Foot problems in patients with systemic sclerosis

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Abstract

Objectives. To assess the nature of the foot problems experienced in patients with systemic sclerosis (SSc) and patient awareness of such problems.

Methods. Fifty unselected patients (42 females, eight males) with SSc were assessed by means of examination by a senior podiatrist, completion of a questionnaire detailing past and present foot problems, determination of random plasma glucose, plain X-rays of the feet, and measurement of the ankle/brachial index and of digital pulses by Doppler ultrasound.

Results. Eighty-six per cent of patients reported colour changes in their feet in response to temperature changes, 82% reported pain usually related to cold, 26% had suffered foot ulceration and 8% had a history of foot surgery. Podiatry assessment confirmed the presence of significant abnormalities, including ulcerations in 10%, pre-ulcerative lesions in 34%, toenail changes in 62%, callus formation in 80% and calcinosis in 18%. Forty per cent of the patients had problems with the fitting of shoes, and 19% had been provided with footwear from the hospital. Plain films of the feet demonstrated the presence of erosions in 6%, soft-tissue calcification in 17%, osteopenia in 26% and degenerative changes in 60% of cases. Ten per cent of the patients had an abnormal ankle brachial index (less than 1.0). Only 21% of the 47 patients in whom digital pulses were examined had normal pulses in all toes, and in 26% all toe pulses were absent.

Conclusion. Although problems with the hands are well recognized in SSc, foot problems also occur in the majority of patients, and can be a cause of major disability. Care of the feet is therefore an important part of the management of SSc.

Key words: Systemic sclerosis, Scleroderma, Raynaud’s phenomenon, Feet, Podiatry.

Systemic sclerosis (SSc) or scleroderma is a multisystem disease characterized by vascular abnormalities and fibrosis. Women are more frequently affected than men. Most patients suffer from Raynaud’s phenomenon, which can progress to digital ulceration, scarring, and sometimes gangrene, necessitating amputation (Fig. 1). While problems in the hands receive more attention, Raynaud’s phenomenon also affects the feet and, as in the fingers, it can progress to irreversible digital ischaemia. Foot problems can therefore be a major source of morbidity and disability in patients with SSc. Yet there have been no reports of the frequency, severity or pattern of foot problems in patients with SSc.

The aim of our study was to assess the nature and prevalence of foot problems experienced in patients with SSc, and patient awareness of such problems.

Patients and methods

Fifty unselected patients (42 females, eight males) with SSc were recruited into the study. Their mean age was 52 yr (range 29–75 yr). All patients were attending the Rheumatic Diseases Centre at Hope Hospital. Fourteen patients (28%) had diffuse cutaneous SSc with a median disease duration (since physician diagnosis) of 7 yr (range 6 months to 17 yr), whereas 36 (72%) had limited cutaneous SSc with a median disease duration of 9 yr (range 1–49 yr). The overall median disease duration was 8 yr (range 6 months to 49 yr). Sixteen (32%) were current smokers, but none were diabetic. Sixteen (32%) were taking nifedipine, five (10%) thyroxamine, six (12%) angiotensin-converting enzyme inhibitors, seven (14%) aspirin and seven (14%) steroids. Fourteen (28%) were positive for anticientromere antibodies.

The Salford Research Ethics Committee approved the study. Each patient entering the study underwent the assessments and procedures described below.

Podiatry assessment

A senior podiatrist assessed all patients, asking about the history of foot symptoms, including colour changes, pain, previous ulceration and previous foot surgery. The examination paid attention to the presence of ulceration, pre-ulceration (discoloration and thinning of the skin) and toenail changes (involution, thickening and discoloration). Callus formation and calcinosis were
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whether any foot problems that were present were felt to be progressive; and whether they knew where to seek help if they had problems with their feet.

Venepuncture
A blood sample was taken to check random plasma glucose.

Plain X-rays of the feet
All films were reported by one musculoskeletal radiologist. Attention was paid to the presence of erosions, soft tissue calcification, osteopenia and degenerative changes.

