



Wassily Kandinsky (1866-1944). *Round and Pointed*, 1930.

*Nutritional supplements may
produce adverse effects
when used concurrently
with treatment for cancer.*

Use of Complementary/Integrative Nutritional Therapies During Cancer Treatment: Implications in Clinical Practice

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Background: *The objectives of this study were to determine the prevalence and characterize the use of complementary/integrative nutritional therapies (CINTs) by patients during cancer treatment.*

Methods: *This retrospective review used data collected as a part of standard clinical care provided by the registered clinical dietitians and included nutritional history, demographic variables, anthropometrics, prevalence of use, and the specific integrative nutritional therapies used by these patients during cancer treatment.*

Results: *Twenty-nine percent of 820 patients reported use of CINTs not prescribed by their physician. Caucasians and patients over age 60 were the principal users of CINTs during treatment. Modular vitamins were the most frequently reported additive (86.9%), followed by botanicals/biologics (43.8%) and mineral supplements (28.6%).*

Conclusions: *A considerable proportion of cancer patients use unproven CINTs during cancer treatment. The health professional should become more aware of the complementary/integrative therapies that their patients are using during cancer treatment.*

Introduction

The term *complementary/integrative therapy* refers to a therapy used by patients as an adjunct to mainstream medical care. The intent of this therapy is to provide symptom control, enhance quality of life, and/or empower clients. Conversely, the term *alternative therapy* refers to a therapy used independently from standard best medical care. Complementary and alternative therapies cover a wide range of approaches

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to health and well-being, including nutritional and lifestyle changes, herbal medicine, manual healing, traditional/folk therapies, unconventional pharmacological and biological treatments, bio-electro magnetic application, and mind-body interventions. Complementary and alternative medical therapies are used by 25% to 50% of the population in industrialized nations.¹

Cassileth² initially observed that only 8% to 10% of patients with biopsy-diagnosed malignancy use alternative treatments. However, the growth in the nutritional supplements industry indicates that there is a significant rise in the use of complementary/integrative nutritional therapies (CINTs) for disease treatment as well as for prevention in general.³ While cancer treatment continues to present a physical and emotional challenge to patients and healthcare professionals, media attention regarding "nutritional" cancer therapies has been increasing (*Washington Post*, March 19, 2000:A01).^{1,2} Alternative and complementary nutritional therapies are being sought by 30% to 80% of cancer patients during cancer treatment and for prevention. The most frequent users are those with breast cancer (80% to 85%),^{4,5} pediatric cancers (46%),⁶ prostate cancer (27% to 43%),⁷⁻⁹ and head and neck cancer (25%).¹⁰ The clinical picture becomes even more complex when cancer patients with comorbidities such as cardiovascular disease consume vitamin C, E, and other supplements for their reported benefits in connection with the nonmalignant condition.

Although the use of alternative and complementary nutritional therapies has been observed in cancer patients as well as in healthy populations, little is known about concurrent use of complementary nutritional therapies, especially during the conventional treatment period. A study reported by Kao and Devine¹¹ observed that 37% of prostate cancer patients were using complementary nutritional modalities concurrently with radiation treatment. In addition, although patients, institutions, media, and healthcare professionals have a considerable interest in CINTs for cancer treatment and prevention, little is known about the efficacy, safety, and potential interaction of these therapies with conventional treatments. A range of adverse interactions with prescription drugs may occur.¹²⁻¹⁴

Generating a detailed evaluation of the use of CINTs among cancer patients is difficult since much depends on the particular supplement(s), the type and severity of disease, comorbidities such as cardiovascular disease or diabetes, the cancer treatment protocol, and the treatment phase of the patient. The major challenge for the healthcare professional occurs when patients consume botanical, biological, and other nutritional supplements during the active phase of treat-

ment, especially if the patients do not report their use to the medical team.

The objectives of this study were (1) to ascertain the prevalence of use of concurrent CINTs among patients at high nutritional risk undergoing active anti-tumor treatment at our center, (2) to determine the characteristics of patients who use integrative/complementary nutritional therapies during the active phase of treatment, (3) to identify the specific complementary modalities used by patients during their treatment phase, and (4) to examine the toxicities and potential negative interactions with these therapies.

