



Efficiency of Acupuncture and Transcutaneous Electroneurostimulation in Treatment of Patients with Anxiety Disorders

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Review Article

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Abstract

Introduction: The effectiveness of transcutaneous electrical nerve stimulation (TENS) in the management of Anxiety disorders (AD) compared with standard pharmacotherapy and acupuncture was demonstrated in rare clinical research studies.

Objective: To study the dynamics of anxiety disorders with the use of a direct TENS and acupuncture.

Materials and Methods: 59 patients with AD were examined. 12 patients underwent only pharmacotherapy. 12 patients underwent low-frequency high-amplitude TENS (LH TENS) of the right median nerve. 11 patients have been treated by high-frequency low-amplitude (HL TENS) of the right median nerve. 12 patients received a course of LH TENS of the right tibial nerve. 12 patients underwent course of acupuncture.

Results: GAD-7 shows that the decrease in the severity of anxiety disorders was most of all after acupuncture and averaged 47.9%, in second place - after LH TENS of the median nerve and averaged 44±3%, in third place - after LH TENS of the tibial nerve and averaged 30.2±5 %, in fourth place after HL TENS of the median nerve (14±6%) and least of all after only use of pharmacotherapy (17.2±5%). There was a significant improvement in the quality of life identified using SF-36 by 37% in patients after acupuncture, by 35% in patients after LH TENS of the median nerve, by 20% in patients after LH TENS of the tibial nerve, by 11% in patients after HL TENS of the median nerve and by 13% after pharmacotherapy.

Conclusion: Acupuncture proved to be more effective than LH TENS of the median nerve in treating AD. At the same time, improving the quality of life has the same results in the two methods of treatment. Direct LH TENS is more effective than direct HL TENS in the treatment of patients with anxiety disorders. Stimulation of the median nerve was found to be more effective than stimulation of the tibial nerve by 66% in decreasing anxiety disorders and by 75% in improving quality of life.

Keywords: Anxiety Disorders; TENS; High Frequency -Low Amplitude TENS; Low Frequency-High Amplitude TENS; GAD-7; SF-36; Acupuncture; Pharmacotherapy

Introduction

Anxiety disorders (AD) are present in up to 15.1% of individuals in Russia and constitute the most prevalent subgroup of mental disorders and associated with a high burden of illness [1]. AD are the most common cause of specific phobias which followed by social anxiety disorder (social phobia) [2]. The current conceptualization of the etiology of AD includes an interaction of psychosocial factors and a genetic vulnerability, which manifests in

neurobiological and neuropsychological dysfunctions [3,4]. In many cases pharmacotherapy turned out to be insufficient in treatment of many patients with AD. Clinicians in recent years have therefore begun to widely use alternative non-pharmacotherapy to enhance the effectiveness of drug treatment of AD.

Experimentally TENS increases the concentration of β -endorphins in the bloodstream and cerebrospinal fluid, and methionine-enkephalin in the cerebrospinal fluid, in human

subjects [5]. In other works the effectiveness of acupuncture in the treatment of AD has been proven by potentially modulating glutamate receptors and excitatory amino acid transporters [6-8]. The effectiveness of transcutaneous electrical nerve stimulation (TENS) in the management of AD compared with standard pharmacotherapy was demonstrated in rare clinical research studies. There are also few scientific studies devoted to the comparative analysis between TENS and acupuncture in the treatment of AD.

