

Title:	Gamma Knife radiosurgery
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The procedure

Gamma Knife (GK) is a form of stereotactic radiosurgery (SRS) used to deliver irradiation for the treatment of intracranial lesions and vascular malformations.

Aim

To assess the safety, effectiveness and cost-effectiveness of GK for treating cerebral metastases, arteriovenous malformations (AVMs), acoustic neuromas, primary malignant lesions, meningiomas, and pituitary adenomas. Comparator treatments varied across indications.

Conclusions and results

Safety

There was minimal comparative safety evidence. GK appears to result in a lower rate of medium-term treatment-related complications and procedural mortality than surgery for acoustic neuroma. The addition of SRS to whole brain radiotherapy (WBRT) for cerebral metastases may result in a slightly increased risk of serious radiation-related toxicity.

Effectiveness

There is evidence from one randomised controlled trial (RCT) for a small increase in survival for patients with single (but not multiple) metastases treated by SRS plus WBRT compared with WBRT alone. One RCT indicated no difference in survival, neurological function or quality of life for patients with primary lesions treated by SRS in addition to radiotherapy, surgery and chemotherapy, compared with these treatments without SRS. Observational evidence suggests that there is no difference in survival for patients with cerebral metastases or primary malignancies treated by GK versus Linac. GK may be comparable to surgery for controlling progression of acoustic neuroma, and may also improve quality of life, hearing preservation and facial function in those ineligible for surgery. There is evidence that patients with residual non-functioning pituitary adenoma benefit from GK after surgery in terms of tumour progression compared with observation. Conclusions regarding the comparative effectiveness for GK for meningioma and AVMs could not be drawn.

Cost-effectiveness

The base case estimate for the cost per treatment for GK was estimated at \$3,757 compared to a range of \$960 to \$3,549 for an adapted Linac unit.

Recommendation

Gamma Knife radiosurgery is safe, appears to be effective, but is not cost effective when compared with Linac stereotactic radiosurgery. MSAC recommends that current funding arrangements should not be changed.

Method

MSAC conducted a systematic review of the biomedical literature (Medline; EMBASE; Pre-Medline; Current Contents; Cinahl; ACP Journal Club; Cochrane Database of Systematic Reviews; Database of Abstracts of Reviews of Effectiveness; and Cochrane Controlled Trials Register) from 2001 to September 2005 to update its previous assessment of GK. Reference lists and health technology assessment websites were also searched. A partial economic costing was conducted due to the limitations of the evidence for effectiveness.