Complementary and Alternative Medicine

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Introduction

Complementary and alternative medicine (CAM) generally consists of healthcare practices and products not considered to be conventional medicine. According to The National Cancer Institute, complementary medicine consists of treatments that are used along with standard medical treatments but are not considered to be standard treatments. Alternative medicine consists of treatments that are used in lieu of standard medical treatments. One example of the latter is using a special diet to treat cancer instead of anticancer drugs that are prescribed by an oncologist.

CAM has become an increasingly popular mode of therapy for patients, especially among those who suffer from chronic illness such as malignancy or chronic pain. Often, it's the patient's spiritual, religious, cultural, and other personal beliefs that drive interest in CAM. Despite continued controversy, medical practitioners have become more accepting of treatment regimens that incorporate conventional therapies alongside CAM treatments.

CAM and Pain

While CAM therapies are poorly understood and often dismissed by many clinicians, CAM use is widespread among many patient populations. For example, during the first year of treatment up to 90% of cancer patients integrate CAM into their care plans. Chronic pain, specifically back pain, is the most common reason for complementary and alternative medicine (CAM) use in the United States, and patients with back pain have more office visits to CAM practitioners than to primary care physicians. Little is known about the pattern of CAM use, the reasons for its usage, and the perceived benefit of CAM nationally among patients with back pain.

CAM Therapies and Evidence

There are several categories of therapies sought by patients that fall under the CAM designation. These include alternative medical systems (i.e., traditional Chinese medicine, homeopathy, mind–body interventions, etc.), biologically based therapies (i.e., herbs, foods, vitamins, etc.), and manipulative methods (e.g., osteopathy), to name a few.

Acupuncture

The practice of acupuncture originated in China approximately 2000 years ago. Since then, it has grown to include a wide variety of techniques and practices. The cornerstone of acupuncture practice is to stimulate discreet anatomical points with not just needles, but also pressure (including negative pressure "cupping"), heat, lasers, ultrasonic waves, and electrical stimulation. The purported goal is to harmonize an imbalance in an internal life force energy known as Qi (pronounced "Chee") [1]. Qi energy flows through the body along channels known as meridians which consist of 14 major foci [2]. These are representative of 6 yin and 6 yang organs that organize bilaterally in addition to two more midline meridians, one anterior (conception) and the other posterior (governing). These 14 channels are associated with organs though their location is not related to the anatomic location of said organ (Fig. 26.1).

Along these meridians there are hundreds of points (traditionally 361) where needle insertion can regulate the flow of Qi, thereby treating a designated ailment. Each acupoint is

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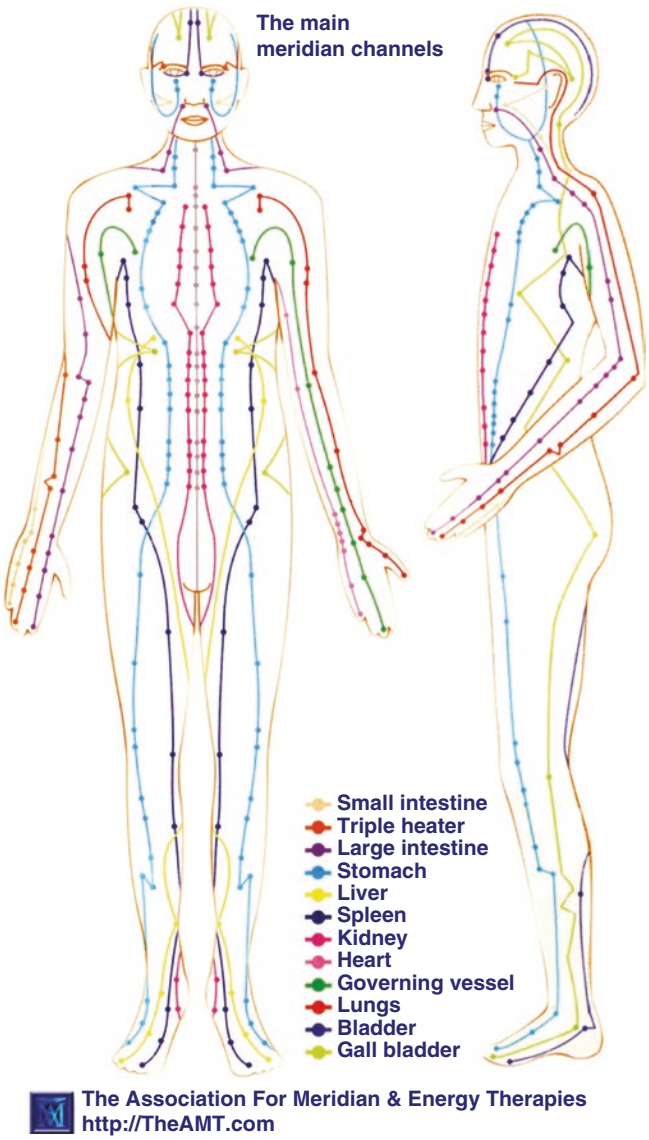

