106Ru/106Rh plaque radiotherapy for malignant melanomas of the choroid
With follow-up results more than 5 years

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Abstract. Therapeutic results are presented with follow-up examinations of at least 5 years (min. 5 years, max. 22 years) after 106Ru/106Rh plaque radiotherapy of posterior uveal melanomas. Out of 227 patients 146 (= 64.3%) could be treated successfully, 37 (= 16.3%) had to be enucleated and are alive, 44 (= 19.4%) died from metastases and 40 (17.6%) from other causes. 75.0% of all small melanomas (T1a) showed an excellent regression pattern to flat scars. Five years after treatment the survival rate was 83.7% (deaths from any causes) respectively 88.2% (deaths from metastases only) and 64.8% (deaths from any causes) respectively 79.7% (deaths from metastases only) ten years after irradiation. 106Ru/106Rh plaque radiotherapy can be recommended for small (T1a, b) and medium sized (T2) choroidal melanomas.

Introduction

The choice of therapy in the management of uveal melanomas is still an unresolved issue. The ideal procedure does not exist which would destroy the tumor locally without inducing the development of metastases and without local side effects.

Enucleation is still indicated for patients with large tumors or painful or blind eyes. However, the treatment of melanomas in eyes with useful vision remains controversial (Zimmerman et al., 1978; Manschott and van Peperzeel, 1980). Since Stallard published his first results obtained with 60Co plaques (Stallard, 1966) the preference for radiotherapy of uveal melanomas has increased (Lommatzsch, 1983). Several irradiation procedures are available but every method has its advantages, hazards, and side effects (Char et al., 1980; Gragoudas et al., 1980).

106Ru/106Rh plaque therapy was introduced in ophthalmology in 1964 (Lommatzsch, 1974). The goal of this investigation is to assess the efficiency of beta irradiation of patients with posterior uveal melanoma based on long-term follow-up examinations.
Patients and methods

Clinical data. These were assessed for 227 patients (116 men, 111 women) with the clinical diagnosis of posterior uveal malignant melanoma who were examined in the University Eye Hospital Berlin, the Eye Hospital Berlin-Buch, and the University Eye Hospital Leipzig and who underwent $^{106}$Ru/$^{106}$Rh plaque radiotherapy by the author between January 1964 and December 1980. The methods of clinical examination, diagnosis, and treatment have been published previously (Lommatzsch 1983). The following clinical findings were recorded for each patient just prior to treatment:

1. Age (years) and sex (male or female)
2. Visual Status: Snellen visual acuity, best correction
3. Tumor category: Size of tumor including maximal and minimal basal diameters (estimated in millimeters derived from ophthalmoscopic examination) and thickness (evaluated prior to the availability of ultrasonography with ophthalmoscopy: 3 Diopters = 1 mm elevation). For pretreatment classification we used the TNM system published by the UICC (Harmer and Oosterhuis, 1985):
   - T1a Tumor not more than 7 mm in its greatest dimension and with an elevation not more than 2 mm.
   - T1b Tumor more than 7 mm, but not more than 10 mm in its greatest dimension and with an elevation more than 2 mm but not more than 3 mm.
   - T2 Tumor more than 10 mm, but not more than 15 mm in its greatest dimension and with an elevation of more than 3 mm, but not more than 5 mm.
   - T3 Tumor more than 15 mm in its greatest dimension or with an elevation of more than 5 mm.
   - T4 Tumor with extraocular extension.
4. $^{32}$P Test: With transscleral incisional technique a positive test was considered to be more than 40% uptake over the lesion compared with the control area.

Treatment. $^{106}$Ru/$^{106}$Rh applicators were sutured upon sclera after careful localization of the tumor with ophthalmoscopy or transillumination and the use of diathermy to mark its margin on the sclera. The plaque was removed after the appropriate dose of 10,000 rad (100 Gy) had been delivered to the apex with 7 to 14 days exposure time. Physical properties, experimental studies, dosimetry and surgical procedures have been published in detail (Lommatzsch, 1974).