Study of serum Vitamin D in Type II diabetes mellitus in Civil Hospital Ahmedabad

Anuja Adarsh1, Vikas K Vaghela2*, Nayan Mali3

1,2Resident, 2Senior Resident, 1,2Dept. of Biochemistry, 3Dept. of Physiology, 1,3B. J. Medical College, Ahmedabad, Gujarat, 2AMC Medical College, Ahmedabad, Gujarat, India

*Corresponding Author:
Email: Drvikaskvaghela@gmail.com

Received: 21st November, 2017
Accepted: 19th December, 2017

Abstract

Introduction: Type-II diabetes is one of the most common non-communicable chronic disease and Vitamin D deficiency is also considered a public health problem around the world. As Vitamin D deficiency influence the insulin levels so this study is conducted.

Objectives: This study aims to evaluate serum level of Vitamin D in patients with type II diabetes mellitus.

Materials and Methods: 50 patients with type II diabetes is taken as cases and 50 healthy person taken as control. Study is conducted from June 2017 to Sept. 2017 in Civil Hospital, Ahmedabad.

Result: In present study mean serum vitamin D level of case is significantly lower than controls. P value is < 0.05.

Conclusion: It suggests that alterations in vitamin D status may affect insulin sensitivity, β-cell function or both. So monitoring of Fasting plasma sugar & Post prandial plasma sugar levels in patients along with serum Vitamin D plays an important role in prevention & treatment of the Type II Diabetes Mellitus.

Keywords: Vitamin D, Diabetes Mellitus.

Introduction

Type-II diabetes is one of the most common non-communicable chronic disease and its complications play a major role in morbidity and mortality worldwide. Diabetes is fastest growing with the status of a potential epidemic in India with more than 62 million diabetic individuals currently well diagnosed with the disease which is among the top 3 contributing nation followed by China and US. Vitamin D deficiency is also considered a public health problem around the world. Recent studies show that vitamin D deficiency may predispose to glucose intolerance, altered insulin secretion which leads to type -II diabetes mellitus.1

Materials and Methods

This study in Cross-sectional study conducted during June 2017 to September 2017 in Civil Hospital, Ahmedabad. 50 known patient of diabetes taken as cases and 50 apparently healthy individuals taken as controls.

Table 1: Diagnostic criteria for Diabetes Mellitus

<table>
<thead>
<tr>
<th>Type II*</th>
<th>Test</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA1c</td>
<td>&gt;6.5%</td>
<td></td>
</tr>
<tr>
<td>FBS</td>
<td>&gt;126 mg/dl</td>
<td></td>
</tr>
<tr>
<td>PPBS</td>
<td>&gt;200 mg/dl</td>
<td></td>
</tr>
<tr>
<td>RBS</td>
<td>&gt;200 mg/dl</td>
<td></td>
</tr>
</tbody>
</table>

* NGSP- National Glycohemoglobin standardization program

Inclusion Criteria: Comprised of diagnosed cases of Type II Diabetes Mellitus, both genders, aged 40-60 years.

Exclusion Criteria: Pediatric age group (<18 yrs), Pregnancy, Renal disorders, Hepatic disorders, Bone disorders, Hypertension or any other systemic illness that may affect plasma sugar & Serum Vitamin D levels, Patients on any medications that might affects plasma sugar & Serum Vitamin D levels.

Sample Collection: For serum vitamin D 5.0 ml of blood collected with clot activator plain vacutate and samples are transported to the lab at 2-8°C immediately. Ensured the complete clot formation has taken place before to centrifugation in red/yellow vacutate. Some specimens, especially those from patients receiving anticoagulant or thrombolytic therapy, may show increased clotting time. Serum is removed from the clot within 2 hours of drawing the sample. For Plasma Glucose 5.0 ml of blood is collected in fluoride vacutate and transported to the lab at 2-8°C immediately and centrifused. If testing was delayed for more than 24 hours, serum specimens are stored at 2-8°C and analyzed next day as per criteria (Ueland PM 1993).2

Sample Analysis: All samples are immediately analysed subjected to assays after thawing at 37°C. The measurement of plasma glucose is analysed on an Erba XL 640 Fully Automated Analyzer by kit of crest biosystems, a division of coral clinical systems. The measurement of vitamin D is analysed on Beckman & coulter 600DXI. Serum Vitamin D level was estimated by Chemiluminescent Microparticle Immunoassay(CMIA) method. Fasting plasmasugar &
Post-prandial plasmasugar levels were estimated by GOD-POD method by colorimetry.

**Data Analysis**

Data was analyzed by unpaired t-test using graphpad prism version 3.03 statistical software which evaluated the differences of various parameters in both group cases and control on the basis of p value. Interpretation was done by p-value

\[ P < 0.05 - \text{Significant}, \quad P < 0.001 - \text{Highly significant}, \quad P \geq 0.05 – \text{Not significant} \]

**Result**

**Table 2:**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Cases</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>Female</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>

In present study there is equal distribution of gender so there is no bias.

**Table 3:**

<table>
<thead>
<tr>
<th>Test</th>
<th>Cases</th>
<th>Controls</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>FBS</td>
<td>190.9</td>
<td>57</td>
<td>89.7</td>
</tr>
<tr>
<td>PPBS</td>
<td>303.5</td>
<td>80.8</td>
<td>129.2</td>
</tr>
<tr>
<td>Vit D</td>
<td>17.7</td>
<td>6.5</td>
<td>50.8</td>
</tr>
</tbody>
</table>

The table shows that Serum Vitamin D is significantly lower in cases (17.7 ± 6.5 ) ng/ml as compared to controls (50.8 ± 7.8)ng/ml ; p value <0.05).

**Discussion**

In our study we found that vitamin d level is very low in cases as compare to controls which may be explained by this mechanism. Direct action via vitamin D receptor (VDR) activation which are present on β-cell of pancreas. Vitamin D influences β-cell insulin secretion by increasing intracellular calcium concentration via non selective voltage dependent calcium channels. Indirectly via calcemic hormones, β-cell calcium dependent endopeptidases, which produce the cleavage that facilitates the conversion of proinsulin to insulin.[3,4,5]Vitamin D have Immune-modulating properties therefore due to its deficiency Chronic low-grade inflammation of pancreas is observed in obese individuals, which increases the risk of type 2 diabetes.6

**Conclusion**

Evidence from this study shows there is possible role of vitamin D in the pathogenesis of type 2 diabetes. It suggests that alterations in vitamin D status may affect insulin sensitivity, β-cell function or both. Thus, monitoring of Fasting plasma sugar & Post prandial plasma sugar levels along with Vitamin D plays an important role in prevention & treatment of the Type II Diabetes Mellitus.

**Limitations**

As our sample size is small here so confirmations by further study on large scale are necessary.

**References**