

INPLASY PROTOCOL

To cite: Li et al. Diffusion Tensor Imaging and Intraoperative Subcortical Stimulation: Comparative Meta Analysis of Subcortical Functional Areas. Inplasy protocol 202180013. doi: 10.37766/inplasy2021.8.0013

Received: 04 August 2021

Published: 04 August 2021

Corresponding author:
Yiming Li

liyimingwin68@163.com

Author Affiliation:
Department of neurosurgery,
Tianjin Medical University
General Hospital, Tianjin,
China.

Support: National Key
Research of China.

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

Conflicts of interest:
None declared.

Diffusion Tensor Imaging and Intraoperative Subcortical Stimulation: Comparative Meta Analysis of Subcortical Functional Areas

Li, Y¹; Guo, J².

Review question / Objective: Participants: Patients with brain neoplasms located in eloquent area; Intervention: Intraoperative Stimulation Mapping or Diffusion Tensor Imaging; Comparison: none; Outcome: Functional impaired or not; S: Randomized Controlled Trials and cohort studies.

Condition being studied: Intraoperative Stimulation Mapping or Diffusion Tensor Imaging.

Main outcome(s): The most relevant outcomes of this study is the ratio of brain function impaired after the surgery (navigated by Diffusion Tensor Imaging or Intraoperative Stimulation Mapping). And we will come to a conclusion as ISM or DTI which is the better surgical navigation for the neoplasm located in eloquent area.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 04 August 2021 and was last updated on 04 August 2021 (registration number INPLASY202180013).

INTRODUCTION

Review question / Objective: Participants: Patients with brain neoplasms located in eloquent area; Intervention: Intraoperative Stimulation Mapping or Diffusion Tensor Imaging; Comparison: none; Outcome:

Functional impaired or not; S: Randomized Controlled Trials and cohort studies.

Condition being studied: Intraoperative Stimulation Mapping or Diffusion Tensor Imaging.

METHODS

Participant or population: Patients with lesion located in subcortical functional areas.

Intervention: Neurosurgical intervention.

Comparator: Diffusion Tensor Imaging (DTI) and intraoperative stimulation mapping.

Study designs to be included: Randomized controlled trials and cohort studies.

Eligibility criteria: 1. Studies in English; Participants: Patients with brain neoplasms located in eloquent area; Intervention: Intraoperative Stimulation Mapping or Diffusion Tensor Imaging; Comparison: none; Outcome: Functional impaired or not; S: Randomized Controlled Trials and cohort studies.

Information sources: Pubmed, Medline, Embase, Cochrane Library, etc.

Main outcome(s): The most relevant outcomes of this study is the ratio of brain function impaired after the surgery (navigated by Diffusion Tensor Imaging or Intraoperative Stimulation Mapping). And we will come to a conclusion as ISM or DTI which is the better surgical navigation for the neoplasm located in eloquent area.

Quality assessment / Risk of bias analysis: The methodological quality of RCTs was assessed by the Cochrane risk of bias tool. The methodological quality of retrospective studies was assessed by the modified Newcastle-Ottawa scale (NOS), which consists of three factors: patient selection, comparability of the study groups, and assessment of outcome. A score of 0-9(allocated as stars) was allocated to each study except RCTs. RCTs and observational studies achieving six or more stars were considered to be of high quality. When it comes to cohort studies, we use Newcastle Ottawa Scale (NOS) as another tool. The methodological quality of RCTs was assessed by the Cochrane risk of bias tool. The methodological quality of retrospective studies was assessed by the

modified Newcastle-Ottawa scale (NOS), which consists of three factors: patient selection, comparability of the study groups, and assessment of outcome. A score of 0-9(allocated as stars) was allocated to each study except RCTs. RCTs and observational studies achieving six or more stars were considered to be of high quality. When it comes to cohort studies, we use Newcastle Ottawa Scale (NOS) as another tool.

Strategy of data synthesis: We will provide a narrative synthesis of the findings from the included studies, structured around the type of intervention, target population characteristics, type of outcome and intervention content. We will provide summaries of intervention effects for each study by calculating risk ratios (for dichotomous outcomes) or standardised mean differences (for continuous outcomes). We anticipate that there will be limited scope for meta-analysis because of the range of different outcomes measured across the small number of existing trials. However, where studies have used the same type of intervention and comparator, with the same outcome measure, we will pool the results using a random-effects meta-analysis, with standardised mean differences for continuous outcomes and risk ratios for binary outcomes, and calculate 95% confidence intervals and two sided P values for each outcome. In studies where the effects of clustering have not been taken into account, we will adjust the standard deviations for the design effect. Heterogeneity between the studies in effect measures will be assessed using both the χ^2 test and the I² statistic. We will consider an I² value greater than 50% indicative of substantial heterogeneity. We will conduct sensitivity analyses based on study quality. We will use stratified meta-analyses to explore heterogeneity in effect estimates according to: study quality; study populations; the logistics of intervention provision; and intervention content. We will also assess evidence of publication bias.

Subgroup analysis: We would divide studies we searched into 3 group as: 1. (Intraoperative Stimulation Mapping) AND

(Neoplasm located in eloquent areas of brain); 2. (Diffusion Tensor Imaging) AND (Neoplasm located in eloquent areas of brain); 3. (ISM) AND (DTI) AND (Neoplasm). We are plan to analysis those 3 subgroup and finally come to comparison.

Sensitivity analysis: The methodological quality of RCTs was assessed by the Cochrane risk of sensitivity tool. When it comes to cohort studies, we use Newcastle Ottawa Scale (NOS) as another tool.

Language: No restriction.

Country(ies) involved: China.

Other relevant information: The department of neurosurgery of Tianjin Medical University General Hospital is the origin department of neurosurgery in China and has trained a large number of professional backbones for the establishment and development of neurosurgery all over the country. With the joint efforts of several generations of neurosurgeons and all colleagues over the past fifty years, the department is currently one of the only three national key disciplines in neurosurgery in China. There is a strong foundation in scientific research, with 12 basic research laboratories, 1 key laboratory of the Ministry of Education and an international first-class stem cell sorting and living cell structure observation platform.

Keywords: Diffusion Tensor Imaging; Intraoperative Subcortical Stimulation; Meta Analysis.

Contributions of each author:

Author 1 - Yiming Li.

Email: liyimingwin68@163.com

Author 2 - Jiahe Guo.

Email: guojiahe@tmu.edu.cn