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Herbal Medications and Perioperative Implications

Although herbs are natural products, they have active ingredients that may have pharmacological effects similar to prescription medications, and may interact with or potentiate other medications, including anesthetics. Certain herbal medications may prolong the duration of anesthesia, while others may increase the risk of bleeding or cause hemodynamic instability. Anesthesiologists, in their role of perioperative physicians, should be familiar with commonly used herbal medicines and their potential adverse effects in the perioperative period. This article reviews some of the commonly used herbal medicines and discusses their adverse effects, particularly in the perioperative period.

Herbal medications are plant or plant parts used for medicinal purposes,1,2 which also are called neutraceuticals. Plants have pharmacologic effects, and many modern medicines are derivatives of plant products. In recent years the use of herbal products has escalated.3 In 1997, Americans spent an estimated \$3.5 billion on herbal drugs. A sense that these products may be safe because they are "natural" seems to exist. However, use of these products could have many severe and life-threatening consequences. Furthermore, herbal products are

not regulated by the Food and Drug Administration or the federal government, and there is no standardization of these products.

It has been estimated that 20% of adults taking prescription medicines also take herbal medicines. Eisenberg et al4 estimate that 15 million people who take herbal products may be at risk for potential adverse interactions between their prescription drugs and these products. Alarmingly, patients using herbal medicines rarely inform their physicians.

Use of herbal medications may potentiate anesthetic drugs, lead to hemodynamic instability, and increase bleeding in the perioperative period.5,6 It is important that the anesthesiologist be aware of patient use of herbal medications and the implications of such use in the perioperative period. This article will discuss common uses for, and anesthetic implications of, several of the more common herbal remedies.

## Commonly Used Herbal Medications

Ginkgo biloba. Ginkgo biloba, also known as maidenhair tree and fossil tree, is one of the most commonly used herbal medications. It is suggested that ginkgo primarily is a circulatory stimulant and an antioxidant. It is used to increase blood circulation and oxygenation, as well as to improve memory and mental alertness. Ginkgo biloba also is used to treat tinnitus, vertigo, and sexual dysfunction. Several large placebo-controlled, double-blind studies evaluating ginkgo biloba have been found to stabilize, and perhaps even improve, cognitive function in patients with dementia.7 In addition, it has been shown to help relieve pain in patients with intermittent claudication, perhaps by means of its antiplatelet and anti-inflammatory effects.8 Potential side effects associated with the use of ginkgo include nausea, vomiting, and headache. It also has been linked to spontaneous hematomas and spontaneous hyphema.9 Long-term use of ginkgo may lead to neurotoxicity.10 Ginkgo biloba may decrease the efficacy of anticonvulsants and may lower the seizure threshold potential of tricyclic antidepressants. With respect to perioperative implications, patients consuming ginkgo biloba may have more bleeding as a result of the inhibition of platelet activating factor.5 In addition, the effects of anticoagulants (eg, warfarin, heparin, and aspirin) and nonsteroidal antiinflammatory drugs could be enhanced.

Ginseng. Ginseng is commonly referred to as American ginseng, Korean ginseng, and Chinese ginseng. Its scientific name is Panax schinseng. Ginseng is used as an antioxidant and energy enhancer, and to augment adrenal steroid production (ie, as an "adaptogen").11,12 It also may have an immunomodulatory effect. Ginseng may cause headache, vomiting, hypertension, hypoglycemia, and insomnia. It may increase bleeding and augment the effects of anticoagulants.13 Ginseng should be avoided with the use of other stimulants. Episodes of mania have been reported with concomitant use of ginseng and monoamine oxidase inhibitors.14 Ginseng abuse may lead to sleepiness, hypertonia, and edema (Ginseng abuse syndrome).15 Because chronic use of ginseng can cause hypertension and its consequences, including autonomic instability and end-organ damage, its use has anesthetic implications. Patients consuming ginseng may be volume-depleted and may experience severe hypotension on induction of anesthesia. Diabetic patients should have their blood sugar levels carefully monitored in the perioperative period because ginseng could cause hypoglycemia in patients who are taking hypoglycemic agents.

Garlic. Other common names for garlic include clove garlic and ajo. Its scientific name is Allium sativum. The proposed beneficial properties of garlic include vasodilatation, hypocholesterolemia, antioxidant, and fibrino-lytic.16 Some studies have demonstrated garlic's ability to lower systemic blood pressure and decrease platelet function.17 Garlic may potentiate the effects of anticoagulants and NSAIDs, and may increase perioperative bleeding. Spontaneous epidural hematoma formation has been reported with use of garlic supplementation.18 Echinacea. Echinacea also is commonly referred to as purple cone flower. It has long been used for the treatment of common cold, coughs, bronchitis, and urinary tract infections, and to promote wound healing. It has been shown to have immunostimulatory effects, and to increase T-cell activity and phagocytosis in vitro.19,20 Echinacea may inhibit the desired immunosuppression offered by drugs such as steroids and cyclosporine in transplant patients. It can inhibit the cytochrome P450 system and be hepatotoxic. Anaphylactic reactions also have been reported with its use. Echinacea should be avoided in patients consuming potentially hepatotoxic drugs. Drugs that are metabolized by the cytochrome P450 system may have enhanced activity in patients using echinacea.

