tive malabsorption of zinc as a consequence of intestinal involvement in GS. In accordance with this view, D-penicillamine was found to increase zinc absorption in our GS patients. A study of GS patients receiving D-penicillamine in identical therapeutical doses as here, revealed normal levels of serum zinc, but an increasing urinary output of zinc, presumably reflecting an increased intestinal absorption of zinc during D-penicillamine treatment (5). Experimental studies in young rats receiving from 63 to 625 mg D-penicillamine per kg per day by gavage showed a dose-dependent significant increase in the ^{65}Zn absorption as compared with untreated controls (10). The therapeutical doses in our patients were considerably lower than in the experimental rats, about 10 mg per kg per day, which may explain the difference between the two studies.

The role of zinc in collagen metabolism is only fragmentarily known. Zinc deficiency induced in rats impairs collagen biosynthesis significantly, probably via nucleic acid dependent processes (3). Whether low or high concentrations of zinc interfere with the establishment of intramolecular crosslinking by means of the copper-containing enzyme lysyl oxidase is still a matter of contention (8).

One direct effect of zinc on collagen metabolism may be on its degradation, since it has been demonstrated that mammalian collagenase is a zinc metalloenzyme (9).

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Low Molecular Weight Dextran in Systemic Sclerosis and Raynaud's Phenomenon

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There have been several reports of improvement of peripheral circulation in patients with systemic sclerosis by infusions of low molecular weight dextran (LMWD) (1, 2, 3, 4, 5). A pilot study by us of 12 patients given a single infusion of LMWD failed to show any significant change in digital temperature when compared with an infusion of 5% dextrose. Some authors (1) have suggested that repeated infusions are necessary, so it was decided to conduct a double-blind trial comparing 10% LMWD in 5% dextrose with 5% dextrose alone, giving three infusions at 8-week intervals.

PATIENTS AND METHOD

Twenty-one patients with systemic sclerosis took part in the trial. Clinical details are shown in Table I. They all suffered from severe Raynaud's phenomenon and 2 patients had had previous digital amputation for gangrene.

Each patient received intravenous infusions on three occasions at 8-weekly intervals. On admission to the

Table 1. *Patient details and results*

	No. of pts	Age Mean ± SD	Sex	Mean finger temperatures ± SD						
				Infusion 1		Infusion 2		Infusion 3		4 weeks later
				Pre	Post	Pre	Post	Pre	Post	
Systemic sclerosis										
Low molecular weight dextran	10	45 ±11.6	♀=9 ♂=1	29.3 ±3.1	29.7 ±3.0	30.7 ±3.3	30.5 ±2.6	26.6 ±3.9	28.4 ±2.7	28.6 ±3.2
5% dextrose	11	46 ±13.2	♀=7 ♂=4	29.5 ±4.2	26.8 ±3.6	28.4 ±3.7	27.8 ±3.9	29.1 ±3.0	29.2 ±3.0	26.9 ±2.8
Raynaud's phenomenon										
Low molecular weight dextran	4	33 ±15.8	♀=3 ♂=1	29.8 ±3.0	31.0 ±3.4	32.0 ±3.4	30.6 ±3.4	28.9 ±5.1	29.9 ±3.8	29.9 ±3.7
5% dextrose	4	36 ±11.3	♀=4	30.6 ±4.3	26.8 ±3.5	29.2 ±4.1	28.9 ±4.3	30.4 ±3.5	30.2 ±3.3	28.2 ±3.8

trial the type of treatment was allocated by the hospital pharmacist and this was not known to the medical staff until the code was broken at the end of the trial. The infusion was either 2 litres 10% LMWD in 5% dextrose, or 5% dextrose alone over 48 hours. Each patient received the same type of infusion on each occasion. The following investigations were carried out before each infusion: creatinine clearance, blood urea, full blood count and urine examination for albumin. All urine passed during the infusion period was tested for albumin.

In addition to the 21 patients with systemic sclerosis in the trial, infusions were also given to 6 patients with severe uncomplicated Raynaud's phenomenon, and to 2 patients with severe Raynaud's phenomenon associated with dermatomyositis and systemic lupus erythematosus (Table 1).

One patient was withdrawn from the trial after one infusion as surgery was required for a gangrenous digit. Two other patients were withdrawn after one infusion as there were technical difficulties in setting up and maintaining the intravenous line. Three patients did not have their third infusion due to family problems which made it difficult for them to come into hospital.

