

Ketil J. Oedegaard  
Jules Angst  
Dag Neckelmann  
Ole B. Fasmer

## Migraine aura without headache compared to migraine with aura in patients with affective disorders

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K.J. Oedegaard (✉) • D. Neckelmann  
O.B. Fasmer  
Department of Psychiatry,  
University of Bergen,  
Haukeland Hospital,  
N-5021 Bergen, Norway  
e-mail: keti@haukeland.no  
Tel.: +47-55958400  
Fax: +47-55974419

J. Angst  
Zurich University Psychiatric Hospital,  
Zurich, Switzerland

**Abstract** The characteristics of psychiatric comorbidity in migraine have been studied in migraine with aura (MA) and migraine without aura (MO). Little information is available concerning patients with migraine aura without headache. In a study of 201 patients with major affective disorders (DSM-IV) we have described the clinical characteristics of patients with these three sub-types of migraine (IHS criteria) and compared the MA and migraine aura without headache groups. Compared to patients having MA ( $n=57$ ), the group with migraine aura without headache ( $n=18$ ) had a higher age of onset of migraine (28.5 vs. 19.2,  $p=0.001$ ), significantly lower prevalences of affective temperaments (28% vs. 56%,

$p=0.036$ ), suicide attempts (17% vs. 53%,  $p=0.013$ ) and Raynaud's syndrome (0% vs. 25%,  $p=0.017$ ). These results indicate that there seem to be differences in the clinical characteristics found in patients with migraine with aura when compared to those having the migraine subtype without a headache phase. This may convey new information concerning the comorbid expression of migraine and affective disorders or concerning the processes that differentiates the migraine types with and without a subsequent pain attack.

**Key words** Affective disorders • Affective temperaments • Migraine • Suicide attempt • Raynaud's syndrome

### Introduction

Patients having migraine with aura (MA) also may experience episodes with characteristic aura symptoms but without a subsequent headache [1, 2] and late in life some patients may only have episodes of aura symptoms without headaches [3]. However, the prevalence of migraine aura without headache (without a history of characteristic migraine headaches) has not been extensively studied. In a community sample Russell and Olesen [4] found 163 persons having migraine auras, but only 7 of these exclu-

sively had aura symptoms without headache. Mattsson and Lundberg [5] found that among 31 women (out of 245) who reported transient visual disturbances indicative of migraine visual auras, 8 experienced no headache phase. Russel et al. [6] found in a community sample that 3.5% had experienced migraine aura without headache, but it was not reported how many exclusively had this type of migraine. In a study from a private specialist practice Endicott [7] reported that a high percentage of patients with major affective disorders had episodes with transient neurologic symptoms resembling the aura symptoms that can be seen in migraine patients.

Many people experience changes in mood or behaviour as a prodromal or accompanying feature of a migraine attack and sometimes psychiatric symptoms may dominate the clinical presentation [2]. As there is a well documented association between migraine (MA and MO) and affective disorders [8, 9], we hoped to find enough patients with aura symptoms only in a population of patients with affective disorders to be able to examine the clinical characteristics of psychiatric symptoms in this migraine subtype. This group of patients may be worthwhile studying for several reasons: (1) Some studies indicate that patients with comorbid migraine and psychiatric disorder are more severely impaired by their disorder [10, 11], but it is not known whether this is true for the migraine aura without headache group. (2) Patients with aura symptoms only (visual or somatosensory) may not recognise the symptoms occurring as part of a migraine headache disorder, and believe these are unexplainable phenomena related to their mental disorder. (3) Recent studies have presented new information on the underlying mechanisms of MA with a sequence of events that lead from the cortex (aura phase) to the activation of trigeminal fibres (headache phase) [12]. Looking for differences in the clinical characteristics between migraineurs in whom a migraine process has started, which is followed by a subsequent headache attack (MA), from those fortunate enough to steer clear of this pain (migraine aura without headache), may help unravel the pathomechanism of migraine.

