Treatment of juxtapapillary melanomas

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Abstract

Thirty nine patients suffering from juxtapapillary choroidal melanoma were treated with Ru-106/Rh-106 β -ray plaques. The tumoricidal dose was 100 Gy at the apex of the tumour within 7-14 days. Additional photocoagulation was performed in 12 eyes. The irradiated eyes of three patients had to be enucleated, seven patients died, five of them (12.8%) from metastases. Thirty two (82%) patients are alive and 29 (74%) have a seeing eye. From the whole series 20 (51%) developed flat scars and 11 (29%) patients retained a visual acuity of 0.5-1.0. Radiogenic late complications with damage to the optic nerve and macula were the main causes of visual deterioration.

Naevi and malignant choroidal melanomas are mostly located at the posterior part of the uvea, possibly due to the fact that ciliary nerves are more concentrated in this region than in other parts of the fundus.¹

Juxtapapillary growth of a malignant melanoma is the most challenging for any conservative therapeutic procedure. On the one hand the malignant tissue must be completely destroyed and on the other hand the macula and optic nerve located closest to the tumour margin should be preserved from destructive side effects of the ionising radiation. The optic nerve, vortex veins, and the insertion of the inferior oblique muscle sometimes hamper the proper suturing of radio-

Figure 2 Location of the 39 juxtapapillary choroidal melanomas.

active plaques which have to cover the tumour margin.

The aim of this paper is to present our clinical experience of the management of these juxtapapillary choroidal melanomas.

Patients and method

Thirty nine patients suffering from juxtapapillary choroidal melanomas were treated between 1964 and 1986. Each melanoma approached the optic disc or was growing less than half a disc diameter (DD) distant from it. During the same period 387 patients were treated with Ru-106/Rh-106 plaques, which means that roughly 10% of all these cases were tumours growing close to the optic disc. Diagnosis was confirmed by ophthalmoscopy and ultrasonography. Treatment was performed with Ru-106/Rh-106 plaques as described in previous papers.²

In most of these tumours we used plaques which have a sector cut out to accommodate the optic nerve (Fig 1). Under local or sometimes general anaesthesia the conjunctiva and Tenon's capsule were incised and, if necessary, muscles were detached so that the plaque could be placed on the sclera as close as possible to the tumour base, which was carefully localised by transillumination or diathermy. The therapeutic dose was calculated to deliver 100 Gy at the apex of the tumour within seven to 14 days.

In 12 eyes additional photocoagulation with xenon was performed after brachytherapy in those cases in which the central margin of the tumour showed insufficient regression. A dense line of heavy coagulation burns was arranged horseshoe-like around the central rim of the tumour.

Tumour regression was recorded on follow-up examinations by fundus photography, ultra-

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Figure 1 Ru-106/Rh-106 plaques with a notch for the optic nerve (Isocomerz Berlin-Buch, Germany).

Table 1 Regression after treatment (median follow-up period 4.6 years)

Tumour size before treatment	Flat scar	Tumour height <1 mm	Tumour height 1–2 mm	No regression	Further tumour growth
Small (less than 3 mm in height or 10 mm in diameter)	11	8	3	0	0
Medium (less than 5 mm in height or 15 mm in diameter)	17	10	2	3	1
Large (Larger than 5 mm in height or 15 mm in diameter)	11	2	3	4	1
Total	39 (100%)	20 (51%)	8 (21%)	7 (18%)	2 (5%)

Figure 3A Female patient aged 53 years. Choroidal melanoma of the right eye growing nasally adjacent to the disc, height 7.8 mm.

Figure 3B Five years after brachytherapy with Ru-106/Rh-106 plaque (240 Gy in 5 mm, 1000 Gy at the scleral surface) and xenon photocoagulation at the temporal rim. VA=0.04.

Table 2 Juxtapapillary choroidal melanoma (n=39)

	Visual acuity		
	Before treatment	One year after treatment	Final examination (median follow-up period 4.6 years)
1.0–0.5	25	18	11
0.4–0.2	9	5	8
0.15–0.02	5	13	16
<0.02	–	3	4

Table 3 Juxtapapillary choroidal melanoma (n=39) seven died – five from metastases

Size	Follow-up period	Regression	Cause of death
1. medium	6 years	flat scar	metastases (autopsy)
2. medium	8 years	tumour remnants (2 mm)	arteriosclerosis
3. medium	3.2 years	flat scar	metastases (autopsy)
4. medium	1.6 years	flat scar	metastases
5. medium	3.6 years	tumour remnants (1 mm)	metastases
6. large	6 years	tumour remnants (2 mm)	metastases (autopsy)
7. large	6 years	flat scar	rectal carcinoma

sonography and fluorescein angiography. The median follow-up period was 4.6 years. The tumours in 19 patients were controlled for more than 5 years.