Methods

Our study was a retrospective review of data collected at our institute as a part of routine clinical care of inpatients who were undergoing chemotherapy, radiation therapy, cryotherapy, or biologic therapy as single or multiple treatment modalities. In the process of comprehensively assessing cancer patients for nutritional deficits, registered clinical dietitians in the Department of Nutrition obtained the nutritional histories of 820 cancer patients who were consecutively admitted and actively treated between January 1999 and May 2000. Patients who were enrolled in the study were evaluated by the Department of Nutrition as being at highest nutritional risk, based on a pre-established, objective, initial nutritional screening process that triages patients to high, moderate, or low nutritional risk. Initial patient screening variables identified as indicators of nutritional risk included current medical diagnosis and treatment, concurrent medical problems, anthropometrics/weight change, change in or loss of appetite, dentition/chewing difficulty, constipation/diarrhea, dysgeusia, nausea/vomiting, mucositis, swallowing difficulties, serum albumin level, use of complementary nutritional therapies, and patient age >65 years. A point system was assigned to each variable and a total nutrition screening score was tabulated to determine priority and level of nutritional risk. This group represented 35% of the total patient population who screen at high nutritional risk on admission. The clinical dietitians at our center are responsible for identifying patients on complementary nutritional therapies during the initial nutrition screening, identifying agents with potential or known interaction with current cancer therapies, and educating patients and informing the healthcare team about potential and documented interactions.

Information on demographic variables, anthropometrics, prevalence of use, the specific CINTs used by these patients during treatment, and the current can-

cer treatment was obtained from a patient interview by the RD and documented. Since patients may have reservations about informing the medical team of the complementary/integrative therapies they used during active treatment, clinical registered dietitians who conducted the interviews were trained to help patients overcome their reservations and were instructed to ask the patients about this subject several times during the interview.

CINTs were defined as modular (individual) supplements of vitamins, minerals, botanicals, or biologics used by patients as adjuncts to mainstream medicine to provide symptom control, enhance quality of life, and/or empower clients. Information was also collected on the use of complementary therapies for other disorders. The data were entered into spreadsheets and descriptive statistics were calculated for the variables of interest.

Results

Data were obtained from 820 patient charts. A total of 237 patients (29.1%) receiving active treatment reported using one or more complementary nutritional

Table 1. — Patient Characteristics (n = 237)

Variable	%
Age	
<30	4.0
30-40	9.5
41-50	11.0
51-60	19.2
>60	56.3
Gender	
Men	50.8
Women	49.2
Race	
Caucasian	92.0
African American	4.0
Hispanic	2.5
Other	1.5
Body Mass Index	
≤20 kg/m ²	22.1
21-30 kg/m ²	58.4
>30 kg/m ²	19.5
Education	
High school	37.0
College	55.0
Graduate school	8.0
Family History of Cancer	
Present	65.3
Absent	34.7
Current Occupation	
Employed	40.0
Retired/Unemployed	60.0

Table 2. — Type of Complementary Nutritional Therapies Used (n = 237)

Type	No. of Users
Modular vitamins	205 (86.5%)
Multivitamins/minerals	139 (58.6%)
Botanicals/biologics	104 (43.8%)
Modular minerals	67 (28.2%)

Note: Patients may have used more than one of these agents concurrently.

therapies during cancer treatment. All patients were receiving active antitumor treatment — surgery, chemotherapy, radiation therapy, bone marrow transplantation — and were assessed to be at high nutritional risk. The demographic data displayed in Table 1 indicate that 50.8% of these patients using the supplements were men and 49.2% were women. Caucasians and patients over 60 years of age were the principal users of complementary therapies during treatment. Over 63% of the patients had a college degree or higher, and 40% were employed at the time of treatment. A family history of cancer was recorded in 65% of the patients.

Multivitamin/mineral preparations were consumed by 139 patients (58.6%), and several reported taking one or more modular vitamins, minerals, or botanicals/biologics in addition to the multivitamins/minerals (Table 2). Modular vitamins were the most frequently used CINTs (n = 205, 86.5%), followed by botanicals/biologics (n = 104 patients, 43.8%), and mineral supplements (n = 67, 28.2%). Table 3 displays the specific modular vitamins, minerals, and biologics/botanicals used by these patients during treatment. Patients were taking 25 different botanicals and biologics during active cancer treatment. The chief botanicals used by this group were garlic, ginseng, soy isoflavones, ginkgo biloba, and Echinacea. Among the biologics, shark cartilage and CoQ10 were the most common agents used.