In a previous study where the purpose was to look at migraine comorbidity in 102 patients with major affective disorders we found 10 patients who had migraine aura without headache [10]. In a new study, using the same methods, we interviewed an additional 99 patients and identified another 8 patients manifesting migraine aura without headache. The purpose of the present report is to look more closely at the characteristics of the 18 patients with migraine aura without headache, comparing them to patients with MA.

## Patients and methods

The study group ( $n=201$ ) comprised 177 psychiatric patients at one of the university hospitals of Bergen (138 inpatients and 39 outpatients) and 24 psychiatric patients from private praxis in the county of Fusa outside Bergen. The mean age in the whole group was  $36.9 \pm 10.2$  years (range 18–64). One hundred and thirty-nine patients (69%) were female. Patients were included if they presented a major affective syndrome (major depression or mania) that was clearly not secondary to an organic or substance abuse disorder, were between 18 and 65 years old, and gave informed consent to participate. Patients that did not speak Norwegian adequately were excluded. All patients were non-

psychotic when interviewed. The local ethics committee approved the study protocol.

We used a semi-structured interview based on DSM-IV criteria [13] for affective disorders (major depressive episode, mania, hypomania), anxiety disorders (panic disorder, agoraphobia, specific phobia, social phobia, generalised anxiety disorder, obsessive compulsive disorder) and eating disorders (anorexia nervosa and bulimia nervosa). Hyperthymic, irritable and depressive temperaments were diagnosed according to the criteria of Akiskal and Mallya [14] and cyclothymic temperament according to Akiskal and Akiskal [15]. Criteria for the cyclothymic temperament require at least three of five attributes of each of the following two sets, with an indeterminate early onset (<21 years). First set: (1) Hypersomnia *vs.* decreased need for sleep. (2) Introverted self-absorption *vs.* uninhibited people-seeking. (3) Taciturn *vs.* talkative. (4) Unexplained tearfulness *vs.* buoyant jocularity. (5) Psychomotor inertia *vs.* restless pursuit of activities. Second set: (1) Lethargy and somatic discomfort *vs.* eutonia. (2) Dulling of senses *vs.* keen perceptions. (3) Slow-witted *vs.* sharpened thinking. (4) Shaky self-esteem alternating between low self-confidence and overconfidence. (5) Pessimistic brooding *vs.* optimism and carefree attitudes. The hyperthymic temperament requires at least five of the following characteristics, with an indeterminate early onset (<21 years): (1) Irritable, cheerful, overoptimistic or exuberant. (2) Naive, overconfident, self-assured, boastful, bombastic or grandiose. (3) Vigorous, full of plans, improvident and rushing off with restless impulse. (4) Overtalkative. (5) Warm, people-seeking or extroverted. (6) Overinvolved and meddlesome. (7) Uninhibited, stimulus-seeking or promiscuous. The irritable temperament requires at least five of the following characteristics, with an indeterminate early onset (<21 years): (1) Habitually moody, irritable and choleric, with infrequent euthymia. (2) Tendency to brood. (3) Hypercritical and complaining. (4) Ill-humoured joking. (5) Obtrusiveness. (6) Dysphoric restlessness. (7) Impulsive. The depressive requires at least five of the following characteristics, with an indeterminate early onset (<21 years): (1) Gloomy, pessimistic, humourless or incapable of fun. (2) Quiet, passive and indecisive. (3) Sceptical, hypercritical or complaining. (4) Brooding and given to worry. (5) Conscientious or self-disciplining. (6) Self-critical, self-reproaching and self-derogatory. (7) Preoccupied with inadequacy, failure and negative events to the point of morbid enjoyment of one's failures.

Affective temperaments were particularly studied because there is substantial evidence supporting the separation of patients with cyclothymic and hyperthymic temperaments from the unipolar depressive group [16]. Validation of affective temperamental characteristics using the semi-structured affective temperament interview has shown very good reliability and internal consistency [17].

Unipolar depressive, bipolar I and bipolar II disorders were diagnosed according to DSM-IV criteria.

