ORIGINAL RESEARCH PAPER

Volume-7 | Issue-6 | June-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY OF LIPID PROFILE IN PATIENTS SUFFERING FROM MIGRAINE

Physiology

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ABSTRACT

Migraine is a common, primary, chronic/intermittent neurovascular headache disorder characterized by episodic severe headache and in some patients, transient neurologic symptoms, known as migraine aura. Previous studies show that migraine, particularly migraine with aura, is associated with many other dysfunctions. The study was conducted on 100 subjects, of which 50 were migraine patients (cases). The remaining 50 subjects formed the control group. Thus the two groups consist of Group A (cases) composed of 50 migraine patients aged 20-40 years and Group B (controls) composed of 50 healthy adults with no clinical signs and symptoms of migraine. The subjects included in both group were assessed for BMI and lipid profile. In our study the difference of mean value of BMI was not statistically significant (P=0.2188) and the mean value of TC, TG, HDL & VLDL was statistically non significant (P=0.5226, P=0.8659, P=0.1549 & P=0.1350 respectively) but difference of mean of LDL was statistically significant (P<0.0001***). We concluded that the lipid profile status cause increased incidences of cardiovascular and cerebrovascular events in migraineurs.

KEYWORDS

Migraine, lipid profile and BMI.

INTRODUCTION

Migraine is a complex disorder of the brain, and its pathomechanism is intensively investigated. Migraine is not a benign disease as it was thought before the imaging era since migraine is an independent risk factor for deep white matter lesions, silent posterior circulation territory infarcts, and infratentorialhyperintense lesions.[1-4] Migraine patients have an almost fourfold greater risk to develop white matter lesions than non-migraine controls[5], and the prevalence of these lesions is higher in migraine with aura than in migraine without aura.[4]
The risk of developing white matter lesions is higher in female migraineurs and in patients with higher attack frequency and longer disease duration.[4-6] Furthermore, it seems that brain white matter lesions do not correlate with age.[7,8] It is also known that beyond the existing relation between migraine and stroke, there is also an association between migraine and coronary heart disease.[9,10] Since the risk of these severe complications is low in the general population, it is not possible to identify which migraine patients will develop a cerebrovascular or cardiovascular event.

Indeed, several studies have found association between migraine with aura and increased risk of ischemic stroke. Some studies have suggested that migraine, particularly migraine with aura, is associated with unfavorable cardiovascular risk profile and prothrombotic or vasoactive factors[11,12] and that the vascular dysfunction of migraine may also extend to coronary arteries.[13,14] It is plausible that migraine, especially migraine with aura, may be associated with other vascular disorders and not just stroke.

AIM OF STUDY: To compare lipid profile between patients of migraine and healthy individuals

MATERIALAND METHODS

This study was conducted in the Department of Physiology, in association with the Department of Biochemistry, Sardar Patel Medical College, Bikaner, Rajasthan.
TYPE OF STUDY: Randomized Case –control study.

Selection of patients:
This study was conducted on 100 subjects, of which 50 were patients of migraine selected randomly from different hospitals of Bikaner city.

Inclusion criteria:

- All adult patients of either sex, aged 20–40 years, presenting with history of headache satisfying the International Headache Society 2004 criteria for primary episodic migraine will be enrolled for the study.
- All secondary causes of headache were excluded by appropriate clinical and radiological examinations.

Exclusion criteria:
Migraine patients with diabetes mellitus, those with hypercholesterolemia disorders, those on oral contraceptives, and those with obesity were excluded from the study.

Selection of control:
Normal healthy adults of either sex, aged 20–40 years, without any history of migraine attacks were taken as control.

METHODS:

The study was conducted on 100 subjects, of which 50 were migraine patients (cases) selected from the different hospitals of Bikaner city. The remaining 50 subjects formed the control group. Thus the two groups consist of:

Group A (cases) - composed of 50 migraine patients aged 20-40 years.

Group B (controls) - composed of 50 healthy adults 20-40 years with no clinical signs and symptoms of migraine.

The subjects included in both group were assessed for BMI and lipid profile.

Lipid Profile:
All subjects were tested under similar laboratory conditions. The blood samples for lipid profile was taken early morning after 12-h fasting and the samples centrifuged in an ultracentrifuge; the serum was stored in the Department of Biochemistry. Lipid profile was performed in the Central Biochemistry Laboratory using semi-automatedanalyser.

Total Cholesterol:[15]
Quantitative determination of cholesterol was done using cholesterol oxidase–peroxidase enzymatic colorimetric method. The intensity of the colour formed is proportional to the cholesterol concentration in the sample. Normal value is <200 mg/dL.

OBSERVATION

Table 1: Comparison of mean value of BMI in between groups

Groups	BMI (kg/m2)		T value	p-value
	Mean	SD		
Control	21.42	1.904	1.238	0.2188NS
Case	20.94	1.956		

Table 2: Comparison of mean value of Lipid profile in between groups

Lipid profile	Control (mean±SD)	Case (mean±SD)	T value	p-value
TC	192±9.035	190.8±9.655	0.6417	0.5226 NS
Triglyceride	143.8±16.24	144.3±11.74	0.1694	0.8659 NS
HDL	43.28±4.160	41.74±6.356	1.433	0.1549NS
LDL	128.2±13.04	153.3±17.19	8.225	<0.0001***
VLDL	29.84±3.165	28.88±3.205	1.507	0.1350NS

RESULT

Body mass index

Mean value of BMI in both case (group A) and control (group B) are statistically insignificant.

