

Original Research Article

Acute viral hepatitis in children: a prospective hospital based study

Chandra Madhur Sharma¹, Sanjay Gupta^{2*}, Bindu Aggarwal¹, Piyush Chaudhary¹

¹Department of Pediatrics, ²Department of Gastroenterology, SGRR Institute of Medical and Health Sciences, Dehradun, Uttarakhand, India

Received: 19 June 2020

Accepted: 24 June 2020

*Correspondence:

Dr. Sanjay Gupta,

E-mail: gastropedia2020@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Viral hepatitis is a major public health issue throughout the world affecting millions of children despite the availability of vaccines, prophylactic measures and improved sanitation. The objective of the study was to analyze the etiology, clinical features, laboratory parameters and sonological findings of Acute Viral Hepatitis in pediatric population.

Methods: A total of 88 children admitted in paediatric department and gastroenterology unit of medicine department with confirmed acute viral hepatitis from June 2016 to July 2018 at tertiary health care teaching hospital of north India were included. The patients were divided in 3 age groups; 1-5, 6-10 and 11-18 years. Clinical features, laboratory parameters, ultrasound findings were compared in three age groups.

Results: Out of 88 cases 48 were boys and 40 girls. In the present study hepatitis A was the most common (85.2%) etiology. Jaundice (90.9%) is the most common symptoms followed by dark colored urine (86.3%), loss of appetite (83.3%) and fever (68.2%) reported in this study. Icterus (90%) is the most common sign reported followed by hepatomegaly (86%). Out of 88 cases 4 cases died. Out of 4 deaths, 2 cases of hepatitis A and 2 cases positive for Hepatitis B. The cause of death was hepatic encephalopathy in both the cases.

Conclusions: Majority of cases in children were hepatitis A cases. Most of the cases were aged above 5 years with slight male predominance. Those cases with elevated liver enzymes (SGOT >5000) and those with PT INR >3.5 at admission has higher mortality.

Keywords: Children, Clinical profile, Hepatotropic, Viral hepatitis

INTRODUCTION

Viral hepatitis continues to be a major health problem in both developing and developed countries. This disorder is caused by the 5 pathogenic hepatotropic viruses recognized to date: hepatitis A (HAV), B(HBV), C(HCV), D(HDV), and E(HEV) viruses. Many other viruses can also cause hepatitis usually as a component of multisystem disease. These include herpes simplex virus, cytomegalovirus, Epstein-Barr virus, varicella zoster virus, HIV, rubella, adenovirus, enterovirus, parvovirus B19, and arboviruses.¹ However, most frequent viral agents of AVH with major health burden in India are

hepatitis A and hepatitis E.² Overcrowding, poor hygiene, improper sanitation and contamination of food and water are predisposing factors, especially in developing, tropical countries. Severity of Hepatitis A may vary from uncomplicated subclinical/clinical acute viral hepatitis (AVH) to acute or acute-on-chronic liver failure. In Indian subcontinent, proportion of overall AVH, acute liver failure, and acute-on-chronic liver failure cases attributed to HAV infection is around 70-85%, 40-60%, and 10-40%, respectively. This highlights the significance of HAV infection, especially when it is one of the only few vaccine preventable hepatic diseases. Universal immunisation against HAV in children in India

is still controversial with limited national epidemiological data on HAV epidemiology.³ Hepatitis B and hepatitis C are major global health problem. They can cause chronic infection which progress to cirrhosis, hepatic decompensation, and hepatocellular carcinoma. This study was aimed to analyze the etiology of AVH in pediatric population, its clinical features, laboratory parameters, sonological findings, severity and complications in children.

METHODS

A prospective cross sectional study was conducted at the department of Pediatrics and Gastroenterology unit of Medicine department of a tertiary care hospital of north India from June 2016 to July 2018. A total number of 88 cases of acute viral hepatitis in between 1-18 years of age after informed written consent from parents were included in the study.

Inclusion criteria

- Patients presenting with two or more symptoms of loss of appetite, jaundice, nausea, vomiting, pain abdomen and itching were enrolled for evaluation.
- Positive serum report of IgM HAV, IgM HEV, hepatitis B surface antigen [HBsAg], and IgM HCV, HBc IgM.

Exclusion criteria

- Acute hepatitis without hepatotropic viral (HAV, HBV, HCV, HEV) etiology like TORCH infection, enteric fever, malaria, dengue, Wilson's disease, autoimmune and drug induced jaundice.
- Those patients with previous history of liver diseases were also excluded from the study.

After history and clinical examination they were subjected to blood tests (complete blood count, liver function tests, prothrombin time, INR, and viral serology

for hepatitis A, B, C and E and ultrasound examination of the abdomen). Those patients having positive viral serology and/or alanine transferase more than 10 times the upper limit were included in the study.

