of the Arnau de Vilanova Hospital between June 2014 and May 2015 due to headache.

Results: A total of 303 people were identified, of which 165 were eventually included in the study. There was a predominance of women (66.7%). The mean age was 41.2 ± 15.9 years. Only 16.4% were referred from primary care and 52 (31.5%) had alarm criteria. In half of these cases a cranial computed tomography was performed, and in 4 (7.7%), a lumbar puncture. A serious cause of the headache was identified in 4 cases (2.4%). After one year of follow-up, three patients who initially did not consult due to alarm criteria were diagnosed with serious diseases of the central nervous system, and 23 (13.9%) returned to the emergency room for the same reason.

Conclusions: Only one out of every two patients meets alarm criteria. The proportion of severe secondary headache is really low. It is necessary to improve the multidisciplinary approach to headache in our setting to avoid consulting for primary headaches without alarm criteria.

Keywords: sociodemographic.

Introduction

Headache is not only one of the most frequent reasons for outpatient consultation services neurology [1 - 6] but also in the emergency departments of hospitals. Individuals who present for that condition to the emergency services account for 04.01% of all the attention [6] and 6-13% of the reasons interclinical urgent neurologist [4 , 11 , 12]. The vast majority of queries is because primary headaches as migraine or TTH, but to one in ten people may suffer a fatal or incapacitating secondary headache potentially [6 , 13 - 15]. The diagnostic approach to the patient with headache in the primary care consists of differentiating patients with primary headache from those with a secondary etiology and assessing the need for complementary tests, in addition to adequately treating pain [16 , 17]. In this sense, the headache study group of the Spanish Neurology Society proposes alarm criteria for the performance of an urgent computed tomography (CT) scan and a lumbar puncture (Table I) [18].

Table I: Distribution of alarm criteria.

	Total (*n* = 165)	**Performing a cranial CT**		**p**
		No (*n* = 135; 81.8%)	**Yes (*n* = 30; 18.2%)**	
Sudden onset severe headache	13 (7.9%)	3 (23.1%)	10 (76.9%)	<0.001
Worsening of chronic headache	10 (6.1%)	8 (80.0%)	2 (20.0%)	0.878
Increasing frequency or intensity	6 (3.6%)	4 (66.7%)	2 (33.3%)	0.327
Strict unilateral localization	9 (5.5%)	8 (88.9%)	1 (11.1%)	1,000
Accompanying manifestations	35 (21.1%)	16 (45.7%)	19 (54.3%)	<0.001
Triggered by Valsalva maneuver	10 (6.1%)	8 (80.0%)	2 (20.0%)	0.878
Atypical features	23 (13.9%)	11 (47.8%)	12 (52.2%)	<0.001
No response to correct treatment	25 (15.2%)	9 (36.0%)	16 (64.0%)	<0.001
Extreme ages of life	38 (23.0%)	24 (17.8%)	14 (46.7%)	0.001
Nocturnal dominance	3 (1.8%)	1 (33.3%)	2 (66.7%)	0.085
Cancer or immunosuppressed patient	2 (1.2%)	0	2 (100%)	0.032
Number of alarm criteria [a]	0 (0-2)	0 (0-1)	3 (2-4)	<0.001

CT: computed tomography. [a] Median (interquartile range).

We intend to analyze the sociodemographic characteristics, the incidence of alarm criteria and the management of people who request attention to the emergency department of our hospital due to headache.

Patients and methods

We carried out a retrospective and observational cross-sectional study of people treated in the primary care department of the Arnau de Vilanova Hospital between June 2014 and May 2015. To do this, we reviewed the computerized records of people whose reason code was 784.0 (spontaneous headache not traumatic / facial pain) according to the triage program of our center, which follows the 'Andorran triage model'. People with a history of intra-cranial pathology and subjects not belonging to our area of influence were excluded. Two investigators reviewed the medical records of all patients. In case of disagreement with any information, a third researcher intervened. The study was approved by the ethics committee of the hospital with code CEIC-1650.

