353 Uveal Melanoma II: Clinical
Tuesday, May 3, 2011, 1:45 PM - 3:30 PM
Hall B/C  Poster Session
Program #/Board #  Range: 3263-3268/A511-A536
Track 1: Genetics and Gene Expression
Track 2: Physiology and Pathology
Track 3: Diagnosis and Treatment
Organizing Section: Anatomy Pathology

Program Number: 3263  Poster Board Number: A511
Presentation Time: 1:45 PM - 3:30 PM
Characteristics of Anterior Uveal Melanomas in 18 Cases
Pratima Kathil1, 2, Paul T. Finger1, 2, Tatyana Milman3, 4. 1The New York Eye Cancer Center, New York City, NY; 2The New York Eye and Ear Infirmary, New York City, NY.

**Purpose:** To evaluate a case series of anterior uveal melanomas for their distinct clinical, histopathologic and high frequency ultrasound (UBM) characteristics.

**Methods:** Retrospective, single-center study of 18 patients, diagnosed between November 1998 and June 2010. Data was obtained through chart review. Main outcome measures included patient, tumor, high frequency ultrasound, histopathologic and follow-up characteristics. Follow-up data included change in visual acuity, growth, secondary glaucoma, extracanal extension or malignant transformation.

**Results:** Median follow-up was 21 months (range: 01-130). Mean patient age at presentation was 51 years (median: 54.5, range: 11-84 years). Tumor was darkly pigmented with nodular configuration in 94%, irregular surface in 78%, characteristic cobbledstone surface appearance in 67% and feathery or fimbriated margins in 83%. Intrinsic vascularity, ectropion uveae, episcleral sentinel vessel, sector cataract, or heterochromia were not seen. UBM showed high (67%) or moderately high (17%) internal reflectivity in the majority of tumors. Thirteen involved the iris (72%), 44% were club-shaped and 100% showed no intrinsic vascularity. Mean tumor thickness was 1.1mm (SD=0.5, median: 0.9, range: 0.3 to 2.1). Mean largest basal dimension was 3.11mm (SD=2.3, median: 2.3, range: 0.5-9.4) (n=14). Four patients underwent tumor biopsy. Pathologic and immunohistochemical evaluation confirmed the diagnosis of melanocytoma. Correlation between UBM and histopathology was demonstrated. Three tumors (17%) had extracanal extension, 21% were documented to grow and one (6%) was caused medically-controlled glaucoma.

**Conclusions:** Anterior uveal melanocytomas are uncommon, typically benign melanocytic tumors with characteristic clinical features. High frequency ultrasound imaging provides excellent views of obscure posterior extent, allows precise tumor measurement and monitoring for growth. It is an invaluable adjunct to digital slit lamp photography for evaluating tumor stability or growth. This study presents and correlates unique clinical, high frequency ultrasound and histopathologic characteristics.

**Commercial Relationships:** Pratima Kathil, Ocular Oncology Fellowship from the International Council of Ophthalmology (F); Paul T. Finger, None; Tatyana Milman, None

**Support:** The Eye Cancer Foundation, Inc., New York City, New York, USA

Program Number: 3264  Poster Board Number: A512
Presentation Time: 1:45 PM - 3:30 PM
Detection and Registration of Risk Factors for Malignant Transformation at the First Consultation of Choroidal Nevi
Maria P. Mera1, Manuel F. Bande2, Maria Santiago1, Maria Pardo3, Carmen Campeds1, Antonio Pinheiro1, Maria J. Blanco4, 1Ophthalmology, Universidad de Santiago de Compostela, Santiago de Compostela, Spain; 2Grupo de Obedesimica, Laboratorio de endocrinologia Molecular y Cellular, Hospital Clinico Universitario de Santiago (CHUS/SERGAS), Santiago de Compostela, Spain.

**Purpose:** Seven clinical and ultrasonographic factors have been described to identify those choroidal nevi (CN) with risk of transformation into malignant melanomas: thickness > 2 mm, orange pigment, symptoms, subretinal fluid, margin minor than 3 mm from optic disc, absence of atrophic halo and acoustic hollowness. The aim of this study was to describe our experience assessing and identifying those choroidal nevi (CN) with risk of transformation into malignant melanoma.

**Methods:** This study included 723 patients (325 men and 398 women) with UM, who were treated between 1998 and 2010 at a single center (Hadasah-Hebrew University Medical Center, Jerusalem, Israel). Men and women were compared regarding differences in annual incidence, age at diagnosis, size and intraocular location of the tumor, symptoms leading to diagnosis, recurrence, metastases development and mortality. Statistical analysis included: student t-test, ANOVA, Pearson correlations and Kaplan-Meier survival analysis.

**Results:** Annual incidence was not associated with gender. No significant gender difference in diagnosis age was observed (men: 60.96 years vs. women: 60.16 years). No significant gender differences in tumors' diameter or height were observed. Tumors were more frequently located posterior to the equator in men than in women (42.28% vs. 33.99%; p=0.03). However, men were less likely than women to complain of symptoms prior to the diagnosis (77.10% vs. 84.65%; p=0.04). Men developed metastases more than women (15% vs. 10%; p=0.05). In the subgroup of patients who developed metastases, the time until development of metastases was shorter in men compared with women (metastases 1 and 5 year after diagnosis of UM: 24% vs. 12.96%; 84% vs. 50%, respectively; p=0.01). Men had a worse survival compared with women (5, 10 and 15 years: 83.09% vs. 92.09%; 76.68% vs. 85.12%; 71.63% vs. 77.37%, respectively; p=0.002). No gender difference was observed in the disease's recurrence rate.

**Conclusions:** No gender differences in UM were observed regarding annual incidence, age, or recurrence of the tumor. However, men were more likely to develop UM posterior to the equator, though they surprisingly tended to complain less. The prognosis of UM in men was worse than in women. Men developed more metastases and the time from the diagnosis of UM until development of metastases was shorter. Finally, the overall mortality from UM was higher in men compared with women.

**Commercial Relationships:** Oftira Zloty, None; Jacob Pe'er, None; Shahar Frenkel, None

**Support:** None

Program Number: 3266  Poster Board Number: A514
Presentation Time: 1:45 PM - 3:30 PM
Comparison of Demographics and Clinical Characteristics of Metastatic vs. Non-Metastatic Choroidal Nevi
Archana T. Seethala1, Carol L. Shields2, Minoru Furuta2, Jerry A. Shields3, 1Ophthalmology, Boston University Medical Center, Boston, MA; 2Ocular Oncology, 3Wills Eye Institute, Philadelphia, PA.

