Plasma Lipid Levels in Patients with Cataract, with and without Pseudoexfoliation Syndrome

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Abstract

Purpose: Pseudoexfoliation syndrome (PES) is an age-related condition characterized by the deposit of an abnormal fibrillar material on many ocular tissues. The current study aimed to assess plasma lipid levels including cholesterol, triglyceride (TG), low-density lipoprotein (LDL), very low-density lipoprotein (VLDL) and high-density lipoprotein (HDL) in patients with cataract, with and without pseudoexfoliation syndrome.

Methods: Patients with the diagnosis of senile cataract and indication of surgery were included in the current case-control study. Following the examination, the patients were classified into two groups; the PES group and the non-PES group. From all participants, blood samples were taken after 12 hours of fasting to measure TG, cholesterol, LDL, HDL and VLDL. Mean of plasma lipids were compared between the two groups.

Results: Two hundred and fifteen patients with cataract were enrolled in the study in which 74 were diagnosed as having PES (58.1% male) and 141 were non-PES (54.6%) and were selected as control group. Differences between PES and non-PES groups were not statistically significant when considering the mean concentrations of cholesterol, LDL, VLDL and HDL (P = 0.899, 0.403, 0.392 and 0.878 respectively). Mean concentration of TG in non-PES group was 127.07 ± 6.59 mg/dL, which was lower than the mean TG of PES group (149.78 ± 6.15 mg/dL). The difference was statistically significant (P = 0.021).

Conclusions: The study found that increased TG values were significantly associated with PES. The study results showed that checking and controlling the dyslipidemia in patients with cataract and PES may be helpful. Further studies with larger sample sizes are recommended.

Keywords: Pseudoexfoliation Syndrome, Cataract, Plasma Lipids

1. Introduction

Cataract, a complete or partial opacification in the human lens or in the capsule, is one of the reversible causes of impaired vision and blindness in the world (1). Cataract surgery is one of the most frequent surgical procedures in older people in both Western and Japanese populations (2, 3). More than 80% of all cataracts are age-related and the pathophysiology behind it is complex and not fully understood (1, 4).

Pseudoexfoliation syndrome (PES) is an age-related condition characterized by the deposit of an abnormal fibrillar material on many ocular tissues and also extraocular organs such as heart, lung, liver, kidney, gall bladder, cerebral meninges, skin, and blood vessels (the walls of small blood vessels). PES prevalence is different according to countries and areas but is reported worldwide (5-8). PES involves all tissues of the anterior segment of the eye and can cause lots of complications. The association between PES and open-angle glaucoma, angle-closure glaucoma and cataract are well established (5, 8, 9). PES is also associated with some systemic disorders such as sensory neural hearing loss, hypertension, cardiovascular and cerebrovascular diseases, transient ischemic attacks, stroke, myocardial infarction and the Alzheimer disease (5, 7, 8). The pathogenesis of PES is not completely defined, but may be related to genetic, environmental and immunologic factors (5).

Dyslipidemia is one of the most important risk factors of cardiovascular disease; it also affects many organs of the body. Dyslipidemia is associated with a wide range of eye diseases, including age-related macular degeneration, glaucoma, retinal vein occlusions and hypertensive and diabetic retinopathy (10, 11). The current study aimed to assess plasma lipid levels including cholesterol, triglyc-
eriode (TG), low-density lipoprotein (LDL), very low-density lipoprotein (VLDL) and high-density lipoprotein (HDL) in
patients with cataract, with and without pseudoexfoliation syndrome.