Clinical variables were recorded, such as age, sex, vascular risk factors, and a history of depression or anxiety. The presence of alarm criteria and CT or lumbar puncture was also recorded during the emergency room stay.

Finally, a follow-up was carried out by reviewing the computerized medical record after one year to establish the final diagnosis, whether he consulted the emergency department again and whether it was assessed in outpatient neurology consultations.

To facilitate understanding of the results, the subjects were classified into three groups based on the final diagnosis: primary headache, non-severe secondary headache, and severe secondary headache [7]. The diagnosis of indeterminate headache was chosen in cases with suspected primary headache in which a clear diagnosis of migraine, tension headache, or trigeminal autonomic headache cannot be reached [14].

Statistical analysis

The statistical analysis of the data was carried out with the SPSS v. 20.0. The comparison between categorical variables was performed using Pearson's chi-square test and Fisher's exact test, and the comparison of means, using Student's *t* tests and ANOVA. A level of $p < 0.05$ was considered statistically significant in all comparisons.

Results

A total of 800 people who consulted the primary care of our center during the study period, a total of 303 people were identified. Finally, 165 (54.5%) were included after excluding 28 for having a known brain pathology, three for suffering a serious mental disorder, 28 for leaving before being visited, 41 after verifying that they actually consulted for Another reason was already 38 for not having access to the computerized history of the patient when residing outside Catalonia .

66.7% were women. The mean age was 41.2 ± 15.9 years. Only 16.4% of the patients were referred from primary care. Although 46 (27.9%) subjects had a history of primary headache, only 10.9% of them were on preventive treatment. In 26.7% of the cases, there had been a previous headache visit to the hospital emergency department since 2008 (year in which the computer program was implemented).

Seventy-one subjects (43%) had alarm criteria. The median of alarm criteria was 2 (interquartile range: 1-3.5). Among them, the most frequent alarm criteria highlighted the presence of accompanying manifestations in 35 (21.1%) subjects and the fact that the headache appeared at extreme ages of life (> 50 years) in 38 (23%) subjects (Table I). The variables significantly related to the presence of alarm criteria were age, history of anxiety-depression symptoms, and the fact that the patient was referred by the primary care physician (Table II). A head CT scan was performed in half of the alarm criteria cases, and a lumbar puncture in four (7.7%). The alarm criteria most related to the

performance of complementary tests were the fact of being an oncological or immunosuppressed patient, atypical characteristics, abrupt onset, accompanying manifestations, and onset at extreme ages (Table I). The study made it possible to diagnose a serious secondary cause of headache in the primary care in only four (2.4%) cases: two of meningitis and two of brain tumor.

Table II. Variables associated with the presence of alarm criteria.

			Total (*n* = 165)	Alarm criteria		p
				No (*n* = 94; 57.0%)	Yes (*n* = 71; 43.0%)	
Age (years) [a]			41.2 ± 15.9	34.9 ± 9.6	49.5 ± 18.7	<0.001
Female gender			110 (66.7%)	64 (58.2%)	46 (41.8%)	0.657
Background	Headache	Tensional	16 (9.7%)	9 (56.2%)	7 (43.8%)	0.169
		Migraine	27 (16.4%)	19 (70.4%)	8 (29.6%)	
		Bunches	3 (1.8%)	3 (3.2%)	0	
	Arterial hypertension		24 (14.5%)	6 (25.0%)	18 (75.0%)	0.001
	Mellitus diabetes		10 (6.1%)	4 (40.0%)	6 (60.0%)	0.263
	Smoking		24 (14.5%)	17 (70.8%)	7 (29.2%)	0.169
	Anxiety-repressive syndrome		19 (11.5%)	6 (31.6%)	13 (68.4%)	0.017
	Insomnia		7 (4.2%)	0	7 (9.9%)	0.002
Previous performances	Pre-emergency analgesia		90 (54.6%)	46 (51.1%)	44 (48.9%)	0.202
	Preventive treatment for headache		5 (3.0%)	3 (60.0%)	2 (40.0%)	0.889
	Referred by primary care		27 (16.4%)	11 (40.7%)	16 (59.3%)	0.001
	Prior assessment in the emergency room		44 (26.7%)	29 (30.9%)	15 (21.1%)	0.178
	Performing CT		30 (18.2%)	3 (10.0%)	27 (90.0%)	<0.001
	Performing lumbar puncture		4 (2.4%)	0	4 (100%)	0.033

