The American Society for Therapeutic Radiology and Oncology (ASTRO) evidence-based review of the role of radiosurgery for malignant glioma

CRD summary
This review concluded that adding radiosurgery boost to external beam radiotherapy and carmustine increases toxicity and does not improve survival or quality of life in malignant glioma. The authors' further conclusion, that there is insufficient evidence about stereotactic fractionated radiation or radiosurgery at progression or recurrence, appears appropriate.

Authors' objectives
To assess the effects of stereotactic radiosurgery or stereotactic fractionated radiation therapy in adults with malignant glioma.

Searching
MEDLINE (1990 to June 2004), Cancerlit (1990 to 2003), CINAHL (1990 to June 2004), EMBASE (1990 to 2004), the Cochrane Library (Issue 2, 2004), and the reference lists of identified studies were searched; the search terms were reported. The authors also searched the PDQ clinical trials database and proceedings of the American Society of Clinical Oncology (1997 to 2004), ASTRO (1997 to 2004) and the European Society of Therapeutic Radiology and Oncology (1997 to 2003) for phase III randomised trials only. Studies reported in a language other than English were excluded.

Study selection
Study designs of evaluations included in the review
Meta-analyses, randomised controlled trials (RCTs), case-control studies, cohort studies and retrospective case series were eligible for inclusion. Prospective and retrospective studies, prospective cohort studies and an RCT were retrieved.

Specific interventions included in the review
Studies were eligible for inclusion if they examined radiosurgery (single fraction) or fractionated stereotactic radiotherapy. The interventions included stereotactic radiosurgery, external beam radiotherapy (EBRT), interstitial brachytherapy, interstitial thermotherapy, carmustine (bischloroethylnitrosourea), fractionated stereotactic radiation therapy (FSRT), taxol and temozolomide alone and/or in various combinations.

Participants included in the review
Studies of adults with high-grade glioma were eligible. Studies that did not separate newly diagnosed from recurrent glioma were excluded. The majority of studies included patients with grade 3 or 4 astrocytoma.

Outcomes assessed in the review
To be eligible for inclusion, the studies had to include data on at least one of the following outcomes: overall survival, quality of life or symptom control, tumour control or response, toxicity.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors graded studies according to the level of evidence provided using a hierarchy of evidence (study type) table. The authors did not state how the validity assessment was performed.
Data extraction
Two independent people extracted the data. Any discrepancies were resolved through discussion, with input from a third person.

Methods of synthesis
How were the studies combined?
The authors provided a narrative synthesis and presented study details in tabular format.

How were differences between studies investigated?
The authors compared studies in narrative form according to study type and patient and treatment characteristics.

Results of the review
The review included 27 studies: 1 RCT with 203 participants, 14 prospective non-randomised studies and 12 retrospective studies. The sample sizes in the non-randomised studies ranged from 14 to 132.

One randomised trial compared the addition of radiosurgery boost to EBRT plus carmustine versus EBRT plus carmustine alone. There was some evidence of increased grade 3 toxicity and no evidence of improved survival or quality of life. The authors also reported results from other prospective and retrospective studies.

There was no randomised evidence of FSRT. Eight uncontrolled studies reported FSRT alone or as boost therapy in patients with newly diagnosed, recurrent or progressive malignant glioma.

Authors' conclusions
The addition of radiosurgery boost to EBRT and carmustine increased toxicity and did not improve survival or quality of life in malignant glioma. There was insufficient evidence on stereotactic fractionated radiation therapy and on the use of radiosurgery at progression or recurrence.

CRD commentary
This review had a well-defined scope and inclusion criteria. The search strategy appeared appropriate, although language bias might have been introduced because only studies published in English were included. It was unclear how many reviewers were involved in selecting the studies and the validity assessment, which may mean these processes were susceptible to bias or error. The studies were graded by study design, but the potential for bias was not assessed for individual studies. The authors did not state why they did not perform a meta-analysis but, given the differences in study design and follow-up, a narrative synthesis seemed appropriate.

The authors suggest there is little evidence upon which to base conclusions because only one randomised trial of radiosurgery boost was identified and there was insufficient evidence on FSRT. These conclusions appear appropriate given the limitations of the evidence presented.

Implications of the review for practice and research
The authors did not state any implications for practice or further research, although they acknowledged that additional trials are ongoing or planned in this field.

Bibliographic details

PubMedID
Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.