Hypovitaminosis D causes impaired glycemic control in type 2 diabetic patients

Authors: Quratulain Yousuf, A Athesham Zafar, Kamrudeen Mohammed and Nauman Jadoon

Aims
To determine the frequency of Vitamin D deficiency and its effect on glycaemic control in patients with type 2 diabetes mellitus.

Methods
Study design: Cross-sectional study.
Setting: The study was conducted in the Outpatient Department of Medicine, Liaquat National Hospital, Karachi, Pakistan.
Duration of the study: 6 months from June 2015 to December 2015.
Sample size: The sample size was 191 patients, as calculated using World Health Organization software for sample size calculation by using:
> proportion of vitamin D deficiency in type 2 diabetic patients = 58.34%
> margin of error (d) = 7%
> confidence interval = 95%.
Sampling technique: Non-probability consecutive sampling. A total of 191 patients were included in the study. After taking informed consent, blood samples for the assessment of Vitamin D levels were obtained from the patients fulfilling inclusion criteria of the study. Confidentiality of their information was maintained.

Results
Patients with type 2 diabetes mellitus were significantly vitamin D deficient. Vitamin D deficiency was found to be 69.1% in patients with type 2 diabetes mellitus. Descriptive statistics of HbA1c were calculated and showed that 98 (62.4%) patients who had HbA1c <8% were found to have vitamin D deficient while 34 (100%) patients with HbA1c >8% had vitamin D deficiency. Further studies are required for the development of strategies for the supplementation of vitamin D in type 2 diabetic patients for better glycaemic control along with standard treatment.

Conclusion
Our study found a significantly high frequency of Vitamin D deficiency in patients with type 2 diabetes mellitus. In view of this, we recommend early replacement of vitamin D in patients with type 2 diabetes mellitus along with the specific therapy to improve the outcome; this may alter the natural history of this disease.

Conflict of interest statement
No potential conflict of interest.

Authors:
1. Internal medicine; 2. Gastroenterology; 3. Endocrine and diabetes, Hull Royal Infirmary, Hull, UK

Table 1. Frequency and association of vitamin D deficiency with HbA1c

<table>
<thead>
<tr>
<th>HbA1c group</th>
<th>vitamin D deficiency</th>
<th>n</th>
<th>p value</th>
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</thead>
<tbody>
<tr>
<td>&lt;8</td>
<td>Yes</td>
<td>98</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>62.4</td>
<td>37.6</td>
</tr>
<tr>
<td>&gt;8</td>
<td>Yes</td>
<td>34</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>132</td>
<td>59</td>
</tr>
</tbody>
</table>

Chi-square test was applied. p value ≤0.05 considered as significant at 0.05 level.