Use of complementary and alternative medicines by surgical patients

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This study examined the frequency of surgical patient use of complementary and alternative medicines prior to surgery. After conducting a literature review on the known effects of alternative medicines, we evaluated their potential interactions with anesthetics. At the University of Colorado Health Sciences Center, Denver, Colo, we surveyed 500 elective surgical outpatients about alternative medicines taken during the 2 weeks prior to surgery. Of the 500 patients surveyed, 51% preoperatively took herbs, vitamins, dietary supplements, or homeopathic medicines (range, 1-22 per patient). Substances from 2 or more categories of alternative medicines (herbs, vitamins, dietary supplements, or homeopathic medicines) were consumed by 24% of patients.

Twenty-four percent of surveyed patients consumed 50 different herbs, 41% took 9 types of vitamins, 44% took 31 types of dietary supplements, and 1% of patients took the homeopathic arnica. Classification by potential adverse effects revealed that 27% of surgical patients consumed alternative medicines that may inhibit coagulation, affect blood pressure (12%), cause sedation (9%), have cardiac effects (5%), or alter electrolytes (4%).

Greater communication, knowledge, and scientific research are needed to safely integrate complementary and alternative medicines in the future management of the surgical patient.

Key words: Anesthesia, complementary and alternative medicine, drug interaction, herbs, surgical patient.

Introduction

The widespread use of complementary and alternative medicines by surgical patients is in sharp contrast with the paucity of controlled scientific studies of the effects of unconventional medicines combined with anesthetics. From 1990 to 1997, the use of herbal remedies increased 380%. At least 15 million adults are taking herbs, high dose vitamins, or both combined with prescription drugs. In 1998, an estimated 37% of Americans used herbs in the previous year, spending more than $3.87 billion for herbal medicines.

Because some herbal medicines can be harmful, especially if combined with prescription drugs, it is likely that certain herbs combined with anesthetics have potential adverse effects. Considering that more than 25 million anesthetics are administered each year in the United States, the potential exists for significant morbidity from the
frequent use of preoperative alternative medicines. The American Society of Anesthesiologists suggests the discontinuation of all herbal medicines at least 2 weeks prior to surgery. This study examined the frequency of use of alternative medicines by surgical patients and aimed to evaluate potential adverse interactions with anesthesia based upon a literature review of known effects of unconventional medicines.

Methods

After Institutional Review Board approval, we surveyed a convenience sample of 500 elective outpatients about their use of alternative medicines during the 2 weeks prior to surgery. From April 14 to May 19, 1999, all outpatients were invited to complete a self-report questionnaire with no identifying format. The survey instrument used a descriptive design with common names of herbs, vitamins, dietary supplements, or homeopathic medicines without requiring dose information. Survey forms were collected from patients prior to surgery by a team of registered nurses and advanced nurse practitioners.

The frequency of use and type of alternative medicines were analyzed by categorizing the reported consumed substances into 4 groups of herbs, vitamins, dietary supplements, or homeopathic medicines. Cross-tabulating alone and then in combination according to their potential for adverse interactions with anesthesia, the alternative medicines were categorized based upon a literature review of known effects. All raw data were entered into a Microsoft Access computer database as nominal variables, then imported into Microsoft Excel and grouped into categorical ranks for frequency distribution.

Results

Of the 500 patients surveyed, we found 255 patients (51%) who took alternative medicines such as vitamins, herbs, dietary supplements, or homeopathic medicines during the 2 weeks prior to surgery. Women comprised 281 subjects, men 174 subjects, with 45 persons not reporting their sex on the questionnaires. Alternative medicine use was higher in females (55%) compared to males (41%, *P*<.003). Examining the data relative to surgical case type revealed that podiatry and thoracic surgery patients used alternative medicines most frequently, although patient use was ubiquitous (range, 21-77%) among 18 surgical subspecialties.

A total of 121 patients (24%) consumed combinations of 2 or more types of alternative medicines, such as herbs, vitamins, dietary supplements, or homeopathic medications. The number of alternative medicines consumed ranged from 1 to 22 per patient. One hundred twenty-two surgical patients (24%) took 50 different herbs mostly in combination with other alternative medicines, while herbs alone were taken by 25 patients (5%). The most common herbs consumed by surgical patients in this study were garlic and cranberry (7% each). Echinacea, gingko, and ginseng each were taken by 4% of patients.

Two hundred six patients (41%) took 9 types of vitamins. The vitamins most frequently consumed were vitamin C (37% of patients), multivitamins (31%), and vitamin E (20%). A total of 220 patients (44%) took 31 types of dietary supplements such as calcium (7%), fish oil (4%), or magnesium or zinc (1% each). Arnica, a homeopathic medicine, was taken by 1% of patients.

