THE EFFECTS OF ELECTRICAL ACUPUNCTURE AT LUMBAR NERVE ROOT FOR RADICULAR SCIATICA DUE TO LUMBAR DISC HERNIATION

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Abstract

We applied electrical acupuncture to the spinal nerve root by inserting needles under x-ray control in two cases with radicular sciatica as a non-pharmacological substitute for the lumbar spinal nerve block. In both cases, symptoms were markedly reduced after electrical acupuncture to the spinal nerve root. The sustained effect was noticeably longer than that of caudal anesthesia previously performed one time on one of the cases. We suggest that descending inhibitory control, inhibitory control at the spinal level, or changes in nerve blood flow may be involved in the mechanism of the effect of electrical acupuncture to the spinal nerve root. These results suggest that electrical acupuncture to the spinal nerve root may be superior to lumbar spinal nerve block or caudal anesthesia when it is applied appropriately in certain cases of radicular sciatica, taking into consideration of patient age, severity of symptoms and duration of the disorder.

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key word : Radicular sciatica, Electrical acupuncture, Nerve root, Lumbar disc herniation

Introduction

It is generally known that acupuncture therapy applied to lumbar muscle and fascia is effective for relieving low back pain originating from muscle and fascia¹⁾. Since it has little effect as a treatment for radicular sciatica, however, there is a call for the development of more effective acupuncture therapy. On the other hand, at pain clinics and orthopedic departments and centers, one conservative treatment frequently employed for radiculopathy is selective spinal nerve block (SNB). We treated two cases of radicular sciatica due to lumbar disc herniation using electrical acupuncture to the lumbar spinal nerve root (EASNR) as a non-pharmacological substitute for the lumbar spinal root block.

Methods

Case

Case 1 : A forty-years-old male who had been

suffered from low back pain, left lower extremity pain and numbness (L.5 area) for 1.5 months. The patient had been treated with poultices, NSAIDs (p. o.), local injection of anesthetics for lumbar muscle region and had massages on the low back and the leg previous to EASNR.

Case 2 : A thirty seven-years-old male who had been suffered from low back pain, left lower extremity pain and numbness (L.4 and L.5 area) for two months. The patient had been treated with poultices, NSAIDs (p. o.), local injection of anesthetics for lumbar muscle region and had massages on the low back and the leg previous to EASNR. In addition, the patient underwent caudal anesthesia prior to receiving EASNR.

The Ethics Committee of Meiji University of Oriental Medicine approved this study. Written informed consent to participate in the study was obtained from the subjects.

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X-ray and MRI findings

Case 1 : X-ray findings indicated diminished intervertebral space at L4-5. Disc herniation and degeneration at L4-5 were suggested with MRI.

Case 2 : X-ray findings indicated diminished intervertebral space at L3-4, L4-5 and L5-S1. Disc herniation and degeneration at L3-4, L4-5 and L5-S1 were suggested with MRI.

EASNR method

Having ascertained that symptoms, X-ray and MRI findings pointed to nerve root disorder, 2 acupuncture needles (length : 90 mm, diameter : 0.24 mm) were inserted in the part of the nerve root that appears peripherally from the intervertebral foramen (external abdominal side of transverse process) under X-ray fluoroscopy (Case 1 : Left L5 nerve root, Case 2 : Left L5, S1 nerve root). With at least one of the 2 needles located in a position close enough to enable stimulation of the nerve root, electrical acupuncture was conducted using the acupuncture needles as electrodes (POINTER F-3, ITO CO., Ltd. stimulation wave : spike wave-form, stimulation frequency : 2 Hz, stimulation time : 10 minutes, stimulation strength : degree of stimulation that can be sensed in the area of innervation) (Figure. 1, 2).

Figure 1. Schematic diagram of nerve root acupuncture stimulation sites. Confirmed the referred pain in the part controlled by the nerve root by inserting 2 acupuncture needles to the part of the nerve root with disorder under X-ray fluoroscopy.

