Dear Editor,

We report a case of a patient that was diagnosed as having a stroke due to basilar occlusion with unclear onset. The patient was transferred from a spoke hospital to our hub center to perform acute stroke reperfusion therapy; however, the diagnosis of stroke was not confirmed. According to previous studies, from 20 to 40% of patients admitted to the hospital with suspected acute stroke have an alternate diagnosis, i.e., stroke mimics [1]. Clinical examination and diagnostic workup allow the exclusion of other pathological conditions that mimic stroke, and identification of stroke mimics involves important medical implications including the risks associated with inappropriate long-term secondary prevention. Moreover, endovascular treatment is allowed only in tertiary stroke centers, and inappropriate transferral from referring centers may result in overtriage of suspected stroke patients, slowing in-hospital workflow and timely stroke acute treatment.

Stroke mimics may have a wide clinical phenotype and can be difficult to differentiate from a stroke. Among the various clinical manifestations of stroke mimics, impaired consciousness is one the most challenging for the clinician in the emergency setting.

Presentation

A 63-year-old man was transferred from a spoke hospital to our hub center with a diagnosis of basilar occlusion suitable for endovascular treatment. Early in the morning, the patient experienced involuntary movements at four limbs and decreased level of consciousness, associated with slight bleeding from the mouth; however, the onset of the symptoms was unclear. The emergency physician administered benzodiazepines at patient’s home but failed tracheal intubation. When the patient arrived to the spoke hospital at 10:00 a.m., he had a decreased level of consciousness with scarce response to painful stimulus, snorting, and shallow breathing. Pupils were normal, and there was no gaze deviation. The patient was then administered with propofol and intubated.

The head computed tomography (CT) showed no intracranial bleeding nor early ischemic changes, while the CT angiography (CTA) demonstrated a thread-like basilar artery with stenosis in the proximal segment and filling defect in the distal segment, regular posterior cerebral arteries (PCA), and thread-like left vertebral artery (Fig. 1a). Blood tests were normal, toxicology screening was negative, and the SARS-CoV-2 test was negative. The patient was then transferred to our hospital with the diagnosis of ischemic stroke due to basilar artery thrombosis with unclear onset to evaluate endovascular thrombectomy. The patient arrived at 1:42 p.m. to our hospital.

Giving that the unclear onset of symptoms and the suspected posterior stroke, we performed a magnetic resonance (MR) to evaluate the extent of the acute ischemic lesion; however, the MR showed no signal alterations in any area of the brain parenchyma, particularly in the midbrain and cerebellar hemispheres (Fig. 1c, d). The thread-like basilar artery was documented in time-of-flight (TOF) images (Fig. 1b). Besides, while there was no blood flow signal at the upper third part of the basilar artery, a regular signal in basilar apex and in posterior
cerebral artery was detected. We decided to stop sedation to evaluate the neurological status of the patient, which actually had no focal neurological deficits with a slight impairment of consciousness. On the basis of the unclear history of symptom onset, clinical examination, and radiological findings, we did not confirm the diagnosis of ischemic stroke and did not give indication for angiography. The patient was transferred to the intensive care unit, where after a careful recording of the medical history, issues related to chronic alcohol exposure and amnesia episodes over the previous days were reported. Diagnosis of alcohol withdrawal crisis was made, and therapy for withdrawal was started.

Discussion

Here, we report a case of a “radiological” stroke mimic in a patient with bilateral fetal type PCA. Imaging findings were not supported by anamnestic data and neurological examination, leading to a misdiagnosis of stroke and to patient transferral for a time-dependent treatment. However, the unclear anamnestic history and the absence of imaging signs of cerebral ischemia on MR scanning led us to reconsider the diagnosis of ischemic stroke. As expected, the evaluation of the patient with suspended sedation showed no neurological deficits. In cases of decreased consciousness, the indication for intubation should be carefully evaluated. This case report shows how anatomical variants, although rare, can challenge stroke diagnosis, particularly when neurological examination is lacking. Fetal origin of the PCA occurs on either the right or left side in around 10% or bilaterally in 8% of the general population [2]. The caliber of the posterior communicating artery may be equal to or greater than the ipsilateral P1 segment, and in the bilateral fetal type origin of the PCA, the P1 segment can be hypoplastic or aplasic. Monolateral P1 segment aplasia is present in 2% of cases [3], whereas bilaterally P1 absent is a rare condition. In an MR study of the circle of Willis, this variant was present in one out of 175 patients [4]. In this context, the basilar artery might have a hypoplastic appearance to CTA or MRA and can mimic a stenotic/occluded basilar artery.

In a time-dependent disease such as stroke, physicians need to take decisions in a few minutes, and the diagnostic process needs to be accurate and should take into account stroke mimics and chameleons. Although non-contrast head CT is often normal following acute stroke and is sufficient to administer intravenous thrombolysis, MR is superior to CT for the diagnosis of cerebral ischemia early after the acute event. However, a pooled meta-analysis showed an incidence of around 7% of DWI-negative strokes [5], and imaging findings should not guide stroke diagnosis. Stroke physicians should bear in

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Fig. 1: Thread-like basilar artery with stenosis in proximal segment on CTA (a) confirmed on TOF images (b), no signal alterations in any area of the brain parenchyma on FLAIR (c) and DWI (d) sequences.
mind the Latin say “post hoc, propter hoc,” meaning that the temporal relation does not imply the causal relation between two factors. In our case report, stroke diagnosis was made on the basis of the angio-CT finding, which was a “radiological” stroke mimic, without the support of the medical history and neurological examination, which remain the essentials for the diagnosis of stroke. Imaging findings may help but cannot substitute stroke physicians in revealing stroke, which is a clinical diagnosis.

Data Availability The data of this report are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate This work involves a human participant. Informed consent has been acquired.

Conflict of interest The authors declare no competing interests.

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