Electroacupuncture therapy for arthralgia and Raynaud’s phenomenon in a patient with systemic lupus erythematosus

Nozomi Donoyama, Norio Ohkoshi

A 45-year-old woman with systemic lupus erythematosus presented with multiple arthralgia, coldness in fingers and toes, and Raynaud’s phenomenon. Electroacupuncture (EA) therapy was performed in two courses (14 treatment sessions) 1 month apart. A needle was inserted in the proximal (or medial) side of the painful joint and another needle was inserted in the distal (or lateral) side of the same joint and a 50 Hz stimulus was applied (3 s bursts with 1 s gaps) for 15 min. A visual analogue scale was used to evaluate pain intensity. Cold provocation testing was conducted before and after EA sessions to determine the vasomotor response.

Visual analogue scale scores were lower after EA sessions than before. Before starting EA, the skin temperature of the right mid fingertip was 27.9°C and that of the left mid fingertip was 28.3°C. In contrast, after the EA sessions, the skin temperature of the right mid fingertip was 34.8°C and that of the left mid fingertip was 34.7°C. In the last EA session, the patient reported that the cold in her fingers and toes had eased and Raynaud’s phenomenon, in which nail colour tone changed from white to red, had disappeared. In the cold-provocation test, before EA, the temperature recovery rates of mid fingertips after cold exposure reached over 80% in 20 min. In contrast, after EA had been completed, the temperature recovery rate exceeded 80% in 10 min, thus the delay of temperature recovery was alleviated.

PRESENTATION AND HISTORY

The patient was a 45-year-old woman, a housewife (at the time of the first visit for acupuncture treatment).

Eight years previously in June, the onset symptoms were a skin disorder manifested as a red, raised rash on the upper extremities and thighs, and morning stiffness in the fingers and lower back. She visited a local clinic and was diagnosed with systemic lupus erythematosus (SLE). Within 6 months, multiple arthritis (knees and elbows) emerged. Aged 39, 6 years ago, she consulted a physician in our facility, the Center for Integrative Medicine, Tsukuba University of Technology, who had majored in traditional herbal medicine and he prescribed Japanese herbal medicine for SLE. The Center was established for integrating Western and Oriental medicine.

On 1 October 2001, aged 45, she wished to control the arthralgia using acupuncture treatment and visited the acupuncture department of the Center despite the physician’s recommendation that steroids be used. Prior to using steroid hormone, she hoped that acupuncture treatment would effectively relieve pain. In the Center, patients can receive acupuncture treatment in the acupuncture department provided they receive permission from a doctor in the medical clinic in the Center.

Subjective symptoms on the first treatment day were following:

1. Multiple arthralgia: pain on rest and movement in knees, elbows, wrists, proximal interphalangeal (PIP) joint of right index finger, PIP joints of both mid fingers and metatarsophalangeal joints of the third toes.
2. Coldness in fingers and toes and Raynaud’s phenomenon in which the colour tone of the nails changes from white to red, giving cold exposure.

TREATMENT

The following three courses of acupuncture treatment were planned in advance, with a 1 month gap between each course, because it would be considered prudent to have periods of non-treatment in order to observe the progress of the condition. Existing observation and medication by a conventional medical doctor was continued as usual during the period of acupuncture treatment (figures 1 and 2).

▶ Acupuncture treatment course I (ATC-I): 1 October to 1 November 2001. Acupuncture treatment was performed in eight sessions during the course.
▶ Acupuncture treatment course II (ATC-II): 6 December to 21 December 2001. Acupuncture treatment was performed in six sessions during the course.
Case report

Acupuncture treatment course III (ATC-III): the third course was planned for February 2002, but the patient withdrew because her pain had been relieved.

