APPLICATIONS OF NUCLEAR MEDICINE IN OPHTHALMOLOGY

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ABSTRACT

Diagnostic techniques using radioactive isotopes can be used for the investigation of cerebral, orbital and intraocular tumours and for the dynamic study of tear flow. The value of such techniques in the study of obstruction of the nasolacrimal system (particularly partial and functional obstructions) has been established and the possibility of using Tc\(^{99m}\) clearance for the investigation of dry eyes is being investigated.

One of the earliest applications of nuclear medicine in ophthalmology was the diagnosis of intraocular tumours using P\(^{32}\) and a detector for measuring beta-radiation over the anterior surface of the eye. The old Geiger-Muller

Fig. 1. Beta-radiation detectors, with a match for scale. The two upper detectors are designed for application to the posterior pole of the eye.
counter has been replaced by a more sensitive, semi-conductor detector, in the tip of a thin probe which can be applied directly to the anterior segment of the eye, or to the posterior pole through a conjunctival incision (Figure 1).

Brain scanning using Tc$^{99m}$ and a rectilinear scanner or a gamma camera equipped with a microcollimator can demonstrate intracranial lesions such as pituitary lesions and sphenoidal ridge meningiomas, as well as large intraorbital tumours – especially if they are vascular. Figure 2 demonstrates the concentration of Tc$^{99m}$ in an inflammatory pseudotumour (sclerosing lipogranuloma) in the left orbit. Bone scanning using Tc$^{99m}$ E.H.D.P.- (diphosphonate) is useful in detecting bone involvement in patients with intraorbital or intracranial tumours.

Fig. 2. Tc$^{99m}$ brain scan showing increased uptake in the left orbit due to the presence of an inflammatory pseudotumour (sclerosing lipogranuloma).