Research

The Effect of Therapeutic Touch on Postoperative Patients

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Background: Therapeutic Touch (TT) is a complementary modality that has been demonstrated to reduce psychological distress and help patients to relax. It is unclear if there is an impact of TT on biobehavioral markers such as cortisol and natural killer cells (NKCs). There is some preliminary evidence that suggests relaxation may have positive effects on the immune system. **Purpose:** To test the efficacy of TT on pain and biobehavioral markers in patients recovering from vascular surgery. **Framework:** The study was grounded in a psychoneuroimmunology framework to address how complementary therapies affect pain and biobehavioral markers associated with recovery in surgical patients. **Design:** This was a between-subjects intervention study. **Sample:** Twenty-one postoperative surgical patients. **Measures:** Measures of level of pain and levels of cortisol and NKCs were obtained before and after a TT treatment. **Results:** Compared with those who received usual care, participants who received TT had significantly lower level of pain, lower cortisol level, and higher NKC level. **Conclusions and Implications:** Evidence supports TT as a beneficial intervention with patients. Future research on TT is still needed to learn more about how it functions. However, there is evidence to support incorporating TT into nursing practice.

Keywords: *therapeutic touch, recovery, psychoneuroimmunology*

Despite advances in surgery and postoperative care, managing symptoms such as pain and stress related to postoperative recovery remain persistent problems during hospitalization for surgery and after discharge (Devine et al., 1999; Flanagan & Jones, 2009; Moore & Dolansky, 2001; Samarel, 1997). When a person undergoes an invasive procedure such as surgery, the stress response is stimulated (Salomaki, Leppäluoto, Laitinen, Vuolteenaho, & Nuutinen, 1993). In addition, patients also experience pain after surgery, and evidence suggests that pain can suppress the immune system (Liebeskind, 1991).

Furthermore, pain, fatigue, and stress can affect a patient's willingness to engage in postsurgical health promoting behaviors such as ambulation, deep breathing, and coughing (Kiecolt-Glaser, Page, Marucha, MacCallum, & Glaser, 1998). Despite nurses' work with postoperative patients to assist them with these strategies to enhance their recovery, hospitalization is still challenged by additional stressors that affect the patient's recovery.

Nurses incorporate many types of intervention strategies to help their patients recover from surgery. Increasingly, some nurses are using complementary

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or alternative therapies to help patients manage their stress and discomfort during hospitalization. Complementary and alternative therapies are a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine (National Center for Complementary and Alternative Medicine, n.d.). Many patients ask for these therapies when hospitalized because they use such therapies outside the hospital to help manage their health. In 2007, Americans spent nearly $34 billion out of pocket on complementary and alternative medicine (CAM), with 38% of adults (almost 4 in 10) and approximately 12% of children (about 1 in 9) using some form of complementary or alternative therapy (Nahin, Barnes, Stussman, & Bloom, 2009).

Therapeutic Touch (TT) is one complementary modality that has been used by nurses for more than 30 years, and it has been demonstrated to reduce psychological distress, reduce anxiety, and help patients to relax (Peters, 1999; Winsted-Fry & Kijek, 1999). However, in many of the studies analyzed by these authors, TT had been done with healthy people. Winsted-Fry and Kijek (1999) recommended that "future studies should use real time TT with ill persons" (p. 62). To this end, the following study was undertaken.

The purpose of this pilot study was twofold: to determine the efficacy of a TT intervention on postoperative pain and the biobehavioral stress markers of cortisol and natural killer cells (NKCs) that have been demonstrated to be associated with postoperative stress in patients (Kiecolt-Glaser et al., 1998) and to determine the feasibility of implementing a TT intervention protocol on a busy inpatient unit with postoperative patients at Massachusetts General Hospital.

Background

Conceptual Framework

The psychoneuroimmunology (PNI) model, the framework that underpinned this study, suggests that psychological variables such as emotions have a direct effect on "stress" hormones, which can work to modulate immune function. Kiecolt-Glaser et al. (1998) found that individuals who are more anxious are more likely to experience greater postsurgical pain that, in turn, can downregulate immune function. McCain, Gray, Walter, and Robins (2005) consider the PNI paradigm to be comprehensive because it provides for inclusion of individual as well as social/collective/environmental phenomena. In recent years within nursing, the PNI framework has served well as the theoretical underpinnings for the use of complementary healing interventions designed to improve and/or maintain health. Over the past decade, theoretical work has been established to support the link between stress and neuroendocrine and immune function (Glaser & Kiecolt-Glaser 1994). However, most research has focused not on stress relief per se but on how stress adversely affects immune function and increases risk for compromised health. Halldorsdottir (2007) states that "this rapidly expanding field of research is of particular importance to health professionals since their common goal is to empower suffering people and increase their health and promote healing" (p. 32). The exploration of interventions to decrease stress and its impact on immune and neuroendocrine stress markers in at-risk populations creates new possibilities to advance the PNI framework and to develop and refine interventions useful in reducing stress associated with surgery.