**Purpose:** To compare characteristics of metastatic choroidal melanoma with non-metastatic choroidal melanoma.

**Methods:** Retrospective Review

**Results:** Of 8045 eyes with choroidal melanoma, 968 were metastatic, while 7077 were not (12% versus 86%). Both metastatic and non-metastatic groups consisted primarily of Caucasians (99% versus 98%). Average age at diagnosis was 59 years in metastatic tumors and 63 years in non-metastatic. Five years non-metastatic tumors were female, and 49% were male. Of non-metastatic tumors 49% were female and 51% were male. Clinical features (metastatic versus non-metastatic) favoring metastatic tumors included anterior tumor margin in the ciliary body (34% versus 17%), posterior tumor margin between the equator and macula (53% versus 49%), mean diameter (13.5mm versus 10.8mm), mean thickness (7.0mm versus 5.3mm), tumor color brown (59% versus 54%), subretinal fluid (76% versus 70%), Bruch's rupture (22% versus 21%), extracanal extension (5% versus 3%), retinal hemorrhage (14% versus 8%), tumor shape diffuse (7% versus 6%), tumor shape mushroom (19% versus 18%). Clinical features favoring non-metastatic tumors revealed epicerter between equator and macula (66% versus 70%), anterior margin between the equator and macula (25% versus 44%), tumor shape dome (74% versus 75%), tumor color yellow (12% versus 16%), tumor color mixed (29% versus 30%).

**Conclusions:** Metastatic choroidal melanoma is more likely to show features of anterior margin in the ciliary body and display larger mean diameter and thickness.
than non-metastatic melanomas. Other characteristics, including subretinal fluid, Bruch’s membrane rupture, extracellular extension, and retinal hemorrhage, are found slightly more often in metastatic tumors whereas features of dome shape, yellow color, mixed color, epicenter and anterior margin located between equator and macula, were found more often in non-metastatic tumors.

**Commercial Relationships:** Archana T. Seethala, None; Carol L. Shields, None; Minoru Furuta, None; Jerry A. Shields, None

**Support:** None

---

**Program Number:** 3267  **Poster Board Number:** A515  **Presentation Time:** 1:45 PM - 3:30 PM


**Purpose:** Several factors contributing to irreversible vision loss after radiation for uveal melanoma have been identified. These have included tumor size, presence of subretinal fluid, radiation dose to the optic nerve or macula and pre-existing vascular disease, specifically diabetes mellitus. In this study we evaluated whether retinal vessel caliber was associated with vision loss following radiation.

**Methods:** Database searches identified patients with uveal melanomas located within three millimeters of the optic disk or fovea and at least three years follow-up. Patients were then grouped into those who maintained 20/40 vision or better at least three years following treatment and those whose vision became 20/200 or worse. Patient data was collected from records and fundus photos of adequate quality for retinal vessel analysis were identified. Digital images were enhanced in Adobe Photoshop Elements software followed by manual vessel measurements in the NIH Image analysis software. Using the revised Parr-Hubbard formula, central retinal arteriolar(CRAE) and venular equivalents (CRVE) were calculated for each patient at several time points including pre-treatment, 3 years, and last visit. Means for each group were then compared. Patient visits with fundus images insufficient for vessel measurements were excluded.

**Results:** The mean CRAE and CRVE were 1393±33 and 216±55 (n=23), 125±31 and 185±43 (n=21), and 115±24 and 181±43 microns (n=17) at pre-treatment, 3 year, and final follow-up visits in those with better than 20/40 vision. Mean follow-up was 120 months. In those with worse than 20/200 vision, the mean CRAE and CRVE were 124±18 and 199±21 (n=19), 104±18 and 160±28 (n=14), and 99±14 and 162±23 microns (n=4). For post-treatment, 3 years and final follow-up visits. Mean follow-up was 58 months. Between the pre-treatment and final visits, the mean CRAE and CRVE declined by 17.3% and 15.9% in the good vision group and 20.4% and 18.4% in the poor vision group. Con founding factors included tumors being closer to the disc and fovea and a higher mean radiation dose to the fovea in the poor vision group.

**Conclusions:** Retinal vessel analysis showed a decline in vessel caliber including CRAE and CRVE following radiation. Despite the mean age and rates of hypertension, diabetes, and ischemic vascular diseases being similar between groups, patients in the poor vision group showed smaller caliber vessels pre-treatment possibly offering a prognostic measure of post-treatment vision although numbers were small and further study may be warranted.

**Commercial Relationships:** Brett D. Gerwin, None; Devin Christ, None

**Support:** None

---

**Program Number:** 3268  **Poster Board Number:** A516  **Presentation Time:** 1:45 PM - 3:30 PM

**Choroidal Melanoma in a Tertiary Eye Care Center in Saudi Arabia: Clinical Characteristics and Treatment Outcomes Hanan N. Al-Shamsi, Emad Abboud, Nicola Ghazi. Vitreoretinal, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia.

**Purpose:** To investigate whether choroidal melanoma (CM) seen at King Khaled Eye Specialist Hospital (KKESH) in Saudi Arabia exhibit clinical differences compared to what is known in the literature for CM in Caucasians in the United States (USA) . In an effort to identify potential differences particularly related to metastasis and mortality outcomes

**Methods:** Retrospective chart review of patients with CM seen at KKESH between 1983 and 2010

**Results:** A total of 120 patients were identified with an apparent incidence much lower than that in the Caucasian population. Thirty out of 120 records were reviewed to date. All patients were Middle Eastern except for two, only one had a blue colored iris, and all lesions were unilateral. The age ranged from 24 to 74 years (average 48.4 years). None had metastasis at the time of initial presentation. Associated findings on clinical examination included subretinal and choroidal detachment in 22 eyes (73%) and neovascular glaucoma in one. The CM was pigmented in all but three eyes (90%), mushroom shaped in 14 eyes, dome shaped in 15, and multi-lobulated in one. The most common site of involvement was the temporal area in 15/30 eyes (50%). The ultrasound lesion thickness ranged from 3.24 to 15.5mm (average 8.4mm) and 26 lesions (87%) had low to moderate retinal detachment. Treatment included I-125 radioactive plaque in 5 eyes, proton beam in one, transscleral thermotherapy in one and enucleation in 23 eyes (77%). Of the 23 enucleated eyes, 7 could have been treated with brachytherapy based on lesion characteristics, but enucleation was elected for other reasons, for a total of 16/30 eyes (53%) that required enucleation based on lesion characteristics. Among the 23 enucleated eyes, the most common cell type was spindle in 13 eyes (56%), followed by the mixed and the epithelioid type in 5 eyes each. Two eyes had extrascleral extension and another 2 had optic nerve invasion. None of the 30 patients developed metastasis or tumor-related mortality over an average follow up of 69.7 months.

**Conclusions:** CM at KKESH has different characteristics and treatment outcomes as compared to that in Caucasians in the USA including a lower incidence, a younger age at diagnosis, a predominantly large size at presentation, treatment with enucleation in the majority of cases, predomination of the spindle cell type lesions, more frequent optic nerve invasion, and an apparent lower metastasis/mortality rate. Understanding the etiology of such differences can lead to better insight into differences in the pathobiology and cytogenetics of the tumor, which in turn may reveal new pathways for targeted therapies.

