To thrombolyse or not?

Primum non nocere
Diagnosis of Acute Ischaemic Stroke
Diagnosis of Acute Ischaemic Stroke

Introduction

- Stroke should be considered a “brain attack” with emphasis placed upon rapid diagnosis, evaluation and treatment. Remember “Time is brain”
- Early recognition by patient or bystander is essential
- Emergency medical services must be called immediately
- Emergency medical services must perceive stroke as a similar emergency to AMI and trauma
Diagnosis of Acute Ischaemic Stroke

Goals of diagnosis

- Determine that neurological symptoms are due to stroke and exclude non-vascular reasons for symptoms
- Determine the type of stroke e.g. haemorrhagic or ischaemic
- Determine the location of brain injury to assess the size of the stroke
- Determine the most likely cause of the vascular lesion
- Detect any acute neurological or medical complications
Diagnosis of Acute Ischaemic Stroke

Differential diagnosis of acute stroke

- Ischaemic stroke
- Haemorrhagic stroke
- Craniocerebral trauma
- Brain abscess
- Encephalitis
- Brain tumours
- Seizure
- Hypoglycaemia
- Migraine headache
## Diagnosis of Acute Ischaemic Stroke

### Differential diagnosis of acute stroke

<table>
<thead>
<tr>
<th>FEATURES SUGGESTING HAEMORRHAGIC STROKE</th>
<th>FEATURES SUGGESTING ISCHAEMIC STROKE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Early and prolonged loss of consciousness</td>
<td>• Stepwise deterioration or progressive worsening</td>
</tr>
<tr>
<td>• Prominent headache, nausea and vomiting</td>
<td>• Waxing and waning of findings</td>
</tr>
<tr>
<td>• Retinal haemorrhages</td>
<td>• Focal neurologic impairments in the pattern of a single blood vessel</td>
</tr>
<tr>
<td>• Nuchal rigidity</td>
<td>• Signs point to a focal cortical or subcortical lesion</td>
</tr>
<tr>
<td>• Focal signs do not fit the anatomic pattern of a single blood vessel</td>
<td></td>
</tr>
</tbody>
</table>

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5 Acute Trusts - 6 Primary Care Trusts – Ambulance Trust – 4 Local Authorities
### Diagnosis of Acute Ischaemic Stroke

#### Clinical features of stroke

| TIME COURSE AND EVOLUTION | • Reach maximal intensity within 24 hrs  
<table>
<thead>
<tr>
<th></th>
<th>• Sudden or rapid onset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Headache</td>
</tr>
<tr>
<td></td>
<td>• Nausea and vomiting</td>
</tr>
<tr>
<td></td>
<td>• Altered mental status (syncope, seizure, coma)</td>
</tr>
<tr>
<td></td>
<td>• Hypertension and abnormal vital signs</td>
</tr>
<tr>
<td></td>
<td>• Nuchal rigidity</td>
</tr>
<tr>
<td></td>
<td>• Cognitive impairments (i.e. Aphasia, neglect, etc.)</td>
</tr>
<tr>
<td></td>
<td>• Weakness or lack of coordination of limbs</td>
</tr>
<tr>
<td></td>
<td>• Facial weakness</td>
</tr>
<tr>
<td></td>
<td>• Numbness of limbs and/or face</td>
</tr>
</tbody>
</table>
Diagnosis of Acute Ischaemic Stroke

Diagnostic tools

- Variety of diagnostic tools available, and should be performed urgently
- Medical history may reveal risk factors, stroke type and area of brain affected
- Physical examination will help uncover underlying pathology
- CVS assessment might provide evidence of cause or detect cardiovascular complications
- Computed tomography is most reliable way to differentiate haemorrhagic stroke from ischeamic stroke
Diagnosis of Acute Ischaemic Stroke

CT scanning

- Most important initial diagnostic study

- Current gold standard for ruling out haemorrhagic stroke. It is:

  Widely available, non-invasive, quick, relatively inexpensive, relatively easy to interpret

- But limitations because:

