

Neuropsychologic symptoms in the migraine syndrome

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Twenty patients with complex neuropsychologic symptoms associated with classic migraine were selected from a group of 200 patients with vascular headache. Twenty types of symptoms were found and grouped into six categories (language, visual symptoms, cognitive-dysmnesic symptoms, olfactory-gustatory hallucinations, automatisms, and somatosensory symptoms). Some of the symptoms found have apparently not been reported previously. The importance of the analysis of this complex neuropsychologic set of symptoms and of the possible consequences of complicated, frequent vascular headache is emphasized. • *Classic migraine, neuropsychologic symptoms*

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In addition to the most frequently observed symptoms of classic migraine, such as sparkling scotomas, paresthesia, motor deficits, hemianopsia, and so forth, other complex disorders can appear, such as aphasia, alexia, visual hallucinations, micropsia, macropsia, achromatopsias, movement illusions, amnesia, macro- or micro-somatognosia, confusional states, and so forth (1-7). In general, sensory, motor, or cognitive dysfunction is transitory and usually ends after some 10 or 15 min. However, the analysis of such a complex neuropsychologic set of symptoms can be important not only for understanding the possible mechanism involved in migraine but also for the differential diagnosis of migraine and other nosologic entities.

A further analysis of the neuropsychologic symptoms associated with classic migraine was therefore considered relevant.

Methods and results

Over the past 3 years 200 patients diagnosed as having vascular headache were studied in the Neurologic Institute of Colombia. Of these, 20 patients were found (14 women, 6 men, average age, 35 years; age range, 20-69 years) who showed some neuropsychologic symptoms as a prodrome (from about 5 min to several hours) of classic migraine. Since some of the patients had more than one phenomenon, the total number of symptoms recorded was 40. Table 1 shows the phenomena found and their frequency in the sample analyzed.

Table 1. Complex neuropsychologic phenomena associated with migraine and the number of subjects who experienced them

Anomia (forgetting the name of things)	7
Difficulty in speaking	5
Depersonalization (feeling as if another person)	3
Seeing the world as strange	3
Macropsia (apparent increased object size)	2
Micropsia (apparent decrease object size)	2
Simultaneous agnosia (only the object or part of the object being looked at is recognized)	2
Automatic behavior	2
Inability to understand language	2
Olfactory hallucinations	2
Achromatopsia (disappearance of colors)	1
Chromatopsia (modification of object colors)	1
Palinopsia (visual perseveration)	1
Pelopsia (objects seem to approach the subject and become larger)	1
Gustatory hallucinations	1
Alexia (inability to read)	1
Acalculia (calculation disturbance)	1
Teleopsia (objects seem small and far away)	1
Transient global amnesia	1
Hemiasomatognosia (unilateral misperception of one's own body)	1

Table 2. Types of neuropsychologic phenomena associated with migraine; frequency and percentage in the sample analyzed

Type	Frequency	Percentage
Language	16	40.0
Visual disturbances	11	27.5
Cognitive-dysmnesic symptoms	7	17.5
Olfactory-gustatory hallucinations	3	7.5
Automatism	2	5.0
Somatosensory symptoms	1	2.5

The 20 types of complex neuropsychologic phenomena found in the sample were grouped into 6 categories. Language and visual phenomena were found to represent approximately two-thirds (Table 2). Complex somatosensory phenomena appeared in only one case.

The most frequently found phenomena were anomia (forgetting the name of things, sometimes with the presence of semantic paraphasia) and difficulties in speaking (which were usually associated with right-sided paresthesia). In the first case, the territory involved corresponded theoretically to the temporo-occipital region of the left hemisphere, and, in the second, to the anterior parietal region. In the case of anomia, the deficit was associated with defects in the right visual field and with scotomas in this field. The difficulties in understanding language were associated with anomia and also with defects in the right visual field.

Patient E.T., a 27-year-old woman, had a 14-year history of vascular headache. Initially, she presented with right visual field hemianopia and difficulties in remembering the names of objects. This would last for about 15-20 min; during this period she never tried to read. Afterwards, vascular headache appeared. She had to lie down in bed. Headache lasted several hours. Findings on neurologic examination, computed tomography (CT) scan, and EEG were normal.

Alexia (inability to read) appeared in only one patient as the inability to join letters to form words and was associated with defects in the right visual field and anomia; it was therefore a verbal alexia, and, as a result, we would expect it to be an alexia without agraphia (inability to write). Acalculia (calculation disturbance) was evident in a female patient who performed simple, routine calculations in her work; "I didn't know what I had to do to add up; it was as if I had never learned to add up". This was associated with anomia.

