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Congress of Neurological Surgeons systematic review and evidence-based guidelines for the role of radiotherapy in the management of patients with diffuse low grade glioma in adults: update

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Abstract

Target population: These recommendations apply to adults with newly diagnosed WHO Grade 2 diffuse glioma.

Questions and Recommendations from the Prior Version of These Guidelines Without Change

Question What is the optimal role of external beam radiotherapy in the management of adult patients with newly diagnosed low-grade glioma (LGG) in terms of improving outcome (i.e. survival, complications, seizure control or other reported outcomes of interest)?

Recommendations Level I Radiotherapy is recommended in the management of newly diagnosed low-grade glioma in adults to prolong progression free survival, irrespective of extent of resection.

Level II Radiotherapy is recommended in the management of newly diagnosed low grade glioma in adults as an equivalent alternative to observation in preserving cognitive function, irrespective of extent of resection.

Level III Radiotherapy is recommended in the management of newly diagnosed low grade glioma in adults to improve seizure control in patients with epilepsy and subtotal resection.

Level III Radiotherapy is recommended in the management of newly diagnosed low-grade glioma in adults to prolong overall survival in patients with subtotal resection.

Level III Consideration of the risk of radiation induced morbidity, including cognitive decline, imaging abnormalities, metabolic dysfunction and malignant transformation, is recommended when the delivery of radiotherapy is selected in the management of newly diagnosed low grade glioma in adults.

Question Which radiation strategies (dose, timing, fractionation, stereotactic radiation, brachytherapy, chemotherapy) improve outcomes compared to standard external beam radiation therapy in the initial management of low grade gliomas in adults?

Recommendations Level I Lower dose radiotherapy is recommended as an equivalent alternative to higher dose immediate postoperative radiotherapy (45–50.4 vs. 59.4–64.8 Gy) in the management of newly diagnosed low-grade glioma in adults with reduced toxicity.

Level III Delaying radiotherapy until recurrence or progression is recommended as an equivalent alternative to immediate postoperative radiotherapy in the management of newly diagnosed low-grade glioma in adults but may result in shorter time to progression.

Level III The addition of chemotherapy to radiotherapy is not recommended over whole brain radiotherapy alone in the management of low-grade glioma, as it provides no additional survival benefit.

Level III Limited-field radiotherapy is recommended over whole brain radiotherapy in the management of low-grade glioma.

Level III Either stereotactic radiosurgery or brachytherapy are recommended as acceptable alternatives to external radiotherapy in selected patients.

Question Do specific factors (e.g. age, volume, extent of resection, genetic subtype) identify subgroups with better outcomes following radiation therapy than the general population of adults

with newly diagnosed low-grade gliomas?

Recommendations Level II It is recommended that age greater than 40 years, astrocytic pathology, diameter greater than 6 cm, tumor crossing the midline and preoperative neurological deficit be considered as negative prognostic indicators when predicting overall survival in adult low grade glioma patients treated with radiotherapy.

Level II It is recommended that smaller tumor size, extent of surgical resection and higher minimal status exam be considered as positive prognostic indicators when predicting overall survival and progression free survival in patients in adult low grade glioma patients treated with radiotherapy.

Level II I It is recommended that seizures at presentation, presence of oligodendroglial histological component and 1p19q deletion (along with additional relevant factors—see Table 1) be considered as positive prognostic indicators when predicting response to radiotherapy in adults with low grade gliomas.

Level III It is recommended that increasing age, decreasing performance status, decreasing cognition, presence of astrocytic histological component (along with additional relevant factors (see Tables 1, 2) be considered as negative prognostic indicators when predicting response to radiotherapy.

New Questions and Recommendations



Question In adult patients with pathology confirmed WHO Grade 2 diffuse glioma is proton therapy superior to standard radiation therapy result in terms of overall survival, progression free survival, local control, complications, neurocognitive preservation, and quality of life (QOL)?

Recommendation There is insufficient evidence to provide guidance on the superiority or inferiority of proton radiation effect compared to standard radiation therapy on WHO Grade 2 diffuse glioma in terms of overall survival, progression free survival, local control, complications, neurocognitive preservation, and quality of life.

Question In adult patients with pathology confirmed WHO Grade 2 diffuse glioma receiving radiotherapy, do the molecular markers IDH-1 status, MGMT promoter methylation status and 1p19q presence or absence result in better prediction of overall survival, progression free survival, local control, complications, neurocognitive preservation, and quality of life?

Recommendation Level III It is suggested that 1p/19q deletion status be used as a positive

prognostic indicator regarding the effect of radiation therapy on progression free survival and overall survival for WHO grade II diffuse gliomas.

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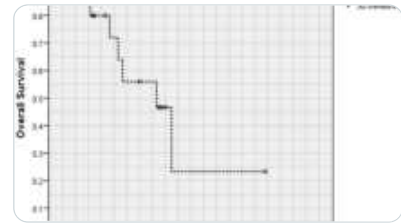
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Data availability

This clinical systematic review and evidence-based guideline was developed by a physician volunteer task force as an educational tool that reflects the current state of knowledge at the time of completion. Each chapter is designed to provide an accurate review of the subject matter covered. This guideline is disseminated with the understanding that the recommendations by the authors and consultants who have collaborated in their development are not meant to replace the individualized care and treatment advice from a patient's physician(s). If medical advice or assistance is required, the services of a competent physician should be sought. The proposals contained in these guidelines may not be suitable for use in all circumstances. The choice to implement any particular recommendation contained in these guidelines must be made by a managing physician in light of the situation in each particular patient and on the basis of existing resources.

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SL wrote the main manuscript. LH, SC, PK, TW and HKS conducted the systematic review. JJO led the guideline task force. All authors reviewed the manuscript.

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Ethics declarations

Conflict of interest

All Guideline Task Force members were required to disclose all potential COIs prior to beginning work on the guideline, using the COI disclosure form of the AANS/CNS Joint Guidelines Review Committee. The CNS Guidelines Committee and Guideline Task Force Chair reviewed the disclosures and either approved or disapproved the nomination and participation on the task force. The CNS Guidelines Committee and Guideline Task Force Chair may approve nominations of task force members with possible conflicts and restrict the writing, reviewing, and/or voting privileges of that person to topics that are unrelated to the possible COIs. The task force has not made any disclosures.

Additional information

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