

Acute Headache of Recent Onset and Subarachnoid Hemorrhage: A Prospective Study

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SYNOPSIS

Twenty-seven patients with acute severe headache of recent onset were prospectively recruited in the Emergency Room. Mean duration of headache was 61 hours. CT scan disclosed subarachnoid bleeding in 4 patients and spinal tap revealed subarachnoid hemorrhage (SAH) in 5 patients with normal CT scan. In most SAH cases pain was bilateral, very intense and involving the occipital region. Four of these patients had doubtful or no nuchal rigidity and in one, pain improved while in the Emergency Room.

In every case with an intense acute severe headache of recent onset CT scan and (if normal) a lumbar puncture are warranted to help rule out a SAH.

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INTRODUCTION

Headache is a common complaint in Emergency Departments, but only a small percentage of patients have a serious disease.^{1,2} Nevertheless, some particular forms of headache, usually headaches of recent onset, require special attention from the physician.

Management of headache of recent onset is still a medical controversy. Some retrospective studies state that a number of patients with ruptured intracranial aneurysms had severe "warning" or "sentinel" headache episodes some days before the hemorrhage.³⁻⁸ This observation was made after questioning patients with subarachnoid hemorrhage (SAH),^{4,6} or after reviewing medical records of patients with major subarachnoid bleeding.^{3,5,7,8} Based on these experiences many authors suggest that one should be aware of headaches of acute onset, examine them very cautiously and even perform a cerebral angiogram in selected instances.³ On the other hand there are those who consider that most acute headaches of recent onset

(AHRO) are not associated with a significant risk of future subarachnoid bleeding.^{9,10} Finally, there are also different explanations for the mechanism of these so-called "warning" headaches.^{4,10,11}

To analyze prospectively the relationship between AHRO and SAH we performed the following study.

PATIENTS AND METHODS

The study was done in a general hospital. Of all the patients attending the Emergency Room during one year, those complying with the following criteria were admitted to the study. Inclusion criteria were: acute headache of sudden onset, severe pain, no previous similar headaches, no obvious cause for the headache, and no overt focal symptoms nor focal signs on neurological exam.

All patients were initially examined by a neurologist. Immediate evaluation included a blood and coagulation screen, a CT scan (GE 9800) and, if CT scan was normal, lumbar puncture was performed. The following data were analyzed: age, sex, delay between beginning of symptoms and arrival at the hospital, precipitating factors, headache features, associated symptoms, previous headaches or diseases, blood pressure and temperature, neurological examination, CT results and cerebrospinal fluid features (SAH being considered when there was xanthochromia with less than 100 mg/dL protein or blood-stained CSF unchanged on three sequential samples together with a xanthochromic supernatant after centrifugation).

Patients with a diagnosis different from acute headache of unknown origin were admitted to the hospital. Those with a normal neurological examination, normal CT and lumbar puncture were followed for three months. Three patients initially recruited were eventually excluded because of the suspicion of a traumatic tap.

RESULTS

Twenty-seven patients entered the study (15 men and 12 women). The age range was 24-77 years (mean, 47.7, sd, 12.2). The delay between beginning of symptoms and arrival at the hospital was of 61 hours (sd, 74.9, range 1 hour-13 days). Mean delay in SAH cases was 72 hours). The headache started abruptly in 20 patients and subacutely (increasing to its maximal intensity in few hours) in 7. Headache was bilateral in all but one case (of unknown cause) and throbbing in two cases (one

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SAH and one of unknown origin). Other relevant clinical data are summarized in Table 1, in which SAH and cases of unknown origin are shown independently. Dizziness was recorded in one case, and transient blurred vision and a brief loss of consciousness in one patient each (both SAH cases). The previous headaches reported by 15 patients were mostly migraine and tension-type headaches. On neurological examination two patients appeared moderately confused (both SAH cases). Systolic blood pressure ranged between 90 and 200 mm Hg (mean 138, sd, 29), and diastolic pressure ranged between 50 and 120 (mean, 83, sd, 14.2).

