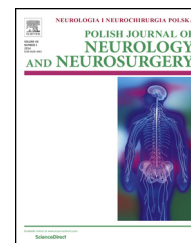


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Original research article

Migraine frequency and its association with dyslipidemia in women



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ABSTRACT

Background: Some studies have shown a higher occurrence of unfavorable lipid profile in women with migraine as compared to the general population.

Aim: The aim of our study was to assess the link between lipid profile and the frequency of migraine attacks.

Patients and methods: 64 female migraine patients, mean age 40 ± 10.84 years and mean duration of the disease 18.52 ± 7.57 years, were included into the study. Lipid profile (total cholesterol, TC; low-density lipoprotein cholesterol, LDL-C; high-density lipoprotein cholesterol, HDL-C; triglycerides, TG) was evaluated in all migraine patients. Frequency of migraine attacks was calculated from the amount of migraine episodes within the last 3 months.

Results: The correlation between TC and TG and the frequency of the migraine attacks were statistically significant.

Conclusion: TC and TG values may have an influence on migraine severity and also contribute to the increased risk of cardiovascular diseases, especially in women.

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1. Introduction

In some populations high level of cholesterol may affect even more than 50% of the cases [1–5]. The major problem with a proper diagnosis of dyslipidemia is its asymptomatic course which finally leads to the development of severe and irreversible conditions of cardiovascular nature. Not to mention that the final effect of elevated lipid levels may be massive and destructive stroke, heart attack and eventually

death [6–8]. Some recent studies showed that prevalence of migraine and its severity might be related to serum level of lipids. Most of them postulated that an abnormal lipid profile may be linked with greater odds of migraine [9–13]. Although Monastero et al. did not find any correlation between abnormal cholesterol level and frequency of migraine episodes [12]. Also migraine is reported to increase the risk of cardiovascular events like stroke, atherosclerosis and perhaps coronary heart disease [14–17]. Such finding combined with abnormal lipid profile might multiply cardiovascular risk in

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migraineurs and needs to be better understood. Based on the mentioned hypotheses the aim of our study was to evaluate the serum level of total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C) or triglycerides (TG) in migraine patients as a factor which might play a role in a more often manifestation of migraine episodes.

2. Patients and methods

Our study is a cross-sectional study performed in the Headache Outpatient Clinic of Department of Neurology Warsaw Medical University. Consecutive migraine patients were examined in the Headache Outpatient Clinic from November 2010 to April 2012.

71 migraine patients were included into the study. Patients with a known history of metabolic, cardiovascular or other diseases were excluded from study. Our study group did not include individuals on medications affecting cholesterol and triglycerides levels. The study group consisted of patients without migraine prophylactic treatment. The study group consisted of 64 women and 7 men, mean age 40 ± 10.84 years. The mean duration of the disease was 18.61 ± 7.45 years, mean frequency of migraine attacks 3.44 ± 5.82 per month. 51 patients (72%) were diagnosed as patients with migraine without aura and 20 (28%) patients had attacks of migraine with aura. Migraine was diagnosed according to the International Headache Society (IHS) criteria, 2nd edition [18] and next revised according to 3rd edition [19]. The full neurological and general examination was performed. Frequency of the migraine attacks was calculated from the number of migraine episodes within the last 3 months. Our patients reported the data using patient's diaries. Because of the small number of our male patients, we ruled them out of the study to avoid selection bias. Baseline characteristics of migraine patients are presented in Table 1.

All patients had their blood samples tested during the first visit in the Headache Outpatient Clinic of the Neurology Department. Our patients had lipid panel analysis for the first time. The value of 4 components (TC, HDL-C, LDL-C, TG) was evaluated in the same medical laboratory, using standard

enzymatic methods. Blood test was taken after a night of fasting by venous puncture.

We assessed the association between lipid profile values and frequency of migraine attacks. The statistical analysis was carried out using SAS 9.2 with Spearman correlation coefficients, which is nonparametric measure of statistical dependence between two variables. P-values of <0.05 were considered statistically significant. Lipid levels and frequency of migraine episodes were treated as continuous variables.