Measurements

Measurements of digital temperature were taken immediately before each infusion, 24 hours afterwards and 4 weeks after completion of the trial. The temperature of each finger tip was measured using a Light Laboratories electric thermometer. Readings were taken at 5-min intervals for 30 min with the patient at rest in a room with a steady ambient temperature. The patient's feet and legs were then placed in a bucket of hot water, maintained at 45°C, to produce generalized vasodilatation. Readings of finger tip temperature were taken every 5 min for the next 30 min. Observations indicated that patients were maximally vasodilated and the oral temperature was raised above 37.8°C in this time. After infusion the patient was asked about warmth and flexibility of the fingers, pain in the fingers, and healing of any ulcerated lesions. The results were graded as better, no change, or worse.

RESULTS

As initial temperatures and the response to treatment varied between fingers in individual patients, the results were expressed for each patient as the mean of the temperatures of all the digits. Table 1 shows the mean temperatures of the digits of the whole group before treatment and after each infusion. In the group of patients given LMWD there was no significant change in the mean digital temperature after any of the infusions. Similarly there was no significant change in temperature 4 weeks after completion of the trial compared with the temperature on entry to the trial. In the control patients there was a reduction in the mean temperature significant at the 5% level after the first infusion, but not after the second and third infusions.

Of the 14 patients who received the LMWD infusion, 7 thought their circulation had improved, 5 thought there was no change and 2 thought that they were worse. Of the 15 patients who received 5% dextrose, 6 thought their circulation had improved, 8 that there was no change and one that he was worse.

All the patients tolerated LMWD well. There were no side effects, deterioration of renal function or allergic response.

DISCUSSION

We have shown that repeated infusions of LMWD do not increase the digital temperature in patients with systemic sclerosis and Raynaud's phenomenon. The difficulty in this type of trial is indi-

cated by the inexplicable tendency to a reduction in temperature after the first infusion of 5% dextrose in our control patients. This was not consistent, however, and did not occur in all patients. It is possible that an increase in digital temperature from the LMWD in treated patients was masked by the effect of the 5% dextrose in which it was diluted. However, this is unlikely as there was no difference in temperature after the second and third infusions of 5% dextrose in our control patients. We would stress the unpredictability of response of individual digits to warming or therapy. Moreover, subjective changes in patients are not always matched by objective temperature measurements.

The methodological difficulties we encountered probably account for the anomalous results in previous uncontrolled trials.

CONCLUSION

Repeated infusions of LMWD did not significantly alter the temperature of the fingers in a controlled clinical trial. However, in occasional patients the finger temperature rises and ulceration heals, so that this form of therapy may have a limited place in therapy as there is no alternative specific form of treatment. It is impossible to predict those few patients who will have a satisfactory response.

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Long-term Follow-up of Photochemotherapy in Pityriasis lichenoides

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Abstract. Five patients with a histopathologically confirmed diagnosis of pityriasis lichenoides were treated with PUVA or irradiated with a light source emitting UVB and UVA, without prior intake of psoralens. All patients showed a good response to treatment. Long-term follow up showed that patients remained free of lesions during a period of 20 to 36 months; 3 patients had a recurrence of the disease, though less extensive than before, after 25, 23, and 23 months, respectively.

Key words: Pityriasis lichenoides; Photo(chemo)therapy

Pityrasis lichenoides (PL) is a skin disease of unknown aetiology. It may be divided into an acute and a chronic type, although the two types are considered to be different expressions of one disease entity (1). The chronic form especially is considered to be resistant to all kinds of propagated treatments (2). It has been reported that exposure to sunlight may have a beneficial influence on the course of the disease (3). Recently, favourable results of photo(chemo)therapy of PL have been reported (4, 5).

MATERIAL AND METHODS

We treated 5 patients with PL, in which 3 cases were classified as "acute" and 2 as "chronic" type, with photo(chemo)therapy. The type of disease, established by clinical and histophatological criteria, the age of the patients, the duration of the disease and previous treatments are shown in the table.

Four patients were treated with PUVA (8-methoxypsoralen plus UVA, light source Fr-T12 Sylvana tube). Initial irradiation energy was established according to the skin type and the dosage was increased according to the guidelines of the European Cooperative Clinical Trial. One patient was treated with a light source consisting of 8 Osram Ultra Vitalux lamps emitting UVA and UVB. Initial irradiation was 3 min and was increased according to our psoriasis scheme. The energy output of the lamps was not known. Treatment was given three times each week