

Prevalence of Complications Associated With Hepatitis A Infection Among Children

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Abstract: Hepatitis A virus (HAV) is a common cause of acute viral hepatitis in children, particularly in developing countries. While it is typically self-limiting, complications may arise and contribute to significant morbidity. **Objectives:** To determine the frequency of complications of hepatitis A in children infected with hepatitis A virus. **Method:** This cross sectional study conducted at Pediatrics department of Pakistan Institute of Medical Sciences, Islamabad, Pakistan from March-2022 to March-2024. In this study, a total of 140 patients with hepatitis A were included. Demographic data and clinical information of the participants including age, gender and weight was collected. Patients were assessed carefully and presence of any complication related to viral hepatitis A were documented. Data was stratified based on confounding variables and post-stratification comparison analysis was performed using Chi-square test while keeping the p-value of ≤ 0.05 as statistically significant. Software used for analysis was Statistical Package for Social Sciences version 20. **Results:** Median age was 7.00 (5.00) years. There were 86 (61.40%) male and 54 (38.60%) female patients. Frequency of patients who had viral hepatitis due to HAV and developed complications was 78 (55.70%). Most common complications observed were splenomegaly, low platelet count and pancytopenia affecting 12 (15.38%) patients each followed by ascites and dilated common bile duct (CBD) occurring in 10 (12.82%) each, diffuse cutaneous rash in 9 (11.54%) patients, hepatic encephalopathy (HE) occurring in 7 (8.97%) patients and fulminant hepatic failure in 6 (7.69%) patients. **Conclusion:** In patients with HAV related viral hepatitis, complications occurred in 55.70% patients.

Keywords: Complications, Frequency, Hepatitis A, Viral Hepatitis

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Introduction

Viral hepatitis is an infectious disease marked by inflammation of the liver which can vary in intensity from a mild disease spanning only a few days to a major, lifelong sickness that may lead to severe liver damage or death. (1, 2). It can be caused by a variety of hepatitis viruses including A, B, C, D and E but amongst these hepatitis A is amongst the most common virus that results in acute hepatitis. (3) This organism is a vaccination preventable, RNA-virus that is transmitted through consumption of water contaminated with fecal material which results in abdominal pain, yellowing of skin and eyes, fatigue, vomiting, loss of appetite, fever, pale stool and dark urine. (4) Globally, this condition has been reported to affect more than 170 million people but fortunately it never transforms into the chronic form and is rarely associated with death. (5) In Pakistan, similar trend of commonality of hepatitis A virus (HAV) being the most common cause of acute viral hepatitis was observed with this virus being the cause of acute hepatitis in 59% of the cases. (6) Clinically, acute hepatitis caused by the HAV can have variable symptomatology. Among infected children under six years old, fewer than 30% show symptoms with jaundice being the predominant one that can last as long as two weeks. By comparison, in older kids and adults, it can last for several weeks. (7) Despite the benign nature of this infection, there are multiple complications that can culminate in association of this infection including the hepatic complications, like fulminant hepatitis, cholestatic hepatitis, autoimmune hepatitis and relapsing hepatitis, and extra-hepatic complications including arthritis, glomerulonephritis, optic neuritis, cryoglobulinemia, myocarditis, transverse myelitis, pleural effusion, thrombocytopenia, red cell aplasia and aplastic anemia. (8) In this instance, a study found that complications occurred in 35.3% of the patients who were found to have HAV related acute hepatitis and they reported frequency of some of these complications associated with this

common cause of viral hepatitis including ascites being the most common one occurring in 20% patients followed by pleural effusion in 15% patients, thrombocytopenia in 10% patients, cholestasis in 6% patients, fulminant hepatic failure in 3% patients, skin rash in 2.5% patients, severe anemia in 2.5% patients, pericardial effusion and aseptic meningitis in 1% patients. (9)

Aim of this study was to describe various presentations of HAV as these are associated with high morbidity and mortality, and little data is available in Pakistan. This study was thus conducted to collect the current data of the complications of this disease caused by HAV.

