

The Stress and Cancer Conundrum: Is There a Lesson for Acupuncture?

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I ACCEPTED THIS INVITATION to submit a Commentary on Stress and Cancer in this Special Issue of *Medical Acupuncture* with some ambivalence, because the topic did not seem to be relevant to acupuncture, and I wanted to contribute something that would be meaningful. My interest in this subject was kindled in 1997, when Hans Selye, MD, PhD, invited me to present a paper for a symposium on “Cancer, Stress and Death,” cosponsored by his International Institute of Stress and the Sloan–Kettering Institute. Selye and I had developed a close personal and professional friendship since my Fellowship at his Institute in 1951, when we coauthored book chapters about his novel concepts.^{1,2}

Over the intervening years, Selye had invited me to prepare updated reviews, we corresponded frequently, coauthored more chapters,^{3,4} and tried to meet when mutually convenient. He had come to New York in connection with the symposium, and, during dinner, indicated that he had a very personal interest in cancer and stress. Five years previously, a tumor in his thigh had been diagnosed as a histiocytic reticulosarcoma, a normally fatal malignancy, from which he apparently recovered completely. He had refused chemotherapy and radiation, and attributed his good fortune to a fierce determination to continue living so that he could complete his important research on the health effect of stress with respect to cancer.

Based on anecdotal reports of similar experiences and spontaneous remissions, Selye was convinced that a firm faith and upbeat attitude could retard or reverse cancer growth. Conversely, he wondered whether stress might contribute to the development of certain malignancies or accelerate their growth and metastases. He recalled that I had previously suggested that cancer might represent another one of his “diseases of adaptation” and asked if I would present a paper to support this possibility. It was difficult for me to refuse anything that Selye requested, but I politely pointed out a variety of potential pitfalls in attempting to prove such a link. In addition, I had been

completely involved in clinical practice for the past 25 years, and I no longer had the time, training, or resources to address this subject adequately.

PURPOSEFUL REGENERATION VERSUS CANCER AND THE ENDEMIOLGY OF DISEASE

I assumed that the matter was closed, but soon received a large parcel filled with an assortment of articles dealing with various pertinent animal experiments and clinical reports. Selye had penciled in comments on many of the reprints to support his position, as well as questions designed to pique my curiosity.

I did the best I could and my chapter, “Stress and Cancer: A Disease of Adaptation?,” was published in the Sloan–Kettering Cancer Series in 1979.⁵ Selye was unusually enthusiastic about this and emphasized it in his Foreword as follows: “Perhaps, as Paul Rosch of New York has suggested, cancer might even be an attempt by the human organism to regenerate tissues and organs and even limbs, as lower animals are able to do spontaneously.”⁶ For example, when methylcholanthrene is injected into a rat or human, a malignant sarcoma similar to Selye’s develops at the site—a tumor that often metastasizes to the lungs and elsewhere. However, if the cancer is injected into the limb of a newt, a new limb starts to grow, and, when injected into the epithelial iris tissue of the newt’s eye, the newt will regenerate a new lens. Thus, the identical carcinogenic stimulus could produce either purposeful regeneration or a malignant growth, depending upon the evolutionary development of the organism.

The book generated a great deal of interest, and I received a surprising number of favorable as well as critical comments. When asked to expand on this hypothesis for the 1986 second edition of the book, I contributed an updated

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chapter entitled “Some Thoughts on the Endemiology of Cancer.”⁷ Western researchers studying the origins of disease tended to focus on epidemiology, which is derived from Greek *epi*, meaning “upon,” *demos* or “people,” and *logos*, meaning the “study of” or “discourse on.” Thus, infections and cancer were diseases thought to be caused by factors in the external environment. I used *endemiology* to refer to disorders that were generated within the body, not only from genetic influences, but also from impaired immune-system defenses resulting from depression and other emotions that could influence malignant growth.

