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Risk Factors for Postoperative Neurocognitive Disorders in Older Patients Undergoing Non-Cardiac, Non-Neurosurgical Procedures: A PRISMA-ScR Scoping Review

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Postoperative neurocog...



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We use this protocol and it's working

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Keywords: postoperative neurocognitive disorder, risk factors by perioperative timing, term cognitive dysfunction, cognitive dysfunction, including delirium, undergoing surgery, perioperative timing, pnds in patient, common in older adult, surgical context, significant morbidity, reported risk factor, examining patient

Abstract

Background:

Postoperative neurocognitive disorders (PNDs), including delirium and longer-term cognitive dysfunction, are common in older adults undergoing surgery and are associated with significant morbidity. Numerous risk factors have been described in the literature, but there is a lack of synthesis regarding their nature, categorisation, and study methods. A comprehensive mapping is needed to inform clinical practice and future research.

Objective:

This protocol outlines the methodology for a scoping review aiming to map the extent, nature, and characteristics of published literature on risk factors for PNDs in patients aged 65 years and older undergoing surgery. Secondary objectives include categorising risk factors by perioperative timing, describing study populations and surgical contexts, identifying the definitions and diagnostic tools used, and highlighting research gaps.

Methods:

This scoping review will follow the PRISMA-ScR guidelines. A comprehensive literature search will be conducted in the MEDLINE database for studies published since 1 January 2000, without language restriction. Eligible sources will include prospective and retrospective observational studies, randomised controlled trials, and systematic or narrative reviews, examining patients aged ≥ 65 years who have undergone non-cardiac, non-neurosurgical, and non-carotid surgery. Two reviewers will independently screen titles, abstracts, and full texts for inclusion. Data extraction will capture patient and study characteristics, surgical context, types and definitions of PNDs, risk factors evaluated, and main findings. Quality appraisal will be performed for informational purposes using the Newcastle-Ottawa Scale and other appropriate risk of bias tools, depending on study design. Results will be presented through numerical, tabular, and narrative synthesis.

Expected Outcomes:

This review will provide a comprehensive mapping of reported risk factors for PNDs in older adults, identify heterogeneity in definitions, measurement tools, and study contexts, and reveal key gaps in current research. Findings will inform clinicians and guide future investigations in this important area.

Registration:

This protocol will be registered and made publicly available via **Protocols.io**.

Guidelines

This scoping review will be conducted in accordance with the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) guidelines.

Objectives

- 1 Primary Objective
 - 1.1 The primary objective of this scoping review is to map the extent, nature, and characteristics of the scientific literature regarding risk factors associated with the development of postoperative neurocognitive disorders (PNDs) in older patients.
- 2 Secondary Objectives
 - 2.1 To identify and categorise risk factors studied in the literature, grouping them according to the preoperative, intraoperative, and postoperative periods.
 - 2.2 To describe the characteristics of the populations studied (e.g., age, comorbidities), surgical contexts (type, duration), and the types of PNDs evaluated (e.g., delirium, delayed neurocognitive disorder).
 - 2.3 To compile the various operational definitions and diagnostic tools used to define PNDs (e.g., CAM, 4AT, DSM-5).
 - 2.4 To identify research gaps (e.g., under-studied risk factors, under-represented populations) and offer recommendations for future research.

Eligibility Criteria

- 3 Inclusion Criteria
 - 3.1 Population: Studies on adult patients aged ≥ 65 years undergoing any surgical procedure. Studies exclusively involving cardiac, neurosurgical, or carotid surgery will be excluded.
 - 3.2 Concept: Studies evaluating at least one risk factor, or reporting an association, with the occurrence of a postoperative neurocognitive disorder.
 - 3.3 Context: All types of original clinical publications (prospective or retrospective observational studies, clinical trials), as well as reviews (systematic, narrative, scoping).
 - 3.4 Time period: Publications from 1 January 2000 to the present.

3.5 Language: No language restrictions will be applied.

4 Exclusion Criteria

4.1 Studies not pertinent to the research question (e.g., purely pathophysiological studies or animal models).

4.2 Editorials, commentaries, letters, or conference abstracts lacking sufficient original data.

4.3 Studies focusing on surgical procedures that are overly specific and likely to directly affect PND outcomes (i.e., neurosurgery, cardiac surgery, carotid surgery).

