



Application of Auricular Therapy for Cancer-related Pain in Nursing Care

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Abstract

Regardless of the advances in cancer treatment, cancer-related pain is still one of the most challenging symptoms that patients face. In the United States, cancer patients have turned to a wide variety of complementary and alternative medicine (CAM) therapies as an adjunct to conventional cancer treatments. This paper introduces Auricular Point Acupressure (APA), an innovative acupuncture technique that (1) features the use of seed patches instead of needles and (2) treats only the acupoints located on the surface of the ear. The technique not only offers a less invasive alternative to acupuncture, but also can be self-managed—the patient is instructed to press the points on which the patches have been placed at regular intervals and as needed to decrease pain. As a non-invasive, semi-self-managed, non-pharmacological technique for pain relief, APA has minimal side effects and, therefore, may be particularly acceptable to cancer patients. This paper describes the historical development of auricular therapy, auricular therapy treatments, a proposed biological mechanism underlying the analgesic effects of APA, and the implications of APA on nursing practice for cancer-related pain management.

Keywords: Auricular therapy; Acupressure; Cancer-related pain

Introduction

Cancer-related pain (CRP) is considered one of the most trying and challenging symptoms that cancer patients experience [1,2]. The prevalence of pain reported by cancer patients is estimated to range from 29% to 85% for those in active anticancer treatment and 66% to 85% for individuals with advanced cancer [1]. Opioid use is a common strategy to manage CRP; nonetheless, it is associated with a variety of adverse side effects. For example, and perhaps causing the greatest concern, the needs for pain medication can escalate, resulting in dependence and the potential for drug addiction [3,4]. This danger, together with the high prevalence of pain reported by cancer patients, highlights the need to examine the efficacy of non-pharmacological techniques [5]. It also suggests that not only the management of CRP should be high-priority clinical goal, but also the efficacy of non-pharmacological pain reduction techniques need to be examined [5].

Cancer patients in the United States have used a wide variety of complementary and alternative medicine (CAM) therapies as an adjunct to conventional cancer treatment to manage symptoms related to cancer treatment [6]. More than 39% of cancer patients—and up to 65.5% of cancer survivors—have used some form of CAM [6]. Acupuncture, one form of CAM, has been reported to be effective for the control of pain in adult cancer patients [7-12]. Acupuncture, a part of traditional Chinese medicine (TCM), is performed by inserting sterile needles into specific acupoints located on the body; it is generally considered safe when performed by experienced practitioners [13]. However, the widespread application of acupuncture to manage CRP is limited by several factors that include the lack of high quality clinical trials in the literature [12], the limited availability of suitably trained oncology acupuncture specialists, the need for patients to travel to the acupuncture site [14], the use of needles and the potential for infection [14], and the cost of acupuncture treatment not typically being covered by insurance [15].

Auricular Therapy

Auricular therapy is one form of acupuncture that stimulates ear acupoints on specific areas of the ear to treat disease or alleviate symptoms. Most auricular therapy includes auricular acupuncture (e.g., acupuncture imbedding and electroacupuncture stimulation) and

pellet acupressure. The primary side effect of auricular acupuncture is the piercing sensation that occurs either at the time needles are inserted into the ear surface or when intense electrical stimulation is applied to an ear acupoint [16]. This use of needles necessitates that auricular acupuncture be performed by licensed practitioners. In contrast, auricular point acupressure (APA), which uses adhesive patches containing hard, smooth, round objects (e.g., botanical plant seeds or metal/magnetic pellets) on the front and back surface of the ear to stimulate the acupoints, is not only non-invasive, but also can be performed by practitioners with minimal training. Moreover, with APA, patients can be taught to self-manage their symptoms at home. Due to the disadvantages of auricular acupuncture, APA has become increasingly popular during the past 20 years in Taiwan and China [17,18].

Auricular Point Acupressure (APA)

In brief, APA treatment comprises (1) identification of ear points by a trained therapist, (2) taping seeds over ear points that correspond to an affected anatomical body region, and (3) using the fingers to exert pressure on the seeds by the patient, which stimulates the ear points to achieve acupuncture-like effects. This allows patients to self-manage CRP at home by applying pressure to the seeds throughout the day. Application of the very small seeds used for APA is non-invasive, non-pharmacological, inexpensive, and causes minimal side-effects [18,19]. Because of these attributes, APA may be a good choice for the management of pain among oncology patients. In China and Taiwan, APA is widely used and considered very effective by both patients and clinicians. However, outside China and Taiwan, APA is seen as a non-tested alternative treatment and, therefore, is not yet accepted in

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the United States. The science to explain this well-respected Chinese treatment has yet to be identified.

