

The International comparison of Systems of care and patient outcomes In minor Stroke and Tia (InSIST) study: a community-based cohort study.

Cover title

TIA and minor stroke in community practice

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Abstract

Rationale

Rapid response by health-care systems for transient ischaemic attack and minor stroke (TIA/mS) is recommended to maximize the impact of secondary prevention strategies. The applicability of this evidence to Australian non-hospital-based TIA/mS management is uncertain.

Aims

Within an Australian community setting we seek to document processes of care, establish determinants of access to care, establish attack rates and determinants of recurrent vascular events and other clinical outcomes, establish the performance of ABC2-risk stratification, and compare processes of care and outcomes to those in the UK and New Zealand for TIA/mS.

Sample size estimates

Recruiting practices containing approximately 51 full-time-equivalent general practitioners to recruit 100 TIA/mS per year over a 4-year study period will provide sufficient power for each of our outcomes

Methods and design

An inception cohort study of patients with possible TIA/mS recruited from 16 general practices in the Newcastle-Hunter Valley-Manning Valley region of Australia. Potential TIA/mS will be ascertained by multiple overlapping methods at general practices, after-hours collaborative, and hospital in-patient and outpatient services. Participants' index and subsequent clinical events will be adjudicated as TIA/mS or mimics by an expert panel.

Study outcomes

Process outcomes: whether the patient was referred for secondary care; time from event to first patient presentation to a health professional; time from event to specialist acute-access clinic appointment; time from event to brain and vascular imaging and relevant prescriptions

Clinical outcomes: recurrent stroke and major vascular events; and Health-Related Quality of Life.

Discussion

Community management of TIA/mS will be informed by this study.

Introduction and rationale

Transient ischaemic attack and minor stroke (TIA/mS) comprise approximately 40% of all episodes of brain ischaemia^{1,2} and carry a significant risk of disabling or fatal stroke.³ Much of the stroke risk occurs very early after TIA/mS⁴ and rapid specialist assessment and intervention has been shown to reduce this risk.^{5,6} Therefore a rapid response within the system of care for TIA/mS is required to maximize the impact of secondary prevention strategies.^{6,7} Based on this international evidence, current Australian guidelines recommend universal rapid-access to specialist care.⁸

There are uncertainties regarding compliance with these guidelines and with the applicability of the current evidence and guidelines to the contemporary management of TIA/mS in Australia beyond the hospital secondary care setting.

Rapid-access acute neurovascular clinics, one preferred model,⁶ were only available in 38% of Australian hospitals in 2015⁹ compared with 98% of UK hospitals 2010.¹⁰ Even in Australian areas with rapid-access clinics, service utilization is uncertain. Extrapolation of figures for populations served^{11,12} and TIA/mS seen^{4,13} in acute neurovascular clinics in Oxfordshire and the Hunter region of Australia (where TIA/mS are infrequently admitted to hospital) suggest that the majority of TIA/mS in this Australian region are not referred for rapid-access management. Thus it is not clear if improvements in TIA/mS outcomes evident in regions with more ready access to stroke specialist care⁷ are applicable to health systems such as Australia's.

There are uncertainties concerning TIA/mS management and compliance with national guidelines in Australia. These include:

1. Contemporary management and processes of care for TIA/mS have not been well characterized in Australia nor have they been compared to international benchmarks

2. The performance of the Australian health care system in the management of TIA/mS has not been examined in sufficient detail to inform or update local guidelines and health policy. Variations in models of care, access to stroke specialist diagnostic and management support, factors influencing processes of care including resource utilization and comparison to the UK-based models (currently an important source of evidence for Australian guidelines) have not been evaluated.
3. The clinical outcomes of TIA/mS have not been defined nor have the guideline-recommended tools for risk stratification been validated in contemporary Australian populations, where geographic access to specialist care can be limited and many elements of management need to be undertaken in primary care (contrary to the current Australian guideline recommendations⁸).

