

Cytotoxic Lesions of the Corpus Callosum (CLOCCs) Associated with SARS-CoV-2 Infection in West Africa (Côte d'Ivoire)

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Abstract

Background: Cytotoxic lesions of the corpus callosum (CLOCCs) represent a collection of disparate conditions that can cause a signal change in the corpus callosum, usually involving the splenium. CLOCCs is present in a variety of disorders, such as cerebral infarction, bleeding, multiple sclerosis, acute disseminated encephalomyelitis, glioblastoma, lymphoma, metabolic diseases, and infections. Since 2020, World Health Organization (W.H.O) defined Coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2, as a pandemic. Numerous CLOCCs cases have been reported in adults in particular in Japan, in China, and recently in children in Turkey associated with SARS-CoV-2. We report the first case of CLOCCs diagnosed in West Africa (Côte d'Ivoire) in an adult associated with SARS-CoV-2. **Case Report:** A 60 year-old-woman with a medical history of high blood pressure and diabetes, presented to the emergency department with confusion without fever. Neurological examination was normal apart from temporospatial disorientation. Brain magnetic resonance imaging (MRI) showed abnormal signals in the splenium of the corpus callosum (SCC). Forty-eight hours (48 h) after admission, the patient experienced a fever (temperature: 385°C), several episodes of hypoglycemia (capillary blood glycemia levels below 0.5 g/l) and a dry cough. Lung CT imaging showed typical features with ground-glass opacities. Oropharyngeal swab was positive for SARS-CoV-2 on reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assay. The clinical course was favorable. One month after disease

onset, a follow-up Brain MRI showed considerable regression of SCC abnormal signal. The multiple episodes of hypoglycemia and SARS-COV 2 infection were incriminated as the causal factors. **Conclusion:** The improvement of the technical platform in our context of work gives us the possibility to identify the etiological factors of this rare clinico-radiological entity.

Keywords

Africa South of the Sahara, COVID-19, Corpus Callosum

1. Introduction

Cytotoxic lesions of the corpus callosum (CLOCCs) represent a collection of conditions that can cause a signal change in the corpus callosum, usually involving the splenium. This term has been proposed recently as a more precise description of the phenomenon which has previously been known by a variety of terms including transient lesions of the splenium of the corpus callosum (SCC), mild encephalitis/encephalopathy with a reversible isolated SCC lesion (MERS), reversible splenial lesions syndrome (RESLES). CLOCCs is present in a variety of disorders, such as cerebral infarction, bleeding, multiple sclerosis, acute disseminated encephalomyelitis, glioblastoma, lymphoma, metabolic diseases, and infections [1]. Since 2020, World Health Organization (W.H.O) defined Coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2, as a pandemic. Numerous CLOCCs cases have been reported in adults in particular in Japan [1], in China [2], and recently in children in Turkey associated with SARS-CoV-2 [3]. We report the first case of CLOCCs diagnosed in West Africa (C te d'Ivoire) associated with SARS-CoV-2.

2. Case Report

On June 01, 2021, a 60 year-old-woman with a medical history of high blood pressure and diabetes, presented with a confusion without fever. On arrival, her blood pressure, temperature and oxygen saturation were normal. Neurological examination was normal apart from temporospatial disorientation. The initial laboratory tests including the complete blood count (CBC), complete blood ionogram, glycemia, thyroid hormone and heart enzyme tests were normal. Computed tomographic (CT) imaging of the brain was normal. Brain magnetic resonance imaging (MRI) performed 12 hours after the onset of confusion showed a focal hyperintense signal in the SCC on diffusion weighted images (DWI) and a low ADC value. T2-fluid-attenuated inversion recovery (FLAIR) and the TOF were normal (Figure 1). Cerebrospinal fluid (CSF) examination was normal (protein level, cytology, bacteriological examination). Forty-eight hours (48 h) after admission, the patient experienced a fever, several episodes of hypoglycemia and a dry cough. We noted the existence of a cough a few days before the onset of

confusion and the D-dimer performed was high. The possibility of a viral infection of the SARS-COV-2 type was evoked given the pandemic context. Lung CT imaging showed typical features with ground-glass opacities (**Figure 2**). Oropharyngeal swab was positive for SARS-CoV-2 and the patient was managed in a Covid treatment unit. She received symptomatic treatment: oxygen therapy, anticoagulants, glycemia management and antibiotics against bronchial superinfections. The clinical course was favorable, marked by the disappearance of the confusional syndrome and the negativity of the PCR test two weeks after his admission to the Covid treatment unit. The patient was discharged home. One month after disease onset, a follow-up Brain MRI showed considerable regression of SCC abnormal signal (**Figure 3**).

