Assessment of cognition as a predictor of prognosis in inpatients with brain damage: A Scoping Review Protocol

Authors

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Abstract

Objective:
The purpose of this study is to determine what cognitive assessments are used to predict or determine outcomes in inpatients with brain damage.

Introduction:
The prognosis of hospitalized stroke and brain injury patients is related not only to physical function but also to cognition. Global mental functions such as the Mini-Mental State Exam (MMSE), Montreal Cognitive Assessment (MoCA), and Functional Independence Measure (FIM) are commonly used to assess cognition in stroke patients. It is not clear whether these assessments are used because they have better predictive discriminating ability than other assessments.

Inclusion criteria:
Patients with stroke, traumatic cerebral hemorrhage, or subarachnoid hemorrhage who are hospitalized are included in the study. Eligibility criteria will consist of studies that use cognitive assessments (global mental functions, higher brain function, memory, attention, neglect, apraxia, disorientation, executive function, multitasking, apathy) as exposure or covariates and examine the association between gait, falls, hospital discharge, activities of daily living, and quality of life. The study design will be observational, but case studies (case reports, case series), intervention studies, and systematic reviews will be excluded. In addition to peer-reviewed articles, conference abstracts will be included in the search. Countries and languages are not restricted.

Methods:
Databases (PubMed, Web of Science, Scopus, CINAHL, Igaku Chuo Zasshi) will be used for searching. NPO Japan Medical Abstracts Society operates Igaku Chuo Zasshi. Results will be tabulated by country, publication type, study design, type of analysis (univariate or multivariate), names of cognitive assessments and when to assess them, and type and timing of the outcome. In addition, we will also add whether there are exclusion criteria due to cognitive impairment such as aphasia and whether studies are comparing the MMSE, MoCA, and FIM-Cog with other cognitive assessments.

Introduction

Cognitive dysfunction was identified as an important priority at the Second Stroke Recovery and Rehabilitation Roundtable (1). A variety of cognitive-behavioral disorders frequently occur in stroke sequelae, and some cognitive dysfunction can affect the functional outcome of patients.(2). Although rehabilitation research in the stroke area has called for the creation of good predictive models and appropriate stratification (3), actual studies often use data from clinical practice at specific centers, and no consensus has emerged regarding which assessment batteries are valid (4). The lack of uniformity in assessment items not only makes it difficult to integrate results in systematic reviews, but can also be a source of heterogeneity, thus requiring the selection of a standard assessment battery(4,5).

A standardized assessment battery is also needed for the cognitive assessments after stroke, but there are some issues specific to cognition. First, cognition is multidimensional and hierarchical, and it is clinically difficult to assess without over- or under-estimation, as there is sometimes overlap in assessment. The second issue is that many cognitive assessments are language-dependent, making it difficult to standardize assessments internationally(1). Third, severe cognitive impairment or aphasia may make the assessment itself difficult(6). to evaluate disability, there are few tools to assess cognition in activity contexts. Therefore, while it is well known that stroke causes cognitive impairment, the impact of cognitive impairment after stroke on activities of daily living is not well understood(7,8).

In the ICF, cognition is divided into global and specific mental functions, but the frequency of use varies. Assessments of global mental functions such as the Mini-Mental State Exam (MMSE), the Montreal Cognitive Assessment (MoCA), and the cognitive items of the Functional Independence Measure (FIM-Cog) are often used (9). Although prognostic studies should use assessments that are better predictive than diagnostic accuracy of the condition, it is not clear whether assessment of global mental functions is a better predictor than specific mental functions such as higher brain function, memory, language, attention, and perception.

(a) What cognitive assessments are candidate predictors of outcome in stroke and brain injury patients? (b) Are those assessments compared with the MMSE, MoCA, and FIM-Cog? A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews, and JBI Evidence Synthesis was conducted on these, and no current or ongoing systematic or scoping reviews on this topic were identified. There is insufficient evidence to integrate results in these topics, and a scoping review summarizing gaps in evidence is more appropriate than a systematic review.

