Stroke: early management
(alert, prehospital phase, initial hospital phase, indications for thrombolysis)

May 2009

OBJECTIVES
- Identify relevant information for the general public in order to improve recognition of warning signs and increase awareness of the need for urgent treatment
- Optimise the initial prehospital and hospital care pathway of patients with suspected stroke and improve management for the largest possible number of stroke patients
- Reduce the frequency and severity of the functional disorders associated with stroke through early multiprofessional management, implemented as quickly as possible in a stroke unit (SU), or failing this, in a hospital with an organised care pathway for patients with suspected stroke, in coordination with a SU
- Improve the practices of the SAMU-Centre 15 dispatching physician, emergency physicians and all professionals involved in the early management of stroke including transient ischemic attacks (TIAs)

KEY POINTS
- Stroke is an emergency
- The SAMU-Centre 15 should be called immediately in all cases of sudden, transient or prolonged neurological deficit
- The dispatching physician should refer all patients with symptoms of acute stroke to a SU as a priority
- Patients with symptoms of acute stroke should undergo cerebral imaging as soon as possible, using MRI whenever possible
- Where indicated, thrombolysis should be administered as early as possible after neurovascular assessment
Increasing awareness and informing the general public

<table>
<thead>
<tr>
<th>Population</th>
<th>Information method</th>
<th>Key messages</th>
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<tbody>
<tr>
<td>General public</td>
<td>Information campaigns</td>
<td>• How to recognize symptoms of stroke or TIA (FAST message)&lt;br&gt;• Stroke is an emergency situation&lt;br&gt;• Call SAMU-Centre 15&lt;br&gt;• The earlier stroke management techniques and treatments are administered, the more they are effective</td>
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<td>Patients at risk of vascular damage (history of stroke, myocardial infarction, lower limb occlusive arteriopathy, high blood pressure, diabetes, etc.) and their families</td>
<td>Message transmitted by general practitioner</td>
<td>• Same as for general public underlining the importance of immediately calling the SAMU-Centre</td>
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FAST: Face Arm Speech Time (message based on the Cincinnati Prehospital Stroke Scale): F=face numbness or weakness especially on one side; A=arm numbness or weakness especially on one side of the body; S=slurred speech or difficulty speaking or understanding; T=time to call 911 if these occur suddenly or are accompanied by: loss of vision, loss of balance with dizziness or the worst headache of your life, with no known cause, both sudden and severe

Increasing awareness and training for all health professionals involved in stroke management

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<th>Population</th>
<th>Training method</th>
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<td>SAMU-Centre 15 medical dispatch auxiliaries Switchboard operators in medical call centres</td>
<td>Specific and ongoing training</td>
<td>• Identification of patients with stroke symptoms using the 5 ASA warning signs</td>
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<td>Firefighters Ambulance personnel Certified first responders</td>
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<td>• Identification and management of acute stroke using the FAST message</td>
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<td>Medical and paramedical professionals • from emergency pathway • managing patients at risk of vascular damage</td>
<td></td>
<td>• Consider any sudden, transient or prolonged neurological deficit as an absolute emergency&lt;br&gt;• Note the exact time of onset of symptoms&lt;br&gt;• Know that SU management and specific stroke treatments are effective&lt;br&gt;• Understand that TIA is an emergency and warrants immediate neurovascular management</td>
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ASA: American Stroke Association; FAST: Face Arm Speech Time (message based on the Cincinnati Prehospital Stroke Scale); the 5 ASA warning signs are: sudden numbness or weakness of the face, arm or leg, especially on one side of the body; sudden confusion, trouble speaking or understanding; sudden trouble seeing in one or both eyes; sudden trouble walking, dizziness, loss of balance or coordination; sudden, severe headache with no known cause
Earliest management of patients in A&E: Accident and Emergency; INR: interventional neuroradiology; NS: neurosurgery; SMUR: mobile emergency unit; SU: stroke unit; TM: telemedicine.

Suspected stroke
Patient or bystander

Call to medical emergency no. 15

3-way conference call

General practitioner

Suspected stroke or TIA confirmed

no

Local A&E or appropriate referral
don't know and no nearby SU

yes

Dispatch medical team (SMUR)

Check for signs of clinical severity: confusion, respiratory distress, haemodynamic instability

no

yes

Medical assessment

Call physician in nearest SU

Transport to the SU or to a hospital with an organised care management pathway for suspected stroke patients in coordination with a SU by fastest available means

Choice of appropriate effector

Prepare admission to the organised pathway (emergency physicians, neurologists, radiologists, clinical laboratory specialists, intensivists, etc.)

Check for contraindications to thrombolysis

Hospital with a SU, NS and INR

Hospital with a SU

Hospital with an organised care pathway for patients with suspected stroke in coordination with a SU

Clinical and laboratory assessment, imaging, prognosis, treatment

A&E: Accident and Emergency; INR: interventional neuroradiology; NS: neurosurgery; SMUR: mobile emergency unit; SU: stroke unit; TM: telemedicine
The in-hospital neurovascular care pathway should be carefully organised and coordinated with all the personnel involved (emergency medical staff, neurologists, radiologists, laboratory specialists, intensivists, etc.) and formalised through written procedures. It should have an effective structural and functional organisation allowing rapid access to neurovascular expertise and cerebral imaging.

- Patients referred to a hospital with a SU should be immediately managed by a physician from the neurovascular care pathway on admission
- Hospitals without a SU but admitting stroke patients should organise a care pathway for patients with suspected stroke in coordination with a SU
- Emergency ECG and laboratory tests including tests of haemostasis, capillary glucose and a haemogram are required if these were not performed during the prehospital phase
- Blood pressure, heart rate, oxygen saturation and temperature should all be monitored

Patients suspected of acute stroke should have priority access 24 hours a day and 7 days a week to cerebral imaging, using MRI whenever possible. Protocols for management of patients with suspected acute stroke should be formalised and contractualised between the department admitting these patients and the radiology department.

Early investigation of the cervical arteries should be conducted in all cases of ischaemic stroke. This is urgent in cases of TIA, minor infarction and fluctuating or progressing ischaemic stroke.

Indications for thrombolysis

- In hospitals with a SU, IV thrombolysis is prescribed by a neurologist (marketing authorisation) and/or a physician with an inter-university diploma in neurovascular pathology (off-label). The patient should be monitored in the stroke unit.
- In hospitals that do not have a SU, indications for thrombolysis should be approved during a teleconsultation with the neurovascular physician of the SU to which the patient will be transferred after thrombolysis (off-label).
- Intravenous thrombolysis using rt-PA for cerebral infarctions is recommended for up to 4.5 hours after the onset of symptoms of cerebral infarction (off-label). It should be administered as early as possible (grade A).