Literature Review

Therapeutic Touch is a complementary healing modality that has been used and researched by nurses for more than 30 years (Barron, Coakley, Fitzgerald, & Mahoney, 2008; Denison, 2004; Engle & Graney, 2000; Gronowicz, Jhaveri, Clarke, Aronow, & Smith, 2008; Heidt, 1979; Krieger, 1973; Meehan, 1985; Movaffaghi, Hasanpoor, Farsi, Hooshmand, & Abrishami, 2006; Quinn, 1983). Since the time of Nightingale and before, touch has been the hallmark of nursing care. Nurses have integrated the use of touch into the delivery of patient care. The back rub before sleep, for example, was used regularly to promote relaxation and induce sleep. This strategy offered the nurse an opportunity to interact and connect with patients in a therapeutic manner. Back rubs, considered a form of massage, were developed from Chinese folk medicine. For many, massage continues to be used for healing purposes throughout India, Egypt, Persia, and Japan (Groer et al., 1994).

Therapeutic Touch, an intervention derived from the laying on of hands, transfers energy via the hands from a person (the healer) to another person (the healee) to help or heal that individual (Krieger, 1993; Mulloney & Wells-Federman, 1996).

> During TT the healer acts as a human support system, their own health energy field providing the scaffolding to guide the repatterning of the healee's weakened and disrupted energy flow. . . . This support is oriented toward stimulating the healee's own immunological system, for it is the healee who heals her- or himself. (Krieger, 1993, p. 13)

An intervention, not a cure, TT is very low tech, low cost, and within the scope of nursing practice. This intervention can be incorporated readily into nursing practice and has enjoyed increasing popularity and interest by both patients and nurses in recent years (Fenton, 2003).

Over the past 30 years, numerous studies have been conducted to support the use of TT in clinical practice. The classic preliminary work related to TT done by Dolores Krieger (1973) in her doctoral dissertation research at New York University found that TT elicits a condition of general relaxation of the body that includes flushing of the skin, lowering of the vocal pitch, and a subjective feeling of tranquility. These effects appear similar to the condition of reduced tension known as the Relaxation Response (Benson, Greenwood, & Klemchuk, 1975), which is believed to be a meditative state mitigating the effects of stress reactions.

Although many of the early TT studies were qualitative in nature (France, 1993; Heidt, 1990; Samarel, 1992), there were some early quantitative studies conducted by Quinn (1982) and Heidt (1981) that established TT as an intervention to help decrease anxiety. An examination of the two studies' findings revealed that an average decrease in state anxiety of 17% can be expected when TT is used with hospitalized cardiovascular patients (Quinn, 1982).

In addition to its effect on anxiety and relaxation, TT has also been used to help patients with pain management. Meehan (1985) found that post-surgical patients who had received TT waited a significantly longer time before requesting analgesic medication. Later, she replicated her study and found when TT was given along with a narcotic analgesic, patients waited significantly longer before requesting further narcotic medication (Meehan, 1993). Keller and Bzdek (1986) found TT reduced headache in 90% of subjects to a significant degree (70%) and the effect was enhanced over 4 hours following the intervention. Turner, Clark, Gauthier, and Williams (1998) reported a significant effect of TT on reducing pain (Pain Response Inventory; t = 2.76, p = .000) in burn patients.

Two meta-analytic studies of TT research done by Winsted-Fry and Kijek (1999) and by Peters (1999) show mixed or equivocal results related to the effect of TT on various outcomes. Authors of both studies believed this was due most likely to small sample sizes, lack of theoretical frameworks, lack of standardized intervention protocols or outcome measures, and the use of healthy participants. The authors acknowledged that even though TT has been shown to decrease anxiety, additional research is needed.

