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# Gamma Knife Radiosurgery for symptomatic eloquently deep-seated cystic pilocytic astrocytoma mural nodules: Retrospective case series of effective outcomes

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## Abstract

**Background:** Although most pilocytic astrocytomas grow slowly, their progression in critical sites such as the brainstem or hypothalamus may prove fatal much more rapidly. Cystic progression may be more problematic than solid tumor. Patients with progressive cystic PAs located in eloquent deep areas of the brain are the best candidates for stereotactic radiosurgery.

**Objective:** This retrospective case series aims to present the effective outcomes obtained from GKRS, targeting the mural nodules of symptomatic eloquently deep-seated cystic PAs in 9 consecutive patients treated at the IMC Gamma Knife Centre in Cairo, Egypt, between 2003 and 2021.

**Patient and methods:** The median follow-up period was 84 months (range 24-240 months). The median treated mural nodule volume was 1.25 cm<sup>3</sup> (range 0.32-1.97 cm<sup>3</sup>), treated with a median peripheral prescription dose of 12 Gy and a median maximum dose of 24 Gy. The median cyst volume in treated patients was 7.64cm<sup>3</sup>(range 1.66-40.6cm<sup>3</sup>).

**Results:** At the last follow-up, 7 out of 9 patients (78%) achieved tumor control (marked reduction > 50% of the entire tumor volume in 6 patients and moderate tumor reduction < 50% in one patient) in addition to clinical improvement. The median time of confirmed tumor reduction was 18 months (range 12-32 months). Two patients reported progression of the treated tumor. The overall tumor control rates at 2, 5, and 7 years of follow-up were 88.9%, 78%, and 78%, respectively.

**Conclusion:** The encouraging results of this series indicate that limiting the GKRS to the mural nodule of eloquently deep-seated cystic PAs may be a practical and effective pattern in the salvage of its treatment. Our data do not support radiation for extensive, large symptomatic cysts in deep-seated cystic PA or patients where microsurgical removal is feasible.

**Keywords:** Astrocytoma; Gamma knife radiosurgery; Pilocytic astrocytoma; Stereotactic radiosurgery.

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