With regard to affective disorders, the following information was recorded: age of onset of the first major affective episode and the first depressive episode, the number of depressive episodes, the presence of melancholic or atypical symptoms (DSM-IV criteria) in the present or in previous episodes, seasonal variability of depressive episodes, current or previous suicide attempt, suicidal thoughts, psychotic symptoms and the

presence of prominent irritability or suspiciousness in the current or previous major depressive episodes.

For the anxiety disorders, the age of onset was recorded for each.

The criteria of the International Headache Society (IHS) [18] were used to establish the diagnosis of migraine. In addition to migraine with and without aura, the occurrence of migraine auras without headache was specifically assessed. Age of onset of migraine and the frequency of attacks (>1/week, >1/month, <1/month, no attacks last year) were recorded. The characteristics of aura symptoms were recorded by the following procedure: patients were first asked whether they had migraine headache attacks, according to the IHS criteria for migraine without aura. Then they were presented a checklist of many possible descriptors of aura symptoms and explained that these symptoms sometimes precede headache attacks. Finally, the patients who initially did not report migraine headache attacks were asked whether they sometimes experienced the described aura symptoms without having a headache attack. If the patients recognised symptoms similar to auras, they were asked to give a subjective description of aura symptoms in their own words, and only diagnosed into the aura groups if this description qualified for the diagnostic criteria of migraine auras proposed by the IHS.

Raynaud's syndrome was diagnosed according to the criteria of Miller et al. [19].

Chi-square test, *t*-test (two-tailed), ANOVA and Fisher's exact test were used to calculate differences between groups. Multivariable logistic regressions were used to confirm the univariate analyses. SPSS version 11.0 was used for the statistical analyses.

## Results

In Table 1 the most important general characteristics of the study sample of major affective disorder patients are

shown, comparing the overall differences between the four groups: (1) MA, (2) MO, (3) migraine aura without headache, (4) patients with no migraine (NO). In addition, the significances for the comparison between groups 1 and 3 are presented. There were significant differences between the four groups concerning gender distribution, number of inpatients and prevalence of migraine in first-degree family members. Migraine was more common in females and females more often had first-degree family members suffering from migraine. Most inpatients were found in the no-migraine group. There were no significant differences between the MA group (group 1) and the migraine aura without headache group (group 3) concerning sociodemographic features, including substance abuse, current patient status, genetic loading of migraine headaches and psychiatric illness.

Concerning the somatic conditions we asked for (Table 2), there was a significant difference in the prevalence of asthma between the four groups, with higher rates of asthma in all migraine groups than in the no migraine group. This difference was not significant between MA and migraine aura without headache. However, there was a clear difference in the rates of Raynaud's syndrome between these two groups. Whereas 14 patients with MA (25%) had Raynaud's syndrome, this condition was not found in any of the patients manifesting only migraine aura without headache ( $p=0.017$ ). The difference in the rates of Raynaud's syndrome was also significant when comparing the whole sample ( $p=0.038$ ). Most of the patients with Raynaud's syndrome were females (13/14).

The migraine characteristics of the study sample are displayed in Table 3. There was a significant difference concerning the age of onset of migraine between the three

**Table 1** Characteristics of the study sample ( $n=201$ ). Data are % ( $n$ ) unless otherwise indicated

	Migraine with aura ( $n=57$ )	Migraine without aura ( $n=41$ )	Migraine aura without headaches ( $n=18$ )	No migraine ( $n=85$ )	$p$ 1-4	$p$ 1 vs. 3
Age (years), mean $\pm$ SD	36.3 $\pm$ 9.6	37.0 $\pm$ 9.9	41.0 $\pm$ 10.3	36.5 $\pm$ 10.6	NS <sup>c</sup>	NS <sup>a</sup>
Sex (females)	75 (43)	83 (34)	61 (11)	60 (51)	0.035 <sup>b</sup>	NS <sup>b</sup>
Married or cohabiting	46 (26)	46 (19)	44 (8)	35 (30)	NS <sup>b</sup>	NS <sup>b</sup>
Holding a job or studying	44 (25)	29 (12)	50 (9)	32 (27)	NS <sup>b</sup>	NS <sup>b</sup>
Use of tobacco	70 (40)	61 (25)	78 (14)	67 (57)	NS <sup>b</sup>	NS <sup>b</sup>
Alcohol or substance abuse	28 (16)	34 (14)	33 (6)	27 (23)	NS <sup>b</sup>	NS <sup>b</sup>
Serious psychiatric illness in family	67 (38)	71 (29)	56 (10)	58 (49)	NS <sup>b</sup>	NS <sup>b</sup>
Migraine in family	67 (38)	51 (21)	56 (10)	27 (23)	0.000 <sup>b</sup>	NS <sup>b</sup>
Inpatients	53 (30)	63 (26)	78 (14)	80 (68)	0.004 <sup>b</sup>	NS <sup>b</sup>