**Commercial Relationships:** Hanan N. Al-Shamsi, None; Emad Abboud, None; Nicola Ghazi. None

**Support:** None

---

**Program Number:** 3269  **Poster Board Number:** A517  **Presentation Time:** 1:45 PM - 3:30 PM

**Flexible Multimodal Approach To Eye Melanoma: Patterns Of Care And Related Complications Federica Genovesi-Ebert1, Maria-Grazia Fabrini1, Franco Perrone1, Emanuele Di Bartolo1, Federica Cresti1, CarloGreco2, StanislaoRizzalo3, UO Chirurgia Oftalmica, 4Radiotherapy Department, 5Medical Physicists, 6Azienda Ospedaliera Universitaria Pisana, Pisa, Italy.

**Purpose:** To evaluate the efficacy and safety of a flexible radiotherapy approach for uveal malignant melanomas (UMM)

**Methods:** A retrospective analysis was performed on a series of 100 consecutive patients treated between 2003 and 2010 in a single institution. Main outcome measures were survival rate, enucleation rate, local tumor control, visual outcomes and complications. The treatment was planned depending on tumor size and location, using a multimodal range of options such as: brachytherapy plaque (BEP), proton beam (P), 120 Gy stereotactic radiosurgery (SRS), brachytherapy plaque was the treatment of choice in small (< 3mm) and medium-sized (3-10 mm) tumors. A 106-Ru plaque was used for T1-T2 lesions with a single administration with a prescription dose of 100-120 Gy to tumor apex. For medium-sized UMM a single fraction with a 125-I plaque was used with a prescription dose of 85 Gy to COMS point for lesions ≤ 5 mm, and to tumor apex for larger lesions. In selected cases, two subsequent fractions with 106-Ru and a 125-I plaque were used to keep the scleral dose with acceptable toxicity levels while ensuring an optimal dose coverage. In the presence of large (>10 mm) tumors the treatment of choice was SRS with a dose of 30 Gy in a single fraction. A sequential brachytherapy treatment was performed 6 weeks after SRS with a prescription dose of 45 Gy to COMS point. Transscleral thermotherapy and intravitreal injection of bevacizumab were used as adjunctive therapies.

**Results:** Median follow-up was 35.4 months. Mean 5-year overall survival was 95.3%. Local recurrence rate 3.7%. Vision preservation achieved in 84% of cases. Treatment-related major complications occurred in 6% of cases (2 severe glaucomas, 1 scleral necrosis, 2 radiation retinopathy, 1 optic neuropathy). Enucleation was performed in 4 patients due to uncontrolled neovascular glaucoma (2 eyes) or local recurrence (2 cases).Tumor reduction was : large UMM 14.0 %, medium UMM 40.5 %, small UMM 66%. Conclusion: The flexible approach to uveal melanomas achieves a high local tumor control rate with a low complication rate by reducing the over-irradiation of healthy tissues. The survival rates appear similar to previously published data

**Commercial Relationships:** Federica Genovesi-Ebert, None; Maria-Grazia Fabrini, None; Franco Perrone, None; Emanuele Di Bartolo, None; Federica Cresti, None; Carlo Greco, None; Stanislao Rizzo, None

**Support:** None

---

**Program Number:** 3270  **Poster Board Number:** A518  **Presentation Time:** 1:45 PM - 3:30 PM

**Fna Of Uveal Melanoma With A Graded Prototype Needle Arun D. Singh1, David Pelayos2, Jorge O. Zárate3, Charles V. Biscotti1. 1Cole Eye Institute; Cleveland Clinic Foundation, Cleveland, OH; 2Department of Radiology, Cleveland Clinic, Cleveland, OH; 3Department of Anatomic Pathology, Cleveland Clinic Foundation, Cleveland, OH.

**Purpose:** Fine needle aspiration biopsy of uveal melanoma is being increasingly performed for prognostication purposes. Standard 25 G needle has a long bevel (1.5 mm) and lacks any surface markings to judge depth of penetration. We evaluated a custom designed prototype 25 G needle with short bevel (0.25 mm) with millimeter marking on the outer surface (Geuder, Heidelberg, Germany) for fine needle aspiration biopsy of uveal melanoma.

**Methods:** 12 eyes with clinical diagnosis of uveal melanoma were included in the study. In all cases, a flexible approach was used to perform the aspiration biopsy with a standard 25 G needle and the prototype needle. Aspiration biopsy was performed after enucleation (10 cases) and during brachytherapy (2 cases) (Figure 1). Aspirated samples were rinsed into Cytolx® preservative solution (7 cases) or a non-haemolytic fluid (AutoCyte®) (5 cases). For each case, one vial contained

---

Copyright 2011 by the Association for Research in Vision and Ophthalmology, Inc., all rights reserved. For permission to reproduce any abstract, contact the ARVO Office at pubs@arvo.org.
the sample from 25 G needle and the other vial contained the sample from prototype needle. After processing, the cytological slides were evaluated in a blind fashion by a single cytopathologist for the presence of diagnostic melanoma cells. Further, cellularity was scored semiquantitatively, as 0 through 5+, with 0 being acellular. In addition, a side by side cellularity comparison was also performed.

**Results:** The mm surface markings on the prototype needle facilitated precise depth penetration in all 12 cases. FNAB aspirates were diagnostic only in 8 cases (67%) whereas all aspirates (100%) with the prototype needle were judged as diagnostic. Moreover,cellularity of the aspirate was greater with the prototype needle in 10 cases (83%) and equivalent to the standard 25 G needle aspirate in the remaining 2 cases (17%).

**Conclusions:** Custom designed prototype 25 G needle with short bevel and mm surface marking offers precision in depth penetration and provides more cellular aspirates when compared with standard 25 needle for aspiration biopsy of uveal melanoma.

**Commercial Relationships:** Arun D. Singh, None; David Pelayes, None; Jorge O. Zárate, None; Charles V. Biscotti, None
Support: Falk Trust and This work was supported by a Research to Prevent Blindness Challenge Grant

**Program Number:** 3271 Poster Board Number: A519
Presentation Time: 1:45 PM - 3:30 PM

**Iris and Iridociliary Tumor Biopsy Utilizing a 25-Gauge Aspiration-Cutter: 10-year Experience**

**Vasileios Petousis**1,2, Paul T. Finger1,2, Tatyana Milman2. 1The New York Eye Cancer Center, New York, NY; 2The New York Eye and Ear Infirmary, New York, NY.
**Purpose:** To demonstrate the results and complications of an aspiration-cutter assisted biopsy and compare them to those of other techniques.

**Methods:** Retrospective, single-center study of 50 consecutive patients (50 eyes) who underwent biopsy between 2000 and 2010. This is one entry-point, clear corneal incision followed by viscoelastic chamber maintenance and 25-gauge aspiration cutter biopsy. Indications included: atypical tumor and the patient’s request for a pathology diagnosis in cases of iris or iridociliary tumors. Data was obtained through chart review. Assessed outcomes included: visual acuity, secondary cataract and glaucoma, hemorrhage and recurrence.

