Oncology, Nuclear Medicine and Transplantology
(eISSN 3105-8760)

Congress Abstract

Results of Stereotactic Radiosurgery for Renal Cell Carcinoma Brain Metastases: A Retrospective Single-Center Study

Zhanerke Abisheva[1], Zada Gapbas[1], Nurzat Sygai[1], Ruslan Sarsenov[1], Nursultan Ibraev[1]

[1] *"National Center of Neurosurgery" JSC, Astana, Kazakhstan*

Proceedings of International Scientific and Practical Conference *"ONCO FUTURE KAZAKHSTAN 2026: Precision Oncology Theranostics, Artificial Intelligence,"* **September 24-26, 2026, Astana, Kazakhstan**

Corresponding author's email: abisheva.zhanerke777@gmail.com

Introduction: Renal cell carcinoma brain metastases are a complication of oncological disease and are associated with an unfavorable prognosis. Stereotactic radiosurgery is one of the main methods of local treatment for intracranial metastases. Data on its outcomes in renal cell carcinoma brain metastases in Kazakhstan are limited.

Objective: To evaluate overall survival, intracranial progression-free survival, and local control after stereotactic radiosurgery.

Materials and Methods: A retrospective cohort study was conducted on patients with renal cell carcinoma brain metastases who underwent stereotactic radiosurgery using the Gamma Knife at the National Center for Neurosurgery between 05.10.2021 and 18.03.2026. The median age was 60 years (44–75), the median Karnofsky Performance Status score was 75 (50–90), and the median prognostic score was 1.5 (0–3.5). Extracranial metastases were present in 25 patients (78.1%), and 21 patients (65.6%) received systemic therapy prior to radiosurgery. Overall survival was assessed in 32 patients; intracranial progression-free survival and local control were assessed in 28 patients with available follow-up magnetic resonance imaging (MRI) studies. For local control assessment, 89 treated lesions were analyzed. Survival rates were calculated using the Kaplan–Meier method. The study was approved by the Bioethics Commission No. 1 of the "National Center for Neurosurgery" JSC (protocol extract No. 7 dated April 13, 2026) and conducted in accordance with the ethical principles of the Declaration of Helsinki.

Results: The median overall survival was 22.1 months. Overall survival rates at 6, 12, and 24 months were 71.4%, 60.8%, and 47.9%, respectively. Among the 28 patients with follow-up MRI studies, the median follow-up period was 4.5 months (1.23–36.13), and the median intracranial progression-free survival was 12.7 months. Intracranial progression was recorded in 11 patients: 9 developed new brain metastases, and 2 had leptomeningeal dissemination. Local control was analyzed in 89 treated metastatic lesions in 28 patients. One case of local progression of a treated lesion was recorded by MRI, detected 9.57 months after treatment. Local control at 6 and 12 months was 100% and 96.8%, respectively.

Conclusions: Stereotactic radiosurgery using the Gamma Knife provides high local control of renal cell carcinoma brain metastases. Intracranial progression was predominantly due to the appearance of new metastatic lesions and leptomeningeal dissemination, rather than progression of previously treated lesions. The obtained results demonstrate the high efficacy of the Gamma Knife in achieving local control in patients with renal cell carcinoma brain metastases.

Keywords: Carcinoma, Renal Cell; Brain Neoplasms; Radiosurgery; Progression-Free Survival; Survival Rate; Magnetic Resonance Imaging.