CANCER CAUSED BY EMOTIONS, PERSONALITY TRAITS, AND THE STRESS OF CIVILIZATION

I had an embarrassment of riches to choose from to support the belief that emotional stress could cause cancer. Two thousand years ago, in *De Tumoribus*, his treatise on tumors, Galen observed that melancholy women were particularly prone to cancer of the reproductive organs because of an excess of black bile (Greek *mēlas chole*). In 1701, Gendron, emphasized the effect of “disasters of life as occasion much trouble and grief” in the causation of cancer.⁸ Eighty years later, Burrows attributed the disease to “the uneasy passions of the mind, with which the patient is strongly affected for a long time.”⁹ Nunn was impressed with the influence of emotional factors on breast tumors,¹⁰ and Rigoni-Stern similarly noted that cancer of the cervix in women was more common in sensitive and frustrated individuals.¹¹ In the mid-1800s, Walshe’s *The Nature and Treatment of Cancer* called attention to “the influence of mental misery, sudden reverses of fortune and habitual gloomings of the temper on the disposition of carcinomatous matter. If systematic writers can be credited, these constitute the most powerful cause of disease.”¹²

Toward the end of the nineteenth century, in a study of >250 patients at the London Cancer Hospital, Snow concluded that “the loss of a near relative” was an important factor in the development of cancer of the breast and uterus.¹³ Numerous additional citations attested to the firm belief of eighteenth-, nineteenth-, and twentieth-century physicians that stressful states and emotions predisposed patients to cancer.^{14–16}

I attached particular importance to these observations because the practice of medicine was quite different than today, especially with respect to patient encounters, which were much more personalized. Physicians had to rely more upon eliciting and appraising the significance of each patient’s history, environment, emotional makeup, and lifestyle, in contrast to contemporary diagnostic workups, which emphasize sophisticated laboratory tests and imaging procedures. These physicians’ education was much more apt to include a strong background in literature, philosophy, history, and other

branches of learning concerned with human thought and relations, rather than the prevailing preoccupation with a basic science curriculum. A physician undoubtedly spent much more time observing a patient’s personality, and talking to that patient about intimate family, social, and work relationships; and other potentially pertinent psychosocial influences. Thus, by virtue of educational enlightenment, cultural orientation, and a more personalized approach, these physicians might well be expected to have had a greater sensitivity to any subtle relationships between stress and cancer than is possible in the frenetic pace of today’s “high tech”—and often apathetic—medical practice environment.

More recent researchers have proposed various “Type C” cancer-prone behaviors characterized by an inability to express anger or resentment,¹⁷ feelings of hopelessness, helplessness and self-dislike,^{18–20} and a pessimistic attitude, given that “happy people rarely get cancer.”²¹ A more comprehensive description of personality characteristics that increased susceptibility to cancer included these attributes, but emphasized lack of emotional support and the recent loss of a loved one as important influences.²² I summarized these developments in subsequent book chapters^{23,24} and, in the latter one, was able to cite more than 250 supportive references. One author claimed that stress-reduction strategies were effective for reducing malignancies by 40%–50% in individuals who had been assessed as being cancer-prone.²⁵

A particularly common theme was that cancer was a disease of civilization. As Donnison pointed out in *Civilization and Disease*, people in simple and stable societies rarely suffer from cancer, hypertension, diabetes, or peptic ulcers, but this protection disappears rapidly when established norms and traditions are swept aside by the pressures of civilization.²⁶ The medical missionary in Africa and Nobel Laureate, Albert Schweitzer, PhD, MD, wrote:

On my arrival in Gabon in 1913, I was astonished to encounter no cases of cancer. I cannot, of course, say positively that there was no cancer at all; but like other frontier doctors, I can only say that if any cases existed, they must have been quite rare. In the course of the years, we have seen cases of cancer in growing numbers in our region. My observations incline me to attribute this to the fact that the natives are living more and more after the manner of the whites.²⁷

Similarly, the celebrated anthropologist and Arctic explorer, Vilhjalmur Stefansson, in his book—which was actually entitled, *Cancer: Disease of Civilization?*—noted the absence of cancer in the the people native to the Arctic, but a subsequent increase in the incidence of the disease as closer contact with white civilization was established.²⁸

A strong link between civilization and cancer was proposed more than 170 years ago in Tanchou’s 1843 *Memoir on the Frequency of Cancer*—which was delivered to the French Academy of Sciences by LeConte—according to the following description:

