Efficacy of Saam acupuncture treatment on improvement of immune cell numbers in cancer patients: a pilot study

Dae-Joon Kim, Seong-Hoon Park, Jung-Chul Seo, Kyung Soon Kim, Ki Cheul Sohn, Im Hee Shin, Hun Mo Ryoo

Abstract

OBJECTIVE: To collect preliminary data on the effects of Saam acupuncture with regard to the immunity in cancer patients.

METHODS: Ten cancer patients were analyzed for improvements in immunity. Acupuncture was applied at the 5 acupuncture points, Jingqu (LU 8), Zutonggu (BL 66), Yangqu (SI 5), Yangchi (TE 4), and Zhongwan (CV 12) for 2 weeks with 4 sessions. We assessed the effect of Korean Saam acupuncture on the immune system in cancer patients by measuring particular blood cell subsets, including CD3+, CD4+, CD8+, CD19+, and CD56+ cells, as well as total white blood cell count, absolute neutrophil count, and fatigue score. The measurement was performed before and after acupuncture and at a 2-week follow-up.

RESULTS: There was a statistically significant increase in the number of CD3+ (P=0.023) and CD8+ cells (P<0.001) and T-cell subsets, as well as a decrease in the fatigue severity scale (FSS) score (P=0.001) after Saam acupuncture using the 5 acupuncture points.

CONCLUSION: Acupuncture may improve the immune system by increasing the counts of a few immune cells and relieve fatigue in cancer patients by decreasing FSS scores. Although this was a non-controlled study, it constitutes preliminary research investigating the potential effects of Saam acupuncture in increasing the counts of several immune cells in cancer patients.

© 2014 JTCM. All rights reserved.

Key words: Acupuncture; Leukocyte count; Neutrophils; Fatigue severity scale; Pilot projects

INTRODUCTION

Complementary and alternative therapies are mainly adopted for balancing bodily functions, controlling adverse effects, and enhancing the therapeutic effects of conventional medicine. Acupuncture is also performed in oncology clinics and has recently been used for the improvement of immune function in cancer patients. Some studies have investigated whether acupuncture could improve immune function. A study reported that acupuncture enhanced anticancer immune...
function by stimulating natural killer (NK) cells in animals and humans. Another study reported that T-lymphocyte subsets such as CD3+, CD4+, and CD8+ cells, as well as NK cells, were substantially increased after acupuncture or moxibustion treatment in cancer patients. Furthermore, a single-arm study that involved 28 cancer patients showed no decline in the activity of CD3+, CD4+, CD8+, or NK cells after 1 month of chemotherapy combined with electroacupuncture.

T cells and NK cells play a role in defense against potential tumors. These lymphocyte subsets express various cell surface markers. Some T cells have CD3+ cell surface markers, while NK cells have CD16+ and CD56+ cell surface markers; moreover, T cells are further classified as helper cells (CD4+) or cytotoxic cells (CD8+). T helper (CD4+) and cytotoxic (CD8+) lymphocytes are directly involved in cell-mediated tumor destruction, whereas NK cells are important in tumor rejection. Thus, lymphocyte subset analyses can provide information regarding the immune status of a patient and help a physician monitor the therapeutic effects.

Fatigue is also a distressing symptom commonly experienced by 80%-99% of cancer patients. Acupuncture has been the focus of an increasing amount of research in recent years. However, there seems to be a lack of systematic research on acupuncture with regard to its effects on fatigue. A recent study reported an improvement in fatigue scores following acupuncture for chronic post-chemotherapy fatigue.

The efficacy of Korean Saam (or Sa-Ahm) acupuncture has been rarely reported. Saam acupuncture is a unique methodology within traditional Korean acupuncture and is currently used by Korean clinicians. This study investigated Saam acupuncture, which employs 4 acupuncture points located on the upper or lower limbs and 1 acupuncture point on the abdominal region. For a person who has chronic exhaustion, this method is known to help restore vitality and balance the excess, as well as the deficiency of the meridian.

