INPLASY

Functional Outcomes of Decompressive Hemicraniectomy in older adults With Malignant Large Hemispheric Infarction: A Single-Arm Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Data extraction.

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 4 April 2026 and was last updated on 4 April 2026.

INTRODUCTION

Review question / Objective The aim of this study was to comprehensively characterize the outcome profile of decompressive hemicraniectomy in elderly patients with malignant large hemispheric infarction through a single-arm systematic review and meta-analysis, with particular emphasis on the balance between survival and functional recovery. We further aimed to identify key prognostic factors associated with poor outcomes through subgroup analyses.

Condition being studied Malignant large hemispheric infarction (mLHI) in elderly patients, typically defined as acute ischemic stroke involving a large portion of the middle cerebral artery territory, characterized by space-occupying cerebral edema and a high risk of mortality. This condition is commonly associated with severe neurological deficits and poor functional outcomes, particularly in older adults.

METHODS

Participant or population Patients over 60 years old with large-area cerebral infarction who need decompressive craniectomy.

Intervention Decompressive craniectomy.

Comparator No direct comparator. This study is designed as a single-arm meta-analysis evaluating outcomes in patients undergoing decompressive hemicraniectomy.

Study designs to be included We will include randomized controlled trials, prospective and retrospective cohort studies, and case series that report outcomes of decompressive hemicraniectomy in elderly patients with malignant large hemispheric infarction.

Eligibility criteria Inclusion criteria (PICOS)

P: Study subjects: Patients over 60 years old diagnosed with large-area cerebral infarction and presenting with cerebral edema.
I: Intervention: Decompressive craniectomy.
O: Outcome measures: Good outcome (mRS score 0-3), poor outcome (mRS score 4-6), and mortality.
C: Control measures: This study is a meta-analysis of single-arm trials, so there are no control trials.
S: Study types: Prospective clinical trials, retrospective cohort studies, and real-world evidence studies.
Exclusion criteria: 1) case reports 2) animal trials, and 3) articles for which full text could not be obtained, data could not be extracted, or data were missing.

Information sources We will systematically search the following electronic databases: PubMed, Embase, Web of Science, and the Cochrane Library. In addition, the reference lists of included studies and relevant reviews will be manually screened to identify additional eligible studies.

Main outcome(s) Outcome measures; Good outcome at 3 months (mRS ≤ 3), good outcome at 6 months (mRS ≤ 3); Poor outcome at 3 months (mRS > 3), poor outcome at 6 months (mRS > 3).Safety outcome: Mortality rate.

Quality assessment / Risk of bias analysis The methodological quality of the included studies was evaluated using the JBI case series research quality assessment tool。The publication bias was assessed using funnel plot and Egger's test. The funnel plot appeared to be generally symmetrical, and Egger's test did not indicate significant publication bias.

Strategy of data synthesis The meta-analysis of single-arm studies was conducted using the proportion pooling method. For binary outcome measures, the original rates were first subjected to an appropriate variance-stabilizing transformation (Freeman–Tukey double arcsine transformation), and then the pooled effect size and its 95% confidence interval were calculated. Inter-study heterogeneity was assessed using the I^2 statistic. A random-effects model (DerSimonian–Laird method) was used when $I^2 > 50\%$ or $P < 0.10$; otherwise, a fixed-effects model was applied. To explore the sources of heterogeneity, subgroup analysis or sensitivity analysis could be further conducted. If the number of studies included in the subgroup analysis was small, descriptive analysis was performed instead. Publication bias was evaluated through funnel plots and Egger's test, and sensitivity analysis was conducted using the leave-one-out method. All statistical analyses were typically performed in Stata software, and a two-sided test with $P < 0.05$ was considered statistically significant.

Subgroup analysis Combined infarction, arterial thrombectomy, poor preoperative GCS/NHIS score.

Sensitivity analysis Conduct sensitivity analysis using the one-by-one elimination method.

Country(ies) involved China.

Keywords Brain Infarction; Hemicraniectomy; Aged; Treatment Outcome; Mortality; Disability; Meta-Analysis.

Contributions of each author

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