

Use of Alternative Medical Therapies in the Perioperative Period: Is It Time to Get on Board?

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Acustimulation has been shown to produce sedation and to reduce preoperative anxiety levels and postoperative pain, nausea and vomiting in a variety of clinical settings. For example, Kober et al. (1) found auricular acupressure to be effective in reducing anxiety in patients being transported to the hospital. In elderly patients with hip fractures, this technique was recently reported to reduce both anxiety and pain during emergency transportation (2). Wang et al. reported that auricular acupressure decreased maternal anxiety during induction of anesthesia in their children (3), and also reduced preoperative anxiety in adult patients undergoing ambulatory surgery (4). In this issue of *Anesthesia & Analgesia*, Karst et al. (5) compared the anxiolytic effects of auricular acupressure to a well-known pharmacologic anxiolytic drug (midazolam) in patients undergoing dental procedures. Although the authors' decision to use the intranasal route for administering midazolam is a valid criticism of this study, the investigation is still a useful addition to the literature because the authors compared this nontraditional approach to reducing preoperative anxiety with a well-known anxiolytic drug. Clearly, there is a need for additional studies comparing this acustimulation technique to a more widely used premedication technique (e.g., midazolam 20 $\mu\text{g}/\text{kg}$ IV). The major challenge in performing these much needed comparative studies is the difficulty in avoiding bias due to inadequate "blinding" of the investigators and the patients (6,7).

The study by Fassoulaki et al. (8) illustrates some of the difficulties in conducting clinical investigations into the possible mechanism(s) of acupressure's sedative and anxiolytic effects. These investigators previously reported that acupressure reduces the bispectral index (BIS) value and the "verbal stress score" in volunteers (9). In their recent investigation (8), these researchers examined the relationship between acupressure stimulation, stress levels, BIS values, and blood concentrations of melatonin and β -endorphin. The authors minimized the placebo effect by including both a "no treatment" (control) and a "sham acupoint" group. This cross-over study confirmed that acupressure reduced the volunteers' stress level and BIS values; however, sedation and stress levels failed to correlate with changes in melatonin and β -endorphin blood concentrations. The authors' inability to detect a change in their primary end points suggests that the clinical effects of acupuncture are unrelated to changes in these surrogate end points (i.e., hormone levels). Alternatively, the study may simply be inadequately powered (i.e., the group sizes were too small) to detect meaningful changes in these variables.

A variety of acustimulation techniques have been used to control emetic symptoms in the postoperative period, including acupressure, acupuncture, and transcutaneous electrical stimulation (10). Acustimulation appears to be comparable to the popular 5-HT₃ antagonist, ondansetron, in the prevention of PONV when used as part of a multimodal antiemetic regimen (11,12). However, the efficacy of this technique varies markedly depending on the clinical setting (e.g., surgical population (13,14), timing of its administration (15,16)). Interestingly, the study by Gan et al. (12)

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suggested that electro-acupoint stimulation possessed both antiemetic and analgesic activity. Given the importance of multimodal antiemetic and analgesic therapies in controlling PONV (17), and the lack of clinical toxicity associated with acustimulation techniques, it would appear that acustimulation techniques have very high therapeutic indices when used in the management of pain and emesis. Therefore, it is appropriate to ask what evidentiary standard these acustimulation techniques should be expected to achieve before practitioners begin to incorporate them into our therapeutic armamentarium.

In reviewing the peer-reviewed literature, it is apparent that there is growing body of scientific evidence supporting the efficacy of acupuncture and its many variants (e.g., percutaneous neuromodulation therapy, transcutaneous electrical nerve stimulation, percutaneous electrical nerve stimulation) in providing pain relief in patients with acute and chronic pain syndromes (18–21). One barrier to the expanded use of acustimulation techniques in the management of pain is our lack of understanding of the mechanisms of their analgesic action (22). The study by Tsuchiya et al. (23) provides evidence that acupuncture enhances the generation of nitric oxide (NO), which serves an important regulatory function in controlling local blood flow. These authors demonstrated that acupuncture increased the plasma levels of NO, and that increases in plasma NO concentrations correlate with the increase in blood flow to the extremity receiving the acupuncture stimulation. Unfortunately, this study in volunteers failed to evaluate whether the changes in NO levels and blood flow were correlated with changes in the intensity (or perception) of an experimental pain stimulus.