The alternative medicines were categorized into groups based on their potential adverse effects for surgical patients. Alternative medicines that may prolong coagulation (Table 1) were taken by 134 patients (27%). Of the 745 supplements reported taken by patients, 35% (261) of the substances consumed may affect coagulation. Fifty patients (10%) took multiple supplements that may inhibit coagulation (range, 2-7 medicines).

Herbs that may affect blood pressure (Table 2) were consumed by 58 patients (12%). Sedative herbs (Table 3) were taken by 44 patients (9%). Twenty-five patients (5%) took herbs that may have cardiac effects (Table 4). Twenty patients (4%) took herbs that may alter electrolytes (Table 5).

Examination of previous and subsequent monthly surgical logs suggests that this population was representative of elective surgical outpatients seen throughout the year. Data on surgical outcomes or anesthetic complications of the participants were not collected. Factors that may predispose this study to conclusion errors include the data instrument, which did not ascertain the dose or frequency of use of alternative medicines. Errorneous patient disclosure could have occurred due to the survey instrument that listed the common names of herbs without the corresponding scientific Latin terms for exact identification. Furthermore, since middle class, college-educated white females living in the southwestern United States more frequently use alternative medicines, this study’s population may not be representative of nationwide trends. However, comparison of alternative medicine use between male and female
patients in this study was similar to the national frequency of alternative medicine use for men versus women.3

Discussion
This study revealed that in a metropolitan university hospital more than 50% of surgical patients took herbs, vitamins, dietary supplements, or homeopathic medicines during the 2 weeks prior to surgery. Review of the potential interactions of alternative medicines with anesthesia and analysis of frequency of patient use revealed that the most common potential adverse effect is possible prolongation of coagulation. Because 27% of surgical patients took alternative medicines that may affect coagulation and 10% of patients combined up to 7 of these supplements, further study of the synergistic effects of multiple alternative medicines that may affect coagulation is indicated.

Certain alternative medicines may have adverse effects upon blood pressure during anesthetics. Volatile anesthetic agents diminish blood pressure by myocardial depression and vasodilation.17-19 Black cohosh, a peripheral vasodilator, could potentiate antihypertensive medications.18

<table>
<thead>
<tr>
<th>Name</th>
<th>% Use</th>
<th>Effect</th>
<th>Medicinal uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>1.2</td>
<td>Contains coumarins</td>
<td>Prothrombinaemic purpura</td>
</tr>
<tr>
<td>Capsicum</td>
<td>0.4</td>
<td>Contains coumarins, inhibits platelet aggregation</td>
<td>Dyspepsia, arthritis</td>
</tr>
<tr>
<td>Celery</td>
<td>1.4</td>
<td>Contains coumarins</td>
<td>Arthritis, urinary infection</td>
</tr>
<tr>
<td>Chamomile</td>
<td>2.8</td>
<td>Contains coumarins</td>
<td>Dyspepsia, anxiety</td>
</tr>
<tr>
<td>Chinese herbs</td>
<td>1.2</td>
<td>Inhibit platelet aggregation</td>
<td>Scientific names: *Allium bakeria, Andrographis paniculata, Angelica dahurica, Angelica sinesis, Artemisia capillaris, Astragalus membranaceus, Bombyx mori, Conodonopsis pilosula, Paonie lactiflora, Glehnia littoralis, Gynostemma pentaphyllum, Ligusticum chuanxiong, Panax ginseng, Rheum palmatum, Scutellaria baicalensis, Typha latifolia</td>
</tr>
<tr>
<td>Fenugreek</td>
<td>0.2</td>
<td>Contains coumarins</td>
<td>Dyspepsia, gastritis</td>
</tr>
<tr>
<td>Feverfew</td>
<td>0.2</td>
<td>Inhibits platelet aggregation</td>
<td>Migraine, arthritis, fever</td>
</tr>
<tr>
<td>Fish oil</td>
<td>3.6</td>
<td>Decreases platelet aggregation and platelet adhesion</td>
<td>Hypercholesterolemia</td>
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<td>Garlic</td>
<td>6.8</td>
<td>Decreases plasma viscosity,</td>
<td>Arteriosclerosis, hypertension, hypercholesterolemia, infection</td>
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<td></td>
<td></td>
<td>increases clotting time,</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>inhibits platelet aggregation</td>
<td></td>
</tr>
<tr>
<td>Ginger</td>
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<td>Inhibits platelet function</td>
<td>Nausea, arthritis</td>
</tr>
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<td>Gingko</td>
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<td>Improve memory,</td>
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<td>decreases plasma viscosity,</td>
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<td>Ginseng</td>
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<td>Stress reduction,</td>
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<td></td>
<td></td>
<td>contains coumarins</td>
<td>improves vitality</td>
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<tr>
<td>Horseradish</td>
<td>0.2</td>
<td>Contains coumarins</td>
<td>Infection, inflammation</td>
</tr>
<tr>
<td>Kava kava</td>
<td>1.2</td>
<td>Decreases platelet aggregation</td>
<td>Anxiety, stress, muscle pain</td>
</tr>
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<td>Licorice</td>
<td>0.8</td>
<td>Contains coumarins</td>
<td>Cough, peptic ulcer</td>
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<td>Passionflower</td>
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<td>Contains coumarins</td>
<td>Anxiety, insomnia</td>
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<tr>
<td>Red clover</td>
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<td>Contains coumarins</td>
<td>Infections, psoriasis</td>
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<td>Vitamin E</td>
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<td>Reduces platelet adhesion and</td>
<td>Antioxidant</td>
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<td></td>
<td></td>
<td>aggregation</td>
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</table>

