Evaluation of Vitamin B₁₂ Monitoring in Veterans with Type 2 Diabetes on Metformin Therapy

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BACKGROUND
Metformin is the recommended first-line agent for Type 2 Diabetes in normal kidney function and is widely used.² Multiple studies have linked metformin to lower vitamin B₁₂ levels. Studies have shown that 7-30% of metformin-treated patients experience subnormal vitamin B₁₂ levels and 6-10% develop vitamin B₁₂ deficiency.² Longer duration of use and higher doses of metformin have been consistently associated with a greater risk of vitamin B₁₂ deficiency. Consequences of vitamin B₁₂ deficiency include macrocytic anemia and neurologic manifestations, which can mimic the signs and symptoms of diabetic peripheral neuropathy.³ In 2017, the American Diabetes Association (ADA) Standards of Medical Care in Diabetes Guideline introduced a recommendation for periodic vitamin B₁₂ monitoring in metformin-treated patients, especially those with anemia or peripheral neuropathy.¹ VA North Texas Health Care System (VANTXHCS) current practice recommends at least annual B₁₂ monitoring for metformin-treated patients and supplementation for vitamin B₁₂ <250 pg/mL. The impact of the ADA guideline recommendation and current compliance are unknown.

PRIMARY OBJECTIVE
To determine the impact of the ADA Standards of Medical Care in Diabetes Guideline recommendations of vitamin B₁₂ monitoring in a veteran population on long-term metformin therapy.

OUTCOMES

• Primary:
  o Proportion of patients receiving vitamin B₁₂ levels in 2016 versus 2018
  o Metformin effect on vitamin B₁₂ levels by dose and duration

• Secondary:
  o Amount of supplementation for low vitamin B₁₂ levels according to VANTXHCS current practice (<250 pg/mL) and local lab reference range (<170 pg/mL)

METHODS

METHODS

Inclusion Criteria

- Diagnosis of Type 2 Diabetes
- 18 years or older
- Active metformin prescription
- New start metformin prior to 2005

Exclusion Criteria

- eA1c in 2015
- 580% PDC (proportion of days covered)
- Additional criteria for sub-analyses on metformin dose and duration:
  - Baseline anemia or B₁₂ deficiency
  - Documented medications or comorbidities that could impact vitamin B₁₂ levels or absorption

RESULTS

Baseline Characteristics

<table>
<thead>
<tr>
<th>Group</th>
<th>Age (yrs), median</th>
<th>BMI (kg/m²), median</th>
<th>Male, n (%)</th>
<th>Race, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>55</td>
<td>31.65</td>
<td>85 (96.6)</td>
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<tr>
<td>Deficient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td></td>
<td></td>
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<tr>
<td>Levels ≤80-194 pg/mL</td>
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<tr>
<td>Levels &gt;194 pg/mL</td>
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<tr>
<td>Levels &gt;300 pg/mL</td>
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<tr>
<td>Levels &gt;500 pg/mL</td>
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Outcome

2016 (n=394) 2018 (n=394)

• Deficient levels (<145 pg/mL)
  o 1%: Patients with at least 1 vitamin B₁₂ level, n (%)
  2016: 136 (34.5) 2018: 198 (50.3) OR 1.94, P<0.001
  o Intermediate levels (145-194 pg/mL)
  2016: 3 2018: 3
  o Sufficient levels (195-300 pg/mL)
  2016: 130 2018: 181
  o Levels <250 pg/mL
  2016: 20 2018: 33

CONCLUSIONS

- Vitamin B₁₂ monitoring in 2018 for patients on metformin therapy significantly increased after the release of 2017 American Diabetes Association Standards of Medical Care in Diabetes Guidelines
- Patients who were prescribed vitamin B₁₂ levels at least once per year had higher vitamin B₁₂ levels compared to those not prescribed vitamin B₁₂.

Disclosure Statement: Authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.

References: