Antioxidant Use and Cancer Treatments

Interpreting Facts for Patients

Barbara L. Winters, PhD, RD
winters@es.marywood.edu
Marywood University
Scranton, PA
Evidence-Based Approach

- Challenges in an exciting area
- Antioxidants: Be aware of the unknowns
- Continued Training
  - Peer review literature & courses
  - Ethical practices
  - Make use of known facts
Cancer Treatment

Chemotherapy
- Alkylating Agents - cyclophosphamides
- Anthracycline Antibiotics - doxorubicin
- Platinum Compounds - cisplatin
- Mitotic Inhibitors - vincristine
- Antimetabolites - 5-fluorouracil
- Camptothecin Derivatives - topotecan
- Biological Response Modifiers - interferon
- Hormonal Therapies – tamoxifen

Radiation
Maintain Weight & Meet Nutrient Needs

Cancer Treatment Effects

- Digestive difficulties
- Weight loss
- Micronutrient deficiencies
- Fatigue
Data: Antioxidants During Treatment

• Levels of vitamins A, C, and Se ↓ during chemotherapy for breast cancer

• Vitamin C & antioxidant enzymes levels are significantly ↓ in children with acute lymphoblastic leukemia

• Vitamin E & retinol ↓ during Tx with doxorubicin

Faure H et al. 1996; Bhavarahurthy V et al., 1996; Subramanian et al., 1993
Evidence-Based Research

• Benefits of normalizing antioxidant levels during treatment have not been established.

• Prevention vs. Treatment

• Research evidence is complex and mixed
Overcoming Drug Resistance

- Antioxidant – Quercetin
- ↑ doxorubicin in breast cancer cells
- ↓ daunorubicin in colon cancer cells

- Differences in cell types

Beta Carotene & Chemotherapy

• **Beta-Carotene Plus:**
• Cyclophosphamide - ↑ tumor killing in solid tumors (mice)
• 5-FU - ↓ effect on reducing tumor cell in fibrosarcomas

Thatcher et al. 1980 Cancer
Antioxidants: Interference

- **St. John’s Wort**
- Interferes w/ metabolism of drugs
  - Cytochrome P450
- \(\downarrow\) plasma levels of protease inhibitors, cyclosporin, cyclophosphamides
Flavones

Antioxidants

Hydroxyflavones

- Apigenin
- Luteolin
  - Luteolin-6-C-glucoside
  - Luteolin-7-glucosylrutinoside
  - Luteolin-7-sophoroside

Methoxyflavones

- Nobiletin
- Sinensetin
- Tangeretin
Selenium & Chemotherapy

- Se decreased nephrotoxicity of cisplatin and increased "antitumor" activity in animals
- Human study w/ Se was associated with reduction in nephrotoxicity
- **Long-term survival not explored**

Naganuma et al. J Pharm Dyn 1984
Interpreting **Facts** for Patients

- **Vitamin C**
- **beta-carotene**
- **Vitamin E**
- **Selenium**
- **Diallyl disulfide**
Antioxidants: How do we respond?

• **Support antioxidants during therapy?**
  • Understanding of pharmacokinetics of the therapeutic agent & the supplement
  • Drug Clearance:
    • Extended or diminished exposure
• Pharmacologist
• Computer modeling
Antioxidants: How do we respond?

- Ignore lifestyle practices?
- Forbid use during treatment?

Patients: No matter what they are told, can still go home and do what they want.
Explore the use of dietary supplements during cancer therapy

Maintain an open dialog
• Cancer Patient’s Practices:

• Supplement Use: *Women’s Intervention Nutrition Study (WINS)* CA 45504

• American Health Foundation, UCLA-Harbor, UCLA, BIDMC Harvard Medical School
WINS: Baseline Supplement Intake

81% taking supplements

- Single Mineral: 15%
- Multivitamin and Mineral: 33%
- Multivitamin: 7%
- Multimineral: 7%
- Other Dietary/CAM: 9%
- Single Vitamin: 29%
WINS: Baseline Supplement Intake by Product Type

- 81% taking supplements

<table>
<thead>
<tr>
<th>%</th>
<th># Formulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>45%</td>
<td>1-3</td>
</tr>
<tr>
<td>55%</td>
<td>4</td>
</tr>
<tr>
<td>10%</td>
<td>8+</td>
</tr>
</tbody>
</table>

Product Types:
- Vitamin E: 57%
- Vitamin C: 40%
- B-Carotene: 6%
- Selenium: 9%
- Multimineral: 7%
- Single Mineral: 15%
- Other Dietary/CAM: 9%
- Single Vitamin: 29%
- Multivitamin and Mineral: 33%
- Multivitamin: 7%
81% taking supplements of which 53% are taking complementary.
Protocols on Antioxidant Use

- Vitamin E
- Selenium
- beta-carotene
- Ajoene
- Catechin
Reported Practices: Antioxidants During Tx

- Pharmacy policy against supplement use
- No formal policy: stays in nursing/MDs/RDs
- Ok, as long as below UL w/ complementary at recommended level on label
- Conflicting information given to Pts
- Counseled: Informed decision
- Monitor use and suggest delay – post Tx
Critical Considerations

- Tumor: stage, type of CA, Tx
- Diet: Baseline
- Medical History
- Genetics
- Lifestyle Practices: weight, smoking status, alcohol...
- Age: Adults or Children
Interpreting Facts for Patients

• Could the patient be sacrificing long-term cure for short-term improvement?

• Could the use of a single or multiple antioxidant combination be of benefit?
Interpreting Facts for Patients

• Evidence the supplement provides a safe means to tolerate therapy & that is will facilitate the patient in completing the protocol?

• What is the Efficacy?

• Have the risk/benefits been explained to the patient and have they understood?
Antioxidants & Cancer Treatment

• The number of individuals with suggestions and opinions outweighs the quantity/quality of supporting evidence.
Cancer Treatment & Control

Multi-Disciplined Training and Education

Evidence Based Research

Dietary Supplements
Functional Foods
Genetics and Variable Responses
Counseling Techniques
Bio-behavioral Studies
Medical /Clinical Studies
Therapeutic agents

Evidence Based Counseling
Welcome to the IBIDS database.

Welcome to the CARDS database.

Welcome to the "Botanicals for Women's Health" CE course.

"WHAT IS BOTANICAL DIETARY SUPPLEMENT RESEARCH?" AND OTHER FAQs

Univ. Illinois at Chicago
Antioxidants Use During Cancer Treatments

GOALS:

INTEGRATED APPROACH

Evidence-Based Research

Patient-Centered Counseling Techniques

Evidence-Based Counseling

Best Informed Decision

Marywood University Nutrition Dept.
Recommendations during cancer treatment: Now and in the Future

2002  2003  2004  200??

Antioxidants: Genetically Tailored Counseling Strategies

Evidence-Based Counseling