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Acute Viral Hepatitis with Severe Haemolytic Anaemia- Hep A/E dual Infection with G6pd Deficiency in an Indian Female Child: A Case Report

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Abstract

Background: Dual-infection with Hepatitis A & E has been reported. Its co-presence with Glucose 6-Phosphate Dehydrogenase (G6PD) deficiency is rare especially in female.
Case chacterstics: An 8yrs old female child with Hep A & E dual infection, later on she developed severe anemia.
Observation: Severe anemia was related to intravascular haemolysis; on further evaluation G6PD deficiency was documented. She responded well to conservative treatment and PRBC transfusion.
Conclusion: G6PD deficiency should be ruled out in cases of acute viral hepatitis with severe anemia.

Keywords: G6PD deficiency, Dual infection, intravascular haemolysis, severe anemia

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Introduction

Acute viral hepatitis is a major public health problem worldwide [1,2]. Hepatitis A and Hepatitis E viruses are the most common cause of acute viral hepatitis that mainly affects the pediatric age group. Hepatitis A and Hepatitis E both Viruses are transmitted through enteral route and there are postulations that their co-infection might be associated with a more severe natural course of illness and increased mortality specially in pediatric patients. Incidence of infection is more in non affluent countries like India due to sub-optimal hygiene and sanitary conditions[3]. Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency is inherited in an X- linked manner. The prevalence of G6PD deficiency in Indian population is very low, reported approximately 2.2 - 14% (as in a study in northern Indian population), and in females prevalence is much lower[4]. In India, many cases of acute viral hepatitis (A/E) with G6PD deficiency has been reported in adults[4,5,6,7] and no such case has been reported in female child with best of our knowledge. We are reporting an unusual case of dual infection: Hepatitis A & E with G6PD deficiency in a female child from a tertiary care centre of northern India, presented as acute viral hepatitis induced liver failure with severe haemolysis.

Case Summary

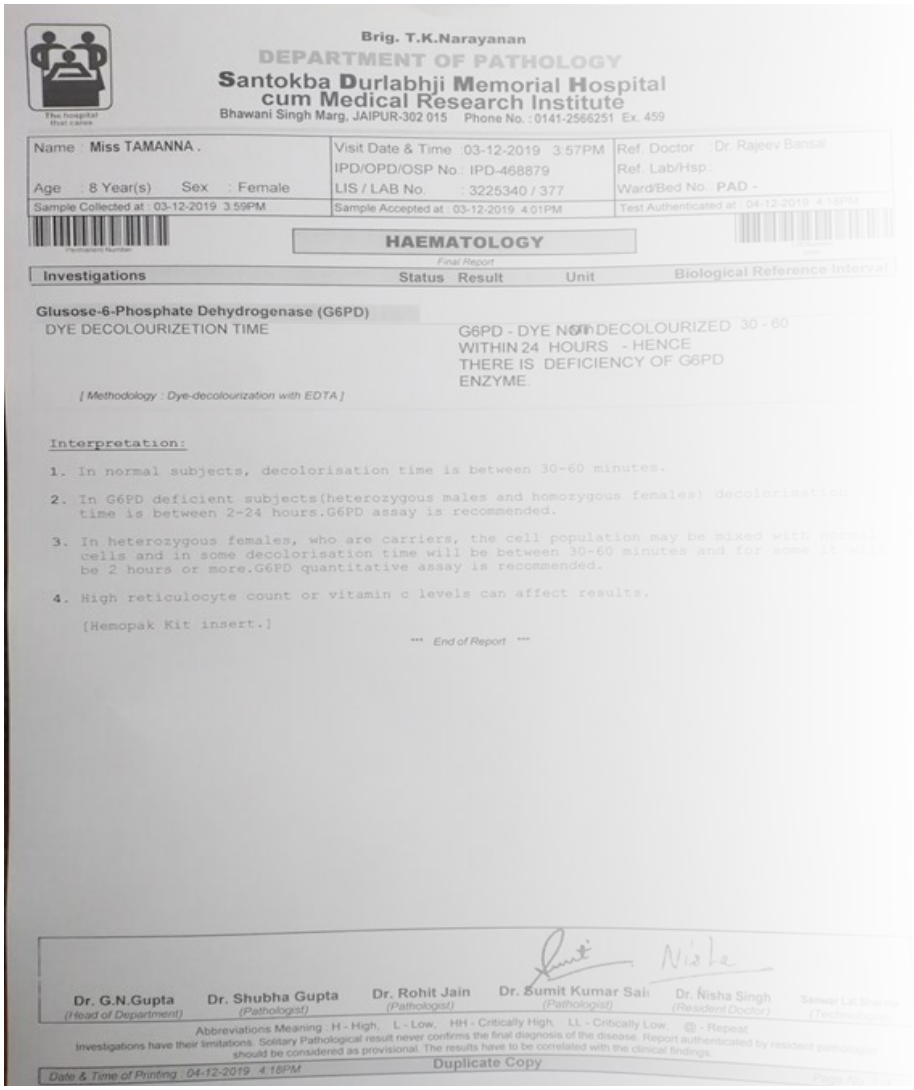
An 8yrs old female child from Rajasthan, India, presented at ED with acute history of brief febrile illness followed by vomiting, upper abdominal pain, yellowish discoloration of body for a week along with altered mental status from last 2 days.
At the time of PICU admission, child had encephalopathy along with tender hepatomegaly (3cm BCM) and deep icterus. Investigations (Tab 1) showed deranged coagulation profile (PT/INR: 2.52) and liver enzymes (AST: 3735 , ALT: 2395). USG abdomen showed altered hepatic echotexture with minimal B/L pleural effusion & ascitis. On

