INPLASY PROTOCOL

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None declared.

Endovascular Treatment for Acute Basilar Occlusion: A Systematic Review and Meta-Analysis

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Review question / Objective: **We plan to conduct a systematic review and meta-analysis to compare effectiveness and safety of EVT (endovascular treatment) and SMT (standard medical treatment) for acute basilar artery occlusion, to help clinicians to select the optimal treatment for acute BAO patients. SMT includes intravenous thrombolysis (IVT) with recombinant tissue plasminogen activator (rt-PA) or urokinase, systematic anti-coagulation, antiplatelet medications, or combinations of above medical treatments. SMT-plus-endovascular thrombectomy (EVT) includes mechanical thrombectomy (MT) with stent retriever (SR) and/or thromboaspiration, stenting, intra-arterial thrombolysis, balloon angioplasty, or combinations of any of above approaches.**
Information sources: **Literature search will be performed by two independent reviewers using the following databases, EMBASE, MEDLINE, Web of Science, and the Cochrane Library. The secondary source of potentially relevant material will be a search of the grey or difficult to locate literature, including clinical trials registers (such as ClinicalTrials.gov). Keywords and additional free-text terms from MeSH Glossary.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 15 November 2022 and was last updated on 15 November 2022 (registration number INPLASY2022110067).

INTRODUCTION

Review question / Objective: **We plan to conduct a systematic review and meta-analysis to compare effectiveness and safety of EVT (endovascular treatment) and SMT (standard medical treatment) for acute basilar artery occlusion, to help clinicians to select the optimal treatment for acute BAO patients. SMT includes intravenous thrombolysis (IVT) with recombinant tissue plasminogen activator (rt-PA) or urokinase,**

systematic anti-coagulation, antiplatelet medications, or combinations of above medical treatments. SMT-plus-endovascular thrombectomy (EVT) includes mechanical thrombectomy (MT) with stent retriever (SR) and/or thromboaspiration, stenting, intra-arterial thrombolysis, balloon angioplasty, or combinations of any of above approaches.

Condition being studied: Previous randomised trials have shown an overwhelming benefit of mechanical thrombectomy for treating patients with stroke caused by large vessel occlusion of the anterior circulation. Whether endovascular treatment is beneficial for vertebrobasilar artery occlusion remains unknown. In this study, we aimed to investigate the safety and efficacy of endovascular treatment of acute strokes due to vertebrobasilar artery occlusion.SMT includes intravenous thrombolysis (IVT) with recombinant tissue plasminogen activator (rt-PA) or urokinase, systematic anti-coagulation, antiplatelet medications, or combinations of above medical treatments. SMT-plus-endovascular thrombectomy (EVT) includes mechanical thrombectomy (MT) with stent retriever (SR) and/or thromboaspiration, stenting, intra-arterial thrombolysis, balloon angioplasty, or combinations of any of above approaches.

METHODS

Search strategy: Literature search will be performed by two independent reviewers using the following databases, EMBASE, MEDLINE, Web of Science, and the Cochrane Library. The secondary source of potentially relevant material will be a search of the grey or difficult to locate literature, including clinical trials registers (such as ClinicalTrials.gov). Keywords and additional free-text terms from MeSH Glossary for the concepts of "Basilar Artery occlusion", "Posterior circulation ", "vertebrobasilar occlusion", "Cerebral Infarction", "Ischemic Stroke", "Thrombectomy ", "Endovascular treatment", "Aspiration Thrombectomy " will be used to include all possible eligible studies. Searches will be restricted to studies published in English before November 1, 2022.

Participant or population: Patients aged 18 years or older and with acute ischemic stroke caused by BAO or no flow to the basilar artery (eg, functional basilar artery occlusion) due to occlusion of the distal intracranial vertebral artery (V4 segment) will be included. Arterial occlusion is confirmed by computed tomographic angiography, magnetic resonance angiography, or digital subtraction angiography.The included sample size was more than 10 people.

Intervention: The intervention will be endovascular therapy, or bridging therapy, including stent retrieval and/or thrombus aspiration mechanical thrombectomy, stent implantation, intra-arterial thrombolysis, balloon angioplasty, or a combination of any of the above. EVT should be initiated within 24 hours of the estimated BAO time.

