Metabolic Syndrome among Patients with Dyslipidemia
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Abstract:
Background: the term "Metabolic syndrome" (MS) refers to the association between hypertension, type-2 diabetes mellitus, android obesity and dyslipidemia. Prevalence of MS is rising as a result of sedentary lifestyle and abundance of food rich in fat and carbohydrates that is to say; the pandemic of obesity throughout the world. The definition of MS was arranged by the National Cholesterol Education Program – Adult treatment panel III (NCEP-ATP III) of United States. It requires the presence of any three out of five criteria.

Objective: to study the percentage of MS among patients with dyslipidemia, the difference between both sexes, to compare serum uric acid between those with MS to those without MS.

Materials and methods: Fasting blood samples were collected from 76 dyslipidemic patients (50 males, 26 females). FPG, serum triglycerides, HDL-cholesterol, serum uric acid were measured using enzymatic colorimetric method. Data were analyzed by chi square test, t-test, all values quoted as the mean ± Standard deviation (SD), and difference between observations were considered significant at p<0.05.

Results: fifteen patients (20%) were found to have MS according to NCEP ATP-III criteria of diagnosis. Females are predominant. The main differences in biochemical parameters were FPG and serum triglycerides.

Conclusion: the study points to the fact that excess sugar are stored as fat. The problem of dyslipidemia could be preceded into more broad syndrome.

Key words: dyslipidemia, metabolic syndrome, syndrome X.

Introduction:
In 1988, Dr. Gerald Reavan in his banding lecture, brought into light the association of insulin resistance and other factors with an increased risk of cardiovascular disease, for which he coined the term "Syndrome X" (1)

Most authorities at present time prefer to use the term "Metabolic syndrome "for the association of hypertension, type-2 diabetes, android obesity, insulin resistance and dyslipidemia (2). In Iraq, study of MS looks an area of interest since like other Arab and Muslim countries, and few studies on epidemiology of MS were published. (3,4)

The prevalence of metabolic syndrome in foreign countries is increasing too (5), and this seems secondary to the pandemic of obesity (6,7) with its impact on metabolism (8).

The definition criteria to make the diagnosis of MS in this study are those arranged by the National Cholesterol Education Program – Adult treatment panel III (NCEP-ATP III) in the United States (9).

The criteria requires the presence of any of three out of the following five criteria to make the diagnosis of MS possible:
1. Abdominal obesity (waist circumference>=102 cm in men, and>=88 cm in women).
2. Low serum HDL-cholesterol (<=40 mg/dl in men, and <=50 mg/dl in women).
3. Elevated serum triglycerides (>=150 mg/dl).
4. Raised blood pressure (>=130/85 mmHg).
5. Fasting plasma glucose (FPG) (>=110 mg/dl). However, it is worthwhile to enlist the world health organization WHO version of MS definition, which considered insulin resistance/hyperglycemia as one major obligatory component for the diagnosis. (10)

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Definition level</th>
</tr>
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<tbody>
<tr>
<td>1 Blood pressure</td>
<td>&gt; 160/90 mmHg</td>
</tr>
<tr>
<td>2 Fasting plasma glucose</td>
<td>&gt;110 mg/dl</td>
</tr>
<tr>
<td>3 Serum triglycerides</td>
<td>&gt; 150 mg/dl</td>
</tr>
<tr>
<td>4 Body mass index</td>
<td>&gt; 30 kg/m²</td>
</tr>
<tr>
<td>5 HDL-cholesterol</td>
<td>&lt;39 mg/dl in women</td>
</tr>
<tr>
<td>6 micro albuminuria</td>
<td>Urinary albumin &gt;= 20µ/min</td>
</tr>
</tbody>
</table>

One hinder back for the application of WHO criteria is that it might miss those who may have low plasma glucose caused by more than 12 hours fasting needed to measure their lipid profile. Another drawback is the cost for micro albuminuria measurement. The NCEP-ATP III Seems more applicable in our community.

This study aimed to assess the frequency of MS among dyslipidemic patients who visit the lab for checking their lipid profiles and to find if there is difference between both sexes, the serum uric acid difference between those who fulfill the criteria of MS and those who are free from it.

Materials and Methods:
Fasting blood samples were collected by venipuncture from 76 known dyslipidemic patients,
50 males and 26 females, mean age (50±5 years) visited the lab to check their lipid profile initially during May and June 2008, the patients had been asked for any drug history, medical history for different diseases, and then their waist circumferences in cm and blood pressure in mmHg were measured using flexible measure tape and sphygmomanometer, respectively. Sera were separated by centrifugation after clotting of blood.