further etiological evaluation, serology for both Hepatitis A & E was positive. Hence, child was treated as Hepatitis A & E dual infection induced acute liver failure with hepatic encephalopathy.

	DAY1	D2	D3	D4	D5	D6	D7	D8	D9
AST[1]	3735					321			
ALT[2]	2395					570			
S. Bill	24.7		25.5			12.2			
Ammonia		69							
PT/INR	2.52	1.87	1.66	1.64	1.51	1.54	1.54	1.38	1.28
Haemoglobin	7.6	5.8	6.0		10.1 (post transfusion)				
LDH[3]			1338						
Reticulocyte			14%						
Coombs			Neg.						
Urine Hburia			+ve						
IgM Anti HAV			+ve						
IgM Anti HEV			+ve						
G6PD (Dye decolourization time)			Def.						
Ceruloplasmin			N (23.0)						
Dengue serology			Neg						
Scrub serology			Neg						
MP parasite/Rapid			Neg						
WIDAL test									

Table1: Important Lab findings

Patient also developed severe anemia (Hb:5.8 gm) with reticulocytosis (14%), raised LDH (1338) and occult blood in urine. Workup for autoimmune hemolytic anemia was done which showed negative coomb's test & normal IgG level. On further evaluation, the child was known to have G6PD deficiency (Fig 1). Other causes of hemolytic anemia with acute liver decompensassion were ruled out i.e. Malaria, Dengue, Leptospiral infection, Ricketessial diseases, Wilson`s disease and Typhoid.



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Name : Miss TAMANNA .	Visit Date & Time : 03-12-2019 3:57PM	Ref. Doctor : Dr. Rajeev Bansal
	IPD/OPD/OSP No. : IPD-468879	Ref. Lab/Hsp :
Age : 8 Year(s) Sex : Female	LIS / LAB No. : 3225340 / 377	Ward/Bed No. : PAD -
Sample Collected at : 03-12-2019 3:59PM	Sample Accepted at : 03-12-2019 4:01PM	Test Authenticated at : 04-12-2019 4:18PM

HAEMATOLOGY
Final Report

Investigations	Status	Result	Unit	Biological Reference Interval
Glusose-6-Phosphate Dehydrogenase (G6PD) DYE DECOLOURIZETION TIME		G6PD - DYE NOT DECOLOURIZED WITHIN 24 HOURS - HENCE THERE IS DEFICIENCY OF G6PD ENZYME.		30 - 60

[Methodology : Dye-decolourization with EDTA]

Interpretation:

1. In normal subjects, decolorisation time is between 30-60 minutes.
2. In G6PD deficient subjects(heterozygous males and homozygous females) decolorisation time is between 2-24 hours.G6PD assay is recommended.
3. In heterozygous females, who are carriers, the cell population may be mixed with normal cells and in some decolorisation time will be between 30-60 minutes and for some it will be 2 hours or more.G6PD quantitative assay is recommended.
4. High reticulocyte count or vitamin c levels can affect results.

[Hemopak Kit insert.]

*** End of Report ***

Dr. G.N.Gupta (Head of Department) Dr. Shubha Gupta (Pathologist) Dr. Rohit Jain (Pathologist) Dr. Sumit Kumar Sai (Pathologist) Dr. Nisha Singh (Resident Doctor)

Abbreviations Meaning : H - High, L - Low, HH - Critically High, LL - Critically Low, @ - Repeat
Investigations have their limitations. Solitary Pathological result never confirms the final diagnosis of the disease. Report authenticated by resident pathologist should be considered as provisional. The results have to be correlated with the clinical findings.

Date & Time of Printing : 04-12-2019 4:18PM Duplicate Copy

Child was managed conservatively and all potential hepatotoxic & haemolysis inducer drugs in G6PD deficiency state were avoided. 1unit of PRC was transfused for severe anemia. Patient improved clinically as well as by lab parameters in a course of 2 weeks(Fig 2). Close follow-up was done for recurrence of liver failure and haemolysis.

Figure 2: Picture of same patient (After recovery)

Disscussion

In India the prevalence of Hepatitis A is high (31-67%) in comparison to Hepatitis E (16-66%) in children, whereas the prevalence rate of HAV and HEV co-infection is 10.4% [3].