Discussion

The concurrent use of complementary and conventional therapies poses many challenges and unanswered questions in clinical oncology. In our study, the characteristics of patients using CINTs were similar to those observed in the general population reported by previous studies, with patients who were higher educated, Caucasian, and elderly being the principal users of these therapies.

Although multivitamins and minerals are used by more than 50% of the American population, intake of high-dose modular supplementation of vitamins and

minerals during treatment for cancer has continued to increase, especially modular supplements of antioxidant vitamins such A, C, and E, and the mineral selenium,^{3,8,10-13,15} as observed in our study. The most commonly used modular vitamin and minerals include antioxidant vitamins C, E, and B, calcium, iron, and selenium. While the literature supports a possible therapeutic potential for some of these therapies,^{1,2,16} there is no evidence to date to support better outcomes as a result of using these supplements concurrently with conventional treatments, even the well-researched supplements such as vitamin C.¹⁷ Vitamin C has come under scrutiny as a result of a recent laboratory study that reported enhanced cancer cell growth as a result of active oxidized vitamin C uptake via glucose trans-

porters,¹⁷ but the clinical significance of this result is unclear. Vitamin E is a common supplement used by men with prostate cancer; however, megadoses of vitamin E (those exceeding 10 times more than that recommended by the USRDA, 8 to 10 mg/day), are known to affect blood clotting by interfering with the action of vitamin K and is contraindicated prior to surgery.¹⁸ Of the modular minerals used, additional modular doses of zinc, boron, and magnesium have no proven efficacy in cancer treatment, and their effects during treatment are unknown.

Toxicity From Dietary Supplements

Although there are no human clinical trials proving efficacy of specific botanicals and biologics as supplements in the treatment or prevention of cancer, a number of patients in our study were taking biologics and botanical supplements that may have theoretical or documented the potential to interact with cancer treatment. Recent reviews summarize evidence suggesting that many supplements, such as garlic (*Allium sativum*), ginger, and ginkgo biloba have anticoagulant properties that may interfere with warfarin (Coumadin) therapy¹⁴ and should not be used in the presurgical period.¹³ A supplement such as Echinacea is heavily marketed as an immune booster, but research is inconclusive. Echinacea should be avoided by patients who are receiving therapies designed to boost or suppress the immune system, who have autoimmune disorders, and who are undergoing organ transplantation.

Data are emerging to elucidate specific mechanisms by which some supplements may interact with medications. For example, some components of the herb St John's wort induce the cytochrome P450 3A4 isoform, thus potentially altering the pharmacokinetic profile of a large number of drugs, including the vinca alkaloids used in chemotherapy. St John's wort may also augment expression of the P-glycoprotein efflux pump, which is associated with drug resistance.^{19,20} Clinically, the preparation results in lower drug levels of CPT-11 (Irinotecan) and should be avoided in this situation.²¹ In addition to being ineffective as a cancer cure, essiac, a cocktail of several botanicals, contains constituents such as rhubarb (*Rheum palmatum*) and sheep sorrel (*Rumex acetosella*) that have laxative properties and the potential to cause vomiting. The anthraquinones, which produce the laxative effect of rhubarb, have been shown in vitro to potentiate the action of doxorubicin (Adriamycin), a widely used chemotherapy drug,²² but the clinical significance of this action is not known. Ginger can reduce nausea, but the flavor may be too strong for chemotherapy patients. Laboratory and animal studies show that ginseng (*Panax quinquefolium*) can inhibit tumor

Table 3. — Specific Nutritional Therapies Used (n = 237)