<sup>a</sup>*t*-test (two-tailed); <sup>b</sup>Chi-square test; <sup>c</sup>ANOVA  
NS, not significant

**Table 2** Somatic features of the study sample ( $n=201$ ). Data are % ( $n$ )

	Migraine with aura ( $n=57$ )	Migraine without aura ( $n=41$ )	Migraine aura without headaches ( $n=18$ )	No migraine ( $n=85$ )	$p$ 1–4	$p$ 1 vs. 3
Somatic disorders					NS <sup>a</sup>	
Asthma	25 (14)	24 (10)	17 (3)	7 (6)	0.018 <sup>a</sup>	NS <sup>b</sup>
Allergic rhinitis	37 (21)	22 (9)	33 (6)	22 (19)	NS <sup>a</sup>	NS <sup>a</sup>
Atopic dermatitis	17 (10)	20 (8)	11 (2)	11 (9)	NS <sup>a</sup>	NS <sup>b</sup>
Other allergies	26 (15)	29 (12)	28 (5)	27 (23)	NS <sup>a</sup>	NS <sup>a</sup>
Thyroid disorder	7 (4)	5 (2)	0 (0)	7 (6)	NS <sup>a</sup>	NS <sup>b</sup>
Raynaud's syndrome	25 (14)	12 (5)	0 (0)	12 (10)	0.038 <sup>a</sup>	0.017 <sup>b</sup>

<sup>a</sup>Chi-square test; <sup>b</sup>Fisher's exact test  
NS, not significant

**Table 3** Migraine characteristics of the study sample ( $n=201$ ). Data are % ( $n$ ) unless otherwise indicated

	Migraine with aura ( $n=57$ )	Migraine without aura ( $n=41$ )	Migraine aura without headaches ( $n=18$ )	$p$ 1–3	$p$ 1 vs. 3
Age of onset, years $\pm$ SD	19.2 $\pm$ 9.4	21.7 $\pm$ 9.7	28.5 $\pm$ 10.5	0.002 <sup>c</sup>	0.001 <sup>a</sup>
Migraine auras					
Visual	47 (27)	x	78 (14)		
Somatosensory	18 (10)	x	0 (0)		
Both visual and somatosensory	35 (20)	x	22 (4)	x	0.046 <sup>b</sup>
Migraine frequency					
More than once a week	25 (14)	17 (7)	11 (2)		
More than once a month	33 (19)	42 (17)	28 (5)		
Less than once a month	35 (20)	39 (16)	61 (11)		
No attacks last year	7 (4)	3 (1)	0 (0)	0.000 <sup>b</sup>	NS <sup>b</sup>

<sup>a</sup> $t$ -test (two-tailed); <sup>b</sup>Chi-square test; <sup>c</sup>ANOVA  
x, not relevant; NS, not significant

migraine groups, with lower ages of onset in patients with MA and MO than in the group with aura symptoms only. The frequencies of migraine attacks were also significantly different between these groups, with generally more attacks in the first two groups. When comparing the group having MA to the group with aura only, there was a significant difference concerning the age of onset of migraine (19.2 vs. 28.5;  $p=0.001$ ), but the frequencies of migraine attacks were not significantly different. The type of aura symptoms in these two migraine groups was quite similar, as most patients had visual auras. Among the patients having MA the aura symptoms were visual in 27, somatosensory in 10 and both visual and somatosensory in 20 patients. Fourteen of the patients having aura only had visual aura symptoms only, four had both visual and somatosensory symptoms, and none had only somatosensory symptoms. These two constellations of aura symptoms were, however, significantly different ( $p=0.046$ ). Twenty-two of the 57 patients with MA also had episodes with aura symptoms without headache, 13 of these had

visual symptoms only during these episodes, 4 had somatosensory symptoms and 5 had both visual and somatosensory symptoms. Thirty-nine of the MA patients also had headache attacks without aura, fulfilling the criteria for MO.