The biochemical measurements of FPG, serum triglycerides, HDL-cholesterol, serum uric acid were done using enzymatic colorimetric method, as follows:
- FPG using GOD-PAP method (11), Biocon diagnostic kit (Germany).
- Serum uric acid measured by uricase method (12) using kit from Biolabo (France).
- Serum triglycerides by GPO method (13), Biolabo reagents (France).
- The HDL-cholesterol by CHOD-PAP method, after precipitation of chylomicrons, VLDL and LDL lipoproteins in samples by addition of phosphotungustic acid and in the presence of magnesium ions(14), using kit from Biomeriuex (France).

Readings were assessed in ANA72 spectrophotometer (Japan).

Data were analyzed by chi square test, t-test, all values quoted as the mean ± SD, and difference between observations were considered significant at p<0.05. (15)

Results:
Among 76 patients there were 15 (20%) who had MS according to NCEP ATP-III criteria of diagnosis as shown in figure (1). Females are predominant in these samples, see Figure (2) and table (1).

The difference between the patients who met the definition of MS and those who are free from it were tested, table (2) shows the differences between MS and Non-MS Persons in regard to different criteria measured. The main differences were in fasting plasma glucose and serum triglycerides, demonstrated in figure (3), which points to the fact that excess sugar are stored as fat.

![Fig (2):](image1)

![Fig (2):](image2)

| Table (1): Compare between sex percentage for patient |
|-----------|-----------|
|           | N         | P        |
| Male      | 1         |          |
| Female    | 14        | 0.000    |

*Used Test (Two Proportions)
Table (2) the differences between MS and Non-MS Persons in regard to different criteria measured.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: Non-MS</td>
<td>50.0 y</td>
<td>10.5</td>
<td>NS</td>
</tr>
<tr>
<td>MS</td>
<td>53.67 y</td>
<td>6.06</td>
<td></td>
</tr>
<tr>
<td>Waist: Non-MS</td>
<td>113.46 cm</td>
<td>17.53</td>
<td>NS</td>
</tr>
<tr>
<td>MS</td>
<td>136.32 cm</td>
<td>15.39</td>
<td></td>
</tr>
<tr>
<td>FBG: Non-MS</td>
<td>103.6 mg/dl</td>
<td>43.2</td>
<td>0.000</td>
</tr>
<tr>
<td>MS</td>
<td>182.6 mg/dl</td>
<td>53.4</td>
<td></td>
</tr>
<tr>
<td>UA: Non-MS</td>
<td>5.71 mg/dl</td>
<td>1.06</td>
<td>NS</td>
</tr>
<tr>
<td>MS</td>
<td>5.95 mg/dl</td>
<td>1.17</td>
<td></td>
</tr>
<tr>
<td>TC: Non-MS</td>
<td>229.1 mg/dl</td>
<td>40.3</td>
<td>NS</td>
</tr>
<tr>
<td>MS</td>
<td>241.7 mg/dl</td>
<td>30.6</td>
<td></td>
</tr>
<tr>
<td>HDL: Non-MS</td>
<td>44.23 mg/dl</td>
<td>4.19</td>
<td>NS</td>
</tr>
<tr>
<td>MS</td>
<td>44.13 mg/dl</td>
<td>4.19</td>
<td></td>
</tr>
<tr>
<td>TG: Non-MS</td>
<td>149.2 mg/dl</td>
<td>52.7</td>
<td>0.003</td>
</tr>
<tr>
<td>MS</td>
<td>195.7 mg/dl</td>
<td>48.9</td>
<td></td>
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</table>

Discussion:

The present study is an atrial to put a line under the problem of disturbed metabolism in obese and/or dyslipidemia patients. Those patients were vulnerable for the expected risk of coronary heart diseases (16). The female sex in the sample studied is more prone to meet the criteria of MS as females in general are more obese than males (17), it is especially true because most of females are housewives and not exercising outdoor. The main point is the basic difference between MS patients and those free from it in regard to FPG and triglycerides which goes with the conclusions of other studies (18).

The increased glucose level raises the possibility of getting MS dilemma, this is in concordance with other study (19). We suggest that the excess sugar is stored as fat, and the adipose tissue which is known to be an active endocrine factory, by its signals will modulates the general metabolism.

Unexpectedly the uric acid is not significantly different, between patients with MS and those free of it, in contrast to other report (20).

We expect this is due to that most of patients were actually on diet low in red meat for the control of the hyperlipidemia. This study encourages the conclusion of abroad reports that MS requires more attention (21).

Further study to assess prevalence of MS in our society is needed together with directing physicians to this common health problem.

Acknowledgment:

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References