In the four sessions from 1 to 18 October, based on observation of the whole body by the theory of Oriental medicine, acupuncture needles were inserted in LU9, SP3, LR2, KI5, PC7, TE4, BL20, BL23, GB24, ST36, BL38 and L5S. Disposable needles, with a diameter of 0.16 mm and length of 40 mm, sterilised with ethylene oxide gas (Seirin Corporation, Shimizu city, Japan), were used. The needles were inserted 0.5–0.7 cm deep depending on the part of the body, at the depth of achieving de qi, heaviness with no manual stimulation and retained for 10 min.

On 22 October, the fifth session, the treatment method was changed to electroacupuncture (EA) therapy at the patient’s request. In EA, two acupuncture needles are inserted into the body, perhaps in places unrelated to the theory of Oriental medicine and low-frequency electricity passed between the two needles; it is often used for pain relief. In this case, a needle was inserted in the proximal side of the painful joint and another needle was inserted in the distal side of the same joint for the knees, elbows and wrists. The PIP joints of the right index finger and both middle fingers and metatarsophalangeal joints of the third toes were crossed by two acupuncture needles between the medial and lateral side of each joint. In the EA, a 50 Hz stimulus was applied (using 3 s bursts with 1 s gaps) and continued for 15 min. The intensity of the electrical stimulation was decided by the patient’s sensation; the current increased until the patient could feel it.

OUTCOME
A visual analogue scale (VAS) was used to evaluate pain intensity. A sheet of paper (width 100 mm × height 40 mm) was given to the patient and it was explained that the left edge of the paper represented no pain and the right edge represented the most pain that the patient could imagine. The patient was asked to indicate the degree of pain felt in each joint at the time before every acupuncture session by marking the corresponding location on the paper. To reduce the burden on the patient, the degree of pain was evaluated only before each acupuncture session and not after the session; in ATC-II it was done once per two sessions. The length from the left edge of the paper to the mark was measured and used as the VAS score. Changes of VAS joint pain scores are shown in Table 1. Due to the change of evaluation method, data of each joint for the first three sessions is missing in Table 1. In general, the subjective symptoms of pain were reduced successfully.

To assess the vasomotor response as part of routine management, cold-provocation testing was conducted on 22 October before starting the EA and on 25 December after ATC-II was completed. It was done after the patient had entered the laboratory at 26±0.5°C and rested for 15 min. Both hands were immersed in cold water at 10°C for 1 min, then the hands were dried and post immersion skin temperature was followed up for 30 min by a thermograph (Thermoviewer JTG-5310; JEOL Ltd, Tokyo). Converting the pre-immersion skin temperature of the mid fingertip into 100% and immediate-post

Table 1 Changes of arthralgia

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<td>Fingers</td>
<td>62.0</td>
<td>69.0</td>
<td>56.0</td>
<td>38.0</td>
<td>41.0</td>
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<td>Wrist</td>
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<td>76.0</td>
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<td>48.0</td>
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<tr>
<td>Elbow</td>
<td>90.0</td>
<td>53.0</td>
<td>60.0</td>
<td>47.0</td>
<td>37.0</td>
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<tr>
<td>Knee</td>
<td>81.0</td>
<td>61.0</td>
<td>74.0</td>
<td>66.0</td>
<td>46.0</td>
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<tr>
<td>Toes</td>
<td>59.0</td>
<td>74.0</td>
<td>68.0</td>
<td>47.0</td>
<td>35.0</td>
<td></td>
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<tr>
<td>Mean</td>
<td>76.0</td>
<td>63.0</td>
<td>48.0</td>
<td>73.0</td>
<td>64.0</td>
<td>68.6</td>
<td>50.0</td>
<td>41.4</td>
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<tr>
<td>SD</td>
<td>14.9</td>
<td>8.1</td>
<td>8.7</td>
<td>10.3</td>
<td>5.6</td>
<td>12.3</td>
<td>8.3</td>
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</tr>
</tbody>
</table>