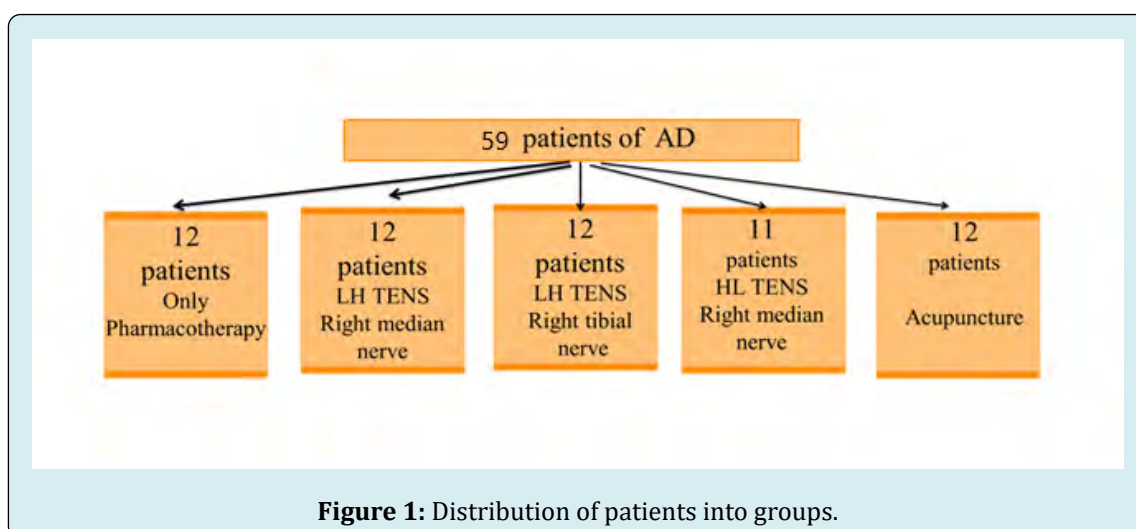
Objective

To study the dynamics of anxiety disorders with the use of a direct transcutaneous electroneurostimulation and acupuncture.

Materials and Methods

59 patients with autonomic dystonia syndrome accompanied by AD were examined. 12 patients underwent only pharmacotherapy. 12 patients underwent low-frequency high-amplitude direct transcutaneous electroneurostimulation (LH TENS) of the right median nerve. 11 patients have been treated by high-frequency low-amplitude direct transcutaneous electroneurostimulation (HL TENS) of the right median nerve.

12 patients received a course of LH TENS of the right tibial nerve. 12 patients underwent course of acupuncture (Figure 1).



Methods of Treatment

TENS combined with pharmacotherapy. Median and tibia nerves were stimulated by monophasic and square form of electrical impulses. Characteristics of TENS are shown in table №1. Method of labile stimulation median nerve was used. Cathode was fixed on the proximal side of median nerve (above carpal canal). Anode stimulated the palmar surface of distal phalange of I-IV fingers in sequences of 20 seconds each. We performed 15 sessions, 3 sessions per week. Method of labile stimulation tibial nerve was used. Cathode was fixed on the proximal side of tibial nerve (above tarsal canal). Anode stimulated the palmar surface of distal phalange of I-V fingers in sequences of 20 seconds each. We performed 15 sessions, 3 sessions per week.

	Frequency	Duration	Amplitude
HL TENS	100 Hz	100 μ s	15 mA
LH TENS	1 Hz	200 μ s	5 mA

Table 1: Characteristics of TENS.

Acupuncture combined with pharmacotherapy. We used acupoints GV20, PC6, PC7, HT7, SP6, LR3 and ExHN3. Acupoint selection based on the recommendations of the majority of specialists who have used acupuncture in the treatment of AD. We used 15 sessions in course and 3 of sessions per week. Duration of session was 30 minutes. In all patients ranges of Generalized Anxiety Disorder Scale-7 (GAD-7) were higher than 10 scores and averaged 16 ± 0.5 scores. Quality of life was investigated by SF-36 questionnaire.

Results

GAD-7 The decrease in the severity of anxiety disorders was most of all after acupuncture and averaged 47.9%, in second place - after LH TENS of the median nerve and averaged $44 \pm 3\%$, in third place - after LH TENS of the tibial nerve and averaged $30.2 \pm 5\%$, and least of all after HL TENS of the median nerve ($14 \pm 6\%$) and after only use of pharmacotherapy ($17.2 \pm 5\%$) (Figure 2).

It is important to note, that there are no a reliable

difference between the results of acupuncture treatment and LH TENS of the median nerve ($p>1$). Also, there are no significant differences between HL TENS of the median nerve and the use of pharmacotherapy alone ($p>1$). At the same time, acupuncture and LH TENS of the median nerve are

undoubtedly more effective in treating AD than after using LH TENS of the tibial nerve ($p<0.05$). Also, LH TENS of the tibial nerve turned out to be more effective than after using pharmacotherapy only and after HL TENS of the median nerve ($p<0.05$).