History was also focused on dietary habit after development of symptoms and intake of herbal medications. The studied patients were divided in three age groups; 1-5, 6-10 and 11-18 years. Clinical features, laboratory parameters, ultrasound findings were compared in three age groups. Acute liver failure (ALF) was diagnosed by PT >15 sec or INR >1.5 with features of encephalopathy OR PT >20 sec or INR >2.0 with or without features of encephalopathy. History, clinical findings and laboratory results were recorded.

RESULTS

Out of 88 cases of acute viral hepatitis, 10 (11.4%) in 1-5 years age group, 33(37.5%) in 6-10 years age group and 45(51.1%) in the 11-18 years age group. As the age increased, there were more cases (Table 1).

Table 1: Demographic profile.

Age group (years)	Male	Female	Total (%)
1-5	4	6	10 (11.4%)
6-10	19	14	33 (37.5%)
11-18	25	20	45 (51.1%)
Total	48	40	88

Among studied children, 48 (54.5%) were male and 40 (45.5%) were female, so there was slight male preponderance (Table 1).

In the present study most of the cases were positive for anti-HAV IgM 75 (85.2%), followed by anti-HEV IgM 8 (9.0%). Four (4.5%) cases were found with positive for HBsAg and anti-HBcIgM, Anti HAV IgM and Anti HEV Igm (Figure 1).

Table 2: Clinical presentation of cases.

Symptoms	1-5 years (n=10)	6-10 years (n=33)	11-18 (n=45)	Total
Jaundice	10 (100%)	30 (90%)	40 (88.9%)	80 (90.9%)
Loss of appetite	10 (100%)	24 (72.8%)	40 (88.9%)	74 (84%)
Nausea	8 (80%)	18 (54.5%)	36 (80%)	62 (70.4%)
Vomiting	8 (80%)	20 (60.6%)	36 (80%)	64 (72.7%)
Pain Abdomen	8 (80%)	18 (54.5%)	28 (62.2%)	54 (61.3%)
Itching	0	6 (18.2%)	25 (55.5%)	31 (35.2%)
Dark Urine	8 (80%)	30 (90%)	38 (84.4%)	76 (86.3%)
Fever	6 (60%)	24 (72.8%)	30 (66.7%)	60 (68.2%)
Loose Stool	6 (60%)	20 (60.6%)	24 (53.4%)	50 (56.8%)
Hepatomegaly	10 (100%)	30 (90%)	36 (80%)	76 (86.3%)
Splenomegaly	1 (10%)	8 (24.3%)	11 (24.5%)	20 (22.7%)
Ascites	2 (20%)	6 (18.2%)	7 (15.6%)	15 (17%)

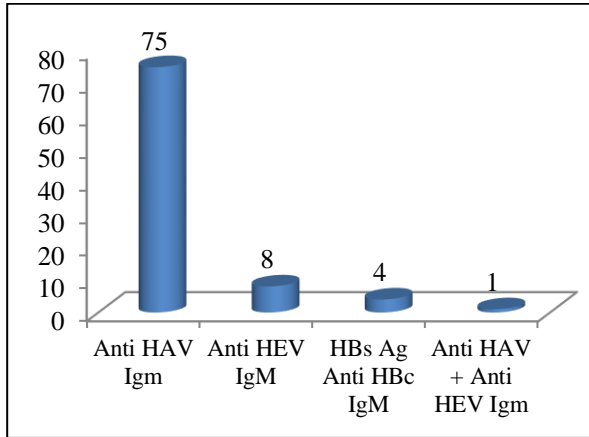


Figure 1: Etiology of acute viral hepatitis.

The presenting complaints of the cases were variable and are given in Table 2. The most common presenting complaints were jaundice (90.9%), loss of appetite (84%), dark colored urine (86.3%), vomiting (72.7%) and pain abdomen (61.3%). There was overlap of many symptoms. Unlike the adult age group 68.2% patients presented with history of fever ranging from 100-104° F. There were many cases of AVH initially investigated and treated as enteric fever and referred to us after blood test showed liver dysfunction or they developed jaundice in due course of illness. Itching was more common with increase in age.

In 1-5 year age group itching was not present in any case. Those patients who had previously taken herbal medications had more itching compared to those who had not taken anything prior to consultation. The average time for normalization of bilirubin and enzymes took longer in patients who were exposed to herbal medication and came to us very late. On physical examination icterus was present in 90% cases, hepatomegaly in 86.3% cases,

spleneomegaly in 22% cases and 17 % cases had ascites respectively. In the present study Table 3 showed lab parameters at the time of admission. Maximum number 88 (100%) of patients had increase serum bilirubin, ALT and AST.

