Differential diagnosis of stroke in clinical practice

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Abstract

The diagnosis of acute stroke is usually straightforward. Hence, the clinical diagnosis of this condition is determined since the initial phases of patient evaluation. However, in cases of an abrupt onset of focal neurologic deficit, there is a need for a differential diagnostic process in order to distinguish and exclude some other potential conditions. In these cases, the first issue to handle is the determination of the presence of a central nervous system event. This may be sometimes not simple as the stroke resembles certain systemic problems including hypoglycemia, hyperglycemia, and other encephalopathies which should be taken into account by physicians. In any case, hypoglycemia is a commonplace event occurring in all patients who experience stroke episodes.

The presence of an ictal or post-ictal phenomena is always indicated in cases of convulsive episodes. Under these circumstances, there are strong grounds in the clinical practice for determination of central nervous system events. Subsequently, in the presence of central nervous system events, the differential diagnosis between stroke and other events that resemble stroke should be taken into consideration. Currently, the standard acute neuroimaging with non-contrast CT scanning is the preferred method of diagnosis confirming the presence of stroke and its subtype in most of the patients.

Nevertheless, certain issues in clinical practice require the attention of physicians because ischemic stroke, like other common diseases, exhibits uncommon and exceptional signs which may be misleading. In any case, acute stroke should be considered in neurologic syndromes where sudden onset of symptoms figure prominently, particularly in patients with cerebrovascular risk factors.

Keywords: cerebrovascular disease, diagnosis, neuroimaging, stroke.

Stroke differential diagnosis

In clinical practice, the diagnosis of acute ischemic stroke is clear-cut in most of the circumstances. From this point of view, the unexpected onset of a focal neurologic deficit in an identifiable vascular distribution with a common presentation (including hemiparesis, facial weakness and aphasia) denotes a common syndrome of 'acute stroke'.

Nonetheless, there may be quite a range of differential diagnostic issues and problems to be handled. This is for two reasons (1,2): i) there are several subtypes of stroke, and; ii) there are some non-vascular disorders which may exhibit a clinical profile almost indistinguishable from strokes.

Therefore, in these cases, the differential diagnosis of stroke is of paramount importance. Even in cases when the diagnosis of stroke is clear, the determination of its sub-type should be also considered carefully. Even more importantly, stroke resembles certain non-vascular conditions that simulate it. In addition, there are some unusual clinical cases resulting from stroke which should be carefully considered in the clinical practice.

Subtypes of stroke

The abrupt appearance of acute ischemic stroke is a consequence of a sudden interruption of blood flow to a part of the brain (1). In most of the cases this occurs from embolic or thrombotic arterial vascular occlusion (1). These clinical presentations can be visualized angiographically in many patients who undergo this examination procedure (i.e., patients who have clear and severe symptoms which justify the acute angiography procedure) (1). Lacunar strokes, arteritis, arterial dissections, and cortical venous occlusions constitute some other vascular events which may result in stroke syndromes (1,2). Intraparenchymal intracranial hemorrhage from a variety of causes (including the spontaneous or hypertensive hemorrhages, vascular malformations, or aneurysmal origin) are observed quite often in the clinical practice. Typically, these additional conditions are involved in the initial differential diagnosis of stroke. As a matter of fact, for the sake of classification, these different conditions have been referred to as stroke subtypes and are presented in Table 1.

Table 1. Stroke subtypes

- **ischemic stroke**
  - embolic
  - thrombotic
- **hemorrhagic stroke**
- **lacunar infarction**
- **intraparenchymal hemorrhage**
  - intracerebral hemorrhage
  - arteriovenous malformations
  - aneurysmal hemorrhage with intraparenchymal extension
- **venous thrombosis**

Magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), diffusion-weighted imaging (DWI), and perfusion-weighted imaging (PWI) are commonplace procedures employed for differentiation of stroke from hemorrhage, lacunar infarction, or posterior circulation ischemia (1-3).

The confusion between stroke and the other aforementioned conditions has been reported in several studies. As a remarkable example, a study has reported that over 20% of patients initially considered to have had anterior circulation ischemic stroke had in fact other types of stroke types (2).

As a matter of fact, the accuracy of proper identification of stroke subtypes is increasingly improving due to the technological advancements which are also evident in clinical practice (4,5).

Stroke mimics

The term "stroke mimic" is used for manifestations of nonvascular disease processes when a stroke-like clinical picture is produced (6). These manifestations are very similar and often impossible to differentiate from an ischemic stroke syndrome. The stroke mimics include both processes occurring within the central nervous system and systemic events (6). Given the different therapies of stroke which nowadays are quite complex and also bear adverse effects, it is very important to distinguish these noncerebrovascular stroke mimics from real strokes, as suggested in the international literature (6,7).

It has been shown that stroke mimics may be discovered at different points in clinical investigation (6). However, it is only after a comprehensive neuroimaging and laboratory work that the differential diagnosis of stroke is made. The current neuroimaging procedures and laboratory tests allow not only for the differential diagnosis, but also for assessment of the frequency of stroke mimics (8). As an outstanding example, one study including patients admitted with an initial diagnosis of cerebrovascular disease, reported that 30% of them had unsuspected intracranial lesions. However, this finding included patients with slower progression of neurological impairment, as well as more acute presentations (3).

Conclusions

In summary, the diagnosis of acute stroke is usually straightforward. Hence, the clinical diagnosis of this condition is determined since the initial phases of patient evaluation. However, in cases of an abrupt onset of focal neurologic deficit, there is a need for a differential diagnostic process in order to distinguish and exclude some other potential conditions. In these cases, the first issue to handle is the determination of the presence of a central nervous system event. This may be sometimes not simple as the stroke resembles certain systemic problems including hypoglycemia, hyperglycemia, and other encephalopathies which should be taken into account by physicians. In any case, hypoglycemia is a commonplace event occurring in all patients who experience stroke episodes.

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Nevertheless, certain issues in clinical practice require the attention of physicians because ischemic stroke, like other common diseases, exhibits uncommon and exceptional signs which may be misleading. In any case, acute stroke should be considered in neurologic syndromes where sudden onset of symptoms figure prominently, particularly in patients with cerebro-vascular risk factors.

These issues should be taken into consideration in the clinical practice especially by young physicians who have not been exposed to a wide range of clinical manifestations of stroke-like events.

Conflicts of interest: None declared.

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