Review question

The purpose of this study is to determine what cognitive assessments are used to predict or determine outcomes in inpatient with brain damage.

Keywords

Stroke; Brain damage; Cognition; Inpatient; Prediction

Eligibility criteria

Participants

Patients with ischemic, hemorrhagic, and mixed strokes, subarachnoid hemorrhage including traumatic, and traumatic brain injury who are hospitalized and treated will be included. Patients must be at least 18 years of age.

Concept

[Inclusion Criteria]
Studies that examined the association between cognition (global mental functions, higher brain function, memory, attention, neglect, apraxia, disorientation, executive function, multitasking, apathy) as exposure/covariates and gait, falls, hospital discharge, activities of daily living, and quality of life will be eligible for inclusion. In order to include cross-sectional studies using data from the date of discharge, the timing of the assessment shall be during hospitalization and on the date of discharge. There are no restrictions regarding the timing of outcome assessment.

[Exclusion Criteria]
Transient ischemic attack
Cognitive assessments is not performed during hospitalization.

The name of the cognitive assessment is not listed.
No assessment specific to cognitive items (e.g., assessment of severity of illness including cognition as a sub-item, as in the NIHSS.)

Context

No limitation on location, race, or gender has been imposed. No limitation on language has been imposed too.

Types of Sources

Observational studies (cohort studies, case-based studies, and cross-sectional studies) will be considered. Conference abstracts as well as peer-reviewed articles will be included. Case studies, intervention studies, systematic reviews, and meta-analyses will be excluded.

Methods

This protocol will proceed according to the PRISMA Extension for Scoping Reviews (PRISMA-ScR) (10)。It will also be conducted in accordance with the JBI methodology for scoping reviews.

Search strategy

Databases (PubMed, Web of Science, Scopus, CINAHL, Igaku Chuo Zasshi) will be used for searching. NPO Japan Medical Abstracts Society operates Igaku Chuo Zasshi. The search strategy aimed to find both published and unpublished studies. An initial limited search using MEDLINE and the Central Journal of Medicine was conducted to identify articles on this topic. The words in the titles and abstracts of relevant articles and the index terms used to describe the articles were used to develop a complete search strategy (See Appendix I). Web of Science was used as the search source for gray literature.

Study/Source of Evidence selection

After searching, all identified citations will be uploaded to Rayyan (11) (Qatar Computing Research Institute, Ar Rayyan, Qatar) and duplicates will be removed. After pilot testing, the title and abstract will be reviewed by two independent reviewers who will evaluate them against the review's inclusion criteria. All potentially relevant references are selected. The full text of the selected citations will then be evaluated in detail by two independent reviewers against the comprehensive criteria. Reasons for excluding full-text evidence sources that do not meet the inclusion criteria will be documented and reported in the scoping review. Disagreements among reviewers at each stage of the selection process will be resolved through discussion or with additional reviewers. Search results and the study inclusion process will be reported in the final scoping review and presented via the PRISMA-2020 flow diagram (12).

Data Extraction

An extraction form will be created by Microsoft Excel. The data extracted will include author, year of publication, country, language, publication type, study design, type of analysis (univariate or multivariate), sample size, cognitive assessments used as exposure or covariate and timing, type of outcome and timing, whether there are exclusion criteria due to cognitive impairment such as aphasia, and whether there are studies comparing the MMSE, MoCA, and FIM-Cog with other assessments of cognition. The draft data extraction tool will be modified and revised as needed during the process of extracting data from each of the included evidence sources. The revisions will be detailed in the scoping review. Disagreements that arise among reviewers will be resolved through discussion or with additional reviewers. A critical appraisal of each study will not normally be conducted as it is not required for the scoping review.

Data Analysis and Presentation

The extracted data will be summarized in tables and graphs using R version 4.1.2.