The characteristics of the affective disorders are displayed in Table 4. When comparing the four groups, the distribution of unipolar, bipolar I and bipolar II disorders were significantly different between the groups. There was also a significant difference in the rates of affective temperaments, suicide attempts and frequencies of reported irritability during depression. The distribution of unipolar, bipolar I and bipolar II disorders was not significantly different between the patients with MA compared to the patients with migraine aura without headache.

Interestingly there was a low prevalence of suicide attempts in patients having migraine aura without headache (17%) compared to the patients in the MA group (53%), whereas the frequency of suicidal thoughts was not significantly different between the two groups (91% vs.

**Table 4** Characteristics of affective disorders and depressive symptoms ( $n=201$ ). Data are % ( $n$ ) unless otherwise indicated

	Migraine with aura ( $n=57$ )	Migraine without aura ( $n=41$ )	Migraine aura without headaches ( $n=18$ )	No migraine ( $n=85$ )	$p$ 1–4	$p$ 1 vs. 3
<b>Affective disorders</b>						
Onset first affective episode, years $\pm$ SD	24.8 $\pm$ 12.0	25.8 $\pm$ 12.2	28.0 $\pm$ 12.1	25.2 $\pm$ 9.9	NS <sup>d</sup>	NS <sup>a</sup>
Unipolar	54 (31)	56 (23)	50 (9)	60 (51)		
Bipolar I	9 (5)	10 (4)	22 (4)	27 (23)		
Bipolar II	37 (21)	34 (14)	28 (5)	13 (11)	0.006 <sup>b</sup>	NS <sup>b</sup>
Affective temperament	56 (32)	46 (19)	28 (5)	32 (27)	0.017 <sup>b</sup>	0.036 <sup>b</sup>
<b>Characteristics of major depressive episodes</b>						
Onset first depressive episode, years $\pm$ SD	25.0 $\pm$ 11.5	25.9 $\pm$ 11.3	28.9 $\pm$ 11.8	25.8 $\pm$ 9.7	NS <sup>d</sup>	NS <sup>a</sup>
Number of depressive episodes, $n\pm$ SD	5.7 $\pm$ 6.2	4.2 $\pm$ 4.1	5.1 $\pm$ 5.9	3.6 $\pm$ 4.1	NS <sup>d</sup>	NS <sup>a</sup>
Seasonal variability	28 (16)	27 (11)	22 (4)	18 (15)	NS <sup>b</sup>	NS <sup>c</sup>
Psychotic symptoms	23 (13)	37 (15)	22 (4)	35 (30)	NS <sup>b</sup>	NS <sup>c</sup>
Melancholic features	35 (20)	29 (12)	39 (7)	33 (28)	NS <sup>b</sup>	NS <sup>b</sup>
Atypical features	32 (18)	20 (8)	17 (3)	27 (23)	NS <sup>b</sup>	NS <sup>c</sup>
Suicide attempts	53 (30)	44 (18)	17 (3)	38 (32)	0.044 <sup>b</sup>	0.013 <sup>c</sup>
Irritability	72 (41)	73 (30)	67 (12)	51 (43)	0.024 <sup>b</sup>	NS <sup>b</sup>
Suspiciousness	58 (33)	61 (25)	67 (12)	55 (47)	NS <sup>b</sup>	NS <sup>b</sup>

<sup>a</sup> $t$ -test (two-tailed); <sup>b</sup>Chi-square test; <sup>c</sup>Fisher's exact test; <sup>d</sup>ANOVA  
NS, not significant

87%, data not shown). Another significant finding was that only 28% (2 cyclothymic, 1 irritable and 2 depressive temperaments) of the patients having migraine aura without headache had an affective temperament, compared to 56% of the patients having MA (17 cyclothymic, 5 hyperthymic, 8 depressive and 2 irritable temperaments).