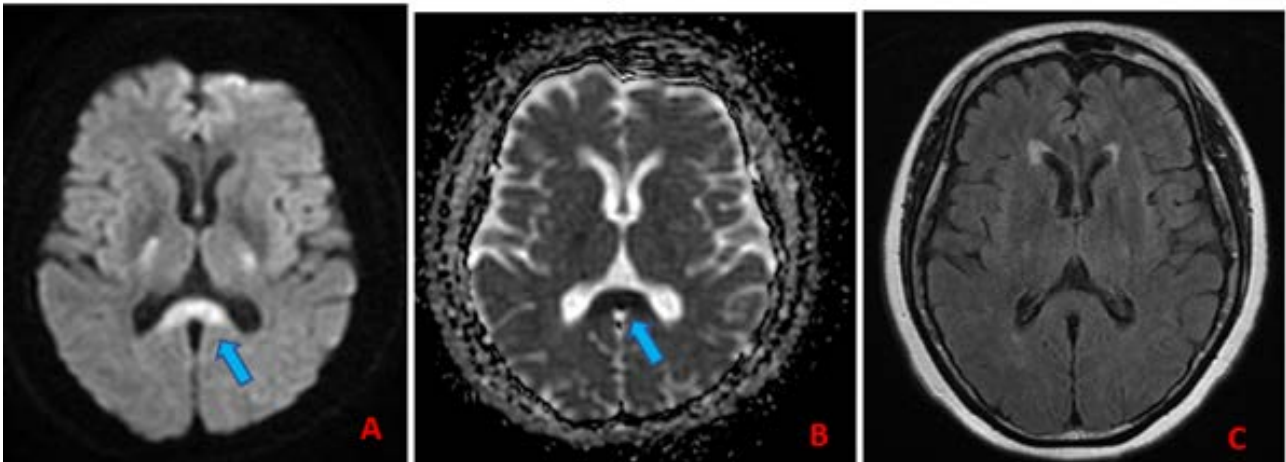


Figure 1. Brain MRI (June 2, 2021). (A) (diff B1000): hyper signal of the splenium of the corpus callosum (arrow); (B) (ADC): decreased ADC coefficient (arrow); (C) (FLAIR): no signal abnormality.

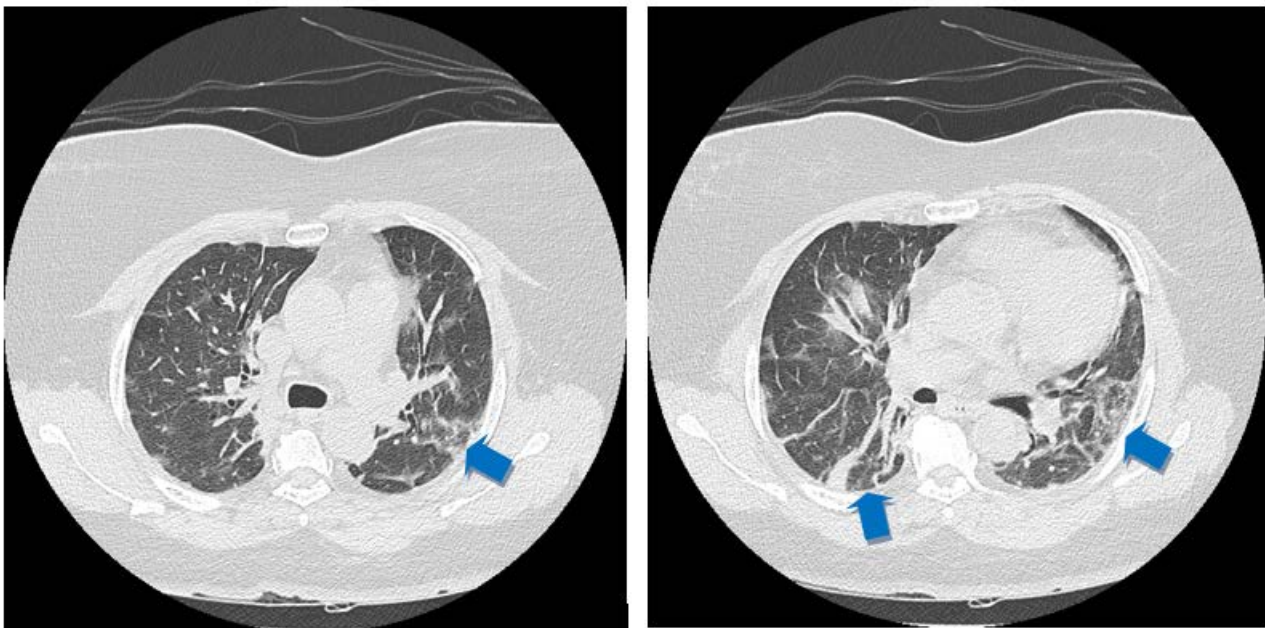


Figure 2. Chest CT (June 3, 2021): bilateral lung disease; ground-glass opacities and fibrous parenchymal bands (arrows).