Acknowledgements

None

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None

Conflicts of interest

None

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Appendices

Appendix I: Search strategy

Pubmed

(stroke[Mesh] OR "Brain Injuries, Traumatic"[Mesh] OR "Intracranial Hemorrhages"[Mesh] OR "Brain Infarction"[Mesh] OR "Subarachnoid Hemorrhage"[MESH] OR stroke[tiab] OR "cerebrovascular accident*"[tiab] OR "cerebro vascular accident*"[tiab] OR "cerebral vascular accident*"[tiab] OR "Cerebrovascular Disease*"[tiab] OR "Cerebrovascular Disorder*"[tiab] OR "Cerebrovascular Insufficiencie*"[tiab] OR "Cerebrovascular Occlusion*"[tiab] OR "brain ischemic attack"[tiab] OR "brain vascular accident"[tiab] OR CVA[tiab] OR Apoplex*[tiab] OR "ischaemic cerebral attack"[tiab] OR "ischemic cerebral attack"[tiab] OR "Intracranial Hemorrhage*"[tiab] OR "Brain Hemorrhage*"[tiab] OR "Putamen Hemorrhage*"[tiab] OR "Putaminal Hematoma*"[tiab] OR "Putaminal Hemorrhage*"[tiab] OR "Brain Infarction*"[tiab] OR "Brain Venous Infarction*"[tiab] OR "Cerebral Infarction*"[tiab] OR "brain damage"[tiab] OR "brain injury"[tiab] OR "Traumatic Brain Injurie*"[tiab] OR "Brain trauma*"[tiab]) AND (cognition[Mesh] OR "executive function"[Mesh] OR memory[Mesh] OR attention[Mesh] OR Agnosia[Mesh] OR Apraxias[Mesh] OR Apathy[Mesh] OR "Multitasking Behavior"[Mesh] OR cognit*[tiab] OR "neurobehavioral manifestation*"[tiab] OR "neurobehavioural manifestation*"[tiab] OR volition[tiab] OR neuropsychiatric[tiab] OR "executive function*"[tiab] OR "executive control*"[tiab] OR memory[tiab] OR attention*[tiab] OR "Dysexecutive Syndrome"[tiab] OR "executive dysfunction*"[tiab] OR neglect[tiab] OR Agnosia[tiab] OR Apraxia[tiab] OR Apathy[tiab] OR multitask*[tiab] OR "multi task*"[tiab] OR "dual task*"[tiab] OR "cognitive and motor task*"[tiab]) AND ("Patient Admission"[Mesh] OR Inpatients[Mesh] OR admission*[tiab]OR Inpatient*[tiab]) AND (Locomotion[Mesh] OR "Activities of Daily Living"[Mesh] OR "Quality of Life"[Mesh] OR "Independent Living"[Mesh] OR "Accidental Falls"[Mesh] OR "Accidents, Home"[Mesh] OR "Patient Discharge"[Mesh] OR "Patient Transfer"[Mesh] OR locomotion[tiab] OR gait[tiab] OR walk*[tiab] OR Ambulation[tiab] OR "Activities of Daily Living"[tiab] OR ADL[tiab] OR HRQOL[tiab] OR "HR QOL" OR QOL[tiab] OR "Health-Related Quality Of Life"[tiab] OR "Life Qualit*"[tiab] OR independent*[tiab] OR Dwelling*[tiab] OR fall*[tiab] OR accident*[tiab] OR discharge*[tiab] OR Transition*[tiab] OR Turfing*[tiab] OR Dumping*[tiab])

EMBASE

(TI,AB(stroke) OR TI,AB(“Intracranial Hemorrhages”) OR TI,AB(“Brain Infarction”) OR TI,AB(stroke) OR TI,AB(“cerebrovascular accident*“) OR TI,AB(“cerebro vascular accident*“) OR TI,AB(“cerebral vascular accident*“) OR TI,AB(“Cerebrovascular Disease*“) OR TI,AB(“Cerebrovascular Disorder*“) OR TI,AB(“Cerebrovascular Insufficiencie*“) OR TI,AB(“Cerebrovascular Occlusion*“) OR TI,AB(“brain ischemic attack”) OR TI,AB(“brain vascular accident”)) AND (TI,AB(stroke) OR TI,AB(“Intracranial Hemorrhages”) OR TI,AB(“Brain Infarction”) OR TI,AB(stroke) OR TI,AB(“cerebrovascular accident*“) OR TI,AB(“cerebro vascular accident*“) OR TI,AB(“cerebral vascular accident*“) OR TI,AB(“Cerebrovascular Disease*“) OR TI,AB(“Cerebrovascular

