e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2023; 15(8); 203-208

Original Research Article

Clinical Profile of AcuteViral Hepatitis and its Outcome in Children at Tertiary Care Hospital

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Received: 27-05-2023 / Revised: 25-06-2023 / Accepted: 30-07-2023

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Conflict of interest: Nil

Abstract

Background: Hepatitis is a contagious disease caused by different types of viruses, causing temporary or permanent damage to liver cells. Hepatitis in children constitutes a significant population of hospital admissions in India. The present study was undertaken with the objectives to investigate clinical profile, complications and outcome of viral hepatitis in children and to correlate laboratory investigations with clinical outcome.

Methods: This prospective observational study was carried out December 2019 to September 2021. All children >1 month and <12 years of age with clinical symptoms and sign of acute viral hepatitis with proven laboratory investigations admitted in paediatric ward were included in the study. All data of history, examination, investigation, diagnosis and management was recorded systemically in proforma. Data thus collected was subjected to statistical analysis.

Results: The mean age of study patient was 6.88±2.85 years and 75% of them were male. Majority of patients presented with symptoms of yellow sclera (94.44%) followed by fever (75%). Icterus was most common clinical sign seen in 94.44% patients followed by pallor in 83.33% patients. Liver function tests of all patients were deranged. Hepatomegaly was seen on ultrasonography in 75% patients. Viral hepatitis A (58.33%) was most commonly present. All patients with viral Hepatitis A and E were discharged after successful treatment, while 14.28% of Hepatitis B and 20% of Hepatitis C patients expired.

Conclusion: Hepatitis A virus is commonest causative agent of acute viral hepatitis with good prognosis. Timely done serological viral markers supported with liver function test are good enough to diagnose and prognosticate the admitted case.

Keywords: Acute viral hepatitis, biochemical profile, clinical profile, Hepatitis

Introduction

Hepatitis, or inflammation of the liver can be due to a variety of causes of which viral infection is the most important, and leads to significant morbidity and mortality.[1] Viral Hepatitis is a contagious disease caused by different types of viruses, causing temporary or permanent damage to liver cells.[2] Viral Hepatitis has caused 1.34 million deaths in 2015, a number comparable to deaths caused by tuberculosis and higher than those caused by HIV. Available literature indicates that HAV is responsible for 10-30% of acute hepatitis and 5-15% of acute liver failure cases in India. It is further reported that HEV accounts for 10-40% of acute hepatitis and 15-45% of acute liver failure. HAV and HEV are important causes of acute viral hepatitis and Acute Liver Failure (ALF). Hepatitis B surface Antigen (HBsAg) positivity in the general population ranges from 1.1% to 12.2%, with an average prevalence of 3-4%. Anti-Hepatitis C virus (HCV) antibody prevalence in the general population is estimated to be between 0.09-15%.[3] Based on some regional level studies, it is estimated that in India, approximately 40 million people are chronically infected with Hepatitis B and 6-12 million people with Hepatitis C. Chronic HBV infection accounts for 40% of Hepato-cellular Carcinoma (HCC) and 20-30% cases of cirrhosis in India. Chronic HCV infection accounts for 12-32% of HCC and 12- 20% of cirrhosis.

Childhood hepatitis constitutes a significant population of hospital admissions in India. Worldwide, the overall frequency of paediatric liver disease is 1:8,000. According to a study in U.S, it amounts to almost 15,000 hospital admissions per year. Over the last few years, paediatrics has witnessed a gradual but a definite change in the pattern of the liver diseases. For instance, Indian childhood cirrhosis (ICC) which earlier accounted

for about 50% of all chronic liver diseases and almost 5% of all paediatric admissions, has today become a rare entity, with only occasional case reported annually even from large medical centres.[4] The present study was undertaken with the objectives to investigate clinical profile, complications and outcome of viral hepatitis in children and to correlate laboratory investigations with clinical outcome.

