Calcium and Vitamin D Supplements in Cancer: Consensus or Notion Commotion

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Disclosure

• Relationships with commercial interests:
  Provision of oral nutritional supplement samples for patients supplied by Nestle and Abbott
Mitigating Potential Bias

• No one oral nutritional supplement product line recommended over another to patients
Learning Objectives

At the end of this session participants will be able to:

1. Recall the principal roles that calcium and vitamin D serve in the human body and cancer prevention
2. Describe some of the consequences of inadequate and excessive intake of each nutrient
3. List principal sources of calcium and vitamin D
4. Recall the optimal intake of each nutrient
Calcium

• Required for:
  – bone and dental health
  – vascular contraction and vasodilation
  – muscle function
  – nerve transmission
  – intracellular signaling
  – hormonal secretion
• Serum calcium:
  – tightly regulated
  – does not fluctuate with changes in dietary intakes
Calcium and Cancer Prevention

<table>
<thead>
<tr>
<th>Colon Cancer</th>
<th>Prostate Cancer</th>
<th>Breast Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observational and experimental studies:</td>
<td>More studies needed</td>
<td>No link</td>
</tr>
<tr>
<td>• Inconsistent</td>
<td></td>
<td></td>
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<tr>
<td>• Protective effect</td>
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</tbody>
</table>
Consequences of Inadequate Intake of Calcium

• No obvious symptoms short term

• Symptoms of deficiency:
  – numbness/tingling fingers
  – muscle cramps
  – convulsions, rickets
  – lethargy
  – poor appetite
  – abnormal heart rhythm
Consequences of Inadequate Intake of Calcium

• Long term:
  – osteopenia (osteoporosis, if untreated)
  – eventual death
Consequences of Excessive Intake of Calcium

• renal insufficiency
• vascular and soft tissue calcification
• high levels of calcium (urine)
• kidney stones
• constipation
• micronutrient absorption
• primary hyperparathyroidism or malignancy
Principal Sources of Calcium

- Food sources:
  - cheese, milk, yogurt,
  - powdered milk,
  - fortified beverages
  - tofu
  - blackstrap molasses
  - canned sardines
  - salmon with bones
Principal Sources of Calcium

- Visit “Canadian Nutrient File 2016” for detailed information:

## Calcium Dietary Reference Intakes (DRI)

<table>
<thead>
<tr>
<th></th>
<th>Females ≤ 50 y</th>
<th>Males ≤ 70 y</th>
<th>Females &gt; 50 y</th>
<th>Males &gt; 70 y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 mg/day</td>
<td>1000 mg/day</td>
<td>1200 mg/day</td>
<td>1200 mg/day</td>
</tr>
</tbody>
</table>
Calcium Dietary Reference Intakes (DRI)

- Breast and prostate cancer patients (hormone therapy)
  - consistent with DRIs
  - not to exceed upper limit of 2000 mg/day

- If daily calcium intake is inadequate from food, a dietary supplement may be considered
Vitamin D

• You make vitamin D under your skin: “sunshine vitamin”
• Actually a hormone
• We can make it in our body.
• Essential for the absorption and utilization of calcium and phosphorous
Vitamin D

- Required for proper growth and development of bones and teeth

- Role on the immune, endocrine and cardiovascular systems
Vitamin D and Cancer Prevention

• No strong evidence of a link between vitamin D and cancer risk
  – AICR unable to advise people on vitamin D levels and cancer prevention
Vitamin D and Cancer Prevention

• Colon cancer – too soon to make a strong case for vitamin D as an overall cancer fighter

• Vitamin D supplementation does not reduce the incidence of cancer.
Consequences of Inadequate Intake of Vitamin D

• Problems converting vitamin D from food/sunshine can set you up for deficiency

• Using sunscreen can interfere with getting vitamin D
Consequences of Inadequate Intake of Vitamin D

- Most people with low levels of vitamin D don’t notice any symptoms
- Severe deficiency in adults can cause
  - soft bones
  - bone pain
  - muscle weakness
  - rickets (rare)
Consequences of Excessive Intake of Vitamin D

• Toxicity has not been observed to result from sun exposure

• Toxicity ⇒ abnormally high serum calcium ⇒ bone loss, kidney stones and calcification of organs if untreated for a long time
Principal Sources of Vitamin D

• Not found naturally in many commonly eaten foods

• In Canada some foods have vitamin D added to them
  – milk, margarine,
  – some soy/rice beverages
  – yogurts
Principal Sources of Vitamin D

- Other good sources include
  - fish (salmon, tuna, sardines, mackerel)
  - egg yolks
Principal Sources of Vitamin D

• Dietary supplements - Vitamin D2 or D3
## Vitamin D Dietary Reference Intakes (DRI)

<table>
<thead>
<tr>
<th>Females and Males ≤ 70 y</th>
<th>Females and Males › 70 y</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 IU</td>
<td>800 IU</td>
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</tbody>
</table>

UL (upper limit) 4000 IU
Vitamin D Dietary Reference Intakes (DRI)

• For breast and prostate cancer patients (hormone therapy):
  – intake of 1000 IU for women
  – as per DRIs for men for osteoporosis prevention
  – from all sources not exceed 4000 IU/day UL
Take Home Message

• Healthy diet and lifestyle choices are the best

• Choose food rather than dietary supplements

• http://www.hc-sc.gc.ca/fnan/nutrition/reference/table/index-eng.php
References

- Calcium and Vitamin D Supplements in Cancer: Consensus or Notion Commotion
- References:
  - Mei Chung, PhD, MPH; Jounghee Lee, PhD; Teruhiko Terasawa, MD, PhD; Joseph Lau, MD; and Thomas A. Trikalinos, MD, PhD. Vitamin D With or Without Calcium Supplementation for Prevention of Cancer and Fractures: An Updated Meta-analysis for the U.S. Preventative Services Task Force. American College of Physicians Reviews 20/December/2011.


Winnipeg Regional Health Authority. Vitamin D Supplementation Recommendation for Health Children and Adults Practice Issue Evidence Summary. September 2013.


Warshawski Frank J., MD, Department of Critical Care, University of Calgary. April 2012. Vitamin D – Just the Facts Ma’am Powerpoint Slides.

Thank you! Questions?

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