Stroke - Initial assessment and management

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This care map was published by Qatar. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.
1 Background information

Quick info:

Objective and purpose of the care map
The purpose of this care map is to define the appropriate diagnosis and management of strokes and transient ischaemic attacks in adults. The objective is to improve the appropriateness of investigation, prescribing, and referral of patients presenting to provider organisations in Qatar. It is intended that the care map will be used primarily by physicians in primary/generalist care and secondary/specialist care settings.

Scope of the care map
Aspects of care covered in this care map include the following:
• Assessment of TIA and acute stroke.
• Indications for neuroimaging.
• Pharmacological management.
• Care in specialised stroke units.
• Secondary prevention of TIA and stroke.

Aspects of care not covered in this care map include the following:
• Primary prevention of stroke or TIA.
• Detailed recommendations on neuro-surgical techniques.

Definitions
Stroke is defined as [1]:
• A syndrome with a rapid onset of focal neurological deficit of vascular origin.
Ischaemic stroke [1][L2]:
• An episode of neurological dysfunction caused by focal cerebral, spinal, or retinal infarction.
TIA is defined as [1,2][L2]:
• A brief episode of focal neurologic dysfunction caused by ischaemia, typically lasting less than one hour and without evidence of acute infarction.
Stroke caused by intracerebral haemorrhage is defined as [1][L2]:
• A focal collection of blood within the brain parenchyma or ventricular system that is not caused by trauma.

Aetiology
Ischaemic stroke or embolic TIA [3]:
• Arterial blood supply can be restricted or occluded by atherosclerosis and atherothrombosis.
• When vascular endothelium becomes damaged and weak, atherosclerotic plaques activate a cascade in which clot formation and emboli may be generated.
• The most common causes of damage to arterial endothelium are [3][L2]:
  • Increased low-density lipoproteins.
  • Smoking.
  • High blood pressure.
  • Diabetes mellitus.
Specific causes of intracerebral haemorrhage include [4][L1]:
• Arteriovenous malformations.
• Tumours.
• Enlarged vessels.
• Aneurysm.
The TOAST classification of ischaemic stroke aetiology is as follows [5]:
• Large artery atherosclerosis:
  • Extracranial or intracranial disease.
• Small artery occlusion.
• Cardioembolism:
  • Higher or lower risk cardiac lesions.
Other demonstrated cause:
- Non-atherosclerotic vasculopathies.
- Prothrombotic disorders.

Undetermined cause (cryptogenic):
- Incomplete evaluation for cause.
- Diagnostic studies were negative.
- ≥2 conflicting causes found.

Risk factors
The following factors are associated with an increased risk of stroke [6-8]:
- Increasing age – stroke typically presents at an earlier age in Qatar.
- Hypertension.
- Dyslipidaemia.
- Diabetes mellitus.
- Smoking.
- AF.
- Previous history of stroke or ischaemic heart disease.
- Women taking oral oestrogen is associated with a small increase in the risk of venous stroke [8] [L2].
- Obesity.

References:
Please see the care map's Provenance.

2 Updates to this care map

Quick info:
Date of publication: 19-Mar-2017
Please see the care map's Provenance for additional information on references, contributors, and the editorial process.

3 Key recommendations of this care map 1

Quick info:
The key recommendations of this care map are:

**Screening in a pre-hospital setting** (see the 'Screen for stroke using FAST' care point):
- The FAST is used to screen for possible stroke or TIA in a pre-hospital setting [2,9,12].
- If the FAST test is positive [2,9,12]:
  - Call the ambulance immediately.
  - Record the time of symptom onset, where known.
  - Do not delay ambulance transfer for any reason.
  - Ensure the person is taken immediately to the nearest hospital with facilities for stroke thrombolysis.
- Hospitals with facilities and expertise for stroke thrombolysis (but not thrombectomy) should initiate thrombolysis and transfer the patient immediately to an endovascular unit for assessment (i.e. ‘drip and ship’) [9,13,14].