3. Results

The mean level of TC in migraine patients was 194.38 ± 35.06 mg/dl, mean LDL-C 109 ± 32.3 mg/dl, mean HDL-C 66.4 ± 13.86 mg/dl, mean triglycerides 88.68 ± 45.27 mg/dl. 21 women (39%) had an increased TC level (>190 mg/dl), 18 (28%) had increased LDL-C (>115 mg/dl), 5 (8%) increased TG level (>150 mg/dl) and 4 (6%) patients were diagnosed with abnormally low HDL-C level (<50 mg/dl) (Table 2).

The statistical calculation revealed a significant correlation between a value of TC ($p = 0.0481$, $r = 0.34$) or TG ($p = 0.0147$, $r = 0.41$) and frequency of migraine attacks. Moreover, the statistical analysis did not show any link between LDL-C ($p = 0.084$, $r = 0.31$) or HDL-C ($p = 0.53$, $r = -0.11$) level and frequency of migraine. Statistical correlation between TC, TG, HDL-C, LDL-C levels and frequency or duration of migraine is presented in Fig. 1.

4. Discussion

We found the statistically significant differences between the value of TC, TG and frequency of migraine attacks. We found only one published study making a similar comparison. Kurth et al. did not find any significant link between TC, LDL-C and HDL-C levels and frequency of migraine attacks. In this large cross-sectional study all 27,626 female participants were over 45. Therefore, we cannot directly refer to such a specific population [12]. The other studies mostly focused on abnormal lipid levels and odds of migraine. Scher et al. in their GEM population-based study concluded that migraineurs with aura were more likely to have an abnormal cholesterol profile. The study group comprised 620 migraineurs (31% with aura and 64% without aura). The controls were 5135 probands without any history of migraine. The odds of having an elevated Framingham risk score for coronary heart disease were

Table 1 – Baseline characteristics of migraine patients.

	Migraine patients
All	71
Females	64
Age (years)	40 ± 10.84
Duration of the migraine (years)	18.61 ± 7.45
Frequency of migraine attacks (attacks per month)	3.44 ± 5.82
TC (mg/dl)	194.38 ± 35.06
HDL-C (mg/dl)	66.4 ± 13.86
LDL-C (mg/dl)	109 ± 32.3
TG (mg/dl)	88.68 ± 45.27
Migraine with aura (%)	28.17

TC, total cholesterol; LDL-C, low-density lipoprotein cholesterol; HDL-C, high-density lipoprotein cholesterol; TG, triglycerides.

Table 2 – The mean lipid values of the female population.

	Migraine female patients
TC (>190 mg/dl)	21 (39%)
HDL-C (<50 mg/dl)	4 (6%)
LDL-C (>115 mg/dl)	18 (28%)
TG (>150 mg/dl)	5 (8%)

TC, total cholesterol; LDL-C, low-density lipoprotein cholesterol; HDL-C, high-density lipoprotein cholesterol; TG, triglycerides.