**Results:** The median follow-up was 31 months (range: 7-190 months). The mean patient age was 61 years (median: 61 years, range: 33 - 88 years). The mean initial visual acuity was 20/50 (median: 20/20, range: 5/200 - 20/20). The majority were either nodular iris tumors (54%) or iridociliary tumors (42%) while there was also one multifocal (2%) and one diffuse lesion (2%). Seven cases (n=7/50, 14%) required one 10-0 nylon suture to close the corneal entry point. Pre-operative pigment dispersion (4%) was rare. Most cases were found to be iris melanoma (72%) followed by iris nevus (6%) and melanocytoma (6%). Short-term, peri-operative surgical findings included transient increase of intraocular pressure (n=8/50, 12%) and one case of hyperemia (2%), flare (2%) and pupillary defect (2%). All but two pupillary defects resolved within 4 weeks of the biopsy procedure. There were no secondary cataracts or infections.

**Conclusions:** An adequate specimen was acquired in 100% of cases. There have been no short or long-term complications related to use of a 25-gauge aspiration cutter. Aspiration-cutter assisted anterior segment biopsy technique is a safe and effective procedure for biopsy of iris and iridociliary tumors.

**Commercial Relationships:** Vasileios Petousis, Scholarship of The Eye Cancer Foundation (F); Paul T. Finger, None; Tatyana Milman, None
Support: The Eye Cancer Foundation

**Program Number:** 3272 Poster Board Number: A520
Presentation Time: 1:45 PM - 3:30 PM

**Role Of 18F-Fluorodeoxyglucose Positron Emission Tomography Integrated With Computed Tomography (18F-FDG PET-CT) In Patients With Intraocular Tumours To Differentiate Low From High Risk Lesions**

**Maria A. Blasi**,3, Maria Lucia Calcafiori3, Antonio Mulè3, Maria Vittoria Mattoli3, Maria Grazia Sammarco3, Gianluigi Petronio3, Alessandro Giordano3, Emilio Balestrazzi3, 1Dept of Ophthalmology, 2Dept of Nuclear Medicine, 3Dept of Pathology, 4Catholic University of Rome, Rome, Italy.
**Purpose:** 18F-Fluorodeoxyglucose Positron Emission Tomography integrated with Computed Tomography (18F-FDG PET-CT) has been used for the diagnosis and follow-up evaluations of intraocular tumors, using Standardised Uptake Value (SUV). The aim of our study is to assess the feasibility of quantitative analysis to obtain the metabolic rate of glucose (MRglu, ml/min/100gr) of intraocular tumors and evaluate whether MRglu or SUV parameters can differentiate low (spindle cell type) from high risk (mixed and epithelioid cell type) uveal melanoma.

**Methods:** Twelve patients (mean age 58.5±12.6years) with intraocular tumors candidate for enucleation or transcleral resection were enrolled. In all patients, a complete ophthalmologic examination, ocular ultrasonography (US), metastatic work-up, and pre-operative 18F-FDG PET-CT images were carried out and evaluated drawing regions of interest (ROIs) over the lesion using a 70% threshold level for SUV max, and SUV mean. For statistical analysis two sample T-test was used.

**Results:** All intraocular lesions were visualised at 18F-FDG PET-CT. The mean volume measured by ultrasonography was 48±96cm³ and since the volume values were similar in all intraocular tumors (n=12), the partial volume effect correction has not been performed. The mean value of SUV max and SUV mean were 3.95±1.94 and 3.24±1.51, respectively; and high correlation was found between SUV max and SUV mean: r²=0.99, p<0.000. A good correlation was also found between SUV values and volume (r²=0.74, p=0.006). SUV max and SUV mean values of low risk intraocular lesions were significantly (p=0.02) lower than those observed in high risk lesions.

**Conclusions:** High risk melanomas showed higher values either SUV or MRglu when compared with low risk melanomas. More aggressive type cells have higher metabolism and higher 18F-FDG uptake. Differences in glucose consumption among tumours with same histology can be found.

**Commercial Relationships:** Maria A. Blasi, None; Maria Lucia Calcafiori, None; Antonio Mulè, None; Maria Vittoria Mattoli, None; Maria Grazia Sammarco, None; Gianluigi Petronio, None; Alessandro Giordano, None
Support: None

**Program Number:** 3273 Poster Board Number: A521
Presentation Time: 1:45 PM - 3:30 PM

**Association of High Metabolic Activity Measured by Positron Emission Tomography Imaging with Poor Prognosis of Choroidal Melanoma**

Christopher S. Lee1, Min Kim1A, Hee J. Kwon1, Kyu S. Lee1A, Arthur E. Cho1B, Sung C. Lee1A. 1Ophthalmology, Division of Nuclear Medicine, Department of Diagnostic Radiology, 2Yonsei Univ College of Medicine, Seoul, Republic of Korea.
**Purpose:** To evaluate prognostic value of positron emission tomography (PET) imaging in patients with choroidal melanoma.

**Methods:** Sixty-four consecutive patients with choroidal melanoma who underwent pretreatment whole-body PET or PET/computed tomography and had one year of follow-up or more were retrospectively reviewed. Metabolic activity of choroidal melanoma by PET imaging was evaluated with respect to survival of patients.

**Results:** Tumor metabolic activity measured in standardized uptake value (SUV) (P<0.001), largest basal diameter of tumor (P=0.001), and tumor height (P=0.043) significantly correlated with metastatic death on univariate analysis, whereas only metabolic activity (P=0.005) was significant on multivariate analysis (Cox proportional hazards regression). ROC curve analysis showed that SUV > 2.3 was 80% sensitive and 80% specific in predicting metastatic death. There was an inverse correlation between tumor metabolic activity and time to metastasis (P=0.023, r²=0.547, linear regression).

**Conclusions:** Metabolic activity by PET imaging significantly predicted survival of patients with choroidal melanoma.

**Commercial Relationships:** Christopher S. Lee, None; Min Kim, None; Hee J. Kwon, None; Kyu S. Lee, None; Arthur E. Cho, None; Sung C. Lee, None
Support: None

**Program Number:** 3274 Poster Board Number: A522
Presentation Time: 1:45 PM - 3:30 PM

**Safety of Pars Plana Vitrectomy in Eyes Containing a Treated Uveal Melanoma**

Rithwick Rajagopal1, P. Kumar Rao1, J. William Harbour1A. 1Ophthalmology and Visual Sciences, Washington University, St Louis, MO; 2Barnes Retina Institute, St Louis, MO.
**Purpose:** To determine the safety of pars plana vitrectomy performed in eyes with a treated choroidal melanoma.

**Methods:** Retrospective analysis of patients at one academic institution who underwent pars plana vitrectomy after treatment of a choroidal melanoma. Data...
collected included initial tumor characteristics and treatment, cytologic or histopathologic analysis of vitreous biopsies or enucleated specimens and presence of systemic metastases. In some cases, the gene expression profile of the tumor was available.

**Results:** Twenty-two patients met the inclusion criteria for the study. All underwent pars plana vitrectomy after treatment of a choroidal melanoma. Average follow-up time was 23.3 months after vitrectomy and 59.6 months after melanoma treatment. No instances of local recurrence or extrascleral extension were observed. Metastases occurred in three individuals, two of whom were known to have the high metastatic class 2 gene expression profile.