**ED assessment and management** (see the 'Initial assessment in the ED' care point):
- Hospitals with the capabilities for stroke thrombolysis should follow the recommendations outlined below. Other hospitals without thrombolysis capability should immediately transfer the patient to an appropriate stroke centre [R-GDG].
- Tele-stroke services can be used to remotely discuss the management of patients with stroke specialists if stroke services are unavailable at the receiving hospital [R-GDG].
- Initial assessment will include the following [9]:
  - Confirmation of focal neurological deficit.
  - Exclusion of hypoglycaemia.
  - Determining the time of onset of symptoms.
• Arranging urgent CT scanning.
  • Informing the stroke team for assessment (on-site or via tele-stroke).
• Adults presenting at an ED with acute stroke should be admitted to a specialist acute stroke unit within 4 hours of arrival [15].
• Patients who are not eligible for thrombolysis/endovascular intervention, should still be assessed by a neurology stroke team within 24 hours of onset of symptoms [9][L1, RGA1].
• Patients who present within 72 hours of onset of acute symptoms, but in whom symptoms have resolved, should be assessed in the ED by a neurologist or stroke expert [R-GDG].
• Patients who present after 72 hours, should be assessed in a fast-track TIA outpatient clinic where available [R-GDG]. If fast-track TIA clinics are not available, the patient should be risk-stratified for their risk of subsequent stroke. Validated scoring systems such as ABCD² can help to risk stratify patients but do not perfectly predict the risk of stroke [2,9]:

**Neuroimaging** (see the ‘Neuroimaging’ care point):
• Patients who present within 8 hours of onset of a suspected acute stroke, should receive neuroimaging within 20 minutes of arrival at the hospital [R-GDG].
• Patients who present after 8 hours of onset of a suspected acute stroke, should receive neuroimaging within 12 hours of arrival at the hospital, but as early possible [2].
• Evaluation of suspected TIA patients in the ED, presenting within 72 hours of onset, should also undergo neuroimaging [R-GDG].
• Patients with the following should receive imaging immediately upon arrival at hospital [2]:
  • Indications for thrombolysis or early anticoagulation treatment.
  • Current anticoagulant treatment.
  • A known bleeding tendency.
  • A depressed level of consciousness (Glasgow Coma Score below 13), unexplained progressive, or fluctuating symptoms.
  • Papilloedema, neck stiffness, or fever.
  • Severe headache at onset of stroke symptoms.
• If a haemorrhagic stroke is suspected, then CT scan should be the initial imaging modality [R-GDG].

**Aspirin and anticoagulants** (see the ‘Acute anti-thrombotic therapy’ care point in the ‘Specialist management’ page):
• Administer aspirin to all patients presenting with acute stroke (after intracerebral haemorrhage has been excluded by CT brain scanning) [2,9,21].
• NB: Anticoagulation treatment should not be routinely used in the treatment of acute stroke [2,9,23], unless clinically indicated [2,9].

**Thrombolysis** (see the ‘Thrombolysis’ care point in the ‘Specialist management’ page):
• Thrombolysis with IV tPA [9,18-20]:
  • Should be offered and may be given to selected patients with acute ischaemic stroke within 4.5 hours after stroke onset, who satisfy the inclusion/exclusion criteria [18,19][L2, RGA2]:
    • IV tPA can be administered by the ED physicians in consultation with stroke specialists using the Tele-stroke service if the hospital does not have an on-site stroke team [R-GDG].
    • If IV tPA is administered in a non-stroke centre, the patient should be transferred immediately to a stroke centre for further evaluation and possible endovascular intervention [R-GDG].

References:
Please see the care map's Provenance.

4 Key recommendations of this care map

Quick info:

**Endovascular intervention** (see the ‘Endovascular management of acute ischaemic stroke’ care point in the ‘Specialist management’ page):
• The following patients are eligible for endovascular intervention [24,25]:
  • All patients who present within 8 hours of symptom onset with [R-GDG]:
    • Large vessel occlusion on computerised tomography/magnetic resonance angiography (CTA/MRA); and
    • Evidence of significant salvageable brain tissue on imaging.


This care map was published by Qatar. A printed version of this document is not controlled so may not be up-to-date with the latest clinical information.
Irrespective of whether thrombolysis has been administered.

In case of transfer from another hospital, neuroimaging will be repeated prior to any intervention [R-GDG].

ICH (see the ‘Management of ICH’ care point in the ‘Specialist management’ page):

The following patients should be considered for a neurosurgical opinion [2,9]:

- Posterior fossa bleeds.
- ICH with mid-line shift of >5 mm.
- ICH with intra-ventricular extension.
- ICH with hydrocephalus.
- ICH with underlying brain tumours or vascular malformations.
- ICH with decreased level of consciousness (GCS below 13).