M. Tanchou is of the opinion that cancer, like insanity, increases in a direct ratio to the civilization of the country and of the people. And it is certainly a remarkable circumstance, doubtless in no small degree flattering to the vanity of the French savant, that the average mortality rate from cancer in Paris is about 0.80 per 1000 living annually, while it is only 0.20 in London! Estimating the intensity of civilization by these data, it clearly follows that Paris is four time more civilized than London!²⁹

In *The Cancer Problem*, Bainbridge also wrote:

Man in his primeval condition has been thought to be very little subject to new growth, particularly to those of a malignant character. With [a] changed environment, it is claimed by some, there came an increase in susceptibility to cancerous disease, this susceptibility becoming more marked as civilization develops.³⁰

Hoffmann's *Mortality from Cancer Throughout the World*, emphasized that "[t]he rarity of cancer among native races (primitive races) suggests that the disease is primarily induced by the conditions and methods of living which typify our modern civilization."³¹

In an article entitled "Cancer: A Disease of Either Election or Ignorance," Hay noted:

A study of the distribution of cancer, among the races of the entire earth, shows a cancer ratio in about proportion to which civilization living predominates; so evidently something inherent in the habits of civilization is responsible for the difference of cancer incidence compared with the uncivilized races and tribes. Climate has nothing to do with this difference, as witness the fact that tribes living naturally will show a complete absence until mixture with more civilization, even so does cancer begin to show its head.³²

In *Malignancy and Evolution*, Roberts wrote: "I take the view commonly held that, whatever its origin, cancer is very largely a disease of civilization."³³ He was referring to opinions such as those expressed in Moore's *The Antecedents of Cancer*, that linked the steady increase of cancer with the "progress of civilization"³⁴ and Powell's contention that "[t]here can be little doubt that the various influences grouped under the title of civilization play a part in producing a tendency to Cancer."³⁵ One of the most persuasive arguments is presented in Alexander Berglas, MD's *Cancer: Its Nature, Cause and Cure*, which proposed that we are threatened with death from cancer because of our inability to adapt to present-day living conditions. Berglas stated: "I have come to the conclusion that cancer may perhaps be just another intelligible natural process whose cause is to be found in our environment and mode of life."³⁶

HOW THE CANCER AND STRESS CONUNDRUM APPLIES TO ACUPUNCTURE

My Commentary would normally have ended here, given that it synopsized my prior efforts to explain how stress

might cause cancer. However, I recognized that most of this was based on anecdotal reports, speculations, and theories, none of which provided any proof of this. In addition, it was a biased view, because, during my review of the literature, I retrieved but did not cite articles demonstrating that stress did not cause cancer and a few claiming it could have beneficial effects. There were many more articles concluding there was no proof that stress had any positive or negative impact, and I recalled my conversation with Selye decades earlier in which I voiced a similar opinion. Some of my reasons included the inability to define—much less measure—stress, the need to distinguish between acute and chronic stress, the nature and severity of different stressors, how can we ascertain when a malignancy first developed or how long it took to be diagnosed, as well as a lack of knowledge about the mechanisms of action involved.

Suppression of immune-system resistance to infections and carcinogens seemed a likely possibility, but it was not clear what the immune system consisted of, where it was located, or how it should be measured. There are varied components of humoral- and cell-mediated immunity, and, depending on which is selected, the same stressor could increase or decrease immune defenses. While certain stressors appear to lower immune-system measurements thought to reflect resistance to cancer, (natural-killer cell and T-cell mitogenic activity), other stressors have an opposite effect. Similarly, stress stimulates some endocrine responses that accelerate the growth of certain tumors, but also others that have inhibitory effects. How can we explain the observation that all the interventions we use to treat cancer (radiation, hormones, and chemotherapy) can also cause cancer? Finally, what was the connection to acupuncture? Does acupuncture have any effect on cancer?

