

SCIENTIFIC SESSION 12
UVEAL MELANOMA 2

Shilpakalavedika Convention Center
Tuesday, January 27, 2004
8:30 AM – 10:30 AM

Chair: Dennis Robertson
Co-chair: Norbert Bornfeld
Moderator: Patrick dePotter
Session Summary: Patrick dePotter

	Presenter	Title of Presentation	Time
1	Jerry Shields	Introduction to Peter Lommatzsch	8:30 AM
2	Peter Lommatzsch	Guest Lecture: Plaque Brachytherapy	8:32 AM
3	Jerry Shields	Key Note Lecture: Options in the Management of Uveal Melanoma	8:50 AM
4	Rob De Keizer	Ruthenium Brachytherapy in 24 Iris and Iridociliary Melanomas	9:05 AM
5	Kaan Gunduz	Early Results of Ruthenium-106 Plaque Radiotherapy in the Management of Ciliary and Choroidal Melanoma	9:15 AM
6	Bertil Damato	Local Tumor Control, Ocular Conservation, and Visual Retention after Ruthenium 106 Brachytherapy for Choroidal Melanoma	9:25 AM
7	James Fontanesi	Treatment of Uveal Melanoma with I-125. A 17-year Experience	9:35 AM
8	Tero Kivela	Prognosis and Complications after I-125 Plaque Brachytherapy for Large Uveal Melanomas	9:45 AM
9	Alastair Gittos	Radiation Dose Variation and Treatment Margin Width in 106-Ruthenium Brachytherapy for Uveal Melanoma	9:55 AM
10	Antoniata Blasi	Ultrasound Findings of Choroidal Melanoma after Ruthenium106 Brachytherapy, Thermotherapy, and Sandwich Treatment	10:05 AM
11	Dan Gombos	Independent Dosimetric Verification of BEBIG Ru-106 Plaques	10:15 AM
12	Patrick De Potter	Session Summary	10:25 AM

GUEST LECTURE PLAQUE BRACHYTHERAPY

Peter Lommatzsch

Leipzig, Germany

KEY NOTE LECTURE OPTIONS IN THE MANAGEMENT OF UVEAL MELANOMA

Jerry Shields

Wills Eye Hospital, Philadelphia, PA, USA

RUTHENIUM BRACHYTHERAPY OF 24 IRIS-AND IRIDOCILIAR MELANOMAS

*Rob De Keizer, Reineke, Ad Verbeek, Jan Keunen EE
LUMC, Leiden, The Netherlands*

PURPOSE: Evaluation of the results of ruthenium brachytherapy for small iris and iridociliary body melanomas. **METHODS:** In a retrospective study the clinical, ultrasound biomicroscopic (UBM) and ruthenium dosimetry data of 24 patients with a follow-up of 0.5- 5 years were analyzed. Six cases had an iris melanoma and 18 an iridociliary melanoma. In three cases a FNAB or biopsy was performed, prior to therapy, to confirm the diagnosis. **RESULTS:** Tumor reduction was seen in all 24 cases, 1-5 years post-treatment both clinically and with the UBM. One case developed persistent CME after phaco emulsification for a radiation-induced cataract, two cases developed severe anterior segment complications after a total doses of 800 Gy. In one case the tumor vanished completely, but after 16 months on 180 degrees of the irradiated field a new melanoma developed and enucleation was performed; metastasis of the liver were treated with liver perfusion. **CONCLUSION:** Ruthenium 106 brachytherapy of small iris- or iridociliary melanomas with 400-500 Gy seems an alternative for enucleation or complicated iridocyclectomy with preservation of eye and visual function. A special calculation protocol based on the slitlamp and UBM tumor dimensions is helpful to achieve a minimal effective radiation dose at the deepest part of these tumors.

EARLY RESULTS OF RUTHENIUM-106 PLAQUE RADIOTHERAPY IN THE MANAGEMENT OF CILIARY AND CHOROIDAL MELANOMA

Kaan Gunduz, Elif, Ilhan Günalp, Meltem Nalcaci

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Medicine, Ankara, Turkey*

PURPOSE: To report the early results of Ruthenium-106 plaque radiotherapy (Ru-106 PR) in the management of ciliary and choroidal melanoma. **METHODS:** Retrospective review of 30 eyes with ciliary and choroidal melanoma undergoing Ru-106 plaque radiotherapy (Ru-106 PR) between July 2000 and July 2003. Following plaque radiotherapy, the patients were examined at 3, 6, 12 months and at 6-month intervals thereafter. **RESULTS:** The median largest basal tumor diameter was 10.0 mm (range: 6.0-14.0 mm) and the median tumor thickness was 5.0 mm (range: 2.0-8.0 mm). The median apex radiation dose was 90 Gy (62-120 Gy) and the median scleral radiation dose was 610 Gy (370-1452 Gy). The number of patients available for follow-up were 30 at 3 months, 21 at 6 months, 14 at 12 months, 5 at 18 months, 2 at 24 months, and 1 at 30 months. Among patients available for follow-up, the tumor thickness decreased by 20% at 3 months, 38% at 6 months, 50% at 12 months, and 50% by 18 months. Complications of Ru-106 PR were radiation maculopathy in 4 eyes, vitreous hemorrhage in 4 eyes, cataract in 3 eyes, and radiation papillopathy in 1 eye. Two eyes were enucleated because of tumor unresponsive to radiation treatment. No

patient develops melanoma-related metastasis and death. **CONCLUSION:** Ru-106 PR seems to be safe and effective in the management of ciliary and choroidal melanoma. During the limited follow-up of this study, the major decrease in tumor thickness seemed to take place in the first 12 months following Ru-106 plaque radiotherapy.

