

I-125 Plaque Brachytherapy for Choroidal Melanoma

Mature Single-Institution Outcomes Analysis from the OHSU Casey Eye
Institute

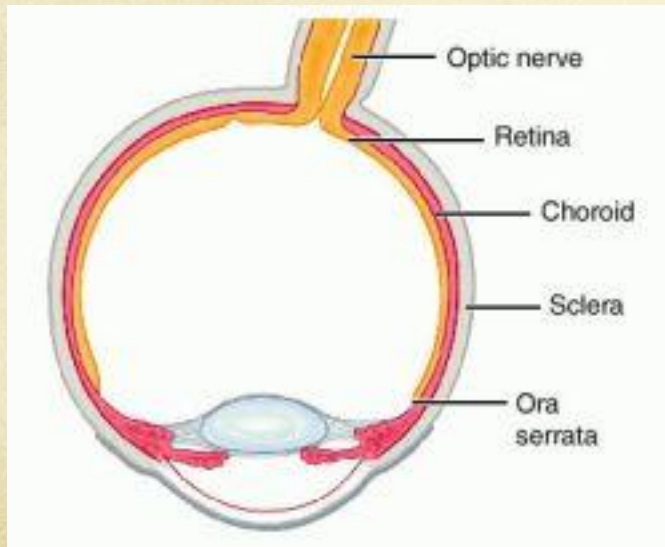
Leonel Kahn* #, Martin Fuss, David Wilson, Brandon Merz, James Tanyi,
Charles R. Thomas, Jr., Arthur Hung

*2012 Rubinstein Research Student Scholarship, Dept of Radiation Medicine

#2012 Radiological Society of North America Research Medical Student Grant
recipient

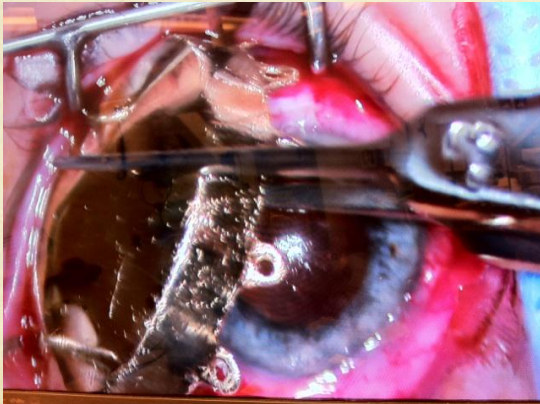
Background

- Choroidal melanoma is a deadly cancer
 - Untreated melanoma related mortality is 31% at 5 years
 - Using plaque radiotherapy all cause mortality rate is 18% at 5 years

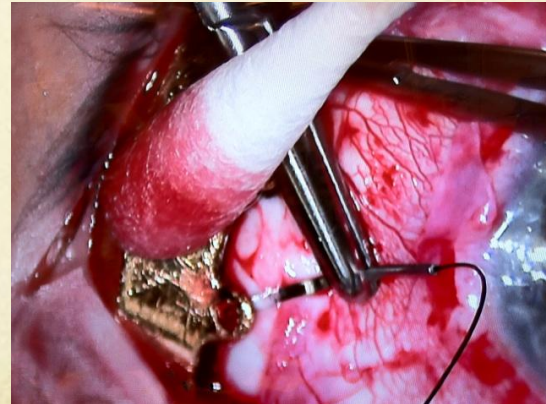


Background

- I-125 plaque brachytherapy is a widely used technique for treatment of choroidal melanoma and is as effective as enucleation
- When local control is not achieved with brachytherapy, secondary enucleation is required



Intra-operative Plaque Placement



Background

- A paramount benefit of plaque usage is the potential for a higher quality of life via organ preservation
- However, visual acuity is reduced in most patients
 - Well established down-trend in visual acuity over time
- Limited data regarding subjective vision loss
 - This gap in knowledge with respect to patient-related outcomes would be useful to fill



Microscopic View of Choroidal Melanoma

Specific Aims

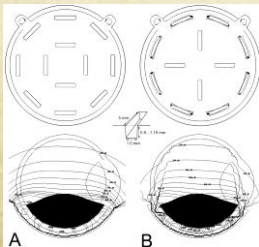
- To report a series of patients treated with I-125 plaque brachytherapy for choroidal melanoma at Casey Eye Institute
 - Overall and metastasis-free survival
 - Local tumor control
 - Loss of visual acuity versus loss of subjective vision
 - Need for secondary enucleation



