

Effect of Transcutaneous Electrical Nerve Stimulation (TENS) on Pain among Patients with Cancer

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Abstract

Background: Pain is one of the main symptoms reported in cancer patients which is directly associated with the disease itself or while undergoing treatment. Non-pharmacological interventions are necessary to be included in treatment modalities for pain related to cancer, wherein a variety of options can be used to reduce pain and improve the quality of life. Transcutaneous electrical nerve stimulation (TENS) is widely used, despite lacking evidence to confirm effectiveness in any type of chronic pain, including cancer-related pain.

Purpose: There are limited studies that discussed the uses of TENS. Therefore, the purpose of this paper was to explore the effectiveness of TENS on cancer-related pain.

Methodology: Literature review was conducted by searching in PubMed, Science Direct, EBSCO, CINAHL, and Google Science. 36 articles were found; the review utilized 9 articles despite extensive research which met the selection criteria. The articles regarding TENS is limited, thus the author extends the search for more than five years published articles, which extend between 1997-2013.

Conclusion: There is insufficient evidence to ascertain as to whether TENS can be used in adults with cancer-related pain. After reviewing all the articles, it is evident that there is no significant improvement in pain especially in patients with advanced cancer. The 9 articles which support the use of TENS, still provide inadequate evidence in the effectiveness of TENS to cancer patients. The author believes that TENS is futile to use in the treatment of cancer-related pain.

Keywords: TENS; Cancer pain; Non-pharmacological pain management

Introduction

More than 10 million patients worldwide are diagnosed with cancer every year. A serious concern with this, is the pain these patients experience accompanying their condition. While pain is inevitable for everyone with cancer, it is a common occurrence. Approximately, one-third of adults who have active treatment for cancer, and two-thirds of those with advanced stage of cancer experience pain (International Association for the Study of Pain [IASP], 2009).

Pain is one of the main symptoms reported in cancer patients which is directly associated with the disease itself or while undergoing treatment. Approximately, 30% to 50% of cancer patients receiving treatment experience pain and 70% to 90% with advanced stages of cancer experienced moderate to severe pain [1]. Reducing the pain and suffering of cancer patients is essential in delivering quality care. Pain experienced by cancer patients affecting the quality of life, physical functioning, social relationship, and mental health, pain often co-occurs with additional symptoms, such as fatigue, sleep disturbance, loss of appetite, and anxiety [2].

Nonpharmacological interventions are important to treatment modalities for pain related to cancer. A variety of options can be used to reduce pain and increase the quality of life. Physicians may feel unfamiliar about which modalities have been used for patients with

cancer that have scientific pain relief [3]. Transcutaneous electrical nerve stimulation is a commonly used nonpharmacological and non-invasive treatment for pain.

TENS refers to the delivery of electrical impulses to the skin to activate peripheral nerves. The technique is predominantly used in developed countries to relieve a wide range of acute and chronic pain conditions, including cancer-related pain [4]. Transcutaneous electrical nerve stimulation (TENS) is widely used, despite lacking evidence to confirm effectiveness in any type of chronic pain, including cancer-related pain [5]. Case reports and uncontrolled studies propose efficacy, while the duration of benefit may be limited [6].

Despite the results of experimental research, the efficiency of TENS in clinical practice is debatable. TENS has been the subject of a number of systematic reviews addressing its effectiveness in cancer pain. However, the benefits of TENS for cancer-related pain remain unclear. Although physicians propose that TENS has a significant role, there is currently no direction for clinicians regarding the use of TENS in the oncology and palliative care setting. [7].

This paper will be guided by the Gate Control theory developed by Patrick Wall and Ronald Melzack in 1965. The theory states that pain is the interplay of balance between the information traveling into the spinal cord over large nerve fibers and information traveling into the spinal cord through small nerve fibers. If the relative amount of activity is greater in the large nerve fibers, there should be little or no pain [8].

The Purpose

The aim of this literature review is to determine the effectiveness of TENS for cancer-related pain in adults. In addition, the result will provide guidance for health care professionals and patients on the optimal parameters of TENS for effective pain relief.

Methodology

A literature review was conducted by searching in PubMed, Science Direct, in March 2017 by using keys word: TENS, Pain, Cancer, Non-pharmacological pain management. The articles regarding TENS is limited, thus the author extends the search for more than five years published articles, which extend till the year 1997. 36 articles were found; the review utilized 9 articles despite extensive research which met the selection criteria.