Acupuncture treatment course-I (ATC-I): Acupuncture treatment was performed in eight sessions from 1 October to 1 November 2001. Electroacupuncture therapy started on 22 October. Acupuncture treatment course-II (ATC-II): Acupuncture treatment was performed in six sessions from 6 December to 21 December 2001. There was a 1 month intermission between ATC-I and ATC-II. Mean: the first three scores refer to a single score for the whole body and other values are the means for the joint pairs.
immersion skin temperature into 0%, the temperature recovery rates were calculated as shown in figure 3. The result of cold-provocation testing by the same method in a 36-year-old female who did not have vasomotor dysfunction is also shown as a normal control in the figure. On 22 October before starting the EA, preimmersion skin temperature of the right middle fingertip was 27.9°C and that of the left middle fingertip was 28.3°C. On 25 December when the ATC-II was completed, preimmersion skin temperature of the right middle fingertip was 34.8°C and that of the left mid fingertip was 34.7°C. In the last session of EA, the patient reported that the cold in her fingers and toes had eased and Raynaud’s phenomenon had disappeared.

DISCUSSION

The result that the VAS score on the last day of ATC-I was lower than the pre-EA score is the same as a previous study using an 80 Hz stimulus EA as an analgesic.\(^1\) Moreover, the VAS score after ATC-II was lower than the pre-EA score. This result suggests that sustained EA effectively reduces pain continuously. During the break between the two acupuncture treatment courses, the pain did not relapse. This result implies that the analgesic effectiveness of EA continues for at least 1 month.

The temperature recovery rates of the mid fingertip for normal females after 10°C cold water exposure for one minute in a previous study were as follows: 62% in 1 min after exposure, 84% in 5 min, 92% in 10 min and 95% in 15 min.\(^2\) Before starting EA, the temperature recovery rates of middle fingertips in this patient after cold exposure reached over 80% only after 20 min, indicating a delay in recovery. Moreover, after cold exposure for 25 min, the skin temperature of the left mid fingertip was far higher than the pre-immersion temperature (figure 3). These results show the vasomotor dysfunction. In contrast, after two acupuncture treatment courses, the temperature recovery rate exceeded 80% in 10 min (figure 3). Compared with healthy female adults\(^2\) and our normal control (figure 3), this patient still showed delayed temperature recovery, but the delay was diminished. In addition, a previous study demonstrated that the mean temperature of the fingertips is 31–33°C and there is no difference between the left and the right fingertips.\(^3\) As for the patient, the temperatures of both the left and right mid fingertips after the acupuncture treatment courses were higher than before starting the EA and the temperature difference between the left and right mid fingertips was smaller even though it was winter. This patient was enthusiastic about receiving acupuncture, so may have been biased in reporting subjective symptoms. However, these positive results from an objective test support improvement of the patient’s subjective symptoms and indicate that EA improved the vasomotor response.\(^4\)–\(^6\)

It is presumed from the blood count data (figure 1) that this patient’s clinical condition of SLE was not alleviated by the acupuncture treatment (figure 1). In April 2002, after the acupuncture treatment, a physician decided to administer prednisolone.

In conclusion, EA seems unlikely to prevent progression of SLE activity, but may relieve unpleasant symptoms of the condition, like arthralgia, cold in fingers and toes and Raynaud’s phenomenon. How much of this effect is due to the placebo response cannot be stated for certain. This case suggests that EA therapy can add to the benefit for patients with SLE when used in conjunction with conventional medicine.

Nozomi Donoyama,\(^1\) Norio Ohkoshi\(^2\)

\(^1\)Course of Acupuncture and Moxibustion, Department of Health, Faculty of Health Sciences, Tsukuba University of Technology, Tsukuba, Ibaraki, Japan; \(^2\)Neurology, Department of Health, Faculty of Health Sciences, Tsukuba University of Technology, Tsukuba, Ibaraki, Japan

Correspondence to Dr Nozomi Donoyama, Licensed Acupuncture Therapist, Assistant Professor, Course of Acupuncture and Moxibustion, Department of Health, Faculty of Health Sciences, Tsukuba University of Technology, 4-12-7, Kasuga, Tsukuba, Ibaraki 305-8521, Japan; donoyama@k.tsukuba-tech.ac.jp

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