



## Case Report

# Normal MRI Stroke in a Resource-Limited Setting: About a Case

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### Summary

The sensitivity of brain MRI, the gold standard for the early diagnosis of ischemic stroke, is not 100%. False negatives can account for up to 10% in some series.

We report the case of a 61-year-old patient admitted in April 2023 in a hospital in Lubumbashi (DRC) with brachiofacial motor deficit right sudden onset and whose brain MRI performed more than 3 hours from the onset of signs had found no recent neurovascular lesion. A new MRI was performed more than 24 hours later and found a left superficial sylvian infarction.

Our case highlights the importance of educating physicians about the limitations of brain MRI and the need to adapt our stroke diagnostic strategy. In a resource-limited environment in which urgent revascularization therapies are not available, it seems wise to us to have urgent recourse to a brain scan without injection, which is much more available and which will effectively eliminate cerebral haemorrhage and initiate antithrombotic treatment.

**Keywords:** Stroke, Normal MRI, Resource-constrained setting

### Introduction

Stroke is the second leading cause of death and disability worldwide, with a disproportionate burden for low- and middle-income countries.

In both developed and developing countries, stroke remains a diagnostic and therapeutic emergency [1].

Stroke is ischemic (constituted or transient) in 80% of cases, hemorrhagic in 15% of cases. Subarachnoid hemorrhages account for 5% of cases.

Accurate and early diagnosis of stroke and determination of its type and even etiological subtype are important for treatment

decisions that can influence stroke recurrence, management and prognosis.

Imaging plays a major role in the diagnosis of stroke and facilitates the choice of the appropriate treatment. When a stroke occurs, the two brain imaging tests used are brain scan and brain MRI.

Early signs of cerebral ischemia on the CT scan without injection are inconsistent and difficult to interpret. However, coupled with the clinic, the CT scan allows the diagnosis of cerebral ischemia with an even greater probability as there are early signs of ischemia. In addition, it allows the diagnosis of cerebral hemorrhage with good sensitivity and specificity [2].

Brain MRI remains the modality of choice for the diagnosis of cerebral ischemia because it simultaneously visualizes the

ischemic focus regardless of its size or topography in all arterial axes [3].

Access to emergency MRI is still only possible in a few centers in the world. In low- and middle-resource countries, even when neuroimaging is available, patients may not have access to it due to the concentrated location in urban areas and the cost of the exam [4,5].

MRI also requires patients to be cooperative, which is not always the case in the context of acute stroke [1,6].

Note that in practice, the sensitivity of brain MRI for the diagnosis of ischemic stroke in the acute phase is not 100%. False negatives can exist especially in case of lesion of very small volume of about 1 ml, seen very early [7].

We report an unusual case of normal initial MRI cerebral ischemia in the acute phase in a region where brain imaging is still very inaccessible. The patient has given informed consent for the publication of this case report, including the images.

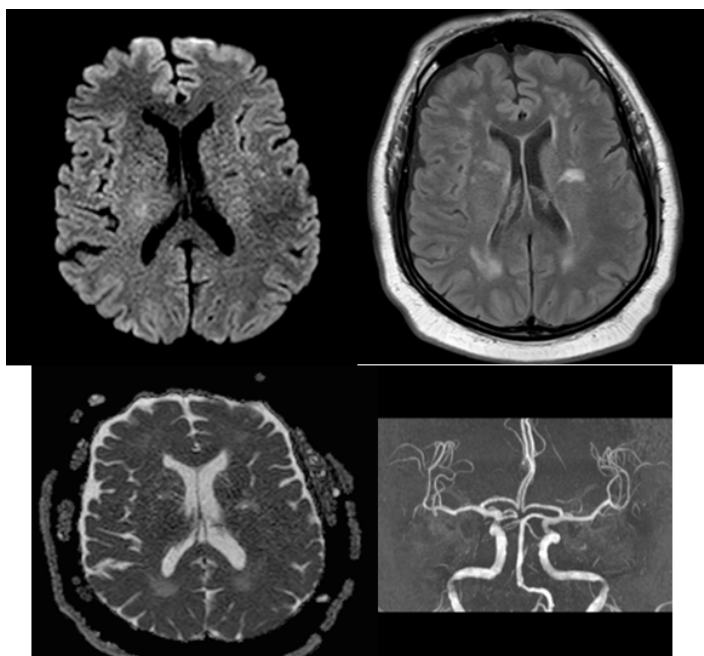
### Clinical Observation

He is a 61-year-old, basic autonomous person with a history of arterial hypertension.

The patient presented on 06/04/2023 at 13:40, a deviation of the mouth and a motor deficit of the right upper limb. He is admitted to the Urgences of the Neuropsychiatric Center Doctor Joseph Guslain of Lubumbashi (DRC) at 16:20. The haemodynamic parameters are normal, except for the blood pressure which is 170/110 mm Hg.

The neurological examination noted lucid consciousness (Glasgow score of 15), discrete right central facial paralysis (rated 1 in the NIHSS) and paresis of the right upper limb (scored at 2 in the NIHSS), or a NIHSS score of 3. The rest of the neurological exam is normal.

