Bilateral Basal Ganglia Infarction and Bilateral Thalamic Lesions in Sudanese Pediatric Patient with COVID-19 and Malaria Co-Infection, a Case Report

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Case Report

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Abstract

COVID-19 is of uncommon diagnosis in pediatric with their presentation in much of time of a nonspecific entity; here we experienced a case of two years old female with Malaria presented with fever, cough, rhinorrhea, hemoptysis and convulsion diagnosed as COVID-19, complicated with encephalitis, received treatment and improved over weeks.

Introduction

Since 2019 when the first SARS-CoV-2 case was reported in China, different and variable clinical presentations with a wide variety of symptoms have been documented by literature ranging from common manifestations to unfamiliar presentations. From multiple reported cases in early 2020 in China 2% of the victims were children [1]. Pediatric population tends to have relatively mild and non-specific symptoms compared to adults. Symptomatic infection is less common. In those with symptoms fever and cough is the most common manifestation [2–4]. Symptoms in children can be related to upper respiratory tract, pneumonia, or gastrointestinal symptoms. It can be classified to mild, moderate and severe infection. With severe infection occur less frequent and include respiratory distress, decrease oxygen saturation, cyanosis, feeding difficulties, loss of consciousness, seizures, or shock [12]. Cases may present with neurological symptoms related to either the peripheral nervous system or central nervous system. Literature reported paraparesis, headache, encephalopathy and epileptic seizures as sequel of COVID-19 [2, 3]. In this report we describe a child with COVID-19 and Malaria co-infection who presented with convulsions and prolonged loss of consciousness.

Case Presentation

Two-year Old previously well female presented with intermittent high grade fever, cough, and rhinorrhea for one day. Patient sought medical advice and her blood film for malaria (BFFM) came negative with high total white blood cells count (TWBC) and the patient received four doses of benzyl penicillin but with minimal improvement. One week later the patient developed high grade fever and sought advice, again BFFM was done and this time came positive. She was put on injectable artemether and ceftriaxone and discharged home. One day later the patient developed two attacks of generalized convulsion for two minutes and three minutes respectively with complete resolution between them and the patient was taken to ER where a 3rd attack of convulsions occurred during assessment which was associated with hematemesis, then the patient was unconscious after that.

On examination, the patient was vitally stable but deeply comatose; in decorticate position, with Glasgow coma scale (GCS) of 3. There was hypertonia with exaggeration of all reflexes in both upper and lower limbs bilaterally, with bilateral up going plantar reflex, her both pupils were in pinpoint shape but still reactive to light, with no other signs of other cranial nerves defect. The power couldn't be assessed. Cardiac examination was unremarkable. Her lung auscultation revealed diffuse crackles all over the chest, with normal air entry. Liver was palpable 4cm below the costal margin.

Investigations requested were unremarkable apart from leucopenia with lymphocytopenia; the result of RT-PCR for COVID-19 was positive (Table 1).

CT brain was done which revealed bilateral basal ganglia infarction (Figure 1). MRI was done later which revealed bilateral thalamic lesions due to viral encephalitis or vascular insult (Figure 2, Figure 3).

The patient received acyclovir, meropenem and ciprofloxacin for twelve days. Also artesunate for six days, dexamethasone for nine days and the patient was put on low flow oxygen and regular nasogastric tube feeding. The patient's condition was stable and her conscious level was improving slowly. She was discharged on GCS of 11.

Discussion

Here in we report a 2 year old patient with neurological manifestations associated with COVID-19 infection which is suspected due to the nature of symptoms, the low lymphocyte count and then confirmed by RT-PCR. Our findings on CT brain revealed bilateral basal ganglia infarction and MRI revealed bilateral thalamic lesions which we assume to be due to direct vascular insult or viral encephalitis. There is little data about neurological manifestations in pediatric patients with coronavirus disease. Potential differential considerations in a child with acute stroke include stroke, cerebral vasculitis, arterial dissection, genetic disorders and others [4]. The exact mechanism of stroke is not known yet. Direct contamination of mucosal linings is the main transmission route for SARS-CoV-2. An important role in activating the inflammatory system and chemical release is related to direct activation of the immune system, platelets, and endothelial cells by SARS-CoV-2. Vascular events including stroke may be due to the increased inflammatory responses through various mechanisms [5]. Vascular hemostasis and blood flow are maintained by endothelial cells. Cells respond to stimuli by secreting pro-inflammatory cytokines and increasing vascular permeability. Cytokines recruit immune cells, and combine with pro-coagulant factors to formulate a thrombus that captures pathogens, which may contribute to the development of stroke [5, 6]. Concerning encephalitis, there are two main possible routes of entry for SARS-CoV-2 to the central nervous system. One is through angiotensin-converting enzyme 2 receptors located on epithelial cells of the blood-cerebrospinal fluid barrier. The other is retrograde axonal transport of peripheral neural pathways such as through the olfactory mucosa in the nasal cavity [7]. Encephalitis clinical presentation can mimic stroke clinical presentation as documented in literature [8]. Regarding Malaria infection, there is not enough data regarding co-infection, but it's stated in the literature that most patients with co-infection were symptomatic at presentation. People who live in malaria endemic areas and get COVID-19 infection may be at a more vulnerable statue for developing severe COVID-19 infection if they were co-infected with malaria [9]. Which we assume attributed to the severity of the inflammatory response hence the patient's presentation. Our patient did not show clinical findings that suggest a multisystem inflammatory syndrome in children (MIS-C) or a Kawasaki disease– like presentation which are not uncommon in children with COVID-19 infection and associated with severe anemia and thrombocytopenia [10]. We did not find previous evidence in the literature that presents the association between bilateral basal ganglia infarction, COVID-19 and Malaria co-infection. A case of