Literature Search Strategy

5 A systematic literature search will be conducted solely in PubMed (MEDLINE). The search strategy will combine controlled vocabulary (MeSH terms) and free-text keywords ([tiab]) to cover three main concepts and to exclude highly specific surgeries:

6 Older population

7 Postoperative neurocognitive disorders

8 Surgical context NOT: cardiac and neurosurgical procedures

- 9 The exact search string to be used is: (("Aged"[Mesh] OR "Aged, 80 and over"[Mesh] OR aged[tiab] OR elderly[tiab] OR "older adult*"[tiab]) AND ("Surgical Procedures, Operative"[Mesh] OR postoperative[tiab] OR perioperative[tiab])) AND ("Delirium"[Mesh] OR "Postoperative Cognitive Complications"[Mesh] OR delirium[tiab] OR "postoperative cognitive dysfunction"[tiab] OR POCD[tiab] OR "postoperative neurocognitive disorder*" [tiab] OR PND[tiab]) AND ("Risk Factors"[Mesh] OR "Risk"[Mesh:NoExp] OR risk factor* [tiab] OR predictor*[tiab] OR determinant*[tiab] OR association[tiab] OR incidence[tiab]) NOT ("Cardiac Surgical Procedures"[Mesh] OR "Neurosurgical Procedures"[Mesh] OR "cardiac surg*" [tiab] OR "heart surg*" [tiab] OR neurosurg*[tiab] OR "brain surg*" [tiab] OR carotid[tiab])
- 10 The reference lists of identified relevant reviews will also be manually screened to identify any additional studies (snowball method).

Study Selection

- 11 The study selection process will be carried out independently by two reviewers.
- 12 Phase 1: Screening of titles and abstracts. Titles and abstracts will be screened according to the eligibility criteria.
- 13 Phase 2: Full-text assessment. Full-text articles identified as potentially relevant will be reviewed to confirm final inclusion.
- 14 Any disagreement between the two reviewers will be resolved by discussion. If consensus is not achieved, a third reviewer will be consulted. The selection process will be documented and presented in a PRISMA-ScR flow diagram.

Data Extraction

- 15 A standardised and piloted data extraction form will be used. The following data will be collected from included studies:
- 16 General information: Author(s), year of publication, country, study design.
- 17 Population characteristics: Number of patients, mean/median age, gender, key comorbidities, ASA score.
- 18 Contextual characteristics: Type of surgery, type of anaesthesia.

- 19 Concept characteristics:
- 20 Type of PND studied (delirium, POCD, etc.)
- 21 Diagnostic criteria and tool used (e.g., CAM, 3D-CAM, MoCA)
- 22 List of risk factors evaluated
- 23 Main conclusions regarding associations between risk factors and PNDs

Methodological Quality Appraisal

- 24 As is standard for scoping reviews, the primary aim is to map the available literature without excluding studies based on methodological quality. However, to contextualise the findings, methodological quality will be appraised descriptively by two reviewers, using the following tools tailored to study designs:
- 25 Cohort and case-control studies: Newcastle-Ottawa Scale (NOS)
- 26 Cross-sectional studies: Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Studies
- 27 Randomised controlled trials: Cochrane Risk of Bias (RoB 2) tool
- 28 Qualitative studies: Critical Appraisal Skills Programme (CASP) checklist
- 29 Systematic reviews: AMSTAR 2

- 30 Results of this appraisal will be presented in summary form but will not be used as an exclusion criterion.

Data Synthesis and Presentation

- 31 The data extracted will not be subjected to statistical meta-analysis. The results will be presented as follows:
- 32 Numerical synthesis: A quantitative description of study characteristics (e.g., number of studies per year, per country, per surgical type).
- 33 Visual presentation: A PRISMA-ScR flowchart illustrating the study selection process.
- 34 Thematic and narrative synthesis: Results will be organised and summarised in tables ("charts") categorising risk factors (demographic, clinical, perioperative, etc.). A narrative analysis will accompany these charts to describe current knowledge, highlight the most frequently studied risk factors, and identify major gaps in the literature, following the objectives of this scoping review.

Protocol Registration

- 35 This protocol has been prepared in accordance with PRISMA-ScR recommendations to ensure transparency and methodological rigour. It will be registered and publicly accessible via protocols.io.