Annals of Medicine and Surgery 75 (2022) 103400

Contents lists available at ScienceDirect

Annals of Medicine and Surgery

journal homepage: www.elsevier.com/locate/amsu

Case Report

Severe SARS-COV-2 infection in pediatric patient with atypical Hemolytic Uremic Syndrome: A case report

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ARTICLE INFO

Keywords:
SARS-COV-2
Atypical
Hemolytic uremic syndrome
Pediatric

ABSTRACT

Introduction and important: There is a high incidence of acute kidney injury with COVID-19 infections. We report a child with atypical Hemolytic Uremic Syndrome (aHUS) admitted to Intensive care Unit (ICU) due to severe SARS-COV-2 infection. Children are recognised as at lower risk of severe COVID-19 compared with adults, but the impact of atypical Hemolytic Uremic Syndrome is yet to be determined.

Case presentation: An eleven years old male presented to Mohammed Alamin Hamid Pediatric Hospital with generalize body swelling, skin rash and red urine. Examination reveal hepatomegaly and hemic murmur. Investigations reveal anemia, normal platelets, and impaired renal function. Peripheral blood picture shows shistocytes, crenated RBCs, occasional poikilocytes and mild neutrophilia.During hospital stay the patient developed severe shortness of breath and fever, diagnosed as COVID-19 and required ICU admission 2 days later due to severe respiratory compromised.

Clinical discussion: An atypical Hemolytic Uremic Syndrome with normal platelets is extremely rare condition. SARS-COV-2 infection in patients atypical Hemolytic Uremic Syndrome has not been reported in literature.

Conclusion: Our study shown that severe SARS-COV-2 infection can be developed in pediatric patients patients with co-existing atypical Hemolytic Uremic Syndrome.

1. Introduction

Since December 2019, an outbreak of severe acute respiratory infection (SARS-COV-2) had emerged in Wuhan City, the capital of Hubei Province, China, driving an atypical pneumonia (COVID-19) [1]. A retrospective analysis showed that SARS can cause elevated serum creatinine and acute tubular necrosis, implying renal function damage in patients infected with SARS-CoV [2].

The Hemolytic Uemic Syndrome in pediatrics is classified into two categories: typical hemolytic Uremic Syndrome with a diarrheal prodrome, and atypical Hemolytic Uremic Syndrome without diarrheal prodrome. Typical disease represent up to 90% of children with the Hemolytic Uremic Syndrome, commonly presenting before school age, with acute onset of bloody diarrhea precipitated by verotoxin-producing bacteria such as *Escherichia coli* O157:H7 [3]. Although many affected children have severe acute kidney injury, the majority regain effective function [4].

The classic triad of HUS is microangiopathic hemolytic anemia, thrombocytopenia, and acute renal failure. HUS presenting with normal platelet count is extremely rare [5,6]. A normal platelet count in the setting of anemia and renal failure typically leads the clinician to alternative diagnoses.

This study highlights a rare case of atypical Hemolytic Uremic Syndrome that is commonly missed in real practice. To our knowledge no study highlighted the severity of SARS-COV-2 infection in pediatric patients with atypical Hemolytic Uremic Syndrome. This work has been reported in line with the SCARE 2020 criteria [7].

2. The case

We present eleven years old male presented to Mohammed Alamin Hamid Pediatric Hospital with generalize body swelling, skin rash and red urine. The condition started with sorethroat diagnosed initially as tonsillitis and received Amoxicillin-clavulanic acid. Then the patient received medical advice initially at primary health center and labelled to have allergic reaction manifested with papular skin rash with complete response to antihistamine. One week after that the patient developed generalize body swelling, red urine and decreased urine out-put.

