Short Communication

Effect of finasteride on lipid profile in individuals with androgenetic alopecia

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Atherosclerosis constitutes one of the most frequent diseases and one of the important predisposing factors for atherosclerosis is lipid profile change. Androgen changes lipid profile, mainly high density lipoprotein (HDL), and oral finasteride are used for treating androgenetic hair loss as a risk factor for atherosclerosis. This study was conducted in order to determine the lipid profile changes by 1 mg finasteride tablets daily in patients with androgenetic hair loss. Twenty-five patients with androgenetic hair loss were prescribed one 1 mg finasteride tablet daily. Fasting plasma levels of low density lipoprotein (LDL), HDL, triglyceride, total cholesterol and HDL to LDL ratio of patients before therapy and after 3 and 6 months of therapy were measured. The study was conducted in the form of a before-after clinical trial. Data were analyzed using SPSS software version 16. A statistically significant rise in triglyceride plasma level (p=0.014) and significant decreases in HDL plasma level (p<0.001) was observed after 3 and 6 months of therapy, respectively. Plasma levels of LDL, total cholesterol and HDL to LDL ratio were not changed significantly but changes in ratio between third and sixth month were significant. Therefore finasteride may decrease dihydrotestosterone and increase testosterone that could lead to complications of the lipid profile by reducing HDL and increasing total cholesterol.

Key words: Atherosclerosis, finasteride, testosterone, lipid profile.

INTRODUCTION

Atherosclerosis constitutes one of the most common diseases, with an increasing frequency. It is predicted that atherosclerosis will be the top cause of death in 2020. Atherosclerosis may involve vessels of different regions of the body and thus induce stroke and myocardial infarction (Fauci et al., 2008). Lowering the low density lipoprotein (LDL) level through administration of statins may prevent atherosclerosis. Increasing high density lipoprotein (HDL) and lowering triglyceride are two other major factors for preventing atherosclerosis (McRobb et al., 2009) indicated that androgens may cause vascular calcification.

Smoking is considered as a risk factor associated with elevated serum level of triglyceride, cholesterol and LDL but HDL was almost similar in both groups of smoker and non-smoker (Al-Ajlan, 2012). Tulbaghia violacea is a valuable medicinal plant used in South Africa for management of heart diseases and many human disorders and methanolic extract of it in rat reduces plasma level of triglyceride, cholesterol, VLDL and LDL (Olorunisola et al., 2012).

Finasteride is used for treating benign prostatic hyperplasia and hormonal hair loss, exerting its effect through inhibition of 5-α reductase (Moorjani et al., 1987). Long-term therapy with 1 mg finasteride tablets may prevent androgenic hair loss (Barud et al., 1999). It also suppresses the conversion of testosterone to dihydrotestosterone, the most potent metabolite of testosterone (Asscheman et al., 1994; Hämäläinen et al.,
Androgenetic hair loss is considered a risk factor for atherosclerosis (Dogramaci et al., 2009). The increase in HDL level following total testectomy and the subsequent decrease in testosterone have been demonstrated in patients with prostatic cancer (Moorjani et al., 1987). Furthermore, the impact of testosterone on lowering HDL and increasing cholesterol and triglyceride has been established (Asscheman et al., 1994). Also, an inverse relationship exists between the plasma level of free testosterone and serum triglyceride (Hämäläinen et al., 1987). HDL to LDL ratio has been confirmed to be not only an important factor for development of cardiovascular disease (Reaven, 1988; Onyesom et al., 2012) but also used to efficacy of anti-lipid drug therapy (Kannel, 2005).

There are a few studies that evaluated the effect of using finasteride tablets on lipid profile with variable results (Moorjani et al., 1987; Denti et al., 2000; Amory et al., 2008; Dusko et al., 2010). According to predictor factor of androgenetic alopecia for atherosclerosis and the effect of using oral finasteride tablets on lipid profile, we undertook the present study to determine the impact of using 1 mg finasteride tablets on lipid profile of patients with androgenetic hair loss.

**MATERIALS AND METHODS**

This study took place in Hajdade Clinic of Kermanshah University of Medical Sciences in the city of Kermanshah, west of Iran. This is a before-after clinical trial.

**Subjects**

Twenty-five patients with androgenetic hair loss as confirmed by a dermatologist were selected. Prior to entry, the patients were inquired about using other drugs which may influence the lipid profile, such as statins and patients who used these drugs were excluded from the study. All patients were referred to one single laboratory for tests and they were fasting before the tests. During the study, patients were evaluated for nutritional status. Patients had different degrees of androgenetic hair loss and this difference did not affect our study. All patients expressed their informed consent in writing prior to the study. The proposal of the study was approved by the Ethics Committee of Kermanshah University of Medical Sciences and registered in IRCT database.