encephalopathy and bilateral thalamic lesions in a child but with a multisystem inflammatory syndrome associated with COVID-19 has been reported in literature [11]. Although MRI showed bilateral thalamic lesion suggestive for infarction, we did not treat our patient as a stroke patient; yet she showed improvement after treating other underlying diseases, which is highly suggestive that the clinical picture of the patient was mainly not due to stroke, but might have been due to the viral encephalitis. Infarction might have been concomitant at the time of presentation and resolved later on its own. Such presentation is considered a challenge for physicians and careful evaluation is required to manage patients properly. We highlight the importance of careful evaluation, especially in areas endemic with Malaria, as co-infection with Malaria should be considered. We also emphasize on the importance of a careful neuro-evaluation when encountering patients with stroke or stroke like presentation. Physicians are to expect extra-pulmonary COVID-19 manifestations and to raise their level of suspicion for the disease.

Conclusion

COVID-19 infection in the pediatric age group is uncommon but levels of infection are rising. COVID-19 infection in paediatrics can present with extra-pulmonary manifestations. Encephalitis and stroke can present with a similar clinical picture so careful evaluation is important for proper management. Malaria co-infection may contribute to COVID-19 severity, so immediate action is required for better prognosis.

Declarations

Conflicts of interest:

All authors declare that there are no conflicts of interest.

Funding:

There was no fund.

Informed consents:

Considering the child was two year old both written and verbal consents were taken from his guardians (parents) in accordance with the general preoperative guidelines as well as consent to be the case of interest in this article.

Ethical approval;

Ethical approval was obtained from the Sudan State Ministry of Health.

Authors' contributions

All authors participated in planning the study, data collection, results and discussion sections.

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Table 1

Table 1: Investigation result

Test	Result	Normal range
CBC		
TWBC	2.7 x 10 ³	N.R 10-26
RBC	4.74 x 10 ⁶	N.R 4.1- 6.7
HGB	10.8 g/dL	
HCT	32.8 %	N.R 44-50 low
MCV	69.3 fl	102 – 115 low
MCH	22.7 pg	33 – 39 low
MCHC	32.9 g/dl	
PLT	299 x 10 ³ /	150 - 450
LYM%	39	N.R %20 -40
MXD %	14.6	1-15
NEUT%	46.4 %	
LYM	1.1 x 10 ³ / ml	2.5-10.5
NEUT	1.3 x 10 ³ / ml	
MXD	0.3	
RDW-CV	18.6	11 – 16
CRP	7	Up to 10
Bleeding profile		
INR	0.8	
PT	13.9	
PT Control	15	
Liver profile		
Total portion	6.5 g/dl	6.6-8.7
Serum albumin	3.9 g/dl	3.4-4,8
Bilirubin (Total)	0.2 mg/dl	Less than 1.1
Bilirubin (Direct)	0.1 mg/dl	Less than 0.3
Bilirubin (indirect)	0.1 mg/dl	

ALT (GPT)	27 U/L	Up to 45
AST (GOP)	37 U/l	Up to 42
ALP	232 U/L	Child 727
Urea and electrolytes		
Blood urea	55 mg/dl	10-50
Serum creatinine	0.5 mg/dl	F(0.6-1.1) M(0.7-1.4)
Na+	140 mmol/L	135-145
K+	4.5 mmol/L	3.5-5.0

Figures

Figure 1

CT brain was done which revealed bilateral basal ganglia infarction.

Figure 2

MRI reveals bilateral thalamic lesion due to viral encephalitis or vascular insult.

Figure 3

MRI reveals bilateral thalamic lesion due to viral encephalitis or vascular insult.

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