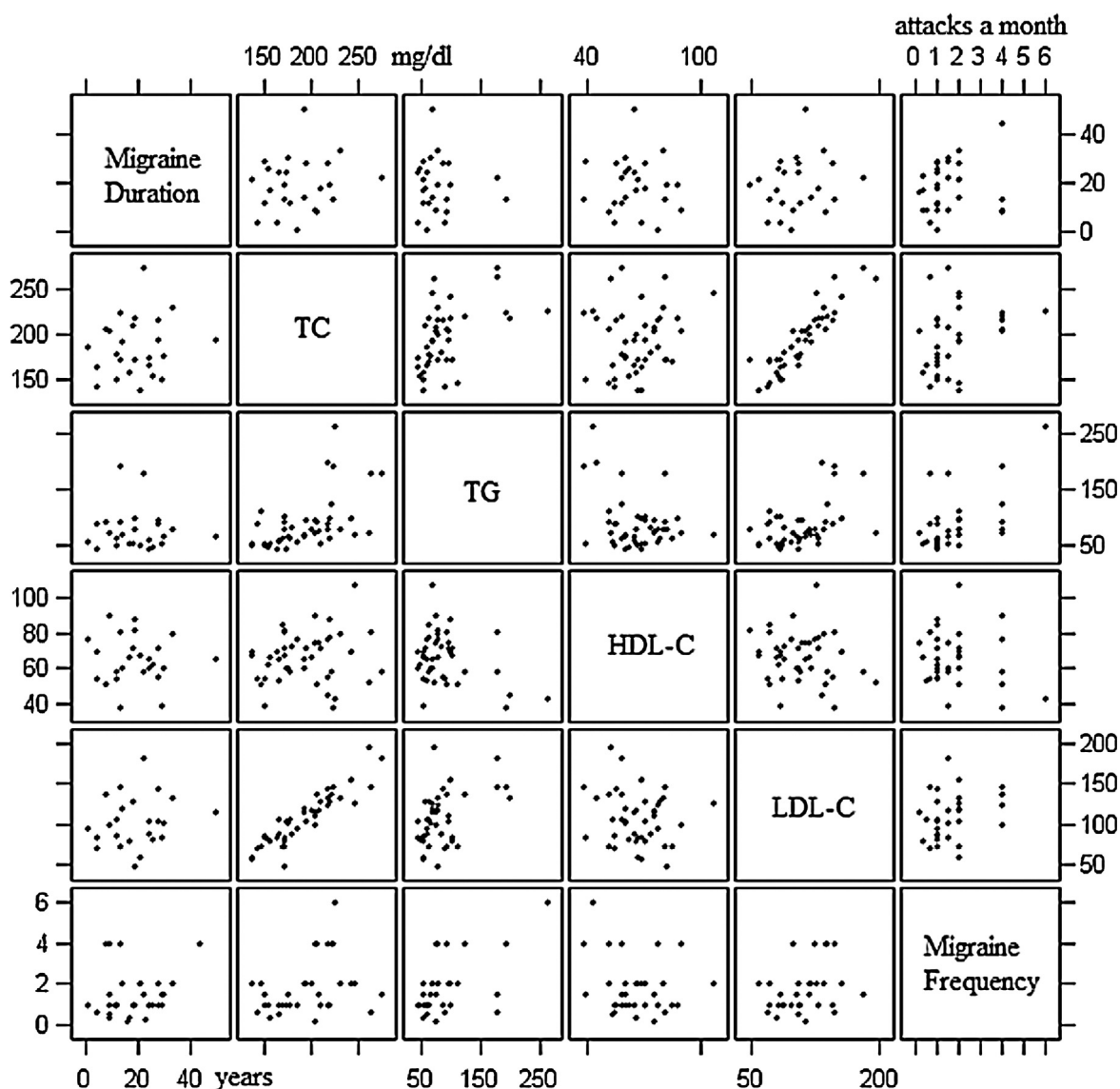


Fig. 1 – Statistical correlation between TC, TG, HDL-C, LDL-C levels and frequency of migraine episodes a month (migraine frequency) and migraine duration. TC, total cholesterol; LDL-C, low-density lipoprotein cholesterol; HDL-C, high-density lipoprotein cholesterol; TG, triglycerides.

approximately doubled for patients with migraine with aura [10]. Similarly Rist et al. stated that migraine with aura was associated with a higher risk of cardiovascular diseases. Their prospective study characterized 1155 probands aged 45 years or older, 166 of who were the patients with migraine [13]. Manestro et al. showed that an elevated TC level was significantly associated with migraine in general. They assessed the group of 1809 patients. 151 of them suffered from migraine. The link between a TC level and migraine was higher in elderly males with migraine [11]. Also the HUNT study revealed a relationship between an unfavorable lipid profile and both types of migraine (with and without aura) [17]. Gruber et al. study showed elevated oxidized LDL level associated with a 7.93-fold higher risk for migraine [9]. The results of some previous and our study concerning lipid levels

and migraine suggest a correlation between migraine and abnormal lipid profile.

It is worth to underline that the main strength of our study is the ascertained method of the migraine diagnosis. The types of the headache were not self-reported, so their classification was confirmed by professionals. Our group did not included individuals on drugs lowering cholesterol and triglycerides levels. Neither they suffered from conditions affecting lipid metabolism. In the other hand one of the limitation of our study is a small number of the analyzed group and also the lack of our own control group. Finally, we did not carry out any adjustment of potential confounder, such as age, tobacco smoking and the phenomenon of aura which seems to worsen cardiovascular complications in migraineurs [14,15].

5. Conclusion

Our results show that migraine frequency might be associated with TC and TG levels. The data suggests that migraine may increase the risk of cardiovascular diseases, especially in women. Higher level of TC and TG in migraine female patients may multiply the risk of cardiovascular diseases.

Conflict of interest

None declared.

Acknowledgement and financial support

None declared.

Ethics

The work described in this article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; Uniform Requirements for manuscripts submitted to Biomedical journals.

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