

Acupuncture for Bone Cancer Pain

Narda G. Robinson, DO, DVM, MS, FAAMA

Recently published evidence regarding the mechanisms of how acupuncture treats bone cancer pain underscores the imperative of practicing acupuncture from a scientific, rather than the unfortunately more common, belief-based, perspective. That is, the philosophical dichotomy between those who believe that acupuncture point stimulation moves invisible energy (qi) through invisible pathways on the body (meridians), and those who recognize the neuroscientific basis of acupuncture may have tremendous impact on the health and well-being of veterinary cancer patients.

Promoters of acupuncture as an energy medicine have promulgated two diametrically opposed ideas among their followers. The first concept promises to cure most cancer by carefully selecting a single acupuncture point chosen according to tumor location, pulse diagnosis, or the practitioner's intuition. This technique, described in the originator's website along with reported cases, supposedly leads to "total disappearance or significant regression" of cancer in 80% of patients.^{1 2 3} The second idea cautions against treating oncology patients with acupuncture altogether, lest the energy stimulated by the needle either feeds tumors to make them grow or leads to metastasis by increasing local circulation.^{4 5 6 7} Neither has a rational scientific mechanism nor has been submitted to experimental scrutiny. This leaves energy-based acupuncturists facing an uncomfortable conundrum; they find themselves immobilized, not knowing whether they will cure or cause cancer, like Buridan's ass, wherein a donkey placed equidistant from two equivalent stacks of hay starves to death by his inability to choose between two equally compelling options.⁸ Unfortunately, it is the opportunity to engender effective and meaningful relief for cancer patients that will most likely perish in this instance. That is, those seeking to cure cancer with acupuncture may delay effective interventions that actually work, while those fearing that they may worsen cancer deny patients a potentially effective method of palliating pain and improving quality of life.

Rigorous scientific research has shown that acupuncture can both safely and effectively reduce physical and psychological problems related to cancer and its treatment, providing a favorable risk-benefit ratio.⁹ Even more intriguing is the new evidence showing *how* acupuncture works to relieve cancer pain. Specifically, two recent studies have elucidated at least two pathways by which acupuncture attenuates bone cancer pain, as described below.

While an energy-based view of cancer pain describes it as "one or several evils attacking an organ or meridian, leading to sluggish flows of qi (vital energy) or blood"¹⁰, the scientific analysis weighs in with far more complexity. The pathophysiology of bone cancer pain involves central sensitization and stems also from tumor-derived products sensitizing primary afferent neurons.¹¹ Tumor-derived factors, many of which sensitize or aggravate primary afferent neurons, include prostaglandins, tumor necrosis factor-alpha, endothelins, interleukins, transforming growth factor-beta, platelet-derived growth factor, and epidermal growth factor.¹² Tumor cells and associated macrophages express high levels of cyclooxygenase-2, the

enzyme that synthesizes prostaglandins. Furthermore, the tumor stroma, the ischemic areas surrounding necrotic tissue, and tissues afflicted by inflammatory cells all become relatively acidotic, which sensitizes and excites acid-sensing ion channels on nociceptors.¹³ Finally, as tumors grow, their leading edge injures and destroys sensory fibers in the bone marrow and bone itself, invoking neuropathic pain.

In addition to prescribing opioids for general pain control, other pharmacologic measures can be targeted directly against tumor-derived products and inflammatory cells, the bone remodeling process, and nerve injury.¹⁴ However, most of these can produce complications or untoward effects, including constipation, bone marrow suppression, oversedation, and nephrotoxicity.

Scientific acupuncture treatments designed to reduce the hyperexcitability of the central nervous system and offset pain generated by inflammatory mediators offer analgesic benefits with few to no side effects. One study involving a rat model for bone cancer pain showed that electroacupuncture over the sciatic nerve (at acupuncture point GB 30 (Huantiao)) significantly attenuated cancer-related hyperalgesia and also significantly suppressed the expression of interleukin-1beta (IL-1 β). This endogenous protein cytokine, IL-1 β , facilitates bone cancer hyperalgesia and participates in the spinal transmission and processing of noxious inputs from cancerous regions.¹⁵ Suppressing its production therefore reduces pain. A follow-up study, published this year in the *European Journal of Pain*, suggests another mechanism by which electroacupuncture reduces bone cancer pain. By counteracting spinal dynorphin expression in the spinal cord, electroacupuncture to GB 30 similarly increased paw withdrawal latency and paw withdrawal pressure threshold in the same rat model of bone cancer pain.¹⁶

An important feature of both these studies surrounded their neuroanatomic focus, involving nerve stimulation via acupuncture for the neural structure (i.e., the sciatic nerve) supplying the tumor cell inoculation (i.e., the tibia). Neither belief systems, nor metaphors, nor magical thinking, were required.

¹ Thoresen A. Acupuncture and cancer therapy. Obtained at <http://home.online.no/~arethore/engelsk/foredrag/kreft.html> on 05-26-08.

² Thoresen A. Small animal cancer. Obtained at <http://med-vetacupuncture.org/english/articles/an-canc.html> on 05-26-08.

³ Kaphle K, Wu Y-L, and Lin JH. Thirtieth Annual Congress on Veterinary Acupuncture: IVAS Report. *eCAM*. 2005;2(2):239-242.

⁴ Chi Institute of Chinese Medicine. *TCVM News*. Issue 4. September 3, 2004. P. 6.

⁵ Flaim D. Worth their weight in gold. *Animal House*. July 16, 2002. Obtained at <http://64.233.167.104/search?q=cache:jWqyEXHYOYJ:www.newsday.com/entertainment/nyc-pets-implants.0,918948.column+gold+beads+cancer+durkes&hl=en&ct=clnk&cd=2&gl=us> on 05-26-08.

⁶ Dvorak RF. Permanent acupuncture with gold bead implants. Obtained at <http://www.himmlich.com/goldbeads.htm> on 05-26-08.

⁷ Repeated personal experience and personal communication with other veterinary acupuncturists, 1997-2008.

⁸ Buridan's ass. Defined at <http://www.encyclopedia.com/doc/1O87-Buridansass.html>.

⁹ Wesa K, Gubili J, and Cassileth B. Integrative oncology: complementary therapies for cancer survivors. *Hematol Oncol Clin North Am*. 2008;22(2):343-353, viii.

¹⁰ TCM Local Applications for Cancer Pain Management. Obtained at http://www.shen-nong.com/eng/exam/specialties_cancer2pain.html on 05-27-08.

¹¹ Sabino MAC and Mantyh PW. Pathophysiology of bone cancer pain. *Supportive Oncology*. 2005;3(1):15-24.

¹² Sabino MAC and Mantyh PW. Pathophysiology of bone cancer pain. *Supportive Oncology*. 2005;3(1):15-24.

¹³ Sabino MAC and Mantyh PW. Pathophysiology of bone cancer pain. *Supportive Oncology*. 2005;3(1):15-24.

¹⁴ Sabino MAC and Mantyh PW. Pathophysiology of bone cancer pain. *Supportive Oncology*. 2005;3(1):15-24.

¹⁵ Zhang R-X, Li A, Liu B, et al. Electroacupuncture attenuates bone cancer pain and inhibits spinal interleukin-1 β expression in a rat model. *Anesth Analg*. 2007;105:1482-1488.

¹⁶ Zhang R-X, Li A, Liu B, et al. Electroacupuncture attenuates bone cancer-induced hyperalgesia and inhibits spinal preprodynorphin expression in a rat model. *European Journal of Pain*. 2008. In press.