All other patients should preferably be admitted to a stroke ward within 4 hours of arrival to the ED for ongoing monitoring [R-GDG].

Care in a specialised stroke unit (see the ‘Care in the specialised stroke unit’ care point in the ‘Specialist management’ page):

Care should preferably be provided in a specialised stroke unit comprised of a multidisciplinary team of professionals [9,26].

Care should comprise of the following [9]:

- Appropriate nursing care and physiological monitoring.
- Access to speech and language therapy, including assessment and management of swallowing.
- Further investigation of the aetiology and risk factors for the stroke.
- Access to physiotherapy and occupational therapy.
- Access to dietetic services, including nutrition screening.
- Providing monitored care for stroke patients who require enhanced monitoring or who develop complications.
- Prompt access to support from specialist critical care colleagues [R-GDG].
- Good communications with patients, their families, and the patient’s primary care physician.
- Regular MDT assessment and discussion as a key component of patient care.

Stroke rehabilitation (see the ‘Stroke rehabilitation’ care point in the ‘Specialist management’ page):

Should be provided by a specialised rehabilitation team skilled in the care of stroke patients. The rehabilitation team should be part of the Stroke MDT [9,17].

Patients with neurological deficits from acute stroke, should be assessed by the rehabilitation team within a specialised stroke unit [9,17].

All patients with neurological deficits should be transferred to a rehabilitation facility as soon as investigation of stroke aetiology and acute care is complete [R-GDG].

Secondary prevention (see the ‘Secondary prevention of stroke and TIA’ care point in the ‘Secondary prevention’ page):

For every patient, an individualised and comprehensive secondary prevention strategy for stroke should be implemented as soon as possible following a TIA or stroke and prior to discharge from the hospital [9]. This should comprise of the following:

- Patient information.
- Lifestyle advice.
- Glycaemic control in diabetic and pre-diabetic patients.
- BP management.
- Lipid management.
- Anti-thrombotic therapy.
- Anticoagulation in selected patients.

References:
Please see the care map's Provenance.

5 Abbreviations used in this care map

Quick info:
The abbreviations used in this care map are as follows:

ACE
6 Clinical presentation

Quick info:
Features of ischaemic or haemorrhagic stroke develop rapidly, are focal, and include the following [1,2,9,10]:

Angiotensin converting enzyme
AF
Atrial fibrillation
ARB
Angiotensin receptor blockers
BMI
Body mass index
BP
Blood pressure
CBC
Complete blood count
CTA
Computed tomography angiogram
DASH
Dietary approach to stop hypertension
DBP
Diastolic BP
DVT
Deep vein thrombosis
ED
Emergency department
FAST
Face Arm Speech Test
GCS
Glasgow Coma Scale
ICH
Intracerebral haemorrhage
ICU
Intensive care unit
INR
International normalised ratio
MDT
Multidisciplinary team
MRA
Magnetic resonance angiogram
NGT
Nasogastric tube
PE
Pulmonary embolism
PPI
Proton pump inhibitors
SBP
Systolic blood pressure
TIA
Transient ischaemic attack
tPA
Tissue plasminogen activator
Stroke - Initial assessment and management

Medicine > Neurology > Stroke

- Unilateral numbness, weakness, or paralysis of face, arm, or leg.
- Problems with speech and comprehension, e.g. aphasia or slurred speech.
- Problems with swallowing.
- Monocular symptoms:
  - Sudden onset vision loss.
  - Blurred vision.
- Acute new onset, severe headache.

Consider a posterior circulation stroke in patients with vascular risk factors who present with a combination of the following sudden onset symptoms [11]:
- Dizziness and balance difficulties.
- Diplopia.
- Vomiting.
- Altered consciousness.

References:
Please see the care map's Provenance.

7 Screen for stroke using FAST

Quick info:
The FAST is used to screen for possible stroke or TIA in a pre-hospital setting [2,9,12]:
- New onset facial weakness:
  - Ask the patient to smile or show their teeth.
  - The FAST test is positive if there is new facial asymmetry, e.g. the mouth or eye droops.
- New onset arm weakness:
  - Raise the patient's arms to 90° if they are sitting, or 45° if they are lying.
  - Ask the patient to maintain the position when you let go.
  - The FAST test is positive if one arm falls or drifts down.
- Speech problems:
  - Assess patient's speech and determine whether it is slurred or the person has difficulty finding the name for commonplace objects, e.g. cup, table, chair, keys, pen.
  - If they have difficulty seeing, place the objects in their hands.
  - If they have a companion, check whether this is a new problem.
  - The FAST test is positive if there is a new unexplained speech problem.

