Pudendal nerve electroacupuncture for lumbar spinal canal stenosis – a case series

Motohiro Inoue, Tatsuya Hojo, Miwa Nakajima, Hiroshi Kitakoji, Megumi Itoi, Yasukazu Katsumi

Abstract

Objective To investigate the effectiveness of pudendal nerve electroacupuncture for lumbar and lower limb symptoms in patients with lumbar spinal canal stenosis for whom acupuncture of the lumbar and lower limb muscles had been ineffective.

Methods Nine patients with lumbar spinal canal stenosis for whom conventional acupuncture at the lumbar and lower limb muscles had no effect. Pudendal nerve electroacupuncture was performed eight times (once per week). VAS scores and continuous walking distance were used to evaluate changes in symptoms.

Results The following changes in symptoms occurred after pudendal nerve electroacupuncture: low back pain was improved from 45.3±17.4mm (mean ± SD) to 39.2±14.0mm, lower limb pain was improved from 61.1±5.6mm to 35.4±11.9mm, lower limb dysesthesia was improved from 63.9±8.4mm to 46.9±16.2mm, and continuous walking distance was improved from 100.0±35.4m to 250.0±136.9m.

Conclusion Pudendal nerve electroacupuncture may be an effective treatment for lumbar and lower limb symptoms due to spinal canal stenosis, and is potentially useful in patients who have not responded to conventional acupuncture.

Keywords

Electroacupuncture, spinal canal stenosis, pudendal nerve.

Introduction

Lumbar spinal canal stenosis is a condition in which the lumbar spinal canal becomes narrower, and is commonly associated with degenerative changes of the spine. This narrowing compresses the cauda equina and/or the nerve roots inside the spinal canal, resulting in low back pain and lower limb symptoms. There have been several reports of the efficacy of acupuncture stimulation of lumbar muscles as a treatment for lumbar and lower limb symptoms due to lumbar spinal canal stenosis. However, since there are many cases for which this is not effective, there is a call for a more effective acupuncture treatment.

Acupuncture stimulation of the pudendal nerve has been applied to the symptoms of neurogenic bladder dysfunction and chronic pelvic pain syndrome. We have found through our clinical experience that some patients with neurogenic bladder dysfunction who have received acupuncture stimulation of the pudendal nerve reported improvement in their low back or lumbar symptoms. Taking into consideration the above, to clarify the clinical effect of pudendal nerve electroacupuncture, we studied the effect of electroacupuncture stimulation of the pudendal nerve in patients for whom acupuncture of the lumbar and lower limb muscles was ineffective.

Methods

Participants

The participants were nine patients (five males, four females, mean age 72.6±5.3 years, and mean duration of disorder 65.7±25.0 months) who complained of lumbar and lower limb symptoms; who had x ray film and MRI findings of lumbar spinal canal stenosis; and who had not been relieved by acupuncture treatment of lumbar and lower limb muscles innervated by damaged lumbar nerves. Of nine patients included in the study, five complained
of intermittent claudication. Patients had all received eight conventional acupuncture treatments, once a week for eight weeks, but had shown an improvement of less than 20% in pain in the back or lower limbs, lower limb dysaesthesia and continuous walking distance.

Conventional acupuncture treatment of lumbar and lower limb muscles was given at the spinal segmental level of the disorder, as determined from clinical symptoms, physical findings and x-ray film and MRI results. The basic location for needle insertion were the extra points Hua Tu Jia Ji (0.5cun, 1–2cm in adults, lateral to the lower border of the relevant spinous process) with an insertion depth of 2cm at the spinal level of the disorder. Stimulation was also conducted in areas of the erector spinae muscle of the spine, quadratus lumborum muscle, gluteal muscles and iliopsoas muscle (to reach the iliopsoas muscle, the needle was inserted at the lower border of the inguinal ligament and immediately lateral to the femoral artery) where palpation revealed tension or tenderness, or where pressure induced recognised symptoms (trigger point). For lower limb treatment, acupuncture stimulation was performed at muscles innervated by the relevant peripheral nerves, taking into consideration the symptoms, neurological findings and imaging findings. All the acupuncture needles were inserted with an intention to obtain de qi and left in place for 10 minutes before being removed.

All the procedures in the present study were approved by the Ethics Committee of Meiji University of Integrative Medicine.

Pudendal nerve electroacupuncture method

Pudendal nerve electroacupuncture was commenced one week after the acupuncture treatment of lumbar and lower limb muscles had finished. The point for acupuncture stimulation to the pudendal nerve is located in the glutal region (at a point 50–60% of the distance along a straight line from the posterior superior iliac spine to the lower inner edge of the ischial tuberosity). An acupuncture needle (0.25mm in diameter) was inserted perpendicularly to a depth of approximately 6–7cm in this region. When the needle reaches the pudendal nerve, a feeling of stimulation arises in the pudendal area. Then the second acupuncture needle was inserted in the same area, close to (within 5mm) the first needle and these two needles were used as electrodes for low frequency electroacupuncture treatment (stimulation frequency: 10 Hz; duration: 10 minutes; and intensity:

---

![Diagram](image.png)

**Figure 1** This schematic diagram shows the points used for pudendal nerve electroacupuncture (see text for full description).
sufficient for stimulation in the pudendal area to be felt). A total of eight sessions of pudendal nerve electroacupuncture (once per week) were performed, on the same side as the lumbar and lower limb symptoms (Fig 1).