LOCAL TUMOUR CONTROL, OCULAR CONSERVATION AND VISUAL RETENTION AFTER RUTHENIUM-106 BRACHYTHERAPY OF CHOROIDAL MELANOMA

*Bertil Damato, Imran Patel, Helen Mayles, Douglas
Errington, Philip Mayles*

*Royal Liverpool University Hospital, St Paul's Eye Unit,
Liverpool, UK*

PURPOSE: To report on tumor control, ocular conservation and vision after ruthenium-106 brachytherapy for choroidal melanoma. **METHODS:** Minimum scleral and apex doses of 350 Gy and 80 Gy respectively were delivered with a 15 mm or 20 mm plaque, which was positioned eccentrically with no posterior safety margin if the tumor extended to within three to four disc-diameters (DD) of the optic disc or fovea. Adjunctive transpupillary thermotherapy was administered six months post-operatively if there was uncertainty about radiation dose delivered to the posterior tumor margin. **RESULTS:** By October 2003 427, 364 and 153 of 458 patients were followed up more than one, two and five years respectively. The tumors had a median diameter of 10.6 mm and a median thickness of 3.2 mm. The nine-year actuarial rates of tumor control and ocular conservation were 96.6% and 97.1% respectively. Tumor extension to within 2DD of disc or fovea increased eight-year actuarial rates of loss of 6/60 visual acuity from 23% and 48%, and of loss of 6/12 from 24% and 68% respectively. **CONCLUSION:** Ruthenium-106 brachytherapy with eccentric plaque positioning and adjunctive TTT in selective cases achieves reasonable rates of local tumor control, ocular retention, and conservation of vision.

TREATMENT OF UVEAL MELANOMA WITH I-125. A 17-YEAR EXPERIENCE

James Fontanesi, Agus, John Linn

Cedars Sinai Medical Center, Los Angeles, CA, USA

PURPOSE: to evaluate the use of I-125 radioactive plaque therapy in the treatment of uveal melanomas.

METHODS: Between 1/1/1987 and 10/31/2000, 260 consecutive uveal melanomas were treated using custom-made I-125 plaques. The initial 100 patients were treated with doses prescribed to the apex of the tumor and ranged from 75 - 89 Gy. The remaining patients were treated based on the following parameters: If the tumor height was less than or equal to 10 mm, then the dose prescribed was 100Gy delivered to the 3mm level over 90-96 hours. For lesions whose height was greater than 10 mm, 150Gy were prescribed. Follow up is from the month of treatment completion. No patient has been lost to follow up which has ranged from 14 to 202 months. **RESULTS:** 13/260 (5%) has required enucleation, 10 for progression of tumor and 3 due to complications. The tumor failure rate is 3.8%. 17/260 (6.5%) has developed metastatic disease. Ten had either a base of greater than 15 mm or height greater than 10 mm. Significant complications, including those requiring surgical intervention, were noted in 44 patients. **CONCLUSION:** The use of I-125 episcleral plaque in the treatment of uveal melanoma is a viable treatment option for most patients. The local control of 95% and the acceptable complication rate of 17 % are encouraging. The metastatic rate of 6.5% is not directly attributable to any one factor although total tumor size appears to be a leading indicator.

PROGNOSIS AND COMPLICATIONS AFTER I-125 PLAQUE BRACHYTHERAPY FOR LARGE UVEAL MELANOMAS

Tero Kivela, Ilkka Puusaari, Jorma Heikkonen, Ahti Tarkkanen

University of Helsinki, Helsinki, Finland

PURPOSE: To evaluate I-125 plaque brachytherapy (IBT) for large uveal melanomas. **METHODS:** Of 121 consecutive patients with a uveal melanoma large by the Collaborative Ocular Melanoma Study criteria, 97 underwent IBT (median dose to tumor apex, 87 Gy). Survival, incidence of local recurrence and ocular complications, and preservation of vision were analyzed. **RESULTS:** Median tumor height was 10.7 mm (range, 4.5-16.8) and LBD 16.1 mm (range, 7.3-25.0). The 5-year Kaplan-Meier estimate for all-cause and melanoma-specific survival was 62% (95% CI, 49-72%) and 65% (95% CI, 52-75%), respectively. 5-year incidences of local recurrence, cataract, glaucoma, maculopathy and optic neuropathy were 6% (95% CI, 2-14), 69% (95% CI, 57-78), 60% (95% CI, 48-70), 52% (95% CI, 35-65) and 46% (95% CI, 30-61), respectively. The estimate for avoiding low vision and blindness was 11% (95% CI, 4-24%) and 26% (95% CI, 16-37%) at 2 years, respectively. Tumor height and location entirely posterior to the ora serrata were main predictors of visual loss. **CONCLUSION:** IBT appears to be a reasonable alternative to enucleation as regards survival and local tumor control. In spite of frequent complications, IBT provides a good chance of preserving the eye and a possibility of conserving useful vision at least short-term.