CT scan was normal in 20 patients, 4 showed cisternal bleeding and an intraventricular hemorrhage, a hypodense lesion (compatible with a small frontal meningioma), a hyperdense lesion (hematoma associated with SAH) and diffuse enhancement (in a bacterial meningitis) were found in one case each. Spinal tap was performed in 19 patients, and was compatible with SAH in 5 cases, with purulent meningitis and lymphocytic meningitis in one case each. Final diagnoses are listed in Table 2. Cerebral angiography was performed in every SAH case, detecting an aneurysm in two.

All patients with normal CT scan and lumbar puncture were alive and remained asymptomatic during the three months follow-up.

Table 1
Clinical Data According to Diagnosis

	SAH	UNKNOWN ORIGIN	ODDS RATIO	CONFIDENCE INTERVALS
AGE (mean)	51.8	43.9		
SEX: Male	6	8	1.7	0.3-9
Female	3	7		
PARTICIPATING FACTORS:				
Valsalva (+ coitus)	4 (+2)	5 (+1)	3	1.8-16.4
HEADACHE LOCATION				
Occipital	4	2		
Occipito-frontal	4	2		
Occipito-vertex	0	2		
Diffuse	1	5		
Other	0	2		
SEVERITY				
Very severe	8	6	12	1.1-120
Severe	1	9		
ASSOCIATED SYMPTOMS				
Nausea/Vomiting	6	9	1.3	0.12-13
PREVIOUS HEADACHES (Different)	4	11	0.8	0.14-7.3
EVOLUTION IN THE EMERGENCY ROOM				
Better	1	6	0.18	0.01-1.8
Similar or worse	8	9		
NUCHAL RIGIDITY				
Clear	5	0		
Doubtful (+ no)	3 (+1)	4 (+11)		

Table 2
Diagnosis of Acute Headache of Recent Onset

	Cases
Subarachnoid hemorrhage	9
Intraventricular hemorrhage	1
Bacterial meningitis	1
Viral meningitis	1
Unknown origin	15

DISCUSSION

Headache is one of the most common complaints of patients coming to an Emergency Department. Most of these headaches are not associated with serious diseases. A retrospective study by Dhopesht et al¹ showed that 1.2% out of 872 patients had a serious neurological condition. Olesen et al² found 3 patients out of 859 cases of acute headache with a potentially dangerous disease (one case with a SAH, one with a tumor and another with benign intracranial hypertension).

On the other hand studies focussed on the analysis of symptoms provoked by SAH stress the importance of acute headaches occurring in the days preceding the bleeding. These so-called "warning" or "sentinel" headaches are present in a high percentage of SAH cases, according to some studies. Leblanc et al³ found them in 39% of patients with demonstrated aneurysmal SAH, Vermeij et al⁴ in 43%, Okawara⁵ in 48%, Waga et al⁶ in 59% and a recent cooperative study⁹ in 20.3%. Nevertheless all these studies were done retrospectively reviewing patients previous clinical records or by asking them after a demonstrated SAH about prior events of acute headaches.

A different approach to AHRO is provided by some studies such as the one by Wijdikis et al⁹ who studied retrospectively 89 patients admitted to a hospital because of an acute headache in whom no organic cause was found (normal CT and normal CSF). There was not any occurrence of SAH during a 3 years follow-up. In similar "thunderclap" headaches, neither Harling et al¹⁰ nor Markus¹² found any subarachnoid bleeding during the follow-up. These authors conclude that severe acute headaches only rarely correspond to "warnings" for SAH. During the short term follow-up of our AHRO of unknown cause cases we did not record any complication, being in accordance with these authors regarding the favorable outcome of AHRO once a definite etiology has been ruled out.

Our results show that it is important not to dismiss the clinical relevance of an AHRO. We must underline the bias present in our study, due to the fact that only selected patients, defined by severe

or very severe headache, mostly bilateral and not accompanied by focal neurological symptoms or signs, were included. Among 27 patients we could not find any clinical data that allowed us to definitely exclude SAH. However in most SAH cases there was a very severe bilateral headache located mainly in the occipital region. Clinical SAH series emphasize the characteristic severity of the headache, its association with an altered level of consciousness in a third of patients, to nausea in the majority of them and to meningeal irritation signs in at least 85%.¹³ However other studies comment on the frequent absence of these typical features, nuchal rigidity being absent in up to 65% of cases.¹⁴