Newer research has demonstrated that TT improves functional ability in elders with degenerative arthritis (Eckes Peck, 1998) and decreases anxiety in both TT providers and recipients (Coakley, 2001). Denison (2004) found that TT is an effective treatment in decreasing pain and improving quality of life in fibromyalgia patients. Engle and Graney (2000) report that TT has an effect of total pulse amplitude and patient's perception of time. Movaffaghi et al. (2006) found that TT had an effect on increasing hemoglobin levels and probably hematocrit levels. Barron et al. (2008) found that TT provided an opportunity for a therapeutic interaction between nurses and patients on an inpatient medical oncology and bone marrow transplant unit. More recently, Aghabati, Mohammadi, and Esmaiel (2008) reported that TT reduces pain and improves the tolerance of fatigue in cancer patients undergoing chemotherapy, and Gronowicz et al. (2008) demonstrated that TT stimulates the proliferation of human cells. Thus, there is increasing evidence that TT has an effect on certain biologic indicators associated with hospitalized or postoperative patients.

There have been those who have not supported TT as an intervention. Rosa, Rosa, Sarner and Barrett (1998), who claimed that blindfolded practitioners could only "guess" which of their hands was in the experimenter's energy field at a rate expected for random guessing, concluded that "the use of TT by health professional is unjustified" (p. 1009). Cox (2003) reanalyzed their data and concluded that in fact 123 correct responses is actually outside the range of likely values of random guesses, refuting their conclusions. Additionally, this author challenged their conclusions that the use of TT by health professional is unjustified because the blindfolded practitioners involved in the study did not incorporate intention to help the recipient, which is a major component required in a TT treatment.

The specific purpose of this investigation was to test if the TT intervention would have an effect on pain and biobehavioral stress markers, cortisol and NKCs, in postoperative vascular surgical patients.

The hypothesis of this study was the following: After controlling for the influence of significant confounding variables, patients who receive one TT treatment will report significantly lower pain levels and cortisol levels and significantly higher levels of NKCs than patients who receive usual nursing care.

Method

Sample, Setting, and Design

After approval from the institutional review board, this between-group intervention pilot study measured pain and two biobehavioral stress markers in a sample of 21 vascular surgical patients on an inpatient unit at Massachusetts General Hospital. Inclusion criteria were that study participants needed to be English speaking, 18 years of age or older, able to give informed consent, and hemodynamically stable. Staff on the vascular surgical floor initially screened patients for eligibility, and then a research nurse explained the study and obtained consent. The study was conducted in the afternoon on Days 1 through 7 after a vascular surgical procedure. These procedures, namely endovascular repair, open surgical bypass, carotid endarectomy, carotid stenting, and percutaneous transluminal angioplasty, were judged comparable in terms of affecting outcome measures.

Instruments and Measures

Amount of experienced postsurgical pain, defined as the patient's subjective experience of discomfort after a vascular surgical procedure, was measured using a Visual Analog Scale (VAS) ranging from 0 (*no pain*) to 10 (*pain as bad as it can be*). A VAS is a scale determined by a straight line that represents the continuum of the dimension being measured with anchors at either end to help delineate boundaries of a measure (McDowell & Newell, 1987). Huskisson, Jones, and Scott (1976) studied the approximate repeatability of pain VAS in 100 rheumatology patients who were given a vertical scale and a horizontal scale in random order. The reported correlation was .99 between scores and .75 between a VAS printed vertically and a four-point horizontal descriptive scale rating pain as slight, moderate, severe, or agonizing pain. In this pilot study, the scale was printed horizontally, and each patient was asked to rate his/her level of pain prior to and immediately following the TT treatment or usual care.

Biobehavioral Markers

Cortisol, an important hormone in the body, is secreted by the adrenal glands and is involved in proper glucose metabolism, regulation of blood pressure, insulin release for blood sugar maintenance, immune function, and inflammatory response. It is often called "the stress hormone," because it is secreted in higher levels during the body's "fight or flight" response to stress and is responsible for several stress-related changes in the body (Scott, 2009). Considered a biological marker linked to surgical recovery (Kiecolt-Glaser et Al., 1998), cortisol has been linked with adverse health outcomes when elevated (Kiecolt-Glaser et al., 1998, McCain et al., 2005). In this pilot study, blood cortisol levels were measured immediately before the TT intervention or usual care was administered and 1 hour after TT or usual care by drawing blood from an angiocatheter.