Disorder*“) OR TI,AB(“Cerebrovascular Insufficiencie*“) OR TI,AB(“Cerebrovascular Occlusion*“) OR TI,AB(“brain ischemic attack”) OR TI,AB(“brain vascular accident”)) AND (TI,AB(“Patient Admission”) OR TI,AB(Inpatients) OR TI,AB(admission*) OR TI,AB(Inpatient*)) AND (TI,AB(locomotion) OR TI,AB(gait) OR TI,AB(walk*) OR TI,AB(Ambulation) OR TI,AB(“Activities of Daily Living”) OR TI,AB(ADL) OR TI,AB(HRQOL) OR TI,AB(QOL) OR TI,AB(“Health-Related Quality Of Life”) OR TI,AB(“Life Qualit*“) OR TI,AB(independent*) OR TI,AB(Dwelling*) OR TI,AB(fall*) OR TI,AB(accident*) OR TI,AB(discharge*) OR TI,AB(Transition*) OR TI,AB(Turfing*) OR TI,AB(Dumping*))

Web of Science

((TI = (stroke OR "cerebrovascular accident*" OR "brain injur*" OR "brain damage" OR "Subarachnoid Hemorrhage")) OR AB =(stroke OR "cerebrovascular accident*" OR "brain injur*" OR "brain damage" OR "Subarachnoid Hemorrhage")) AND ((TI = (cognition OR "executive function*" OR memory OR attention* OR neglect OR "dual task" OR "Dysexecutive Syndrome")) OR AB = (cognition OR "executive function*" OR memory OR attention* OR neglect OR "dual task" OR "Dysexecutive Syndrome")) AND (TI = (admission* OR Inpatient*) OR AB = (admission OR Inpatient*)) AND (TI = (locomotion OR walk* OR gait OR amburation OR "Activities of Daily Living" OR "Quality of Life" OR fall* OR accident* OR discharge* OR transition*) OR AB = (locomotion OR walk* OR gait OR amburation OR "Activities of Daily Living" OR "Quality of Life" OR fall* OR accident* OR discharge* OR transition*))

CINAHL

((MH stroke+) OR (MH "Brain Injuries, Traumatic+") OR (MH "Subarachnoid Hemorrhage") OR (TI stroke OR AB stroke) OR (TI "cerebrovascular accident*" OR AB "cerebrovascular accident*") OR (TI "cerebro vascular accident*" OR AB "cerebro vascular accident*") OR (TI "cerebral vascular accident*" OR AB "cerebral vascular accident*") OR (TI "brain ischemic attack" OR AB "brain ischemic attack") OR (TI "brain vascular accident" OR AB "brain vascular accident") OR (TI CVA OR AB CVA) OR (TI "ischaemic cerebral attack" OR AB "ischaemic cerebral attack") OR (TI "ischemic cerebral attack" OR AB "ischemic cerebral attack") OR (TI "brain damage" OR AB "brain damage") OR (TI "brain injury" OR AB "brain injury") OR (TI "Traumatic Brain Injurie*" OR AB "Traumatic Brain Injurie*") OR (TI "Brain trauma*" OR AB "Brain trauma*") OR (TI "Subarachnoid Hemorrhage" OR "Subarachnoid Hemorrhage")) AND ((MH cognition+) OR (MH "executive function+") OR (MH memory+) OR (MH attention+) OR (TI cognit* OR AB cognit*) OR (TI "neurobehavioral manifestation*" OR AB "neurobehavioral manifestation*") OR (TI "neurobehavioural manifestation*" OR AB "neurobehavioural manifestation*") OR (TI volition OR AB volition) OR (TI neuropsychiatric OR AB