CT scan demonstrated SAH in 4 out of 9 SAH cases, a proportion lower than CT sensitivity in general SAH series.¹⁵ It is possible that this low percentage is due to the fact that SAH presenting only as AHRO, with no other physical signs are the less severe ones and in minor SAH cases as well as in those of unknown origin CT scan is less sensitive.^{16,17}

Some authors warn about the possibility of AHRO being due to acute neurologic diseases.^{18,19} A review of the management of acute headaches²⁰ proposes some guidelines where further investigation (CT scan or lumbar puncture) would not be necessary. These criteria are: a) previous identical headaches, b) intact alertness and cognition, c) supple neck, d) normal neurological exam, e) normal vital signs and f) improving under observation. However some of the SAH patients in our series did not comply with several of these points.

We conclude that first severe acute headaches of recent onset without obvious immediate cause should be studied by means of CT scan and lumbar puncture, if CT scan is normal. If diagnostic procedures are negative the prognosis of these patients is good.

REFERENCES

1. Dhopes V, Anwar R, Herring C. A retrospective assessment of emergency department patients with complaint of headache. *Headache* 1979; 19:37-42.

2. Olesen J, Aebelholt A, Vellis B. The Copenhagen Acute Headache Clinic: organization, patients, material and treatment results. *Headache* 1979; 19:223-227.
3. Leblanc R. The minor leak preceding subarachnoid hemorrhage. *J Neurosurg* 1987; 66:35-39.
4. Vermeij RD, Wijdicks EFM, van Gijn J. Warning headache in aneurysmal subarachnoid hemorrhage. *Arch Neurol* 1988; 45:1019-1020.
5. Okawara SH. Warning signs prior to rupture of an intracranial aneurysm. *J Neurosurg* 1973; 38:575-580.
6. Waga S, Otsubo K, Handa H. Warning signs in intracranial aneurysms. *Surg Neurol* 1975; 3:15-20.
7. Kassell NF, Kongable GL, Torner JC, Adams HPO, Mazur H. Delay in referral of patients with ruptured aneurysms to neurosurgical attention. *Stroke* 1985; 16:587-590.
8. Bassi P, Bandera R, Loiero M. Warning signs in subarachnoid hemorrhage: A cooperative study. *Acta Neurol Scand* 1991; 84:277-281.
9. Wijdicks EFM, Kerkhof H, van Gijn J. Long-term follow-up of 71 patients with thunderclap headache mimicking subarachnoid hemorrhage. *Lancet* 1988; 1:68-70.
10. Harling DW, Featfield RC, van Hille PT, Abbott RJ. Thunderclap headache: is it migraine?. *Cephalalgia* 1989; 9:87-90.
11. Day JW, Raskin NH. Thunderclap headache: symptom of unruptured cerebral aneurysm. *Lancet* 1986; 2:1247-1248.
12. Markus HS. A prospective follow-up of thunderclap headache mimicking subarachnoid hemorrhage. *J Neurol Neurosurg Psych* 1991; 54:1117-1118.
13. Sengupta RP, McAllister VL. Subarachnoid hemorrhage. Berlin, Springer, 1986.
14. Fontanarosa PB. Recognition of subarachnoid hemorrhage. *Ann Emerg Med* 1989; 18:1199-1205.
15. van Gijn J, van Dongen KJ. The time course of aneurysmal hemorrhage on computed tomograms. *Neuroradiol* 1982; 23:153-156.
16. Adams HP, Kassell NF, Torner JC. Usefulness of computed tomography in predicting outcome after aneurysmal subarachnoid hemorrhage. *Neurology* 1985; 35:1263-1267.
17. Gomez PA, Lobato RD, Rivas JJ. Subarachnoid hemorrhage of unknown etiology. *Acta Neurochir* 1989; 101:35-41.
18. Hopkins A. A neurologist's approach to patients with headache. In: Hopkins A, Ed. Headache: problems in diagnosis and management. London, WB Saunders, 1988; 40-75.
19. Silberstein SD. Evaluation and emergency treatment of headache. *Headache* 1992; 32:396-407.
20. Edmeads J. Challenges in the diagnosis of acute headache. *Headache* 1990; 30 (suppl.): 537-540.