**Conclusions:** Vitrectomy following successful plaque radiotherapy for posterior uveal melanomas can be performed safely with no apparent increased risk of local recurrence or metastasis.

**Commercial Relationships:** Rithwick Rajagopal, None; P. Kumar Rao, None; J. William Harbour, None

**Support:** None

**Program Number:** 3275 **Poster Board Number:** A523 **Presentation Time:** 1:45 PM - 3:30 PM

**Slotted Plaque Brachytherapy for Juxtapapillary and Circumpapillary Choroidal Melanoma: A 5-Year Study**

Paul T. Finger1, Kimberly J. Chin1, Lawrence Tena2, Ophthalmic Oncology, New York Eye Cancer Center, New York, NY; Radiation Oncology, Beth Israel Cancer Center, New York, NY.

**Purpose:** To evaluate a case series of patients treated with slotted eye plaques for choroidal melanomas within 1.0 mm or surrounding the optic disc.

**Methods:** Retrospective, single-center study of 24 patients, treated between 1995 and January 2010. Recorded characteristics were related to the patient, tumor, ultrasonography, and outcomes. Follow-up data included change in visual acuity, tumor-size, recurrence, eye-retention and metastasis. All cases were treated with plaques containing 8-mm wide variable depth slots. Prescription doses ranged from 69.3-163.8 Gy (mean 85.0 Gy) based on delivering a minimum 85 Gy tumor dose to the tumor within the slot. All treatments were continuously delivered over a 5-7 day duration.

**Results:** Mean patient age at presentation was 55 years (median: 53, range: 22-83 years). The tumors were within 1.0 mm of the optic nerve in 12.5% (n=3), juxtapapillary (touching up to 180 degrees of the optic disc) in 21% (n=5), greater or equal to 180 degrees in 25% (n=6), circumpapillary (surrounding 360 degrees of the optic disc) in 37.5% (n=9), and there was no view in 1 patient (4%). Ultrasound revealed dome-shaped tumors in 83%, collar button in 17%, and 8% (n2) with intranuclear invasion. Mean tumor thickness was 3.4 mm (SD±1.7, median: 2.8, range: 1.4 to 7.1). Mean largest basal dimension was 10.8 mm (SD±3.4, median: 11.4, range: 4.6-16.4).

Initial visual acuities were median 20/25 (range 20/20 to NLP) and decreased to median 20/40 (range 20/20 to NLP) with a mean follow up of 25 months (range: 4-60). Twelve patients required periodic intravitreal bevacizumab to suppress their radiation optic neuropathy. This study revealed a 100% local control rate for the 21 patients where slotted plaque brachytherapy was used as primary treatment. One of the 3 patients treated for failure of conventional plaque irradiation also failed slotted plaque and was the only secondary enucleation. None have developed metastasis during the study interval.

**Conclusions:** Finger’s slotted plaque radiation therapy can be used to control juxtapapillary and circumpapillary choroidal melanomas. Incorporating the optic nerve (within the plaque) allows for more posterior placement and inclusion of the entire tumor beneath the plaque and within the targeted zone. These 5-year results suggest slotted plaques offer better local control than notched plaque designs, and offer an alternative (to proton beam or enucleation) for circumpapillary melanoma.

**Commercial Relationships:** Paul T. Finger, None; Kimberly J. Chin, None; Lawrence Tena, None

**Support:** The Eye Cancer Foundation, New York, NY USA

**Program Number:** 3276 **Poster Board Number:** A524 **Presentation Time:** 1:45 PM - 3:30 PM

**Pre-Clinical and Clinical Evaluation of Intraretinal Silicone Oil Placement Prior to Iodine-125 Brachytherapy for Uveal Melanoma**

Yachna Ahuja1,4, Rowan M. Thomson1, Keith M. Furutani1,4, Ryan W. Shultz1,4, Scott L. Stafford1,4, Sundee Dev2, Nakhle E. Abu-Yagh1,4, Dale Reynolds2, José S. Pulido1,4, Ophthalmology, Radiation Oncology, Mayo Clinic, Rochester, MN; Physics Department, Carleton University, Ottawa, ON, Canada; VitreoRetinal Surgery, PA, Edina, MN; Ophthalmology, The University of Jordan, Amman, Jordan; VitreoRetinal Vitreous Specialists, Sartell, MN.

**Purpose:** A recent preclinical study suggests that using intraretinal silicone oil prior to iodine 125 (125I) brachytherapy for uveal melanoma may reduce the development of radiation retinopathy. We report our pre-clinical and clinical cases of the use of silicone oil with 125I brachytherapy to suggest that this technique should only be used in very selected cases.

**Methods:** A 16 mm COMS plaque loaded with 125I seeds was simulated on an eye model containing silicone oil as a vitreous substitute using BrachyDose. The radiation dose ratio of silicone oil versus water to ocular structures was calculated at angles subtended from the center of the eye.

**Results:** When silicone oil is used, the radiation dose to ocular structures at the AP axis of the eye is 65% of the dose in an eye without silicone oil. Radiation dose ratios on the retina increase from 0.45 to 0.99 when moving from points at the opposite side of the plaque to the plaque’s central axis. Between November 2009 and January 2010, three female patients (age 58-69, median 58) at our center underwent 23-gauge vitrectomy and silicone oil plaque placement prior to 125I brachytherapy (80-85 Gy) for posteriorly located medium or large uveal melanomas. Preoperative vision ranged from 20/25 to 20/40 (median 30). Each patient has required silicone oil removal, in addition to developing dense nuclear sclerotic cataracts. One also developed a retinal detachment requiring scleral buckling and vitrectomy. Postoperative follow-up period has ranged between 6-10 months (median 7 months). Vision at most recent follow-up ranged from 20/100 to 4/200 (median 20/100). To date, none of these patients have developed radiation retinopathy.

**Conclusions:** We recommend limiting the consideration of the use of silicone oil in 125I brachytherapy patients to select cases, such as posterior pole melanomas with a high risk of intraocular bleeding or retinal detachment, or as retinal tamponade after intracocular biopsy. There is no conclusive clinical data in the literature that supports the use of silicone oil to decrease the development of radiation retinopathy.

**Commercial Relationships:** Yachna Ahuja, None; Rowan M. Thomson, None; Keith M. Furutani, None; Ryan W. Shultz, None; Scott L. Stafford, None; Sundee Dev, None; Nakhle E. Abu-Yagh, None; Dale Reynolds, None; José S. Pulido, None

**Support:** Research to Prevent Blindness Inc, NY

**Program Number:** 3277 **Poster Board Number:** A525 **Presentation Time:** 1:45 PM - 3:30 PM

**Long Term Results of Primary Transpupillary Thermotherapy in Choroidal Melanoma**

Caesar Luo1, Antonio Capone, Jr.2, Lisa Faia1, Melanie Schmidt1, VitreoRetinal Surgery, Associated Retinal Consultants, Royal Oak, MI; Ophthalmology, Beaumont Eye Institute, Royal Oak, MI.