It occurred to me that these concerns still had not been addressed. Like most people with pet theories, I had cherry picked those references that provided support and ignored the others. I also recognized that this could have harmful effects, given that nothing could be crueler than adding to the stress and guilt of any patient who has cancer by insinuating that the illness or failure to improve with treatment was the result of some deficiency in that patient's character. In addition, if stress caused cancer, then reducing stress should prevent this or possibly delay cancer's progress. This had already been reported in prospective studies by Hans Eysenck, PhD,^{25,37-39} who is famous for his introversion-extraversion personality profile³⁹ and who the most frequently quoted psychologist of the mid-twentieth century.

Some studies have demonstrated that an optimistic attitude and strong social support can increase longevity in patients with breast cancer and malignant melanoma. In addition, there is little doubt that stress reduction can improve a patient's quality of life and reduce the adverse side-effects of chemotherapy and radiation. As a result, it is not surprising that entrepreneurs and charlatans were quick to promote various stress-reduction devices and programs to

desperate patients with cancer who were eager to try anything that might help. Unfortunately, these benefits are often hyped in extravagant claims that are exaggerated further in media reports that also provide false hope.

I was reminded of this when headlines in the Huffington Post and news services trumpeted, “**Acupuncture Relieves Stress.**”⁴⁰ The article went on to explain that scientists had finally discovered the mechanisms of action responsible for this and the lead author proudly proclaimed: “It has long been thought that acupuncture can reduce stress, but this is the first study to show molecular proof of this benefit.” This was based on an experiment in which 21 rats were placed on crushed ice for 1 hour per day for 10 days. A half-hour prior to this, 7 rats received electroacupuncture (EA) to the *Zuslani* acupoint below the knee, 7 received sham acupuncture to the tail, and 7 controls received nothing. The researchers reported that the *Zuslani* EA group had much less of an increase in certain stress-related hormones after the ice bath than the other two groups as well as “less impact on adrenal Npy mRNA expression in raising transcription activity.”⁴¹

This was a well-designed and executed study but the results may not apply to humans for several reasons. Electrical stimulation was delivered to a needle inserted into the *Zuslani* acupoint, also referred to as Stomach 36 (ST 36), because it is located in the leg portion of the Stomach meridian and is often selected to treat gastrointestinal complaints. In an extensive review of the literature dealing with acupuncture to reduce anxiety, this point was mentioned rarely, and GV 20, PC 6, HT 7, SP 6, and ExHN 3 were the acupoints most commonly selected.⁴² In addition, most studies used three sites, and, for other stress related indications, the norm was between five and fifteen sites. It is not known if stimulation of ST 36 produces the same effects in humans as in rats. A decrease in the rise of specific stress-related hormones following exposure to cold does not mean that the rats also felt less nervous or anxious, nor does it show how long this effect lasted.

These results were obtained with electrical stimulation, and it is not clear if the same response would be elicited with traditional acupuncture. In that regard, how can one be certain that the correct site is being stimulated? Virtuoso acupuncturists have emphasized the importance of De Qi, a grabbing or pulling sensation felt by both the patient and practitioner. This requires considerable skill and experience that many practitioners do not possess, and, as noted in a review that was just published, this also seems to be a controversial subject.⁴³

It is impossible to prove or disprove that acupuncture relieves stress because of the difficulties in defining these terms. Acupuncture today comprises a variety of procedures and techniques designed to correct imbalances in the flow of Qi (*chi*) by stimulating anatomical locations on or under the skin. This includes not only the insertion of different types of needles and sometimes turning them, or applying heat or

electrical stimulation, but also stimulating these acupoints directly with pressure, heat, electricity, or “cold laser” light; and auriculotherapy, which is limited to acupoints in the ear. As indicated previously, stress can be acute or chronic, and responses also vary, depending on the nature, severity, and duration of the stressor.

A major problem in proving that acupuncture has any beneficial effects at all is lack of knowledge about its mechanisms of action. The existence and nature of Qi or its Yin and Yang components have never been demonstrated, and there is no agreement about the number of meridians or channels these travel through, the number of acupoints available, and which should be stimulated for specific complaints. Originally, 365 acupoints were identified corresponding to the number of days in a year, but this has now grown to thousands of acupoints on some charts. There were traditionally 12 standard or principal meridians associated with either Yin or Yang, but we now have at least eight additional supplementary or Extraordinary meridians, two of which have their own sets of acupoints. There does not appear to be any unanimous or general agreement on which acupoint or acupoints should be stimulated for any complaint, or on which technique should be applied and for how long.