Historical Overview of Auricular Therapy

Auricular therapy, including disease diagnosis and treatment, has been part of TCM for 2,000 years [18]. French Neurosurgeon Dr. Paul Nogier theorized in 1950 that the ear represents the inverted fetus within the womb, and the relationship of the anatomical body to auricular ear points in TCM ear medicine has been modified according to Nogier's theory [18,20]. Later, in 1968, Nogier further proposed an "auricular pulse reflex," which posits that the result of auricular stimulation depends on the auricular points stimulated—not the intensity of the stimulation [20]. Nogier was described as the "Father of Auricular Therapy" at the 1994 Internal Auricular medicine in Lyons to honor his pioneering discovery of somatotopic correspondences to the external ear, development of a new form of pulse diagnosis, and subtle energies of the body [20].

Chinese ear medicine has been modified since the inverted fetus model was proposed by Nogier [18]. After 1982, a variety of professional auricular acupuncture societies were established, seminars were held, and medical journals and textbooks of auricular therapy were published in Chinese [18]. The first scheme of standardization of auricular points was approved at the International Conference on the Standardization of Acupoints, held in South Korea in June, 1987 [18]. As a result, the "Chinese Standard Ear-Acupoints," including 91 points, organized in zones, was established and widely adopted in China [18].

Dr. Lichun Huang integrates anatomy, embryology, genetics, immunology, neurology, and pathomorphology with clinical experience and has identified and located additional auricular points, expanding auricular theory to include 201 acupoints [18]. However, few studies have yet documented the differences in acupoint paradigms between Nogier, Huang and Chinese Standard Ear-Acupoints Chart, which is recognized by the World Health Organization [21]. A systematic and comprehensive auricular diagnosis has proposed which is based on pathomorphology (i.e., when there are pathological changes in the body, the color and shapes of the corresponding auricular points will also change) [18,22]. Since the end of the 1980s and the beginning of the 1990s, auricular diagnosis and treatment has become a recognized branch of acupuncture around the world [20,23]. Auricular therapy is recognized by The World Health Organization as a form of micro-acupuncture that can affect the whole body [21]. An ear zone system with standardized nomenclature has been established by the World Health Organization (WHO) [21]. This system incorporates auricular anatomy and proven therapeutic values, and it has been accepted internationally [21]. In 1990, the Director General of the WHO asserted that "auricular acupuncture is probably the most developed and best documented, scientifically, of all the microsystems of acupuncture and is the most practical and widely used" [21].

Training Health Care Professionals in APA

APA, which is similar in effect to acupuncture but without the use of needles, is well suited to primary health care, which should be available, affordable, and accessible to patients. In addition, APA is well suited for health care professionals for three reasons: (1) It has standardized auricular nomenclature; [21] (2) Points on the ear can be located easily and systematically using an electronic finder, skin changes upon visual inspection, and/or associated tenderness when probed; [24,25] (3) Applying seeds to points on the ear can be done by non-acupuncturists. Health care professionals without formal training in acupuncture and TCM can be taught to incorporate APA into their practice to provide

pain relief and augment the effects of other pain interventions. There is no data regarding the number of trained auricular therapists in the U.S. However, there is evidence of widespread training in APA. Not only was auricular therapy part of the acupuncture educational training of 28,735 licensed acupuncturists in the U.S. as of 2013 [26], but also many agencies offer auricular therapy seminars and workshops in the U.S. For example, the Auricular Medicine International Research and Training Center (AMIRTC) [27] has offered at least 30 seminars and trained over 1,000 health care practitioners each year since 1994.

Auricular Diagnosis

In order to select the correct acupoints for treatment, auricular diagnosis is a systematic and comprehensive method to locate the ear points that correspond to the symptomatic body to treat illness and symptoms [18,20,24]. These points are known as *active corresponding ear points*. Auricular diagnosis is based on reflex theory, which holds that the symptomatic body part can induce changes in the skin surface, tenderness, and electrical conductivity of the ear [18,20,24]. For example, when an individual is experiencing pathological change in a particular area of the body, the corresponding ear points will have lower skin resistance. Auricular diagnosis includes the following strategies [24].