References:
Please see the care map's Provenance.

8 RED FLAG! Transfer to hospital immediately

Quick info:
If the FAST test is positive [2,9,12]:
- Call the ambulance immediately.
- Record the time of symptom onset, where known.

NB [9,13,14]:
- Do not delay ambulance transfer for any reason.
- Ensure the person is taken immediately to the nearest hospital with facilities for stroke thrombolysis.
- Hospitals with facilities and expertise for stroke thrombolysis (but not thrombectomy), should initiate thrombolysis and transfer the patient immediately to an endovascular unit for assessment (i.e. 'drip and ship').
- In the near future, it is expected that 'stroke ambulances' will be introduced in Qatar [R-GDG]:

References:
Please see the care map's Provenance.
9 Initial assessment in the ED

Quick info:
Hospitals with the capabilities for stroke thrombolysis should follow the care points below. Other hospitals without thrombolysis capability should immediately transfer the patient to an appropriate stroke centre [R-GDG]. Tele-stroke services can be used to remotely discuss the management of patients with stroke specialists if stroke services are unavailable at the receiving hospital [R-GDG].

Initial assessment
Patients with suspected acute stroke should be assessed by a physician in the ED within 10 minutes of arrival [R-GDG]. Initial assessment will include the following [9]:
• Confirmation of focal neurological deficit.
• Exclusion of hypoglycaemia.
• Determining the time of onset of symptoms.
• Arranging urgent CT scanning.
• Informing the stroke team for assessment (on-site or via tele-stroke).

Adults presenting at an ED with acute stroke should be admitted to a specialist acute stroke unit within 4 hours of arrival [15]. Tele-stroke services can be used to remotely discuss the management of patients with stroke specialists [R-GDG]. Patients who are not eligible for thrombolysis/endovascular intervention, should still be assessed by a neurology stroke team within 24 hours of onset of symptoms [9][L1, RGA1].

References:
Please see the care map's Provenance.

10 Risk assessment of patients with TIA

Quick info:
Patients who present within 72 hours of onset of acute symptoms, but in whom symptoms have resolved, should be assessed in the ED by a neurologist or stroke expert [R-GDG]. Patients who present after 72 hours, should be assessed in a fast-track TIA outpatient clinic where available [R-GDG]. If fast-track TIA clinics are not available, the patient should be risk-stratified for their risk of subsequent stroke. Validated scoring systems such as ABCD² can help to risk stratify patients but do not perfectly predict the risk of stroke [2,9]:

• ABCD² is calculated as follows:
  • Age ≥60 years – 1 point.
  • BP at presentation ≥140/90 mmHg – 1 point.
  • Clinical features:
    • Problems with speech – 1 point; or
    • Unilateral weakness – 2 points.
  • Duration of TIA symptoms:
    • 10-59 minutes – 1 point; or
    • ≥60 minutes – 2 points.
  • Presence of diabetes mellitus – 1 point.
  • The total scores range from 0 (low risk) to 7 (high risk).

People with any of the following are at high risk of recurrent events and should be referred urgently to the ED for assessment [R-GDG]:
• ABCD² score of ≥3.
• Crescendo stroke (2 or more TIAs in a week).
• AF.

References:
Please see the care map's Provenance.

11 Neuroimaging

Quick info:
Patients who present within 8 hours of onset of a suspected acute stroke [R-GDG]:
• Should receive neuroimaging within 20 minutes of arrival at the hospital.

Patients with the following should receive imaging immediately upon arrival at hospital [2]:
• Indications for thrombolysis or early anticoagulation treatment.
• Current anticoagulant treatment.
• A known bleeding tendency.
• A depressed level of consciousness (Glasgow Coma Score below 13), unexplained progressive, or fluctuating symptoms.
• Papilloedema, neck stiffness, or fever.
• Severe headache at onset of stroke symptoms.

Patients who present after 8 hours of onset of a suspected acute stroke should receive neuroimaging within 12 hours of arrival at the hospital, but as early as possible [2].

