REVIEW ARTICLE

DYSLIPIDEMIA: CLINICAL VIGNETTE AND REVIEW OF LITERATURE

Amit Badgal,1 Amrit Rai Badgal,2 Alok Raina,3 Som Dutt Bassi4

1. Senior Resident, Department of Medicine, MMMCH, Solan, Himachal Pradesh, India.

2. Casualty Medical officer, Department of Gastroenterology, GMC Jammu, J&K, India.

3. Senior Resident, Department of Paediatrics, SMGS, GMC Jammu, J&K, India.

4. Professor, Department of Medicine, MMMCH, Solan, Himachal Pradesh, India.

Corresponding author:

Dr Amit Badgal (Senior Resident)

Department of Medicine, MMMCH

Solan, Himachal Pradesh, India

Mob. 09882082946, 09858174119

E-mail: badgalamit@yahoo.com

Abstract

Dyslipidemia is one of the most important risk factors for many chronic non-communicable diseases resulting in serious morbidity, and mortality, and medical costs worldwide. The prevalence of dyslipidemia varies according to the ethnic, socioeconomic, and cultural characteristics of distinct population groups. We report a patient of Dyslipidemia with coexisting
hypertension who had tendon xanthoma and ventricular bigeminy, along with relevant review of the literature.

Introduction

Dyslipidemia refers to the derangements of one or many of the lipoproteins; elevations of total cholesterol, low-density lipoprotein (LDL) cholesterol and/or triglycerides, or low levels of high-density lipoprotein (HDL) cholesterol while elevation of lipoproteins alone is labeled as ‘hyperlipidemia’. The term ‘atherogenic dyslipidemia’ denotes a combination of elevated triglycerides and small-dense LDL particles, and low levels of HDL cholesterol. The term ‘atherogenic dyslipidemia’ denotes a combination of elevated triglycerides and small-dense LDL particles, and low levels of HDL-cholesterol [1]. Dyslipidemia is a risk factor for cardiovascular disease, which is a major contributor to mortality [2]. Heart disease and stroke are usually due to atherosclerosis of large and medium sized arteries. Hypercholesterolemia is the most important factor in the pathogenesis of atherosclerosis. Hypertension, smoking, diabetes, obesity, physical inactivity, and atherogenic diets have all been identified as modifiable risk factors for heart disease. Age, male gender, and a family history of premature coronary heart disease (CHD) have been identified as nonmodifiable risk factors [3]. The high rates of CHD in Asian Indians are due to a combination of genetic predisposition and lifestyle factors. Metabolic abnormalities seem to have a synergistic effect on the development of CHD in genetically susceptible individuals, such as those with elevated levels of Lp(a)[4]. The coexistence of hypertension and dyslipidemia has more than an additive adverse impact on the vascular endothelium, which results in enhanced atherogenesis, leading to cardiovascular and cerebrovascular disease[5]. The dermatologic manifestations of dyslipidemia include xanthelasma and xanthomas [6].
Clinical vignette

A 45 years old female was admitted with complaints of palpitations for last two weeks not associated with chest pain or dyspnoa. She denied any past history of hypertension, diabetes mellitus and smoking. She was a vegetarian and worked as a labourer. Her family history was significant for heart disease in the mother. Her examination revealed pulse rate of 80 beats/min, blood pressure of 180/110 mmHg, vesicular breath sounds, normally audible heart sounds and a nodular non tender swelling over right middle finger. The thyroid lobes were not palpable and JVP was not raised. Her blood sugar was 89mg/dl, blood urea was 28mg/dl, serum creatinine was 0.6mg/dl, no albumin/casts in the urine. Her electrocardiography revealed QRS axis 60°, ventricular bigeminy without ST/T changes. Her troponin levels were not raised and there were no regional wall motion abnormalities on echocardiography, ejection fraction being 50%. Her fasting lipid profile showed a total cholesterol of 244mg/dl, triglycerides 126 mg/dl, LDL cholesterol 161 mg/dl, HDL cholesterol 47 mg/dl and VLDL 35mg/dl.