Lipid profile

Triglyceride: There was no statistically significant difference between case and control group triglyceride level. (p=0.8659).

Total cholesterol: There was no statistically significant difference between case and control group TC level(p=0.5226) High density lipo-protein: There was no statistically significant difference between case and control group HDL level (p=0.1549) Low density lipo-protein :In this study, the LDL-cholesterol estimation showed an increased level, which was in agreement with several previous studies. The case group had a higher level of LDL-cholesterol than the control group, and the difference was found to be statistically significant .There is a nonspecific sympathetic hyperactivity in migraine patients in headache-free intervals. The LDL levels might have increased because of an increased release of catecholamines during this sympathetic hyperactivity. Epinephrine decreases LDL uptake (binding + internalization) and degradation in a dose-dependent manner.

VLDL: VLDL level comparison between the cases and controls was also statistically insignificant.

DISCUSSION

A randomized case –control study conducted on 100 subjects of which 50 were patients of migraine selected from different hospitals of Bikaner city. All adult patients of either sex, aged 20–40 years, presenting with history of headache satisfying the International Headache Society 2004 criteria for primary episodic migraine were included in this study.

In our study the mean value of BMI was 21.42±1.904 in control group and 20.94±1.956 in case group but difference of mean was not statistically significant (P=0.2188). But obesity has been found to be an important cardiovascular risk factor associated with migraine, especially with a new onset chronic daily headache (CDH), higher frequency and intensity of migraine crises[16,17]. With respect to BMI, Bigal et al. have shown an increase in the proportion of subjects with severe headache pain and a doubling of cases in the morbidly obese group (BMI > or = 35 kg/m_2) compared to the normally weighted group (BMI 18.5 to 24.9 kg/m_2; OR = 1.9). A greater BMI was, indeed, directly correlated with an elevated number of headache crises [4.4% of cases with 10 to 15 headache days per month in the normally weighted group, 5.8% in the overweight (OR = 1.3), 13.6% in the obese (OR = 2.9), and 20.7% in the morbidly obese group (OR = 5.7).[16]

Our study suggested that the mean value of TC, TG, HDL & VLDL was statistically non significant (P=0.5226, P=0.8659, P=0.1549 & P=0.1350 respectively) but difference of mean of LDL was statistically significant (P<0.0001***).This could be because the Indian population generally has lower lipid levels than the Western population. In another study from India, even lower level of plasma cholesterol (<150 mg/dL) in patients with coronary artery disease has been reported.[143]Comparison of values with those reported in different populations in prosperous communities indicated that serum cholesterol levels in India are low in all the age groups.[19]

In our study, the LDL-cholesterol estimation showed an increased level in case group which was in agreement with several previous studies.[20-23]The case group had a higher level of LDL-cholesterol than the control group, and the difference was found to be statistically significant.

The HDL-cholesterol levels showed no statistical significance between the cases and controls on comparison, similar to the results of the study by Gruber et al.[20] A study of plasma lipids in migraine by Monastero et al.[21] also found no statistical significance for HDL.

Comparison of TGs showed no statistically significant difference between case and control group, similar to the study by Monastero et al.,[21] and VLDL level comparison between the cases and controls was also statistically insignificant.

These parameters need further elaborate evaluation to find out their association with migraine. There is a nonspecific sympathetic hyperactivity in migraine patients in headache-free intervals.[24] The LDL levels might have increased because of an increased release of catecholamines during this sympathetic hyperactivity. Epinephrine decreases LDL uptake (binding + internalization) and degradation in a dose-dependent manner. These results are in agreement with the general view that epinephrine increases cyclic AMP intracellular level, as it was previously shown that dibutyryl cyclic AMP or isoproterenol treatment of cultured fibroblasts had similar effect on these pathways. The decrease in LDL processing induced by epinephrine could be involved in the worsening effect of epinephrine on the lipid profile.[25]

SUMMARY AND CONCLUSION

- The mean value of BMI was 21.42±1.904 in control group and 20.94±1.956 in case group but difference of mean was not statistically significant (P=0.2188).
- The mean value of TC, TG, HDL & VLDL was 192±9.035, 143.8±16.24,43.28±4.160 &29.84±3.165 respectively in control groups and 190.8±9.655,144.3±11.74,41.74±6.356 & 28.88±3.205 respectively in case group and mean value of lipid profile was statistically non significant (P=0.5226, P=0.8659, P=0.1549 & P=0.1350 respectively).
- The mean value of LDL was 128.2±13.04 in control group and 153.3±17.19 in case group, difference of mean value was statistically significant (P<0.0001***).
- We concluded that the lipid profile status in migraine has been found to be proatherogenic, and this may lead to increased incidences of cardiovascular and cerebrovascular events in migraineurs, which necessitates that their lipid profile should be constantly monitored to prevent any future vascular events.

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