Ginger. Ginger also is called black ginger and African ginger; its scientific name is Zingiber officinale. It commonly is used as an antiemetic and an antispasmodic. It has been shown to be an effective antivertigo agent in studies using caloric stimulation of the vestibular system.21 Some studies show it to have a higher efficacy in treating motion sickness when compared to diphenhydrinate.22 It also has been used with success in the treatment of hyperemesis gravidarum. However, its efficacy in the treatment of postoperative nausea and vomiting remains controversial.23,24 Ginger inhibits thromboxane synthetase and, as such, may prolong bleeding time.25 In addition, it may augment effects of anticoagulants and NSAIDs, thus resulting in increased perioperative bleeding.

St John's Wort. This herb's common names include hardhay, amber, and goatweed. Its scientific name is Hypericum perforatum. St John's Wort has been used to treat depression and anxiety; however, its exact mechanism of action is not known. Its antidepressant effects may be a result of inhibition of monoamine oxidase or inhibition of GABA receptors.26 Its most common side effects include dry mouth, dizziness, constipation, and photosensitivity. When combined with serotonin-specific reuptake inhibitors, St John's Wort may trigger a serotonergic syndrome, which is characterized by autonomic dysfunction, hyperthermia, hypertonicity, hallucinations, and perhaps death. Anesthesiologists should be aware that St John's Wort may prolong the effects of anesthetics and may potentiate the effects of sympathomimetic drugs.27

Ephedra. Ephedra is also called ma huang, ephedrine, and Chinese joint fir. Its scientific name is Ephedra sinica. It is used as a stimulant, a diet aid, a bacteriostatic agent, and as an antitussive. This herb has potent alpha- and beta-adrenergic effects and has been related to several deaths, usually resulting from myocardial infarction or stroke. Ephedra also may lead to potentially lethal arrythmias,

Management, University of Texas Southwestern Medical Center at Dallas. seizures, and hallucinations.6 It may enhance the effects of sympathomimetic drugs such as MAOI and guanethidine.6 Ephedra may interact with anesthetic drugs as well as cardiac medications to augment their potential arrhythmogenic effects. Prolonged use of ephedra may cause depletion of catecholamines and, therefore, may result in resistance to indirectly acting vasopressors. It can cause perioperative hypertension, myocardial ischemia, and stroke. Long-term ephedra use may lead to volume depletion, which may cause profound hypotension on induction of general anesthesia.

## Conclusion

There is a common misperception that herbal remedies are "natural," "safe," and without detrimental side effects. In fact, herbal medicines have the potential to cause serious adverse effects and major drug interactions. In the perioperative period, herbal medications can prolong the duration of anesthetic drugs, cause hemodynamic instability (eg, hyper- or hypotension), and increase bleeding. These adverse effects also may influence the type of anesthetic delivered (eg, regional vs general in light of potential anticoagulant properties of some herbs). Because many patients who use herbal medicines do not volunteer this information to their physicians, physicians must determine patients' use of such treatments. Therefore, communication is of paramount importance. Preoperative evaluation should include a thorough history of the patient's medication use, including the use of prescribed or over-the-counter herbal medicines, high-dose vitamins, or nutritional supplements. The American Society of Anesthesiologists recommends that patients stop taking herbal dietary supplements at least 2 weeks before surgery.

Written by KOUROSH REZAI, MD. Resident, Department of Anesthesiology and Pain Management, University of Texas Southwestern Medical Center at Dallas. and GIRISH P. JOSHI, MD. Associate professor, Director of Perioperative Medicine and Ambulatory Anesthesia, Department of Anesthesiology and Pain Herbal Medication Common Uses **Perioperative Implications** Ginkgo biloba Increase blood circulation and Increased bleeding, potentiate anticoagulants, oxygenation, enhance memory, lower seizure threshold improve mental alertness Enhance energy, improve mental Ginseng Hemodynamic instability (hypertension and concentration, antioxidant, hypotension), increased bleeding, hypoglycemia Adaptogen Hypocholesteromic, antioxidant, Garlic Increased bleeding, particularly in patients antihypertensive using anticoagulants Echinacea Boost immune system, treat Hepatotoxicity, inhibition of cytochrome P450 infections, promote wound system, decreased efficacy of healingimmunodepressants Ginger Antiemetic, antispasmodic Increased bleeding in patients taking NSAIDs or anticoagulants St John's Wort Anxiolytic, antidepressant Augmentation of sympathomimetics, serotonergic syndrome Hemodynamic instability (hypertension and Ephedra Stimulant, bacteriostatic, diet aid hypotension), dysrhythmia, myocardial infarction. stroke

TABLE. Commonly used herbal medications and their perioperative implications

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