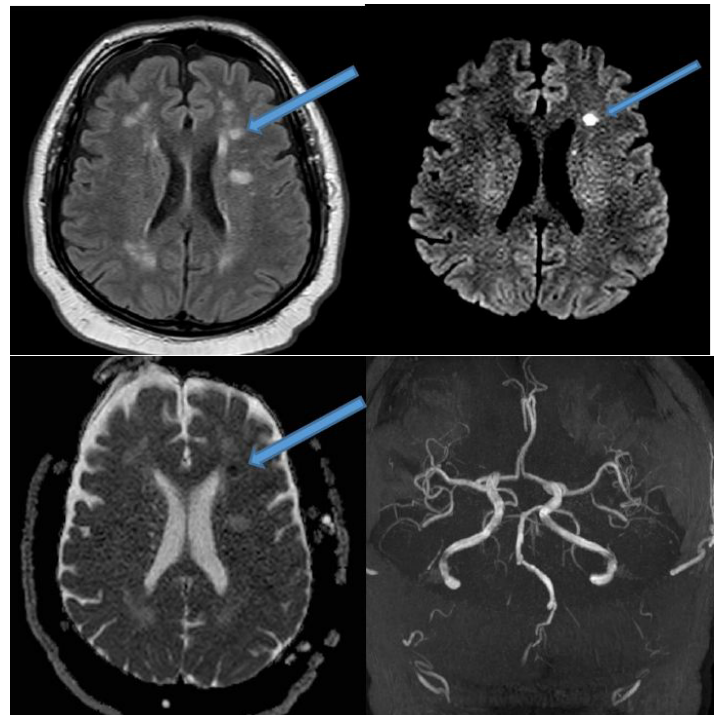
The MRI performed at 4:45 p.m., 3 hours and 5 minutes after the onset of signs, found no abnormality in favor of recent or semi-recent neurovascular involvement (Figure 1).



**Figure 1:** Initial brain MRI without recent infarction (Diffusion B1000, ADC, FLAIR and TOF sequences).

The patient is monitored in the Emergency Department and a bolus of Aspégic 250 mg is administered.

In front of the persistence of neurological signs, a control MRI is performed on 07/04 at 18 hours, more than 28 hours after the onset of signs, and shows hyper signal in Diffusion, in ADC restriction and already visible in Flair, in favor of a recent left superficial sylvian infarction.



**Figure 2:** Control brain MRI with visible infarction in Diffusion, ADC and FLAIR.

The etiological assessment is in favor of an atheromatous cause in a 61-year-old male subject, with calcified atheromatous plaques with non-significant stenosis of the left internal carotid artery, and total cholesterolemia at 4 g / l with LDL cholesterol at 2.8 g / l.

The patient was subsequently treated with Kardegic 160 mg and Simvastatin 20 mg. He was subsequently hospitalized in the intensive care unit for 72 hours for close monitoring; then in Internal Medicine until returning home.

The evolution was favourable with regression of symptomatology and return home on day 7 with NIHSS 0 and a modified Rankin score at 0.

No inter current complications were noted during the hospital stay.

A post-stroke medical follow-up was scheduled by the Neurologist with a first consultation scheduled three months after the stroke.

### Discussion

Brain MRI, especially the diffusion sequence is currently the gold standard test in the early diagnosis of ischemic stroke. Its sensitivity is estimated at around 90% [8].

Ischemic strokes with normal MRI are described in the literature. The vast majority of these cases are characterized by NIHSS core less than 5, small stroke, stroke involving posterior circulation and early imaging [9-11].

These particularities apply to our patient, except for the location of the lesion which concerns the anterior circulation in our case.

We did not find published cases in sub-Saharan Africa, or in low- and middle-resource countries in general. This would be explained by the low accessibility to MRI in these settings and the non-availability of revascularization therapies (intravenous thrombolysis and thrombectomy) for which the time window of effectiveness is very limited.

Note that, as in our case, the evolution is often good in these strokes with normal MRI [11].

Cerebral infarctions with normal initial MRI pose a problem of differential diagnosis with stroke mimics and transient ischemic attacks [12].

Stroke mimics (post-ictal deficit, migraine aura, conversion disorder, neurological deficit in a context of hypoglycaemia, etc.) can be particularly difficult to differentiate from an acute infarction when the symptoms are very brief and disappear before the patient be examined [12].

The clinical picture and the context of onset in our patient were not very suggestive of stroke mimics. The persistence of deficient neurological signs beyond 24 hours allowed us to eliminate the diagnosis of transient ischemic attack and motivated the realization of a new cerebral imaging.

The limit of our case lies in the non-availability, in our research environment, of advanced imaging that could facilitate the diagnosis and allow an informed therapeutic decision. Under these conditions, the diagnosis of stroke should be based essentially on the clinic with a well-researched anamnesis (in particular on the circumstances and mode of onset of the symptoms) and a well-conducted neurological examination.

### Conclusion

Normal brain MRI does not rule out the diagnosis of stroke in front of an evocative neurological picture. False negatives are found especially in case of infarction of small volume and early realization of the MRI.

This case is to our knowledge the first published in the DRC. It reminds us of the importance of clinical examination as the basis of any neurological diagnosis and the need to adapt our diagnostic strategy according to our environment.

### Conflicts of Interest

The authors do not declare any conflict of interest.

### Authors' Contributions

All authors contributed to the conduct of this work. All authors also declare that they have read and approved the final version of the manuscript.

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