Natural killer cells, a crucial first defense against many infectious agents and tumor cells, come forth from the tonsils, lymph nodes, and spleen and destroy infected and cancerous cells while the immune system's T and B cells are still mobilizing. Without NKCs, threatening conditions can get a strong foothold before the adaptive immune response kicks in (Munz, 2009). NKCs were measured immediately before the TT treatment or usual care and 1 hour after TT or usual care by drawing blood from an angiocatheter. TT treatments, usual care, and all blood work were done in the afternoon.

Procedure

Postoperative patients admitted to the vascular surgical inpatient unit were considered for inclusion in this study on postoperative Days 1 to 7. Nurses providing care for these patients asked them if they were interested in hearing about the TT study, and if they agreed to hear more about the study, the research nurse from the General Clinical Research Center (GCRC) described the study in detail. If a patient agreed to participate in the study, the research nurse

Table 1. Descriptive Statistics for Study Variables by Groups

	Experimental Group (n = 12)		Control Group (n = 9)	
Variables	Mean	*SD*	Mean	*SD*
Age	72.7	14.5	68.6	11.8
Length of stay	5.1	4.5	6.2	1.8
Time since surgery	2.9	2.3	4.2	2.1
Stress markers				
Pretest pain	2.0	1.6	3.2	1.3
Posttest pain	1.6	1.3	2.8	0.9
Pretest cortisol	20.0	5.0	11.2	6.2
Posttest cortisol	15.8	8.2	14.8	0.2
Pretest NKC	17.5	7.6	10.1	6.8
Posttest NKC	19.5	6.0	17.0	7.4

Note: NKC = natural killer cell.

Table 2. ANCOVA Summary Table

Source	*F*	Significance	Power
Dependent variable: Posttest pain			
Corrected model	8.6	.000	.997
Group	3.6	.081	
Pre-TT pain	1.6	.224	
Age	6.0	.025	
Length of time since surgery	0.1	.830	
Dependent variable: Posttest cortisol			
Corrected model	10.0	.000	.999
Group	0.1	.78	
Pre-TT cortisol	8.4	.01	
Age	0.004	.95	
Length of time since surgery	0.11	.75	
Dependent variable: Posttest NKCs			
Corrected model	34.4	.000	1.000
Group	0.01	.92	
Pre-TT NKC	96.1	.000	
Age	6.8	.02	
Length of time since surgery	8.4	.01	

Note: TT = Therapeutic Touch; NKC = natural killer cell.

obtained written informed consent and contacted the principal investigator (PI) of the investigation who conducted the TT treatments for the experimental subjects. The PI of this investigation is a TT practitioner trained in Krieger's (1979) TT technique. Control subjects received usual care from the staff nurses working on the vascular surgical unit at Massachusetts General Hospital.

Just prior to receiving the specific treatment (TT or usual care), the research nurse asked the patient to complete the VAS pain scale. Then, the research nurse placed an angiocatheter in the participant's arm to be able to draw blood for the cortisol and NKC levels, which were drawn immediately before the TT intervention or usual care and 1 hour after the TT treatment or standard care. All patients were then asked again to rate their pain level.

Results

Characteristics of the Sample

Twenty-one subjects participated in this study with 12 in the experimental TT group and 9 in the usual care control group. Data were analyzed using SPSS 15.0. Descriptive statistics were computed first and examined to determine if there were systematic missing data and whether study variables were normally distributed and met the assumptions of the planned analyses (see Table 1). No problems were noted. Three analyses of covariance (ANCOVA) were then computed to test the study hypothesis that there would significant difference between the group of patients who received TT and the standard care group in postsurgical pain level, cortisol level, and NKC level. The grouping variables in each analysis was the TT group and the usual care group. Covariates in each analysis were participant's age, length of time since surgery, and the appropriate pretest outcome measure, namely, pretreatment pain, cortisol, or NKC. A Bonferroni correction for Type 1 error was imposed in each ANCOVA so that the p value for detecting significant differences between the two groups was .016. Table 2 summarizes the results of the three ANCOVAs.

After the removal of the covariate influence, the group in all three ANCOVAs had significantly different postoperative outcome measures in the posited directions. After removal of the influence of age, number of days since surgery, and their preoperative pain, cortisol, or NKC levels, patients in the TT group had a significantly greater drop in postoperative pain (F = 8.6; p = .000) level and cortisol levels (F = 10.0; p = .000) and significantly higher NKC levels (F = 34.4; p = .000). All ANCOVAs had very high power once covariate influence was removed.

