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The Use of Healing Touch in Integrative Oncology

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Abstract

The use of complementary therapies by cancer patients has become so prevalent that nurses working in oncology are finding it necessary to understand these therapies and the evidence-based support for their use. The integrative use of the biofield therapy Healing Touch (HT) in conjunction with the chemoradiation received by patients with cervical cancer (stages 1B1 to IVA) during a recent research study is described. Findings indicated effects of HT on the immune response and on depression, in contrast to patients receiving relaxation or standard care. Specifically, HT patients demonstrated a minimal decrease in natural killer cell cytotoxicity (NKCC) over the course of treatment whereas NKCC of patients receiving relaxation therapy (RT) and standard care (SC) declined sharply during radiation ($p = 0.018$). HT patients also showed significant decreases in depressed mood compared to RT and SC ($p < 0.05$). These findings, as well as the energetic effects of chemoradiation that were observed, and the proposed mechanisms and potential contributions of biofield therapy are addressed. It is suggested that the appropriate integration of complementary modalities into oncology care has the potential to enhance the impact of conventional care by putting the patient in the best condition to use their innate healing resources.

Historical Perspectives on Oncology Nursing Practice

The essence of oncology nursing is the desire to make a difference for people facing the challenges of cancer. During the Dark Ages care consisted of bed, board, bath and prayer (Minkowski, 1992). Until the 1940's, when oncology nursing emerged as a specialty, oncology nursing consisted of traditional bed side care and comfort measures (Yarbro, 1991; Ferris, 1930). In the 1950's the emotional and psychosocial impact of cancer was recognized and in the 1980's the Standards of Oncology Nursing Practice included outcomes with regard to physical, psychosocial and spiritual aspects of cancer care (Haylock, 2008). Today the public has increased access to information regarding health care. Complementary and alternative therapies have grown so popular that nurses working in oncology are finding it necessary to learn as much as possible about Integrative Oncology (Decker & Lee, 2010)

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Effects of Healing Touch on Women Undergoing Treatment for Cervical Cancer

Cervical cancer is the second most common female cancer worldwide (Kamangar, Dores & Anderson, 2006). Whereas chemoradiation treatment is potentially curative (Eifel et al., 2004), cervical cancer survivors frequently report both acute and late side-effects, compromised quality of life, and psychological distress (Hodgkinson et al., 2007; Vistad, Fossa, Dahl, 2006). Rose et al. (1999) found that gastrointestinal adverse effects occurred in approximately 75% of locally advanced cervical cancer patients treated with cisplatin-based chemoradiation, 37% experienced leucopenia, and 8% experienced neuropathy and cutaneous adverse effects. A prospective randomized clinical trial (Lutgendorf et al., 2010) reported the effects of Healing Touch (HT) versus relaxation therapy (RT) vs. standard care (SC) for 60 women being treated with chemoradiation for a new diagnosis of cervical cancer (stages 1B1 to IVA cervical squamous or adeno-carcinoma). All patients received standard medical treatment including weekly platinum-based chemotherapy, external beam radiation (total dose approx. 45–50.4 Gy), and brachytherapy. Treatment generally lasted 6 weeks. Patients receiving HT showed relative preservation of their natural killer (NK) cell activity over the course of treatment, whereas the NK cell activity of patients receiving RT and those in the SC group showed significant declines in NK cell activity. As NK cells play an important role in the immune response to cervical cancer (Textor et al, 2008), the immune-preserving effects of HT may be clinically significant. Additionally, all 3 groups entered treatment with mean levels of mood placing them in a clinically depressed category. By the end of their six weeks of treatment the HT patients had moved out of clinical depression, showing significantly greater decreases in two different indicators of depressed mood compared to the RT and SC patients whose scores still indicated levels of clinical depression.

The purpose of this article is to provide information regarding how the biofield modality of HT, used as an integrative therapy during the above research study so that oncology nurses will have greater knowledge from which to respond to inquiries about biofield therapies. Since instrumentation for assessment of biofields is not well developed biofields were not measured in the study reported above. The following discussion is based on proposed mechanisms of action.