Materials and Methods

This prospective observational study was carried out in a tertiary care hospital of South Gujarat from December 2019 to September 2021. Study protocol was approved by the Institutional Ethical Committee. Written informed consent was obtained from each patient before their enrolment in the study. Earlier, sample size considered was 50, but the hospital was converted as COVID 19 hospital during both waves of COVID 19 pandemic and non-covid stable patients were not admitted, so we had 36 patients of viral hepatitis during the stipulated study period. Patients fulfilling following inclusion and exclusion criteria were enrolled into this study:

Inclusion Criteria:

- Patients diagnosed with viral hepatitis according to CDC guidelines [Acute illness with discrete onset of symptoms (e.g., nausea, anorexia, fever, malaise or abdominal pain) with rise of total serum bilirubin (≥2 mg/dl) or elevation of serum alanine aminotransferase (ALT ≥twice the upper limit of normal) at any point in the course of disease in absence of underlying chronic liver disease]
- All children >1 month and <12 years of age with clinical symptoms and sign of acute viral hepatitis with proven laboratory investigations admitted in paediatric ward.

Exclusion Criteria:

- Children having chronic liver disease
- Children having metabolic disease or on drug therapy
- Children with surgical cause of hepatitis

Methodology

Initially in all patients of suspected viral hepatitis, brief history was taken and patient was examined for signs and symptoms of hepatic encephalopathy/acute viral hepatitis and was managed in paediatric ICU/ward to stabilize airway, breathing and circulation. Symptomatic and supportive care was given to all patient according to clinical diagnosis. After stabilization, detailed history regarding presenting complaints, source of infection was recorded. Detailed general and systemic examination was carried out. All data of history, examination, investigation, diagnosis and management was recorded systemically in proforma. Investigations done included complete blood count, liver function test (Serum Bilirubin and Liver Enzymes- SGPT), Coagulation Profile (PT, INR), Urine – Bile Salts and Bile Pigments, USG abdomen and pelvis, and Viral markers (Hepatitis A, B, C, D and E). All necessary investigations were done as per clinical indication like chest x-ray, renal function test etc. Outcome was decided in the form of discharge and death.

Acute viral Hepatitis A was diagnosed by the presence of Anti-HAV IgM in the serum. Diagnosis of acute hepatitis B was based on the presence of IgM antibody against hepatitis B core antigen (IgM anti-HBc) with or without HBsAg. Acute hepatitis E and hepatitis C were diagnosed by the presence of IgM antibody against HEV (anti-HEV IgM) and anti- HCV antibody, respectively.

Statistical Analysis:

All the data was entered into Microsoft excel spreadsheet and it analysed with the help of licenced open Epi software along with Microsoft office 365, with frequency tabulation and multivariate analysis.

Results:

The mean age of the patient was 6.88±2.85 years, with age ranging from 1 month to 12 years. Out of these, most of the children (69.44%) were between 5 and 10 years of age in all types of hepatitis, which was statistically significant (p<0.01). 75% of the patients were male, with a Male: Female ratio of 3: 1 and majority (88.88%) of patients belonged to urban population. Distribution of viral hepatitis according to socio-demographic profile of study patients is presented in Table 1.

Table 1: Socio-demographic profile

Parameters		Hep A (n=21)	Hep B (n=7)	Hep C (n=5)	Hep E (n=3)	Total (%)	p-value
Age (years)	< 5	6(28.57%)	0(0%)	1(20%)	0(0%)	7 (19.44%)	p<0.01
	5 to 10	14(66.66%)	6(85.71%)	2(80%)	3(100%)	25 (69.44%)	
	> 10	1(4.76%)	1(14.28%)	2(80%)	0(0%)	4 (11.11%)	
Gender	Female	4(19%)	3(42.85%)	2(66.66%)	0(0%)	9 (25%)	p<0.01
	Male	17(81%)	4(57.14%)	3(33.33%)	3(100%)	27 (75%)	
Place of Residence	Urban	18(85.71%)	6(85.71%)	5(100%)	3(100%)	32 (88.88%)	p<0.01
	Rural	3(14.28%)	1(14.28%)	0(0%)	0(0%)	4(11.11%)	

The most common clinical symptom observed in this study was yellow sclera (94.44%) in all types of viral hepatitis, which was statistically significant. Other clinical symptoms observed were fever (75%), yellow urine

(44.44%), vomiting (27.77%), abdominal pain (16.66%), convulsion (5.50%), diarrhoea (2.22%) and others (13.88%). Distribution of viral hepatitis according to clinical symptoms is presented in Table 2.