Nutrient	No. of Patients
Vitamins/Minerals	139
Modular Vitamins	
Vitamin E	85
Vitamin C	66
Vitamin B	37
Vitamin A	13
Vitamin K	4
Modular Minerals	
Calcium	16
Iron	14
Selenium	13
Zinc	8
Potassium	8
Boron	4
Magnesium	4
Botanicals	
Garlic	16
Ginseng	15
Soy	15
Ginkgo biloba	8
Echinacea	6
Flaxseed oil	4
Saw palmetto	4
Essiac	3
St John's wort	3
Grapeseed extract	2
Milk thistle	2
Artichoke extract	1
Berry extract	1
Black walnut	1
Cascara	1
Ginger	1
Herbal	1
Horsetail	1
Kava kava	1
Laetrile	1
Red clover	1
Wormwood	1
Biologics	
Shark cartilage	7
CoQ10	6
Bee pollen	2

Table 4. — Supplements Associated With Antiplatelet/Bleeding Risk*

Bilberry (<i>Vaccinium myrtillus</i>)
Bromelain, from pineapple stem (<i>Ananas comusus</i>)
Cayenne (<i>Capsicum annum</i>)
Coleus/forskolin (<i>Coleus forskohlii</i>)
Flaxseed oil (<i>Linum usitatissimum</i>)
Feverfew (<i>Tanacetum parthenium</i>)
Garlic (<i>Allium sativum</i>)
Ginger (<i>Zingiber officinale</i>)
Ginkgo (<i>Ginkgo biloba</i>)
Ginseng, American (<i>Panax quinquefolium</i>)
Green tea (<i>Camellia sinensis</i>)
Meadowsweet (<i>Filipendula ulmaria</i>)
Motherwort (<i>Leonurus cardiaca</i>)
Poplar (<i>Populus spp</i>)
* May enhance effects of anticoagulant medications (eg, warfarin) and potentiate bleeding.

Table 6. — Supplements Associated With Coagulant/Anticoagulant Properties

Coagulant*
Barberry (<i>Berberis vulgaris</i>)
Oregon grape root (<i>Berberis aquifolium</i> , <i>Mahonia aquifolium</i>)
Shepherd's purse (<i>Capsella buisa-pastoris</i>)
Anticoagulant**
Chamomile (<i>Chamaemelum nobile</i>)
Dong quai (<i>Angelica sinensis</i>)
Horse chestnut (<i>Aesculus hippocastanum</i>)
* May inhibit effects of anticoagulant medications (eg, warfarin).
** Exhibits anticoagulant activity and may enhance effects of anticoagulant medications (eg, warfarin) and potentiate bleeding.

growth in chemically induced lung and skin tumors, in addition to having antiangiogenic, antiproliferative and apoptotic properties.²³⁻²⁶ Human studies, however, have not confirmed this effect.

Because there are no legal standards in place for packaging or processing, the content of the supplements may vary significantly from batch to batch, and the actual content of the packaged supplement may vary from the content statements and claims made on the label.²⁷ Some of the products tested may have less than half the potency listed on the label.² In a recent report, analysis of commercially available botanical supplements revealed unsafe levels of mercury and other toxic metals, and prescription drug compounds were discovered in more than one third of the products tested.²⁸ Adulteration and product quality issues are of particular concern with ginseng due in part to the high cost of the root in the marketplace. Horsetail is a nutritional supplement that may contain material from a number of equisetum ferns. It is known for its diuretic properties that may cause dehydration and also for possible adulteration. Toxicity of laetrile is of paramount concern due to the potential for cyanide poisoning. Milk thistle (sily-marin) is an herb marketed as a chemoprotective agent promoted as useful for

patients receiving regimens that are known to be toxic to the liver and kidneys, but these claims have not been substantiated in human trials. Shark cartilage may have anti-inflammatory properties^{29,30} or may protect against damage by reactive oxygen species,³¹ but the most frequently cited claim is it contains proteins that inhibit angiogenesis associated with metastatic breast, prostate, brain, and ovarian cancers. In 1998, Miller and colleagues³² reported a negative trial of shark cartilage as a cancer therapy, citing that no benefit was noted from this agent. To date, the health claims for shark cartilage are not supported by results in human trials. Although no toxicities have been reported, some shark cartilage products contain only binding agents, fillers, or negligible amounts of cartilage, including impurities.