  Ability to detect cerebral infarction depends upon size, location and age of lesion. Infarcts smaller than 5 mm may escape detection, only around 5% are visible within the first 12 hours of stroke onset
Diagnosis of Acute Ischaemic Stroke

MRI scanning

- MRI has some advantages over CT scanning:

  * It is more sensitive to changes in tissue structure
  * It provides a more accurate and earlier measure of cerebral infarction

- However, it also has some limitations:

  * It is more expensive than CT
  * It is less widely available
  * It requires special expertise
## Mortality and Disability

<table>
<thead>
<tr>
<th>(30 days)</th>
<th>TACI</th>
<th>PACI</th>
<th>LACI</th>
<th>POCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>39</td>
<td>4</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Dependant</td>
<td>56</td>
<td>39</td>
<td>36</td>
<td>31</td>
</tr>
<tr>
<td>Independent</td>
<td>4</td>
<td>56</td>
<td>62</td>
<td>62</td>
</tr>
</tbody>
</table>
Emergency Department

Assessment

- Confirm time of onset
- Exclude hypoglycaemia
- Define neurological deficit (ROSIER)
- IV access - bloods (FBC, clotting, glucose, U&E, PT, aPTT, INR, cardiac enzymes + ECG)
- NIHSS
- Medications (Warfarin)
- Assess patient weight
- Request Urgent CT scan
- Complete thrombolysis checklist
- Inform patient / relative potential candidate for thrombolysis
<table>
<thead>
<tr>
<th>Symptom</th>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/time of symptom onset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GCS E= V= M= BP BM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(if BM &lt; 3.5mmols treat urgently and reassess once blood glucose normal)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has there been loss of consciousness or syncope</td>
<td>Y(-1)</td>
<td>N(0)</td>
</tr>
<tr>
<td>Has there been seizure activity</td>
<td>Y(-1)</td>
<td>N(0)</td>
</tr>
<tr>
<td>Is there a NEW ACUTE onset or on awakening from sleep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymmetric facial weakness</td>
<td>Y(1)</td>
<td>N(0)</td>
</tr>
<tr>
<td>Asymmetric arm weakness</td>
<td>Y(1)</td>
<td>N(0)</td>
</tr>
<tr>
<td>Asymmetric leg weakness</td>
<td>Y(1)</td>
<td>N(0)</td>
</tr>
<tr>
<td>Speech disturbance</td>
<td>Y(1)</td>
<td>N(0)</td>
</tr>
<tr>
<td>Visual field deficit</td>
<td>Y(1)</td>
<td>N(0)</td>
</tr>
</tbody>
</table>

Total score: -2 to +5
The NIHSS assesses neurological impairment such as:

- Paresis
- Aphasia
- Level of consciousness
- Sensory symptoms
- Facial and gaze palsy
- Dysarthria and hemi-neglect

It shows good inter-rater reliability and validity, which can be increased by video-assisted training and self assessment.

It has a score range from 0 to 42; death is not coded.
Emergency Department

Stroke Mimics

Neurological
- Seizure / postictal state
- Complicated migraine
- Subdural Haematoma
- Abscess, tumour or malignancy
- Hypertensive encephalopathy
- Multiple sclerosis (or other demyelinating process)
- Vertigo
- Cranial and peripheral neuropathies
Stroke Mimics

Neurological (cont)
- Spinal cord or disc disease
- Transient global ischaemia
- Bell’s Palsy
- Encephalitis

Metabolic
- Hypo/hyperglycaemia
- Hyponatraemia
- Hepatic encephalopathy
Stroke Mimics

Metabolic (cont)
- Drug overdose

Other
- Syncope
What the clinician needs to know

- Has a stroke occurred or are the patient’s symptoms due to a different pathology?
- If a stroke has occurred, is it a haemorrhagic stroke or a cerebral infarction
- Is there a treatable underlying aetiology for the patient’s acute stroke.
- Is the territory of the ischaemic insult salvageable or are the tissues already irreversibly infarcted
Any Questions