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Frailty and Outcomes After Left Atrial Appendage Closure: A Systematic Review and Meta-analysis

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Citation

Hamzah Pratama Megantara, Naura Anjanie. Frailty and Outcomes After Left Atrial Appendage Closure: A Systematic Review and Meta-analysis. PROSPERO 2026 CRD420261360553. Available from https://www.crd.york.ac.uk/PROSPERO/view/CRD420261360553.

REVIEW TITLE AND BASIC DETAILS

Review title

Frailty and Outcomes After Left Atrial Appendage Closure: A Systematic Review and Meta-analysis

Condition or domain being studied

Atrial Fibrillation; Left atrial appendage closure; Frailty

Adults with atrial fibrillation undergoing percutaneous left atrial appendage closure or occlusion, with frailty assessed as a prognostic exposure for adverse clinical outcomes after the procedure.

Rationale for the review

Percutaneous left atrial appendage closure is increasingly used for stroke prevention in older patients with atrial fibrillation who are poor candidates for long term oral anticoagulation. Many of these patients are medically complex and may be frail, but frailty is not consistently incorporated into routine preprocedural risk assessment. Several recent registry based, claims based, electronic health record, and prospective studies have examined the association between frailty and outcomes after left atrial appendage closure, using different frailty instruments and reporting varying endpoints. However, the magnitude and consistency of these associations across clinically important outcomes remain uncertain. This review is being conducted to systematically synthesize the available evidence on whether frailty is associated with mortality, rehospitalization, cerebrovascular events, bleeding, and procedure related

complications after left atrial appendage closure, and to clarify the potential value of frailty assessment for risk stratification, patient counselling, and postprocedural care planning.

Review objectives

To systematically review and meta-analyze the available evidence on the association between frailty and clinical outcomes after percutaneous left atrial appendage closure in adults. Specifically, the review will evaluate whether frailty is associated with higher all-cause mortality, major adverse cardiovascular events, rehospitalization, ischemic stroke, transient ischemic attack, bleeding events, and vascular or procedure related complications compared with non-frail status.

Keywords

Prognosis; Mortality; Rehospitalization; Bleeding; Stroke

Country

Indonesia

ELIGIBILITY CRITERIA

Population

Included

Adults undergoing percutaneous left atrial appendage closure or occlusion, typically for stroke prevention in the setting of atrial fibrillation. Eligible studies must assess frailty before or at the index procedure and report at least one clinical outcome according to frailty status or frailty category.

Excluded

Pediatric populations, nonhuman studies, patients not undergoing percutaneous left atrial appendage closure or occlusion, non-LAAC structural heart intervention populations, and reports that do not distinguish outcomes according to frailty exposure.

Intervention(s) or exposure(s)

Included

Frail Elderly Assessment; Left atrial appendage closure

The exposure of interest is frailty as assessed before or at the time of percutaneous left atrial appendage closure. Frailty will be accepted as defined by each study, including claims-based, diagnosis-based, registry-based, or bedside frailty instruments such as the Hospital Frailty Risk Score, Kim claims-based frailty index, Johns Hopkins frailty-defining diagnoses, Essential Frailty Toolset, or similar validated or study-defined frailty measures.

Excluded

Studies that do not assess frailty before or at the index left atrial appendage closure procedure, do not define frailty clearly, or do not report outcomes according to frailty status or category will be excluded.

Comparator(s) or control(s)

Included
PICO tags selected: Frail Elderly Assessment

Study design

Only nonrandomized study types will be included.

Included
Observational studies, including retrospective or prospective cohort studies, registry analyses, administrative claims studies, and electronic health record based studies evaluating outcomes after percutaneous left atrial appendage closure according to frailty status. Both comparative adjusted analyses and studies providing extractable event data will be eligible.

Excluded
Randomized trials not reporting frailty-based comparisons, case reports, case series without comparative frailty data, conference abstracts without usable data, reviews, editorials, and overlapping publications lacking extractable outcome-specific information.

Context

The review will include studies of adult patients undergoing percutaneous left atrial appendage closure or occlusion in routine clinical practice across administrative claims databases, national registries, electronic health record networks, and prospective multicenter cohorts. No geographic restriction is planned. Studies will be eligible provided frailty is assessed before or at the index procedure and clinical outcomes are reported according to frailty status.

TIMELINE OF THE REVIEW

Date of first submission to PROSPERO

10 April 2026

Review timeline

Start date: 11 March 2026. End date: 10 May 2026.

Date of registration in PROSPERO

11 April 2026

AVAILABILITY OF FULL PROTOCOL

Availability of full protocol

A full protocol has been written and uploaded to PROSPERO. The protocol may be accessed through this link https://www.crd.york.ac.uk/PROSPEROFILES/19a7c3cdfc854a7ab1b08f023cb74232.pdf.

SEARCHING AND SCREENING

Search for unpublished studies
Both published and unpublished studies will be sought.

Main sources that will be searched
The main databases to be searched are *CENTRAL - Cochrane Central Register of Controlled Trials*, *CINAHL - Cumulative Index to Nursing and Allied Health Literature*, *Embase - Embase via Ovid*, *Embase.com*, *MEDLINE*, *PubMed* and *Scopus*.

Search language restrictions
There are no language restrictions.

Search date restrictions
There are no search date restrictions.

Other methods of identifying studies
Other studies will be identified by: *contacting authors or experts*, *looking through all the articles that cite the papers included in the review ("snowballing" or forward citation searching)*, *reference list checking (backward citation searching)*, *searching conference proceedings*, *searching dissertation and thesis databases* and *searching trial or study registers*.

