ISSN: 2754-4990

Journal of Ophthalmology Research Reviews & Reports

SCIENTIFIC Research and Community

Research Article

Open Access

Study of Blood Lipid Levels and C-Reactive Protein in Patients with Pseudoexfoliation Syndrome

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ABSTRACT

Aim: To evaluate the relationship between the level of blood lipids and inflammatory reaction protein and pseudoexfoliation syndrome.

Methods: The research sample included 75 patients with pseudoexfoliation deposits that were discovered during the examination of the anterior sections of the eye on the slit lamp, attending the general eye clinic at Tishreen University Hospital in Lattakia during the time period 2022-2023, who investigated the inclusion criteria in the research, in addition to a control sample consisting of 75 patients as well. All participants underwent a detailed clinical history and ophthalmological examination including visual acuity examination and slit-lamp examination before and after mydriasis, after which the following laboratory tests were performed: CRP, LDL, HDL, TC, and TG on peripheral blood samples drawn after a 12-hour fast.

Results: By comparing the patient group with the control group, our study found that there were no statistically significant differences between the two research groups according to demographic variables, as it was (P-value=0.6) for gender and (P-value=0.1) for age. We also noted with this comparison that there were no statistically significant differences between the two research groups according to the average values of the inflammatory reaction protein (CRP) (P = 0.06), total cholesterol (TC) (P = 0.5), triglycerides (TG) (P = 0.4), and low-density lipoprotein. (LDL) (P=0.6) and high-density lipoprotein (HDL) (P=0.8)

Conclusion: We did not find an increase in the level of lipids in the blood, nor even in the level of CRP, in PEX patients attending the eye clinic at Tishreen University Hospital in Lattakia. These findings raise doubts about the possible relationship between PEX and vascular disease. Because the results of our and other studies are inconclusive, the causes and correlates of PEX remain unexplained and more studies on this topic are needed.

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Received: March 16, 2024; **Accepted:** March 22, 2024; **Published:** April 10, 2024

Introduction

Pseudoexfoliation syndrome (PEX) is an age-related complex systemic disorder of the extracellular matrix affecting the eye and visceral organs. The average worldwide prevalence of PEX is 10%–20% of the general population over the age of 60 years [1,2]. Originally, PEX was thought to be limited to the anterior segment of the eye; some studies have indicated, however, that pseudoexfoliative material may be present in blood vessels and impaired endothelial function can be observed [1,2]. Since endothelial dysfunction is an independent predictor of future cardiovascular and cerebrovascular events, it might suggest an increased vascular risk in PEX patients [3-5]. Dyslipidemia is a well-established risk factor for cardiovascular and cerebrovascular diseases. Many studies have shown a strong correlation between serum lipids levels and risk of developing vascular events [5-7]. It was found that C-reactive protein (CRP) is significantly associated with cardiovascular disease [8].

Methods

The subjects for this study were recruited from patients who presented to the Department of Ophthalmology at Tishreen University Hospital in Lattakia-Syria from April 2022 to April 2023 for cataract surgery. Exclusion criteria were diabetes, any evidence of an inflammatory or tumoral condition in the body, a history of using antihyperlipidemic medications such as statins and others, a history of using lipid-lowering medications such as steroids, oral contraceptives, beta blockers, and thiazides or Any form of familial hyperlipidemia.

Pseudoexfoliation changes were identified by slit lamp examination after pupil dilation as the presence of typical PEX material on the anterior lens surface, iris, or corneal endothelium in either eye. The individuals without any evidence of pseudoexfoliation deposits were taken as the control group. This study has been approved by the local bioethical committee. All patients gave their informed consent for this study.

Blood samples were collected in all patients after an over- night fast. Plasma was obtained within less than 1 hour to avoid proteolysis and stored deep-frozen (−80°C) in small aliquots until assayed but no longer than 8 months. Total cholesterol (TC), high-density lipoprotein (HDL), Low-density lipoprotein (LDL), triglyceride (TG), and C- reactive protein (CRP) were measured by chemistry analyzer (Mindray BS 380, China).