Discussion and Implications

The purpose of this pilot investigation was to evaluate the efficacy of a TT intervention on postoperative level of pain and two biobehavioral markers, cortisol and NKCs, in postoperative vascular patients. In this pilot study, patients who received the TT treatment had lower levels of pain after the TT treatments as compared with the subjects who only received usual care. This finding is similar to prior research done by Meehan (1985), Keller and Bzdek (1986), and Turner et al. (1998). All these studies demonstrated that TT decreases level of pain in different patient populations, namely, patients with headaches, burns, or after surgery. Additionally, this pilot investigation had an effect on biologic or biobehavioral markers, cortisol and NKCs. As hypothesized, cortisol levels decreased and NKCs increased 1 hour after the TT treatment. It should be noted that both control and experimental group patients had increases in cortisol and decreases in NKCs initially following surgery, which are consistent responses to the surgery, a major stressor for all participants, regardless of group. These variables were studied because their changes are associated with the surgical experience and elevations in cortisol and decreases in NKCs can lead to adverse outcomes for patients. Kiecolt-Glaser et al. (1998) recommended studying interventions that could have an impact on these variables associated with surgery.

These findings support Movaffaghi et al. (2006), who found that TT increases hemoglobin levels in students who are anemic, indicating that TT does have a measurable physiologic effect. Study findings also support Engle and Graney (2000), who found immediate effects of TT on physiologic variables, pulse amplitude and vital signs. They differed however from the present study findings of effects lasting at least 1 hour rather than the effects not lasting beyond a 10-minute recovery period. This difference may have been due to one or more reasons such as Engle and Graney's use of healthy subjects in a controlled laboratory setting in contrast to the present in vivo study with real patients on a hospital surgical unit and the use of different biobehavioral markers, pulse amplitude, and passage of time versus cortisol and NKCs.

Study findings concur with other studies that have used biologic variables in TT research such as Movaffaghi et al. (2006), who demonstrated that TT had an effect on increasing hemoglobin levels, and Gronowicz et al. (2008), who found that TT stimulates the proliferation of human cells. Although all these studies used different variables in researching the effects of TT, it is increasingly evident that TT does have an impact on biomarkers presumably through the reduction of stress and promotion of relaxation as outlined in the PNI framework. Kiecolt-Glaser et al. (1998) recommended that stress-reducing interventions should be studied in surgical patients. However, more extensive research on TT is needed to understand how the effects of these biomarkers link to patients' experience, recovery, and healing.

An unexpected finding in this pilot study illustrated the challenges associated with conducting intervention research, especially that which includes an invasive-type procedure such as drawing patients' blood for analyses. Many postoperative patients who were asked to participate in this study were interested in learning about TT and were eager to receive a treatment; however, many refused to participate when they were informed that they would need to have an angiocatheter placed in their arm for blood draws. This challenge, which was not identified by the PI prior to conducting the pilot study, extended data collection and resulted in a smaller-than-expected sample size. Another issue related to this in vivo research was the scheduling challenges associated with participants. Patients would agree to participate in the study but when it came time to conduct the intervention protocol, they were off the unit for a diagnostic test, had visitors, or had just received their lunch because they had been off the floor for a diagnostic test. Last, there were some patients who were tired and did not feel well enough to participate. Thus, recruitment for participation in this study proved to be a more serious issue than the PI had anticipated prior to the study onset. Future studies with TT should make sure to provide for longer data entry and collection times, particularly if invasive procedures will be used to gather outcome data for measurement.

Future studies examining TT as an intervention in the recovery of surgical patients are needed to focus on determining the accurate dose of TT needed, the use of repeated TT treatments to study cumulative effect, and other long-term effects on patients posthospitalization. Additionally, different biobehavioral stress markers and noninvasive data collection methods such as the use of salivary cortisol instead of blood cortisol need to be identified along with other less invasive procedure for collection of outcome measures postoperatively. Because of the challenges of recruitment, subjects who were 1 to 7 days after their vascular surgical procedure were included in this study. This may be the reason why patients had such different pretreatment levels of cortisol and NKCs because some patients were just 1 day postsurgery and others were up to 7 days after surgery, thus further along in their recovery. Future studies will need to plan for more similar data collection times.

Although the limitations of this pilot investigation, namely, the small sample size, one time TT treatment, and the homogenous patient population studied, may have decreased the generalizability of the findings, this study provides important information for the growing body of biobehavioral research that supports the use this complementary therapy in the care of hospitalized patients.

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