Figure 2. This is an x-ray image at left L4, L5 EASNR (Case 2). Two acupuncture needles (arrows) were inserted in the part of the nerve root.

Evaluation method

Each time the subjects received EASNR, low back pain, lower extremity pain and lower extremity dysesthesia were evaluated to determine any changes before and directly after receiving electrical acupuncture using a numerical scale, with 10 being the degree of pain and discomfort prior to receiving EASNR at the first consultation, and 0 indicating a complete lack of symptoms. Subjects were also asked how long the effect continued after EASNR. Of the two subjects, one had undergone caudal anesthesia treatment before receiving EASNR, and the effectiveness of that was also evaluated in the same way as those of EASNR. EASNR was performed at 10 days after the caudal anesthesia.

Results and Course

Case 1 : Immediately after electrical acupuncture at the spinal root, score for the low back pain decreased from 10 to 3, and the score for the pain and dysesthesia in the extremity decreased from 10 to 4. Even during a visit to the hospital 2 weeks later, due to the sustained effectiveness of the EASNR, low back pain was still evaluated as having decreased from 10 to 3, and lower extremity pain and lower extremity dysesthesia from 10 to 3. Immediately

after second treatments, score for the low back pain and lower extremity pain decreased from 3 to 0. At present, 4 months after the treatment, there has been no clear recurrence of symptoms.

Case 2 : Immediately after caudal anesthesia, score for the low back pain decreased from 10 to 9, and the score for the pain and dysesthesia in the extremity decreased from 10 to 8. However, with this subjects symptoms recurred one day after caudal anesthesia, and L4 and L5 EASNR was performed once every 2 weeks for a total of 5 times. Although the symptoms had not decreased much after first and second treatments, they had significantly decreased after third treatments and almost disappeared after fifth treatments. At present, 2 months after the treatment, there has been no clear recurrence of symptoms.

Discussion

Selective SNB began with a report by Macnab in 1971²⁾. At present it is generally used for assisted diagnosis to specify spinal nerve lesions and as a method of treatment, and it has been reported widely^{2~4)}. In terms of the mechanism of action of SNB, an injection of local anesthetic blocks the sensory nerve and sympathetic nerve to alleviate pain and improve blood flow. When corticosteroids are also used, there is also a direct anti-inflammatory action on the nerve root⁵⁾. We applied electrical acupuncture to the spinal nerve root by inserting needles under X-ray control in two cases with radicular sciatica due to lumbar disc herniation as a non-pharmacological substitute for the lumbar spinal nerve block. As a result, in a case there was a marked reduction in the root symptoms directly after EASNR. In addition, long-term effects were observed in the case. In another case, although the symptoms had not decreased much after first and second treatments, they had significantly decreased after third treatments and almost disappeared after fifth treatments. At present, 2 months after the treatment, there has been no clear recurrence of symptoms. It was suggested that descending inhibitory

control and inhibitory control at the spinal level are the mechanisms of electrical acupuncture analgesia that participate in reducing lower extremity pain immediately after treatment^{6,7)}. results of the present case, however, indicated that in addition to lower extremity pain, the treatment reduces lower extremity dysesthesia and had a long-lasting effect. Inoue et al. reported that EASNR has considerable clinical effects on intermittent claudication due to canal stenosis which lowers blood flow in the sciatic nerve or cauda equina⁸⁾. The effect was supported by a evidence that the blood flow in the sciatic nerve could be increased temporarily by the low frequency electrical stimulation⁹⁾. Low frequency electrical acupuncture stimulation at nerve root may play a role in increasing nerve blood flow. In the Case 2, the effect became clear after the third treatment session and the symptom disappeared at the fifth treatment. This result indicates that the repetition of the temporal increase in the blood flow in the sciatic nerve by the electrical stimulation may be an important factor. The analgesic mechanisms of the anesthetic treatment of SNB and the stimulating treatment of EASNR are also different, while it is thought that stimulation treatment is possibly more effective than anesthetic treatment depending on the pathology, stage, symptoms and other factors. Although the results in these two cases were promising, further study is needed.

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