Methodology

This cross sectional study was conducted at Pediatrics department of Pakistan Institute of Medical Sciences, Islamabad, Pakistan from March-2022 to March-2024 after getting approval from institutional ethical approval board (Ref No: F.1-1/2015/ERB/SZABMU/1143). Sample size calculation was performed using Raosoft ® sample size . Sample size calculation was performed by using confidence level of 95%, absolute precision of 8% and anticipated frequency of hepatitis A complications of 35.3%. (9) This gave a sample size of 140.

Study sample was selected by using non-probability consecutive sampling technique. Male and female children, aged 1-12 years who were admitted at pediatrics indoor unit with viral hepatitis due to hepatitis A infection were included. Those who were not willing to share any information and data regarding the disease and treatment, those with history of being co-infected with other viruses and pathogens and those having other co-morbid conditions were excluded.



Informed consent was taken from the parents of study participants before being included in the study. After this, demographic data and clinical information of the participants with hepatitis A infection was collected through structured questionnaire including patient's age, weight and gender. Diagnosis of hepatitis A associated viral hepatitis was made by presence of characteristics clinical features suggestive of hepatitis A infection (jaundice, abdominal pain, fever and vomiting) along with detection of IgM antibodies to hepatitis A virus (HAV) in a single acute phase serum sample. Information regarding investigations like blood complete counts, liver function tests, hepatitis A IgM antibodies values and investigations related to complications were collected. All the patients were then assessed through detailed history, clinical examination and investigations review for presence of complication associated with hepatitis A. In case of occurrence of any of the complication related to the viral hepatitis caused by hepatitis A virus, appropriate management was provided as per standard guidelines.

Data was analyzed by using Statistical Package for Social Sciences software version 26. Age and weight were found to be distributed normally upon assessment by using Shapiro-Wilk test and were thus represented using median interquartile range (IQR). Qualitative variables (gender and complications) were presented as frequency and percentage. Frequency of complications was stratified by age and gender to deal with effect modifiers. Post stratification Chi-square test was used as test of significance keeping a p-value of ≤ 0.05 as statistically significant.

Results

In this study, 140 patients were included. Median age was 7.00 (5.00) years. In younger age group (1-6 years) there were 64 (45.70%) patients and in older age group (7-12 years) there were 76 (54.30%) patients. There were 86 (61.40%) male and 54 (38.60%) female patients. Median weight of the children was 22.00 (10.00) kg. Baseline parameters of the patients in Table-I:

Table-I: Baseline parameters of the patients (n = 140)

Parameter	Median (IQR); n (%)
Age	7.00 (5.00) years
1-6 years	64 (45.70%)
7-12 years	76 (54.30%)
Gender	
Male	86 (61.40%)
Female	54 (38.60%)
Median weight	22.00 (10.00) kg

Frequency of patients who had viral hepatitis due to HAV and developed complications was 78 (55.70%). Most common complications observed were splenomegaly, low platelet count and pancytopenia affecting 12 (15.38%) patients each followed by ascites and dilated common bile duct (CBD) occurring in 10 (12.82%) each, diffuse cutaneous rash in 9 (11.54%) patients, hepatic encephalopathy

(HE) occurring in 7 (8.97%) patients and fulminant hepatic failure in 6 (7.69%) patients. Frequency and distribution of complications of viral hepatitis due to HAV are given in Table-II. Stratification of frequency of patients who had viral hepatitis due to HAV and developed complications by age and gender is given in Table-III.

Table-II: Frequency and distribution of complications of viral hepatitis due to HAV (n = 140)

Complications	n (%)
Yes	78 (55.70%)
No	62 (44.30%)
Distribution of complications (n = 78)	
Splenomegaly	12 (15.38%)
Low platelet count	12 (15.38%)
Pancytopenia	12 (15.38%)
Ascites	10 (12.82%)
Dilated common bile duct	10 (12.82%)
Diffuse cutaneous rash	9 (11.54%)
Hepatic encephalopathy	7 (8.97%)
Fulminant hepatic failure	6 (7.69%)

Table-III: Stratification of frequency of hyponatremia by confounding variables (n = 140)