Use of Energy Therapies in Complementary and Alternative Medicine

Complementary/Integrative and Alternative Medicine (CAM) modalities are commonly used by cancer patients and survivors, with several studies reporting about 50% of female cancer patients using CAM modalities, (Fashing et al., 2007; Navo, et al., 2004; Wyatt, Sikorskii, Wills, & An, 2010) although some reports of CAM utilization are as high as 80% (Boon, Olatunde, & Zink, 2007). When alternative modalities are referred to as complementary it indicates that they are being used in conjunction with conventional therapy. When these modalities are integrative they are being integrated into the care delivery of the medical system. Cancer patients using CAM modalities, are more often female, having surgery or chemotherapy, experiencing substantial symptoms (Fouladbakhsh, Stommel, Given & Given, 2005), well educated, and report higher incomes (Alferi, Antoni, Kilbourn, & Carver, 2001).

Biofield Therapies

According to the National Center for Complementary and Alternative Medicine (NCCAM, 2004), biofield based modalities deal with two types of energy fields—those which can be measured (called veritable) and those which have yet to be measured (called putative).

Veritable energy includes those energies with specific, measurable wavelengths and frequencies such as mechanical vibrations of sound, visible light, magnetic fields, laser beams, and radiation from the electromagnetic spectrum. There is substantial documentation of the use of veritable energy fields in medicine (Fredericks et al. 2000; McLeod & Rubin, 1992; Rubin, Donahue, Rubin & McLeod, 1993; Markov et al, 2004; Salvatore, Harrington & Kummet, 2003) The concept of the presence of electromagnetic fields (putative energy) underlying the patterns and organization of biological systems is not new (Burr, 1972; Tiller, 1977) and has been a basic tenet of medical systems such as Traditional Chinese Medicine and Ayurvedic Medicine for centuries (NCCAM, 2004). The life force, referred to as “prana” in Ayurvedic medicine or “Qi” in Chinese medicine is an example of putative energy (NCCAM, 2004; Dale, 2009). The term “biofield”-used by NCCAM- refers to both veritable/tangible and putative/subtle forms of energy.

Biofields in Nursing Practice

Putative energy fields have been described in nursing theory. Martha Rogers, Nursing Professor and theorist (New York University), developed a conceptual system proposing that energy fields are fundamental units of human beings and their environment. (Rogers, 1970, 1980, 1986 1987, 1988). The basic premise of Rogers’ theory is that all living organisms are sustained by universal life energy. Health is compromised when there is a blockage, and/or deficit in the flow of energy (Meehan, 1991). In 1984, the North America Nursing Diagnosis Association (NANDA) added the Nursing Diagnosis of “Energy Field Disturbance” to its list of Nursing Diagnoses for two reasons: 1) It represents a specific nursing theory—the human energy field theory—and 2) the intervention utilized requires specialized instruction and supervised practice. The diagnosis of Energy Field Disturbance is a state in which a disruption of the flow of energy surrounding a person’s being results in a disharmony of the body, mind and/or spirit (Carpenito, 2009).

The Field Disturbance diagnosis supports the holistic perspective of health. According to this approach, feelings, attitudes and emotions are not isolated events, but are translated into bodily changes that simultaneously affect all parts of the body. Pain and illness are valuable signals of an internal conflict that needs to be addressed. Nursing Standards of Practice (Oncology Nursing Society, 1987), which includes outcomes with regard to physical, psychosocial and spiritual aspects of cancer care, also support this holistic perspective of health.

The emerging evidence-based links between biofields and scientific knowledge have been described by Oschman, a cellular biologist, physiologist and authority on energy and complementary medicine. According to Oschman “The concept of life energy and healing energy ... have not been connected by a series of simple logical steps to generally accepted knowledge. However, scientists have established more than adequate measureable and logical connections between biological energy fields and generally accepted scientific knowledge” (Oschman, 2000).

Proposed Mechanisms for Biofield Effects

It is hypothesized that practitioners of therapies such as Healing Touch, Therapeutic Touch, Reiki, and QiGong modulate the human biofield removing blockages in the biofield (Berden, Jerman, & Skarja, 1997; Chen & Liu, 2004; Kiang, et al, 2002; Grad, 1963, 1964; NCCAM, 2004; Oschman, 2000; Wirth, Brenlan, Levine & Rodriguez, 1993; Wirth & Cram, 1993; Zimmerman, 1990). Effects of biofield therapies on disease processes may occur via a variety of pathways, both direct and indirect. For example, biofield therapies may induce the relaxation response, which results in blunting of the neuroendocrine stress response. Stress-related information is processed via the central nervous system and