Fig.1: Tendon Xanthoma right middle finger.
Fig.2: ECG showing Ventricular bigeminy (a), normal sinus rhythm after beta blocker administration (b).

She was managed with Atorvastatin, metoprolol (β-blocker) and telmisartan (angiotensin receptor blocker).

Review of literature

**Dermatologic manifestations of dyslipidemia**

These include

- Xanthelasma palpebrum
- Xanthoma planum diffusum
- Xanthoma tuberosum
- Xanthoma tendinosum
- Xanthoma eruptivum
- Xanthoma palmare striatum

These cutaneous markers of dyslipidemia may be associated with increased levels of specific lipoproteins but further studies are required to deduce the strength of association. Nevertheless, xanthelasma palpebrum, Xanthoma planum diffusum, tuberosum and tendinosum have been associated with increased levels of LDL cholesterol whereas Xanthoma eruptivum and palmar striatum have been associated with increased VLDL cholesterol and hence Triglycerides. Pathogenetic mechanisms involved in the development of xanthomas resemble early stages of atherogenesis. In clinical practice, xanthomas can signalise various congenital or acquired dyslipidemias. The most prevalent form of xanthomas is xanthelasma palpebrarum. Tendinous and tuberous xanthomas are typical for autosomal dominant hypercholesterolemia, as well as for
some rare conditions, such as cerebrotendinous xanthomatosis and familial β-sitosterolemia. In patients with familial hypercholesterolemia, the presence of tendinous xanthomas has been shown to be associated with a two to four times higher risk for cardiovascular disease. Eruptive xanthomas are skin manifestations of a severe hypertriglyceridemia and implicate an elevated risk for acute pancreatitis or type 2 diabetes mellitus. Xanthoma striatum palmare is pathognomonic for primary dysbetalipoproteinemia, whereas diffuse plane xanthomas are frequently associated with paraproteinemia and lymphoproliferative disorders.⁷

**Screening Recommendations for dyslipidemia**

Screening with full fasting lipid profile is done in

1. **Men:** All men ≥ 40 years every 1 - 3 years

2. **Women:** All women postmenopausal and/or ≥ 50 years every 1 – 3 years

3. **Children:** Family history of severe hypercholesterolemia or chylomicronemia

4. **Adults (≥ 18 years):** All adults at any age with the following additional risk factors or at the discretion of physician

   ✓ Exertional chest discomfort, dyspnea, or erectile dysfunction

   ✓ Cigarette smoking

   ✓ Abdominal obesity

   ✓ Family history of premature CAD

   ✓ Xanthelasma, xanthoma, corneal arcus

   ✓ Diabetes mellitus

   ✓ Hypertension

   ✓ Chronic kidney disease GFR < 30 mL/min/1.73m²

   ✓ Systemic lupus erythematosus
Evidence of atherosclerosis

NCEP ATP III Classification of Total Cholesterol and LDL Cholesterol:

**Total Cholesterol (mg/dL)**

<table>
<thead>
<tr>
<th>&lt;200</th>
<th>Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>200-239</td>
<td>Borderline high</td>
</tr>
<tr>
<td>&gt;240</td>
<td>High</td>
</tr>
</tbody>
</table>

**LDL Cholesterol (mg/dL)**

<table>
<thead>
<tr>
<th>&lt;100</th>
<th>Optimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-129</td>
<td>Near Optimal/Above Optimal</td>
</tr>
<tr>
<td>130-159</td>
<td>Borderline High</td>
</tr>
<tr>
<td>160-189</td>
<td>High</td>
</tr>
<tr>
<td>≥240</td>
<td>Very high</td>
</tr>
</tbody>
</table>

**HDL Cholesterol (mg/dl)**

<table>
<thead>
<tr>
<th>&lt;40</th>
<th>Low HDL Cholesterol</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥60</td>
<td>High HDL Cholesterol</td>
</tr>
</tbody>
</table>