In Table 5 the characteristics of anxiety and eating disorders are shown. When comparing the four groups, significant differences were found concerning the number of anxiety disorders, rates of panic disorder, agoraphobia and anorexia nervosa, with generally higher rates of anxiety disorders in the three migraine groups than in the no migraine group. No significant differences between the MA and migraine aura without headache groups were found concerning anxiety disorders. A tendency towards an earlier onset of the first anxiety disorders and a higher total number of anxiety disorders was seen among patients with MA compared to migraine aura without headache, but this difference did not reach statistical significance.

The impact of variables differentiating MA from migraine aura without headache was tested by multivariable logistic regression analyses using gender (OR: 1.9,

CI 0.5–7.4,  $p=0.36$ , NS), suicide attempts (OR: 3.2, CI 0.7–14.4,  $p=0.13$ , NS), affective temperaments (OR: 4.0, CI 1.0–15.8,  $p=0.047$ ) and age of onset of migraine (age <15, OR: 11.4, CI 1.9–67.2,  $p=0.007$ ; age 15–24, OR: 5.6, CI 1.2–26.5,  $p=0.029$ ; age >25: reference group) as independent variables. The results show that only early age of onset of migraine and affective temperaments have a significant impact.

The effect of Raynaud's syndrome could not be included in these analyses because there were no people with Raynaud's syndrome in the migraine aura without headache group. Fisher's test, however, showed that Raynaud's syndrome was significantly associated with gender ( $p=0.032$ ) and age ( $p=0.019$ ), and not with affective temperaments ( $p=0.42$ ), suicide attempts ( $p=0.11$ ) or age of onset of migraine ( $p=0.49$ ).

The impact of gender, affective diagnosis and affective temperaments on suicidal behaviour was also tested by multivariate logistic regression analyses. The results showed that the effect of gender was not significant (OR: 1.1, CI 0.6–2.1,  $p=0.73$ ), whereas the impact of affective temperaments (OR: 1.8, CI 0.9–3.5,  $p=0.051$ ) and bipolar

**Table 5** Anxiety and eating disorders ( $n=201$ ). Data are % ( $n$ ) unless otherwise indicated

Anxiety and eating disorders	Migraine with aura ( $n=57$ )	Migraine without aura ( $n=41$ )	Migraine aura without headaches ( $n=18$ )	No migraine ( $n=85$ )	$p$ 1–4	$p$ 1 vs. 3
Onset first anxiety disorder, years $\pm$ SD	14.9 $\pm$ 9.0	16.8 $\pm$ 12.3	18.4 $\pm$ 14.6	15.9 $\pm$ 8.5	NS <sup>d</sup>	NS <sup>a</sup>
Number of anxiety disorders, $n\pm$ SD	2.7 $\pm$ 1.7	2.5 $\pm$ 1.5	2.3 $\pm$ 2.0	1.9 $\pm$ 1.5	0.028 <sup>d</sup>	NS <sup>a</sup>
Any anxiety disorder	90 (51)	90 (37)	78 (14)	78 (66)	NS <sup>b</sup>	NS <sup>b</sup>
Panic disorder	51 (29)	54 (22)	44 (8)	28 (24)	0.013 <sup>b</sup>	NS <sup>b</sup>
Agoraphobia	46 (26)	42 (17)	44 (8)	25 (21)	0.044 <sup>b</sup>	NS <sup>b</sup>
Social phobia	42 (24)	46 (19)	39 (7)	33 (28)	NS <sup>b</sup>	NS <sup>b</sup>
Generalised anxiety disorder	49 (28)	51 (21)	50 (9)	46 (39)	NS <sup>b</sup>	NS <sup>b</sup>
Specific phobia	58 (33)	46 (19)	33 (6)	46 (39)	NS <sup>b</sup>	NS <sup>b</sup>
Obsessive compulsive disorder	21 (12)	17 (7)	17 (3)	18 (15)	NS <sup>b</sup>	NS <sup>c</sup>
Anorexia nervosa	18 (10)	20 (8)	6 (1)	4 (3)	0.012 <sup>b</sup>	NS <sup>c</sup>
Bulimia	18 (10)	12 (5)	0 (0)	7 (6)	NS <sup>b</sup>	NS <sup>c</sup>