neuropsychiatric) OR (TI "executive function*" OR AB "executive function*") OR (TI "executive control*" OR AB "executive control*") OR (TI memory OR AB memory) OR (TI attention* OR AB attention*) OR (TI "Dysexecutive Syndrome" OR AB "Dysexecutive Syndrome") OR (TI "executive dysfunction*" OR AB "executive dysfunction*") OR (TI neglect OR AB neglect) OR (TI "dual task" OR AB "dual task") OR (TI "cognitive and motor task*" OR AB "cognitive and motor task*")) AND ((MH "Patient Admission+") OR (TI admission OR AB admission)) AND ((MH Locomotion+) OR (MH "Activities of Daily Living+") OR (MH "Quality of Life+") OR (MH "Independent Living+") OR (MH "Accidental Falls+") OR (MH "Accidents, Home+") OR (MH "Patient Discharge+") OR (MH "Patient Transfer+") OR (TI locomotion OR AB locomotion) OR (TI gait OR AB gait) OR (TI walk* OR AB walk*) OR (TI Ambulation OR AB Ambulation) OR (TI "Activities of Daily Living" OR AB "Activities of Daily Living") OR (TI ADL OR AB ADL) OR (TI HRQOL OR AB HRQOL) OR "HR QOL" OR (TI QOL OR AB QOL) OR (TI "Health-Related Quality Of Life" OR AB "Health-Related Quality Of Life") OR (TI "Life Qualit*" OR AB "Life Qualit*") OR (TI independent* OR AB independent*) OR (TI Dwelling* OR AB Dwelling*) OR (TI fall* OR AB fall*) OR (TI accident* OR AB accident*) OR (TI discharge* OR AB discharge*) OR (TI Transition* OR AB Transition*) OR (TI Turfing* OR AB Turfing*) OR (TI Dumping* OR AB Dumping*))

Scopus

(INDEXTERMS(stroke) OR INDEXTERMS("Brain Injuries, Traumatic") OR INDEXTERMS("Intracranial Hemorrhages") OR INDEXTERMS("Brain Infarction") OR TITLE-ABS(stroke) OR TITLE-ABS("cerebrovascular accident*") OR TITLE-ABS("cerebro vascular accident*") OR TITLE-ABS("cerebral vascular accident*") OR TITLE-ABS("Cerebrovascular Disease*") OR TITLE-ABS("Cerebrovascular Disorder*") OR TITLE-ABS("Cerebrovascular Insufficiencie*") OR TITLE-ABS("Cerebrovascular Occlusion*") OR TITLE-ABS("brain ischemic attack") OR TITLE-ABS("brain vascular accident") OR TITLE-ABS(CVA) OR TITLE-ABS(Apoplex*) OR TITLE-ABS("ischaemic cerebral attack") OR TITLE-ABS("ischemic cerebral attack") OR TITLE-ABS("Intracranial Hemorrhage*") OR TITLE-ABS("Brain Hemorrhage*") OR TITLE-ABS("Putamen Hemorrhage*") OR TITLE-ABS("Putaminal Hematoma*") OR TITLE-ABS("Putaminal Hemorrhage*") OR TITLE-ABS("Brain Infarction*") OR TITLE-ABS("Brain Venous Infarction*") OR TITLE-ABS("Cerebral Infarction*") OR TITLE-ABS("brain damage") OR TITLE-ABS("brain injury") OR TITLE-ABS("Traumatic Brain Injurie*") OR TITLE-ABS("Brain trauma*")) AND (INDEXTERMS(cognition) OR INDEXTERMS("executive function") OR INDEXTERMS(memory) OR INDEXTERMS(attention) OR INDEXTERMS(Agnosia) OR INDEXTERMS(Apraxias) OR INDEXTERMS(Apathy) OR INDEXTERMS("Multitasking Behavior") OR TITLE-ABS(cognit*) OR TITLE-ABS("neurobehavioral manifestation*") OR TITLE-ABS("neurobehavioural manifestation*") OR TITLE-ABS(volition) OR TITLE-ABS(neuropsychiatric) OR TITLE-