ultimately results in activation of the sympathetic nervous system (producing norepinephrine (NE) and epinephrine (E) and the hypothalamic-pituitary adrenal (HPA) axis which produces cortisol (Chrousos, 2009). The relaxation response results in blunting of these neuroendocrine stress hormones, enhancement of immune function, and other bodily systems. (Kiecolt-Glaser et al, 1995; Dusek et al., 2008) Elicitation of the relaxation response may occur through specific biofield manipulations as well as by the provision of social support and hope. Neuroendocrine stress hormones have been shown to enhance tumor growth, angiogenesis, and invasion, as well as to impair the cellular immune response (Antoni, et al, 2006; Sood, et al. 2006; Thaker, 2006). Thus, to the extent that biofield therapies can diminish the neuroendocrine stress response, a variety of cancer growth processes may be blunted, and immunity may be supported. More direct mechanisms would include pathways not mediated by the neuroendocrine stress response. For example, biofield therapies are thought to release blocks to circulation of “vital energy” within the patient. Modulation of a person’s energy to recreate flow and balance throughout the body, affects multiple systems, and ultimately supports greater resistance to disease and more rapid recovery. These direct and indirect mechanisms could also work together (Lutgendorf & Mullen, 2008).

Dynamics of the Human Energy Field

Before discussing the specific techniques used during the Lutgendorf et al., 2010 study, the proposed dynamics of the human energy field will be reviewed. The human energy field, or biofield, is thought to be primarily composed of the aura, a set of energy bands that graduate in color and frequency as they move outward from the physical body. (Dale, 2009). The putative subtle energy centers which convert fast-moving energy obtained from the environment into slow moving energy in the body are referred to as chakras. Each of the auric fields partners with a chakra, or energy center. The chakras serve as collection and transmission centers for both subtle and biophysical energy. The chakras interface with the body’s energy meridians as well as conduits called nadis (in Ayurvedic Medicine) which disperse life energy throughout the body, interfacing between the body’s subtle energy structures and physical organs (Dale, 2009).

Healing Touch as a Nursing Intervention

Healing Touch is categorized by NCCAM as a biofield therapy. The goal in HT is to restore harmony and balance in the client’s energy system placing the client in a position to self-heal. Practitioners of HT believe that HT complements conventional health care by supporting a patient’s innate healing ability. The HT modality is purported to influence the human energy system, specifically the energy fields that surround the body, and the energy centers that control the energy flow from the energy fields to the physical body. It is thought that the non-invasive, non-manipulative techniques of HT utilize the electromagnetic field of the practitioner’s hands to clear, energize and balance the human and environmental energy fields and thus affect physical, emotional, mental, and spiritual health and healing (Mentgen, 2001). HT utilizes a heart-centered caring relationship in which the practitioner and client are thought to come together energetically to facilitate the client’s health and healing. Reports from practitioners indicate that the following are benefits of HT: acceleration of wound healing, relief of pain, reduced anxiety, relaxation, and enhanced spiritual development. (Mentgen, 2001). Research findings, though limited, have noted significant reduction in pain, distress and fatigue (Post- White et al., 2003), improved quality of life, emotional role functioning, and mental health (Cook, Guerrero & Slater, 2004), and, among hospice patients, improved mood, relaxation and pain relief (Ziembroski, Gilbert, Bossarte, & Guldberg, 2003).

