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Cochrane Database of Systematic Reviews 2017, Issue 4. Art. No.: CD009319.
DOI: [10.1002/14651858.CD009319.pub3](https://doi.org/10.1002/14651858.CD009319.pub3).

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[Intervention Review]

Biopsy versus resection for the management of low-grade gliomas

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Editorial group: Cochrane Gynaecological, Neuro-oncology and Orphan Cancer Group.

Publication status and date: Stable (no update expected for reasons given in 'What's new'), published in Issue 6, 2020.

Citation: Jiang B, Chaichana K, Veeravagu A, Chang SD, Black KL, Patil CG. Biopsy versus resection for the management of low-grade gliomas. *Cochrane Database of Systematic Reviews* 2017, Issue 4. Art. No.: CD009319. DOI: [10.1002/14651858.CD009319.pub3](https://doi.org/10.1002/14651858.CD009319.pub3).

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ABSTRACT

Background

This is an updated version of the original Cochrane review published in 2013, Issue 4.

Low-grade gliomas (LGG) constitute a class of slow-growing primary brain neoplasms. Patients with clinically and radiographically suspected LGG have two initial surgical options, biopsy or resection. Biopsy can provide a histological diagnosis with minimal risk but does not offer a direct treatment. Resection may have additional benefits such as increasing survival and delaying recurrence, but is associated with a higher risk for surgical morbidity. There remains controversy about the role of biopsy versus resection and the relative clinical outcomes for the management of LGG.

Objectives

To assess the clinical effectiveness of biopsy compared to surgical resection in patients with a new lesion suspected to be a LGG.

Search methods

The following electronic databases were searched in 2012 for the first version of the review: Cochrane Central Register of Controlled Trials (CENTRAL) (2012, Issue 11), MEDLINE (1950 to November week 3 2012), Embase (1980 to Week 46 2012). For this updated version, the following electronic databases were searched: Cochrane Central Register of Controlled Trials (CENTRAL) (2016, Issue 5), MEDLINE (Nov 2012 to June week 3 2016), Embase (Nov 2012 to 2016 week 26). All relevant articles were identified on PubMed and by using the 'related articles' feature. We also searched unpublished and grey literature including ISRCTN-metaRegister of Controlled Trials, Physicians Data Query and ClinicalTrials.gov for ongoing trials.

Selection criteria

We planned to include patients of any age with a suspected intracranial LGG receiving biopsy or resection within a randomized clinical trial (RCT) or controlled clinical trial (CCT). Patients with prior resections, radiation therapy, or chemotherapy for LGG were excluded. Outcome measures included overall survival (OS), progression-free survival (PFS), functionally independent survival (FIS), adverse events, symptom control, and quality of life (QoL).

Data collection and analysis

A total of 1375 updated citations were searched and critically analyzed for relevance. This was undertaken independently by two review authors. The original electronic database searches yielded a total of 2764 citations. In total, 4139 citations have been critically analyzed for this updated review.

Main results

No new RCTs of biopsy or resection for LGG were identified. No additional ineligible non-randomized studies (NRS) were included in this updated review. Twenty other ineligible studies were previously retrieved for further analysis despite not meeting the pre-specified criteria. Ten studies were retrospective or were literature reviews. Three studies were prospective, however they were limited to tumor recurrence and volumetric analysis and extent of resection. One study was a population-based parallel cohort in Norway, but not an RCT. Four studies were RCTs, however patients were randomized with respect to varying radiotherapy regimens to assess timing and dose of radiation. One RCT was on high-grade gliomas (HGGs) and not LGG. Finally, one RCT evaluated diffusion tensor imaging (DTI)-based neuro-navigation for surgical resection.

Authors' conclusions

Since the last version of this review, no new studies have been identified for inclusion and currently there are no RCTs or CCTs available on which to base definitive clinical decisions. Therefore, physicians must approach each case individually and weigh the risks and benefits of each intervention until further evidence is available. Some retrospective studies and non-randomized prospective studies do seem to suggest improved OS and seizure control correlating to higher extent of resection. Future research could focus on RCTs to determine outcomes benefits for biopsy versus resection.

PLAIN LANGUAGE SUMMARY

Surgical sampling or removal of low-grade glioma brain tumors

The issue: Low-grade gliomas (LGGs) are slow growing, less aggressive brain tumors. The most optimal surgical management is under debate.

The aim of the review: There are two surgical management strategies (treatments) for a person with a suspected LGG. These are biopsy, the surgical sampling of a small amount of tumor tissue, or resection, where as much as possible of the tumor is surgically removed. Tissues from both operations are then histologically examined to give a definitive diagnosis of the type and grade (severity) of the tumor. The aim of the review is to determine if biopsy or resection is the best treatment strategy.

The main findings: There is much debate about which of these surgical techniques is the best for patient survival. We searched the literature up to June 2016. However, currently there are no randomized controlled trials (RCTs) which have looked at which is the better procedure, only retrospective research studies looking at how people have responded to procedures that have happened in the past. Therefore, in the future, more RCTs are needed to try and answer this question.

Quality of the evidence: We were unable to determine this as no studies were included and only low-quality evidence from non-RCTs is available.

Conclusions: There are no randomized clinical trials on this topic; some institutional, non-clinical trials studies have suggested improved overall survival and seizure control with higher extent of resection. However, physicians should approach each case individually and weigh the risks and benefits of biopsy versus surgical resection, as well as incorporate patient preference into their clinical decision-making. Prognostic factors such as patient age, tumor size, and tumor location as well as potential implications for quality of life should be taken into account.