Ultrasound assessment of the circulation
The peripheral circulation was assessed using a Hokanson CW1A Doppler ultrasound with a 5-MHz probe. The ankle brachial index was calculated by measuring the brachial artery pressure in the supine position after a 5-min period of rest. The dorsalis pedis and posterior tibial pressures were measured and the ankle brachial index was calculated using the highest value. Toe pulses were given a score out of 40. Pulses detected distally were given a score of 2, whilst those detected proximally were given a score of 1. Toe pulses were measured both medially and laterally, with a maximum score of 4 for each toe.

Results

Podiatry assessment

Foot symptoms. Forty three (86%) of the patients reported colour changes in their feet in response to change in temperature, 41 (82%) reported pain usually related to cold, 13 (26%) had suffered foot ulceration, and four (8%) had previous foot surgery (removal of left third nail, right forefoot amputation, left below-knee amputation, right below-knee amputation). On examination, it was found that five (10%) patients had foot ulceration, 17 (34%) had pre-ulcerative lesions, 31 (62%) had nail changes, 40 (80%) had callus formation and nine (18%) had visible calcinosis, of whom eight reported symptoms related to the presence of calcinosis.

Questionnaire

two patients completed very few of the questions and some other patients did not respond to all questions. Because not all patients answered all questions, percentages always refer to the percentage answering that question.

Knowledge. Twenty (41%) patients gave four correct answers, nine (18%) gave three correct answers, 10 (20%) gave two correct answers, and 10 (20%) gave one correct answer; one patient did not respond.

Management. In response to being asked how they managed their foot problems, the patients gave various responses: 24 would go to a chiropodist, 15 would use

recorded if present. If calcinosis was present, the patient was asked if it was symptomatic.

Questionnaire

Patients completed a questionnaire comprising four questions that assessed knowledge about whether certain foot problems were associated with SSc (ulceration, calcinosis, poor circulation and pain in the joints). Patients were also asked how they managed their foot problems, and whether they had ever seen a podiatrist/chiropodist. If patients received regular treatment for their feet, they were asked to define how often and where. If they had read any literature about foot problems in scleroderma, they were asked about the source of such information. Patients were also asked if they had problems with the fitting of shoes and whether they had been provided with footwear from the hospital;

Fig. 1. Forefoot amputation in a patient with SSc. Prior to the amputation, this patient had had major problems with non-healing ulceration.
moisturisers and 13 would keep their feet warm. Other responses included the use of massage, pumice stone, salted water soaks, a wax bath and honey tulle. Six did not reply to this question, and one patient replied ‘would just put up with it’.

Podiatry care. Four patients (8%) had never been to a podiatrist/chiroprist. Eight (16%) had been seen but did not receive regular podiatry care. Thirty-eight patients (76%) attended podiatry regularly; 32 (84%) of those who attended regularly had been asked to attend at least 6-monthly.

Sources of information. Twenty-two (46%) patients had read about foot problems in SSc. A number of sources of useful information were identified, including the clinic, the scleroderma nurse, scleroderma booklets, the podiatrist, the Raynaud’s and Scleroderma Association, and the medical library.

Problems with shoe fitting. Nineteen (40%) patients had problems with the fitting of shoes; only nine (19%) had been provided with footwear from the hospital. Most of these nine patients were frequent attenders at the podiatry department; six (67%) attended more often than 3-monthly. Of these nine patients, five (60%) felt that their foot problems were static, three (33%) felt that they were deteriorating, and one (11%) felt that she was improving.

Other questions. In the group as a whole, 26 (63%) felt that their foot problems were static, nine (22%) felt that they were deteriorating, and five (12%) felt that they were improving. One patient (2%) had no problems. Forty-three (90%) knew where to seek help should they have any problems, but five (10%) were not sure.

Plasma glucose
This was normal in all patients.

Radiology
Forty-seven X-rays were available for reporting. Three (6%) patients had erosions, eight (17%) had soft-tissue calcification, four (9%) had vascular calcification, 12 (26%) had osteopenia, two (4%) had previous amputations and 28 (60%) had degenerative changes.

Doppler studies
Five patients (10%) had an abnormal ankle brachial index (less than 1.0), of whom two had had amputation of the contralateral lower limb. Digital scores were recorded in 47 patients. Only 10 (21%) had normal digital pulses, and in 12 (26%) all digital pulses were absent. Eight patients who had a normal ankle brachial index had absent digital pulses. The relationships between smoking, anticientromere antibodies and digital pulses are demonstrated in Table 1.

