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Intra-Arterial Fluorescein for Evaluation of Peripheral Vascular Diseases.

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Lange and Boyd[1,2] introduced the use of fluorescein as an aid in the diagnosis and in the estimation of prognosis of peripheral vascular diseases. They injected 5 to 10 cc of a 5% solution of sodium fluorescein intravenously after making a series of superficial scratches from the base of the toes to the midthigh, and then examined the affected leg under an ultraviolet lamp. Because ultraviolet light penetrates only 2 to 3 mm, scratches enable the examiner to evaluate more accurately the existence of fluorescence.

Neller[3,4] employed wheal fluorescence, both scratch and histamine, in conjunction with the fluorescein technic, and stated that the wheal was the only phase of the tissue response to histamine or injury which reflected accurately the local blood flow. He favored the fluorescent wheal scratch technic for routine clinical use.

At this clinic we had employed these technics but were disappointed in the low intensity of fluorescence and related this to the dilution of the intravenously-injected dye by the total blood volume. Interpretation of the vascular status following intravenous fluorescein appeared but little more objective than the McClure-Aldrich and other similar tests.

In an attempt to secure a more clear-cut definition of circulatory inadequacy, 5 cc of a 20% solution of sodium fluorescein was injected intra-arterially. Following injection of the dye, fluorescence of the entire extremity was apparent in a few seconds. The intensity of fluorescence was many times greater than that obtained when the dye was injected intravenously. In areas of impending gangrene there was a much sharper line of demarcation. Thus, the test became more objective, and was readily adaptable to quantitative fluorometric measurement.

With the intra-arterial method, the value of the previously described scratch technic was enhanced, permitting more clear-cut definition of the extent of impairment of arterial inflow to the extremity. The often sharply localized vascular injury seen in cases of presenile gangrene accompanying diabetes mellitus was in marked contrast to the generalized mottled appearance revealed in cases of diffuse arteriosclerotic disease.

In addition, after intra-arterial injection, the dye is more slowly released into the general circulation, and hence unpleasant side effects such as transitory nausea appear less frequently.

Summary. Intra-arterial administration of fluorescein offers an objective approach to the impaired arterial inflow to the extremities. The method is adaptable to quantitative interpretation, and minimizes the number of unpleasant side reactions.

1 Lange, K., and Boyd, L. J., *Med. Clin. N. Am.*, 1942, **26**, 943.

2 Lange, K., and Boyd, L. J., *Arch. Int. Med.*, 1944, **74**, 175.

3 Neller, J. L., and Schmidt, E. R., *Ann. Surg.*, 1945, **121**, 328.

4 Neller, J. L., *Ann. Surg.*, 1945, **122**, 898.