as compared to controls. This may be related to changes in the vessels themselves or to connective tissue sclerosis limiting the rate of response.

Provocative tests, which evoke sympathetic tone, like the isometric test, were studied in addition to temperature measurements in groups of patients with primary Raynaud phenomenon, systemic sclerosis, and undifferentiated connective tissue disease as compared to a control group (173). Considerable differences were found in both the level of vessels involved and the relative importance of local finger temperature and discrimination between various etiologies of Raynaud phenomenon was possible.

Cutaneous postocclusive reactive hyperemia enabled grading obstructive vascular disease in groups of patients with Raynaud phenomenon, but could not discriminate among individuals in the subgroups (174). Another provocative test, the cognitive test, detected two subgroups within the patients with Raynaud phenomenon (175). The first subgroup showed a reduction in blood flow similar to healthy controls, whereas the second showed a paradoxical increase, suggesting an organic etiology.

LDF was used to evaluate various treatment modalities in Raynaud phenomenon. Thus, a single topical application of minoxidil 5% solution to the fingers was ineffective (176). Ketanserin, an antagonist of the serotonin-2-(5-HT-2)-receptor, was given to nine patients with generalized scleroderma (177). Finger systolic pressure and LDF after cooling and rewarming of the finger did not improve. Thus, ketanserin in the doses used (20 mg three times a day in the first week and 40 mg three times a day for 4 weeks) was not effective in the treatment of Raynaud phenomenon in generalized scleroderma. When given to patients with primary Raynaud phenomenon, ketanserin normalized digital blood flow (178).

Pretreatment with alpha-adrenoceptor antagonists did not abolish this effect, suggesting that in contrast to the effects on the systemic circulation, the mechanism underlying digital vasodilatation after ketanserin does not involve alpha-adrenoceptor antagonism.

Application of the vasodilator hexyl nicotinate at various sites on the upper limb resulted in an increase in blood flow both in patients with Raynaud phenomenon (13 with primary Raynaud disease and 12 with systemic sclerosis and Raynaud phenomenon) and in normal subjects (179). Moreover, increasing the drug concentration increased flow rate.

The effect of nifedipine on perniosis was also studied. An increase in blood flow to a finger or a toe adjacent to a diseased one could be demonstrated after the drug intake (180).

54.4.2.11 Other Diseases

Several diseases, like leprosy, have distinct skin lesions, which may be followed up by LDF. Blood flow in lesions of leprosy paralleled the clinical appearance and histopathology of the lesions during treatment (181, 182). The amount of hyperemia was useful in monitoring the early changes of reversal reaction during chemotherapy.

LDF was also valuable in evaluating peripheral autonomic function in leprosy (183). The skin overlying Kaposi sarcoma was studied by LDF as well (184). In addition, LDF was used to investigate microvascular physiology in patients with sickle cell disease (185). Large local oscillations in skin blood flow to the arm were demonstrated, occurring simultaneously at sites separated by 1 cm, suggesting a synchronization of rhythmic flow in large domains of microvessels. The periodic flow may be a compensatory mechanism to offset the deleterious altered rheology of erythrocytes in sickle cell disease.

Changes in skin microvascular reactivity were demonstrated in hypertriglyceridemia (186), and even in Alzheimer disease (187, 188).

In a study involving a very low-cardiovascular-risk female population of 862 healthy females screened for cardiovascular risk factors, a significant correlation was observed between the weight of cardiovascular risks and the impairment of postischemic forearm skin reactive hyperemia. Thus, skin LDF may represent a valuable, simple, and noninvasive tool to assess and monitor microvascular function in future prospective observational and interventional studies (189).