



<b>Title</b>	<b>Stereotactic Radiosurgery: An Update</b>
<b>Agency</b>	<b>AHFMR, Alberta Heritage Foundation for Medical Research</b> Health Technology Assessment Unit, Suite 1500, 10104-103 Avenue NW, Edmonton, Alberta T5J 4A7, Canada; Tel: 1 780 423 5727, Fax: 1 780 429 3509; www.ahfmr.ab.ca
<b>Reference</b>	Information Paper #12, May 2002 (English). ISBN 1-896956-56-4 (print). Online: www.ahfmr.ab.ca/hta/

## Aim

To update advice provided in a 1998 AHFMR report on stereotactic radiosurgery (SRS).

## Conclusions and results

The previous AHFMR report found limitations in the scope and quality of studies on SRS. There has been little improvement in this situation. Evidence on the efficacy, effectiveness, and economic impact of SRS remains limited. No evidence shows that any one form of SRS is superior to another. Small studies give some indication of similar outcomes from the Gamma Knife® (GK) and focused linear acceleration (LINAC) versions of SRS, and that fractionated stereotactic radiotherapy (FSRT) may produce fewer complications than SRS in some situations. The GK approach is more expensive than the standard LINAC approaches or FSRT, but the costs of using recent developments in LINAC technology are unknown.

With respect to the use of SRS, evidence from the published literature suggests the following.

- *Acoustic neuroma*: SRS is useful when microsurgery would have an unacceptable risk or be refused. Long-term followup data on SRS treatment remain limited. FSRT appears to have potential as an alternative to LINAC or GK SRS.
- *Arteriovenous malformations*: Microsurgery and SRS should be regarded as complementary approaches. Surgery is preferred if the lesion can be safely excised.
- *Brain metastases*: SRS is a useful option in patients not eligible for surgery and may offer advantages in relieving neurological symptoms. SRS plus radiotherapy appears to be more effective than radiotherapy alone.
- *Brain tumors*: SRS appears to be a useful adjunctive treatment in appropriately selected patients, though its success with malignant glioma is limited. SRS is helpful when surgery is not possible or carries unacceptably high risks.

- *Parkinson's disease, epilepsy, and trigeminal neuralgia*: The role of SRS in their management is unclear.

## Recommendations

SRS is an accepted treatment option for several conditions when microsurgery is not possible, and as an adjunct to surgical and other approaches. Either LINAC or GK SRS are acceptable if SRS is to be used. Placement of SRS in specialized centers and excellent quality assurance are essential. Referral of patients from Alberta for SRS treatment outside the province should be to centers of excellence experienced in managing the condition in question and take account of other treatment options.

## Methods

All original studies published since the previous AHFMR report were considered. Studies reporting outcomes of SRS treatments, or other approaches to managing the same conditions being treated with SRS, on humans were identified by searching PubMed, EMBASE, CINAHL, PsycINFO, The Cochrane Library, Web of Science, EBM Reviews – ACP Journal Club, and websites of health technology assessment agencies from January 1997 to January 2002. Case series studies of fewer than 20 patients, technical descriptions of apparatus, dose calculations, imaging and treatment planning approaches, and procedural descriptions were excluded. No language restriction was applied.

## Further research/reviews required

Convincing evidence of the efficacy and cost effectiveness of the new SRS options, eg, CyberKnife and FSRT, is required. There is a need to go beyond cost analysis to economic evaluation, taking appropriate account of local circumstances. As suggested in the 1998 AHFMR report, decisions on referring patients for SRS require careful consideration of history, diagnostic findings by the specialists, and information on SRS efficacy for each application.