Table 2: Distribution of viral hepatitis according to clinical symptoms

Symptoms	Hepatitis A (n=21)	Hepatitis B (n=7)	Hepatitis C (n=5)	Hepatitis E (n=3)	Total (%)
Fever	19(90.47%)	4(57.14%)	2(40%)	2(66.66%)	27 (75%)
Yellow sclera	21(100%)	7(100%)	3(60%)	3(100%)	34 (94.44%)
Yellow urine	8(38.09%)	5(71.42%)	1(20%)	2(66.66%)	16 (44.44%)
Vomiting	7(33.33%)	1(14.28%)	1(20%)	1(33.33%)	10 (27.77%)
Abdominal pain	5(23.80%)	0	0	1(33.33%)	6 (16.66%)
Diarrhoea	1(4.76%)	0	0	0	1 (2.22%)
Convulsion	0	2(28.57 %)	0	0	2 (5.50%)
Others	0	2(28.57%)	3(60%)	0	5 (13.88%)
Chi Square=242.1, Df=18, p<0.01					

Icterus (94.44%) was the commonest clinical sign observed in this study, followed by pallor (83.33%), hepatomegaly (75%), hepatosplenomegaly (8.30%), ascites (8.30%), splenomegaly (5.55%), and altered sensorium (5.55%). Distribution of viral hepatitis according to clinical signs is shown in Table 3.

Table 3: Distribution of viral hepatitis according to clinical signs

Clinical sign	Hepatitis A (n=21)	Hepatitis B (n=7)	Hepatitis C (n=5)	Hepatitis E (n=3)	Total (%)
Icterus	21(100%)	7(100%)	3(60%)	3(100%)	34 (94.44)
Pallor	17(80.95%)	5(71.42%)	5(100%)	3(100%)	30 (83.33)
Hepatomegaly	13(61.90%)	7(100%)	4(80%)	3(100%)	27 (75)
Splenomegaly	1(4.76%)	0	1(20%)	0	2 (5.55)
Hepatosplenomegaly	0	2(28.5%)	1(20%)	0	3 (8.30)
Ascites	0	0	1(20%)	2(66.66%)	3 (8.30)
Altered sensorium	0	2(28.5%)	0	0	2 (5.55)
Chi Square=241.5, Df=15, p<0.01					

In majority of the viral hepatitis patients, haemoglobin level was between 5 and 10 g/dl (50%). WBC count was 4000-11000 per cu mm in most of the patients with Hepatitis A (71.42%) and Hepatitis C (80%), while most of patients with Hepatitis B (57.14%) had WBC level of more than 11000 per cu mm. Platelet count was above 1.5 per cu mm in majority of patients with all types of viral hepatitis (80.55%). PT-INR was less than 1.6 in most of the study patients (72.22%). Distribution of viral hepatitis as per the haematological profile is presented in Table 4.

Table 4: Distribution of viral hepatitis according haematological profile

Parameter	Hepatitis A (n=21)	Hepatitis B (n=7)	Hepatitis C (n=5)	Hepatitis E (n=3)	Total (%)
Haemoglobin(g/dl)					
<5	1(4.76%)	2(28.57%)	0	0	3 (8.33)
5 to 10	7(33.33%)	3(42.85%)	5(100%)	3(100%)	18 (50)
>10	13(61.90%)	2(28.57%)	0	0	15 (41.66)
WBC count (per cumm)					
<4000	3(14.28%)	2(28.57%)	1(20%)	1(33.33%)	7 (19.44)
4000-11000	15(71.42%)	1(14.28%)	3(80%)	1(33.33%)	20 (55.55)
>11000	3(14.28%)	4(57.14%)	1(20%)	1(33.33%)	9 (25)
Platelet count (per cumm)					
<1.5	3(14.28%)	1(14.28%)	2(40%)	1(33.33%)	7 (19.44)
>1.5	18(85.71%)	6(85.71%)	3(60%)	2(66.66%)	29 (80.55)
PT-INR					
<1.5	16(76.19%)	4(57.14%)	5(100%)	1(33.33%)	26 (72.22)
1.5 to 2.5	5(23.80%)	2(28.57%)	0	0	7 (19.4)
>2.5	0	1(14.28%)	0	2(66.66%)	3 (8.33)

In 47.22% patients, total bilirubin level was between 5 to 10 mg/dL. Total bilirubin level higher than 10mg/dL was observed in 16.66% patients, direct bilirubin level ≥ 10 mg/dL was found in 11.11%, indirect bilirubin level

of ≥5 mg/dL was observed in 11.11% patients. In this study, SGPT level was above 500 units/L in 61.1% of viral hepatitis patients. Distribution of viral hepatitis according to Liver Function Test is shown in Table 5.

