Case Report

Hepatitis A Virus-Induced Macrophage Activation Syndrome in a Child: A Case Report

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ABSTRACT

Macrophage activation syndrome (MAS) is characterized by high fever, hepatosplenomegaly, lymphadenopathy, cytopenia, liver dysfunction, and coagulopathy. MAS is a group of hemophagocytic disorders that can be primary or secondary. Primary hemophagocytic lymphohistiocytosis (HLH) is due to an underlying genetic abnormality. Secondary HLH is commonly associated with autoimmune diseases, malignancies, or infections. Although the incidence of hepatitis A virus (HAV) is high in children, there are few cases reports of HAV-associated hemophagocytic syndrome.

Keywords: Macrophage activation syndrome (MAS), Hemophagocytic lymphohistiocytosis (HLH), Hepatitis A

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Introduction

Macrophage activation syndrome (MAS) is a potentially life-threatening condition caused by excessive activation and expansion of macrophage and cytotoxic T cells. It is characterized by high fever, hepatosplenomegaly, lymphadenopathy, cytopenia, liver dysfunction, and coagulopathy.[1] MAS is a group of hemophagocytic disorder which includes hemophagocytic lymphohistiocytosis (HLH) can be either primary or familial, that occurs due to underlying genetic defect, or secondary, associated with autoimmune diseases, malignancies, or infections. Infection associated MAS most commonly occurs due to viral infections of herpes group and Ebstein Barr virus (EBV) is the commonest cause.[2] Although the incidence of hepatitis A virus (HAV) is high in children, there are few cases reports of HAV-associated hemophagocytic syndrome.[3]

Case report

Zarif, a 4-year-6-month-old boy, 1st issue of a non-consanguineous parent, immunized per EPI schedule, hailing from Noakhali, got admitted into Dhaka Medical College Hospital on 19/11/2024 with complaints of fever for 20 days, jaundice for 15 days which was associated with anorexia, nausea, vomiting, and occasional abdominal pain. The fever was initially low grade but was high in the last 5 days and continued in nature. Jaundice also gradually deepened day by day. There was no H/O altered sleep pattern or bleeding manifestation. Despite supportive treatments with antibiotics (Ceftriaxone and Doxycycline), his condition was gradually deteriorating, and he was referred to DMCH for better management. On examination, he was conscious, and oriented but looked sick,

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moderately pale, deeply icteric, distended abdomen, and nontender hepatomegaly (5 cm from right costal margin), and ascites were noticed. Respiratory systems revealed R/R – 38/min, a feature of pleural effusion in the lower part of the right lung. There was no lymphadenopathy, bony tenderness, signs of meningeal irritation, petechiae, purpura, or ecchymosis on the skin survey, GCS 15/15, jerks were regular, bilateral plantar flexor; there were no signs of encephalopathy. Other systems revealed normal findings.

His workup revealed Hb -7.8 g/dl, platelet 147k, WBC – 3460 U/L, PBF showed normocytic normochromic anaemia with leukopenia, S. Bilirubin 7.38 mg/dl, S. SGPT 2692 U/L, S. SGOT 2927 U/L, S. ALP 428U/L, PT 15.7 s, INR 1.43, S. CRP 41.7 mg/dl and anti-HAV IgM positive. ICT for malaria and kala azar negative, USG of the whole abdomen showed acute hepatitis with mild hepatosplenomegaly with mild ascites and bilateral moderate pleural effusion.

The patient was getting empirically in Meropenem and Amikacin along with antiemetic, antipyretic, lactulose, and vitamin K One. As there was no clinical improvement, all antibiotics were held for 2 days, and then blood C/S and urine C/S were sent, which showed no growth. S. Ferritin 15944.84 ng/ml, S. Fibrinogen 198.2 mg/dl, S.LDH 870U/L, S.TG 626 mg/dl, D.dimer 1.01 microgram/ml, S.ANA, S. Anti ds DNA, S. Anti smith ab were not detected, S. Ceruloplasmin and 24 hr urinary copper were within standard limit. Bone marrow study revealed reactive hyperplasia with a marked increase in reticulo-endothelial activity.

Zarif was started on treatment within. Methylprednisolone for 5 days. Following this, there was rapid clinical improvement. The patient became playful and regained appetite; fever, jaundice, and pallor subsided; abdominal girth and liver size were reduced.

He was discharged with oral prednisolone and advised to visit 10 days later for follow-up. He utterly recovered on his 1st F/U visit, and his lab workup (CBC, S. SGPT, Ferritin, Triglyceride) was within standard limits.

Discussion

Acute hepatitis A infection is usually a self-limiting disease, and in children, it may be unapparent, anicteric, or icteric. Jaundice is present in only 10% of children younger than 6 years, 40% of children aged 6-14 years, and 70% of children older than 14 years. Hematological complications of HAV are aplastic anaemia, virus-associated hemophagocytic lymphohistiocytosis (VAHLH), and thrombocytopenic purpura. VAHLH is an infrequent severe complication of HAV infection. HAV is more commonly associated with MAS than Hepatitis B or hepatitis C.[5]

MAS is a group of hemophagocytic disorders that leads to overwhelming inflammatory reactions caused by excessive activation and macrophage and cytotoxic T-cell expansion. Secondary HLH is commonly associated with autoimmune diseases, malignancies, or infections. Infection-associated MAS most commonly occurs due to viral infections of herpes group, and Ebstein Barr virus (EBV) is the commonest cause.[2]

MAS is diagnosed based on clinical features, including recurrent fever, hepatosplenomegaly, lymphadenopathy, jaundice, neurological symptoms, and laboratory findings, including cytopenia, hypofibrinogenemia, coagulopathy, and elevated levels of ferritin, transaminase, and triglycerides. Our patient was previously healthy, but he was diagnosed with a case of HAV infection due to high-grade continuous fever, hepatosplenomegaly, raised ALT, INR, cytopenia, hypertriglyceridemia, and hyperferritinemia.

However, there are only a few hepatitis A virus-induced MAS cases in children reported. Russo et al. and Deena et al. reported that two kids and one kid, respectively, with systemic juvenile idiopathic arthritis, developed hepatitis A-induced MAS.[3,6] However, four cases were previously healthy.[7,8]

Conclusion

We discussed the case of a 4-year-6-month-old boy who developed hepatitis A-induced MAS. Following treatment with I/V methylprednisolone and corticosteroid, the patient had a complete reduction of his clinical symptoms and laboratory abnormalities.

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