Fluorescein angiography in carotid ischaemia

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The hazards of carotid angiography (Walsh and Hoyt, 1969) have led to a search for other methods of diagnosing carotid artery pathology. Among these are infrared imaging devices (Ring, 1971), direct measurement of emitted infrared (Mapstone, 1975), and ultrasonic techniques using the Doppler shift phenomenon (Müller, 1972). In this paper is described a method of diagnosis using intravenous fluorescein.

FIG. 1 Camera mounted on to slit lamp

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FIG. 2 Alloy bracket

Method

The equipment consists of a Zeiss fundus camera and flash unit, with a Nikon camera mounted on a bracket (Fig. 1). The alloy bracket has a 55 mm bore to fit the lens tube (Fig. 2). The bracket arm is 24 cm long overall and is bored with nine 8 mm holes to take the camera screw at different positions. The arm is locked into position by a small nylon set screw.

The patient is seated at a distance (usually about 60 cm) from the Nikon camera so that his face fills the view finder. Three ml of 20 per cent fluorescein are injected into an antecubital vein and photographs are taken.

RESULTS

Normal facial angiogram

Fig. 3 shows a normal angiogram 15.6 s after injection; there is a symmetrical fluorescence of most areas including medial canthi, both lids, and forehead skin. Fluorescence has become diffuse 8 s later (Fig. 4).

FIG. 3 Normal facial angiogram 15.6 s after injection

FIG. 4 As for Fig. 3, 8 s later

FIG. 5 Facial angiogram of patient with right internal carotid occlusion, 17 s after injection

FIG. 6 As for Fig. 5, 4.8 s later

FIG. 7 Facial angiogram of patient with right internal carotid occlusion 14.8 s after injection

FIG. 8 As for Fig. 7, 4 s later

Abnormal facial angiogram

1. Patient with R internal carotid occlusion, abnormal forehead skin, and corneal temperature differences. In Fig. 5 (17 s after injection) there is a symmetrical fluorescence below the lower lids, but the right upper and lower lids, medial canthus, and medial forehead skin show a marked hypofluorescence. An asymmetry remains and the (presumed) path of the right supra-orbital artery can be seen 4.8 s later (Fig. 6).

2. Patient with R internal carotid occlusion and abnormal forehead skin temperature differences, but normal corneal temperatures. In Fig. 7 (14.8 s after injection), there is an asymmetrical fluorescence of the lower half of the face and the left medial canthus and forehead skin are fluorescing. The right medial canthus is beginning to fluoresce but an asymmetry remains 4 s later (Fig. 8).

Discussion

A stenosing/occlusive lesion within the carotid tree will create a time-lag in injected fluorescein reaching

its peripheral territory as compared with the contralateral normal side. Quantitatively, this can be demonstrated by temperature measurement, and qualitatively by fluorescein angiography. The latter can be performed cheaply and safely in most ophthalmic clinics and provides a ready means of demonstrating ocular ischaemia. Present experience (46 angiograms) indicates that thermal and angiographic patterns correlate closely and, as the accuracy of diagnosing carotid ischaemia thermometrically is in the region of 70–80 per cent, the same degree of accuracy can be expected of fluorescein angiography. The ischaemic patterns illustrated are the most common; details of others are published elsewhere (Mapstone, 1974).

Summary

A cheap and safe screening method for demonstrating ocular ischaemia using fluorescein angiography is described and illustrated.

References

- MAPSTONE, R. (1975) 'Proceedings of the Third Wm. Mackenzie Memorial Symposium', ed. J. S. Cant. Kimpton, London (in press)
- MÜLLER, H. (1972) *Neurology (Minneapolis)*, **22**, 816
- RING, E. F. J. (1971) *Brit. J. hosp. Med.* (equipment supplement), **5**, 24
- WALSH, F. B., and HOYT, W. F. (1969) 'Clinical Neuro-ophthalmology', p. 1857. Williams & Wilkins, Baltimore.