Case report

Raynaud’s phenomenon, Cytokines and Acupuncture: a case report

Folashade S Omole,1 James S Lin,1 Tehching Chu,1 Charles M Sow,1 Anthony Flood,1 Michael David Powell2

ABSTRACT
A 30-year-old African-American woman diagnosed in 2006 with primary Raynaud’s phenomenon (RP) was seen in the clinic in 2010 and the diagnosis confirmed excluding underlying disorders. Acupuncture was administered bilaterally at the LI4 Hegu acupuncture points for 5 min twice weekly for 2 months, which resulted in improvement in pain severity, joint stiffness and the colour of her fingers and toes. The literature reveals that acupuncture is effective in improving pain severity and joint stiffness in RP. The patient’s serum proinflammatory cytokines were compared with those from an ongoing study in our institution and the results indicated that acupuncture therapy might be anti-inflammatory. Acupuncture is relatively safe and should be considered as an alternative treatment or non-pharmacological therapy for pain associated with RP.

INTRODUCTION
This case report is presented to demonstrate the positive impact of acupuncture on the symptoms of Raynaud’s phenomenon (RP) in a 30-year-old African-American woman and a potential correlation between proinflammatory cytokines (eg, interleukin 6 (IL-6), tumour necrosis factor α (TNFα), interferon γ (IFNγ), vascular endothelial growth factor (VEGF)) and pain intensity. The patient’s cytokine levels were compared with those of subjects enrolled in a concurrent study in our institution at that time. Preliminary data indicated that, before the acupuncture treatments, proinflammatory cytokine levels in the patient with primary RP were higher than in normal healthy subjects.

CASE REPORT
A 30-year-old African-American woman presented to our acupuncture clinic in January 2010 after a recent move from the northeastern to the southern part of America. She had a history significant for RP diagnosed by her previous physician in 2006. She complained of joint stiffness, change in colour of her fingers and toes as well as coldness of the hands and feet and pain in her neck, shoulders, elbows, hands, low back and feet. The pain was bilateral but was worse on the right side than the left. The patient rated the pain intensity before acupuncture treatment on a numerical rating scale of 0–10 as 8. She had no other chronic illnesses such as hypertension, diabetes or dyslipidaemia but admitted to having stress and occasional anxiety since she had moved. The diagnosis of RP was reconfirmed while excluding any underlying disorders such as rheumatoid arthritis with a negative serum test. She did not take steroids for pain and had had no surgical interventions. Another significant past medical history was gastro-oesophageal reflux disease for which she was taking over-the-counter omeprazole for symptom relief. Further medication review indicated that she was taking oral contraceptives (norethindrone acetate and ethinyl oestradiol). However, for no apparent reason, the patient stopped these medications on her own before acupuncture therapy.

Physical examination
The patient was of petit stature, in no acute distress and vital signs were unremarkable including normotensive blood pressure readings. She was tender to touch in the neck, elbows, wrists, fingers, low back, knees and toes; her hands and feet were freezing cold to touch and she also had a purplish discoloration of her fingers and toes.

Acupuncture treatment
The patient had not previously received treatment with acupuncture. Following her informed consent, she agreed to twice weekly acupuncture treatment for 8 weeks (16 treatments). At each acupuncture visit, 38G × 1.0 inch LEKON needles (CAI Corporation, California, USA) were inserted bilaterally to a depth of about 0.25 inches at LI4 Hegu points. Manipulation/stimulation of the needles was performed for up to 30 s at each acupuncture point until the patient felt the De Qi sensation (sensations of tingling and throbbing). The needles were removed after 5 min. At the very beginning of the acupuncture treatment the patient was a...
**Observation**

Table 1 Serum cytokine levels (all measurements taken twice; units pg/ml) in patient with Raynaud’s phenomenon undergoing acupuncture