The aims of the International comparison of Systems of care and patient outcomes In minor Stroke and Tia (InSIST) study are to answer research questions related to these evidence gaps. Specifically:

1. What is the process of care for a prospective cohort of possible TIA/mS patients interacting with the Australian primary and secondary care systems?
2. What are the determinants of access to care?
3. What are the determinants of recurrent vascular events?
4. What is the applicability of the internationally derived risk stratification tool ABCD2¹⁴ to management and referral processes in Australia?
5. How does the process of care for TIA/mS in Australia influence clinical outcomes?
6. How do processes of care and outcomes for TIA/mS in Australia compare to those in the UK and New Zealand?

Methods

Design

InSIST is an inception cohort study in which patients with possible TIA/mS were followed for 12 months post-index event. InSIST records patients' outcomes and their interactions with health care systems.

Patient population

Participants were recruited from the Hunter and Manning valleys regions of New South Wales, within the referral territory of the Acute Neurovascular Clinic (ANVC) at the John Hunter Hospital (the major teaching and referral hospital of the Hunter New England Local Health District). These patient participants attended one of 16 general practices within the Hunter New England and Central Coast Primary Health Network (HNECCPHN). The HNECCPHN population includes 18.3% aged 65+ years (compared to 14.4% nationally) and has prevalence of diabetes (4.9%) lower than nationally (5.4%) and of circulatory system disease (18.5%) higher than nationally (17.3%).¹⁵ InSIST recruited urban (11) and rural practices (5) – including rural practices (2) in which general practitioners (GPs) staff the local hospitals.

Recruitment, detailing and further engagement of general practices

Practices were recruited by initial contact with individual GPs, the sampling frame being the membership list of the Hunter Medicare Local, a comprehensive list of GPs in the Hunter region. Subsequent recruitment processes were adapted to variability in practice size, organisation, governance and processes across the region. A requirement of recruitment was that the practice assign a practice nurse to work on the study.

Once a practice agreed to participate in the study, a study investigator (PM) visited the practice to orient the designated study practice nurse to the project. The study research manager (DQ) then visited the practice to deliver comprehensive study procedures training

to the study practice nurse, including ascertainment strategies and data collection procedures.

Awareness of the study and of methods was maintained with regular visits to recruiting practices by study investigators (CL, PM, DL) and periodic meetings with participating practice nurses where the progress of the study was reviewed, organisational issues discussed, and clinical education on recognition of difficult TIA/mS scenarios provided.

Ascertainment of events and recruitment of patients

The study aimed to recruit all patients with possible TIA/mS to ensure full case ascertainment. All patients where the attending GP considered TIA/mS a possible diagnosis were invited to participate. This strategy reflects the 'real world' clinical difficulty for GPs in distinguishing TIA/mS from mimics¹⁶ and evidence that the incidence of transient neurological symptoms in the population is substantially greater than the specialist-diagnosed incidence of TIA in hospital-based and population-based studies.^{17,18} Furthermore, there is evidence of variation in the description of TIA/mS features. Less conventional features of presentation are increasingly noted to be important where 'the physical phenotype of stroke that is used as the basis for clinical description of TIA may not capture all of the available diagnostic information'.¹⁹

Patients were identified as potential entrants to the study cohort by multiple overlapping methods (see Appendix 1).

Study participant inclusion and exclusion criteria are detailed in Appendix 2

Recruitment of patients was undertaken from August 2012 to June 2016. Recruitment procedures are detailed in Appendix 3

Data collection

As far as possible data collected was harmonised with the Oxford (UK) and Auckland (New Zealand) based OXVASC²⁰ and ARCOS²¹ studies to enable international comparisons of systems of care for TIA/mS.

Participant data

Participants underwent baseline interview and follow-up interviews at three- and 12-months post-baseline assessment. The interviews were either via phone or home-visit, depending on the participant's functional status. For details of participant data collected, see Appendix 4

Following collection of baseline data, index events were adjudicated as stroke, TIA or a TIA/mS mimic. The adjudication panel consisted of three medical clinicians, at least one of which was a stroke physician and at least one of which was a GP. The adjudication panel assessed available information on the participant and on the index event, including the participant and witness narratives of events, past medical history/vascular risk factors, medications, imaging and other test results, general practice consultation notes, referral letters, specialist consultation notes, and emergency department or hospital discharge letters.