**Experimental design**

Blood samples were obtained from patients at three stages (before therapy, after three months and six months of treatment with 1 mg finasteride tablets) and their fasting plasma levels of LDL, HDL, triglyceride and total cholesterol were measured. Patients who did not take finasteride regularly or had discontinued therapy were eliminated from the study.

**Sample collection**

Twenty-two patients underwent the second phase of tests and finally 16 patients with all three tests and regular consumption of 1 mg finasteride tablets during 6 months remained in the study.

**Statistical analysis**

Analysis was performed using SPSS 16.0 (SPSS Inc., Chicago, U.S.A.). The statistical analysis was performed using the dependent t-test with an assumption that p-value ≤ 0.05 is significant.

**RESULTS**

Changes in parameters were compared. Analysis of data indicated a significant decrease in fasting plasma level of HDL after 6 months of therapy (p<0.001) as well as a significant increase in plasma level of triglyceride after 3 months of therapy (p=0.006). No significant change was observed in the fasting plasma levels of LDL and total cholesterol. Although HDL to LDL ratio did not show significant change after 3 (p=0.073) and 6 months (p=0.056), however, changes in ratio between third and sixth month were significant (p=0.006) (Table 1).

**DISCUSSION**

Our study is the first to indicate that 1 mg finasteride tablets used for treatment of androgenetic hair loss causes a significant decrease in HDL after 6 months of therapy and a significant increase in triglyceride after 3 months of therapy also changes ratio of HDL/LDL between third and sixth months significantly (p-value=0.006), all of which may be increase the risk for

<table>
<thead>
<tr>
<th>Lipid</th>
<th>Before therapy Mean ± SD</th>
<th>After 3 months Mean ± SD</th>
<th>Percent change</th>
<th>After 6 months Mean ± SD</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDL</td>
<td>43.6 ± 9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>44.91 ± 10.7</td>
<td>3.6 ± 17.1</td>
<td>38.5 ± 8.1</td>
<td>-13.2 ± 12&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>LDL</td>
<td>103.8 ± 27.8</td>
<td>99.8 ± 26.2</td>
<td>-1.7 ± 22.1</td>
<td>103.2 ± 27.2</td>
<td>-2.6 ± 12.2</td>
</tr>
<tr>
<td>HDL/ LDL</td>
<td>0.43 ± 0.1</td>
<td>0.48 ± 0.16</td>
<td>8.9 ± 22.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.39 ± 0.11</td>
<td>-9.2 ± 19.2&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>93 ± 32.9&lt;sup&gt;c&lt;/sup&gt;</td>
<td>117.2 ± 48.2&lt;sup&gt;c&lt;/sup&gt;</td>
<td>32.8 ± 51</td>
<td>94.8 ± 28.3</td>
<td>16.5 ± 48.2</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>162.1 ± 36.6</td>
<td>166.1 ± 32.9</td>
<td>5.3 ± 24.6</td>
<td>160 ± 38.3</td>
<td>-0.9 ± 19.5</td>
</tr>
</tbody>
</table>

Values with different superscripts differ significantly (p < 0.05).
atherosclerosis. Moreover, a study by Moorjani et al. (1987) indicated that anti-androgenic medication such as finasteride may increase HDL in patients with prostatic cancer while leaving LDL intact. An Italian study on patients with benign prostatic hyperplasia indicated that using 5 mg finasteride tablets may increase HDL and decrease LDL after 6 months of therapy, which may be due to the direct impact of the drug on hepatic metabolism or through dihydrotestosterone (DHT) suppression (Denti et al., 2000). (Movéreg-Skrtic et al. 2006) reported that treatment with DHT may increase HDL and decrease TG. Amory et al. (2008) indicated that suppressing DHT with 5-α reductase inhibitors, such as finasteride tablet, does not lead to adverse modifications of the lipid profile.

In addition, Duskova et al. (2010) conducted a study on 12 patients to observe that finasteride an initial rise in LDL, HDL and total cholesterol which became constant with progression of the study. We assume that the different results from previous studies may be related to dosage or duration consumption of finasteride, age and nutritional status of patients and different genetic ability of drug hepatic metabolism. While HDL to LDL ratio has been proved to be a predictor factor of cardiovascular disease (Reaven., 1988; Onyesom et al., 2012), our study did not show significant change after 3 and 6 months but changes ratio between third and sixth month were significant.

The risk of stroke and myocardial infarction is higher in young men compared to young women. This change in lipid profile may be due to testosterone elevation by using finasteride. As earlier mentioned, it is recommendable to identify the risk factors for atherosclerosis in patients with androgenetic hair loss so that 1 mg finasteride tablets may be waived for high-risk patients. Moreover, the adverse effect of the drug may be countered through recommendations made to the patients regarding lifestyle modification and abstaining from high-fat food. Further studies aimed at the effects of finasteride exerted on vessels through lowered DHT may corroborate our findings.

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