All articles were collated and reviewed for possible inclusion in this research based on the specific inclusion criteria established. Article selection criteria for the integrative research review were the following: the search was limited to English-language, humankind, RCT researches, integrative literature review, and studies were conducted between 1997-2013. Most articles were published in nursing journals.

Result

Research on the effectiveness of TENS therapy to cancer-related pain is debatable and mostly limited to small sample size clinical studies and case reports. A trial examined acupuncture-like TENS for cancer pain, vomiting/nausea, or both in 15 for palliative patients, and compared outcomes with a control group who received a fake TENS, which was directed for five days for 30 minutes daily. There was no significant pain relief between the two groups [9].

While other randomized, double-blind trial did not recognize a benefit from both TENS and transcutaneous spinal electroanalgesia (TSE), compared to fake TSE in 49 women have pain related previous surgery (Ex. post mastectomy pain syndrome). The patients received each treatment constantly for three weeks with a one-week washout period. All three procedures resulted in relief of pain and improved quality of life. There was no recorded clear evidence that TSE or TENS was more effective than the fake TSE [10]. Robb conducted a systematic review in 2009 which concluded that TENS has insufficient evidence as to whether it should be used in adults with cancer pain [11].

Jeffrey conducted a study in 2013 to examine the effectiveness of TENS in pain management among patients with sarcoma. The study was composed of 8 patients with sarcoma, wherein the patients were visiting the pain clinic regularly with the initial four-lead trial of TENS lasting 30 minutes for two months. The study revealed that seven out of eight patients had less pain, three out of the seven patients reported clinically significant pain relief, while the other four patients described less pain and improved physical movement [12].

A Cochrane systematic review conducted by Karen and his colleagues to assess the effectiveness of TENS in cancer pain management analyzed 43 studies but had only two which met the eligibility criteria for his review. The result reported that there was insufficient evidence to deduce on the use of TENS for patients with cancer or cancer treatment-related pain [11]. The same author, Karen and his colleagues organized a study that compared the effectiveness of TENS, Transcutaneous spinal electro analgesia (TSE), and a placebo

TSE in a randomized controlled trial. The study participants included 41 women with chronic pain after breast cancer treatment, and outcome measure included pain report, pain relief, pain interfering, anxiety, arm mobility, and pain killer consumptions. There was slight evidence to propose that TENS or TSE were more effective than placebo [10].

A case study was conducted to examine the effect of transcutaneous electrical nerve stimulation (TENS) for cancer bone pain. The study involved a 63 year-old woman with a history of metastatic lung cancer to bone. Permission was taken from the patient to go through an hour of TENS therapy to assess its acceptability in challenging-to-treat cancer bone pain. The study concluded that TENS may be a new treatment for cancer bone pain, especially for pain cause by movement, however, the patient did not report less pain [13].

In multicenter s feasibility study conducted phase III trial of transcutaneous electrical nerve stimulation (TENS) in patients with cancer-related bone pain recruited from palliative care units. Eligible participants received active and placebo TENS for 1 hour session of pain for 3 days. Replies assessed at 30 and 60 minutes included numerical and verbal scores of pain at rest and on movement and pain release. 24 patients were randomized selected and 19 completed both applications. The intervention was tolerated well by the majority. On the other hand, five patients withdrew, 3 patients deteriorated in their performance status while 2 had increased pain Nine participants did not recognize that a placebo was used whereas 10 participants correctly recognized the placebo TENS. This feasibility study proposed that TENS may cause pain relief on movement related to pain, but not on the cancer pain itself. [14]. Finally, a review was composed of two RCTs with 64 participants. In the first RCT, there were no significant differences between the placebo and TENS in cancer-related pain among women with breast cancer. In the second RCT, there was no remarkable distinction between TENS and acupuncture type and placebo in palliative care patients.

Summary and Conclusion

The results of this review are inconclusive because limited of suitable RCTs, but after reviewing all the articles there's no significant improvement in pain, especially with advanced cancer patients, despite 9 articles provides insufficient evidence to judge whether TENS can be used for cancer patients, but the authors' opinion that TENS has minimal effect among cancer patients. More RCT research with large sample size is needed to improve facts in this field.

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