The visual phenomena took the form of macropsia (apparent increased object size), micropsia (decreased size), achromatopsia (disappearance of colors), chromatopsia (modification of object colors; for example, "everything looked yellow"), pelopsia (objects seem to approach the subject and become larger: "things came to me"), teleopsia (objects seem small and far away), or palinopsia (visual perseveration; that is, one patient reported that he kept seeing repeated figures or images). This was associated with left homonymous hemianopsia and agnosia (on looking at an object, the edge of it was lost; that is, only the object or part of the object being looked at is recognized); the latter two patients also had defects in their right visual field.

Patient E.S., a 60-year-old woman, has since childhood presented with vascular headache. She reported sparkling scotomas, paresthesia, and left hemianopia. On occasion, she reported macropsia, micropsia, and repeated perception of figures (palinopsia). Neurologic examination and CT scan were normal.

The cognitive-dysmnesic type of phenomena (experimental and mnesic changes) took the form of strangeness (feeling different, as if another person; that is, depersonalization); perceiving the world as if it

were different (two of the patients said they saw things "as if on the television" and the third mentioned that everything seemed *unknown-jamais-vu*). The patient with transient global amnesia (with a history of migraine of 49 years' duration) on one occasion while shaving himself observed: "I could only see one half on my face, and I felt as if I were far away". While she talked to him, his wife realized that he could not understand what was happening to him nor remember what she said to him. This lasted for 2h.

Patient R.M., a 26-year-old woman, has for about 8 years had episodes of paresthesia in the right arm and face lasting about 30 min, whereafter she had a severe headache for about 2 h. Twice she had presented with the "feeling of being another person" and with anguish, followed by right-sided paresthesia and vascular headache. Neurologic examination and EEG were normal.

One patient reported "a kind of sweet taste in my mouth", simultaneously with paresthesia in his lips and tongue. Another patient who experienced phenomena of strangeness referred to "a smell like acid", and still another patient mentioned "a smell like sewage".

One patient (with an almost 30-year history of vascular headache) has over the past months experienced episodes of cephalgia associated with automatic behavior and subsequent amnesia. Similarly, the patient with transient global amnesia experienced episodes of automatisms with sucking, which makes it difficult to decide whether it is a question of two different phenomena (transient global amnesia and automatisms) or, on the contrary, of just one phenomenon. It nevertheless points to an involvement of the mesial temporal territory.

The only case of complex somatosensory phenomena (hemiasomatognosia: unilateral misperception of own's own body) is that of a 60-year-old woman with a history of vascular headache since childhood. On one occasion, she experienced a feeling of strangeness in her left hand ("as if it weren't mine; it didn't belong to me; it moved by itself without my controlling it") followed by left hemi-body dysesthesia.

Discussion

Above all, it is noteworthy that neuro-psychologic phenomena associated with migraine tend to appear in patients with a long history of vascular headache. Even though some of our patients had a 50-year history of headache, the appearance of complex symptoms went back only a few years at most and in most cases had started appearing shortly before examination.

Although most of the symptoms found in our sample have already been described in the literature (8), it is worth emphasizing some points.

Language disorders of various types occur most frequently in our material. However, according to Frederiks (8), they are not frequent in migraine, and when they appear, they are usually of the expressive kind. These disorders occurred frequently in our material owing to the high frequency of anomia. We suppose that anomia is a symptom that runs the risk of being ignored if the patient is not asked directly about it. In routine neurologic examinations only errors of the motor type tend to be included as language defects. Given the high incidence of visual symptoms in migraine, it seems logical to assume that anomia is a frequent symptom, considering that, topographically, anomia corresponds to the left temporo-occipital region (9), which is next to the region that would produce visual disturbances. Although alexia, even without agraphia, has been described in cases of migraine (1, 5), to our knowledge acalculia has not been reported as a phenomenon connected with migraine.

Transient global amnesia has been reported associated with migraine (2, 3), but, in general, cognitive-dysmnestic phenomena do not seem to be frequent in vascular headaches. Three of our patients experienced depersonalization phenomena; two said they felt the world to be unreal ("as if I were watching television"), although it is difficult to be sure that it was a question of purely cognitive-dysmnestic phenomenon and not simply a perceptual one; and one experienced a *jamais-vu* phenomenon.

Although olfactory phenomena have been shown to occur in migraine (10), to our

knowledge no gustatory phenomena have been previously reported. In our patients it was found together with paresthesia of the lips and tongue.

Phenomena related to changes in the body scheme include macrosomatognosia, micro-somatognosia, and autoscopia (8). However, one of our patients had a clear hemiasomatognosia with a "feeling of a strange hand".

The above-mentioned observations emphasize the diversity and richness of the neuropsychologic symptoms that can be found in the case of migraine.

Finally, and bearing in mind the similarity between the mechanisms underlying the migraine type of headache and transient cerebral ischemia, it is important to consider the possibility of permanent neuro-psychologic sequelae in cases of migraine. This possibility has been analyzed by different authors (11-13), who found that, in some cases at least, it is possible to find permanent cognitive deficits in frequent, complicated vascular headache.

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