Fig. 26.1 The main meridians

designated via its organ designated meridian and an identifying number (i.e., "Liver 43," "Heart 17," etc.).

Since its inception, many more meridians and thousands more acupoints have been added to the practice of acupuncture [3].

Acupuncture has been studied extensively since the 1970s. Since then, thousands of studies have yet to demonstrate definitive conclusions regarding the efficacy of this therapy. There have been almost 500 randomized controlled trials (RCTs), about half of these having a placebo control. Studies with positive results have been for the treatment of nausea and vomiting, dental pain, and fibromyalgia. Meanwhile, studies involving conditions such as lower back pain, general back pain, chronic pain, osteoarthritis, and headache have yielded contradictory and inconclusive results [4]. Despite decades of research, the fact that definitive evidence regarding the efficacy of acupuncture for a variety of indications remains elusive is in no small part due to the nature of acupuncture practice itself. Difficulties in ascertaining objective outcomes of acupuncture include projection by practitioners of positive treatment outcomes (leading to bias), a significant placebo effect, and heterogeneity of acupuncture practice among practitioners [5].

Despite these limitations, surveys show that acupuncture has the strongest credibility in the medical community of all the complementary medical therapies. Members of the medical community are encouraged by basic science research that supports physiologic mechanisms of therapeutic action.

Many mechanistic theories behind acupuncture have been proposed, including the mediation of inflammatory factors, afferent modulatory neural pathways, endogenous opioid pathways, antinociceptive networks, and higher level cortical modulation of pain perception.

Studies in the 1980s suggested that acupuncture stimulated small diameter nerves that led to spinal cord, brainstem, and hypothalamic triggering of endogenous opioid pathways that led to changes in concentration of these opioids and stress hormones in plasma or CSF [6]. It has been shown that naloxone, a mu receptor antagonist, can reverse acupuncture-mediated analgesia in a dose-dependent manner [7].

Acupuncture has many documented adverse effects. Needle use in acupuncture can result in disease transmission, foreign body entrapment, infection, hematoma, nerve injury, pneumothorax, pneumoperitoneum, and viscus perforation. Acupuncture can also be associated with pain and paresthesia development at the site [8]. Despite the wide range of possible side effects, their rare occurrence makes acupuncture an overwhelmingly safe modality.

Herbal Remedies

Herbal therapies are often sought by patients with chronic pain, particularly back pain, arthritis, headache, and abdominal pain. Many widely used "conventional drugs" today trace their origin to botanical (herbal) usage that predated their chemical isolation. Opium was used in ancient Mediterranean civilizations thousands of years before the isolation of morphine in 1804, and willow and other salicin-rich plants were also used thousands of years before the first NSAIDs were developed in the late nineteenth century. However, unlike the eliminative process of chemical isolation that leads to conventional drug development, the intake of botanical remedies containing various ingredients leads to the activation of an array of pharmacological pathways, thereby compounding the difficulty in studying these therapies. In 2014, a systematic review of randomized trials of herbal therapies in lower back pain found that compared to placebo, topical *Capsicum frutescens* (cayenne) had the

Table 26.1 Examples of botanical/herbal treatment of pain

Herbal remedy	Review/ article	Route	Control arm	Efficacy evidence
Capsicum frutescens (*Cayenne*)	[9]	Topical	Placebo or plaster, homeopathic gel	Strongly positive
Harpagophytum procumbens (*Devil's claw*)	[9]	Oral	Placebo or rofecoxib	Supportive evidence
Salix alba (*White willow bark*)	[9]	Oral	Placebo or rofecoxib	Supportive evidence
Symphytum officinale (*Comfrey root extract*)	[9]	Topical	Placebo or plaster, homeopathic gel	Supportive evidence
Lavender essential oil	[9]	Topical	No treatment	Supportive evidence
Boswellia serrata (*Indian frankincense*)	[10–13]			Equivocal, some studies support OA use

strongest evidence for effectiveness. Other therapies such as oral devil's claw and white willow bark along with topical comfrey root extract and lavender essential oil had some supportive evidence (Table 26.1) [9]. Risks of herbal therapies include lack of stringent monitoring during manufacturing, absence of dose standardization in many preparations, and unforeseen interactions with other supplements or pharmaceuticals.

