BETA-IRRADIATION OF PTERYGIA*† COMPARISON OF DIFFERENT AREAS TREATED

BY

MALCOLM E. CAMERON

Brisbane, Australia

AN investigation into the efficacy of the treatment of pterygia by excision and beta-irradiation was carried out by the author in 1962–1964 (Cameron, 1965). The apparatus used for beta-irradiation, devised by the Queensland Radium Institute (Mead and Robertson, 1957), consisted of a hollow cylindrical-shaped applicator, 16 mm. in diameter with a shelf 5 mm. from the lower end, on to which was placed a standard disc-shaped plate containing Sr^{90} . The shelf was included because it is impossible to apply a flat plate of large diameter (16 mm.) to a curved surface such as the eyeball and obtain close all-over contact.

The method of excision was to dissect the pterygium from the cornea starting at the apex and continuing towards the limbus until the corneal attachment was severed. The pterygium was then removed by cutting its base so as to leave a bare area of sclera about 12×5 mm. A surface dose of 2,200 r in one application was given immediately.

In the average case the 16 mm. field, as seen with the applicator in place just after excision, consisted of 3 mm. cornea, 5 mm. bare sclera, and 8 mm. conjunctiva. Results obtained with this method in 57 cases of primary, *i.e.* non-recurrent, pterygium were 84 per cent. cosmetically satisfactory. This figure contrasted sharply with 31 per cent. cosmetically satisfactory obtained by excision only, *i.e.* without beta-irradiation.

Having demonstrated the efficacy of this method of beta-irradiation, the next step was to find out if equally good results could be obtained by irradiating separately either the cut edge of the conjunctiva or the bare area of sclera. In 28 cases of primary pterygium, where the irradiation was restricted almost wholly to the cut edge of the conjunctiva, only 61 per cent. gave a cosmetically satisfactory result. Obviously, irradiation of the bare area of sclera was necessary to obtain the best result, but it was not yet determined whether that could be produced only by irradiating conjunctiva and sclera together or whether irradiation of the bare scleral area alone would suffice.

Castroviejo (1956) introduced a series of screening masks designed to fit snugly over the end of the applicator and to restrict irradiation through the areas cut out of the masks. The largest of the kidney-shaped areas (8.7×3 mm.) was suitably shaped to restrict irradiation to the bare area of the sclera at the limbus, but Castroviejo has never reported the efficacy of such an applicator in treating pterygium.

Present Investigation

83 cases of primary pterygium and thirteen of recurrent pterygium were treated by excision and beta-irradiation using a mask similar to that of Castroviejo (Figure, opposite), but with a larger opening (9×5 mm.).

* Received for publication July 3, 1967.

† Address for reprints: 79 Wickham Terrace, Brisbane, Queensland, Australia.

All cases were followed for a minimum of 6 months and were classified in the same way as those in the initial survey in 1962–1964, *i.e.* cosmetically satisfactory or not.

FIGURE.—9 × 5-mm. mask applied to bare scleral area immediately after pterygium excision and before the Sr⁹⁰ plate is dropped in.

Results

The results for primary and recurrent pterygium with the two applicators of different shapes are shown in the Table.

TABLE
RESULTS IN 200 CASES

Type of Pterygium	Applicator	Result				Total Cases
		Satisfactory		Unsatisfactory		
		No.	Per cent.	No.	Per cent.	
Primary	16 mm. circular	48	84	9	16	57
	9 × 5 mm. kidney-shaped	75	96	8	4	83
Recurrent	16 mm. circular	35	74	12	26	47
	9 × 5 mm. kidney-shaped	10	77	3	23	13

Statistical analysis gives χ^2 values for both primary and recurrent pterygium, indicating no difference in efficacy between the two applicators. Since with the 16-mm. applicator more than four times the surface area is irradiated compared with the 9 × 5-mm. applicator, the latter is to be preferred. An additional advantage is the reduction in irradiation time by surface application.

Summary

(1) A comparison was made between the results obtained with a large circular applicator (16 mm. diameter) and a small kidney-shaped applicator (9 × 5 mm.) in the treatment of primary and recurrent pterygium by excision and beta-irradiation with a surface dose of 2,200 r.

(2) Results were just as good with the 9 × 5-mm. applicator, which is therefore to be preferred.

I should like to thank Dr. B. Kynaston, Radiotherapist at the Queensland Radium Institute, for his help in treating the patients with the new applicator.

REFERENCES

- CAMERON, M. E. (1965). "Pterygium throughout the World". Thomas, Springfield, Ill.
 CASTROVIEJO, R. (1956). *Trans. Amer. Acad. Ophthal. Otolaryng.*, **60**, 486.
 MEAD, K. W., and ROBERTSON, D. F. (1957). *Proc. Coll. Radiol. Aust.*, **1**, 83.