INPLASY PROTOCOL

To cite: Zhang et al. Recurrent glioma and radiation necrosis: a meta-analysis of MRI diagnosis. Inplasy protocol 2021120028. doi: 10.37766/inplasy2021.12.0028

Received: 04 December 2021

Published: 04 December 2021

Corresponding author:
Chen Wang

wangchen0122@126.com

Author Affiliation:
Binzhou People's Hospital

Support: **None.**

Review Stage at time of this submission: **Preliminary searches.**

Conflicts of interest:
None declared.

Recurrent glioma and radiation necrosis: a meta-analysis of MRI diagnosis

Zhang, HM[1]; Huo, XB[2], Wang, HL[3]; Wang, C[4].

Review question / Objective: **Distinguishing recurrent glial tumor from radiation necrosis can be challenging. The purpose of this meta-analysis was to compare dynamic susceptibility contrast-enhanced cerebral blood volume (DSC-CBV) magnetic resonance imaging in distinguishing predominant glioma recurrence or progression from predominant radiation necrosis in postoperative patients treated with proton-beam therapy.**
Condition being studied: **At present, many functional MRI techniques, such as diffuse-weighted imaging (DWI), perfusion-weighted imaging (PWI), and MRI spectroscopy (MRS), have been widely used to analysis of tumor or necrotic tissue properties and provide more accurate information on its nature. However, the results from a single retrospective study are not enough. Therefore, a meta-analysis should be performed to increase the statistical power of the small sample study.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 04 December 2021 and was last updated on 04 December 2021 (registration number INPLASY2021120028).

INTRODUCTION

Review question / Objective: **Distinguishing recurrent glial tumor from radiation necrosis can be challenging. The purpose of this meta-analysis was to compare dynamic susceptibility contrast-enhanced cerebral blood volume (DSC-CBV) magnetic resonance imaging in distinguishing predominant glioma recurrence or progression from predominant radiation necrosis in**

postoperative patients treated with proton-beam therapy.

Condition being studied: At present, many functional MRI techniques, such as diffuse-weighted imaging (DWI), perfusion-weighted imaging (PWI), and MRI spectroscopy (MRS), have been widely used to analysis of tumor or necrotic tissue properties and provide more accurate information on its nature. However, the results from a single retrospective study are not enough. Therefore, a meta-analysis should be performed to increase the statistical power of the small sample study.

METHODS

Search strategy: ((((((perfusion weighted imaging) OR (PWI)) OR (perfusion MR)) OR (MR perfusion)) OR (dynamic susceptibility contrast-enhanced)) AND (glioma)) AND ((recurrence) OR (recurrent))) AND OR (radiation necrosis)).

Participant or population: Postoperative glioma.

Intervention: Recurrent glioma.

Comparator: Radiation necrosis.

Study designs to be included: Diagnostic studies.

Eligibility criteria: Using DSC-CBV as the diagnostic tool for recurrent glioma and radiation necrosis.

Information sources: The PubMed, Embase, and Cochrane Library were searched for relevant articles. The publication data was set until to October 2021.

Main outcome(s): Sensitivity, specificity, PLR, NLR, ROC.

Quality assessment / Risk of bias analysis: Risk of bias of each study was evaluated with the quality assessment of diagnostic accuracy studies (QUADAS-2) tool.

Strategy of data synthesis: RevMan v5.3 and Stata v12.0 are employed for this meta-analysis. We pooled sensitivity, specificity, positive likelihood ratio (PLR), negative likelihood ratio (NLR), and relative cerebral blood volume (rCBV) values from the included studies. A significantly higher likelihood of correctly diagnosing TR or RI were indicated by PLR > 5 or NLR < 0.2. Summary receiver operating characteristic (SROC) curves were generated, and when the area under the curve (AUC) of this curve was > 80%, diagnostic accuracy was considered to be good. Heterogeneity is assessed by I2 tests, with I2 > 50% suggesting significant heterogeneity. Random-effects models are employed for significant heterogeneity, while fixed-effects models are employed for significant homogeneity. $P < 0.05$ was the significance threshold. The sources of heterogeneity were detected by the sensitivity, subgroup, and meta-regression analyses.

Subgroup analysis: Yes.

Sensitivity analysis: No.

Country(ies) involved: China.

Keywords: Glioma; Necrosis; MRI.

Contributions of each author:
Author 1 - Hui-Mei Zhang.
Author 2 - Xiao-Bing Huo.
Author 3 - Hua-Long Wang.
Author 4 - Chen Wang.