Assessment
There were three assessments: before the start of acupuncture sessions to the lumbar and lower limb muscles (time T0); after eight acupuncture sessions to the lumbar and lower limb muscles (T1); and after eight sessions of the pudendal nerve electroacupuncture (T2). Self-assessments of low back pain, lower limb pain and lower limb dysesthesia (explained to the subject as Shibire, a kind of numb or tingling sensation) were performed using a visual analogue scale (VAS). The VAS featured a 100mm straight line, with the left end of the line representing no symptoms at all and the right edge the worst symptoms imaginable. In five subjects who complained intermittent claudication, self-reported continuous walking distance was also recorded.

Statistical analysis
All data were expressed as mean values ± standard deviation. Paired t test was used to detect significant changes in low back pain, lower limb pain, lower limb dysesthesia and continuous walking distance between T0, T1 and T2. A P value of less than 0.05 was considered statistically significant, and significance probabilities in each test were corrected using the Bonferroni method.

Results
All patients completed the eight sessions of electroacupuncture to the pudendal nerve. The VAS values for low back pain, lower limb pain and lower limb dysesthesia at T0 before conventional acupuncture were 46.3±17.4 mm (mean ± SD), 62.9±7.4 mm and 64.9±8.8 mm respectively. Mean continuous walking distance (N=5) at time T0 was 96.0±36.5 m. Changes in symptoms at times T1 and T2 were as follows: the VAS values for low back pain changed from 45.3±17.4 mm (mean ± SD) to 39.2±14.0 mm, for lower limb pain from 61.1±5.6 mm to 35.4±11.9 mm, for lower limb dysesthesia from 63.9±8.4 mm to 46.9±16.2 mm, and for continuous walking distance from 100.0±35.4 m (mean ± SD) to 250.0±136.9 mm (Table 1, Fig 2 and 3).

The numbers of patients who showed an improvement of 30% or more at T2 after pudendal nerve electroacupuncture following lower limb and lumbar acupuncture were: six out of nine (lower limb pain), four out of nine (dysesthesia) and four out of five (continuous walking distance). No one showed improvement of more than 30% in low back pain.

Discussion
We observed that pudendal nerve electroacupuncture significantly improved low back pain, lower limb pain, lower limb dysesthesia and continuous walking distance in patients who previously had no response to acupuncture to the lumbar and lower limb muscles.

The first choice treatment for symptoms due to spinal canal stenosis is conservative therapy, which generally consists of administering various anti-inflammatory agents or intravenous injection of prostaglandin E1, performing epidural block or root nerve block, or conducting orthotic and other treatments. When no effect is observed with these conservative treatments, or when bladder or bowel function is affected, surgical operations such as decompressive laminectomy or decompressive laminoplasty are performed. However, laminectomy and laminoplasty procedures have considerable risks,
Figure 2 Changes in low back pain, lower limb pain and lower limb dysaesthesia after pudendal nerve electroacupuncture. Error bars indicate the standard deviation (SD). *P<0.05 vs before treatment; **P<0.01 vs before treatment; †P<0.05 vs after lumbar and lower limb muscle acupuncture; ††P<0.01 vs after lumbar and lower limb muscle acupuncture.

Figure 3 Changes in continuous walking distance after pudendal nerve electroacupuncture. Error bars indicate the standard deviation (SD). *P<0.05 vs before treatment; †P<0.05 vs after lumbar and lower limb muscle acupuncture.
and reoperation for postoperative recurrence is difficult. For these reasons, alleviating symptoms with conservative treatment is of great clinical significance, and acupuncture could now be considered as a treatment option in these patients.

The mechanism of acupuncture’s effect in this condition is not known. Cauda equina intermittent claudication, a characteristic finding of spinal canal stenosis, is thought to be due to ischemia of the cauda equina, nerve root, sciatic nerve and other areas as a result of stenosis of the spinal canal compressing the cauda equina. If this is the case, one could speculate that electrical stimulation of the pudendal nerve in some way influences cauda equina and sciatic nerve blood flow, perhaps by inducing autonomic changes affecting the blood flow, in similar fashion to pudendal nerve stimulation influencing bladder activity. It is not known how relevant these vascular changes could be for symptoms of nerve root compression. In a companion paper, we investigate this possibility using rats.

These results, if confirmed, indicate that electroacupuncture of the pudendal nerve could be an effective treatment for lumbar and lower limb symptoms due to spinal canal stenosis. Since it can be performed using acupuncture needles, it enables non-surgical, percutaneous approach which is a much simpler and safer method of treatment than surgery. However, one adverse reaction is that during stimulation the patient may experience an unpleasant sensation in the pudendal area. For this reason, it is thought that this method of treatment should be used as a second choice treatment for cases that do not respond to acupuncture stimulation of the lumbar and lower limb muscles.

This study has clarified to a certain degree the effectiveness of electroacupuncture of the pudendal nerve. To further explore its place in clinical practice, however, future studies should investigate the therapeutic effect of electroacupuncture of the pudendal nerve alone, and should compare this treatment with sham acupuncture and with other available treatments.

**Conflict of interest**
The authors declare no conflict of interest.

**Acknowledgements**
We are grateful to Dr N Ishizaki (The Department of Clinical Acupuncture and Moxibustion, Meiji University of Oriental Medicine) for his valuable suggestions and review of the manuscript.

**Summary points**

| Spinal canal stenosis is one cause of lumbar and lower limb pain |
| Conventional acupuncture is sometimes unsuccessful |
| Electroacupuncture given in the region of the pudendal nerve gave significant pain relief in six out of nine cases |

**Reference list**


Pudendal nerve electroacupuncture for lumbar spinal canal stenosis – a case series

Motohiro Inoue, Tatsuya Hojo, Miwa Nakajima, Hiroshi Kitakoji, Megumi Itoi and Yasukazu Katsumi

Acupunct Med 2008 26: 140-144
doi: 10.1136/aim.26.3.140

Updated information and services can be found at:
http://aim.bmj.com/content/26/3/140

These include:

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/