Table 5: Distribution of viral hepatitis according to liver function test

Parameters	Hepatitis A (n=21)	Hepatitis B (n=7)	Hepatitis C (n=5)	Hepatitis E (n=3)	Total (%)
Total bilirubin					
< 5	5(23.80%)	3(43.85%)	4(80%)	1(33.33%)	13 (36.11)
5 to 10	15(71.42%)	1(14.28%)	1(20%)	0	17 (47.22)
> 10	1(4.75%)	3(43.85%)	0	2(66.66%)	6 (16.66)
Direct bilirubin					
< 10	20(95.23%)	4(57.14%)	5(100%)	3(100%)	32 (88.88)
≥ 10	1(4.76%)	3(42.85%)	0	0	4 (11.11)
Indirect bilirubin					
< 5	20(95.23%)	5(71.42%)	5(100%)	2(66.66%)	32 (88.88)
≥ 5	1(4.76%)	2(28.57%)	0	1(33.33%)	4 (11.11)
SGPT					
< 500	3(14.28%)	4(57.14%)	5(100%)	2(66.66%)	14 (38.88%)
500-1000	12(57.14%)	2(28.57%)	0	1(33.33%)	15 (41.66)
> 1000	6(28.57%)	1(14.28%)	0	0	(19.44)

In our study, hepatomegaly was the most common USG finding observed in 75% of viral hepatitis patients, followed by hepatosplenomegaly, ascites and splenomegaly. (Table 6)

Table 6: Distribution according to USG finding

USG finding	Frequency	Percentage
Hepatomegaly	27	75%
Splenomegaly	1	2.77%
Hepatosplenomegaly	3	8.33%
Ascites	3	8.33%
Normal	9	25%

In our study, out of 36, 34 patients were discharged and mortality occurred in only 2 patients, out of which one patient was suffering from Hepatitis B and one patient had Hepatitis C viral infection. (Table 7)

Table 7: Distribution of outcome according to viral hepatitis

Outcome		
Viral Hepatitis	**Discharge (%)**	**Expired (%)**
Hepatitis A	21(100%)	0(0%)
Hepatitis B	6(85.71%)	1(14.28%)
Hepatitis C	4(80%)	1(20%)
Hepatitis E	3(100%)	0(0%)
Total	34 (94.44%)	2 (5.56%)

In our study, complication occurred in six patients. Most common complication was acute hepatic failure observed in 3 patients, out of which one was infected with Hepatitis C and two were infected with Hepatitis E virus. Hepatic encephalopathy was seen in 2 patients of viral hepatitis B and acute renal failure in one patient with viral hepatitis B. (Table 8)

Table 8: Distribution of complications according to viral hepatitis

Complication	Hepatitis A	Hepatitis B	Hepatitis C	Hepatitis E	Total
Hepatic encephalopathy	0	2 (100%)	0	0	2 (5.55%)
Acute renal failure	0	1 (100%)	0	0	1 (2.77%)
Acute hepatic failure	0	0	1 (33.33%)	2 (66.66%)	3 (8.33%)

Discussion

In our study, maximum number of patients (69.44%) were between 5 to 10 years of age. Similar results were seen in studies by Behera MR et al[5], Mahmud S et al[6], and Patel A et al[7]. However, in similar studies by Dalal EA et al[8] and Poddar U et al[9] most of the patients were <5 years of age group, whereas Deore JR et al[10] and Sudhamshu KC et al[11] have observed that majority of patients in their study were >10 years of age. The 5 to 10 age group has been affected more in our study, which may be because of their food habits like eating unhygienic food etc. In our study, most of the

patients were male. Similarly male dominance among viral hepatitis patients was observed in previous studies.[6,10-14] In our study, most of patients of acute viral hepatitis belonged to urban area (88.88%). Similarly, Dalal EA et al[8] have observed that 80% of their study population was urban. However, Singh B et al[14] (71%) done their study in rural area.

