

MANAGEMENT OF LOW BACK PAIN IN PREGNANCY WITH TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION – A PROSPECTIVE STUDY

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Abstract:

Background: Low back pain is common in most of women, but it becomes worse during pregnancy. So the management of this condition are fundamental for the women and society to improve the quality of life. Transcutaneous electrical nerve stimulation (TENS) controls pain non-invasively and non-pharmacologically and has wide range of clinical applications including low back pain in pregnancy.

Aims and Objectives: To compare the efficacy of Transcutaneous electrical nerve stimulation (TENS) with those of acetaminophen and exercise for the treatment of pregnancy related low back pain during third trimester of pregnancy.

Materials and Methods: This prospective study is multicentric and conducted on 56 subjects (>32 gestational weeks) with Visual Analog Scale (VAS), pain scores >5. Participants were randomly divided into 4 groups – control group (n = 14) and 3 treatment groups [exercise (n = 14), acetaminophen (n = 14), TENS (n = 14)]. The VAS and Ronald Morris Disability Questionnaire (RMDQ) were completed before and 3 weeks after treatment to assess the impact of pain on daily activities.

Results: During the study period, severity of pain increased by 50% in control group participants, whereas pain decreased in 95% of participants in exercise group and all participants in the TENS group and acetaminophen group. Post treatment VAS and RMDQ values were significantly lowered in treatment groups. VAS, RMDQ scores indicated significantly greater degree of pain relief in TENS group than in the exercise and acetaminophen groups. No adverse effects of TENS application on pregnant women was observed during the study.

Conclusion: TENS is an effective and safe modality for low back pain during pregnancy.

Keywords: TENS, pregnancy, acetaminophen, VAS, RMDQ.

Introduction:

There is significant increase in incidence of low back pain in third trimester of pregnancy.¹ Prevalence of back pain in pregnancy is up to 75% especially in last trimester.²⁻⁵ Back pain is disabling in 8% of cases.^{4,6} In one third of pregnant women, back pain is a severe problem compromising normal every day life.^{3,4}

The etiology of pregnancy related low back pain is unclear, but it is believed to arise from hormonal, mechanical and circulation causes.¹ Prevention and treatment of this condition are fundamental for the women and for the society to improve quality of life, reduce public health costs and increase productivity.^{3,7} TENS controls pain non-invasively and has a wide range of clinical applications. The TENS units

low voltage electrical impulses that vary in frequency and intensity. These electrical pulses are thought to stimulate nerve pathways in the spinal cord, thereby blocking the transmission of pain.⁸ Principles of controlling pain are based on 'gate control theory' of pain postulated by Melzac and Wall which implies that transmission of pain is inhibited by stimulation of large afferent nerve fibers which carry impulses towards central nervous system. When afferent nerves are stimulated, the pathway for other painful stimuli is closed by the operation of 'gate' in the spinal cord that controls transmissions to the brain. The mechanism of action of TENS is based on the facts that a noxious stimulation can inhibit pain produced by another noxious stimulation. When applied to the lower pack, the TENS units emits electrical impulses which excites afferent nerves, and thus inhibits the transmission of painful stimuli arising from region.⁹ It is also suggested that painful stimuli result in chemical changes in the brain and cerebrospinal fluid which mediates the experience of pain. TENS is thought to compliment this chemical process.¹⁰⁻¹¹ Proposed indications of TENS are numerous. Primarily, TENS is used for the relief of musculo-skeletal pain including low back pain of any etiology. TENS has been increasingly and safely used for pain relief during labour and delivery.¹²⁻¹⁷

This prospective study explored the use of TENS as an alternative treatment option for low back pain during the third trimester of pregnancy. We compared the efficiency of this treatment method with those of exercise and acetaminophen.

Aims and Objectives:

To compare the efficacy of Transcutaneous electrical nerve stimulation (TENS) with those of acetaminophen and exercise for the treatment of pregnancy related low back pain during third trimester of pregnancy.

