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Nail fold capillaroscopy findings in patients with primary fibromyalgia

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SUMMARY *The nail fold capillary morphology and blood flow were examined by capillaroscopy in 10 patients with primary fibromyalgia. Only slight morphological anomalies such as moderate enlargement of capillary loops and variations in calibre were found. No obvious correlation emerged between capillary morphology and the duration of the disease, smoking, or history of Raynaud's phenomenon. Three patients with a history of Raynaud's phenomenon showed sluggish capillary flow correlated with subnormal skin temperature during registration. The findings suggest that marked generalized capillary abnormality such as that often involving the nail fold capillaries in many connective tissue disorders is not a prominent feature of primary fibromyalgia.*

Key words: Primary Fibromyalgia, Capillaroscopy, Blood-Flow, Microcirculation.

INTRODUCTION

Primary fibromyalgia (PF) is a disease state still not unanimously accepted as an entity. The symptoms have long been recognized, but not until 1981 were diagnostic criteria set out by Yunus et al (1). These include generalized aches and pains and/or pronounced stiffness at 3 or more anatomical sites for at least 3 months, in the absence of diagnostic signs of rheumatic, endocrine, or malignant disease. Obligatory are either 5 typical trigger points plus 3 minor manifestations, or 3 or 4 trigger points plus 5 minor manifestations.

Minor manifestations are: 1) modulation of symptoms by (a) physical activity, (b) meteorological factors, or (c) anxiety or stress; 2) poor sleep; 3) fatigue; 4) chronic headache; 5) chronic anxiety; 6) irritable bowel syndrome; 7) a feeling of swelling; and 8) a feeling of numbness.

Recent findings, including "moth-eaten" and ragged, red fibres in muscle biopsy specimens and abnormal muscle tissue oxygenation as measured by a surface oxygen electrode, suggest that disordered microcirculation may be an important pathogenetic factor (2,3). Skin capillaries can be observed noninvasively in vivo with the aid of capillary microscopy. The nail-fold area is particularly appropriate for such studies because the capillaries in this area lie parallel to the skin surface (4). Using capillary microscopy, abnormalities in skin capillaries have been demonstrated in a variety of states such as connective tissue disorders (5) and Raynaud's phenomenon (6,7), and also in ischaemic circulatory disorders, where the me-

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thod has proved useful in the evaluation of the viability of the skin (8).

The aim of the present study was to find out whether anomalies of the nail-fold capillaries occur in PF, and also roughly to estimate capillary blood flow in patients with PF with regard to a possible role of the microcirculation in the pathogenesis of this disease.

MATERIAL AND METHODS

Patients

The series comprised 10 consecutive patients, 1 man and 9 women, (mean age 46 years, range 32-60) fulfilling Yunus's criteria (1) for the diagnosis of PF and giving their informed consent. All had more than 10 trigger points. The mean duration of symptoms was 7 years (range 3-12). A history of Raynaud's phenomenon and smoking was asked for.

Laboratory tests

The following tests were performed: erythrocyte sedimentation rate; peripheral blood count; serum concentrations of sodium, potassium, creatinine, and liver enzymes; tests of thyroid function; rheumatoid factor; antinuclear antibodies (ANA); and antibodies against smooth muscle (SMA).

Equipment

Screening. Leitz stereo microscope with zoom objective (magnification × 10-80).
Macrophotography. Olympus camera OM4 with a Zuiko Auto Macro 20 mm F2 lens, Auto Bellows (magnification about × 5), and a T10 Ring Flash.
Capillary microscopy. ITC IKEGAMI TV-camera (CTC-6000) mounted on a Leitz capillary microscope using objectives × 5 and × 20. A 5" ITC IKEGAMI TV monitor (PM 52 T). Video-cassette recorder (Sony U-matic VO 2630). The system gives magnifications on the screen of approximately × 55 and × 220 respectively.
Light source. Schott KL 1500, with a 150-W halogen lamp and fibre-optics.
Skin temperature. Thermocouple thermometer (ELLAB type TE3).

Study design

During acclimatization in the laboratory at a room temperature of 20-22°C the patient was informed and the history taken. The examination was done with the patient sitting up. All patients were examined by the same investigator (T.F.). First a drop of liquid paraffin was placed on the area under examination to reduce light scattering. Then the nail-fold capillaries of all ten fingers were screened with the stereo microscope. The same area of the fourth finger of each hand was then more thoroughly examined and recordings made, first by macrophotography and then by videotape, using the × 5 and the × 20 lenses. The skin temperature of the same area was measured just before tape recording. The fourth finger was selected because it has been described to be best suited (9), an opinion we share.

Assessment

Capillary morphology was classified with regard to enlargement of capillary loops, distortion and budding of capillaries, findings of avascular areas, or capillary haemorrhages, all weighted in an overall impression. The capillary blood flow was judged to be either running at a normal rate and with normal corpuscular distribution, or to be sluggish with a granular appearance of the column of corpuscular elements. Assessment of capillary morphology and flow was based on the clinical findings and the photographic and videotape records as subsequently examined by 2 observers (T.F. and M.S.) independently.