CT: computed tomography. [a] Mean ± standard deviation.

After one year of follow-up, three (2.7%) patients who initially did not consult due to alarm criteria were diagnosed with serious diseases of the central nervous system: one case of cerebral cavernoma without bleeding, one of type I Chiari malformation and one brain tumor. Thus, finally only seven (4.2%) subjects had a secondary cause of their headache. The most frequent diagnoses (Table III) were nonspecific headache in 52 (31.5%) cases, tension headache in 36 (21.8%) cases, and migraine in 31 (18.8%) cases. Only 30 (18.2%) subjects were seen in neurology outpatient clinics later, while 23 (13.9%) subjects returned to the emergency room for the same reason. In 10 (38, 5%) of the 26 cases who had initially undergone a head CT, the neuroimaging test was repeated during follow-up. In 21 (12.7%) cases a neuroimaging test was performed for the first time during follow-up. Of these, 14 (66.7%) did not meet the alarm criteria in the initial emergency episode.

Table III. Distribution of final diagnoses according to the initial presence of alarm criteria.

	Total (*n* = 165)	Alarm criteria		p
		No (*n* = 94; 57%)	Yes (*n* = 71; 43%)	
Migraine	31 (18.8%)	21 (67.7%)	10 (32.3%)	0.118
Nonspecific headache	52 (31.5%)	24 (46.2%)	28 (53.8%)	
Tension headache	36 (21.8%)	23 (63.9%)	13 (36.1%)	
Trigeminal autonomic headache	2 (1.2%)	2 (100%)	0	
Hypertensive crisis	3 (1.8%)	2 (66.7%)	1 (33.3%)	
Glaucoma	1 (0.6%)	0	1 (100%)	
Insomnia	1 (0.6%)	1 (100%)	0	
Carbon monoxide poisoning	1 (0.6%)	1 (100%)	0	
Chiari malformation type I	1 (0.6%)	1 (100%)	0	
Meningitis	2 (1.2%)	0	2 (100%)	
Metabolopathy	1 (0.6%)	0	1 (100%)	
	3 (1.8%)	2 (66.7%)	1 (33.3%)	

Myelopathy					
Cavernoma		1 (0.6%)	1 (100%)	0	
Neuralgia		1 (0.6%)	0	1 (100%)	
Ischemic neuropathy		1 (0.6%)	0	1 (100%)	
Oral pathology		1 (0.6%)	1 (100%)	0	
Progressive supranuclear palsy		1 (0.6%)	0	1 (100%)	
Vertiginous syndrome		3 (1.8%)	0	3 (100%)	
Sinupathy		12 (7.3%)	10 (83.3%)	2 (17.7%)	
Brain tumor		3 (1.8%)	1 (33.3%)	2 (66.7%)	
Viriasis		8 (4.8%)	4 (50.0%)	4 (50.0%)	
Headache type	Primary	124 (75.2%)	71 (57.3%)	53 (42.7%)	0.733
	Secondary not serious	34 (20.6%)	20 (58.8%)	14 (41.2%)	
	Severe secondary	7 (4.2%)	3 (42.9%)	4 (57.1%)	

Discussion

Despite the fact that headache is a frequent reason for consultation in the emergency room [5 , 7 , 13], few studies in our country focus on analyzing the consultations for this cause in primary care department and their final diagnoses in order to be able to propose strategies for more efficient handling. In our study, one out of every three patients had alarm criteria. Despite presenting them, only one in two subjects underwent a neuroimaging test or a lumbar puncture with a low performance. After a one-year follow-up, only 4.2% of the initial subjects who consulted for headache had a secondary cause. In almost half of them, an alarm criterion was not identified during the first emergency visit.

