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Case Report

Differentiating Shock Associated with Multi-inflammatory Syndrome in COVID-19 and Dengue – A Case Report

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ABSTRACT

In India where dengue is endemic, differentiating dengue shock and shock due to multi-inflammatory syndrome in COVID become important. Only a few case reports of such cases are present in the literature and we describe a child who was being managed as dengue developed shock and fitted in definition of multisystem inflammatory syndrome in children (MIS-C). She had positive for dengue NS1 and had raised COVID-19 antibodies. Her capillary refill time was prolonged and her blood pressure was 72/37 mm of Hg. In view of shock, she was given fluid bolus and started on adrenaline infusion. She was given intravenous immunoglobulin and methyl prednisolone. With this management, she improved. When we consider type of shock in dengue, it is narrow pulse pressure, while in our child, this was wide pulse pressure. Hence, we decided to treat with inotropes after initial fluid bolus of 20 mL/kg. We conclude that while differentiating dengue shock from MIS-C shock, pulse pressure may be important adjunct.

Keywords: Dengue, Ionotropes, Multi-inflammatory syndrome in COVID: Shock

INTRODUCTION

The present pandemic of COVID-19 is presenting many new challenges in diagnosis and management as we go along. In India where dengue is endemic, differentiating dengue and COVID becomes important. COVID-19 in children has many facets and one important is multisystem inflammatory syndrome in children (MIS-C), which may present as shock or Kawasaki disease. In a critically ill child with shock with positive dengue test and also having features of MIS-C, it becomes important to differentiate between two aetiologies. Only a few case reports of such cases are present in the literature and we describe a child who was being managed as dengue developed shock and fitted in definition of MIS-C.

CASE REPORT

A 5-year-old girl presented with complaints of high-grade fever of 5 days duration, poor oral intake and reduced urine output for 2 days duration. She tested positive for dengue NS1 on day 3 of fever. As she continued to have fever and developed other symptoms, her parents brought her to our hospital. At the time of hospital admission, she was looking sick and lethargic, had

erythematous rash all over her body, tongue and lips were red, with peeling and cracking of mucosa over lips and her eyes were congested. Capillary refill time was prolonged (6 s), blood pressure was 72/37 mm of Hg, pulse rate (PR) – 132/min, peripheries were cold and oxygen saturation was 81% at room air. On respiratory system examination, bilateral air entry was good and there were no adventitious sounds. In view of shock, she was given fluid bolus and started on adrenaline infusion. Her initial laboratory reports were as per [Table 1].

She was started on intravenous immunoglobulins (IVIG) (2 g/kg) over 24 h and methylprednisolone (2 mg/kg/day). Echocardiography was done which showed normal cardiac function and coronaries.

With above management she improved, fever and rash subsided within 48 h, blood pressure stabilised, and noradrenaline was tapered off by day 3 of admission. Her N terminal pro brain natriuretic peptide (NT pro-BNP), which was 297 ng/L at the time of admission, increased to 14100 ng/L on day 3 of admission, and gradually subsided with treatment. She developed respiratory distress on day 5 of admission likely due to fluid overload needing high-flow nasal cannula support and improved after deresuscitation with frusemide.

She developed hypoalbuminemia was corrected with Injection Albumin 1 g/kg infusion. She developed gum bleeding on day 4 of admission which subsided after stopping low molecular weight heparin (LMWH). She was discharged on day 9 of admission and was asymptomatic on follow-up.

Table 1: Investigation profile of the patient.

Reports	05/12	Reference range
Hb (g/dL)	8.9	11.0–14.05
Hematocrit (%)	25.8	30–40
TLC (thousand/µL)	3600	4–11
Plt (thousand/µL)	160	150–450
CRP (mg/L)	29.1	0–10
S. Alb (g/dL)	2.7	3.8–5.4
Calcium (g/dL)	8.9	8.5–10.1
Na (mmol/L)	127	132–141
ALT (U/L)	1573	0–32
AST (U/L)	329	0–31
PT (sec)	13.5	11.4–13.7
APTT (sec)	28.9	27–40
Urea (mg/dL)	15	14.9–38.34
Creatinine(mg/dL)	0.5	0.6–1.1
Ferritin (ng/mL)	>2000	7–140
D-dimer (µ/L)	7630	<500
Nt Pro-BNP (ng/L)	297	23–327
IL-6 (ng/mL)	138.2	<35
SARS CoV-2 spike IgG quantitative Abs (AU/mL)	2590.2	<50.0: Negative >50.0: Positive
COVID CBNAAT	Positive	
COVID-19 RT PCR	Negative	

Hb: Hemoglobin, TLC: Total leucocyte count, Plt: Platelet count, CRP:C-reactive protein, S Alb: Serum Albumin, Na: Sodium, ALT: Alanine transferase, AST: Aspartate transferase, NT Pro BNP: N Terminal Pro Brain Natriuretic Peptide, IL-6: Interleukin-6, SARS: Severe acute respiratory syndrome, COVID CBNAAT: Coronavirus Disease cartridge-based nucleic acid amplification test,COVID 19 RT-PCR: Corona virus disease-19 reverse transcriptase polymerase chain reaction

DISCUSSION

COVID-19 has been a teacher for the medical fraternity. Paediatricians learned to deal with various presentations of COVID, out of which MIS-C has proven to be most common of the serious complications requiring intensive pediatric intensive care unit (PICU) management. Only a few cases reports in the literature describe patients presenting with shock for whom dengue test is positive and they also fit in definition of MIS-C.[1-3] or Pediatric Inflammatory Multisystem Syndrome- temporally associated with SARS-CoV-2 criteria (PIM-TS criteria). Gradually, it became clear that MIS-C maybe has presentation such as kawasaki disease (KD) or shock. The management has been similar to KD with intravenous immunoglobulins (IVIg) ± steroids. In tropical countries, other common aetiologies of shock needed to be ruled out. Children having dengue with acute COVID infections or MIS-C have also been reported.[4] Dengue shock is common cause of death in PICU.[5]

Our child was initially treated for dengue and was referred to our institution for dengue shock. However, she had almost all clinical criteria of MIS-C. In this setting, dilemma was to decide whether to treat dengue shock with fluids or treat aggressively with inotropes, IVIg and steroids. Both dengue and MIS-C may have high-grade fever, rash, haemorrhagic manifestations and shock.[6,7]

When we consider type of shock in dengue, it is narrow pulse pressure while in our child, this was wide pulse pressure.[6] Hence, we decided to treat with inotropes after initial fluid bolus of 20 mL/kg. Others also have described wide pulse pressure shock in MIS-C.[8-10] Her haemoglobin was 8.9 g/dL, haematocrit – 25.8% and platelets were 1.6 lakhs/cmm. Low haematocrit was also not in favour of dengue shock syndrome. Platelet count although was on lower side but not likely to suggest severe dengue. As described by Samprathi *et al*., severe dengue, with fever, abdominal symptoms, rash, shock, myocardial dysfunction and bicytopenia closely mimics MIS-C. Oral mucosal findings, raised inflammatory parameters, anaemia and coronary artery abnormalities if present can differentiate MIS-C from dengue fever.[1] Ranjit *et al*. also described that dengue shock syndrome patients are significantly less likely to have systemic inflammatory response syndrome, be tachycardic and have a narrower pulse pressure at admission

when compared with SS patients.[11] Hence, we conclude that while differentiating dengue shock from MIS-C Shock, pulse pressure may be important adjunct.

CONCLUSION

Pulse pressure can help in differenting dengue shock from shock due to mulTi inflammatory syndrome in COVID.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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