INPLASY

Impact of stroke imaging selection modality on endovascular thrombectomy outcomes in the early and extended time windows: A meta-analysis

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ADMINISTRATIVE INFORMATION

Support - No.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 08 July 2023 and was last updated on 08 July 2023.

INTRODUCTION

Review question / Objective Patients: Individuals with AIS-LVO. Intervention: AIS-LVO patients treated with mechanical thrombectomy. Comparison of: advanced imaging (MRI and/or CTP) vs basic imaging (CT and/or CT angiography). Outcomes: Outcome variables including functional independence (defined as an mRS score of 0-2), mortality, successful reperfusion (defined as a Thrombolysis in Cerebral Infarction [TICI] score of 2b-3), and spontaneous intracerebral hemorrhage (sICH).

Rationale This study aimed to compare post-EVT outcomes between patients with AIS-LVO selected using basic imaging (computed tomography with or without computed tomography angiography) and advanced imaging (computed tomography perfusion or magnetic resonance imaging) in early and late time windows.

Condition being studied We analyzed 12 non-randomized observational studies, comprising 19,694 patients. In the early time windows, compared with basic imaging, advanced imaging had a higher likelihood of functional independence (OR, 1.24, 95% CI, 1.06–1.46) and lower risk of mortality (OR, 0.74 95% CI, 0.62–0.88). In the extended time window, the group that received advanced imaging techniques had a lower mortality rate (OR, 0.79, 95% CI, 0.68-0.86). Regardless of the time of onset, there were no significant differences between the two groups in terms of sICH or successful reperfusion.

METHODS

Search strategy A combination of keywords and/or medical subject headings (MeSH) terms were used, including: "ischemic stroke" , "large vessel occlusion", "CTP", "MRI", " CT angiography", "NCCT", "mechanical thrombectomy," and others (full search strategy can be found in Supplementary Materials 2).

Participant or population Individuals with AIS-LVO.

Intervention AIS-LVO patients treated with mechanical thrombectomy.

Comparator Advanced imaging (MRI and/or CTP) vs basic imaging (CT and/or CT angiography).

Study designs to be included Prospective study and Retrospective study.

Eligibility criteria English texts that compared studies that met the following PICO criteria (Patient, Intervention, Comparator, and Outcome) were considered to meet the inclusion criteria.Patients: Individuals with AIS-LVO.Intervention: AIS-LVO patients treated with mechanical thrombectomy.Comparison of: advanced imaging (MRI and/or CTP) vs basic imaging (CT and/or CT angiography).Outcomes: Outcome variables including functional independence (defined as an mRS score of 0-2), mortality, successful reperfusion (defined as a Thrombolysis in Cerebral Infarction [TICI] score of 2b-3), and spontaneous intracerebral hemorrhage (sICH).Studies that did not meet the inclusion criteria, including study types such as case reports, reviews, letters, and meta-analyses, were excluded.

Information sources PubMed, Embase, and the Cochrane Library.

Main outcome(s) Outcome variables including functional independence (defined as an mRS score of 0-2), mortality, successful reperfusion (defined as a Thrombolysis in Cerebral Infarction [TICI] score of 2b-3), and spontaneous intracerebral hemorrhage (sICH).

Data management All statistical analyses were conducted using the Reviewer Manager (RevMan v.4.3) software.

Quality assessment / Risk of bias analysis Each study was assessed for the risk of bias by two independent reviewers using the Newcastle-Ottawa scale [17] in a critical manner. All studies were scored based on selection, comparability, and outcomes. Higher scores indicated a higher study quality. Generally, a Newcastle-Ottawa Scale score of 7 or above is considered high-quality. Any discrepancies between the reviewers were resolved through discussion, with the occasional involvement of a third reviewer as an arbitrator.

Strategy of data synthesis Patients with AIS-LVO were categorized according to baseline imaging modality (basic vs advanced) and treatment time window (0-6 hours versus 6-24 hours from the last known well to puncture). We employed a method for measuring the effect size by calculating odds ratios (ORs) and standardized mean differences along with their corresponding 95% confidence intervals (CIs). We conducted a meta-analysis using a random-effects model that considers heterogeneity within and between studies, while assuming that true effect sizes vary across studies. To evaluate the degree of heterogeneity, we employed the I-squared index and considered heterogeneity significant when I-squared exceeded 50% [18]. Funnel plots were used to assess publication bias.

Subgroup analysis Early time windows clinical outcomes, Extended time windows clinical outcomes.

Sensitivity analysis Not applicable.

Language restriction Without any language restrictions.

Country(ies) involved China - Department of Neurosurgery, Clinical Medical College of Yangzhou University, Yangzhou 225009, Jiangsu, China.

Keywords ischemic stroke; thrombectomy; neuroimaging; perfusion imaging; treatment outcome; meta-analysis.

Contributions of each author

Author 1 - Jiwei Wu collected and analyzed the data and wrote the paper; Jiwei Wu analyzed the data; Jiwei Wu conceived and designed this study, analyzed the data, and wrote the paper.
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