Cervical Cancer Healing Touch Study Design and Findings

The 60 women with cervical cancer who participated in the randomized controlled trial (2010) were all treated at a large tertiary hospital in the Midwest. Patients were newly diagnosed with IB1 to IVA cervical cancer. The mean age was 46 (S.D. 13.40) and 36.6% of patients were post-menopausal at the time of study entry, 48.1% of patients had attended at least some college or trade school, although only 22.2% were college graduates, 93.3% were Caucasian, not of Hispanic origin, 3.3% were Hispanic, and 3.3% were Native American or Asian or Pacific Islander. Only 20% of patients had had surgery prior to their chemoradiation. There were no significant differences between groups in these demographic and clinical characteristics. Patients were randomly assigned to receive either standard care (weekly platinum-based chemoradiation, external beam radiation, and brachytherapy) or receive standard care and individual sessions of either HT or RT immediately following their radiation, during their six week chemoradiation treatment. To avoid interfering with the therapeutic effect of the chemotherapy, the RT and HT sessions were not provided until at least 24 hours following the subject's chemotherapy treatment. Therefore, only 4 sessions per week were provided, usually Tuesday through Friday. Sessions occurred immediately following radiation (usually within 10 minutes) in a quiet room, initially in the Clinical Research Center, and subsequently in the Radiation Oncology Suite. HT sessions (approximately 25 minutes) were conducted by experienced (at least ten years) Certified HT Practitioners, who were nurses. The sessions included five specific HT techniques to clear, balance and energize the energy flow of the body, along with supplemental techniques, as needed. For maximum efficiency the HT sessions were generally provided by a team of two practitioners (63.5% of sessions). The RT sessions (approximately 25 minutes) were conducted by a trained research assistant or graduate student. A scripted, standardized relaxation intervention, adapted from previously used protocols (Antoni, 2003), included passive progressive relaxation, autogenic relaxation, relaxation with nature imagery, and relaxation with imagery of a patient-selected special place.

Psychosocial surveys were administered prior to each blood draw (baseline, weeks 4 and 6) by a research assistant. Surveys, all of which assessed the patient's state over the last week included The Center for Epidemiological Studies Depression Scale (CESD) which assesses depressed mood (Radloff, 1977), the Profile of Mood States-Short Form (Curran et al., 1995), the Functional Assessment of Cancer Therapy (FACT) which assesses quality of life (Cella, 1994; Cella et al., 1993), and the Fatigue Symptom Inventory (Hann et al., 1999) which assesses frequency and severity of fatigue. Additionally prior to the intervention a survey modified from the Credibility of therapy questionnaire (Borkovec and Nau, 1972) was administered to assess expectations. All data and samples were coded by subject number. Laboratory personnel and physicians were blinded to group assignments.

Study Findings

Between group differences over time were assessed by multilevel regression analyses using orthogonal contrasts. HT patients demonstrated a minimal decrease in NK cell cytotoxicity (NKCC) over the course of treatment (from 35.64 ± 22.99 % to 26.14 ± 19.65). In contrast, NKCC of patients receiving relaxation therapy (RT) and standard care (SC) declined sharply during radiation (RT: from 28.82 ± 19.96 % to 16.22 ± 13.14 , SC: from 37.27 ± 21.33 % to 11.90 ± 12.57 ; group by time interaction: $p = 0.018$). HT patients showed significant decreases in depressed mood (CESD depressed mood subscale and POMS depression scale) compared to RT and SC (both group by time interactions: $p < 0.05$). Between group differences were not observed in measures of quality of life, days of treatment delay, white and red blood cell counts, or clinically-rated C.T.C. toxicities.

Practitioner observations of patient biofields

The cervical cancer research study (Lutgendorf et al., 2010) provided an opportunity to experience the energetic impact of both chemotherapy and of radiation on the biofield of the subjects. The practitioners noted, kinesthetically, the chemotherapy clogging the body's energy centers and channels. The subjects often identified how they responded to the chemotherapy as "I feeling ill, or toxic, my head doesn't work, I have a film over my eyes, I can't think or remember things very well." The practitioners also felt how the radiation shattered the patient's energy fields, much like a glass shatters when dropped. It was noted that the energy field broke at the waist and the upper half of the field moved up above the subject's heads, 24 to 36 inches, and the lower half moved down below their feet, 12 to 24 inches. Within minutes of receiving radiation the subjects looked pale, had glazed eyes and difficulty with balance and proprioception. They frequently reported not knowing where their feet were without looking at them.

HT Techniques Used in the Cervical Cancer HT Study

Technique I: Practitioner Preparation

At the initiation of each session the HT practitioner(s) moved into therapeutic presence by centering, that is, by directing awareness inward, and operating from heart-centered decisions evidenced by the presence of caring and compassion. (Freel & Hart, 1999). After the practitioner(s) centered, and grounded (connected with the earth's energy) the intention of the work was set: the subject's highest good, to support the client's healing, in particular the healthy function of the patient's immune system. Focused intent is the act of using the conscious experience to define a set of new experiences, realities or outcomes. Intent is thought to initiate a flow of subtle energy to directly or indirectly influence desired outcomes (Barlett, 2007). Studies of intention suggest that human intent is a potent healing force (McTaggart, 2002).