Another agent commonly used by breast cancer patients is coenzyme Q10 (CoQ10), which is generally classified as a non-essential nutrient in humans. It is synthesized from the amino acid tyrosine through a cascade of eight aromatic precursors. CoQ10 has been promoted among cancer patients as an agent that improves outcomes in breast cancer and offsets cardiotoxicity resulting from chemotherapy with doxorubicin. A pilot trial completed in Japan and based on animal data involved 7 patients taking doxorubicin who experienced less cardiotoxicity and were able to tolerate higher doses than controls.^{33,34} CoQ10 may act as an antioxidant, mediating the extracellular stabilization of ascorbate in vitro.³⁵ No toxicities have been reported with oral supplementation. However, caution is needed by patients taking anticoagulants such as warfarin due to the potential for food-drug interaction.

The most popular supplement used by prostate cancer patients is PC-SPES, an herbal preparation consisting of extracts from 8 herbs. PC-SPES exhibits estrogenic activity, and although it has demonstrated potential in the treatment of hormone-sensitive prostate cancer, consumers were recently warned to stop using the

Table 5. — Supplements Associated With Laxative Properties

Aloe vera gel
Aloe vera leaf
Buckthorn bark and berry (<i>Rhamnus frangula</i> , <i>Frangula alnus</i>)
Cascara sagrada (<i>Rhamnus purshiana</i>)
Fennel seed (<i>Foeniculum vulgare</i>)
Islandic moss (<i>Cetraria islandica</i>)
Marshmallow root (<i>Althaea officinalis</i>)
Psyllium husk (<i>Plantago spp</i>)
Rhubarb root (<i>Rheum palmatum</i>)
Senna leaf and fruit (<i>Cassia senna</i>)
Slippery elm (<i>Ulmus rubra</i>)

Table 7. — Other Known/Suspected Adverse Interactions Associated With Nutritional Supplements

Bearberry, also called uva-urse (*Arctostaphylos uva-ursi*)

High tannin content may reduce absorption of cationic minerals (eg, calcium) and some drugs.

Black walnut husk (*Juglans nigra*)

High tannin content may reduce absorption of cationic minerals (eg, calcium) and some drugs.

Cola nut (*Cola acuminata*)

Contains up to 2.5% methylxanthines, including caffeine and theobromine. May strengthen the effects of psychoanaleptic drugs and caffeinated beverages.

Dandelion (*Taraxacum officinale*)

Potassium-rich compounds have a diuretic effect that may enhance activity of diuretic medicines.

Echinacea

May counteract immune-suppressant drugs. Taken over time, may suppress immunity.

Ephedra

May increase side effects of stimulants. Its activity as adrenergic receptors presents the potential for a wide range of drug interactions.

Flaxseed (*Linum usitatissimum*) (not oil)

High fiber content. When taken concurrently with drugs or foods, may bind lipids, nutrients, and some drugs, reducing absorption. Contains compounds near the fiber layer known as lignins that metabolize to the substances enterolactone and enterodiol, which in laboratory analyses have been shown to weakly bind estrogen receptor. Specific effects have not been characterized. They may serve as weak estrogen agonists or antagonists; therefore, flaxseed has a theoretical potential to modulate effects of tamoxifen, raloxifene, hormone replacement, and/or other estrogenic drugs, as well as endogenous estrogens.

Goldenseal (*Hydrastis canadensis*)

Taken over time, can interfere with B vitamin absorption, especially B₁ (thiamine).

Hawthorn (*Crataegus oxyacantha*, *Crataegus monogyna*)

Contains flavinoids that may enhance action of cardiac glycosides and ease their side effects.

Kava kava (*Piper methysticum*)

Banned by the FDA. May cause drowsiness, dizziness, and intoxication. May enhance effects of sedatives or hypnotics. Not recommended for consumption with alcoholic beverages. May impair ability to drive a motor vehicle or operate machinery.

Licorice (*Glycyrrhiza glabra*)

May impair action of drugs that cause potassium loss. May enhance action of corticosteroids. May counteract effectiveness of drugs used to treat hypertension. Contains glycyrrhizic acid, which can affect the hormone aldosterone that helps regulate blood pressure. For patients with high blood pressure, edema, or electrolyte imbalance, use of licorice root or its products can lead to sodium retention, excessive potassium excretion, and water retention. Some licorice products have the glycyrrhizic acid removed and are sometimes sold as deglycyrrhizic licorice.

Oak bark (*Quercus alba*, *Quercus rubrum*)

High tannin content may reduce absorption of cationic minerals (eg, calcium) and some drugs.