Table 1. Digital pulse score (maximum = 40) in 47 patients with SSc in relation to anticientromere antibody status, smoking and gender

<table>
<thead>
<tr>
<th>Digital pulses (n = 47)</th>
<th>Normal score (score = 40)</th>
<th>Abnormal score (score = 1–39)</th>
<th>Absent pulses (score = 0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticientromere antibody-positive (n = 13)</td>
<td>0 (0%)</td>
<td>8 (62%)</td>
<td>5 (38%)</td>
</tr>
<tr>
<td>Anticientromere antibody-negative (n = 34)</td>
<td>10 (29%)</td>
<td>17 (50%)</td>
<td>7 (21%)</td>
</tr>
<tr>
<td>Current smokers (n = 16)</td>
<td>4 (25%)</td>
<td>8 (50%)</td>
<td>4 (25%)</td>
</tr>
<tr>
<td>Non-smokers (n = 31)</td>
<td>6 (19%)</td>
<td>17 (55%)</td>
<td>8 (26%)</td>
</tr>
<tr>
<td>Male (n = 7)</td>
<td>0 (0%)</td>
<td>5 (71%)</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Female (n = 40)</td>
<td>10 (25%)</td>
<td>20 (50%)</td>
<td>10 (25%)</td>
</tr>
</tbody>
</table>

Discussion
This was a cross-sectional study in a tertiary centre, and may reflect a group of patients with particularly severe disease. Nevertheless we were able to demonstrate that most patients with SSc suffer from symptoms related to their feet, with various degrees of morbidity and disability. Only one patient reported having no foot problems. This very high prevalence of foot problems in SSc is not widely recognized.

One weakness of our study was that the questionnaire was self-administered and was not checked before the patient left the clinic. Most patients, in addition to symptoms, had abnormalities on examination. Although some of these abnormalities, such as callosities, are common findings in the general population, they are of particular concern in patients with a compromised peripheral circulation, in whom treatment should be undertaken only by an experienced chiropodist/podiatrist. Overenthusiastic treatment might otherwise lead to ulceration, with the associated risks of super-added infection and poor wound-healing. The fact that most patients had seen a podiatrist reflects our current practice of arranging a podiatry assessment for all patients referred with SSc. This is not routine clinical practice in all hospitals.

While it is classically the microvasculature that is affected in patients with SSc, it is now recognized that large-vessel disease also occurs [1, 2], and so if a patient presents with ischaemic problems of the feet it is always important to assess whether there is coexisting large-vessel disease. For this reason, the assessment of peripheral pulses by Doppler ultrasound is often an important part of the evaluation, and now forms part of our routine assessment. A normal ankle brachial index does not predict normal digital circulation, as many patients with normal ankle brachial ratios have microvascular disease and/or absent digital pulses. Anticientromere antibody has been found to be a predictor of digital ischaemic loss [3, 4]. In our study, 14 (28%) of the patients had anticientromere antibodies. None of
the patients with normal digital pulses and normal ankle brachial indexes had anticientromere antibodies, and those with anticientromere antibodies were over-represented among the patients with absent digital pulses. Therefore, anticientromere antibodies are likely to be predictive of lower-limb as well as upper-limb ischaemic problems. Our observations indicate that male patients are more likely to have absent digital pulses than females.

The presence of erosions in patients with SSc has been documented before [5]. Other radiological abnormalities found on examination may not be exclusive to patients with SSc; for example, the degenerative changes seen could be explained by the age of our patients.

Large surveys of foot problems in the community are lacking, therefore we cannot compare the frequency of foot problems in SSc with that in the general population.

Our study was designed to look at the point prevalence of foot problems in patients with SSc and did not include assessment of the efficacy of intervention. However, specialist foot clinics have been shown to reduce the incidence of lower limb amputation in diabetic patients by up to 50% [6]. Patient education and increased awareness about foot problems in primary care may reduce the frequency of surgical amputations in SSc patients by reducing the incidence of ulcers, which may become infected and difficult to heal, and would almost certainly alleviate their suffering. The main message from our study is that, in patients with SSc, foot problems are common and potentially disabling. A careful assessment of the feet should always be performed in these patients, in order to identify problems at an early stage.

References