Radiotherapy for newly diagnosed malignant glioma in adults
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CRD summary
This review aimed to develop guidelines for radiotherapy in adults with newly diagnosed malignant glioma, and recommended post-operative external beam radiotherapy as standard therapy. However, given the limited study details and the lack of a formal quality assessment, it is not possible to comment on the strength of the authors’ conclusions.

Authors' objectives
To develop guidelines for radiotherapy in adults with newly diagnosed malignant glioma.

Searching
MEDLINE (1966 to June 2003), Cancerlit (1983 to October 2002) and the Cochrane Library (Issue 2, 2004) were searched. The search terms were reported and no language restrictions were applied. The conference proceedings of the American Society of Clinical Oncology (1997 to 2004) and the American Society for Therapeutic Radiology and Oncology (1998 to 2002) were also searched. The PDQ database was searched for ongoing trials and the reference lists of relevant articles and reviews were checked.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were the preferred study designs for inclusion in the review. Where no RCTs were available, non-randomised studies were reviewed.

Specific interventions included in the review
Studies that compared various aspects of radiotherapy were eligible for inclusion. The radiotherapies evaluated were: conventional radiation versus no radiation; radiation volume; radiation dose with conventionally fractionated radiotherapy; accelerated radiotherapy; hypofractionated radiotherapy; hyperfractionated radiotherapy; brachytherapy; hyperthermia; particle therapy; sensitised radiation; and radiosurgery. The evidence on hyperfractionated radiotherapy and sensitised radiation is not reported in this abstract as meta-analyses were included; these results do not fulfil the DARE inclusion criteria.

Participants included in the review
Studies with participants with malignant glioma were eligible for inclusion. No further details of the participants were reported.

Outcomes assessed in the review
Studies that assessed survival were eligible for inclusion in the review.

How were decisions on the relevance of primary studies made?
Three members of the Practice Guidelines Initiative's Neuro-oncology Disease Site Group and methodologists selected and reviewed the evidence.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Data on the 1-year mortality of participants were extracted, and the reported figures or estimates from tables.
or graphs were used. The extracted data were based on intention-to-treat analyses, where available.

Methods of synthesis
How were the studies combined?
Pooled risk ratios (RRs) were calculated using a random-effects model for conventional radiotherapy (post-operative radiotherapy) versus no radiotherapy. Evidence on the other forms of radiotherapy was presented using a narrative synthesis.

How were differences between studies investigated?
The studies included in the meta-analysis were examined for statistical heterogeneity using a chi-squared test. Studies presented using narrative syntheses were grouped according to type of radiotherapy then discussed in terms of treatment and outcomes, and some results were tabulated.

Results of the review
A total of 41 studies, including 22 RCTs, were identified. It was unclear how many participants were included in all of the studies.

Post-operative radiotherapy versus no radiotherapy (6 RCTs): there was a statistically significant survival benefit in favour of post-operative radiotherapy (RR 0.81, 95% CI: 0.74, 0.88, P<0.00001) and no statistical heterogeneity was identified (P>0.10).

Radiation volume (2 RCTs): there were no statistically significant differences between participants receiving various volumes of radiation.

Radiation dose (2 RCTs): one of the RCTs found that participants that received 60 Gy had a significant survival benefit compared with those receiving 45 Gy. The second RCT compared four different dosages of radiation and found no statistically significant differences between treatment arms.

Accelerated radiotherapy (3 RCTs, 2 single-arm studies): there were no statistically significant differences between participants receiving accelerated fractionation compared with those receiving conventional radiotherapy.

Hypofractionation (1 RCT, 1 retrospective study, 5 single-arm studies): no statistical significant benefit in survival was found in the RCT which compared hypofractionated radiation with conventional radiation. The results of the other studies found that the effects of hypofractionated radiation were similar to conventional radiotherapy.

Brachytherapy (2 RCTs): there were no statistically significant differences in terms of median survival for participants receiving brachytherapy compared with no brachytherapy in one RCT; the results of the second RCT were not yet published.

Hyperthermia (1 RCT): participants receiving hyperthermia with brachytherapy had a statistically significant benefit in survival compared with those receiving no hyperthermia (P=0.04).

Particle therapy (5 RCTs): there were no statistically significant benefits in survival for those receiving particle therapy in any of the RCTs.

Radiosurgery (11 non-controlled studies): the authors stated that, owing to the lack of control groups, no comments could be made on the advantages of this approach.

Authors' conclusions
Post-operative external beam radiotherapy is recommended as standard therapy for patients with malignant glioma.

CRD commentary

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The review question was clear in terms of the study designs, outcomes, participants and interventions of interest. Several sources were searched for relevant studies and no language restrictions were applied, which means that the possibility of language bias is low. Methods were used to minimise reviewer error and bias when selecting studies for inclusion, however, the process of how the data were extracted for the review was not reported. A mixture of RCTs and other study designs were included in the review but the quality of the individual studies was not formally assessed; this means it is not possible to assess the validity of the evidence upon which the conclusions are based. Furthermore, limited details about the study participants were provided, which means that it is difficult to assess how appropriate the meta-analysis was. Given the limited study details and the lack of a formal quality assessment, it is not possible to comment on the strength of the authors’ conclusions.

Implications of the review for practice and research
Practice: The authors stated that post-operative external beam radiotherapy is recommended as standard therapy. The high-volume dose should incorporate the enhancing tumour plus a limited margin for the planning target volume, and the total dose delivered should be in the range of 50 to 60 Gy in fraction sizes of 1.8 to 2 Gy. Radiation dose intensification and radiation sensitiser approaches are not recommended as standard care.

Research: The authors stated that patients should be encouraged to participate in properly conducted experimental studies, while further studies of patients with brain tumours should include measures of toxicity and quality of life.

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Indexing Status
Subject indexing assigned by CRD

MeSH
Adult; Brain Neoplasms /mortality /radiotherapy /surgery; Chemotherapy, Adjuvant; Combined Modality Therapy; Dose Fractionation; Dose-Response Relationship, Radiation; Glioma /mortality /radiotherapy /surgery; Radiosurgery; Radiotherapy Dosage

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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.