PC-SPES and SPES

Combination of several products including Dyer's woad, (*Isatis indigotica Fort*), licorice root, ginseng, reishi mushrooms, skullcap,

chrysanthemum, rubescens, and saw palmetto. Risk of deep vein thrombosis, nausea, and mild leg cramps have been reported in patients treated with PC-SPES. Exhibits estrogenic activity; use of PC-SPEC may confound the results of standard or experimental therapies and may produce clinically significant adverse effects. Gynecomastia occurs in several patients. Licorice is a component of the herbal combination. Glycyrrhizin, a constituent of licorice, metabolizes to the aglycone glycyrrhetic acid. The acid has a keto group at position 11, a structural feature shared with the adrenocortical hormone cortisol. When taken in large amounts, ingestion of licorice may affect mineral and carbohydrate metabolism and may dangerously elevate blood pressure. PC-SPES and SPES capsules contain undeclared prescription drug ingredients that could cause serious health effects if not taken under medical supervision. Laboratory analysis of the products by the California Department of Health Services found PC-SPES contains warfarin and SPES contains alprazolam, which are available only by prescription.

Raspberry leaves (*Rubus idaeus*)

High tannin content may reduce absorption of cationic minerals (eg, calcium) and some drugs.

Red clover (*Trifolium pratense*)

Contains the isoflavone biochanin A, which is similar in structure to the isoflavone genistein in soy. Biochanin A in laboratory tests is found to bind estrogen receptors. Specific in vivo effects have not been characterized. Biochanin A may serve as estrogen agonist or antagonist, therefore a theoretical potential exists for red clover to modulate effects of tamoxifen, raloxifene, hormone replacement, and/or other estrogenic drugs as well as endogenous estrogens.

Saw palmetto (*Serenoa repens*, *Sabal serrulata*)

A lipophilic extract of the saw palmetto berries is taken to treat symptoms of BPH (benign prostatic hypertrophy), as the lipophilic (hexane or ethanol) extract of these berries has been shown to relieve urinary symptoms without reducing the hypertrophy associated with BPH. Prostate cancer patients taking saw palmetto might experience false (low) readings on the PSA test. Clinicians should be informed when patients are taking this herb.

Sheep sorrel (*Rumex acetosella*)

Contains high amounts of oxalic acid, which binds dietary minerals and inhibits absorption. May inhibit absorption of some medications.

St John's wort (*Hypericum perforatum*)

May enhance effects of narcotics and selective serotonin reuptake inhibitors (SSRIs). Increases side effects of photosensitizing drugs, alcohol, and melatonin. Laboratory reports have suggested but not confirmed that the mechanism of action for St John's wort may involve monoamine oxidase inhibition, SSRI reuptake inhibition, increased melatonin production, and other effects. Induces the drug metabolizing enzyme cytochrome P450 3A4. Has the potential to interact with many medications, including CPT-11 (Irinotecan).

Turmeric (*Curcuma longa*)

Exhibits antiplatelet activity. May enhance effects of anticoagulant medications such as warfarin and potentiate bleeding.

Valerian (*Valeriana officinalis*)

Enhances the effects of sedatives and hypnotic drugs.

Vitex (*Vitex agnus-cactus*)

May stimulate prolactin and increase the supply of mother's milk. Due to action that may affect sex hormones, vitex should not be taken concurrently with birth control pills or other hormone therapy.

dietary supplement/herbal products PC-SPES and SPES capsules because they contain undeclared prescription drug ingredients that could cause serious health effects if not taken under medical supervision. Laboratory analysis of the products by the California Department of Health Services found that PC-SPES contains warfarin and SPES contains alprazolam, both of which are available only by prescription and sold either by their generic names or the trade names of Coumadin and Xanax, respectively. PC-SPES is marketed “for prostate health” and SPES for strengthening the immune system. BotanicLab Inc, the manufacturer of the products, has voluntarily recalled PC-SPES and SPES nationwide.³⁶