Results

The average age of our patients was 50 years, the youngest was 23 and the oldest 68 years. The sex distribution was 23 male and 16 female patients. The right eye was involved in 21 cases and the left eye in 18 cases. The melanoma was located nasal to the disc in 19, below in eight, above in six and temporal, including the macular area, in six cases (Fig 2).

The pretreatment tumour sizes were as follows: 11 small tumours (less than 3 mm in height or less than 10 mm in diameter), 17 medium sized tumours (more than 3 mm but less than 5 mm in height or more than 10 mm but less than 15 mm in diameter) and 11 large tumours (larger than 5 mm in height or larger than 15 mm in diameter).

Out of the 39 patients, seven died during the follow-up period, five from proved metastases (13%). Three eyes had to be enucleated because of insufficient tumour regression.

Tumour regression after irradiation in relation to the pretreatment tumour sizes is shown in Table 1.

Visual acuity before, 1 year after irradiation, and at final examination is shown in Table 2. Before treatment 25 patients (64%) had a visual acuity between 0.5 and 1.0. After brachytherapy, 11 (28%) still had this good visual acuity at the last follow-up examination.

The majority of radiogenic complications included macular degeneration, papillitis and atrophy of the optic nerve which led to deterioration of the visual function. Macular destruction was found in 16, atrophy of the optic disc in 10, papillitis in six, radiogenic retinopathy in five, vitreous haemorrhage in three eyes and secondary glaucoma in one eye.

Three eyes (two with medium sized and one with a large melanoma) had to be enucleated

Figure 4A Male patient aged 44 years. Choroidal melanoma of the right eye growing nasally adjacent to the disc, height 4 mm. Brachytherapy with Ru-106/Rh-106 plaque (240 Gy in 5 mm, 1000 Gy at the scleral surface) and xenon photocoagulation at the temporal rim. One result of coagulation was accidentally incorrectly situated.

Figure 4B Six years after treatment. Atrophic scar with a pigmented slightly elevated mass in its centre (3.4 mm by ultrasonography high reflectivity). VA=0.1.

because of inadequate tumour regression at 2 months, 5 years, and 9 years after treatment. Histological examination showed spindle cell A melanoma in all cases. Five patients died from metastases as shown in Table 3. However three of these sustained an excellent tumour regression to a flat scar after treatment.

Discussion

The therapeutic outcome after brachytherapy using Ru-106/Rh-106 plaques in patients suffer-

ing from choroidal melanoma depends on the pretreatment size and the location of the tumour. In cases of juxtapapillary melanomas in particular we have to expect a worse prognosis regarding visual acuity and tumour regression in comparison with those tumours growing at the equator. The reasons are the radiosensitivity of the optic nerve, the vicinity of the fovea which sometimes has to be included in the irradiation area, and the impossibility of reaching all tumour cells with a plaque—even using those with a recess for the optic nerve. In such a situation additional light or laser coagulation can be used after radiotherapy (as we did in 12 eyes) to destroy the central tumour margin and to interrupt the feeding choroidal vessels in the vicinity of the optic disc.

There were five deaths (13%) from metastases in this series. This is similar to the 11% metastasis rate after 5 years reported in our statistical analysis, including all locations of choroidal melanomas.²

Proximity of choroidal melanomas to the optic nerve and to the fovea is always a risk factor for visual loss after any kind of radiotherapy.³ The severity and extent of post-radiation retinopathy after brachytherapy with Ru-106/Rh-106 plaques is less than after cobalt-60⁴ because of the higher volume dose of the latter.

Nevertheless using β rays from Ru-106/Rh-106, with the limited penetration depth into tissue, is an effective method for destruction of tumours even those close to the optic disc (Figs 3 and 4). It seems to be a recommendable alternative to enucleation, proton beam irradiation,⁵ iodine-125 plaques,⁶ or local tumour resection.^{7,8}

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