Editorial: Fluorescein angiography of the iris

Papers on iris fluorescein angiography have gradually accumulated over the last 10 years since the first angiograms were reported (Jensen and Lundbaek, 1968a, b), and it therefore is an appropriate time to assess the impact of this investigation on research, diagnosis, and clinical management.

Like the vasculature of the retina and the brain, iris capillaries have a non-fenestrated endothelium lined with basement membrane and occasional pericytes. In primates the junctions between the endothelial cells are tight with zonula occludentes (Vegge, 1972). Fluorescein will not diffuse through vessel walls when they are equipped with tight intercellular junctions of this type. Damage to iris capillaries may result from anoxia, alteration in the intra- and extravascular pressure, ischaemia, trauma, and inflammation.

Experimentally it can be used to study the influence of active agents and their antagonists, which can be administered either topically or systemically. Following the discovery by Ambache et al. (1965) that a prostaglandin-like substance was released into the rabbit's eye in response to mechanical trauma Eakins et al. (1972) showed that prostaglandins were produced in experimental uveitis induced with bovine serum albumin. Whitelocke and Eakins (1975) used fluorescein angiography to demonstrate changes in calibre and permeability of blood vessels in rabbits after topical application of prostaglandins, and reported that the substantial increase in vascular permeability could be reduced by prior treatment with polyphoretin phosphate. Similar techniques have been employed experimentally to study the degenerative release of norepinephrine. This causes transient ocular inflammation, which has been considered to be mediated by prostaglandins, and these can be counteracted with suitable antagonists (Neufeld et al., 1973). Iris angiography would be expected to continue to be of use in similar experimental situations, and in particular such models provide a way in which the efficacy of anti-inflammatory drugs may be tested. It can likewise be used in man to investigate the value of topical therapy of uveitis or postoperative inflammation.

In studies of eye disease many investigators have concentrated on those diseases associated with vascular lesions in an attempt to learn more about the disease process or to investigate the technique as an aid to diagnosis. The vascular responses have now been well documented in a number of pathological conditions, including uveitis (Kottow, 1978), rubeosis iridis (Wong, 1972), the early changes in diabetic microangiopathy (Jensen and Lundbaek, 1968a; Freidburg et al., 1972), occlusive disease of retinal arterioles and venules (Kottow et al., 1976), anterior segment ischaemia (Easty and Chignell, 1973), various types of glaucoma (Vannas, 1969), and postoperative cystoid macular oedema (Kottow and Hendrickson, 1975). Much has been learnt about these diseases, and doubtless other interesting information will be reported in the future.

The causes of iris neovascularisation are numerous (Gartner and Henkind, 1978), and it is helpful to know whether abnormal vessels are present at an early stage in the disease. This is particularly true in patients with central retinal vein occlusion or diabetes with retinopathy. Fluorescein angiography provides a method to detect the early stages which cannot be seen by clinical examination. It allows a prediction of the risk of later development of rubeosis-iridis or thrombotic glaucoma, which can be treated by peripheral retinal ablation (Laatikainen, 1977).

Inflammatory disease of the anterior uvea together with the trauma of various types, including operative trauma, may merely increase vascular permeability, which is difficult to determine by observation alone and can be seen as an increased leakage of fluorescein dye into the anterior chamber. With advances in methods of fluorophotometry, measurement of the concentration of dye in the anterior chamber can be made (Maurice, 1963; Trevor-Smith et al., 1977), which may short-cut the necessity of photographic techniques where quantitative measurements of dye concentration cannot be made.

In short, iris angiography is likely to be of considerable value in the early detection of neovascularisation and will continue to provide one method for the experimental investigation of anti-inflammatory therapy in the laboratory and in clinical trials. In this issue of the BJO 3 papers concern iris angiography, where the uses for the technique are amplified. Dr Laatikainen has followed the iris vascular changes in patients with diabetic retinopathy, and as a result has been able to classify precisely the lesions which she has found, providing a system of grading which will be valuable in future studies of possible treatment modalities. In a second contribution she describes the iris vascular response in a group of patients with uveitis. A third paper, by Drs Brovkina and Chichua, concerns the value of angiography in the diagnosis of iris tumours...
from which histological material was obtained. These 3 papers are an important addition to an expanding field, which has recently been expertly reviewed in a monograph on iris angiography by Kottow (1978).

References