With regard to pain management, curcumin, commonly known as turmeric, is widely believed to hold anti-inflammatory properties and has been shown to exhibit antioxidant properties [17]. Employed as a supplement, it has been utilized in pain control for various osteoarthritic and other inflammatory disorders of the musculoskeletal system, and for inflammatory bowel disease. Overall quality of evidence is poor, but remains suggestive of a benefit for pain control in these conditions [18]. Common side effects of use include gastrointestinal upset, increased risk of bleeding, increased liver function tests, hypotension, and uterine contraction in pregnancy. Toxicity, and efficacy, is limited due to its poor bioavailability and absorption [19].

St. John's wort, or *hypericum perforatum*, is another commonly used supplement in various pain states and related diseases, specifically mild-to-moderate depression, musculoskeletal pain, dermatologic conditions and gastrointestinal upset. Evidence is limited for these indications. Neuropathic pain states are being considered as potential targets from animal studies [20] and neuraxial-related painful conditions [21]. Reported side effects include gastrointestinal upset, headaches, sensitivity to sunlight, fatigue, dizziness, and sexual dysfunction. Concerning its metabolism, patients should be counseled on its use due to its significant induction of the hepatic P450 system, specifically the CYP3A4 system [22]. Therefore patients maintained on digoxin, warfarin, some oral contraceptives, some HIV inhibitors, immunosuppressants and selective serotonin reuptake inhibitors (SSRIs) must be educated on the potential for reduced efficacy of the medication, or the increased risk of serotonin syndrome with the use of SSRIs [23].

Saw palmetto, also plant derived, has been popularized in benefitting symptoms of benign prostatic hypertrophy and in androgenic alopecia (male and female pattern baldness). Side effects are typically mild and include dizziness, nausea, and headache. Currently the NIH does not support its use for any medical condition based on high quality evidence [24]. Because it may decrease the effects of estrogen in the body, it may reduce the effects of estrogen-containing oral contraceptives. Saw palmetto has also been implicated in increased postoperative bleeding, as a solitary supplement, and with concomitant use of anticoagulation agents [25].

With the advent of increased use of herbal supplements, the interventional pain physician must take appropriate precaution when performing neuraxial procedures. Particularly, increased supplemental use of garlic, ginseng, and gingko biloba has been implicated in higher risk of increased bleeding due to inhibition of platelet aggregation and increased prothrombin time [26]. Garlic, in supplemental doses, may inhibit platelet aggregation irreversibly, and caution is advised with other antiplatelet agents, with up to 7 days before normal platelet function resumes [26]. Ginseng and gingko biloba do not appear to increase surgical or neuraxial bleeding independently, but may pose a possible increased risk when taken in conjunction with other antiplatelet agents, with 36 and 24 hours, respectively, required before return of normal platelet function after discontinuation [26].

Mind–Body and Chronic Pain

Mindfulness meditation is a technique based on ancient Eastern meditation and spiritual practices during which one pays attention to the present moment with openness, curiosity, and acceptance. These techniques have use in managing substance abuse, tobacco cessation, stress reduction, and treatment of chronic pain [14]. The most commonly used mindfulness-based intervention is mindfulness-based stress reduction (MBSR). Key components of the program are sitting meditation, walking meditation, yoga, and a mindfulness practice in which attention is focused on different parts of the body [15].

Spinal Manipulation and Osteopathy

Osteopathic medicine is one of the registered professions legally allowed to practice spinal manipulative therapy (SMT). Spinal manipulative therapy (manual therapy) combines moving joints, massage, exercise, and physical therapy. It is designed to relieve pressure on joints, reduce inflammation, and improve nerve function. In spinal *manipulation*, the practitioner rapidly applies a controlled force, while in spinal *mobilization*, a practitioner uses less force and more stretching. There is a lack of quality clinical trials testing osteopathic/manipulative intervention in adult patients with chronic low back pain, and more data is required. A Cochrane review of SMT in low back pain concluded that despite over 800 publications addressing this issue, evidence for the effect on low back pain is equivocal [16]. Certain types of manipulation of the cervical spine may carry a risk of stroke. Further clinical trials into this subject are required in order to validate the long-term benefit of spinal manipulation for chronic low back pain.

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