2. Methods

2.1. Study Population

Patients admitted at the ophthalmology department of the Imam Khomeini hospital of Ahvaz University of Medical
Sciences from July 2011 till July 2012 with the diagnosis of senile cataract and indication of surgery was included in
the current case-control study. The study objectives were explained to the subjects and all the patients signed in-
formed consent before entering the study. Patients char-
acteristics including age and gender were asked. Follow-
ning the examination, the patients were classified into two
groups: the PES group and the non-PES group. All the
patients with cataract and PES were included in the case
group and twice of that from non-PES group were selected
as the control group. Diagnosis of PES was done by stan-
dardized clinical examination for signs of the syndrome
by slit lamp. Diagnostic criteria were the characteristic
grayish-white exfoliative material on the anterior capsule
and/or pupillary margin in mydriatic pupil by slit lamp.
Also, typical flakes on the iris surface, in either eye were
considered as a diagnostic parameter (6, 8). Males and fe-
males were eligible to the study. The following subjects
were excluded from the study: Patients diagnosed with his-
tory of glaucoma, cup/disc ratio more than 0.5, intraocular
pressure ≥20 mmHg, pressure difference between eyes
≥6, history of intraocular surgery, ocular trauma, and his-
tory of taking any drugs for dyslipidemia such as statins
or effective drugs on lipid metabolism. Blood samples of
all participants were taken after 12 hours of fasting to mea-
sure TG, cholesterol, LDL, HDL and VLDL.

2.2. Data Analysis

Statistical analysis was performed using SPSS for win-
dows (Version 16.0, 2007, SPSS Inc, Chicago, IL, USA). The
Student T-test (for comparison of means) and Chi-square
test (for comparison of gender distribution between the
groups) were used. Statistical significance was assessed at
the 0.05 probability level in all analyses and the data were
given as mean± standard error mean (SE) or frequency.

2.3. Ethics

The design of the study was approved by ethics com-
mittee of Ahvaz Jundishapur University of Medical Sci-
ences.

3. Results

Two hundred and fifteen patients with cataract were
enrolled in the study among which 74 were diagnosed with
PES and 141 non-PES and were selected as the control

Of the participants, 120 (55.8%) were male and 95 (44.2%)
were female. There was no significant gender wise differ-
ence between the case and control groups (58.1% female
vs. 54.6% male in case and control groups respectively, P =
0.624). The mean age of participants was 67.01 ± 0.73 years;
the mean age of case and control groups were 70.31 ± 1.26
and 56.28 ± 0.87 years respectively and the difference was
statistically significant (P = 0.01).

Mean concentration of plasma lipid levels are reported
in Table 1. According to Table 1, differences between PES
and non-PES groups were not statistically significant when
considering the mean concentrations of cholesterol, LDL, VLDL
and HDL (P = 0.899, 0.403, 0.392 and 0.878, respectively).
Mean concentration of TG in non-PES group was 127.07 ±
6.59 mg/dL, which was lower than that of the PES group
(149.78 ± 6.15 mg/dL). The difference was statistically signif-
ificant (P = 0.021). Table 1 also reports the comparison of
means of plasma lipid levels after splitting the study sam-
ple into male and female. Results showed no significant
differences between case and control groups in none of
the plasma lipid levels in female subjects (P > 0.05). Also
mean of cholesterol, LDL, VLDL and HDL were not statisti-
cally different between case and control groups in male
participants (P > 0.05). But in male subjects, mean con-
centration of TG was lower in the control group than the
case group and the difference was statistically significant
(118.42 ± 7.54 and 148.87 ± 8.07 mg/dL respectively, P =
0.014). All participants had cataract.

4. Discussion

In recent years, several studies reported the presence
of vascular, cardiac and other organ pseudoexfoliative ma-
terial in patients with ocular pseudoexfoliative (7, 12). The
overall current published studies proposed that pseudoex-
foliation (PEX) was associated with increased risk of vas-
cular disease; therefore, the investigation for systemic ef-
fects of this syndrome attracted more attentions (13, 14).
The current study aimed to investigate the plasma lipid lev-
s in patients with cataract, with and without pseudoex-
foliation syndrome (PES). The obtained results showed
that plasma lipid levels (Chol, TG, LDL and HDL) in both
PES and non-PES patients were within normal limits (15).