RADIATION DOSE VARIATION AND TREATMENT MARGIN WIDTH IN 106-RUTHENIUM BRACHYTHERAPY FOR UVEAL MELANOMA

Alastair Gittos, John Hungerford, Guy Smith

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In 1999 this center reported results for the efficacy of proton beam radiation therapy, as well as both 125-iodine and 106-ruthenium episcleral plaque radiotherapy, in the treatment of 597 patients with choroidal melanoma. Treatment with 106-ruthenium was found to be associated with a higher rate of local recurrence than either 125-iodine or proton beam radiation therapy. However, fewer side effects and better visual results were seen in the 106-ruthenium treated patients. Therefore the use of 106-ruthenium was continued, although we attempted to improve the local tumor control rate by both using wider treatment margins (through a larger 20mm plaque), and by varying the radiation dose according to tumor thickness. Tumors less than 3 mm thickness receive 80 Gy to the apex, those with thickness between 3 and 5 mm receive 100 Gy to the apex, and those greater than 5 mm thickness receive 120 Gy calculated at a 5 mm depth. We present the results of a retrospective analysis of 100 consecutive patients, all treated with 106-ruthenium plaque brachytherapy using this approach, with a minimum follow up of 27 months, and a median of 39 months.

ULTRASOUND FINDINGS OF CHOROIDAL MELANOMA AFTER RU106 BRACHYTHERAPY, THERMOTHERAPY AND SANDWICH TREATMENT

Maria Blasi, Alessandra Cristiana, Lelio Sabetti, Emilio Balestrazzi

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PURPOSE: To analyze the ultrasonographic features of uveal melanoma after brachytherapy, transpupillary thermotherapy (TTT) and sandwich treatment (brachytherapy and TTT).

METHODS: 35 patients (35 eyes) with choroidal melanoma who were treated with conservative approaches (brachytherapy, TTT, sandwich therapy) were followed up with A and B scan ultrasonography every 6 months for at least one year. The echographic parameters included tumor basal diameters, height, internal reflectivity, regularity, vascularity, associated retinal detachment and extrascleral extension.

RESULTS: At the time of treatment the mean height of the tumors was 3.8 mm for brachytherapy, 2.0 mm for TTT, 4.2 mm for sandwich and decreased to 2.6 mm, 0.8 mm and 2.8 mm respectively at one year follow-up. The decrease in height was more evident in tumors treated with sandwich therapy compared with brachytherapy alone (on average 66.6% of the initial height compared with 68.4%). Internal reflectivity increased progressively after treatment: 58% and 88% of tumors were characterized by medium to high internal reflectivity one year after treatment. **CONCLUSION:** Ultrasonographic dynamics of uveal melanomas after conservative approaches support the application of combined treatment modalities. The association of brachytherapy and TTT revealed improved short-term results, in term of local tumor control, compared with brachytherapy alone.

INDEPENDENT DOSIMETRIC VERIFICATION OF BEBIG RUTHENIUM-106 PLAQUES

Dan Gombos, Firas Mourtada, Adam Garden, John Horton, Ann Lawyer

MD Anderson Cancer Center, Houston, TX, USA

PURPOSE: To report a method for independent dosimetric verification of BEBIG Ru-106 plaques. **METHODS:** Three sources (models CCB, COB, and CCA, manufactured by BEBIG Berlin, Germany) were investigated. Measurements of the absolute dose rate and relative dose uniformity were obtained using radiochromic films and a hemispherical eye phantom. A high resolution CCD densitometer was used to digitize the films (0.13 mm pixel resolution). Sr-90/Y-90 source traceable to the NIST was used for film optical density-to-dose calibration. A scaling function, for converting the measured dose rate in plastic to that in water, was estimated with Monte Carlo simulations. **RESULTS:** Our overall measurement uncertainty is $\pm 11\%$. The absolute dose rate, along the central axis, for each source model is found to be in good agreement (within $\pm 10\%$) with the manufacturer's reported values. All plaques were found to have good dose uniformity at measured depths of 2 mm and 5 mm from the inner surface of the plaque. **CONCLUSION:** Sound independent verification of BEBIG Ru-106 plaques can be performed by individual ocular oncology centers. Implementation of this quality assurance program insures accurate and consistent radiotherapy treatment planning. In contrast to recent reports our results confirm the dosimetry and uniformity of these radioactive sources.

SESSION SUMMARY

Patrick dePotter

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