The study by Tsuchiya et al. (23) suggests that NO-mediated changes in the local circulation may be more important in acupuncture-induced analgesia than previously recognized, and Schlunzen et al. (24) also report that manual acupuncture stimulation results in a significant decrease in cerebral blood flow to the contralateral putamen region of the brain. These findings are consistent with previous studies involving functional magnetic resonance imaging and positron emission tomography (25,26). Of interest, the more recent positron emission tomography study (24) found a substantial overlap in the brain regions correlating with the “placebo response” and the “expectation of pain relief,” and the areas of the brain correlating with acupuncture-induced analgesia, indirectly suggesting that the placebo response is an important contributing factor to acupuncture-induced analgesia in humans.

Magnetic therapy is another alternative therapy which has been espoused to have efficacy in a wide variety of clinical situations. In 1972, Reid (27) suggested that a simple bipolar magnet could provide pain relief from nocturnal muscle cramping. However, in 1977, Harper and Wright (28) performed a placebo-controlled,

cross-over study evaluating magnet therapy in volunteers where their pain threshold was assessed using a radiant heat apparatus. These investigators found no difference in pain thresholds when volunteers wore a magnetic bracelet or an identical-appearing sham device. Cepeda et al. (29) evaluated the effect of ordinary bipolar static magnets (e.g., Magna Bloc) or a similar-appearing sham device when placed at the perimeter of the surgical incision for 2 h after surgery. Analogous to the earlier study in volunteers (28), this study also failed to demonstrate any significant analgesic or opioid-sparing effect in the patients receiving the “active” treatment. Although magnets have been advocated to the public for medical conditions ranging from musculoskeletal and arthritic pain to headaches and even pulmonary diseases (e.g., asthma, chronic obstructive pulmonary disease), there is no rigorous scientific evidence supporting their clinical efficacy, as discussed in the accompanying editorial by Flamm (30). Given the relatively weak magnetic fields induced by small commercially available static magnets, it is difficult to imagine that the magnetic fields can penetrate the dermal tissues to a sufficient depth to stimulate the small nerve endings responsible for transmitting pain signals from the periphery to the brain. Although the study by Cepeda et al. (29) consisted of relatively large group sizes, the failure to include a “positive” control (e.g., local analgesia) is a deficiency in their study design. Another valid criticism of this study is that the exposure time (2 h) was extremely limited, and therefore, it would be very difficult to demonstrate a significant reduction in the opioid analgesic requirement after surgery.

The preliminary studies (5,8,23,24,29) published in the current issue of *Anesthesia & Analgesia* suggest that a wide variety of nonpharmacologic acustimulation techniques can produce subjective and physiologic changes in humans, as well as alterations in their central and peripheral nervous system function. A major problem relates to how we balance the demonstrations of clinical efficacy with our general lack of understanding as to how these effects are produced. A more important clinical question relates to whether we should use an alternative therapy that has been repeatedly shown to work, even though we do not understand the mechanism of action. Additional well-controlled clinical studies evaluating the use of these nontraditional therapies in the context of everyday clinical practice are clearly needed.

Despite the lack of any rigorous scientific evidence supporting their usefulness in the perioperative period, an increasing number of patients are self-administering herbal medications before and after surgery. A recent study by Lee et al. (31) reported that there was a significant association between the preoperative use of traditional Chinese herbal medicines and the occurrence of intra- and postoperative complications (e.g., bleeding complications due to antiplatelet effects). Nevertheless, it should be pointed out

that some nontraditional herbal therapies (e.g., capsicum plaster applied at Chinese acupoints) have been found to be extremely useful for minimizing postoperative side effects such as emesis (32,33) and pain (21). Similarly, recent studies have suggested that perioperative imagery, massage, and/or music may reduce pain and anxiety after both nasal (34) and cardiac surgery (35,36). In contrast, Gavin et al. (37) concluded that use of relaxation training was ineffective in reducing postoperative pain and the need for opioid analgesics after spine surgery. Nevertheless, Montgomery et al. (38) concluded that hypnosis improves surgical outcomes based on a meta-analysis of a limited number of clinical studies that used highly variable techniques. In a recent commentary in a major surgical journal (39), it was suggested that it is time to consider incorporating complementary and alternative medical practices into conventional medical treatments to provide "the most holistic and effective management of the (surgical) patient." As suggested in the accompanying editorial by the Editor-in-Chief (40), seemingly extraordinary claims are being subjected to more rigorous clinical testing and over time may make the extraordinary ordinary!

It is the Journal's hope that the growing interest in "alternative" medical practices will lead to clinically important outcome studies evaluating the role of these nontraditional techniques as part of a multimodal approach to reducing anxiety, pain, and emetic symptoms in the perioperative period. In performing studies involving alternative therapies (e.g., acustimulation), clinical researchers need to focus more attention on clinically important outcome variables (e.g., resumption of normal activities of daily living) when these nontraditional approaches are administered as part of a multimodal approach to reducing side effects in the perioperative period and improving the quality of recovery for our future surgical patients.

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