Neurosurgery. 2024 Jun 28. doi: 10.1227/neu.0000000000003083. Online ahead of print.

Pleomorphic Xanthoastrocytoma: Multi-Institutional Evaluation of Stereotactic Radiosurgery

Ali Haluk Düzkalir [1], Yavuz Samanci [1 2], Ahmed M Nabeel [3 4], Wael A Reda [3 5], Sameh R Tawadros [3 5], Khaled Abdelkarim [3 6], Amr M N El-Shehaby [3 5], Reem M Emad [3 7], Nuria Martínez Moreno [8], Roberto Martínez Álvarez [8], David Mathieu [9], Ajay Niranjan [10], L Dade Lunsford [10], Zhishuo Wei [10], Regan M Shanahan [10], Roman Liscak [11], Jaromir May [11], Antonio Dono [12], Angel I Blanco [12], Yoshua Esquenazi [12], Samantha Dayawansa [13], Jason Sheehan [13], Manjul Tripathi [14], Matthew J Shepard [15], Rodney E Wegner [16], Rituraj Upadhyay [17], Joshua D Palmer [17], Selcuk Peker [1 2]

Affiliations

PMID: 38940575 DOI: 10.1227/neu.0000000000003083

Abstract

Background and objectives: Pleomorphic xanthoastrocytoma (PXA) is a rare low-grade glial tumor primarily affecting young individuals. Surgery is the primary treatment option; however, managing residual/recurrent tumors remains uncertain. This international multi-institutional study retrospectively assessed the use of stereotactic radiosurgery (SRS) for PXA.

Methods: A total of 36 PXA patients (53 tumors) treated at 11 institutions between 1996 and 2023 were analyzed. Data included demographics, clinical variables, SRS parameters, tumor control, and clinical outcomes. Kaplan-Meier estimates summarized the local control (LC), progression-free survival, and overall survival (OS). Secondary end points addressed adverse radiation effects and the risk of malignant transformation. Cox regression analysis was used.

Results: A total of 38 tumors were grade 2, and 15 tumors were grade 3. Nine patients underwent initial gross total resection, and 10 received adjuvant therapy. The main reason for SRS was residual tumors (41.5%). The median follow-up was 34 months (range, 2-324 months). LC was achieved in 77.4% of tumors, with 6-month, 1-year, and 2-year LC estimates at 86.7%, 82.3%, and 77.8%, respectively. Younger age at SRS (hazard ratios [HR] 3.164), absence of peritumoral edema (HR 4.685), and higher marginal dose (HR 6.190) were significantly associated with better LC. OS estimates at 1, 2, and 5 years were 86%, 74%, and 49.3%, respectively, with a median OS of 44 months. Four patients died due to disease progression. Radiological adverse radiation effects included edema (n = 8) and hemorrhagic change (n = 1). One grade 3 PXA transformed into glioblastoma 13 months after SRS.

Conclusion: SRS offers promising outcomes for PXA management, providing effective LC, reasonable progression-free survival, and minimal adverse events.