

Stereotactic Radiosurgery for Pilocytic Astrocytoma: A Single Center Retrospective Study

Sukran Senyurek¹, Ilayda Kayir², Dogu Cihan Yildirim³, Ali Haluk Duzkalir³, Mehmet Orbay Askeroglu^{3,4}, Selcuk Peker³

¹ Department of Radiation Oncology, Koç University Hospital, Istanbul, Türkiye ² Bahçeşehir University School of Medicine, Istanbul, Türkiye ³ Department of Neurosurgery, Gamma Knife Center, Koç University Hospital, Istanbul, Türkiye ⁴ Department of Health Physics, Institute of Health Sciences, Istanbul Medipol University, Istanbul, Türkiye

Introduction

Pilocytic astrocytomas (PA) are WHO Grade I gliomas. While surgery is primary, GKRS is a crucial alternative for residual/recurrent tumors. This study evaluates long-term GKRS outcomes in 88 patients.

Materials & Methods

- Cohort:** 88 patients (60 pediatric, 28 adult) treated with GKRS between 2008 and 2024.
- Follow-up:** Median follow-up was 36 months (range: 6–207 months).
- Analysis:** Progression-free survival (PFS) was assessed using Kaplan–Meier analysis. Predictive factors for recurrence were identified using univariate and multivariate Cox regression models.



Results

- Survival Outcomes:**
 - Pediatric group: 5-year and 10-year PFS rates were 84.7% and 66.7%, respectively.
 - Adult group: 5-year and 10-year PFS rates were both 81.7%.
- Risk Factors:** Multivariate analysis identified prior radiotherapy (RT) as the only independent predictor of recurrence in the entire cohort (HR 6.2, $p=0.012$).
- Morphology:** In pediatric patients, cystic/mixed morphology was associated with an increased risk of recurrence ($p=0.01$).
- Safety:** No acute treatment-related complications were observed; all patients were discharged on the same day.

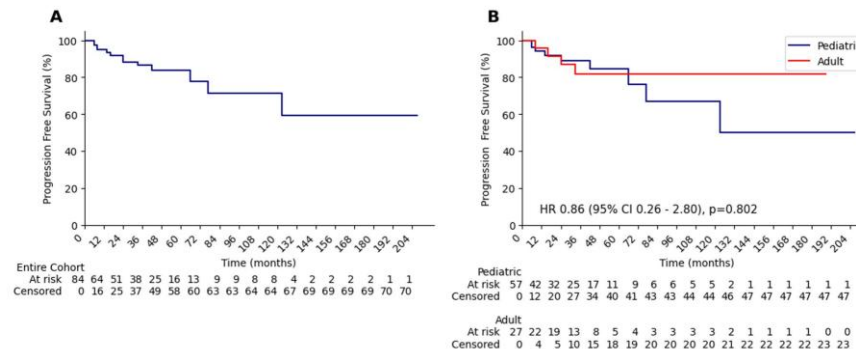
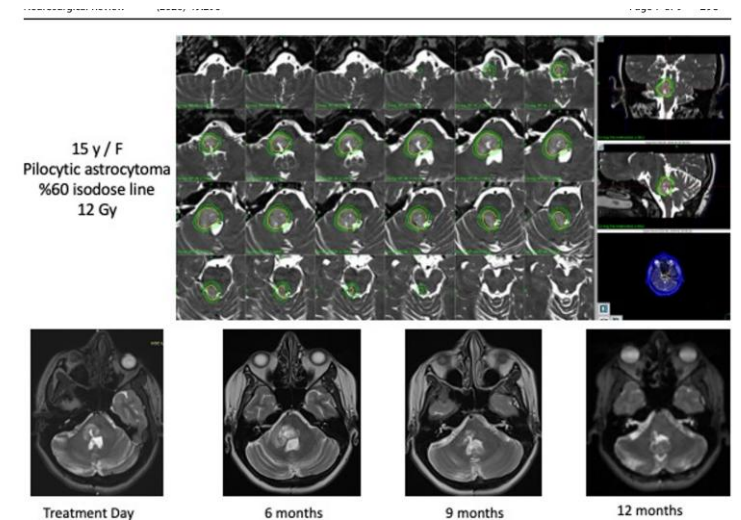


Fig. 1 Kaplan–Meier progression-free survival (PFS) curves following Gamma Knife radiosurgery. (A) In the overall cohort, (B) Pediatric and

Case Illustration

15 y / F, 12 Gy GKRS. Serial MRI shows tumor control over 12 months.



Conclusion

GKRS is safe and effective for PA in both children and adults. Prior RT is a critical prognostic factor. GKRS is a standard for residual/recurrent PA.