ABS("executive function*") OR TITLE-ABS("executive control*") OR TITLE-ABS(memory) OR TITLE-ABS(attention*) OR TITLE-ABS("Dysexecutive Syndrome") OR TITLE-ABS("executive dysfunction*") OR TITLE-ABS(neglect) OR TITLE-ABS(Agnosia) OR TITLE-ABS(Apraxia) OR TITLE-ABS(Apathy) OR TITLE-ABS(multitask*) OR TITLE-ABS("multi task*") OR TITLE-ABS("dual task*") OR TITLE-ABS("cognitive and motor task*")) AND (INDEXTERMS("Patient Admission") OR INDEXTERMS(Inpatients) OR TITLE-ABS("admission*OR Inpatient*")) AND (INDEXTERMS(Locomotion) OR INDEXTERMS("Activities of Daily Living") OR INDEXTERMS("Quality of Life") OR INDEXTERMS("Independent Living") OR INDEXTERMS("Accidental Falls") OR INDEXTERMS("Accidents, Home") OR INDEXTERMS("Patient Discharge") OR INDEXTERMS("Patient Transfer") OR TITLE-ABS(locomotion) OR TITLE-ABS(gait) OR TITLE-ABS(walk*) OR TITLE-ABS(Ambulation) OR TITLE-ABS("Activities of Daily Living") OR TITLE-ABS(ADL) OR TITLE-ABS(HRQOL) OR "HR QOL" OR TITLE-ABS(QOL) OR TITLE-ABS("Health-Related Quality Of Life") OR TITLE-ABS("Life Qualit*") OR TITLE-ABS(independent*) OR TITLE-ABS(Dwelling*) OR TITLE-ABS(fall*) OR TITLE-ABS(accident*) OR TITLE-ABS(discharge*) OR TITLE-ABS(Transition*) OR TITLE-ABS(Turfing*) OR TITLE-ABS(Dumping*))

Igaku Chuo Zasshi

([脳卒中]/TH or [脳出血]/TH or [脳梗塞]/TH or [脳血管外傷]/TH or [クモ膜下出血]/TH or [クモ膜下出血-外傷性]/TH or [脳幹出血-外傷性]/TH or 脳卒中/TA or 脳出血/TA or 脳梗塞/TA or 脳血管疾患/TA or 脳血管障害/TA or 脳外傷/TA or 脳損傷/TA or 頭部外傷/TA or くも膜下出血/TA) AND ([認知]/TH or [認知障害]/TH or [病識]/TH or [認知機能検査]/TH or [高次脳機能障害]/TH or or [持続的注意集中力検査]/TH or [半側空間無視]/TH or [失認]/TH or [実行機能(意識過程)]/TH or [マルチタスク行動]/TH or [行動]/TH or [意欲]/TH or [アパシー]/TH or [失行症]/TH or 認知/TA or 病識/TA or 高次脳機能/TA or 注意/TA or 無視/TA or 失認/TA or 遂行/TA or マルチタスク/TA or 行動/TA or デュアルタスク/AL or 意欲/TA or アパシー/TA or 失行症/TA) AND ([移動運動]/TH or [歩行運動]/TH or [歩行]/TH or [歩行困難]/TH or [補助歩行]/TH or [日常生活活動]/TH or [生活の質]/TH or [退院]/TH or [転倒・転落]/TH or [医療的患者移送]/TH or [自立生活]/TH or 移動/TA or 歩行/TA or 日常生活活動/TA or ADL/TA or 生活の質/TA or QOL/TA or 退院/TA or 転倒/TA or 転落/TA or 転院/TA or 退院/TA or 自宅/TA or 復帰/TA or 自立/TA) AND ([入院患者]/TH or [入院]/TH or 入院/TA or 在院/TA)