Acupuncture is used mostly for relief of pain, and while it is very effective for many patients, it is impossible to rule out a placebo effect, especially because studies show that sham acupuncture may work just as well, and, in some instances, is superior.⁴⁴ It is small wonder that critics refer to this as “quackupuncture.”

HOW TO MAKE ACUPUNCTURE MORE LEGITIMATE AND ACCEPTABLE TO SCIENTISTS

The notion that reducing stress could help prevent cancer, heart disease, hypertension, ulcers etc., or improve treatment results was also viewed with skepticism when I graduated from medical school more than a half-century ago. Most of the evidence that stress caused these and other disorders was also anecdotal, and there were few supportive scientific studies. That began to change when the benefits of meditation were demonstrated for hypertension, because meditation was an intervention that could be reproduced by other researchers and the response could be measured objectively. Acupuncture needs to provide something similar, but it is currently difficult to design a study that could be confirmed by other researchers for the reasons cited, and subjective responses cannot be rated as accurately.

There were also plausible biochemical and physiologic mechanisms of action that explained why meditation could lower blood pressure, and decades later, sophisticated imaging studies provided additional support. Acupuncture is still mired in the belief that this somehow restores the flow

of Qi through meridians or restores the balance of Yin and Yang. However, these are all invisible and intangible constructs that Western science rejects, because they cannot be identified, much less measured. Other theories have been proposed that deserve further investigation such as Bong-Han Kim, MD's Primo Vascular System, so named because he believed it developed before the lymphatic and circulatory systems, and that could be found in plants as well as animals. It contained a fluid with remarkable healing properties thought to be the result of microcellular components that could regenerate any injured tissue, much like pluripotent stem cells. Other researchers had difficulty in reproducing Kim's results, but these threadlike vascular structures have now been identified in various animals, and interest in this has intensified in recent years,⁴⁵⁻⁴⁷ especially with respect to cancer and regeneration.⁴⁸

Björn Nordenström, MD, has proposed the existence of an "electrical" circulatory system composed of biologically closed electrical circuits that may have important clinical applications.⁴⁹⁻⁵¹ Based on this, he has developed a very effective treatment for metastatic lesions in the lung for patients who are not candidates for surgery. While this approach is not practiced in the United States, it is popular in China, where it is also used to treat vascular lesions.⁵² As indicated elsewhere, it may also provide support for the existence of Qi and similar bioenergies that have surfaced over the years, such as Ayurvedic *prana*, *archaeus* (Paracelsus), "cosmic aether" (Newton), "universal fluid," and "animal magnetism" (Mesmer), "odic force," (von Reichenbach) "biocosmic energy" (Brunler) "orgone" (Reich) and "morphogenetic fields" (Sheldrake)⁵³

Nordenström's credentials are impeccable. Chairman Emeritus of the Department of Radiology at the prestigious Karolinska Institute, he has also chaired the Nobel Assembly Committee that selects the Nobel Laureate in Physiology or Medicine and has been mentioned as a possible future recipient. As explained in the concluding chapter he invited me to contribute to his last book, he points out that ancient Oriental philosophy and approaches to health are based on the existence of *chi*, a universal energy that can be converted to serve different purposes. How this energy is transformed is described in the concept of *Tao*, the order that exists in the cosmos that makes nature and its behavior explicable and with which human beings must learn to live in harmony. He goes on to explain that these rules lead to an appreciation of the cyclic motions of energy in the universe with respect to expansion and condensation. He believes that *chi* is analogous to the energy flowing through his "electrical" circulatory system and that *yin* and *yang* may be thought of as positive and negative charges.⁵⁴