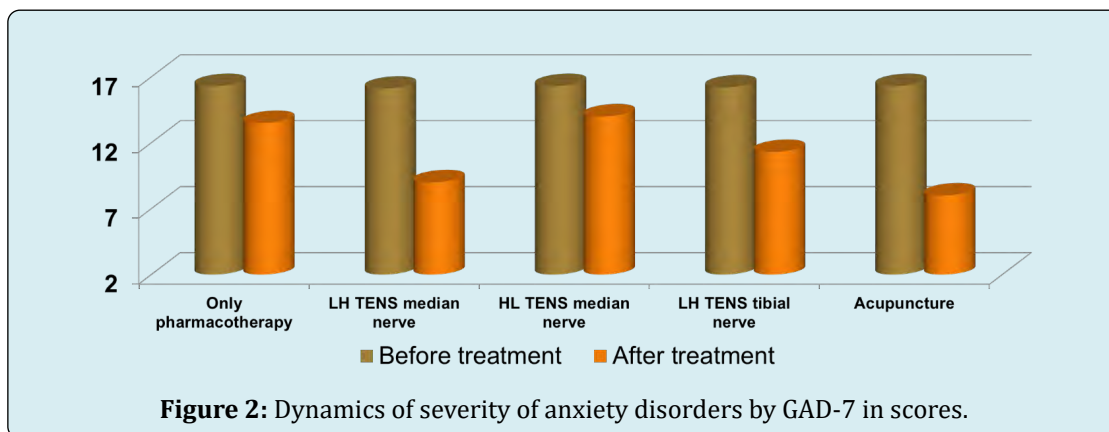


Figure 2: Dynamics of severity of anxiety disorders by GAD-7 in scores.

SF-36 Questionnaire

There was a significant improvement in the quality of life identified using SF-36 by 37% in patients after acupuncture, by 35% in patients after LH TENS of the median nerve, by 20% in patients after LH TENS of the tibial nerve, by 11% in patients after HL TENS of the median nerve and by 13% after pharmacotherapy. More changes were found in physical role functioning, emotional role functioning, and mental health scales (Figures 3-5).

Physical Role Functioning

As seen in figure 3, the highest improvement in Physical role functioning is observed with the use of acupuncture (27.3%) and LH TENS of the median nerve (25.6%). LH TENS of the tibial nerve was in third place and averaged 11.1%. The fourth place was taken by HL TENS of the median nerve, while the effectiveness of treatment on average was 9.5%. Less effective were the use of only pharmacotherapy and averaged only 6.8%.

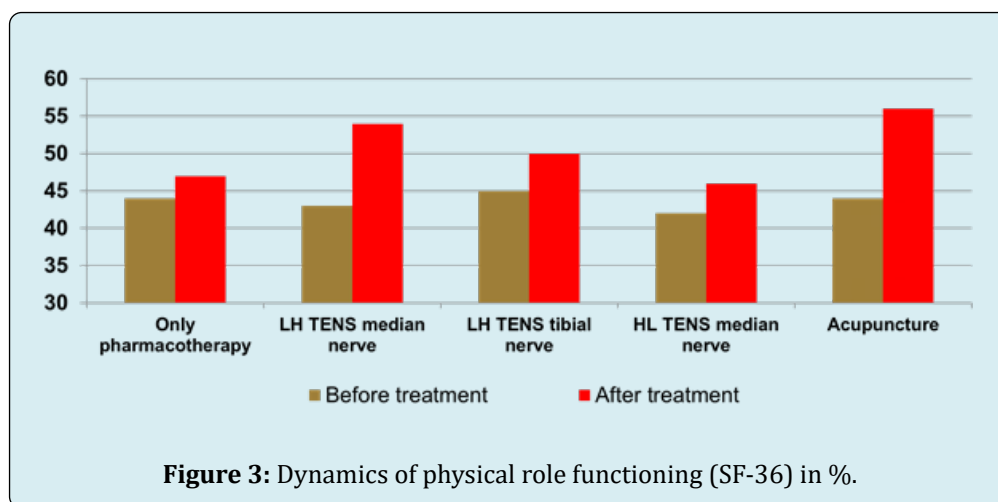


Figure 3: Dynamics of physical role functioning (SF-36) in %.

It should be noted here that in Physical role functioning the effectiveness of LH TENS of the median nerve and acupuncture is not reliably different from each other ($p>1$). Treatment outcomes of HL TENS of the median nerve and LH TENS of the tibial nerve defined by scale of Physical role functioning do not differ reliably with each other ($p>1$).