Our primary objectives were to collect preliminary data on the effects of Saam acupuncture with regard to CD3+, CD4+, CD8+, CD19+, and CD56+ cells, as well as white blood cell (WBC) counts, absolute neutrophil counts (ANCs), and the fatigue severity scale (FSS) score, and determine whether the treatment of Saam acupuncture may improve the immunity in cancer patients in terms of the counts of the cells measured. Our secondary goal was to verify the safety of acupuncture in cancer patients.

**MATERIALS AND METHODS**

**Study design**

The institutional review board of Daegu Catholic University Hospital approved this research. We have acquired informed consent from all patients. This study was a prospective, single-arm, observational study. Participants had 4 sessions of acupuncture administered twice a week for 2 weeks. Improvement in the immune cell numbers was evaluated via blood cell counts and FSS score, as shown in Table 1. Participants were screened based on the inclusion and exclusion criteria described below. We confirmed the safety of the acupuncture by determining the red blood cell (RBC) count, hemoglobin level, platelet count, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC), hematocrit (Hct), aspartate aminotransferase (AST), alanine aminotransferase (ALT), creatinine level, serum urea nitrogen (BUN), serum sodium level, serum potassium level, and serum chloride level. All patients were evaluated 3 times, including a final follow-up visit 4 weeks after the initiation of acupuncture, at which time the levels of the CD3+, CD4+, CD8+, CD19+, and CD56+ cells, as well as the WBC counts and ANC, were determined, and the FSS scores were assessed.

**Patient recruitment and enrollment**

Ten cancer patients participated in this study and were screened from August 2012 to October 2012. The inclusion criteria were as follows: (a) Eastern Cooperative Oncology Group (ECOG) performance score of 52” that corresponded to an ability to participate unassisted or with occasional assistance in the trial; (b) age >40 years; (c) palliative operation and radio- or chemotherapy occurred at least 2 months before trial initiation; (d) a stable state despite having systemic or bone metastases; (e) consent to participate, and (f) ability to attend follow-up visits for the study duration. The exclusion criteria were as follows: (a) a history of sensitivity or allergy to acupuncture treatment; (b) ser-
ous medical or psychiatric conditions rendering participation in the trial unsuitable; (c) pharmacologic treatment for the purpose of a clinical trial; (d) surgical operation within 3 months before acupuncture treatment, with the exception of monoclonal antibody or hormone therapy; (e) a history of myocardial infarction or a cerebrovascular disease within 6 months before the trial, and (f) any communication problem.

**Intervention**

The study protocol involved 2 weeks of treatment with 2 acupuncture sessions per week. For all sessions, vital signs including blood pressure, pulse rate, and body temperature were measured before treatment. In all 4 sessions, acupuncture was applied for 20 min. Needle stimulation was performed manually with a force strong enough to generate a feeling of De Qi. A traditional Korean medicine physician who was registered with the government and had practiced acupuncture for more than 4 years performed the acupuncture. Acupuncture was applied at the 5 acupuncture points, Jinggu (LU 8), Zutonggu (BL 66), Yanggu (SI 5), Yangchi (TE 4), and Zhongwan (CV 12), by using sterile, disposable, stainless steel needles (30 mm x 0.25 mm; Dongbang Acupuncture Inc., Chungcheongnam-do, Korea). The skin was swabbed with an alcohol prep pad prior to insertion of each needle, and the needles were inserted 10-20 mm into the skin.

Saam acupuncture, which was used in this study, is a method for supplementing the deficiency and draining of excess meridian. Tonification and sedation of saam acupuncture are achieved by two methods of needle manipulation: one is to insert the needle with the direction (tonification) or against the direction (sedation) of the meridian/channel course; the other is to rotate the needle counterclockwise (sedation) or clockwise (tonification). We applied a manual tonification: needles were inserted along the channel and twisted 9 times clockwise. For sedation, needles were inserted against the channel and twisted 6 times counterclockwise. No electrical stimulation or other interventions were used.

**Statistical analysis**

Statistical analyses were performed using SPSS version 19 (IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0, Armonk, NY, USA). A P-value of <0.05 was considered statistically significant. Using quantitative data recorded over 6 follow up visits, the mean FSS score and lymphocyte cell counts (CD3+, CD4+, CD8+, CD19+, CD56+, WBC, and ANC) were calculated for each participant. Changes between the initial time-point and the 2- and 4-week time-points were evaluated using the Wilcoxon signed-rank test for repeated measures, as well as one-factor analysis.