Table 111: Stratification of frequency of hypochondria by confounding variables (n = 146)				
Stratification by age				
Complication	1-6 years (n = 64)	7-12 years (n = 76)	p-value	Chi-square value
Yes	36 (56.25%)	42 (55.26%)	0.91	0.014
No	28 (43.75%)	34 (44.74%)		
Stratification by gender				
Complication	Male (n = 86)	Female (n = 54)	p-value	Chi-square value
Yes	53 (61.63%)	25 (46.30%)	0.08	3.160
No	33 (38.37%)	29 (53.70%)		

Discussion

In the developing world, one of the most common type of acute hepatitis is the viral type, particularly those which are transferred in community by the consumption of fecal contaminated water. (10, 11) Amongst these,

HAV is considered as the most common etiological pathogen that leads to this acute inflammation of the liver causing hepatitis. (12, 13) Mostly, the focus is put on the acute management of the clinical symptomatology of this disease, however, present study focused on one the most important

aspect of this infectious disease which is the complication associated with this infection in children and early teenagers.

In present study, average age of the patients who were affected by this infection was seven years with majority of them being aged between seven and fourteen years. Compared to this, a study was conducted by Tasneem et al. (14) among children from Bangladeshi population who were affected by acute HAV hepatitis in which they reported that the most common age group which constituted the major proportion of HAV affecters were aged between five and ten years which is relatively similar to current study. Similar to average age of HAV affected children of current study, a study conducted by Rasheed et al. (15) in Pakistani HAV infected children in which they found the average age of these children to be approximately seven years. Upon assessment of gender distribution, it was observed that most HAV affected children were male constituting 60.4% of the patients. Similar to this slight predominance in present study, Baidya et al. (16) found that 55.5% of the HAV related acute hepatitis cases were male children supporting the evidence of male predominance in this regard. Similarly, in another study conducted by Sarmin et al. (17), it was reported that male children were 1.14 times more likely to get infected by HAV as compared to female children. One possible reason for this male predominance is the higher chances of male children to consume food and beverages from the outdoor sources and thus having higher probability to get infected with this virus.

In present study, many of the HAV infected children had a benign course of the disease leading to complete recovery, however, 55.7% children developed at least one of the complication of this disease. Amongst these patients, complications that occurred were splenomegaly, low platelet count, pancytopenia, ascites, dilated CBD, diffuse cutaneous rash, hepatic encephalopathy and fulminant hepatic failure. Compared to this, a study found that the frequency of complications in children infected by HAV infection associated viral hepatitis was 30% which was lower yet comparable to present study. (18) One possibility of this difference can be the difference in the definition of a clinical presentation being labeled as a complication. Ascites has been reported a fairly common complication of HAV hepatitis and its frequency in present study was 12.82%. Compared to this, a study was conducted by Subedi et al. (19) in which it was reported that this complication occurred in 53.33% which was very high compared to present study. In another study, conducted by Murlidharan et al. (20), frequency of ascites in children with this infectious condition was only 1%. Another common complication observed in present study was increased size of spleen found in 15.38% children which may have culminated in occurrence of low platelet count cytopenias. Compared to this, Murlidharan et al. (20) and Gampa et al. (18) reported the frequencies of thrombocytopenia, splenomegaly and pancytopenia were 9%, 1% and 9%, respectively, much lower than present study.

Amongst the more severe complications of this condition, one of the life threatening complications of HAV hepatitis in children are the fulminant hepatic failure and hepatic encephalopathy that were found in 7.69% and 8.97%, respectively. Compared to this, Yeasmin et al. (21) found the frequency of fulminant hepatic failure to be only 2.5% which was much less compared to present study. Similarly, Rashid et al. (22) reported that hepatic encephalopathy occurred in 10% of the patients which was comparable to current study. These differences can be attributed to the differences in the sample sizes and the availability of level of healthcare to the affected children included in the aforementioned studies.

Results of present study exhibit an alarmingly high rate of complications in a condition which is generally considered a benign and self-resolving disease. This warrants the improvements in the therapeutic care protocols of this disease in the children to mitigate the chances of developing the complications associated with this infection.

Conclusion

In conclusion, patients with HAV related viral hepatitis, complications occurred in 55.70% patients.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-F.1-1/2015/ERB/SZABMU/1143)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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Manuscript drafting, Study Design,

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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