The results obtained in previous similar studies are heterogeneous. Thus, our percentage of people with severe secondary headache due to central nervous system diseases is actually lower than that observed in studies carried out in our country, such as that of Jiménez-Caballero, who documented a percentage of 13% [13], in accordance with other studies such as that of Locker et al [19], but similar to that published in other retrospective studies [9 , 20]. In this sense, Reinus et al, after reviewing 333 patients with acute headache, only detected 17 who reported the worst headache of their life, and of them only one had lesions on cranial CT responsible for the symptoms [21]. Ramírez-Lassepas et al only identified 18 (3.8%) subjects with intracranial lesions after reviewing 468 cases [22].

The prevalence of patients with primary or unspecific headache characteristics, three of four patients in our cohort, is consistent with previous literature [8 - October , 13 , 19]. We highlight that one in five patients suffered a headache secondary to non-serious diseases

The small number of subjects with severe secondary headache makes it impossible to carry out a statistical study to identify characteristics or predictors related to this diagnosis, although it is alarming that in three of the seven patients with severe secondary headache, no alarm criteria were recorded in the first evaluation of emergencies.

Certain variables analyzed do help to reflect on how to improve the care of these patients. Although the proportion of patients referred from primary care is low, slightly less than one in five, 40% of them do not have alarm criteria, so that often the reason for referral is limited access to the specialist [23]. Measures aimed at improving the multidisciplinary approach to headache could avoid the first visit to the emergency room or the repetition of patient care [23 , 24]. In this sense, telemedicine emerges as a technique that should be taken into account in the treatment of patients with headache [24]. Also worrying is the high percentage of people who, despite suffering a headache of primary characteristics, spontaneously go to the emergency room without having alarm criteria, and the low percentage of patients who do not receive preventive treatment. Previous studies have indicated that up to one in five subjects who attend outpatient neurology consultations for headache have previously consulted the emergency department of a hospital [23].

With regard to the behavior of emergency physicians regarding a cranial CT scan, we highlight the low proportion of subjects who undergo this complementary test, slightly less than one in five. Neuroimaging is almost anecdotal in patients without alarm criteria. The most widely considered alarm criteria coincide with those indicated in a systematic review by Detsky et al, which predict the presence of structural lesions: sudden and severe headache and abnormal neurological examination [14]. However, in our series, the worsening with the Valsalva maneuvers or the effort went unnoticed.

The present study has important limitations. The main ones are its retrospective nature and small sample size. The absence of a diagnosis of headache secondary to subarachnoid hemorrhage is surprising, which, according to previous reviews, is the main cause of sudden-onset secondary headaches [20]. This fact can be explained by the limitation in the inclusion criterion that takes into account the initial triage diagnosis. It is possible that patients with a final diagnosis of subarachnoid hemorrhage or intracranial hemorrhage were initially classified as code stroke. It is also necessary to comment on the high percentage of patients with a diagnosis of nonspecific headache, up to one in three, which could be explained by the lack of follow-up by specialists. Taking into account

that one of the interesting aspects of the study is having a one-year follow-up of the patients, a significant number of cases were excluded as they were people from outside our area of influence,without access to their computerized history. Finally,[18]. Coinciding with the completion of our study, this society proposed new criteria that do not differ significantly from the previous ones [25].

Conclusion

In conclusion, only one out of every two patients meets alarm criteria. It would be interesting to improve the multidisciplinary approach to people with headaches in our setting to avoid, above all, the emergency room visit for primary headaches without alarm criteria.

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