A 14-month study of change in disability and mood state in patients with chronic migraine associated to medication overuse

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Abstract This paper aims to evaluate changes in disease severity, disability and mood state in patients with chronic migraine associated to medication overuse (CM-MO). MIDAS was used for assessing disease activity, WHO-DAS-2 for disability, DBI-2 for mood state. ANOVA was used to test change over time; *t*-test to assess follow-up differences in WHO-DAS-2 and BDI-2 between patients with MIDAS ≤ 20 and ≥ 21 . Change in MIDAS, WHO-DAS-2 and BDI-2 scores were computed: Pearson's index was used to assess correlation between them; linear regression to assess change in WHO-DAS-2, using MIDAS and BDI-2 change as predictors. Mean MIDAS decreased significantly (from 101.9 to 52.0). In 26.1 % of the sample, MIDAS fell below 21 at follow-up: these patients had lower WHO-DAS-2 score. WHO-DAS-2 change was little correlated to MIDAS change and strongly correlated to changes in BDI-2 scores. 57.1 % of WHO-DAS-2 change variance is explained by change in BDI-2 and MIDAS scores. There was a clear clinical improvement 14 months after detoxification, and a modest reduction in disability which is explained by reduced disease activity and improved mood state. An appropriate treatment of CM-MO, based on detoxification and prophylaxis, is likely to reduce disease burden: recognition and treatment of mood problems may be a key factor to reduce disability.

Keywords Chronic Migraine · Disability · WHO-DAS-2 · Mood · Prophylaxis

Introduction

Chronic migraine associated to medication overuse (CM-MO) is an unfavourable outcome of migraine course, which seems to be mediated by lifestyle, life events, comorbid conditions, genetic terrain and medication overuse [1, 2], and which determines a relevant burden, in particular in terms of increased disease cost [3]. A recent review showed that patients with a chronic form of headache report a remarkable impact on functioning, with high disability and reduction in work and non-work activities [4]. Compared to those with episodic migraine (EM), CM-MO patients show increased disability and reduced mood level [5], and are twice likely to have depression [6]. Therapeutic approach requires withdrawal, followed by prophylactic intervention [7]: this approach is effective in reducing the frequency of headaches and patients' disability up to 5 years after detoxification [8], but it is not clear to what extent mood state and disease severity change may impact over patients' disability. The aim of this paper was to longitudinally assess the impact of disease activity and mood state change over disability change in a group of CM-MO patients.

Methods

In this longitudinal study, patients with CM-MO according to Silberstein's criteria [9] were consecutively enrolled and followed up for 12–18 months. Disease activity was assessed with the Migraine Disability Assessment (MIDAS) [10], disability with the WHO Disability Assessment

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Table 1 Linear regression: BDI-2 and MIDAS changes as predictors of WHO-DAS-2 change

Model	<i>R</i>	<i>R</i> ²	Adj. <i>R</i> ²	<i>F</i>
	0.768	0.590	0.571	31.22
Coefficients	<i>B</i>	Std err	β	<i>t</i>
BDI-2 somatic	1.092	0.267	0.481	4.10**
BDI-2 cognitive	0.979	0.385	0.302	2.54*
MIDAS	0.024	0.016	0.123	1.50

* $P < 0.05$, ** $P < 0.01$

Schedule-2 (WHO-DAS-2) [11], mood state with the Beck Depression Inventory-2 (BDI-2) [12].

Longitudinal differences were tested with ANOVA; differences in WHO-DAS-2 and BDI-2 between those with MIDAS ≤ 20 (i.e. below high severity threshold) and ≥ 21 at follow-up were assessed with *t*-test. Changes in MIDAS, WHO-DAS-2 and BDI-2 scores were computed, and correlations between each other were calculated with Pearson's index. Linear regression was used to assess change in WHO-DAS-2, using MIDAS and BDI-2 changes as predictors. All analyses were carried out on study completers only, *P* value < 0.05 was used to set statistical significance.

Results

In total, 69 patients (56 females, mean age 42.2, SD 12.6) completed follow-up: mean follow-up duration was 14 months (SD 1.7). Longitudinal differences were significant for MIDAS score only (101.9 ± 79.3 at baseline, 52.0 ± 54.3 at follow-up, $P < 0.001$), for the remaining variables a trend of improvement was observed (i.e. a decrease in WHO-DAS-2 and BDI-2 scores), but no statistical significance was detected. MIDAS fell below 21 in 26.15 % of the sample: compared to the other patients, these reported significantly lower WHO-DAS-2 (14.4 ± 13.4 Vs. 30.8 ± 18.3 , $P < 0.05$), while no difference was observed at BDI-2.

WHO-DAS-2 change was little correlated to MIDAS change ($R = 0.28$, $P < 0.05$) and strongly correlated to changes in BDI-2 Somatic ($R = 0.73$, $P < 0.001$), Cognitive ($R = 0.69$, $P < 0.001$) and Summary scores ($R = 0.76$, $P < 0.001$). Table 1 shows the regression analysis in which MIDAS and BDI-2 change predicted WHO-DAS-2 change. The model explained 57.1 % of variation: BDI-2 Somatic and Cognitive were independent predictors.

Discussion

Our data show a clear clinical improvement 14 months after detoxification: although only one-fourth of patients achieved a MIDAS score ≤ 21 , mean MIDAS reduction was around 50 %, while disability and mood state

improvement were modest. Improvement in disability is largely explained by reduced disease activity and, in a much more significant way, by improved mood state. Our findings therefore indicate that an appropriate treatment of CM-MO, based on detoxification and prophylaxis, is likely to reduce disease's burden. Moreover, our findings suggest that recognition and treatment of mood problems may be a key factor to promote a reduction in disability. Our results support previous findings showing that depression is associated to a higher risk of developing CM [13], and that this condition is more frequent in CM-MO patients compared to EM patients [14].

Our results are limited by small sample size and by the fact that the analyses were based on study completers only; therefore, these have to be intended as preliminary indications only.

Conflict of interest The authors certify that there is no actual or potential conflict of interest in relation to this article.

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