Technique II: Magnetic connecting and clearing

The practitioners noted that after radiation, the physical body of the subject had to be reconnected with their energy field. The practitioners used their hands like rakes and pulled or raked the field that had moved above the head back into the body. This usually took between 10 to 12 passes to bring the field and physical body back together. Then the lower portion was raked back into the body. This usually only took a few passes. When the field was again reconnected the face would pink up, eyes became bright again and patients' proprioception returned. Many of the subjects could tell us when this happened and often describe it as "becoming themselves again". At least 30 passes were made as the practitioner's hands helped clear the subject's electromagnetic field assisting the body's energy flow to reestablish.

Technique III: Chakra connection

The practitioner(s) reconnected the energy centers, chakras, to reestablish the energy flow through the body's energy channels. This was done by placing the practitioner's hands sequentially on each of the minor chakras of the joints, starting with the soles of the feet, and moving up the body to the hips. Then the joint chakras were connected to four major energy centers (root, sacral, solar plexus, heart) up the center of the body. The chakras of the arms were then connected, as with the legs, sequentially from the hands to the shoulders and then connected to the major centers in the throat, third eye and crown. When these centers were connected, and balanced, the energy flow was felt in the practitioner's hands as a symmetrical pulsing and the subjects were relaxed.

Technique IV: Liver drain

Since the platinum based chemotherapy agent is eliminated through the liver, an energetic siphon was used to accelerate the exit of chemotherapy-related toxins from the liver. The left hand was placed over the liver and the right hand held lower than the left hand. Energy flowed from the left hand over to and out of the right hand. The same procedure was applied to the liver meridian on the right foot, between the big and second toe. On the day immediately following the chemotherapy treatment the liver drain usually took 3 to 4 minutes. On the subsequent days draining from the liver took less time (1 to 2 minutes), but draining from the liver meridian took longer and had more intensity. Once the liver and liver meridian were cleared, these structures were reenergized by reversing the siphon to bring in energy to these areas.

Technique V: Mind clearing

The cranial and spinal energetic flow was reconnected and rebalanced by placing the finger tips on a specific sequence of points on the head and base of the head to reconnect energetic flow. These included flow patterns up the spine to the cranium or between the two hemispheres of the brain. Points held also include points around the eyes, and at the temporomandibular joints, thyroid and parathyroid. Subjects became very relaxed with this technique and reported to the practitioners that their ability to think clearly improved and their vision became clearer.

Supplemental techniques

The above five techniques were used with all subjects who received the HT treatments. Additionally, three other energetic systems (marma points, Tan Tiens, and Hara line) were consistently found congested, or broken. Attention was paid to these areas as necessary. Specific techniques were used as necessary to address gastrointestinal symptoms such as loss of appetite, constipation and diarrhea, the menopausal symptoms of hot flashes, and neuropathy in the hands and/or feet.

The Essence of Nursing Interventions

Florence Nightingale in her book *Notes on Nursing* (Nightingale & Barnum, 1992) wrote “Nursing is putting the patient in the best condition for nature to act upon him”. The essence of nursing has always been nurturing, caring and healing rather than curing. Curing is the process of eliminating the signs and symptoms of disease, while healing is the process of restoring balance to body, mind and spirit (Dorsey, 1995; Freel & Hart, 1999). Oncology nurses committed to creating models of healing might consider the advantages of integrative practices. Informed choice, for both nurse and patient, is fundamental to decisions based on the patient’s interests and desires, and to providing the integrated, holistic care consumers are seeking and willing to pay for.

Integrative Oncology Nursing

Changing perspectives regarding integrative modalities, both within the field of nursing and among the public, can reframe these modalities as conventional nursing care. This change can expand and enrich nursing’s current practice models. Many State Boards of Nursing include biofield therapies such as Healing Touch within the scope of practice for the registered nurse. For example, in 1998 the Iowa Board of Nursing voted to affirm that “Therapeutic Touch and Healing Touch were within the scope of practice of the registered nurse when the nurse has the appropriate education and skill to perform the function. As with any nursing activity that requires specialized nursing knowledge and skill, the Board holds the individual nurse accountable and expects the nurse to personally possess current

clinical competence to perform the act safely”(Iowa Board of Nursing, 1998). Of course, local licensure and liability standards apply.