**Purpose:** Evaluate long-term results of transpupillary thermotherapy (TTT) as primary therapy for choroidal melanoma in one institution.

**Methods:** Retrospective case series of patients demonstrating small choroidal melanoma treated with TTT as primary therapy. Outcomes included patient demographics, tumor characteristics, treatment effectiveness, visual acuity over time, recurrence, mortality, and complications.

**Results:** 26 patients with a minimum of 12-month and a mean of 51-month followup were reviewed. 15 women and 11 men with an average age of 63.6 years were included. 23 of 26 patients (88.4%) demonstrated regression of tumor without recurrence. Of the tumors with recurrence, all achieved resolution to flat lesion with repeat TTT alone. The mean time to flat lesion by ultrasound was 5.9 months. Average number of TTT sessions in regressed tumors was 2.2. At last followup, mean visual acuity was 0.42 logMAR, or 20/50 Snellen. Of the tumors that demonstrated recurrence, mean time to recurrence was 30.3 months, with a mean initial tumor thickness of 2.06 mm. All recurrent tumors demonstrated high risk characteristics prior to initial TTT including subretinal fluid, orange pigment, and symptoms. No recurrent tumors displayed pretreatment vascularity, 6 patients (23%) developed TTT related complications, including epiretinal membrane (3), vitreous hemorrhage (2), and transient vitritis (1).

**Conclusions:** Primary transpupillary thermotherapy is an effective alternative to plaque brachytherapy when select cases. Our series demonstrates that long term success is achievable with judicious patient selection and close patient followup. Accessibility to office based care and avoidance of secondary radiation sequelae are important considerations.

**Commercial Relationships:** Caesar Luo, None; Antonio Capone, Jr., None; Lisa Faia, None; Melanie Schmidt, None

**Support:** None

**Program Number:** 3278 **Poster Board Number:** A526 **Presentation Time:** 1:45 PM - 3:30 PM

**Photodynamic Therapy For The Treatment Of Amelanotic Choroidal Melanoma**


**Purpose:** To evaluate the efficacy and safety of photodynamic therapy (PDT) for treatment of amelanotic choroidal melanoma.

**Methods:** Retrospective chart review of medical records. The participants were five consecutive patients with amelanotic choroidal melanoma measuring less than 3 mm in thickness. The main outcome measures were tumor regression, final visual acuity, tumor recurrence, distant metastasis, and mortality.

**Results:** The mean patient age was 57 years (range 42-71 years). There were 3 female (60%) and 2 male (40%) patients. The mean visual acuity at presentation was 20/20 (range 20/20-20/200). The quadrant location of the tumor was nasal in 2 patients (40%), temporal in 2 patients (40%), and superior in 1 case (20%). Four patients had a non-pigmented choroidal melanoma (80%) and 1 had a partially pigmented tumor (20%). The mean tumor basal diameter at presentation was 8.8
mm (range 6-12 mm) and thickness 2.6 mm (range 2.3-2.9 mm). The mean number of PDT sessions was 1.6 (range 1-3). After mean follow-up of 12 months (range 5-20 months), the mean tumor thickness regression was -36% (range -59% to -3.7%). The mean visual acuity after treatment was 20/25 (range 20/20-20/400). None of the patients developed tumor recurrence at a mean follow-up of 12 months. All five patients were alive at the last follow-up without systemic metastasis.

**Conclusions:** PDT might be effective for control of small amelanotic choroidal melanoma. Mean visual acuity was preserved at the last visit, with decrease of 1 line. There were no PDT-related complications. Long-term follow-up is required to evaluate local and systemic tumor outcomes.

**Commercial Relationships:** Sahithya V. Reddy, None; Kiran Turaka, None; Rishav D. Kansal, None; Zunair A. Mahmood, None; Carlos Bianciotto, None; Carol L. Shields, None

**Support:** None

**Program Number:** 2379

**Poster Board Number:** A527

**Presentation Time:** 1:45 PM - 3:30 PM

**Retinal Functional Changes Measured by Microperimetry in Choroidal Melanoma Treated with Ruthenium Episcleral Plaques**

Monica M. Pagliara1,2, Maria A. Blasi3CD, Michela Laguardia4, Carmela Grazia Caputo5, Paolo Di Nicola6, Maria Grazia Sammurco7, Mariangela Gari2,8, Emilio Balestrazzi2,8, 1Dept of Ophthalmology, 2Dept of Physics, 3Catholic University, Rome, Italy.

**Purpose:** to assess functional macular retinal changes in patients with choroidal melanoma treated by Lu1010 brachytherapy and correlate functional data with tumor size, location and radiation dose.

**Methods:** twenty eyes from twenty patients (13 male, 7 female, mean age 59 years) with choroidal melanomas treated with ruthenium episcleral plaques were included in the study. Patients were evaluated at baseline and four month intervals following treatment using opthalmoscopy, fundus photography, FAG, OCT and microperimetry MPI (Nidek Technologies).

**Results:** median follow up was 12 months. Tumor data recorded included quadratic location of the tumor epicentre (40% superior -20% inferior -6.6% nasal - 33.4% temporal), anteroposterior location of the tumor epicentre (46.6% macula to equator, 53.3% equator to ora serrata), associated features (Bruch’s membrane rupture 6.6%, subretinal fluid extent 53.3%), mean basal dimension 10.32mm, mean tumor thickness 3.52mm, and mean proximity to the fovea (11.77mm). The mean radiation dose and dose rate to the fovea were 70.62 Gy and 128.09 Gy/hr respectively. Mean best-corrected logMAR visual acuity decreased from 0.045 at baseline to 0.096 at 12 months. Microperimetry mean retinal sensitivity decreased from 16.71 db at baseline to 14.36 db at 12 months of follow-up.

**Conclusions:** Tumor thickness, tumor location, and radiation dose to the fovea are risk factors for the development of radiation retinopathy and visual loss. In our study, distance from the fovea was found to be the most important parameter for visual function decrease. MPI microperimetry may give additional information about macular function because its sensitivity more than that of visual acuity test and may help to counsel patients on expected visual loss after brachytherapy.

**Commercial Relationships:** Monica M. Pagliara, None; Maria A. Blasi, None; Michela Laguardia, None; Carmela Grazia Caputo, None; Paolo Di Nicola, None; Maria Grazia Sammurco, None; Mariangela Gari, None; Emilio Balestrazzi, None

**Support:** None

**Program Number:** 3280

**Poster Board Number:** A528

**Presentation Time:** 1:45 PM - 3:30 PM

**Prompt Versus Delayed Intravitreal Triamcinolone Injection for Serous Retinal Detachment Secondary to Posterior Uveal Melanoma**

Raffaele Parrozzani1, Elisabetta Pilotto1,2, Alessia Dario1,2, Edouardo Milenda1,2, GB Betti Eye Foundation, IRCCS, Roma, Italy; 3Ophthalmology, University of Padova, Padova, Italy.