Materials and Methods:

This multicentric, prospective, randomized study was conducted from May 2018 to April 2019 among women with uncomplicated pregnancy (≥ 32 gestational weeks) who presented at the antenatal care unit of the department of obstetrics and gynecology. Study participants had reported low back pain during routine antenatal care. No participants had a history of low back pain or lumbar

pathology before pregnancy. Baseline Visual Analog Scale (VAS) evaluations were performed to assess the severity of pain on an intermittent scale from 0 (no pain) to 10 (worst pain imaginable). Participants with VAS score ≥ 5 underwent consultation in physiotherapy clinic. All participants had completed the 24-item Ronald Morris Disability Questionnaire (RMDQ) before treatment to assess the impact of low back pain on daily activities.¹⁸ The minimum score was zero and the maximum was 24. The clinical examination method described by Alber et al¹⁹ was used to discriminate pregnancy related low back pain and pelvic joint pain from other painful conditions. 55 pregnant women were diagnosed with pregnancy related low back pain agreed to participate in the study. After obtaining informed consent, the patients were randomized into 4 groups (control, exercise, acetaminophen, TENS, n = 14 in each group) by drawing sealed opaque envelopes prepared by one author, containing group names from a box. The envelopes were opened by another person who was blind to the contents of the envelopes on inclusion in the treatment. The pregnant women in the exercise group were given a home exercise program by a physiotherapist as a treatment modality for 3 weeks. Patients in acetaminophen group were prescribed 500 mg paracetamol tablets twice daily for 3 weeks. TENS was administered to patients in the third trimester group using a dual-channel portable TENS unit. Four 5 cm² surface electrodes were placed on the painful lumbar region of each patient. Our protocol used continuous waves of stimulation at a frequency of 120 Hz and duration of 100 μ s. The intensity was adjusted to produce a tingling sensation approximately 2 – 3 times above the sensory threshold. In each patient, total 6 TENS therapy sessions were conducted twice weekly during 3 weeks. After 3 weeks, data of 56 participants (n = 14 in each group) who completed the study were analysed. The severity of pain and disability of the participants were reassessed after 3 weeks of treatment using VAS and RMDQ instruments. Difference between pre and post treatment VAS and RMDQ scores were compared within and among groups.

Results:**Table 1: Comparison of pre- and post-treatment VAS and RMDQ scores within and between groups**

	Control n = 14	Exercise n = 14	Acetaminophen n = 14	TENS n = 14
VAS score				
Before treatment	7	6	7	8
After treatment	8	5	6	5
Difference	1	-1	-1	-3
RMDQ score				
Before treatment	13	14	15	15
After treatment	14	12	13	7
Difference	1	-2	-2	-8

During the study period, severity of pain increased by 50% in control group participants, whereas pain decreased in 95% of participants in exercise group and all participants in the TENS group and acetaminophen group. Post treatment VAS and RMDQ values were significantly lowered in treatment groups. VAS, RMDQ scores indicated significantly greater degree of pain relief in TENS group than in the exercise and acetaminophen groups. No adverse effects of TENS application on pregnant women was observed during the study.

Discussion:

Diagnosis of low back pain in pregnancy depends upon symptoms. The evaluation of this condition is difficult because the pain is subjective.¹ The present study used the tests described by Albert et al¹⁹ to distinguish back pain from pelvic pain and other causative syndromes. Wang et al have reported that 75% of prenatal care providers did not recommend any treatment to manage symptoms. Most of the suggestions were given by 25% of prenatal care providers who made management recommendations were stretching / exercises (10.4%), frequent rest (9.8%) and combination of other therapies from various complimentary and other allopathic treatments.⁴ Second treatment modality used acetaminophen. This treatment modality is an acceptable method over the counter medication to relieve pain during pregnancy, whereas aspirin and ibuprofen are not.¹ With a regime of 500 mg twice daily, we found a significant decrease in VAS and RMDQ scores at the end of treatment. Our third treatment modality used TENS. This treatment modality has been used to relieve both acute and chronic pain in variety of settings and for a range of conditions, including dysmenorrhea, labour pain and back pain in pregnancy. TENS performed to the back has been compared

with control group and various modalities during labour pain and there was no significant difference between TENS and other groups in the number of women undergoing cesarean section and assisted vaginal delivery.^{14,15,17} Chao et al¹⁶ have reported that while TENS used during labour pain did not increase the cesarean rate, it tended to significantly increase assisted delivery. No significant differences were found in fetal heart rate tracings and neonatal outcomes (fetal distress, APGAR scores and cord blood pH) between the TENS group and other groups which used different forms of pain management during labour.

Kvorning et al²⁰ have used TENS in a small group (6 patients) in late pregnancy to relieve low back pain and they did not report any adverse effect of TENS on pregnant women and pregnancy prognosis in those patients. In our study, no adverse effect of TENS on pregnant women or pregnancy outcome was detected. The mode of delivery was not different from the other treatment or control groups. Our study was consistent with other studies.

Conclusion:

TENS administration is the most effective, easy to apply and safe treatment modality for low back pain in pregnancy.

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