<table>
<thead>
<tr>
<th></th>
<th>IFNγ</th>
<th>IL-6</th>
<th>TNFα</th>
<th>VEGF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>152/141</td>
<td>138/133</td>
<td>59/67</td>
<td>808/966</td>
</tr>
<tr>
<td>After 8</td>
<td>57/38</td>
<td>75/66</td>
<td>41/38</td>
<td>491/493</td>
</tr>
<tr>
<td>After 16</td>
<td>13/49</td>
<td>48/59</td>
<td>23/28</td>
<td>580/706</td>
</tr>
</tbody>
</table>

IFN, interferon; IL, interleukin; TNF, tumour necrosis factor; VEGF, vascular endothelial growth factor.

bit fearful of needling. She stated that she ‘just hated needles’, which was the reason for using only the two LI4 points for short periods. However, she did not have a troublesome physiological response and she became more comfortable with subsequent treatments. A Teding Diancibo Pu (TDP) heat lamp (CAI Corporation, California, USA) was used to keep her hands warm during the acupuncture treatment.

**OUTCOMES**

After each acupuncture treatment the patient felt relaxed and reported less stiffness in general as well as noticeable pain improvement in her fingers, hands, elbows and neck; the coloration of her fingers and toes also improved. As shown in figure 1, after 1 month of acupuncture treatment her pain level decreased from 8/10 to 5/10 and it further decreased to 3/10 after 2 months of treatment. She returned for follow-up appointments at 6 months, 1 year and 2 years (last seen 3 February 2012) from her last acupuncture treatment at the end of March 2010 and her pain level has remained at 5/10. She no longer has any discoloration of her fingers and toes but her hands and feet are still cold to touch and, to date, she is still not taking omeprazole or oral contraceptives.

In addition, because of our interest in the potential association between pain intensity and proinflammatory cytokines, we applied for and received approval from the Institutional Review Board (Morehouse School of Medicine) to include the patient in an ongoing institutional study. This study (acupuncture effect on cytokine levels in low back pain patient) was supported by funds from NIH grant number G12-RR083043 of the National Center for Research Resources (NCRR).

After receiving the patient’s consent, blood samples were collected before acupuncture treatment and at the eighth and 16th course of treatment. Her proinflammatory cytokine levels were compared with those from the ongoing study (concluded in September 2011). The serum analyses of her proinflammatory cytokines showed a significant decreasing trend (table 1), which may be associated with her pain reduction resulting from the acupuncture treatments. The assays were duplicated and repeated.

**DISCUSSION**

The aetiology of primary RP is currently unknown but may be multifactorial. RP is the transient digital ischaemia that occurs with exposure to cold temperature or emotional distress. It is believed to be the result of vasospasm that decreases the blood supply to the respective regions causing extreme vasoconstriction of the peripheral blood vessels, leading to tissue hypoxia. RP affects approximately 3–9% of the population and is more prevalent in the female population.

It has been reported that acupuncture can induce a long-lasting reduction in attacks of RP. Furthermore, acupuncture has been shown to decrease painful conditions by modulating several proinflammatory markers such as IL-6, TNFα, IFNγ and VEGF. This case highlights a possible alternative treatment of RP using acupuncture for pain alleviation and its potential in decreasing proinflammatory markers. The effectiveness of acupuncture has been studied and demonstrated in some inflammatory diseases including eponychiitis, osteoarthritis and rheumatoid arthritis. The complex interactions with substance P, the analgesic contribution of β-endorphin and the balance between cell-specific proinflammatory and anti-inflammatory cytokines (TNFα and IL-10) have been studied. Previous studies have shown that the serum levels of IL-6 and TNFα were elevated in rheumatoid arthritis. A case report also showed that acupuncture and electroacupuncture treatments could reduce the pain intensity of arthralgia and RP in a patient with systemic lupus erythematosus. In summary, a review of the literature suggests that acupuncture may play an important role in relieving pain intensity and symptom severity in RP. The patient’s long history warranted a trial of acupuncture, and this provided relief from her long-standing pain and discomfort associated with the RP, which might also correlate with decreased serum levels of proinflammatory cytokines. There is currently little information about the effectiveness of acupuncture on RP in the African-American population. However, given that acupuncture is relatively safe, it should be considered as an alternative treatment or non-pharmacological therapy for pain associated with RP.

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**REFERENCES**


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