On examination patient was I'll, not distress, afebrile, BP was 100/70, pulse rate was 75, respiratory rate was 26, and oxygen saturation

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https://doi.org/10.1016/j.amsu.2022.103400
Received 24 January 2022; Received in revised form 10 February 2022; Accepted 21 February 2022
Available online 24 February 2022

was 98%. The patient had hemic murmur and Hepatomegaly. Investigations reveal impair renal function, urine analysis show unaccountable red blood cells and granular cast (Table 1). The eGFR was 13 mL/min/1.73m2. Pt received antibiotics, amilodepine, furosomide and pulse methyl prednisolone regimen without improvement. Due to late presentation the patient was on plasma transfusion and regular hemodialysis. During hospital stay the patient developed severe shortness of breath and fever. PCR for SARS-COV-2 infection was positive. Patient received Paracetamol 500mg, Aspirin 100 mg, Vitamin D, Dexamethasone 6 mg according to protocol developed by Case Management Committee, Federal Ministry of Health, Sudan [1]. Patient's oxygen saturation maintained with high follow through face mask. Two days later the patient was admitted to ICU due to severe respiratory compromise.

3. Discussion

We describe a case of 11 years old with features of atypical Hemolytic uremic syndrome infected with COVID-19.

Atypical hemolytic–uremic syndrome occurs at any age, and the onset tends to be insidious, often with marked hypertension; relapses occur that lead ultimately to end-stage renal disease [4]. Unlike typical HUS there is no specific prodromal diarrheal illness, although atypical Hemolytic Uremic Syndrome may occur after or simultaneously with illness, and severe pneumococcal disease associated with 30–40% of pediatric cases [8]. Absence of diarrheal prodrome is essential to differentiate between typical and atypical HUS. Some types of Streptococcus pneumoniae produce a neuraminidase that cleaves sialic acid residues from renal endothelial cells, thereby exposing the Thomsen–-Friedenreich (T) antigen to an anti-T immunoglobulin commonly found in the plasma, leading to endothelial damage and thrombotic microangiopathy [9].

COVID-19 is also associated with a pro-thrombotic state with increased risk of thrombosis and disseminated intravascular coagulation (DIC) [10,11]. Our search report a cases of COVID-19 in HUS patients in both adult and children. Ville et al. reported a case of atypical HUS relapse in a 28-year-old woman who was positive for COVID-19 [12]. Another study report a 16-month-old boy, presented with COVID-19, new onset DKA, hemolytic anemia, thrombo-cytopenia and kidney failure. He was given a trial of fresh frozen plasma, however there was no improvement [13].

It has been reported in the past that trombotic micro-angiopathy/atypical HUS can relapse in the setting of viral illnesses like infuenza. Some authors have suggested adding COVID-19 as a triggering factor for a HUS relapse.

4. Conclusion

We presented a case severe SARS-COV-2 infection in a child with **atypical** Hemolytic Uremic Syndrome with normal platelets and absence of diarrheal prodrome.

Data sharing statement

The datasets referred to in this case report are available from the corresponding author on reasonable request.

Ethical approval

N/A.

Sources of funding

N/A.

Table 1
Initial investigations.

Investigation	Result
Hemoglobin	6.8 g/dl
MCV	75 fL
MCH	24.3 pg
MCHC	30 g/dl
Platelets	267 × 10^3/μl
TWBCs	9.8 × 10^3/μl
Retics	5.5%
ESR	75 mm/1 hr
Urea	107 mg/dl
Creatinine	6.3 mg/dl
Sodium	133 mmol/l
Potassium	3.3 mmol/l
Serum albumin	5.6 g/dl
Total bilirubin	7.6 mg/dl
Direct bilirubin	6.4 mg/dl
Total proteins	7.6 g/dl
Globulins	2 g/dl
ALP	96 IU/L
AST	54 IU/L
ALT	27 IU/L
PT	21 sec
PTT	55 sec
INR	1.42
CRP	18.5 mg/dl
ASO titer	less than 200
Urine RBCs	uncountable
Urine pus cells	Uncountable
Urine granular casts	++
Urine protein	++
Peripheral blood picture	Shistocytes, crenated RBCs, occasional poikilocytes and mild neutrophilia
C3 level	32 mg/dl
C4 level	28 mg/dl

Author contribution

The corresponding author made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

Conflicts of interest

We declare no conflict of interests.

Provenance and peer review

Not commissioned, externally peer reviewed.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. Patient's parents have given consent for possible publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Research registration

N/A.

Guarantor

The corresponding author, Salih Boushra Hamza is the Guarantor for this manuscript.

Acknowledgement

Special thanks to doctor Sara Abdelsalam, Omer Aljak, Salma Khairy, Hala and Enas abdelbagi for their great help.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.103400.

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