HAV infection is acquired early in life with various community based studies demonstrating the presence of anti- HAV antibodies in nearly 80% of children by the age of 5 years. Although serological positivity of HEV infection is higher in adults than children, it might be due to possibility of asymptomatic/subclinical HEV infection in early childhood which has led to their under diagnosis as suggested by Handa et al in their study on clinical & epidemiological profile of Hepatitis A & E infection in pediatric patients[5]. They have also suggested the possibility of under diagnosis of HEV infection even in symptomatic young children due to the presence of some other acute co-infection like HAV. It is very difficult to distinguish the co-infection with HAV and HEV viruses as a cause of viral hepatitis and cannot be differentiated from mono- infection but the laboratory diagnosis either by serology or polymerase chain reaction (PCR) can be a useful tool in the diagnosis of simultaneous presence of both[5]

A minor degree of haemolysis that is associated with decreased red blood cell survival could be there in the patients of acute viral hepatitis, but is seldom of clinical significance. The patient described in this case had severe intravascular haemolysis as evidenced by a fall in hemoglobin, reticulocytosis, unconjugated hyperbilirubinemia, hemoglobinuria and high serum LDH levels. The presence of severe hyperbilirubinemia in patients with viral hepatitis and G6PD deficiency has also been previously reported in adults as well as pediatric populations. In a case control study, Gotsman and Muszkat[8] evaluated the impact of G6PD deficiency on patients with Hepatitis A virus infection in adult patients. They also found that although the patients with G6PD deficiency had a more severe initial clinical presentation but the clinical outcome was not affected.

As the deficiency of enzyme G6PD is mainly inherited in an X linked manner, prevalence of its presence in a female is quite uncommon. In females possible mechanism of mutation is random X – Chromosome inactivation.

The mechanism behind this is believed to be through decreased levels of glutathione in RBCs as a result of accumulation of oxidants due to hepatic dysfunction, thus causing haemolysis in presence of G6PD deficiency[6].

Treatment is supportive with serial monitoring of the signs of acute liver failure and in rare cases, liver transplant is the end treatment and for haemolysis transfusion of PRBC in severe ones and avoidance of potential haemolysis triggers drugs. Although serum bilirubin level in patients with viral hepatitis along with intravascular haemolysis is quite high, the overall prognosis is usually favorable, and mainly related to the degree of hepatic injury.

So, early & prompt evaluation of hematological abnormalities is useful & essential because the children having acute HAV/HEV are usually at the risk for microangiopathic hemolytic anemia, autoimmune triggered haemolysis, haemolysis triggered by the hepatitis virus itself and exaggerated haemolysis process in the presence of G6PD deficiency, so that adequate interventions can be taken timely[7]. Other possible common causes of such haemolysis with liver disease like Malaria, Dengue, Enteric fever, Wilson`s disease etc. should also be ruled out.

In conclusion, in every pediatric patient who are presenting with acute viral hepatitis and an unexplained severe anemia with jaundice (unconjugated hyperbilirubinemia), the possibility of intravascular haemolysis should always be considered and evaluated with due consideration to rule out G6PD deficiency.

This case explains the same with a rare occurrence of dual infection with hepatitis A & E virus with G6PD deficiency in female child.

Refrences

1. Arora NK, Nanda SK, Gulati S, Ansari IH, Chawla MK, Gupta SD. Acute viral hepatitis types E, A, and B singly and in combination in acute liver failure in children in North India. J Med Virol. 1996;48:215-22.

2. Rawat SK, Jain A. Seroprevalence of Hepatitis A and E virus IgM in children suffering from acutehepatitis. J Med Sci Cli Res. 2015;3:4616-20.

3. Handa S, Wasim S, Kalra BP, Rawat A, Chandar V, Gupta A. Clinico-epidemiological profile of hepatitis A virus and hepatitis E virus co-infection in pediatric age group: a hospital based retrospective study. Int J Contemp Pediatr. 2019:3;6:588.

4. Sheikh UR, Datta K, Khan SM, Das I, Mittal D. G6PD Deficiency as a Precipitant of Haemolysis in Hepatitis E Patients. Ind J Emerg Med. 2017:7;3:325.

5. Lapp RT, Rochling F. Acute cholestatic hepatitis A virus infection presenting with hemolytic anemia and renal failure: a case report. Case reports in hepatology. 2013;2013.

6. Rodriguez Lay LD, Quintana A, Villalba MC, Lemos G, Corredor MB, Moreno AG, Prieto PA, Guzmán MG, Anderson D. Dual infection with hepatitis A and E viruses in outbreaks and in sporadic clinical cases: Cuba 1998–2003.J Med Virol. 2008 :5;80:798-802.

7. Monga A, Makkar RP, Arora A, Mukhopadhyay S, Gupta AK. Case report: acute hepatitis E infection with co-existent Glucose-6-phosphate dehydrogenase deficiency. Can J Infect Dis. 2003;14:230-1.

8. Gotsman I, Muszkat M. Glucose-6-phosphate dehydrogenase deficiency is associated with increased initial clinical severity of acute viral hepatitis A. J Gastroenterol Hepatol 2001;16:1239-43.