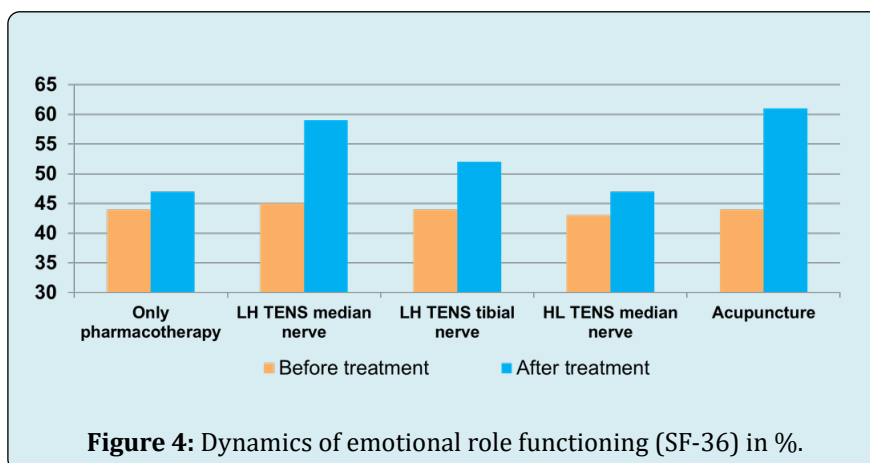
Based on the results obtained, it can be stated that LH TENS of the median nerve and acupuncture are significantly more effective than HL TENS of the median nerve and LH TENS of the tibial nerve ($p<0.05$). Wherein, the effectiveness of using only pharmacotherapy was significantly less than after application of HL TENS of the median nerve and LH

TENS of the tibial nerve ($p<0.05$).

Emotional Role Functioning

The improvement of the indicators of this scale was the most after acupuncture and averaged 38.6% (Figure 4). TENS

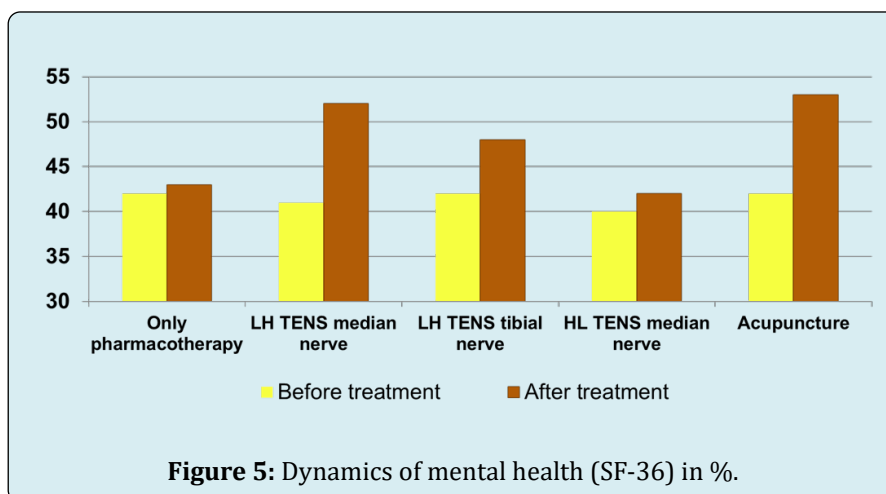
is on the second place. The average improvement was 31.1%. On the third place is LH TENS of the tibial nerve improvement with 18.2%. HL TENS of the median nerve was in fourth place and improved on average 9.3%. The improvement with the use of only pharmacotherapy did not exceed 6.8%.



Here we can state the fact that acupuncture is significantly more effective than LH TENS of the median nerve ($p<0.05$). You can also notice that LH TENS of the median nerve is more efficient than LH TENS of the tibial nerve ($p<0.05$). At the same time, LH TENS of the tibial nerve ($p<0.05$) is more efficient than HL TENS of the median nerve ($p<0.05$). The least effective was the use of only pharmacotherapy ($p<0.05$).

Mental Health

As indicated in figure 5, positive dynamics in mental health scale was noted by 26.8% after LH TENS of the median nerve, by 26.2% after acupuncture, by 14.2% after LH TENS of the tibial nerve, by 5% after than HL TENS of the median nerve and by 2.4% after using only pharmacotherapy.



There are no significant differences in effectiveness between TENS and acupuncture ($p>1$). Both of these treatments are significantly more effective than LH TENS of the tibial nerve ($p<0.05$).

It is also possible to note the absence of reliable differences between the results of treatment after HL TENS of the median nerve and the use of only pharmacotherapy

($p>1$), which were significantly less effective than the use of LH TENS of the tibial nerve ($p<0.05$).

Conclusion

Acupuncture proved to be more effective than LH TENS of the median nerve in treating AD. At the same time, improving the quality of life has the same results in the two

methods of treatment.

Direct LH TENS is more effective than direct HL TENS in the treatment of patients with anxiety disorders. Stimulation of the median nerve was found to be more effective than stimulation of the tibial nerve by 66% in decreasing anxiety disorders and by 75% in improving quality of life.

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