Visual inspection

The outer ear needs to be examined for any possible skin surface change to locate active corresponding ear points within target ear zones. Ear zones are part of a mapping system that charts the correspondence between ear points and areas of the body [20,21]. When there is no body disorder present, the skin at the location of points on the ear is smooth and uniform in color. However, when a body disorder is present, the corresponding points may display discoloration, deformity, a papule, or angiokeratosis [24,25].

Tenderness testing

Through observing the patient's reaction, the therapist can use a probe to touch points on the ear and locate the ones that are tender. Active corresponding ear points usually reveal increased tenderness during examination when specific body parts of the patient are symptomatic [18,28].

Auricular electrical detection

The final determination of ear points for treatment can be made by electrical detection. This is an objective diagnostic method that utilizes an electrical point finder to identify active corresponding ear points by assessing auricular cutaneous resistance [24,28,29]. When body disorders are present, the active corresponding ear points have a lower electrical resistance [24,25]. Before searching for active corresponding ear points, the reaction threshold of the points to the point finder needs to be determined for each participant [20,24,25]. The threshold is set by placing the point finder on the *shenmen* point and increasing the detection sensitivity until the point finder indicates high electrical conductance [24,25]. The *shenmen* point, also known as the *divine gate*, is one of the most recognized and powerful of the auricular acupoints, which has multiple functions that include relieving stress and anxiety, suppressing cough, and providing pain relief [30]. The sensitivity of the point finder is then slightly reduced until the *shenmen* point is barely detectable. The point finder can then be used to measure the ear electrical resistance of other points in target ear zones using the *shenmen* point as a reference. The therapist can begin to search the "zone area" of ear points corresponding to the symptomatic body according to the subject's self-report of related location. This method

of acupoint detection has been validated by using functional magnetic resonance imaging [31].

Auricular diagnosis can systematically locate points because (1) the points can be detected electrically, (2) the skin surface of the ear changes predictably when a body disorder is present, and (3) the points exhibit marked tenderness when probed [18,20,24,25,32]. The reliability of auricular diagnosis to locate these ear points related to the symptomatic body is high (ranging from 75% [29] to 80% [28]).

Procedure for Auricular Therapy

Once the active corresponding ear points are located, a trained auricular therapist can tape pellets onto these ear acupoints for treatment. When these ear acupoints are stimulated, patients experience a sensation of soreness, numbness, distension, or electric shock at these points. This is also called *de qi* or “acupuncture sensation” in traditional acupuncture treatment [25,33,34]. The occurrence of these reactions indicates that the active corresponding ear points related to the disease/symptoms the patient is experiencing are accurately stimulated. Satisfactory effects may then be expected if proper stimulation through pressure is applied to the pellets taped to these ear acupoints.

This finger stimulation can be conducted by patients at home. Moderate stimulation can be used for therapy, by asking patients to gradually increase the pressure applied to the pellets taped on the ear acupoints until they feel discomfort or tingling. Patients are instructed to press the pellets taped on each ear for at least 3 times a day for 3 minutes. Patients can also be taught to press the taped on seeds whenever they feel any symptoms such as pain or discomfort [25,33,34].

Proposed Mechanism of Auricular Therapy for Pain Management

Although APA has been shown to be effective for pain relief [7-12,33-38], the physiological mechanisms for its effects are not well established [39]. The theories of body acupuncture can provide a foundational basis for APA to explore the underlying mechanism and/or pathway of therapeutic effects [40-42]. The predominant Western view is that the effects of acupuncture take place through the nervous system [43]. Auricular acupoints are believed to represent discrete locations in/on the anatomical body. When auricular acupoints are stimulated, specific neural pathways are activated. According to the neurophysiologic model, the pain sensations can be relieved by activating hypothalamic-pituitary-adrenal (HPA) axis pathways through the operating of autonomic nervous and peripheral systems, causing a broad spectrum of systemic effects including immune-mediated analgesia and improved blood flow [40,44]. These responses are induced by cytokines and may explain the analgesic effects of APA.

Hormonal release of endorphins into the blood can trigger pain by promoting inflammation, which occurs in cases of chronic pain even in the absence of injury or damage. From the perspective of TCM, pain is caused because *qi*energy is blocked in acupuncture meridian channels, which causes an imbalance in the macro acupuncture system. Increased flow of *qi* can be activated by stimulating the auricular acupoints, restoring balance and relieving pain. A preliminary study using neuroimaging (i.e., PET [positron emission tomography] and fMRI [functional magnetic resonance imaging]) has demonstrated the existence of specific neurophysiological connections between ear acupoints and the human central nervous system during auricular therapy [31].