ATP III Non-lipid Risk Factors for CHD:

<table>
<thead>
<tr>
<th>Modifiable Risk Factors</th>
<th>Non-modifiable Risk Factors</th>
</tr>
</thead>
</table>
✓ Hypertension
✓ Cigarette Smoking
✓ Thrombogenic/Hemostatic State
✓ Diabetes
✓ Obesity
✓ Physical Inactivity
✓ Atherogenic Diet

✓ Age
✓ Male Gender
✓ Family History of Premature CHD

**Three Categories of Risk That Modify LDL Cholesterol Goals:**

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>LDL Goal (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHD and CHD Risk Equivalents</td>
<td>&lt;100</td>
</tr>
<tr>
<td>Multiple (2+) Risk Factors</td>
<td>&lt;130</td>
</tr>
<tr>
<td>0 to 1 Risk Factor</td>
<td>&lt;160</td>
</tr>
</tbody>
</table>

**NCEP ATP III Criteria for Metabolic Syndrome:** (≥3 criteria define metabolic syndrome)

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Defining level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal obesity</td>
<td>Waist circumference</td>
</tr>
<tr>
<td>Men:</td>
<td>102cm (40inch)</td>
</tr>
<tr>
<td>Women:</td>
<td>88cm (35inch)</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>≥1.7mmol/L</td>
</tr>
<tr>
<td>HDL-Cholesterol</td>
<td>Men</td>
</tr>
<tr>
<td></td>
<td>&lt;1mmol/L</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td>&lt;1.3mmol/L</td>
</tr>
<tr>
<td><strong>Blood pressure</strong></td>
<td>&gt;130/85mmHg</td>
</tr>
<tr>
<td><strong>Fasting glucose</strong></td>
<td>5.7-7.0%</td>
</tr>
</tbody>
</table>

**Surrogate markers for CVD risk:** These include

- Ankle-brachial index
- Exercise stress testing
- Carotid B-mode ultrasonography
- Cardiac computed tomography

**Treatment guidelines:**

- Cholesterol treatment target levels are derived from clinical trials. Nearly all studies have measured the serum (or plasma) level of LDL-C as an indicator of response to therapy.
- Every 1.0 mmol/L reduction in LDL-C is associated with a corresponding 20% to 25% reduction in CVD mortality and nonfatal MI.
- The present version of the guidelines recommends apo B as the primary alternate target to LDL-C [8,9,10].
- The target level for subjects at moderate risk are extrapolated from high risk clinical studies, especially ASCOT and JUPITER.
- The 2006 recommendations also focused on LDL-C as the primary target of therapy in these patients, with a treatment trigger LDL-C level of 3.5 mmol/L and a recommended 40% reduction.(ASCOT trial)[11]
Based on 50% reduction in LDL-C in JUPITER trial, Guest J et al recommended the targets of an LDL-C level of lower than 2.0 mmol/L (apoB lower than 0.80 g/L) or a 50% reduction from baseline LDL-C when the baseline level is known.[12]

For high risk patients:

✓ start drugs immediately along with lifestyle
✓ primary treatment goal is LDL-C < 2.0 mmol/L
✓ for most CAD patients, optimal LDL-C reduction is at least 50%
✓ achieve secondary treatment target of TC/HDL-C < 4.0 by further lifestyle changes; consider adjuvant lipid-modifying therapy

For moderate risk and low risk patients:

✓ lifestyle modifications are the first intervention
✓ treatment to lower LDL-C by at least 40% is generally appropriate in candidates for statins
✓ treatment may be initiated at lower or higher lipid levels if family history or other investigations indicate elevated or reduced risk

Hypolipidemic drugs:

✓ Statins
✓ Bile acid sequestrants
✓ Fibrates
✓ Niacin [2]

Conclusion
Early identification and treatment of dyslipidemia is warranted especially with coexistent hypertension so as to delay the progression of atherosclerosis, thereby, reducing the cardiovascular and cerebrovascular mortality and morbidity.

References:


