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Detection of retinal arterial macroaneurysms with indocyanine green videoangiography

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The occurrence of extensive hemorrhages in the macular site may be secondary to several pathologies, especially vasoocclusive diseases, age-related macular degeneration or retinal arterial macroaneurysms (RAM).

Fluorescein angiography does not often provide a precise diagnosis of the underlying lesion because of the blood masking effect. Indocyanine green videoangiography (ICGV) allows more precise detection of the choroidal abnormalities, in particular choroidal neovascularization [8], through retinal pigmentations, ocular media opacifications, hemorrhages and exudations. We report on two cases of RAM, presenting as wide pre-retinal macular hemorrhage, whose diagnosis was easily achieved by means of ICGV.

Nine consecutive patients referred to our fluorescein angiography center with wide and dense macular hemorrhage were considered. There were six women and three men with a mean age of 68.5 ± 7.06 years (range 59–78 years). All the patients complained of sudden worsening of visual acuity in one eye. Each underwent ophthalmologic examination including fluorescein angiography and ICGV. The latter was performed using a technique described elsewhere [8]. The area of the lesions was obtained using Littmann correctional formulas [3].

The mean visual acuity was 0.1 ± 0.1 (range 0.02–0.3) in the affected eye. Slit-lamp examination of the anterior segment of the eye revealed a cortico-nuclear cataract in five patients. The biomicroscopic evaluation revealed in each case a wide pre-retinal, retinal and subretinal hemorrhage located in the macular area and circumscribed by retinal pigment epithelium and a neurosensory retinal detachment.

The fluorescein angiography demonstrated late hyperfluorescence in two patients close to the center of the macular hemorrhage and in three patients close to the edge of the macular hemorrhage. In all the cases the masking effect due to the blood precluded precise diagnosis. In seven patients ICGV showed a hyperfluorescent lesion.

Fig. 1 Top left: Red-free frame showing extensive macular hemorrhage. Top right: Indocyanine green videoangiography (ICGV) at 15 s showing minimal dilation along the inferotemporal arcade. Bottom left: ICGV at 19 s demonstrating the retinal arterial macroaneurysm (RAM). Along the superotemporal arcade there is evidence of another RAM with spontaneous fibrotic evolution. Bottom right: ICGV at 56 s with evidence of mild leakage.
centered on the fovea in the early phase (0–10 min). The lesion also demonstrated mild leakage in the middle phase (10–20 min) and the late phase (20–40 min). The mean area of the hyperfluorescent lesion was $3.48 \pm 4.12 \text{ mm}^2$ (range $0.11–10.55 \text{ mm}^2$). All these factors are consistent with the diagnosis of active choroidal neovascularization. No laser treatment was performed.

In two patients ICGV showed a round dilation along the superotemporal and the inferotemporal retinal artery, respectively, in the early stages. Starting from the first 60 s of the early phase, mild leakage was evident, and the leakage became more apparent in the middle and late phases (Figs. 1–3). The area of the round lesions was 0.45 and 0.62 mm$^2$ respectively.

The peculiar aspect and the site of the lesions suggested the diagnosis of RAM. In the first of these two patients there was evidence of a previous RAM with spontaneous fibrotic evolution along the superotemporal artery with typical curved aspect of the vessel (Fig. 1). Each patient underwent krypton laser treatment with indirect photocoagulation technique. ICGV is