Comparator: Controls will be best treated with medications, or SMT alone, including recombinant tissue plasminogen activator (rt-PA) or urokinase intravenous thrombolysis (IVT), systemic anticoagulants, antiplatelet agents, or a combination of the above. Intravenous rt-PA was initiated within 4.5 hours of the estimated time of BAO, or intravenous urokinase was administered within 6 hours.

Study designs to be included: Randomized controlled trials, retrospective studies, prospective registries.

Eligibility criteria: Determine the criteria for acute vertebral artery occlusion in accordance with domestic and foreign cerebrovascular disease guidelines, and determine the relevant endovascular treatment or the best drug treatment criteria.

Information sources: Literature search will be performed by two independent

reviewers using the following databases, EMBASE, MEDLINE, Web of Science, and the Cochrane Library. The secondary source of potentially relevant material will be a search of the grey or difficult to locate literature, including clinical trials registers (such as ClinicalTrials.gov). Keywords and additional free-text terms from MeSH Glossary.

Main outcome(s): Effectiveness: Primary effectiveness outcome: good clinical outcome of mRS 0-3 at 90 days. Safety: The primary safety outcome was mortality at 90 days.

Additional outcome(s): Effectiveness: Secondary effectiveness outcome: successful recanalization of modified Thrombolysis In Cerebral Infarction scale (mTICI) 2b-3 within 24 h after intervention. Safety: The secondary safety outcomes include symptomatic intracranial hemorrhage (sICH) and Complication of operation. The definition of sICH is intracranial hemorrhage on imaging and an increase of 4 or more points on the NIHSS within 24 h after intervention.

Quality assessment / Risk of bias analysis: First, two examiners will independently sift through all the results and screen out eligible studies. Titles, keywords, and abstracts are screened, then irrelevant studies are excluded. Secondly, we will obtain the full text of the remaining research. The examiners will then peruse the studies to assess eligibility for inclusion. In this step, the reasons for all excluded studies will be documented. When disagreements arise, they will be resolved by consensus or by a third party reviewer. When multiple articles are based on data from the same trial, we will select the most recent study or the study with the largest sample size. The data will be extracted independently by two reviewers according to a standardized data extraction form. The extracted data included the following information :Study characteristics, such as study type, author, year of publication, sample size, and number of patients. Patient characteristics, such as mean age, sex, medical history, occlusive site, baseline NIHSS score, and baseline pc-ASPECTS. Intervention characteristics, such as types of endovascular therapy and drug therapy. Primary and secondary outcomes. If the included study data is unclear or missing, the authors will be contacted. Each included study will be independently assessed for risk of bias by two reviewers. For randomized controlled trials, we will use the Cochrane collaboration standard. The Newcastle-Ottawa scale will be used for prospective enrollment studies and retrospective studies. Each area included in the study will be given a score based on risk of bias (low, unclear, or high). When the heterogeneity was large, subgroup analysis, sensitivity analysis, meta-regression analysis, or random effects model was used.

Strategy of data synthesis: As most of the outcomes are dichotomous data, relative risk (RR) with 95% CIs will be used to present the measure of treatment effect. For continuous data, the mean differences with 95% CIs will be used. A meta-analysis will be performed if there is sufficient effect size. On condition that there is insufficient data, a meta-analysis is not doable to conduct, and a solely narrative presentation of study results will be provided. The RevMan 5.4 of the Cochrane Collaboration will be used to analyze all data.

Subgroup analysis: If there is significant heterogeneity and sufficient inclusion trials, subgroup analyses will be performed to examine possible sources of heterogeneity, which may include: different study sites, patient characteristics, and different endovascular treatments. For studies with a higher risk of overall bias, a sensitivity analysis will also be performed to assess the effect of exclusion.

Sensitivity analysis: Sensitivity analyses were performed sequentially omitting one study and performing sensitivity analyses to verify the effect of the combined observations.

Country(ies) involved: China.

Keywords: Basilar Occlusion, Endovascular Treatment, Systematic Review, Meta-Analysis.

Contributions of each author:

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