Statistical Analysis

We used SPSS (IBM, USA) for statistics. Data was tabled using excel (Microsoft Corporation, USA). Discriptive Statistics were calculated, and results were summarized as (mean +_SD) for numeric variables and ratio for categorical variables. Correlation between numeric variables was assessed using Independent T-student. Correlation was significant when $p<0.05$.

Results

We studied 75 patients with PEX (40 males and 35 females), median age 65.24 years (Q1=61; Q3=85), and 75 age- and sex-matched controls (42 males and 33 females), median age 66.91 years (Q1=62; Q3=80). The concentrations of serum lipids and CRP constituting one of the major cardiovascular risk factors are shown in Table 1. There were no significant differences in concentration of lipids between PEX and control groups. C-reactive protein level was not increased in patients with PEX and was found to be similar to that of controls. The concentrations of serum lipids and CRP did not differ between males and females, both in PEX and control groups.

Table 1: Biochemical Parameters in PEX Patients and Controls

Parametres	PXS patients n=75		Control n=75		P-value
	Mean	SD	Mean	SD	
TC (mg/dl)	153.45	31.8	150.10	35.2	0.5
TG (mg/dl)	129.97	47.7	119.50	36.4	0.4
HDL (mg/dl)	45.28	8.1	43.77	9.2	0.8
LDL (mg/dl)	107.31	27.1	110.06	33.4	0.6
CRP (mg/l)	7.39	4.5	6.99	3.5	0.06

PXS: Pseudoexfoliation Syndrome

Discussion

There are some studies on the possible association between PEX and vascular diseases although their results are inconclusive [9-15]. The risk for cardiovascular and cerebrovascular diseases might be ascribed to the accumulation of pseudoexfoliative fibrils in the arterial wall [2]. It has been proven that one of the several tests in a vascular risk profile, along with tests for cholesterol and triglycerides, is CRP [5-8]. Studies, that analyzed serum lipids levels and PEX association, provided conflicting results. All these studies are diffcult to compare as they vary in size and design. Türkyılmaz et al. found that the mean total cholesterol and triglycerides levels were significantly higher, and mean serum HDL level was lower in the PEX group of 40 patients compared to the controls [16]. We were unable to show an association between the serum lipid levels and PEX syndrome. Our findings are in accordance with the results of Atalar et al. (23 PEX patients) and Spečkauskas et al. (152 PEX patients), who did not reveal the differences in lipid levels in PEX patients [2, 17]. The latter authors found no clear PEX association with triglyceride and HDL cholesterol levels as well as ischemic heart disease after controlling for effect of age in the population-based study. Presence of PEX was not significantly associated with the blood concentration of high-density lipoproteins and cholesterol in the study of Jonas et al. comprising 69 PEX patients [18].

There is also discrepancy regarding CRP levels in PEX. Elevated plasma CRP levels have been reported in patients with PEX by Sorkhabi et al. [19]. Nevertheless, the study of Yüksel et al. revealed that serum CRP levels were not elevated in patients with PEX [20]. This is in accordance with our results which showed that serum CRP levels were not increased in patients with PEX and were found to be similar to that of controls. The conflicting results of these studies may be due to the selection bias. Similarly to Sorkhabi et al, in our study, we strictly excluded all conditions which may affect the levels of inflammatory biomarkers [19]. Our research casts doubt on the possibility of PEX and cardiovascular and cerebrovascular disease association. These findings suggest that patients with this syndrome do not suffer from increased comorbidity and mortality.

Conclusion

We did not find an increase in the level of lipids in the blood, nor even in the level of CRP, in PEX patients who presented to the Department of Ophthalmology at Tishreen University Hospital in Lattakia. These findings raise doubts about the possible relationship between PEX and vascular disease. Because the results of our and other studies are inconclusive, the causes and correlates of PEX remain unexplained and more studies on this topic are needed.

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