COMS Plaque with I-125 Seeds

Methods

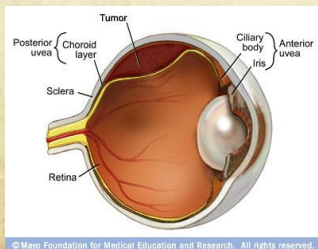
- Clinical records of all patients with choroidal melanoma treated with I-125 plaque brachytherapy at OHSU from 1990 to 2011 were reviewed
- Clinical data were gathered
 - Patient features, tumor characteristics, treatment and technical characteristics
 - Visual acuity and subjective vision loss
 - Ocular characteristics
 - Disease data



Plaque and Dosimetry

Methods

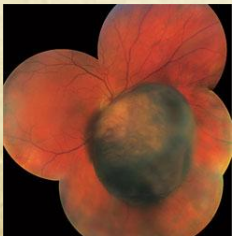
- Most variables were analyzed using descriptive statistics
- Visual acuity was grouped into categories: “better than 20/200” or “worse than or equal to 20/200”
- Kaplan-Meier method use to describe time from treatment to event variables
- Effect of individual clinical variables on [1] time from treatment to death due to any cause, [2] time from treatment to diagnosis of metastatic disease, and [3] time from treatment to enucleation for local recurrence were analyzed by a series of univariate log-rank tests



Cross Section of Orbit with Choroidal Melanoma

Results

- Secondary enucleation
 - 20 total
 - Reason
 - Local recurrence: 10/317 cases (all LR were enucleated)
 - 3/10 of these LR had pre-treatment invasion into the ciliary body
 - Pain (eye): 10/317 cases



Ophthalmoscopic view of Choroidal Melanoma

Results

Plaque Radiotherapy for Choroidal Melanoma in 317 Cases: Visual Acuity and Subjective Vision Loss

Variable	Pre-treatment % of patients (n)	Post-treatment (1 year) % of patients (n)	Post-treatment (5 year) % of patients (n)	Post-treatment (10 year) % of patients (n)	Post-treatment (15 year) % of patients (n)	Post-treatment (20 year) % of patients (n)
Visual acuity better than 20/200 in the treated eye	87.9 (307)	77.3 (291)	54.1 (109)	46.7 (45)	40 (5)	0 (1)
Subjective vision loss in treated eye (**compared to baseline: *compared to previous visit)	45.0** (289)	31.0* (277)	22.3* (103)	18.2* (44)	16.7* (6)	100* (1)

Discussion

- Overall survival
 - I-125 plaque brachytherapy provides a high 5-year overall survival
 - Our values are similar to the 5-year mortality rates reported in the literature
 - Choroidal melanoma requires treatment



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Discussion

- Local control
 - Very high proportion of tumors can be controlled successfully with I-125 brachytherapy
 - Most recurrences occur early in the post-treatment period



Fluorescein Angiography of Retina with Tumor

Discussion

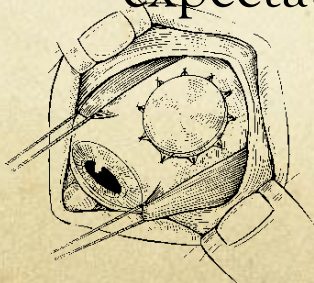
- Visual acuity
 - Small decrease from pre-treatment to 1 year post-treatment
 - Larger decrease between 1 and 5 years post-treatment
 - Visual acuity at 5 year is similar to long-term visual acuity
- Subjective vision
 - Majority occurred in the first 5 years of follow-up
 - Slower rate of decline over remainder of follow-up interval
 - Parallels visual acuity decline in many ways



Cross Section of Orbit with Choroidal Melanoma

Conclusion

- I-125 plaque brachytherapy provides excellent local tumor control, high overall and metastasis free survival, a gradual decline in visual acuity and loss of subjective vision, and a low incidence of secondary enucleation
- Results useful when counseling patients and managing expectations prior to and after treatment



I-125 Plaque in Place

New Directions

- I-125 brachytherapy is generally effective, but some patients experience poor outcomes
- Several clinical factors are predicative of unfavorable results
- Challenging to predict outcomes for an particular patient
- Next step: creation of nomogram to predict individualized outcomes based on pre-treatment characteristics

Support

- Financial
 - RSNA Research & Education Foundation Medical Student Grant
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- Intellectual
 - Department of Radiation Medicine at OHSU
 - Arthur Hung, Charles R. Thomas, Jr., Martin Fuss, Brandon Merz, James Tanyi
 - Casey Eye Institute
 - David Wilson

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Questions?