Table I *Sex, age, duration of fibromyalgia symptoms, history of Raynaud's phenomenon and its duration in years, smoking habits, nail fold capillary morphology and blood flow, and skin temperature in the nail fold area in 10 patients with primary fibromyalgia. Capillaroscopy morphology score: 0 = normal, 2 = most pronounced changes (but still very moderate) in the group.*

Patient no.	Sex	Age (Y).	Duration of fibromyalgia symptoms (Y)	Raynaud's phenomenon Duration (Y).	Smoking cig./d	Laboratory tests − = all tests normal	Capillaroscopy morphology score	Capillary flow + = sluggish − = normal	Skin temp. °C
1	♀	57	5	8	−	−	0.5	+	32
2	♂	60	7	−	15	SMA 1/25	0	−	34
3	♀	40	3	2	−	−	2	+	27.5-29.5
4	♀	32	5	3	−	ANA 1/25 IgM	1	+	28-29
5	♀	43	5	2	−	−	2	−	34.5
6	♀	47	12	(+)*	−	−	1.5	−	34-35
7	♀	59	5	−	−	−	1	−	34
8	♀	45	11	(+)*	15	−	1.5	−	34.5
9	♀	42	12	−	20	−	1	−	34.5-35
10	♀	34	6	(+)*	15	ANA 1/25 IgG SMA 1/100IgG	1.5	−	34-34.5

* = History of cold fingers, but not fulfilling criteria for Raynaud's phenomenon.

RESULTS

All results are presented in Table I, which also gives the age of the patients and the duration of the disease. Four patients had a 2 to 8-year history of Raynaud's phenomenon, 3 others a history of cold fingers not fulfilling the criteria for Raynaud's phenomenon (10). Four were smokers (15-20 cigarettes per day) and 6 nonsmokers. All laboratory tests were normal, except in 3 patients who showed low titres of ANA and/or SMA of uncertain clinical importance. The capillary morphology was generally judged to be normal, any abberrations being so minor that they could not be considered pathological. In no case were there capillary haemorrhages or avascular areas. Anomalies noted were moderate enlargement of capillary loops, slight variations in calibre, and very slight tortuosity. Although all anomalies were minor, we made an individual grading ranging from O (normal) to 2 (most pronounced changes in the group). No obvious correlation between capillary morphology and duration of disease, smoking, or history of Raynaud's phenomenon emerged. The capillary flow was sluggish in 3 patients with a history of Raynayd's phenomenon, and all had a correspondingly subnormal skin temperature at the time of registration.

DISCUSSION

Capillaroscopy allows direct, in vivo observation of the nutritional capillaries of the skin, and is particularly easy in the nail fold area. In connective tissue disorders pathological findings indicate systemic involvement (6,7). The scleroderma pattern is the term coined by Maricq for the capillary anomalies found in systemic sclerosis, dermatomyositis, and mixed connective tissue disease (11). It is characterized by enlargement of capillary loops, loss of capillaries, disruption of the ordinary appearance of the capillary bed, distortion and budding of capillaries, and often capillary haemorrhages. Maricq classifies the changes on a scale from I to V, where I is normal. The very minor degrees of capillary enlargement and distortion in our patients would never

be worse than class II, according to her classification.

Anomalous skin capillaries are a common finding in Raynaud's phenomenon, but marked changes are found only in patients with underlying systemic disease (6,7,9). Raynaud's phenomenon is common in patients with PF (12); 4 of ours had a history of Raynaud's phenomenon, and 3 of them showed characteristic sluggish, granulated capillary flow and subnormal acral temperature, but morphologically their capillaries did not differ significantly from those of the rest of the group. In our 4 smokers this did not seem to influence the capillary findings.

The pathogenesis of PF is not fully understood, but muscular hypoxia seems to be of central importance. This is evidenced by findings indicating maldistribution of the capillary blood flow (2) and by the presence of "moth-eaten", ragged red fibres in trapezius muscle of PF-patients (3). Such fibres indicate mitochondrial damage, and are found after experimentally-induced hypoxia (13). Improvement in the muscular microcirculation can be achieved by sympathetic blockade; marked reduction in pain and number of trigger points have been reported in the area affected by stellate-ganglion blockade (14).

In the present study we found only minor capillary anomalies, and in no case were these so severe that future, progressive change would seem likely to take place with prolonged duration of the disease. It would be interesting, however, to follow-up these patients and watch for change in the microcirculation.

The present findings in no way contradict the hypothesis that disturbance of the microcirculation is important in the pathogenesis of PF, even though no striking signs have emerged of systemic features such as are supposed to involve morphologically and functionally also the capillaries in the skin and that occur in many of the connective tissue diseases. The disturbed microcirculation in PF may be due rather to abnormal regulation of muscular capillary blood flow than to morphological changes in the capillaries. Further, there may be no direct correlation between the microcirculation of the muscle and that of the nail fold.

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