**Purpose:** To evaluate prompt (intraoperative) versus delayed intravitreal triamcinolone acetonide (IVTA) injection (4mg/0.1mL) as adjuvant treatment of serous retinal detachment (SRD) secondary to a posterior uveal melanoma.

**Methods:** Thirty-two consecutive patients affected by posterior uveal melanoma with large SRD (>10 mm in LBD) treated by prompt IVTA injection at the time of plaque brachytherapy (I-125) were included in this retrospective case-control study. Controls included thirty-two patients treated by delayed (more than 3- and less than 9-months after brachytherapy) IVTA injection because of large SRD at time of brachytherapy. Controls were matched with cases for age, gender, initial tumor thickness and tumor location (choroidal vs ciliary body). All patients underwent a 1-, 3-, 6-month follow-up examination, and every 6 months thereafter, including fundus photography and A/B scan ultrasonography. Follow-up was longer than 24 months.

**Results:** Follow-up was 37±7 months. Controls underwent IVTA injection ≤1.7 months after brachytherapy. Complete SRD regression was documented in eighteen prompt-treated patients (56%) vs eleven delayed-treated patients (34%) (p<0.05). Early-onset steroid-induced cataract was observed in four prompt-treated patients (12%) vs three delayed-treated patients (9%) (p<0.05). No steroid-induced increased intraocular pressure, nor others short or long term side effects were documented.

**Conclusions:** Intravitreal IVTA injection substantially increases the probability of earlier and complete serous retinal detachment resolution after brachytherapy of posterior uveal melanoma. These results suggest the existence of a time-limited corticosteroids efficacy in a subgroup of uveal melanoma patients with large serous retinal detachment.

**Commercial Relationships:** Raffaele Parrozzani, None; Elisabetta Pilotto, None; Alessia Dario, None; Edouardo Milenda, None

**Support:** None

**Program Number:** 3281

**Poster Board Number:** A529

**Presentation Time:** 1:45 PM - 3:30 PM

**New Experience With Ranibizumab Against Choroidal Melanoma:**

**Preliminary Results**

Peter E. Liggett,1 Veronica Kon-Jara,2 Gregory Haffner,1 Nauman Chaudhry,3 Hugo Quirao-Mercado1, Ophthalmology, New England Retina Associates, Hamden, CT; 2Ophthalmology, Denver Health Medical Center, Denver, CO.

**Purpose:** To evaluate the safety and tolerability of High dose Ranibizumab + CSTIP for the treatment of Choroidal Melanoma.

**Methods:** A prospective, longitudinal, non-randomized, case-control study was designed. Patients were recruited in a single center for an open-label, active treatment of CSTIP (Combined simultaneous Transpupillary thermotherapy - ICG enhanced PDT) + intravitreal (IV) Ranibizumab (0.5 versus 2 mg). All the patients were 18 years old or older with a small or medium size choroidal melanoma. In every visit, each patient underwent a complete ophthalmological evaluation. The tumor activity was evaluated with Fluoroscein angiogram and B-scan ultrasonography. Outcome measures were best corrected visual acuity and tumor activity.

**Results:** Eight patients met the inclusion criteria. Four males and 4 females. Patients have completed at least 6 months of follow-up. All patients received 2 CSTIP. Four patients received 6 IV injections of 0.5 mg of Ranibizumab, and the other 4 patients received 4 IV injections of 2 mg of Ranibizumab. Mean age was 69 year old in both groups. The laterality was variable. The mean number of CSTIP required to control the tumor locally was 2.5 in the high dose group and 2 in the standard dose group. There were not complications associated. Visual acuity was stabilized in 80% of patients.

**Conclusion:** Ranibizumab does not reduce the number of CSTIP treatments needed to achieve local control of the tumor. However, it does help to maintain visual acuity. This secondary effect may be related to a better perfusion of the treated and surrounding areas of the retina.

**Commercial Relationships:** Peter E. Liggett, None; Veronica Kon-Jara, None; Gregory Haffner, None; Nauman Chaudhry, None; Hugo Quirao-Mercado, None

**Support:** None

**Clinical Trial:** http://www.clinicaltrials.gov, NCT00800225

**Program Number:** 3282

**Poster Board Number:** A530

**Presentation Time:** 1:45 PM - 3:30 PM

**Subfoveal Choroidal Melanoma: Pretreatment Characteristics and Response To Plaque Radiation Therapy**


**Purpose:** To evaluate the clinical presentation, tumor characteristics and response to radiation-103 plaque radiation therapy for subfoveal choroidal melanomas.

**Methods:** A retrospective case series of fifty patients diagnosed with subfoveal melanoma and treated with plaque brachytherapy was performed. Patients were evaluated for tumor characteristics, visual acuity, radiation occluopathy, local tumor control and metastatic disease.

**Results:** According to the AJCC-UICC Classification System there were 26 (52%) T1 tumors, 17 (34%) T2 tumors, 5 (10%) T3 tumors, and 2 (4%) T4 tumors. Tumors were treated to a mean apical radiation dose of 82.8 Gy (over 5-7 consecutive days), resulting in a mean 157.7 Gy to the fovea. Median follow-up time was 54 months (±49.3). Forty-nine (98%) tumors were dome-shaped. Subfoveal (39%) plaque radiation to a dependent exudative retinal detachment was present in 34 (75.6%). Pre-treatment median visual acuity was 20/50, and declined to 20/180 at the last follow-up visit. Visual acuity was better than 20/200 in 33 (66%) patients at baseline and in 25 (50%) patients at last follow up; thirteen patients (26%) lost 6 or more lines of vision. Twenty-eight patients (56%) developed radiation retinopathy with a mean time to onset of 40.6 months. Secondary intervention rates for radiation retinopathy was required in sixteen patients (32%) and included intravitreal anti-vascular endothelial growth factor therapy alone (n=11) or in combinations with laser (n=5), cryotherapy (n=1), or pars plana vitrectomy (n=1). The local tumor control rate of subfoveal tumors was 92%. Four patients (8%) required secondary enucleation. Metastasis developed in 2 patients (4%).

**Conclusions:** Subfoveal choroidal melanomas in this series were almost exclusively dome-shaped and likely to have an associated exudative retinal detachment. They were amenable to plaque radiation therapy. However, this tumor
Treatment Of Uveal Melanoma By Non-thermal Irreversible Electroporation - A Mathematical Model, Animal And Preliminary Ex-vivo Human Experiments

Alok K. Sahgal, Seema Garg, Ophthalmology, University of North Carolina, Chapel Hill, NC.

Purpose: To prospectively characterize visual field function and visual acuity in patients with a history of external beam radiation to the sino-nasal area, resulting in incidental radiation exposure to the retina.

Methods: Inclusion criteria for this prospective study were patients with a history of sinonasal/orbital carcinoma treated with external beam radiation greater than one year ago, resulting in a dose of at least 45 Gy to at least one quadrant of one retina.