Table 3: Lab parameters.

Parameters	Value
TLC	2800-18900/cc
Total bilirubin	1.2-27 mg/dl
Conjugated bilirubin	0.8-24 mg/dl
ALT	300-5600 IU/ml
AST	280-4800 IU/ml
Alkaline phosphatase	248-1080 IU/ml
Albumin	2.8- 4.5 mg/dl
INR	<1.5 to 4.5
Prothrombin time	11- 28 seconds

Table 4: Ultrasonography findings.

USG findings	n (%)
Hepatomegaly	80 (90%)
Spleneomegaly	32 (36%)
Ascites	20 (22%)
Gall bladder wall thickening	27 (30%)
Gall bladder Sludge	38 (43%)
Normal	9 (10%)

Those cases with elevated liver enzymes, PT INR of more than 3.5 progressed to hepatic encephalopathy. In ultrasound findings, hepatomegaly (90%) was found in most of the cases followed by gall bladder sludge (43.0%), splenomegaly (36%), gall bladder wall thickening (30%), and ascites (22%). Normal ultrasound was found in 10% cases (Table 4).

Table 5: Outcome of cases with acute liver failure and hepatic encephalopathy.

Outcome	Acute liver failure	Hepatic encephalopathy			Coagulopathy	PT/INR	ALT	Etiology	
		Grade 1	Grade 2	Grade 3				Hepatitis A	Hepatitis B
Expired	4 cases	-	-	4	4	>25 sec/>3.5	>5000	2	2
Discharged	6 cases	5	1	-	6	<25 sec/<3.5	3000-5000	6	-

In the present study a total of 66% patients were taking herbal medicines before coming to our hospital. /A total of 10 cases developed acute liver failure with hepatic encephalopathy, 5 cases grade -1, 1 case grade -2 and 4 cases to grade -3. All the 4 cases that developed hepatic encephalopathy grade -3 were expired, and had increased ALT >5000 along with PT >25 second and INR >3.5.

Out of these 4 cases two had hepatitis A and two had hepatitis B (Table 5).

DISCUSSION

In the present study hepatitis A is the most common (85.2%) cause of Acute Viral Hepatitis in pediatric

population. It is similar to many previous studies from India.⁴⁻⁷ A recent study from Nepal showed that 83% of cases had hepatitis A infection.⁸ Similar result was seen from Brazil.⁹ Although HEV is predominant causative agent in adult population, it was seen only in 9% cases in our study. Similar results were present in a study by Sudhamshu et al.⁸ Despite of availability of vaccine and improved sanitation HAV infection is still a major issue in developing countries. This is probably due to lack of knowledge regarding availability of vaccine, lack of awareness on mode of disease transmission among lower socio-economic status. In the present study there was slight male preponderance, this is comparable with previous studies.^{8,10} This study suggested majority of cases (88.6%) were aged above 5 years and 51.1% aged more than 10 years. Study done in southern India also reported 10-20-year age group being most commonly affected.¹⁰ On the contrary, another study done in eastern India reported higher prevalence in age group 5 to 10 years.⁵ Another study done by Sudhamshu et al also reported maximum number of cases (49.6%) in 11-15 year age group.⁸

Regarding symptoms and examination findings in case of viral hepatitis, jaundice (90.9%) is the most common symptoms with dark colored urine (86.3%), loss of appetite (83.3%) and fever (68.2%) reported in this study. Parekh et al reported almost similar presenting complaints most common being jaundice (94%) followed by fever (82%).¹¹ Behera et al also reported similar finding as in our study, yellowish discoloration of eye and urine was the most common symptoms in their study.¹² On physical examination icterus was present in 90% cases, hepatomegaly in 86% cases, splenomegaly in 22% cases and 17% cases had ascites respectively. In the present study Icterus (90%) is the most common sign reported, followed by hepatomegaly (86%). This is consistence with other study who reported jaundice and hepatomegaly as most common sign.⁷ Incidence of liver failure was 11.36% in the present study. A total of 10 cases had acute liver failure out of them 6 patients survived and 4 expired, with survival of 60%. It was found that the cases with elevated liver enzymes (SGPT >5000IU/ML), bilirubin more than 10mg/dl, PT INR of more than 3.5 had higher rate of mortality. Out of 75 cases of hepatitis A, 2 cases died, and 2 cases of hepatitis B died out of 4 cases. In a recent study by Girish et al similar pattern of mortality was observed.⁷ This gave an idea of higher mortality of hepatitis B virus.