Table 1. Alternative medicines with coagulation effects used by surgical patients6-11
Patients with hypertension could have exaggerated blood pressure changes under anesthesia, thus increasing the risk for myocardial ischemia, renal failure, or cerebral vascular accidents. Adverse interaction of anesthetic drugs with St. John’s wort may provoke serotonin surge reaction with hypertension, possible exacerbation of allergic reactions, confusion, or agitation. St. John’s wort inhibits monoamine oxidase and serotonin reuptake similar to fluoxetine (Prozac). Therefore, this herb could interact with stimulants, acetylcholinesterase inhibitors, or other medications commonly administered with anesthetics such as ephedrine or meperidine (Demerol).

Arrhythmias can occur during an anesthetic due to hypoxemia, electrolyte disturbances with potassium or magnesium, altered autonomic activity, catecholamines, cardiovascular disease, or anesthetic agents. The risk of arrhythmias also may be increased by some herbal medicines. Ephedra, the herbal sympathomimetic precursor...
to ephedrine and pseudoephedrine, can cause hypertension or arrhythmias. The US Food and Drug Administration (FDA) has received more than 800 reports of adverse reactions from ephedra including liver failure, hypertension, myocardial infarctions, palpitations and arrhythmias, cerebral vascular accidents, and deaths.

Sedative herbs may exhibit synergism with many hypnotic drugs used in anesthesiology. Kava kava has sedative, myorelaxant, and analgesic properties that could potentiate barbiturates due to kava’s binding to gamma-aminobutyric acid and pentobarbital receptors. Valerian may potentiate sedatives, opiates, benzodiazepines, barbiturates, and alcohol. Central nervous system depression and muscle relaxation occur from valerian’s action at gamma-aminobutyric acid receptors or other neurotransmitter sites.

Hypokalemia can result in cancellation of surgery due to the risk of cardiac arrhythmias, hypotension, or prolonged responses to muscle relaxants. Herbs that may affect electrolytes include diuretics that increase urine output adding to the loss of potassium or sparing of sodium. Licorice use for longer than a few weeks is associated with a 30% incidence of edema, hypokalemia, and hypertension.

Although there is a growing body of scientific literature about herbal medicines, most herbs have not been thoroughly researched. Herbs naturally contain many chemicals that dilute the active medicinal components, generally resulting in fewer dose-dependent adverse and toxic effects than pharmaceutical drugs. However, pharmaceutically prepared herbal supplements may be more potent than natural forms and thereby have more deleterious effects. Consequently, herbs cannot be considered innocuous until further large well-designed controlled studies are conducted, and an improved method for reporting adverse reactions is in place.

According to the 1994 Dietary Supplement Health and Education Act, herbs are sold as nutritional supplements provided no claims of medicinal effects are advertised. This lack of product information fails to provide guidelines for consumer use or safety precautions regarding health conditions, drug interactions, side effects, or toxicity. Herbal products can have poor quality, adulteration, contamination, or marked variation in potency. To report an adverse reaction with an herb or nutritional supplement healthcare providers should contact the FDA’s MedWatch Program at 800-FDA-1088 or on the Internet at www.fda.gov/medwatch.

Seventy percent of individuals who use alternative medicines do not discuss it with their doctors but self-diagnose and self-treat their illnesses. This lack of communication could compromise patient safety if the use of unconventional medicines interferes with other health problems or medical treatments. Open communication and greater knowledge of alternative therapies by healthcare providers can prevent adverse reactions or complications from unconventional treatments in the surgical patient. Further study and scientific research are needed before complementary and alternative medicines are safely integrated into the future management of the surgical patient.

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ACKNOWLEDGMENT
We gratefully acknowledge the assistance of the University of Colorado Health Sciences Center Department of Anesthesiology. We would like to thank Charles P. Gibbs, MD, professor and chairman, for the departmental funds to support this research. Additionally, Carolyn Fleck, RN, ANP; Katie Conyers, RN, ANP; and Day Surgery registered nurses graciously collected patient questionnaires.