The current shift in research is toward evidence-based practice, which relies on outcome studies to identify the best available evidence to be used as the basis for clinical guidelines. Some of the challenges related to the integrative use of CAM therapies are the issues of documentation and integrative assessments, the type of therapy best for the patient’s situation, and how to know or find out about the qualifications and/or preparation of the therapists. The Oncology Nursing Society announced in July 2010 that a resource, Handbook of Integrative Oncology Nursing: Evidence-Based Practice, is available from the Oncology Nursing Society’s web site (ONS.org). This handbook addresses the issues of integrative assessments, use of common therapies, symptom management and the evidence surrounding common interventions (Decker, & Lee, 2010). Therapist qualifications can be validated by professional organizations and/or endorsements of practitioner preparation. For example, the site Healingtouchinternational.org provides information regarding HT curriculum, certification, research funding and findings and the status of specific HT practitioners.

The use of integrative modalities, as evidenced by the Lutgendorf et al., 2010 cervical cancer study, can provide ways to diminish adverse effects of allopathic treatment. By supporting the patient’s self healing resources, the positive outcomes of allopathic treatments such as chemoradiation may be enhanced. The primary risk of the use of complementary modalities is when they are used as alternatives or substitutes for conventional medical treatments thereby risking disease progression.

Integrative Oncology Trends in Cancer Care

There is growing evidence of the potential benefits to cancer patients when the best of conventional care is effectively combined with complimentary approaches (Deng & Cassileth, 2002; Society for Integrative Oncology, 2007). Not only do patients want more information about these potential benefits, but they also believe access to complementary therapies should be a part of standard cancer care (Coss, McGrath & Caggiano, 1998). Two trends can be noted: community integrative care centers are emerging and some conventional cancer treatment centers have adopted integrative cancer care departments and programs (Cassileth, 2002). However, it must be acknowledged that complementary and integrative approaches to health care have both outcome and process issues that require rigorous, ongoing, qualitative and quantitative evaluation of short term and long term effects of this type of care (Brazier, Cooke & Moravan, 2008). Clinicians and researchers must continue to examine findings related to biofield based therapies and determine if and when these modalities provide helpful tools (Jain & Mills, 2010).

Oncology nursing is moving into a phase of care delivery articulated with multi-faceted “high tech” delivery and documentation systems. However, the oncology nurse should not let the glamour of “high tech” bio-informatics override nursing’s primary mission. Appropriate integration of low tech complimentary care modalities has the potential to enhance the impact of conventional care by, as Nightingale advised, putting the patient in the best condition for nature to act upon the patient.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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At A Glance

As integrative therapies become more commonly used by oncology patients, oncology nurses are finding it increasingly necessary to understand the rationale and evidence-based literature regarding the use of these therapies. To this end, findings of a recent research study regarding the use of the biofield therapy Healing Touch during chemoradiation for cervical cancer are discussed. Proposed mechanisms and potential contributions of this biofield therapy are also addressed. Integrative oncology care has the potential to enhance conventional care by putting the patient in the best condition to use their innate healing resources.

Table 1

Demographic characteristics of study groups

Measure	Healing Touch	Relaxation	Usual Care
Age(years)(n=21, 20, 19)	48.1	43.1	48.0
Education (n=18,20,17)			
Less than high school	0.0%	10.0%	0.0%
Some high school	16.7%	0.0%	5.9%
High school graduate	38.9%	35.0%	35.3%
Trade school/some college	27.8%	35.0%	29.4%
College graduate	16.6%	20.0%	29.4%
Race (n=21,20,19)			
American Indian/AlaskanNative	0.0%	0.0%	5.3%
Asian	0.0%	5.0%	0.0%
African American	0.0%	0.0%	0.0%
Caucasian	100.0%	95.0%	94.7%
Ethnicity (n=21,20,19)			
Hispanic	9.5%	0.0%	0.0%
Non Hispanic	90.5%	100.0%	100.0%
FIGO stage (n=21,20,19)			
IB1	33.3%	15.0%	15.8%
IB2	23.8%	15.0%	36.8%
IIA	0.0%	15.0%	5.3%
IIB	23.8%	35.0%	5.3%
IIIA	0.0%	5.0%	0.0%
IIIB	14.3%	15.0%	31.5%
IVA	4.8%	0.0%	5.3%

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