In ultrasound findings hepatomegaly was found in 90% cases, followed by gall bladder sludge (43%), splenomegaly (36%), gall bladder wall thickening (30%), and ascites (22%). Normal ultrasound was found in 10% cases. A recent study from Bangladesh observed similar ultrasound findings.¹³

Use of herbal medicine in jaundice is very common in our country. In present study it was clearly seen that morbidity was more when patient were taking herbal

medications. The message from a review article in hepatology is clear that herbal medicines in acute viral hepatitis are a ticket to more trouble and may progressed to liver failure anytime.¹⁴ In the present study, out of 88 admitted patients, 66% were having herbal medicines at the time of admission. In a study from Nepal by Sudhamshu et al reported 73% patients having herbal medicine at the time of admission.⁸ Similar findings were observed by Salahuddin et al from Bangladesh.¹³

Present study was conducted in a tertiary care hospital and only hospitalised cases were included. Hence, the clinical profile may not be generalized to the community. Second, study did not look for serology for non hepatotropic viruses like Epstein Barr virus, Herpes simplex virus and Cytomegalovirus.

CONCLUSION

Hepatitis A is the most common cause of acute viral hepatitis in children. On the basis of clinical findings and biochemical characteristics the viruses can not be differentiated. Thus, serological testing is essential for correct etiological diagnosis. Herbal medicine intake is still common in our country which deteriorating the clinical condition with or without liver failure at the time of hospital admission. It's important to create awareness in the society regarding preventive measures including availability of vaccine especially in rural area. Better sanitation, provision of clean drinking water proper sewage disposal, and public education are the mainstays for prevention of HAV and HEV infection.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Kliegman R, Geme S, Shah B. Nelson textbook of pediatrics. 21st edition. Philadelphia: Elsevier. 2020:2106.
2. Acharya SK, Batra Y, Bhatkal B. Sero epidemiology of hepatitis A virus infection among school children in Delhi, implications for HAV vaccination. J Gastroenterol Hepatol. 2003;18:8227.
3. Sood V, Lal BB, Gupta E, Khanna R, Siloliya MK, Alam S. Hepatitis A virus-related pediatric liver disease burden and its significance in the Indian subcontinent. Indian Pediatr. 2019;56:741-4.
4. Thapa BR, Singh K, Singh V, Broor S, Singh V, Nain CK. Pattern of hepatitis A and hepatitis B virus markers in cases of acute sporadic hepatitis and in healthy school children from North West India. J Trop Paediatr. 1995;41:328-9.
5. Behera MR, Patnaik L. Clinico-biochemical profile and etiology of acute viral hepatitis in hospitalized children: a study from Eastern India. Indian J Child Health. 2016;3(4):317-20.

6. Das AK. Changing patterns of aetiology of acute sporadic viral hepatitis in India: newer insights from north-east India. *Int J Cur Res Rev.* 2014;6(19):32-9.
7. Girish N, Sunil B, Devaranavadagi RA. A clinical study of viral hepatitis in children: a prospective hospital-based study. *Int J Contemp Pediatr.* 2018;5:563-8.
8. Sudhamshu KC, Sharma D, Poudyal N, Basnet BK. Acute viral hepatitis in pediatric age groups. *J Nepal Med Assoc.* 2014;52(193):687-91.
9. Pannuti CS, Mendonça JS, Pereira ML, Carvalho MJ, Amato Neto. Sporadic acute viral hepatitis A, B and non-A non-B, a prospective study of 150 consecutive cases in São Paulo, Brazil. *Trop Geogr Med.* 1985;37(2):136-8.
10. Nandi B, Hadimani P, Arunachalam R, Ganjoo RK. Spectrum of acute viral hepatitis in Southern India. *Med J Armed Forces India.* 2009;65(1):7-9.
11. Parekh Z, Modi R, Banker D. Clinical study of hepatitis in children with special reference to viral markers. *NHL J Med Sci.* 2013;2(1):23-7.
12. Behera AK, Jit BP, Purohit P, Nahak SR, Chhatar S, Marndi C, et al. Clinical profile of viral hepatitis in a tertiary health care centre of eastern India. *Int J Med Res Rev.* 2016;4(7):1276-80.
13. Salahuddin M, Syed SA, Manzoor H, Mahenaz A, Farhana T. Recent spectrum of acute viral hepatitis in children: an experience in a tertiary centre of Bangladesh. *Adv Res Gastroentero Hepatol.* 2017;6(3):555686.
14. Bernuau JR, Durand F. Herbal medicines in acute viral hepatitis: a ticket for more trouble. *Eur J Gastroenterol Hepatol.* 2008;20(3):161-3.

Cite this article as: Sharma CM, Gupta S, Aggarwal B, Chaudhary P. Acute viral hepatitis in children: a prospective hospital based study. *Int J Contemp Pediatr* 2020;7:1681-5.