Effects of transcutaneous electrical nerve stimulation on pain and physical symptoms in patients with cancer: a pilot randomized cross-over trial.

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Introduction

- Pain, nausea, fatigue, constipation, insomnia, dyspnea are major clinical problems of patients with cancer. When these symptoms cannot be treated by pharmacotherapy completely, transcutaneous electrical nerve stimulation (TENS) might use for treatment partly.
- TENS can inhibit various physical symptoms, especially pain. However, there are not many study using TENS as the treatment for physical symptoms except pain of patients with cancer.

This pilot study aimed to assess the effects of TENS on pain and physical symptoms in patients with cancer.

Methods

The cross over design was performed.

Patients

Hospital inpatients with cancer-related pain (n=14), who were treated by palliative care team of Nagasaki University Hospital.

TENS

Rehab400 (DJO Global, USA) was used for TENS.

Stimulation: 20 min, 1 time/ day, 5 days/week.

- The back at the same dermatomal level as the pain (100Hz).
- The back at C6-Th1 and Th4-6 level (10-100Hz) for relaxation.
- Inside of ankle joint (tibial nerve, 10Hz) for constipation.

Evaluation

- Pain (NRS, average and max per day)
- Opioid (quantity, rescue overdose)
- EORTC QLQ-C15-PAL (symptom scale)

Sluka KA, et al: J Neurochem 95(6): 1794-801, 2005.

Iqbal F, et al: Colorectal Dis 18(2): 173-178, 2016.

Xie J, et al: Chin J Cancer 36(1): 2017.

Figure 1. Location of pads

Results

Tbale 1. Characteristics of patients

Number	12
Age (year)	69.5±6.8
Genfer (%Female)	21.4%
BMI	19.4±2.0
Cancer	
Oral	2 (16.7%)
Esophageal	4 (33.3%)
Kidney	2 (16.7%)
Breast	2 (16.7%)
Other	2 (16.7%)
Treatment	
Chemo	4 (33.3%)
Radio	2 (16.7%)
Chemo+Radio	6 (50.0%)
Type of pain	
Visceral	7 (58.3%)
Neuropathic	3 (25.0%)
Somatic	2 (16.7%)
Opioid (morphine, mg)	58.3±133.4
Disease duration (days)	577.5±571.6
Hospitalization (days)	36.0±40.9
Performance Status	2.5±0.8

Figure 2. Treatment effect of pain (a day on average)

Table 2. Changes of Pain and Symptom scale.

	TENS	Non-TEN	p
Pain (average, NRS)	-2.7±2.1	1.1±2.0	0.002
Pain (max, NRS)	-1.7±2.1	1.2±2.2	0.002
QLQ-C15-PAL			
Fatigue	-1.6±27.3	9.5±36.2	0.467
Nausea	-18.1±31.3	7.0±8.6	0.016
Pain	-31.3±20.1	9.7±23.0	<0.001
Dyspnea	-5.6±23.9	-2.8±26.4	0.838
Insomnia	-2.8±26.4	-2.8±26.4	0.999
Loss of appetite	-11.1±21.7	16.7±30.2	0.064
Constipation	-16.7±22.5	2.8±30.1	0.170

Carryover effect: p=0.252 (95%CI -4.940 : 1.454)
 Period effect: p=0.779 (95%CI -3.601 : 2.771)
 Treatment effect p=0.002 (95%CI -5.761 : -1.739)

Figure 3. Quantity of opioid

Conclusion

This pilot study showed the possibility that TENS improves pain and nausea in patients with cancer. To detect a more effective method for physical symptoms, the frequency and location of stimulation should be considered in detail. Further study is required to examine whether TENS is as effective for patients with cancer as the palliative care.