If a haemorrhagic stroke is suspected, then CT scan should be the initial imaging modality [R-GDG]. A history of bleeding tendency, depressed consciousness, neck stiffness, progressive symptoms, and papilloedema all raise the possibility of a haemorrhagic rather than ischaemic stroke [R-GDG].

Evaluation of suspected TIA patients in the ED, presenting within 72 hours of onset, should also undergo neuroimaging [R-GDG].

References:
Please see the care map's Provenance.

12 Other investigations

Quick info:
Other investigations to be performed at initial assessment include [2,9,16,17]:
• ECG.
• Chest radiograph.
• Blood glucose level.
  • NB: Hypoglycaemia can mimic a stroke and must be excluded in those with sudden onset of neurological symptoms.
• CBC.
• Urea, electrolytes, and creatinine.
• Coagulation profile, especially if considering thrombolysis or if intracerebral haemorrhage is suspected.
• Lipid profile.
• Liver function tests.
• HBA1c.
• Troponin-T.

References:
Please see the care map's Provenance.
The diagnosis and management of stroke and transient ischaemic attack

Provenance Certificate

Overview

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

Whilst the MOPH has sponsored the development of the care map, the MOPH has not influenced the specific recommendations made within it.

This care map was approved on 19 Mar 2017.

For information on changes in the last update, see the information point entitled 'Updates to this care map' on each page of the care map.

Editorial approach

This care map has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The care map will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this care map, has involved the following critical steps:

- Extensive literature search for well reputed published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising physicians and subject matter experts from across provider organisations in Qatar.
- Independent review of the guideline by the Clinical Governance body appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Explicit review of the care map by patient groups was not undertaken.

Whilst the MOPH has sponsored the development of the care map, the MOPH has not influenced the specific recommendations made within it.

Sources of evidence

The professional literature published in the English language has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a clinical editor and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
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2. Are published in higher-quality journals (i.e. journals that are read and cited most often within their field).
3. Address an aspect of specific importance to the guideline in question.

Where included, the ‘goal length of stay’ stated within this guideline is supported by and validated through utilisation analysis of various international health insurance databases. The purpose of database analysis is to confirm the reasonability and clinical appropriateness of the goal, as an achievable benchmark for optimal duration of inpatient admission.

Evidence grading and recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritativeness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
  - Meta-analyses.
  - Randomised controlled trials with meta-analysis.
  - Randomised controlled trials.
  - Systematic reviews.

- **Level 2 (L2):**
  - Observational studies, examples include:
    - Cohort studies with statistical adjustment for potential confounders.
    - Cohort studies without adjustment.
    - Case series with historical or literature controls.
    - Uncontrolled case series.
  - Statements in published articles or textbooks.

- **Level 3 (L3):**
  - Expert opinion.
  - Unpublished data, examples include:
    - Large database analyses.
    - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A1 (RGA1):** Evidence demonstrates at least moderate certainty of at least moderate net benefit.
- **Recommendation Grade A2 (RGA2):** Evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C1 (RGC1):** Evidence demonstrates a lack of net benefit; additional research is recommended.
- **Recommendation Grade C2 (RGC2):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice on the basis of the clinical experience of the Guideline Development Group members.
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References


The diagnosis and management of stroke and transient ischaemic attack


The diagnosis and management of stroke and transient ischaemic attack


Guideline Development Group members

The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the Clinical Governance Group. The GDG members have reviewed and provided feedback on the draft guideline relating to the topic. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

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¹ Dr Ahmed Babiker attended the MOPH in his capacity as a Clinical Pharmacist and advisor on the availability of medications in Qatar.
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Responsibilities of healthcare professionals

This care map has been issued by the MOPH to define how care should be provided in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.

The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or carers and should consider the individual risks and benefits of any intervention that is contemplated in the patient’s care.

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- Ms Huda Amer Al-Katheeri, Acting Director & Project Executive.
- Dr Alanoud Saleh Alfehaidi, Guideline & Standardisation Specialist.
- Dr Ilham Omer Siddig, Guideline & Standardisation Specialist.
- Ms Maricel Balagtas Garcia, Guideline Standardisation Coordinator.
- Dr Rasmeh Ali Salameh Al Huneiti, Research Training & Education Specialist.
- Mr Mohammad Jaran, Risk Management Coordinator.

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