**RESULTS**

Ten patients were included in the trial and completed a total of 4 treatments and a follow-up session. A flow chart of the trial participants is shown in Table 1. The participants, including 5 men and 5 women, had a mean age of 57.6 years (standard deviation, 10.69; range, 41-75).

As shown in Table 2, the median CD3+ cell count was 661.830 cells/µL at baseline and rose to 819.000 cells/µL at week 4, representing a statistically significant improvement (F=5.597; P<0.023). The median CD8+ cell count was 298.670 cells/µL at baseline and was 404.830 cells/µL at week 4, representing a statistically significant improvement (F=18.997; P<0.001). In the Wilcoxon signed-rank test, there was a statistically significant difference observed between week 4 and the other measurements for acupuncture. However, the intragroup analysis of the CD4+, CD19+, and CD56+...
cell counts showed no significant changes. The median FSS score was 35.830 at baseline and 33.500 at week 2. The FSS score decreased to 19.5 at week 4 ($F=14.591; P=0.001$) that was statistically different compared to that of the FSS scores at baseline and week 2. All 10 enrolled patients showed a decrease in the FSS score measured at baseline compared to those of the follow-ups. The FSS scores between visit 2 and visit 6 decreased by 50%-150%, and FSS score between visit 5 and visit 6 decreased in the range of 56%-188%.

No adverse events were reported during the acupuncture process.

**DISCUSSION**

In our study, the levels of T-lymphocyte subsets such as CD3+ and CD8+ cells increased 2 weeks after the final acupuncture treatment. In comparison with the baseline levels, the mean CD3+ cell count at the 2-week follow-up increased by 23.7%, and the CD8+ cells increased by 35.5%. Our results were consistent with those of other clinical trials that showed acupuncture could result in a significant increase in lymphocyte numbers. Furthermore, although not statistically significant, the mean values of the other cell subsets were also increased at the 2-week follow-up and had similar patterns to those of the CD3+ and CD8+ cells.

Regarding the response of the WBC count and ANC to acupuncture, we found no statistically significant differences between the baseline values and the 2-week follow-up values, although the median WBC counts and ANC per volume of blood reduced by 11.0% and 17.4%, respectively. However, several studies showed that acupuncture increased the WBC counts or ANC in cancer patients who were receiving chemotherapy.

In order to reconfirm the discrepancy between our results and the other studies, we believe further study is necessary with a larger number of participants, including a comparison of an acupuncture group with a control group.

In our study, acupuncture appeared to alleviate the cancer patients’ fatigue. The FSS score had a mean improvement from baseline to follow up of 54.4%; moreover, the FSS scores decreased from baseline to follow up. In concurrence with our study, Vickers et al. reported that 12 of 32 post-chemotherapy patients (39%) had improvements of 40% or more after acupuncture treatment, and 3 experienced 75% improvements in their fatigue symptoms after acupuncture. However, this study also had limitations, including the absence of a control group. To objectively evaluate the effects of acupuncture, we think comparison of a study group to a control group is needed.

In this study, the decline of the immunity was induced by yin deficiency with effulgent fire. Based on the characteristics of Saam acupuncture of modulating imbalance of excess and deficiency in body, we employed acupuncture points to tonify water points and sedate fire points of Five shu points located on the upper or lower limbs, which consist of Jinggu (LU 8), Zutonggu (BL 66), Yanggu (SI 5), and Yangchi (TE 4). Zhongwan (CV 12) in the extra channel was selected to modulate the function of stomach. We hypothesized that the utilization of these 5 acupoints could improve the immune cell numbers of cancer patients, although a concrete mechanism is not clear. In this study, the effect of acupuncture was evident during the final fourth week of the trial. Additional follow up over a longer period would help in verifying whether the effects of acupuncture persist up to 4 weeks.

Despite the single-arm trial design, this pilot study suggested that acupuncture might improve the CD3+ and CD8+ cell counts and reduce fatigue in cancer patients in Korea. For future study, we are planning large controlled trials to confirm the efficacy of Saam acupuncture for the improvement of immune cell numbers in cancer patients.

**REFERENCES**