<sup>a</sup> $t$ -test (two-tailed); <sup>b</sup>Chi-square test; <sup>c</sup>Fisher's exact test; <sup>d</sup>ANOVA  
NS, not significant

I diagnosis (OR: 2.1, CI 0.9–4.6,  $p=0.07$ ) was not significant. The impact of having a bipolar II disorder was highly significant (OR: 3.4, CI 1.7–6.8,  $p=0.001$ ).

## Discussion

The results from the present study have shown that a surprisingly large number of patients (18/201) presenting with major affective disorders have migraine aura without headache. The patients with migraine aura without headache were different from patients having migraine headache plus aura concerning some important clinical characteristics. The patients that had migraine aura without headache had a low frequency of affective temperaments and a low probability of having made a suicide attempt, as well as a higher age of onset of migraine auras. It is also noteworthy that none of the patients in this group had Raynaud's syndrome, and this difference was statistically significant. There is not an obvious explanation for these results, and they could be caused by pathophysiological differences between the two groups. There were no statistically significant differences in the number of inpatients, frequency of drug abuse, age of onset of first affective episode or number of previous depressive episodes between the two groups. In addition, the variables that were significantly associated with Raynaud's syndrome (gender and age) were not significantly associated with

MA vs. aura without headache. Likewise, the variables significantly associated with MA vs. migraine aura without headache, i.e., suicide attempts ( $p=0.013$ ), age of onset of migraine ( $p=0.002$ ) and affective temperaments ( $p=0.057$ ) were not significantly associated with Raynaud's syndrome. This reduces the risk that our findings result from the interference of other variables. Also, no other variable indicated that the patients having migraine aura without headache represented a group with a less severe type of affective disorder.

The gender distribution in migraine aura without headache and MA is in agreement with an epidemiological study from Denmark, where a ratio of 1:2 between men and women was found for both of these migraine types [6]. However, in another study it has been reported that migraine aura without headache may be more common in men [20]. It is known that some migraine patients that have aura symptoms accompanied by headache in younger years lose the headache phase as they grow older [3, 21]. Interestingly there was a higher mean age in the migraine aura without headache group, although this was not significant. Nevertheless, there was a significant difference concerning age of onset of migraine symptoms between the two groups. Even though it seems unlikely that the patients should have forgotten previous characteristic headache episodes, this might be an explanation. The results from the logistic regression analyses showed that early age of onset was strongly associated with having migraine with aura (OR: 11.4, age <15 years, OR: 5.6,

age: 15–24 years), and that this effect explained the differences between the two migraine groups (MA vs. migraine aura without headache) better than the variables suicide attempt (OR: 3.2,  $p=0.13$ , NS) and affective temperaments (OR: 4.0,  $p=0.047$ ).

It has been reported that a history of migraine headaches is associated with increased frequencies of suicidal ideation and suicide attempts in patients with major depression [22]. We found a clear difference in the association between suicide attempts and the two different migraine types studied. In a previous study [10] we reported that 45% of the migraine patients and 39% of those without migraine had made a suicide attempt during the current or previous affective episodes, and that the lack of significant difference could possibly be explained by the high rates of suicide attempts at baseline. However, the frequency of suicide attempts in the current study was high among the patients having MA (53%), and against this background it was surprising to find that only three (17%) of the eighteen patients having migraine aura without headache had made a suicide attempt. This was despite the fact that the frequencies of suicidal thoughts were approximately equal in the two groups. Disturbances in serotonergic systems are found in completed and attempted suicides [23], and the serotonergic systems are involved in the pathophysiology of both migraine [24] and the affective disorders [25]. In view of this evidence, one speculation is that the serotonergic systems function differently in these two groups of migraine patients. The patients with migraine aura without headache also had a lower frequency of affective temperaments, and it is therefore possible that the low frequency of suicide attempts among these patients is related to the low frequency of affective temperaments. The results from the logistic regression analyses concerning variables with an impact on suicidal behaviour showed that the effect of affective temperaments was not significant (OR: 1.8,  $p=0.051$ ) when controlling for the affective diagnosis. The bipolar II patients were most strongly related to suicidal behaviour (OR: 3.4,  $p=0.001$ ). There were no differences concerning the affective diagnosis in the MA and migraine aura without headache groups, so this does not explain the differences in suicidal behaviour between the groups.

