



Complementary & Alternative Therapies

Acupuncture: Evidence and Implications for Cancer Supportive Care

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Patients with cancer have been an important part of the growing use of complementary and alternative medicine. It is essential for oncology clinicians to be informed about the potential benefits and risks of these therapies and to discuss these issues openly with their patients. According to surveys of complementary and alternative medicine use, among prominent complementary therapies acupuncture had the highest rate of physician referral and enjoyed the most credibility among physicians.¹ There is no evidence that acupuncture can successfully treat cancer; however, it may be complementary in cancer supportive care.

What is Acupuncture?

Acupuncture is a traditional component of healthcare in Asia that has been used for about 2000 years. The word "acupuncture" simply means puncture through skin with a sharp instrument. Clinicians apply fine needles at external points of a patient's body with the aim of maintaining health or improving the natural healing process. The needles can be used by various means. The clinician may twist, lift, and turn the needles through a variety of techniques, or electrical stimulation or local heating with moxibustion can be applied.

Since the 1970s, there has been growing interest in the application of acupuncture to Western medicine. In 1996, the US Food and Drug Administration changed acupuncture needles from the investigational and experimental medical device category to the regular medical device category. In

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1997, a National Institutes of Health consensus statement² on acupuncture supported the treatment efficacy of acupuncture for specific conditions, particularly for control of pain, nausea and vomiting. In 2000, under the auspices of its Board of Science and Education, the British Medical Association issued a policy report³ addressing various issues of acupuncture, including its potential for integration into the national health service.

The effect of acupuncture has been explained by reference to two main systems. The neurophysiologic explanation of acupuncture is based on modern concepts of physiology and neuroanatomy. In this model, the substrate of acupuncture is the nervous system. The mechanical action of needling or its electrical equivalent, electroacupuncture, triggers a chain of events, which can be understood through controlled experiments. For example, needling may cause receptors to send neural impulses to the spinal cord or act on ascending pathways to the brain, causing the release of neurotransmitters that subsequently modulate central functions in the brain. Using this model, the diverse effects from acupuncture treatment could be tested by biomedical experiments and modeled in nervous, endocrine, and immune systems.

The traditional system of acupuncture, also called the meridian system, subscribes to the theoretical belief that energy channels (meridians) link internal organs with the externally located acupuncture points. It is believed that vital energy flows in these channels, that interruptions or imbalances in this flow lead to illness, and that acupuncture seeks to stimulate the appropriate points along the channels to balance the flow of energy. This balanced and free-flowing energy force is believed to be the basis for disease prevention and health maintenance. Most traditional acupuncturists subscribe to the meridian theory in their practice, and there is an international nomenclature for these energy channels (and related acupuncture points) agreed upon by the World Health Organization. However, not all practitioners of acupuncture subscribe to the meridian (and energy) theory.⁴

Neurophysiologic Basis

Are there biologically plausible explanations for how acupuncture works? The neurochemical basis of pain relief

by acupuncture, commonly termed acupuncture analgesia, has been investigated by various independent laboratories and described over the last 3 decades by researchers around the world. Measurable and reproducible effects have been shown through extensive research in laboratory settings. Select references are provided for interested readers.⁵⁻¹² The complex and multiple mechanisms of acupuncture make it difficult to describe a single unifying explanation, even in the well-investigated field of acupuncture analgesia. One hypothesized model suggests that the small nerve bundles receive stimulation, the impulses travel to the spinal cord and brain, and further impulses are generated that result in the inhibition of neurons with ascending painful messages or further modulations of brain functions. Several neurotransmitters (both in the brain and the spinal cord)—including met-enkephalin, dynorphins, β -endorphin, substance P, cholecystokinin, and serotonin—have been shown to play important roles in acupuncture analgesia. While invasive electrophysiologic and histochemical studies have been performed in animal models, recent advancements in neuroimaging techniques have enabled noninvasive studies in humans. These findings also are reported by independent groups of researchers. For example, functional magnetic resonance imaging, using a blood oxygen level-dependent response, has been used to demonstrate brain activation in various regions associated with acupuncture stimulation in human subjects.¹³⁻¹⁵

Current Clinical Evidence

Despite the progress made in the biomedical understanding of acupuncture, research on the clinical efficacy of acupuncture is complicated by the diversity of practices. The current "gold standard" for assessing clinical efficacy is a well-designed randomized, controlled trial. However, there are important difficulties in designing and conducting trials of acupuncture. First is the quality of the acupuncture treatment. Because of the diverse styles and individualized approach to practice, there is a paucity of literature defining what constitutes quality acupuncture. Second is the presence of many potential confounding factors; acupuncture is often used in conjunction with other interventions, and patients who choose this therapy are inclined to use a variety of conventional and unconventional therapies. Third is the controversy over what constitutes a reasonable control group. For example, *sham acupuncture* (a specific type of acupuncture) in the past was regarded as a placebo, but the outcome among patients receiving sham acupuncture was reportedly superior to those receiving no intervention or inert placebo. Fourth is blinding in the course of the trial. Many consider that the effectiveness of acupuncture may be attributed to the patient's expectation and belief; therefore, it is essential to control for the placebo effect. While such expectation and belief may add to treatment effectiveness in actual practice, the assessment of efficacy in a clinical trial should be separated from the placebo effect. In addition, overly enthusiastic clinicians can also bias the outcome in a trial; therefore, a patient's perception of the clinician administering acupuncture and of the quality of the treatment requires assessment.