Link to search strategy
A full search strategy has been uploaded to PROSPERO. The PDF may be accessed through this link https://www.crd.york.ac.uk/PROSPEROFILES/8d66468110856975ad96e1e9fbf79ae7.pdf.

Selection process
Studies will be screened independently by at least two people (or person/machine combination) with a process to resolve differences.

Other relevant information about searching and screening
None

DATA COLLECTION PROCESS

Data extraction from published articles and reports
Data will be extracted independently by at least two people (or person/machine combination) with a process to resolve differences.

Authors will be asked to provide any required data not available in published reports.

Study risk of bias or quality assessment
Risk of bias will be assessed using: *Newcastle-Ottawa*

Data will be assessed independently by at least two people (or person/machine combination) with a process to resolve differences.

Additional information will be sought from study investigators if required information is unclear or unavailable in the study publications/reports.

Reporting bias assessment

Reporting bias will be assessed qualitatively by comparing study methods, prespecified outcomes, and reported results where available. Funnel plot asymmetry and Egger's test will be considered only if at least 10 studies contribute to a meta-analysis; otherwise, reporting bias will be discussed narratively.

Certainty assessment

The certainty of evidence for each important outcome will be assessed using the GRADE approach. Certainty will be judged across risk of bias, inconsistency, indirectness, imprecision, and publication bias. Because the review is expected to include observational studies, certainty will generally start at low and may be downgraded or, where appropriate, upgraded based on factors such as large effect size, consistency, and dose-response pattern. The overall certainty for each main outcome will be rated as high, moderate, low, or very low.

OUTCOMES TO BE ANALYSED

Main outcomes

The main outcome is all-cause mortality after percutaneous left atrial appendage closure in frail versus non-frail patients. Mortality will be accepted as defined and reported by each included study, including in-hospital, 30-day, 45-day, 1-year, or longer follow-up mortality. Outcome data may be derived from hospital records, administrative claims, registry follow-up, electronic health records, or prospective cohort follow-up. For synthesis, the principal effect measure will be odds ratio with 95% confidence interval. Published adjusted relative effect estimates will be preferred where available and harmonised for pooled analysis.

Additional outcomes

Additional outcomes will include major adverse cardiovascular events, rehospitalization or readmission, ischemic stroke, transient ischemic attack, bleeding events, vascular or procedure-related complications, and pericardial complications after percutaneous left atrial appendage closure. Outcomes will be accepted as defined by each included study and measured at the follow-up time points reported in each study, including in-hospital, short-term, and longer-term follow-up. Data may be obtained from registry data, claims data, hospital records, electronic health records, or prospective follow-up. For synthesis, effect estimates will be expressed primarily as odds ratios with 95% confidence intervals, with adjusted estimates preferred where available.

PLANNED DATA SYNTHESIS

Strategy for data synthesis

Data will be combined using quantitative meta-analysis when at least two studies are sufficiently similar in population, frailty definition, outcome definition, and follow-up period. Study-level effect estimates will be log-transformed and pooled using inverse-variance meta-analysis. Because included studies may report adjusted odds ratios, hazard ratios, or other relative effect

measures, published adjusted estimates will be preferred and harmonised on a common log effect scale, with pooled results presented as odds ratios for consistency of reporting. Random-effects models will be used when heterogeneity is substantial, and fixed-effect models will be used when heterogeneity is low. Statistical heterogeneity will be assessed using the I^2 statistic and Cochran's Q test. Where clinical or methodological heterogeneity is too great to justify pooling, findings will be synthesised narratively. Potential cohort overlap across related publications will be considered cautiously in interpretation.

CURRENT REVIEW STAGE

Stage of the review at this submission

Review stage	Started	Completed
Pilot work	✓	✓
Formal searching/study identification	✓	✓
Screening search results against inclusion criteria	✓	✓
Data extraction or receipt of IPD		
Risk of bias/quality assessment		
Data synthesis		

Review status
The review is currently planned or ongoing.

Publication of review results
Results of the review will be published in English.

REVIEW AFFILIATION, FUNDING AND PEER REVIEW

Review team members
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No conflict of interest declared.

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No conflict of interest declared.

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Funding source
Review has no funding and no agreed support from an academic institution and is done in authors' own time.

Peer review
There has been no peer review of this planned review.

ADDITIONAL INFORMATION

Review conflict of interest
Declared individual interests are recorded under team member details.. No additional interests are recorded for this review.

Medical Subject Headings
Adult; Atrial Fibrillation; Classification; Frailty; Hospitals; Humans; Ischemic Attack, Transient; Ischemic Stroke; Left Atrial Appendage Closure; Patient Readmission; Prognosis; Registries; Risk Factors

SIMILAR REVIEWS

Check for similar records already in PROSPERO
PROSPERO identified a number of existing PROSPERO records that were similar to this one (last check made on 5 April 2026). These are shown below along with the reasons given by that the review team for the reviews being different and/or proceeding.

- Impact of Frailty on Outcomes After Catheter Ablation for Atrial Fibrillation: A Systematic Review and Meta-Analysis [published 24 March 2026] [CRD420261334081]. The review was judged **not to be similar**
- Effect of frailty on the clinical effectiveness of seasonal influenza vaccination in older adults: a systematic review [published 18 February 2026] [CRD420251153863]. The review was judged **not to be similar**
- Frailty and survival of patients with renal cell carcinoma: a meta-analysis [published 20 May 2025] [CRD420251056657]. The review was judged **not to be similar**

PROSPERO version history

- Version 1.0, published 11 Apr 2026

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