The only evidence, as far as we are aware, for pathophysiological differences between patients having migraine aura without headache or MA comes from a study of visual evoked potentials [26]. It would be interesting to combine such an electrophysiological approach with biochemical investigations of serotonergic systems in further studies of these patients.

There seems to be a clear association between migraine headaches and Raynaud's syndrome [27, 28]. Raynaud's syndrome is an episodic disorder that is char-

acterised by attacks of rubor, primarily of the fingers, and usually provoked by cold [28]. Both disorders are common in the general population and they both have a gender distribution that reflects an influence of female sex hormones [27, 29]. Episodes of either disorder may be precipitated by emotional stimuli, and for both there is also evidence for a genetic basis [28]. It has previously been suggested that migraine and Raynaud's syndrome may be part of a generalised vasospastic disorder, which also includes variant angina [30]. Although it is now fairly well established that the primary pathophysiological disturbance in migraine is neuronal [31], there are also prominent alternations in blood flow [24, 32]. Against this background the lack of association between migraine aura without headache and Raynaud's syndrome might reflect pathophysiological differences between MA and migraine aura without headache.

The present results are preliminary and require replication in a larger sample. The major limitation of the study is the cross-sectional non-blind assessment. Furthermore it is difficult to know if these patients are similar to persons in the general population having migraine aura without headache that is not combined with major affective disorders. The generalisability of the results is limited by the selection of a depressed study sample, and an ideal study should include a larger sample with a control group. The use of psychoactive drugs can influence the frequency and modify the clinical features of migraine headaches. We were interested in this topic and therefore included questions about the use of lithium, valproate, carbamazepine, SSRIs and other psychoactive drugs in our interview. We also included questions concerning the effect of these drugs in both depression and migraine. It is well established that valproate and amitriptyline have a prophylactic effect on migraine headaches, whereas the effect of SSRIs seems more uncertain [33]. Alas, our sample of 18 patients with migraine aura without headache included only 5 patients using either lithium, valproate, carbamazepine or any of these drugs in combination, and only 2 patients using amitriptyline, and no meaningful comparison between these drugs across diagnostic groups could be carried out. Concerning the SSRIs, they were used frequently in patients in both migraine aura without headache and MA groups. In the migraine aura without headache group 9 of 18 patients used SSRIs and 8 of them reported an effect of these drugs on depressive symptoms. None reported a positive effect of the SSRIs on the aura symptoms. In the MA group, 36 of 57 patients used SSRIs and 21 of them reported that this had a positive effect on depression, whereas only 3 reported a positive effect on migraine headaches. Although the use of psychoactive drugs may have influenced the migraine features in the study sample, the dis-

tribution and reported effects of drugs used by the patients do not seem to obviously have modified the data under investigation. Migraine aura without headache is a rather uncommon condition, and it would therefore probably require a large sample of healthy controls to examine its relationship with Raynaud's syndrome. In addition, the detection of migraine aura without headache probably requires a direct interview by a trained MD, reducing the possibilities of conducting such a study with an acceptable control group. However, migraine is more frequent in depressed patients than in healthy controls, and alterations in monoamine systems or channelopathy are thought to be involved in the pathogenesis of both migraine and mood

disorders. Studying the relationship between subtypes of migraine headaches and affective disorders may be a way to further explore a possible common pathomechanism in both disorders. Learning more about patients with migraine aura without headache, i.e., having a migraine process started without a subsequent headache attack, may also give clues to new treatment possibilities for those who suffer from migraine headache.

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