BMJ Open Prevalence of spontaneous recanalisation of complete internal carotid occlusion: protocol for a systematic scoping review

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ABSTRACT

Introduction Although previously thought to be a rare occurrence, spontaneous recanalisation is not uncommon, with a growing number of reports describing this phenomenon. However, the frequency, time course and mechanism of spontaneous recanalisation remain unknown. A better characterisation of these events is essential to ensuring adequate identification and proper future trial design for treatment.

Objective To describe the current body of literature around spontaneous recanalisation following internal carotid occlusion.

Methods and analysis With the assistance of an information specialist, we will search MEDLINE, Embase, Cochrane Central Register for Controlled Trials and Web of Science for studies of adults with spontaneous recanalisation or transient occlusion of the internal carotid artery. Two reviewers will independently collect data on included studies pertaining to publication data, study population information, timepoints of initial presentation, recanalisation and subsequent follow-up.

Ethics and dissemination Primary data will not be collected; therefore, formal ethics is not required. The findings of this study will be disseminated through peer-reviewed publications and presentations at academic conferences.

INTRODUCTION

Stroke is a leading cause of morbidity and mortality in Canada, and extracranial internal carotid artery (ICA) stenosis is a major risk factor.1 Patients who have experienced a minor stroke or transient ischemic attack (TIA) and are found to have stenosis of the ipsilateral ICA are at high risk of stroke, with some estimates suggesting up to 20% may have a major stroke within 30 days if left untreated. The identification of 50%–99% stenosis in a recently symptomatic patient is indication for urgent intervention in the form of carotid endarterectomy or stenting.2 It is thought that once the artery is occluded (ie, 100% stenosis), the possibility of further embolisation is very low.3 However, spontaneous recanalisation of a previously occluded ICA may reintroduce the risk of artery-to-artery embolisation and may lead to further ischaemic strokes or TIsAs.4

Indeed, there is evidence for spontaneous recanalisation of completely occluded internal carotids.5,6 However, the majority of these data are published as case series or individual case reports, with an unclear overall incidence and timeline of recanalisation.

The primary objective of our study is to perform a scoping review to describe the current body of literature describing spontaneous recanalisation following internal carotid occlusion. Our secondary objectives are to capture the imaging modalities used to measure recanalisation, the time course and natural history of recanalisation (including risk and timing of ischaemic recurrences), pre-recanalisation and post-recanalisation medical treatment, and to determine if the existing data will allow for a subsequent meta-analysis in order to estimate the prevalence of recanalisation.

METHODS AND ANALYSIS

Study registration

This study will be conducted based on the guidelines of the Joanna Briggs Institute.
(JBI) Methodology for Scoping Reviews. The findings of this study will be reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension Statement for Reporting of Scoping Reviews. This protocol will be reported, using PRISMA-Protocols and JBI guidelines.

Inclusion/exclusion criteria
Eligibility criteria were established using the population, concept and context framework. Studies will be selected according to the following criteria.

Participants
We will include prospective observational, interventional cohort studies and case reports/series of adult patients (≥18 years of age) presenting with transient or spontaneously recanalising occlusion of the ICA. We will exclude studies where a surgical or endovascular intervention involving the carotid was performed.

Concept
We are capturing in this scoping review all papers reporting on spontaneous recanalisation of the ICAs with the ultimate goal of determining if there are sufficient existing data to estimate the prevalence of these events. We will include all prospective observational, interventional studies and case reports/series that clearly document the presence of a recanalisation event in the ICA.

Context
There is no restriction on healthcare locations, although we expect most studies will involve patients who were treated in an emergency room, intensive care unit or neurological/neurosurgical ward. There will also be no restrictions on country of study, ethnicity, gender or socioeconomic status.

Information sources and search strategy
For our scoping review, our search strategy will include the following four databases from the date of inception to June 2022: MEDLINE, Embase, Cochrane Central Register of Controlled Trials and Web of Science. A search strategy was developed (see online supplemental appendix) with the assistance of an information specialist using search terms relating to recanalisation and/or transient occlusion of the ICA. Supplemental searches will include scanning the reference list of included studies. We will include only published studies in English due to constraints in translational resources. No other restrictions were placed on search results.

Study records
Data management
Database search results will be uploaded to Covidence Systematic Review Software (Covidence, Melbourne, Victoria, Australia). After removal of duplicate results, citation titles, abstracts and full texts will be screened.

Selection process
Two reviewers will independently screen the articles in a two-step manner. Initially, screening will consist of a review of titles and abstracts (step 1). All studies deemed potentially relevant will proceed to screening of the full journal article (step 2). Full-text screening will be performed using Covidence. Should there be a disagreement between the two reviewers in either step, a third-party neurologist will resolve discrepancies. The process of study selection will be described using a PRISMA flow diagram.

Data extraction process and summarisation of results
Reviewers will independently extract data from the included studies using an a priori designed data extraction form. Information will be collected on publication data (eg, journal of publication, authorship list and funding) and study population information (demographic, radiological and medical history), summarised as qualitative descriptions. Type of imaging modality and pre-recanalisation and postrecanalisation treatment will also be collected, presented as an absolute count of modalities and treatment by type of study (eg, case reports, randomised controlled trials, etc). Finally, time-points of initial presentation, recanalisation and subsequent follow-up (if any) will be collected and reported as a range. The data extracted will be compared in a tabular form with side-by-side comparison. Where possible and relevant, the reliability and validity of outcome measures will be presented.

Data synthesis and risk of bias assessment
The analysis of data surrounding spontaneous recanalisation of ICA occlusions is ultimately dependent on the data extracted from each study. Since our primary goal of this scoping review is to determine if the existing data will allow for a subsequent systematic review with meta-analysis, formal quantitative analysis is not planned as part of this review. Instead, the focus will be on assessing the appropriateness of potential meta-analysis by assessing heterogeneity of study characteristics, timing of recanalisation/follow-up and outcome measures. As data synthesis is not the primary aim of a scoping review, a formal assessment of methodological quality of the included studies will not be performed.

PATIENT AND PUBLIC INVOLVEMENT
The data collected within this scoping review are derived from previously published studies. As such, neither patients nor the general public were involved in the development of the research question or assessment methods.

ETHICS AND DISSEMINATION
The findings of this scoping review will inform future clinical trial development and guide future research endeavours. As such, we will disseminate the findings of our work.
through conference presentations and peer-reviewed publication.

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**Contributors** SYZ and DD were responsible for the concept, design, search strategy, review, first draft and final draft of the manuscript. RS was responsible for developing the search strategy. BD, RF and MS were involved in the design, search strategy, review and revisions.

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**REFERENCES**