

# DIAGNOSTIC CRITERIA OF STROKE

Diagnostic criteria are used to validate clinical diagnoses. Here below MONICA diagnostic criteria are reported.

## ***MONICA - MONItoring trends and determinants of Cardiovascular disease***

Stroke is defined as rapidly developed clinical signs of focal (or global) disturbance of cerebral function lasting more than 24 hours (except in cases of sudden death or if the development of symptoms is interrupted by a surgical intervention), with no apparent cause other than a vascular origin: it includes patients presenting clinical signs and symptoms suggestive of subarachnoid haemorrhage, intracerebral haemorrhage or cerebral ischaemic necrosis. Global clinical signs are accepted only in cases of subarachnoid haemorrhage or in patients with deep coma. Brain lesions detected by CT-scan but not accompanied by acute focal signs are not accepted as stroke, nor are extradural and subdural haemorrhages. This definition does not include TIA or stroke events in cases of blood disease (e.g. leukemia, polycythaemia vera), brain tumour or brain metastases. Secondary stroke caused by trauma should also be excluded.

The diagnostic classification follows:

### **(1) Definite focal signs**

- unilateral or bilateral motor impairment (including dyscoordination)
- unilateral or bilateral sensory impairment
- aphasia/dysphasia (non-fluent speech)
- hemianopia (half-sided impairment of visual fields)
- diplopia
- forced gaze (conjugate deviation)
- dysphagia of acute onset
- apraxia of acute onset
- ataxia of acute onset
- perception deficit of acute onset.

## **(2) Not acceptable as sole evidence of focal dysfunction**

Although strokes can present in the following way, these signs are not specific and cannot therefore be accepted as definite evidence for stroke.

- dizziness, vertigo
- localized headache
- blurred vision of both eyes
- dysarthria (slurred speech)
- impaired cognitive function (including confusion)
- impaired consciousness
- seizures

On the basis of the background information, each event may be classified into:

Definite stroke

Not stroke

Insufficient data

Insufficient data should be mainly used for fatal cases, especially for cases of sudden death without necropsy.

Cerebrovascular lesions discovered at autopsy are considered for diagnostic category.

All patients having insufficient supporting evidence of stroke, but for whom the diagnosis of stroke cannot be entirely excluded, should be classified as insufficient data, e.g. cases with no necropsy, no documented history of focal neurologic deficits and no other diagnosis. Living patients can be classified into this category if:

- it is impossible to say whether the symptoms were from stroke or from some other disease, e.g. epilepsy, or
- patients with symptoms and clinical findings otherwise typical for a stroke but the duration remaining uncertain.

### ***Subtype definition***

Cases identified as 'definite stroke' were classified into stroke subtypes.

The MONICA subtype definition of stroke has to be confirmed by CT scan, examination or autopsy.

### **Subarachnoid Haemorrhage ICD-8 or ICD-9 430**

#### *Symptoms:*

Abrupt onset of severe headache or unconsciousness or both. Signs of meningeal irritation (stiff neck, Kernig and Brudzinski signs). Focal neurological deficits are usually not present.

#### *Findings:*

At least one of the following must be present additional to typical symptoms.

1. Necropsy - recent subarachnoid haemorrhage and an aneurysm or arteriovenous malformation
2. CT-scan - blood in the Fissura Sylvii or between the frontal lobes or in the basal cistern or in cerebral ventricles
3. CSF (liquor) bloody ( $>2,000$  rbc per  $\text{cm}^3$ ) and an aneurysm or an arteriovenous malformation found on angiography
4. CSF (liquor) bloody ( $>2,000$  rbc per  $\text{cm}^3$ ) and xanthochromic and the possibility of intracerebral haemorrhage excluded by necropsy or CT-examination

### **Intracerebral haemorrhage ICD-8 or ICD-9 431**

#### *Symptoms:*

Usually sudden onset during activities. Often rapidly developing coma, but small haemorrhage presents no consciousness disturbance.

#### *Findings:*

CSF often, but not always bloody or xanthochromic. Often severe hypertension present. Haemorrhage must be confirmed by necropsy or by CT-examination.

### **Brain infarction due to occlusion of precerebral arteries ICD-9 433 ICD-8 432**

#### *Symptoms:*

May vary.

#### *Findings:*

The occlusion must be confirmed by angiography or ultrasound or necropsy.

### **Brain infarction due to cerebral thrombosis ICD-9 434 ICD-8 433**

#### *Symptoms:*

No severe headache, if at all. Onset acute, sometimes during sleep. Often gradual progression of focal neurologic deficits. Usually, no, or only slight, disturbance of consciousness. TIA can often be detected in history. Often other symptoms of atherosclerosis (IHD, peripheral arterial disease) or underlying diseases (hypertension, diabetes).

*Findings:*

Brain infarction in the necropsy or in the CT-examination and no evidence for an embolic origin.

OR

CT-scan of satisfactory quality shows no recent brain lesion although clinical criteria of stroke are fulfilled.

**Embolic brain infarction ICD-9 434 ICD-8 434**

*Symptoms:*

Abrupt onset, usually completion of the neurologic deficits within a few minutes. Disturbance of consciousness absent or only slight at the onset.

*Findings:*

As in brain infarction due to cerebral thrombosis, but in addition a source of the embolus must be detectable. The most common origins are:

- arrhythmia (atrial flutter and fibrillation)
- valvular heart disease (mitral)
- recent Acute Myocardial Infarction (AMI) (within previous 3 months)

**Remarks**

If it is impossible to assign to a definite stroke event one of these sub-categories, the subcategory 'Acute, but ill-defined cerebrovascular disease' should be recorded (ICD code 436). If the clinical criteria for a stroke are fulfilled but a CT-scan (of satisfactory technical quality) fails to reveal a brain lesion of recent origin, the patient has in all probability suffered an ischaemic stroke. In this case, type of stroke should be coded as 434 (infarction).

### MONICA subtype

| Type of stroke   | ICD Code            |
|--|---------------------|
| <i>Subarachnoid Haemorrhage</i>                                  | ICD-8 or ICD-9 430  |
| <i>Intracerebral haemorrhage</i>                                 | ICD-8 or ICD-9 431  |
| <i>Brain infarction due to occlusion of precerebral arteries</i> | ICD-9 433 ICD-8 432 |
| <i>Brain infarction due to cerebral thrombosis</i>               | ICD-9 434 ICD-8 433 |
| <i>Embolic brain infarction</i>                                  | ICD-9 434 ICD-8 434 |

*For a more complete overview of MONICA criteria consult the following publication: World Health Organization: WHO Monica Project: MONICA manual. Part IV: Event Registration.*

<http://www.ktl.fi/publications/monica/manual/part4/iv-2.htm#s1-1>