Because of the difficulties in trial design, the assessment of acupuncture efficacy has been less than conclusive for most conditions. But in the area of nausea and vomiting treatment, supportive evidence has emerged. A positive systematic review,¹⁶ which included more than 30 trials, and a supportive meta-analysis¹⁷ on the use of acupuncture to control nausea and vomiting in the postoperative setting both presented sufficient evidence on the clinical efficacy for this condition. Extending its use to a group of patients with cancer undergoing stem cell transplantation, the effect of electroacupuncture in reducing high-dose chemotherapy-induced emesis also was reported in a randomized controlled trial.¹⁸ The use of acupuncture in the management of pain has been categorized into areas such as muscular-skeletal pain, dental pain, headache, angina, postherpes, fibromyalgia, and dysmenorrhea. There are no well-designed trials to assess the efficacy of acupuncture in cancer pain treatment. Several reviews¹⁹⁻²¹ on non-cancer-related chronic pain have restated the difficulties regarding study design and have not produced conclusive evidence for benefits.

Safety Issues

It has been assumed generally that natural and holistic therapy is safe for patients and poses no risk. This assumption is not always correct. Acupuncture is a relatively safe procedure when practiced by well-trained clinicians and acupuncturists who understand human anatomy. However, several recent reports²²⁻²⁶ suggest that acupuncture is not free of risk and that certain contraindications need to be observed (Table 1).

Acupuncture carries the potential risk of infection, due to the invasiveness of the needles, and has been implicated in the transmission of viral hepatitis. Inadequate sterilization techniques are a serious risk factor. The use of single-use disposable needles has made it possible to substantially diminish the risk of infection with acupuncture. However, potentially lethal infections and other serious adverse

Table 1. Safety Issues and Potential Risks of Acupuncture Use

Contraindications	
Acupuncture in general:	patients on anticoagulants
Electroacupuncture:	patients with a cardiac pacemaker
Prolonged placement of needles:	patients with diabetes or prosthesis
Commonly observed side effects	
Local bruising	
Local pain	
Fainting	
Potentially serious adverse events	
Trauma to internal organs (eg, pneumothorax or cardiac tamponades)	from inaccurate needle placement
Infection*:	viral (eg, hepatitis or HIV), bacterial (eg, endocarditis or sepsis)

*Particularly with unclean needles.

events have been reported in association with acupuncture. More commonly observed side effects include fainting, local bruising, and aggravated local pain (Table 1).

Implications for Cancer Supportive Care

A number of differing views on the value of acupuncture have been expressed by leading organizations worldwide. For example, the US National Institutes of Health consensus statement concluded that there is sufficient evidence of the value of acupuncture to expand its use into conventional medicine and to encourage further studies of its physiology and clinical value. The European Commission in their study of complementary and alternative medicine concluded that the only good evidence available for the effectiveness of acupuncture was for nausea and vomiting, but its effectiveness for other conditions was not convincing. The World Health Organization encourages and supports countries to identify safe and effective remedies and practices for acupuncture use in public and private health services and has produced guidelines on basic training and safety in acupuncture.²⁷

What might be some clinical implications for acupuncture in cancer practice? As outlined in a prior article in *Cancer Practice*²⁸ and based on existing evidence, acupuncture might provide added benefit when used as an adjunct in cancer supportive care. Several areas of patient care that might benefit from this nonpharmacologic adjunct are cancer pain control, management of anticipatory nausea and vomiting, and chemotherapy-induced nausea and vomiting, which are refractory to currently available pharmacologic agents. Other conditions, such as postsurgical nausea and vomiting control, postsurgical pain reduction, anxiety and stress management, also may be considered.

For example, in the area of pain control, a nonpharmacologic adjunct approach such as acupuncture might reduce the dosage required for pain medications, thereby reducing the side effects of pain medications, be they nonsteroidal anti-inflammatory drugs or opioids. In the area of nausea and vomiting control, high-dose, multiple-day, multiple-drug chemotherapy poses substantial challenges. Because of concerns over pharmacokinetic interactions between high-dose chemotherapy agents and some antiemetic medications, some patients receiving intense multiple-agent chemotherapy regimens may not be able to receive certain potent antiemetics concurrently. Also, delayed and prolonged nausea and vomiting are not optimally managed with the currently available antiemetics. In addition, among patients who had previously received multiple courses of chemotherapy, anticipatory nausea associated with chemotherapy also poses a challenge in cancer practice. When a patient's platelet count remains in the normal range and the patient's oncologist deems it appropriate, acupuncture might be an adjunct option in these particularly difficult situations.

Finally, from a researcher's standpoint, the authors believe that future neurophysiologic and neurochemical investigations may help further our understanding of the complexity of pain and nausea. Most importantly, gaining an understanding of the biologic basis for acupuncture may

provide novel insights into neuroendocrine, immunologic, and other physiologic processes. Such insights will broaden our understanding of these disciplines and potentially will lead to improvement in the treatment and care of persons with cancer.

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