More recently, "bioelectricity circulation" and "bioelectric resonance therapy" have each been proposed as the bridge between traditional Chinese and Western Medicine.⁵⁵ Some facets of this paradigm are based on Nordenström's research, and numerous illustrations help explain

these links and why this approach can be effective for addressing a wide range of disorders. A few of the headings for the numerous topics covered include: Bioelectric Changes at the Molecular Level Lead to Water Distribution Problems and Metabolic Diseases, Bioelectric Changes at the Cellular And Higher Levels Result In Organ Functional Diseases, The Bioelectricity Circulatory System and Traditional Chinese Medicine, Traditional Chinese Medicine Yin and Yang Theory, Traditional Chinese Medicine Five Elements Theory, Traditional Chinese Medicine Channels Theory, Traditional Chinese Medicine State of Viscera Theory, Body Qi and Fluids.⁵¹

It is important to emphasize that theories do not have to be correct, only facts must be so. Some theories are valuable because of their heuristic merit, in that they stimulate other researchers to discover new facts and discoveries that lead to better theories.

I believe we are on the threshold of developing new insights into why acupuncture works because of advances in our ability to see and measure energy fields about the body with Gas Discharge Visualization (GDV) technology.⁵⁶ GDV photos show a vivid, colored corona of energy surrounding the body in health; this field loses its luster and becomes fragmented in illness. The field is restored when the cause of the illness is corrected, and these changes are immediately and vividly illustrated by pre and post acupuncture pictures.⁵⁷ GDV technology is not in widespread use because of the cost of the camera and equipment, but this is expected to improve as less-expensive versions are developed for practitioners.

Another giant step in the right direction stems from research advances in heart rate variability (HRV), which provides the most accurate objective assessment of stress and how it affects health.⁵⁸ Acupuncturists are utilizing HRV increasingly to provide objective confirmation of their success, because changes in HRV are also dramatic and could provide clues about mechanisms of action involving the autonomic nervous system.⁵⁹ In addition, the benefits are not simply transient, given that one study last year showed that HRV improved over weeks and months in patients who were treated successfully for hypertension.⁶⁰ If GDV and HRV are both valid measures of health and stress levels, we would expect them to respond in a similar fashion. In that regard, a statistically significant correlation has been confirmed between pertinent GDV parameters and HRV changes in healthy volunteers subjected to 3 different stressors.⁶¹

Acupuncture is currently in a "gray zone," because this modality is neither "black nor white" with respect to diagnosis, therapy, ethics, and other aspects of patient care. By coincidence, this issue is discussed in a recent issue of *The New England Journal of Medicine*, which summarizes the problem with the following concerns:

- (1) Is a given health care intervention effective or not?
- (2) Is it appropriate in a given clinical context or not?

- (3) Should it be covered by health insurance or not?"
 (4) Are the costs excessive or justified?⁶²

These are questions patients, health care practitioners, insurance companies, the U.S. Food and Drug Administration, and legislators want answered. The above concerns are likely to become more stringent because of the currently exorbitant and escalating health care costs, and gray-zone practices will be the first to be dropped. The major problem with acupuncture is proof of efficacy, and the increased use of HRV, GDV, and other objective measures will help to achieve this.

Another impediment is that licensing requirements vary tremendously in different states and, in some, any physician or chiropractor can be certified with minimal training. In Oregon, the requirement for training is only 16 hours for chiropractors versus 4000 hours for licensed acupuncturists. There is also a confusing "alphabet soup" of varied acupuncture "degrees," some of which can be obtained online. Cold laser therapy for smoking cessation, weight loss, or pain requires no certification or formal training and can be performed by anyone. Given that all of this comes under the heading of acupuncture, the public as well as physicians are disappointed with the results, and there is the danger that the "baby will be thrown out with the bath water," if this confusion is not corrected.

This is analogous to the current dilemma of determining the authenticity of stress-reduction programs and devices. There are credentialing programs for stress-reduction practices, such as mindfulness meditation, yoga, progressive muscular relaxation, Reiki, and various types of massage, as well as devices such as EmWave. However proficiency in one technique does not extend to others, and anyone can claim to be a qualified stress-reduction therapist. Similarly, anyone who stimulates random points on the ear with a cold laser can claim to be practicing acupuncture—despite the lack of any training. The public as well as health care professionals need to be educated about these abuses and the importance of heeding the old adage, *Caveat Emptor*.

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