Advantages of APA

The most significant advantage of APA is that it is non-invasive. Once seeds are taped to active corresponding ear points by a trained therapist, patients can then stimulate these points by pressing on the taped seeds with the index finger and thumb as directed to achieve acupuncture-like effects. The taped seeds can remain on the ear for 1 to 4 weeks, depending on the ear skin condition, therefore requiring fewer office visits. In contrast to the frequent visits required to an acupuncturist (usually twice per week), APA can reduce the frequency of visits to practitioners.

Side effects arising from APA are rare. However, abnormal phenomena such as mild dizziness during or after the procedure or allergic reactions to the skin from the adhesive tape may be possible. Such allergic reactions diminish very quickly when the tape is removed. Moreover, the dizziness is generally temporary and occurs very rarely. The occurrence frequency of such adverse reactions, if they do occur, is monitored closely and recorded in regular APA practice.

Patient involvement in the practice of APA to alleviate pain provides patients with a greater sense of control over their symptoms. APA practice includes teaching the patients the treatment rationale (i.e., the use of APA improves chronic pain, and patients can practice APA in improving their own pain), skill training (i.e., learning how to press the taped seeds to practice APA at home), and application and maintenance of learned skills (adherence to the treatment regimen). Training the participants in the skills necessary for APA practice can be completed within 15 minutes, which is potentially cost-effective. Moreover the cost of the treatment is low. In our pilot study examining the effectiveness of APA on treating chronic low back pain (CLBP), the cost of the seeds and tape for each treatment is less than US\$5.00. Our preliminary findings demonstrate that (1) CLBP patients (n = 74) who received a 7-day APA treatment reported immediate pain relief (40% reduction in CLBP intensity) [34] and (2) CLBP patients who received a 4-week APA treatment reported lasting pain relief (75% reduction in CLBP intensity) [33].

Limitations of APA

APA has not been widely adopted in the U.S. because of a limited understanding of its biological mechanism, the lack of high quality randomized controlled trials supporting its efficacy, and the paucity of therapists trained in APA [45,46]. Additionally, in current practice, APA is part of acupuncture training and can be administered by acupuncturists is not often covered by insurance. A better understanding of how APA reduces pain and the development of effective interventions strategy are required to improve acceptance of APA in clinical practice. Before APA can be more widely used in clinical settings, it is necessary to establish its efficacy, safety, and cost effectiveness. Without uncovering the foundational physiological data that explains how and why APA works, it is difficult to apply APA in clinical settings. If APA can be effectively proven to eliminate or reduce cancer-related pain, and if we can gain a better understanding of the underlying biological mechanism, we will be able to promote its acceptance by medical practitioners and then disseminate this treatment to patients.

Implications of APA for Cancer-Related Pain and Nursing Care

APA is a non-invasive, low-cost, self-manageable, and non-pharmacological approach that can be used as an adjunct therapy for CRP with minimal side effects. The nature of APA blends perfectly

with nursing practice, incorporating both holistic nursing and Orem's Self-Care Deficit Theory [47]. From a professional nursing perspective, the basic skills of auricular therapy are easily learned. Nurses can integrate APA into clinical practice to treat subject's physiological and psychological needs. How to use APA by them at home is also safe and easy to teach patients so that they can be self-reliant and responsible for their own care. Orem asserts that patients should not only be self-reliant and responsible for their care, but also be responsible to others in their family who need care [47].

With its effectiveness for reducing CLBP [33,34] and chronic pain [48], APA shows promise to be an adjunctive therapy to current standard care in (1) decreasing the side effects of cancer treatment, (2) decreasing the medical cost of pharmacological treatment, (3) improving the patient's and family's quality of life, and (4) increasing the patient and family self-management of numerous health problems. The opportunity for involvement of both the patient and family can ease the stress of battling the disease alone; moreover, family members can not only provide a source of strong support, but also better maintain their own health.

From a practical perspective, APA has several distinct advantages: it is non-invasive, non-pharmacological, and non-painful. In addition, it is cost-effective and relatively easy to learn. Most importantly, once the seeds are taped to active corresponding ear points, the patient can self-manage his or her treatment at home, thus reducing the dependence of patients on clinic visits. Moreover, unlike most standardized treatments for pain, the patient's involvement in practicing APA for controlling pain provides him or her with more control over pain and symptoms. Therefore, it follows that once cancer patients are taught and learn the advantageous techniques involved with APA, they will likely come to accept APA as a viable alternative therapy for cancer-related pain.

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