

# Factors associated with acute seizures following Gamma Knife (GK) radiosurgery for arteriovenous malformations (AVMs) in a single Australian centre

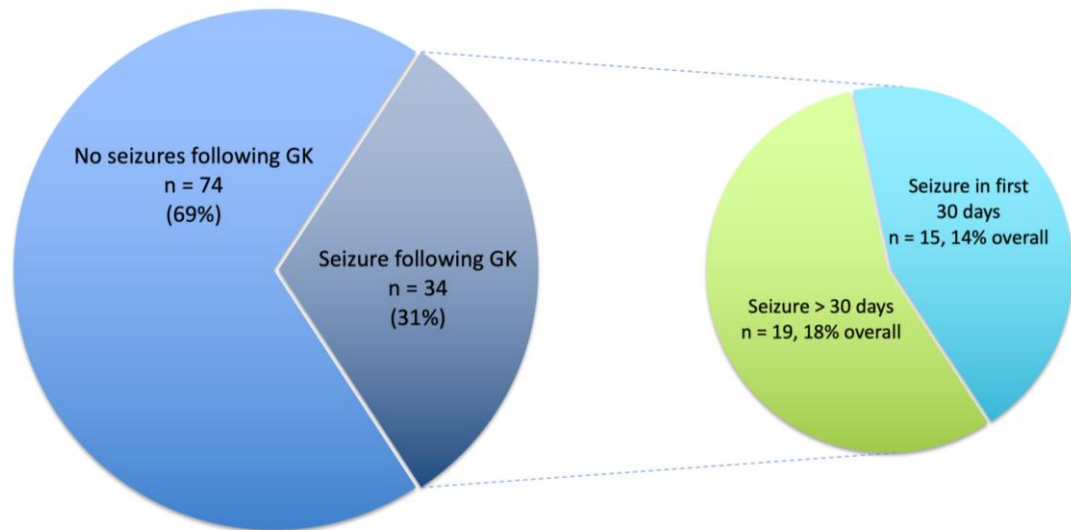
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**Purpose:** To identify risk factors for acute seizures following Gamma Knife radiosurgery for cerebral AVMs.

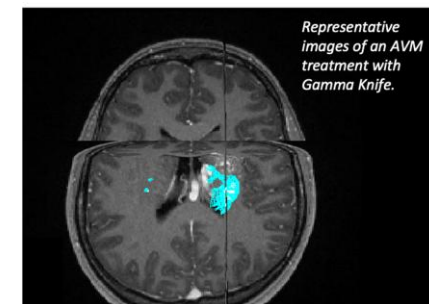
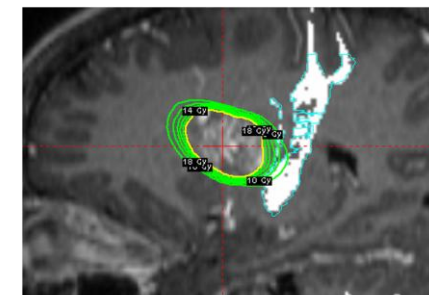
**Methodology:** A retrospective audit of patients treated with GK for AVMs at our centre between October 2015 and November 2019 was performed. Follow-up data was collected for a minimum of 3 years after GK. Analysis was performed per GK treatment course to include multistage and multi-AVM patients. Data were analysed by Fisher's exact test or Mann Whitney test where appropriate.

**Results:** 108 GK treatments were delivered to 93 patients aged 14-72 years. 11 patients received multi-stage GK. *Seizures occurred within 30 days of GK in 15 cases (14%); a total of 34 patients (31%) had seizures at any time post GK.*



Acute seizures following GK were associated with patients having prior seizure history (73% vs 34%, p=0.0104) and use of antiepileptic drugs (AED) before GK (p=0.0085). AED non-compliance was more common in patients who experienced acute seizures (20% vs 9%).

Demographics of patients receiving Gamma Knife for AVMs, analysed per treatment (n=108)			
	Patients with seizure <30 days of GK (n=15)	Patients without acute seizures (n=93)	p-value
Age range in years	22-66 (median 46)	14-72 (median 40)	0.116
Male gender	7 (47%)	53 (57%)	0.577
Median dose to nidus (IQR)	20Gy (17.5-21Gy)	18Gy (18-21Gy)	0.996
Median nidus size (IQR)	5.78cc (2.09-8.29cc)	2.84cc (0.85-7.11cc)	0.213
Patients with seizures prior to GK	11 (73%)	32 (34%)	<b>0.0104 (significant)</b>
Periprocedural dexamethasone omitted	2 (15%)	9 (11%)	0.649



Patients who had experienced prior haemorrhage from their AVM were **less likely** to have acute seizures following GK (20% vs 49%, p=0.0489). Acute seizures were more common after multistage GK treatments than single stage (5/15, 33% vs 18/93, 19%), though this did not reach statistical significance (p=0.3047). Two multi-stage patients with acute seizures had them following both first- and second-stage GK, another only following the first stage.

*Age, gender, history of prior neurosurgery, irradiated nidus volume, covering isodose prescription, and omission of periprocedural dexamethasone were not associated with acute seizures.* Temporal lobe AVM location versus non-temporal lobe did not predict for acute seizures post GK, nor did any other location.

**Conclusion:** The incidence of acute seizures after GK for AVMs is greater in patients with a history of seizures and AED noncompliance, but not associated with age, gender, GK dose, nidus volume or periprocedural dexamethasone omission.