A study conducted by Sabanayagam et al. on assessing
the association of metabolic syndrome (MetS) and its five
components (including abdominal obesity, elevated blood
triglycerides, low HDL cholesterol, high blood pressure
Table 1. Comparison of Mean Concentration of Chol, TG, LDL, VLDL and HDL Between Case and Control Groups

<table>
<thead>
<tr>
<th>Plasma Lipids</th>
<th>PES Group</th>
<th>Non-PES Group</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chol</td>
<td>192.32 ± 5.64</td>
<td>193.24 ± 4.33</td>
<td>0.899</td>
</tr>
<tr>
<td>M</td>
<td>180.70 ± 7.89</td>
<td>185.64 ± 5.97</td>
<td>0.620</td>
</tr>
<tr>
<td>F</td>
<td>208.45 ± 6.98</td>
<td>202.39 ± 6.35</td>
<td>0.550</td>
</tr>
<tr>
<td>TG</td>
<td>149.78 ± 6.35</td>
<td>127.07 ± 6.59</td>
<td>0.021</td>
</tr>
<tr>
<td>M</td>
<td>148.87 ± 8.07</td>
<td>118.42 ± 7.54</td>
<td>0.014</td>
</tr>
<tr>
<td>F</td>
<td>150.88 ± 9.52</td>
<td>139.06 ± 11.57</td>
<td>0.459</td>
</tr>
<tr>
<td>LDL</td>
<td>124.90 ± 5.86</td>
<td>119.65 ± 3.33</td>
<td>0.403</td>
</tr>
<tr>
<td>M</td>
<td>117.58 ± 5.79</td>
<td>120.27 ± 4.75</td>
<td>0.727</td>
</tr>
<tr>
<td>F</td>
<td>115.06 ± 11.34</td>
<td>118.90 ± 4.65</td>
<td>0.121</td>
</tr>
<tr>
<td>VLDL</td>
<td>28.08 ± 1.41</td>
<td>28.36 ± 1.09</td>
<td>0.792</td>
</tr>
<tr>
<td>M</td>
<td>25.60 ± 1.47</td>
<td>24.86 ± 1.93</td>
<td>0.928</td>
</tr>
<tr>
<td>F</td>
<td>31.54 ± 2.57</td>
<td>32.59 ± 2.31</td>
<td>0.768</td>
</tr>
<tr>
<td>HDL</td>
<td>45.41 ± 2.02</td>
<td>45.70 ± 0.86</td>
<td>0.878</td>
</tr>
<tr>
<td>M</td>
<td>47.18 ± 3.25</td>
<td>44.54 ± 1.09</td>
<td>0.353</td>
</tr>
<tr>
<td>F</td>
<td>42.96 ± 1.71</td>
<td>47.10 ± 1.36</td>
<td>0.074</td>
</tr>
</tbody>
</table>

Abbreviations: Chol, cholesterol; F, female; HDL, high-density lipoprotein; LDL, low-density lipoprotein; M, male; PES, Pseudoexfoliation syndrome; TG, triglyceride; VLDL, very low-density lipoprotein.

*Unit for all data is mg/dL; data are given as mean ± standard error mean.

and diabetes mellitus) with cataract showed that cataract was associated with MetS but not with all its components. Their results showed that age-related cataract was associated with high blood pressure and diabetes (16).

The results showed no significant differences between the means of cholesterol, LDL, HDL and VLDL in patients with cataract, with and without PES. But PES group had a significantly higher plasma TG level than non-PES group. Wang et al. in a study to determine the association between dyslipidemia and ocular diseases in Chinese population reported that dyslipidemia was not significantly associated with the prevalence of ocular diseases such as glaucoma, retinal vein occlusions, diabetic retinopathy, age-related macular degeneration, nuclear cataract, cortical cataract and subcapsular cataract (10). Another study conducted by You et al. showed that PES was not associated with gender, diabetes mellitus, blood pressure, dyslipidemia and body mass index (BMI) (17). Kurtul et al. showed that increased LDL levels were significantly associated with PEX (18). In another study, they noted that PEX syndrome was a major risk factor for glaucoma and a coronary artery disease (19). However, the correlation between PEX syndrome and vascular disorders is not obviously demonstrated (20).

In the current study, the difference in the TG levels of female subjects was not statistically significant between patients with cataract, with and without PES. But male subjects with PES had a higher TG level than those without PES. It means that male patients with cataract and PES may need more care about their plasma lipid levels, especially TG level, comparing females.

4.1. Conclusion

The current study found that increased TG values were significantly associated with PES. The study results showed that checking and controlling the dyslipidemia in patients with cataract and PES may be helpful. Further studies with larger sample sizes are recommended.

References