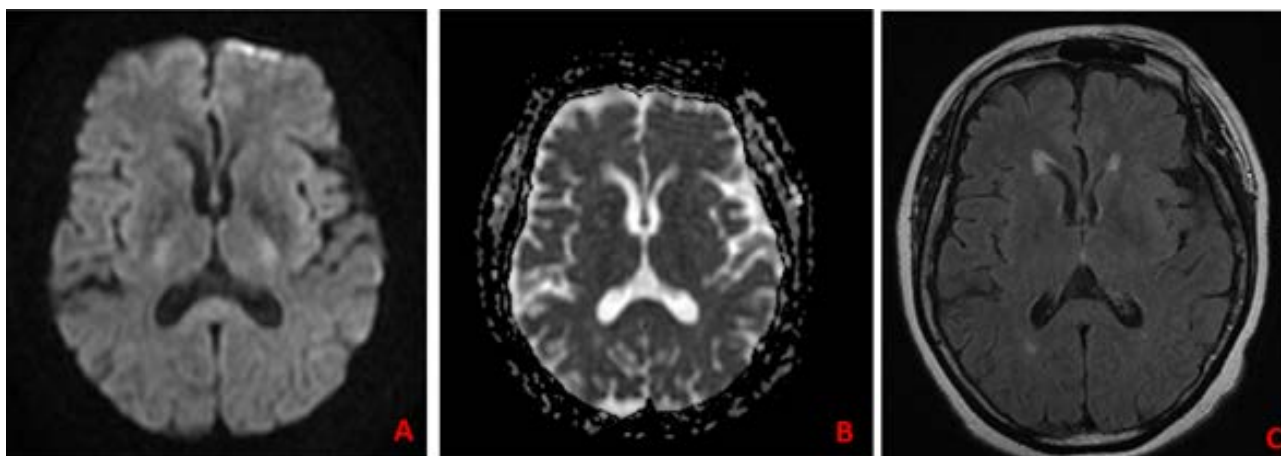


Figure 3. D 40 Follow-up brain MRI: (A) (diff): regression of the hypersignal of the splenium of the corpus callosum; (B) (ADC): no abnormality; (C) (FLAIR): no signal abnormality

3. Discussion

We, herein, described the first case of CLOCCs associated with SARS-COV-2 infection in West Africa (Côte d'Ivoire), presenting as a sudden onset confusional syndrome, after the two cases reported in a pediatric population by Gonca Bektas *et al.* [3] and the cases reported respectively by Hayashi *et al.* [4] and El Aoud [5]. CLOCCs is a rare clinico-radiological entity with numerous underlying etiologies identified. These lesions appear to result from a stereotyped cascade of cytokines and stimulated cells (macrophages, monocytes, T-cells, astrocytes) with a massive increase in glutamate in extracellular fluid, an influx of water into both astrocytes and neurons (cytotoxic edema) [2]. The reason why the splenium of corpus callosum is preferentially affected is the presence of a high density of oligodendrocytes expressing large numbers of glutamate affected receptors [2]. Various clinical presentations of CLOCCs have been reported, including agitation, disorientation, disturbed behavior or consciousness, comicality, and even transient ischemic attack [5]. Our patient presented with a sudden episode of disturbed consciousness, which initially suggested either a metabolic or vascular process, considering the history and the sudden onset of the disorder. The initial metabolic tests and the brain CT imaging were normal, which led to the performance of a MRI 12 hours after the onset of the disorders. Brain MRI showed a lesion of the SCC on DWI with a decrease in the ADC coefficient and normal FLAIR sequence. On the other side, Wen xu *et al.* [6] reported, in patients with CLOCCs, FLAIR hyper signal with DWI signal abnormalities and decreased ADC, for brain MRIs performed during a mean time of 5.36 ± 3.45 days after onset. Nevertheless, the normal FLAIR sequence, 12 hours after the onset, eliminates and ischemic stroke. Several etiological processes of CLOCCs have been reported in the literature, including antiepileptic treatments such as carbamazepine, phenytoin, vigabatrin, valproate, oxcarbazepine, levetiracetam, metabolic disorders such as hyponatremia [7] [8] [9], hypoglycemia [10], and infections, especially viral infections, with SARS-COV-2 [4].

4. Conclusion

CLOCCs is a rare clinico-radiological entity related to several causes including viral infections. The improvement of the technical platform in our context of work gives us the possibility to identify its etiological factors. The association of multiple episodes of hypoglycemia and covid 19 infection was the etiological factor highlighted.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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