The nature of each TIA/mS mimic was adjudicated, as was the territory of the TIA/mS or mimic e.g. anterior (cortical, subcortical, retinal, uncertain) or posterior circulation. If the participant was adjudicated to have had a TIA/mS, the likely mechanism was determined using the TOAST classification²²

Practice data

Practice data collected included practice size (both individual and full-time-equivalent GP numbers), rurality/urbanicity index of the practice,²³ after-hours care arrangements, practice GP staffing arrangements in the local hospital, and distance from the practice to the ANVC.

Hypotheses

1. That the majority of TIA/mS patients in the Hunter region are managed exclusively in primary care.
2. That rural dwelling, lower socio-economic status and advancing age will be associated with lower rates of referral to specialist care.
3. That specialist care will demonstrate greater adherence to guideline-recommended investigation and management in comparison to exclusive GP management specifically for:
 - a) Brain imaging
 - b) Vascular imaging
 - c) Immediate anti-platelet, blood pressure and statin therapy
4. That referral to specialist care will result in lower recurrent vascular event rates.
5. That referral to specialist care will result in greater quality of life
6. That rates of recurrent vascular events will be lower than those in the international cohorts
7. That rates of recurrent vascular events will be higher in lower SES bands.
8. That the processes of care (time from event to presentation, time from presentation to referral to secondary care, time to secondary care assessment) will be associated with -
 - a) Risk stratum (ABCD2); b) Patient factors (age, SES status, risk factors and co-morbidities); c) Practice factors (geographical location, size of practice, out-of-hours care arrangements)

Outcome measures

Process and clinical outcomes were determined.

- a) Process measures

- Whether a patient was referred for secondary care or was managed entirely in general practice.
- Time from event to first presentation to a health professional.
- For participants referred to the ANVC: time from event to clinic ANVC appointment. This composite outcome entails other study outcomes - time from first patient presentation to referral to the ANVC, time from event to referral, time from referral to ANVC appointment.
- Time from event to receiving brain imaging, vascular imaging and prescriptions of anti-platelet, anti-coagulant, antihypertensive and statin medications.

b) Clinical outcomes

- Recurrent stroke and major vascular events were ascertained via:
 - Diagnosis by stroke physicians (in ANVC attendees).
 - Research nurse phone interviews with participants at baseline, 3, 6 and 12 months
 - Research nurse examination of GP clinical records of consenting participants at baseline and 12 months.
 - General practice records including imaging findings.
 - Cross-referencing with the Hunter Region Heart and Stroke Register.²⁴
- Health Related Quality of Life
- Disability
- Depression and anxiety
- Cognitive status
- Fatigue

(see Appendix 4 for details of instruments to be used)

The primary outcomes were

- 1) Whether a patient was referred for secondary care or was managed entirely in general practice
- 2) Recurrent stroke and major vascular events

Analyses and sample size calculations

The Hunter region population in 2011 was 620,530.¹¹ For reference, the OXVASC study is conducted across a population of 91,000 individuals registered with nine Oxfordshire general practices and 63 GPs. The OXVASC catchment ascertains approximately 100 neurologist-adjudicated TIA and 100 minor stroke cases per annum.^{4,20,25,26} In the Hunter region, with a ratio of population to Full-Time Equivalent (FTE) GPs of 1500:1, and allowing for a participation response rate of 60%, we needed to recruit practices containing approximately 51 FTE GPs to recruit 100 TIA/mS per year (and, thus 400 TIA/mS during the study period).

See Appendix 5 for planned analytical methods and associated sample size calculations.

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Summary and conclusions

InSIST is an inception cohort study addressing the interactions of TIA/mS patients with health care systems, including the primary-secondary care interface, and the outcomes of TIA/mS in a community-based sample. It compares processes of care and outcomes in three countries and provides data on which to base context-appropriate TIA/mS management guidelines for Australian practice.

Conflict of interest

No conflicts of interest of relevance.

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