On the same day, visual acuity was measured in both eyes using a standardized ETDRS chart, and Goldmann visual field testing was performed. A single technician performed each GVF test for all subjects. Five isopters (12e, 13e, 14e, III4e, and V4e) were mapped in each eye. For each eye, a visual field score was determined by totaling the peripheral extent of the visual field in degrees on each of the 24 meridians and subtracting any scotomas. This sum was averaged across all patients and then compared to that calculated from normative data of each isopter.

Results: Eight subjects (40 to 73 years old) were enrolled. Four subjects had a history of ethmoid sinus carcinomas, two with maxillary sinus tumors, and one with nasopharyngeal carcinoma. Sixteen eyes were incidentally irradiated, with each subject having a dose above 45 Gy in at least one retinal quadrant. The ETDRS visual acuities ranged from 70 (Snellen 20/50) to 90 (Snellen 20/10). The visual field scores for each isopter (averaged across 16 eyes) compared to normative values are shown in the table below. On average, the central isopter 12e (336.75 ± 211.8) was markedly contracted relative to the normal (837.6 ± 93.3). Isopter 13e was moderately constricted relative to the normal, and the peripheral isopters (14e, III4e, and V4e) were essentially the same as normal.

Conclusions: Goldmann visual field inner isopters were constricted in patients at least one year after incidental external beam radiation exposure to the retinas following treatment. With this study, visual function not found to be compromised from radiation at this early stage, the observed constriction of inner isopters may represent an early sign of retinal damage.

<table>
<thead>
<tr>
<th>Isopter</th>
<th>Normal (SD)</th>
<th>Irradiated (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12e</td>
<td>837.6 ± 93.3</td>
<td>336.75 ± 211.8</td>
</tr>
<tr>
<td>13e</td>
<td>1061 ± 140.5</td>
<td>840.1 ± 137.3</td>
</tr>
<tr>
<td>14e</td>
<td>1230 ± 113.5</td>
<td>1170.5 ± 91.6</td>
</tr>
<tr>
<td>III4e</td>
<td>1388 ± 142.5</td>
<td>1428.5 ± 52.2</td>
</tr>
<tr>
<td>V4e</td>
<td>1468 ± 104.5</td>
<td>1495.7 ± 77.9</td>
</tr>
</tbody>
</table>
source only after biopsy of a distant metastasis. Biopsy was used to confirm the primary tumor in 79% (n=11/14) of patients. Forty-two percent were found to have metastatic lung carcinoma, 29% metastatic breast carcinoma and the other 29% had colon, esophageal, prostate and pancreatic carcinomas.

**Conclusions:** PET/CT was found useful in evaluation patients with suspected uveal metastases. It allowed for screening of the entire body, directed extraocular biopsy and tumor staging. Small, non-avid tumors and those within the hypermetabolic brain can be missed. However, in most cases, PET/CT revealed diffuse metastatic disease. This study suggests that PET/CT was helpful in the evaluation of patients referred for evaluation of uveal metastasis.

**Commercial Relationships:** Payal Patel, None; Paul T. Finger, None

**Support:** New York Eye Cancer Center

---

**Program Number:** A535
**Presentation Time:** 1:45 PM - 3:30 PM

**Characterization Of Computerized Tomography (CT) Scan Abnormalities In Patients With Biopsy-proven Hepatic Metastases From Uveal Melanoma**

Inna G. Georgieva1, Michael H. Foerster2, Antonia M. Joussen1. 1ophthalmology department, Charite-CBF, University hospital, Berlin, Germany; 2DRK Klinik Berlin, Westend Berlin, Germany.

**Purpose:** To describe the spectrum of computerized tomography (CT) features of patients with biopsy-proven hepatic metastases of uveal melanoma and to evaluate the prognostic value of the observed findings and their correlations to liver function tests.

**Methods:** The charts of consecutive patients with uveal melanoma evaluated at Memorial Sloan-Kettering Cancer Center between 1998 and 2009 were reviewed. Inclusion criteria included biopsy-proven liver metastasis and CT scan available within 2 months of biopsy. Exclusion criteria included prior systemic or liver-directed therapies for uveal melanoma. The charts and CT reports for patients in this study were retrospectively reviewed. Statistical analyses were carried out using Student’s t-test, Chi-squared analysis, and Kaplan Meier log-rank analysis, with a p-value of <0.05 taken to be significant.

**Results:** Of the 505 charts that were reviewed, 76 patients met the inclusion and exclusion criteria defined above. Characteristic CT findings in this cohort of uveal melanoma patients with biopsy-proven liver metastases included multiple (89%), hypodense (100%), heterogenous (100%), and enhancing (100%) lesions with average dominant lesion size of 46.76 cm. Twenty-three percent exhibited hepatomegaly. Predominant lesion size >100 cm, hepatomegaly, and ascites correlated with worse survival (p = 0.0079, p<0.0001, and p<0.0001, respectively). Radiographic evidence of extrahepatic metastases was present in 53% of patients, most frequently in the lungs and lymph nodes, though a variety of atypical sites were also affected. In patients with hepatic metastases, the presence of additional extrahepatic metastases did not affect survival. At least one liver function test was abnormal in 69% of patients, and both elevation of one or both serum aminotransaminases and elevation of alkaline phosphatase were associated with larger lesions (p<0.0086 and p<0.0040, respectively) and hepatomegaly (p<0.0004 and p<0.0001, respectively). Bilirubin was elevated in only 33% of cases and did not correlate with lesion size or hepatomegaly.

**Conclusions:** We report that radiographic evidence of predominant lesion size >100 cm, hepatomegaly, and ascites—but not radiographic evidence of extrahepatic metastases—correlate with worse survival in patients with biopsy-proven hepatic metastases of uveal melanoma.

**Commercial Relationships:** Payal Patel, None; Corinne Winston, None; Brian P. Marr, None; Richard Carvajal, None; Gary Schwartz, None; Jed Wolchok, None; David H. Abramson, None

**Support:** The Fund for Ophthalmic Knowledge

---

**Program Number:** A536
**Presentation Time:** 1:45 PM - 3:30 PM

**Serum Survivin Levels In Patients With Uveal Melanoma- A Promising Biomarker?**

Inna G. Georgieva1, Michael H. Foerster,2 Antonia M. Joussen1. 1ophthalmology department, Charite-CBF, University hospital, Berlin, Germany; 2DRK Klinik Berlin, Westend Berlin, Germany.

**Purpose:** Detection of survivin in the serum of patients with uveal melanoma (UM) and establishment of a method by which these levels can be used as treatment predictive value

**Methods:** The serum samples were obtained from patients with UM (n=24) and healthy volunteers (n=23) after given informed consent. Most of the patients suffered from newly diagnosed uveal melanoma. The mean tumor prominence was 7.93mm (range 3.4-11.7mm). Five patients had metastatic disease and received chemotherapy. The mean age of patients with uveal melanoma was 67.46 years (range 36-81). Survivin serum levels were determined using enzyme-linked immunosorbent assay (ELISA).

**Results:** Increase of the survivin protein serum levels in patients with UM compared to the healthy controls, however without statistical significance (t-test p=0.06). The serum levels tend to be higher in patients with a greater tumor burden or metastasis.