Reduced Fingertip Blood Flow and Peripheral Dysautonomia in Leprosy Patients in Iranian Azerbaijan and in Maharashtra, India

TO THE EDITOR:

Damage to the somatic motor and sensory pathways in the nerves is well recognized in leprosy neuropathy but autonomic function can also be disturbed ([4]). Recently, we have described a sensitive technique for the measurement of fingertip blood flow by laser Doppler flowmetry, and have used the method to assess the competence of skin sympathetic (vasomotor) reflexes control-

THE TABLE. *Comparison of mean (± S.D.) laser Doppler blood flow and vasomotor reflex results for Iranian and Indian leprosy patients and controls.*

	No.	RBC flux (V)	% Fall in RBC flux from resting value after challenge by	
			Inspiratory gasp	Cold challenge
Iranian				
Treated patients	45	3.8 ± 2.8[a]	26 ± 28[b]	12 ± 23[b]
Controls	20	6.6 ± 1.7	77 ± 17	75 ± 19
Indian				
Newly registered patients	38	3.1 ± 2.0[a]	51 ± 33[a]	35 ± 32[b]
Treated patients	12	4.4 ± 1.6	49 ± 33[a]	22 ± 26[b]
Controls	35	5.3 ± 1.5[b]	81 ± 14	64 ± 23[b]
European				
Controls	14	6.3 ± 1.8	79 ± 12	72 ± 13

[a] Different from Iranian, Indian and European controls ($p < 0.05$).
[b] Different from all other groups ($p < 0.05$).

ling blood flow ([3]). This technique provides a signal (RBC flux) indicative of blood flow and monitors the transient reflex vasoconstrictor responses to two physiological challenges, deep inspiratory gasp (IG) and contralateral cold challenge (CC). Disturbance of these reflexes has been used to search for autonomic neuropathy in several groups of leprosy patients in Miraj, Maharashtra, India ([2]). RBC flux was reduced in all patient groups and was lowest in long-time patients with long-standing disease and orthopedic complications ([1, 2]).

The vasomotor reflex responses to both challenges also were reduced below normal levels in newly registered patients and in treated ex-patients: this defect was more prominent in patients with multibacillary disease than in those with paucibacillary disease. The cold challenge reflex was disproportionately affected in all leprosy patient groups. This study was restricted to Indian leprosy patients and healthy Indian and European controls, so it was not possible to establish conclusively whether the presence of low flows and/or impaired reflexes is characteristic of leprosy itself or whether it has resulted from other influences on the Indian patients, for example, from the interplay between leprosy and racial or social factors, such as dietary deficiency or relative imbalance.

We recently conducted a study at Tabriz, Azerbaijan, Iran, using the same apparatus and with a protocol closely similar to that previously described. The Iranian leprosy patients were long-standing residents at Baba Baghi leprosy hospital and had completed courses of multidrug therapy (MDT) but had not had any other immunotherapy. All eight fingers (L2–L5, R2–R5) were studied on the hands of each individual subject. The Table summarizes the findings in these Iranian patients and local controls along with the equivalent values previously obtained from Indian leprosy patients and Indian and European controls ([2]).

The pattern of reduction in microcirculatory flow and the impairment of its autonomic control observed in the Iranian treated patients was similar to that seen in Indian leprosy patients. In both groups the response to cold challenge was affected to a greater extent than that to inspiratory gasp ($p < 0.0001$). However, the mean values for IG and CC in the Iranian treated patients are significantly lower than those of the Indian treated group. Absent IG and CC responses are found in 49.8% and 74.7% of the fingers in the Iranian patient group compared with 25.0% and 50.0%, respectively, in the Indian treated group. This greater level of impairment in the Iranian patients most probably reflects the longer duration of disease in these patients, since it has been shown that slow progressive deterioration in peripheral nerve function occurs even after effective MDT ([5]); most of the patients investigated had been residents of Baba Baghi leprosy hospital for more than 15 years.

The microcirculatory measurements were closely similar for Iranian and European control subjects, but in the Indian control group mean RBC flux values and CC re-

sponses were lower than either of the other control groups. Moreover, the Indian control group contained a disproportionately large number of individuals (12 of 35) with absent or impaired CC reflexes in some fingers and these subjects had closer occupational contact with leprosy patients than the uninvolved controls. In a previous paper ([2]) we postulated that while subclinical infection could be an explanation for these findings, a much more likely explanation was that some of these individuals had had leprosy and had been curatively treated without leaving clinical stigmata. By contrast, the Iranian control group showed no good evidence of impaired CC reflexes indicative of subclinical infection despite the fact that 8 people had close occupational contact with leprosy patients, 10 were the offspring of treated leprosy patients who had been reared and were now employed at the leprosy hospital, and 2 were clerical workers. In this group of individuals with close long-term contact with patients, only one individual (2 of 160 fingers) had absent CC responses.

This study has shown that the phenomenon of reduced flow in the fingertips with impaired vasomotor reflexes is seen in Iranian as well as Indian patients. We also have seen a similar association in 3 out of 3 Caucasian leprosy patients in Scotland. We conclude that this vasomotor impairment is likely to be a manifestation of leprosy and not a secondary effect of some sociogeographic influence.

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