Cureus

Open Access
Abstract
Published 04/02/2023

Copyright
© Copyright 2023
Ehret et al. This is an open access abstract distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Distributed under
Creative Commons CC-BY 4.0

Stereotactic Radiosurgery for the Treatment of Uveal Melanoma – an 18-year Single Institution Experience

Felix Ehret [1] , Raffael Liegl [2] , Valerie Schmelter [3] , Christoph Furweger [4] , Siegfried Priglinger [3] , Paul Foerster [3] , Alexander Muacevic [5]

1. Radiation Oncology, Charité - Universitätsmedizin Berlin, Berlin, DEU 2. Ophthalmology, University Hospital Bonn, Bonn, DEU 3. Ophthalmology, Ludwig-Maximilians-University Munich, Munich, DEU 4. Medical Physics, European Radiosurgery Center Munich, Munich, DEU 5. Radiosurgery, European Radiosurgery Center Munich, Munich, DEU

Corresponding author: Felix Ehret, felix.ehret@charite.de

Categories: Ophthalmology, Radiation Oncology, Neurosurgery
Keywords: uveal melanoma, stereotactic radio surgery (srs)

How to cite this abstract
Ehret F, Liegl R, Schmelter V, et al. (April 02, 2023) Stereotactic Radiosurgery for the Treatment of Uveal Melanoma – an 18-year Single Institution Experience. Cureus 15(4): a878

Abstract

Objectives:

Various treatment options for uveal melanomas are available, including surgical resection, brachytherapy, proton therapy, fractionated radiotherapy, and stereotactic radiosurgery (SRS). However, extensive analyses on SRS utilizing robotic radiosurgery are lacking. This study aims to assess the long-term results of SRS with robotic radiosurgery for the treatment of uveal melanomas in a large patient cohort.

Methods:

This single-institutional, retrospective study included patients with uveal melanomas treated with single-fraction robotic radiosurgery between 2005 and 2019. Eye retention, local control, and disease-specific survival rates were assessed with the Kaplan-Meier estimator. The impact of prescription dose, tumor size, and ciliary body involvement was assessed with Cox proportional hazards models. Patients were staged according to the TNM classification system (8th edition).

Results:

A total of 594 patients met the inclusion criteria. In 22.7%, patients were stage I, 57.9% were stage II, 18.9% stage III, and 0.5% of patients were classified as stage IV. Median apical tumor height and base diameter were 5.8 and 11.4 mm, respectively. The mean follow-up was 41.7 months, and the median prescription dose was 21 Gy, with a median prescription isodose line of 70%. Local control rates after three and five years were 92.0% and 84.3%, respectively, for prescription doses of 21 and 22 Gy (448 patients) and 86.9% and 77.7%, respectively, when treated with a prescribed dose of 20 Gy or less (146 patients). The multivariable Cox regression model confirmed that a higher prescription dose had a significant positive impact on the local control (hazard ratio 0.73, p=0.018), whereas tumor size (p=0.31) and involvement of the ciliary body (p=0.36) had no effect. Eye retention was achieved in 89.9% and 81.0% after three and five years with 21 and 22 Gy, and 85.9% and 80.0% for 20 Gy or less. The multivariable Cox regression model demonstrated that only tumor size had a significant negative impact on eye retention (hazard ratio 1.52, p=0.003). In contrast, an effect of prescription dose (p=0.28) and involvement of the ciliary body (p=0.89) could not be confirmed. Disease-specific survival rates were 93.1% after three years, 89.8% after five years, and 87.8% after seven years. A higher tumor stage was associated with shorter disease-specific survival (p=0.0001). Serous retinal detachment was observed in 216 patients (36.4%). Secondary glaucoma occurred in 104 patients (17.5%), of whom 40 (38.5%) had to be enucleated due to intractable secondary glaucoma. Vitreous hemorrhage occurred in 74 patients (12.5%), and radiation retinopathy was detected in 72 patients (12.1%).

Conclusion(s):

To the best of our knowledge, this analysis represents the most extensive patient cohort with uveal melanomas treated with SRS. Eye retention and local tumor control are achieved in the majority of cases, the latter mostly with prescription doses of at least 21 Gy. Disease-specific survival depends on the tumor stage. Retinal detachment is seen in about one-third of patients and should be anticipated during follow-up. These results suggest that single-fraction robotic radiosurgery is not only a safe but also an effective treatment for uveal melanomas.