Low Dose Calcium and Vitamin D Ineffective in Primary Prevention of Fractures in Postmenopausal Women Without Osteoporosis

**Why is this important?**

Approximately 56-60% of women ≥ 60 years take supplemental vitamin D and/or calcium for primary prevention of fractures. 1.5 million osteoporotic fractures occur annually in the US. Nearly half of all women ≥ 50 years will suffer an osteoporotic fracture in their lifetime. Fractures are associated with chronic pain, disability, decreased quality of life and institutionalization.

**Facts:**

- United States Preventive Services Task Force (USPSTF) commissioned 2 systematic reviews and 1 meta-analysis to assess supplementation of Vitamin D +/- calcium on bone health among community dwelling (noninstitutionalized) adults without osteoporosis.
- Daily doses of ≤ 400 IU Vitamin D$_3$ with ≤ 1000 mg of calcium did not prevent fractures in postmenopausal women without osteoporosis (6 trials, N= 43,549).
- There was insufficient data to assess Vitamin D and calcium supplementation for fracture prevention in men and premenopausal women.
- Compared to placebo, Vitamin D and calcium treatment led to 4 episodes of nephrolithiasis per 1000 patient over 7 years (1 trial, women only).

**Harms and concerns:**

- There was limited information about harm, however the largest trial$^3$ noted an increased risk for nephrolithiasis over 7 years.
- The majority of trial participants were white, though the risk for fractures in nonwhite women is lower.
- Most, but not all trials used Vitamin D$_3$ and the type of calcium supplement varied extensively.
- Although low dose of Vitamin D and calcium showed no benefit, there was insufficient data about the benefits or harms of higher doses.

**The Bottom Line**

Daily supplementation with ≤ 400 IU of Vitamin D$_3$ and ≤ 1000 mg calcium in community dwelling postmenopausal women is not recommended for primary prevention of fractures. The benefits and harms of larger doses and use in premenopausal women or in men is not known.
**Strength of Evidence**

(Adapted from Guyatt G BMJ, 26 April 2008)

This refers to the degree to which the findings of this study are likely to be free of bias.

| 🟢🟢🟢🟢 | High         |
| 🟢🟢🟢🟢   | Moderate     |
| 🟢🟢🟢🟢   | Low          |
| 🟢🟢🟢🟢   | Very low     |

**Tips for Discussion of Results with Patients**

- Low daily doses of Vitamin D₃ (≤ 400 IU) and calcium (≤ 1000 mg) did not provide a benefit against fractures for community dwelling postmenopausal women without osteoporosis, and there was an increased risk of forming kidney stones.

- The USPSTF recommendations only apply to the low daily doses of Vitamin D₃ and calcium.
  - It is uncertain if Vitamin D and Calcium at higher doses offer a benefit
  - It is uncertain if Vitamin D and Calcium benefits premenopausal women, or men
  - Recommendations do not address falls or cancer prevention

- Discussions about starting or continuing vitamin D and calcium should include consideration of the patient’s individual baseline risk for fracture and renal stones.

**References**


**Written by the Evidence-Based Medicine Task Force:**

<table>
<thead>
<tr>
<th>Rebecca Beyth, MD, MSc</th>
<th>Zackary Berger, MD, PhD</th>
<th>M.E. Beth Smith, DO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Kaatz, DO, MSc</td>
<td>Daniel Elliott, MD, MSCE</td>
<td>Jeremy Sussman MD, MSc</td>
</tr>
<tr>
<td>Koko Aung, MD, MPH</td>
<td>Deborah Korenstein, MD</td>
<td>Daniella Zipkin MD</td>
</tr>
</tbody>
</table>

The Bottom Line summaries reflect the expertise and opinions of the SGIM EBM Task Force as of the date of release of this summary.