In our study, most of the patients with acute viral hepatitis presented clinically with yellow sclera (94.44%) followed by fever (75%). Yellow discoloration of sclera, fever and yellow discoloration of urine were most common symptoms that bring notice to parent. Other studies done by Patel A et al[7], Deore JR [10], Das M et al[12], Das S et al[13], and Singh S et al[14] have shown that yellow sclera is most common symptom followed by fever. Other symptoms observed in our study were vomiting, abdominal pain, diarrhoea which was also observed in several previous studies.[7,10,12-14] In our study, convulsion was found in 5.55% patients while a study done by Singh B et al[14] 22.7% patients had convulsion.

In our study, icterus (94.44%) was most common sign seen, followed by pallor (80.33%). Other studies have observed that icterus was most common sign followed by hepatomegaly.[10,12-14] Hepatomegaly was seen in 75% patients. Other clinical signs observed in our study were splenomegaly (5.55%), hepatosplenomegaly (8.30%) and ascites (8.30%). In our study, pallor was seen in 80.33% patients, while a study done by Das S et al[13] has shown 16.07% had pallor. In our study hepato-splenomegaly was seen in 8.30% while study done by Patel A et al[7] have observed hepato-splenomegaly in 23% patients.

In our study, PT/INR in hepatitis A was <1.5 (16)76.19%, and 1.5-2.5(5)23.80%. While in hepatitis B and E <1.5 was (4)57.14% and (1)33.33% respectively. >2.5 PT- INR seen in hepatitis B and E. In hepatitis C all patient had PT/INR <1.5. A study done by Das S et al[13] which also similar but hepatitis B and C were not included. In our study, patient with hepatitis A show PT/INR >2.5 were 4 while in our study no viral hepatitis A patient has PT/INR >2.5. In our study, most of patients (47.22%) with viral hepatitis were show elevated serumbilirubin level range between 5-10 mg/dL. A study done by Das M et al[12] had 50% patients were >10mg/dl serum total bilirubin while another study done by Girish N et al[15] and Sarker NR et al[16] shown that maximum patients had serum bilirubin <5 mg/dL. In our all patient with viral hepatitis had elevated serum SGPT, with maximum patients (41.66%) with elevated SGPT between 500-1000IU/L. A study done by Das M et al[12] had maximum patients with elevated SGPT level <500; a study done by Girish N et al[15] had maximum patients with elevated SGPTlevel >1000. Liver function test (Total bilirubin and SGPT) were deranged in all patients of hepatitis irrespective of etiology.

Hepatomegaly is an important finding in ultrasonography of hepatitis patients. In our study, hepatomegaly was found in USG finding of 75% of viral hepatitis patients. Studies by Sudhamshu KC et al[11] and Arooj S et al[17] also had similar results. In our study, viral hepatitis A (58.33%) was more common in children followed by Hepatitis B (19.44%), Hepatitis C (13.88%) and Hepatitis E (8.33%). Previous studies have also observed that viral Hepatitis A affects children more commonly.[6-9,12-14]

In our study, 94% patients with viral hepatitis were discharged and 6% patients expired. Good outcome seen in our patients because of good immunization status, early presentation, early diagnosis and treatment. Similar results for outcome were seen in studies by Dalal EA et al[8] and Das M et al[12]. In our study, no complication was seen in Hepatitis A patients, while hepatic encephalopathy (2) and acute renal failure (1) were seen only in Hepatitis B patients. Acute hepatic failure was seen in Hepatitis C (1) and Hepatitis E patients (2). However, study done by Dalal EA et al[8], has observed that Hepatitis A had more complications like acute hepatic failure (73.33%), hepatic encephalopathy (75%), Renal failure (66.6%), while Hepatitis E patients had Acute hepatic failure (16.67%) and Hepatic encephalopathy (10%). Due to Covid-19 Pandemic the sample size for the present study is small. Further larger community-based studies are needed to know the Sero-epidemiology of viral hepatitis in this part of the country.

Conclusion

Despite availability of vaccine and improved sanitation HAV infection is still a major issue in our country. This is probably due to lack of knowledge regarding availability of vaccine, lack of awareness about mode of disease transmission among lower socio-economic status. From the present study we concluded that hepatitis A virus is commonest causative agent of acute viral hepatitis with good prognosis. Timely done serological viral markers supported with liver function test are good enough to diagnose and prognosticate the admitted case.

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