Saw palmetto is another botanical used frequently by prostate cancer patients. Oral administration of saw palmetto extract was generally supported in clinical trials as having a beneficial effect on symptoms of benign prostatic hyperplasia. One area of research has focused on the potential of saw palmetto to inhibit conversion of testosterone to dihydrotestosterone (DHT). High concentrations of DHT are found in prostate tissue of patients with benign prostatic hyperplasia. DHT stimulates hyperplasia at a higher rate than other androgens; it binds nuclear androgen receptors in prostate cells and stimulates downstream events including growth and division. In 1998, a meta-analysis involving 2,939 men by Wilt et al³⁷ studied data from 18 placebo-controlled randomized trials of saw palmetto and benign prostatic hyperplasia. Compared with patients in the placebo group, men treated with saw palmetto reported better symptom scores, ranging from .3–2.52 points on the International Prostate Symptom Scale (95% confidence interval [CI]), decreased nocturia on average .76 times less per night, and increased peak urine flows (95% CI, 0.72–3.14 mL). Compared with patients receiving finasteride, men treated with saw palmetto had fewer reports of erectile dysfunction. However, there is no evidence that saw palmetto is useful in the treatment and prevention of cancer, including prostate cancer. In addition, there is concern by some health-care professionals that men taking saw palmetto might experience false (low) readings on the prostate-specific antigen test.

Although not specifically recommended for cancer prevention or treatment, bee pollen is a nutritional supplement that is not inspected by the US Food and Drug Administration. Manufacturers claim that it contains vitamins, minerals, and some amino acids. However, no animal, laboratory, or human clinical trials have been completed to prove the efficacy of bee pollen or to validate the specific content claims of these supplements.

Other supplements associated with drug/nutrient/ supplement interactions are described in Tables

4-7. In addition to questionable health effects and interactions, the cost of these supplements may pose a financial burden to patients and their families, especially the elderly. It has also been reported that new users of unconventional cancer treatments are more depressed and suffer severe somatic symptoms in addition to having greater fears that their cancers may recur than non-users.⁹

Benefits From Dietary Supplements

Some biologics and micronutrients have been identified as having the potential to prevent induction and inhibit the development of preinvasive and invasive neoplasia and its progression. Increasing evidence from animal research, observational human studies, and a few clinical trials suggests that some nutrients may indeed help prevent certain cancers or assist in cancer therapies.

The concept of cancer prevention using nutrients is based on evidence from human epidemiology, clinical trials, and studies of animal carcinogenesis models for cancer-inhibiting potential of these nutrients and nonnutrients derived from foods. Basic research has identified nutrients as agents that are carcinogen-blocking, are antioxidant/anti-inflammatory, and are capable of inhibiting mutagenesis and hyperproliferation, as well as those that induce apoptosis or differentiation as critical characteristics for chemoprevention regardless of their specific molecular targets. More than 40 diet-derived agents and agent combinations have been identified and are currently being evaluated clinically as chemopreventive agents for major cancer targets, including breast, prostate, colon, and lung cancers. Some of the most promising nutrients identified as chemopreventive agents include soy isoflavones, green and black tea polyphenols, curcumin, lycopene, indole-3-carbinol, vitamins D and E, selenium, and calcium.¹⁶ Conclusive evidence can be obtained only from well-characterized agents tested in suitable cohorts and using the same scientific rigor used to evaluate pharmaceutical agents and also using reliable intermediate biomarkers of cancer for evaluating their efficacy.

Future Directions

Healthcare professionals need to develop a greater awareness of the alternative and complementary therapies used by their patients during therapy, and they should examine the potential interactions that these therapies may have with indicated cancer treatments. Practitioners must first identify patients who are vulnerable and then support these patients to make informed, safe, and appropriate choices. Vulnerable

patients include those who are Caucasian, educated, young, highly motivated, and eager to participate in the treatment plans and take an active role in their cancer treatment. Also, they may be distressed about their illness or have a holistic philosophy of health. They may be pediatric patients whose parents have supported the use of CINTS, or they may be patients with brain, breast, and prostate cancers.³⁸⁻⁴¹ To identify patients using unconventional treatments concurrently with conventional ones, they should be specially questioned about their use of complementary therapies. This clinical screening allows evaluation of patient supplement intake against known and potential adverse interactions with the cancer therapy protocol being implemented. We need to provide not only the best conventional care, but also the best information and guidance for patients who are using alternative and complementary therapies.

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