Evaluation of clinical spectrum of Hepatitis A in children admitted at a tertiary care center in Western Nepal

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ABSTRACT

Introduction: Hepatitis A is one of the causes of morbidity and mortality in children in developing countries like Nepal. Hepatitis A virus is a positive-strand RNA virus that is transmitted feco-orally through person-to-person contact. Lack of awareness, overcrowding, and poor sanitation have led to increased infection mainly in many rural areas. This study was conducted to assess the clinical course of hepatitis A, blood parameters and its associated complications in patients admitted pediatric ward. **Methods:** A hospital-based cross-sectional study was conducted on pediatric patients who had presented with icterus. Only serologically confirmed cases by the detection of IgM antibodies against Hepatitis A virus (HAV) ELISA were included in the study group. The clinical course and lab profiles of the patients were analyzed. **Results:** A total of 75 patients were positive for HAV IgM A (serology) and were included in the study. The majority of children seen were in the age group of 5 to 12 years (51%). The most common symptoms were icterus. More than a five-fold rise in AST and ALT (SGPT) was seen in 58 cases (77.3%) and 62 cases (82.6%) respectively. More than 2,000 U/L of AST and ALT were seen in 10 cases (13.3%) and 14 cases (18.6%) respectively. **Conclusions:** It was found that vomiting, abdominal pain and icterus were most common clinical features. Elevated prothrombin time and raised liver enzymes were most common lab findings. The most common abdominal ultrasound finding was ascites. No patients presented with severe complications.

Keywords: Children, complications, Hepatitis A.

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INTRODUCTION

Hepatitis A virus (HAV) is a positive-strand RNA virus that is transmitted feco-orally through person-to-person contact. Poor sanitation, overcrowding, or food and water contamination are the causes of its outbreaks.[1] Hepatitis A is a widespread disease, accounting for 1.4 million cases annually worldwide.[2-4] The unusual clinical manifestations include cholestatic, relapsing, and fulminant hepatitis.[5] In developing countries, infection is acquired early in life, mostly anicterically about 90% of exposure occurs by the age of five and universal exposure by adolescence.[6]

Clinical manifestations can vary from mild, anicteric illness to fulminant hepatitis.[7] Acute liver failure occurs in less than 1% of cases. Extra-hepatic complications of hepatitis A are unusual.[2] Although it is usually self-limiting, it can still cause considerable morbidity and mortality.[8,9] There is a paucity of data related to the clinical course of hepatitis A in children in Nepal.

This study was done to assess clinical course of hepatitis A, blood parameters and its associated complications in pediatric patients at Gandaki Medical College in Pokhara, Nepal.

METHODS

A hospital based cross-sectional study was conducted at Department

of pediatrics, Gandaki Medical College Teaching Hospital and Research Center, Pokhara. Data collection was done from September 5, 2021 to September 4, 2022 .The ethical clearance was obtained from the Institutional Review committee of Gandaki Medical College (Ref. No. 21/2078/2079). Written consent was taken from the patient's parents. Children aged between 2 to 15 years, who had presented with icterus/ duration of jaundice less than 3 months were enrolled in the study. Only serologically confirmed cases by the detection of IgM antibodies against HAV (ELISA) were included in the study group.

Patients above 15 years of age, patients with jaundice of duration more than three months, negative serological test, children with chronic liver disease, and those on hepatotoxic drugs were excluded from the study.

Other viral hepatitis markers (HBsAg, Anti HCV, Anti HEV) were taken into account in all cases. Anti-HAV IgM [ELISA], Hemoglobin (Hb), total leucocyte count (TLC), differential leucocyte count (DLC), platelet count, serum bilirubin, Alaninetransaminase (ALT), Aspartate transaminase (AST), Alkaline phosphatase (ALP), serum albumin, serum globulin, total proteins, Prothrombin time (PT), Activated partial thromboplastin time (APTT), blood urea, serum creatinine, blood sugar, serum amylase and ultrasonography of the abdomen and thorax were the other investigations performed. Any complication associated with Hepatitis A in the study population was noted.

Using nmaster 2.0 software, sample size was calculated to be 95, considering the prevalence of ascites (p=44.9%)[10] and absolute precision taken as 10%. The sample size in the study was considered to be 75 because out of 83 patients admitted, only 75 were positive for HAV IgM A (serology). There was a reduced number of patients due to the COVID outbreak during the study period so the sample size was reduced.

The data was entered in a Microsoft excel sheet. It was then transferred into SPSS (statistical package for social sciences) version 25.0 for statistical analysis. Descriptive statistics were computed and expressed in percentage and mean.

RESULTS

A total of 83 patients were admitted with findings of icterus over the study period. 75 of the patients were positive for HAV IgM A (serology) and were included in the study. The majority of children belonged to the age group of 5 to 12 years (51%) and the mean age was 3.7 years. Out of 75 patients, 41(53.9%) were males.

The most common symptoms were icterus 57(76%) and vomiting 49(64.5%). Other symptoms were fever 47(61.8%), and abdominal pain 47(61.8%). Hepatomegaly was present in 19(25%) of the cases. Splenomegaly was seen in 8(10.5%) patients. Few enlarged mesenteric lymph nodes were seen in five cases. Nephrolithiasis with focal hydronephrosis was seen in one patient. Deviation of the face towards the right side was seen in 1(1.3%) patient and rashes over the whole body were seen in 1(1.3%) patient. The longest duration of hospital stay was seven days in one patient. Thrombocytopenia was seen in four cases (5.3%).

The findings of liver function tests (LFT) are depicted in Table 1. Coagulopathy in the form of excessive prolongation of PT was seen in 30(40%) cases. More than five-fold rise in AST and ALT (SGPT) were seen in 58(77.3%) cases and 62(82.6%) cases respectively. More than 2,000 U/L of AST and ALT were seen in 10(13.3%) cases and 14(18.6%) cases respectively. ALP was elevated in 69(92%) cases. The ultrasound findings are given in table 2. Most common USG findings were ascities 40(53.33%) and thickening of wall of gall bladder 35(46.66%).

Table 1: Liver function tests findings in Hepatitis A children(N= 75)

Parameters(LFT)	Cases(N=75)	Percentage(%)
Serum bilirubin>1mg/dl	75	100%
Elevated AST(>40 U/L)	73	97.33%
Elevated ALT(>40 U/L)	72	96%
Elevated ALP	69	94.66%
Abnormal PT(INR>1.5)	30	40%
Serum protein(<6g/dl)	7	9.33%
Serum albumin(<3.5 g/dL)	10	13.33%
Serum globulin(<2.5 g/dL)	6	8%

Table 2: Ultrasound findings tests findings in the Hepatitis A children (N=75)

Findings	Number	Percentage
Ascites	40	53.33%
Pleural effusion	12	16%
Gall bladder wall thickening	35	46.66%
Reduced ecogenicity of liver	17	22.66%
Increased ecogenicity of liver	11	14.66%

DISCUSSION

HAV is a small, non-enveloped RNA virus belonging to the Picornaviridae. Transmission is usually through the fecal and/or oral route by person-to-person contact.[9] Unusual clinical manifestations of hepatitis A include cholestatic, relapsing, and fulminant hepatitis.[5] Hepatitis A infection is an important public health problem in developing countries. Hepatitis A itself presents as completely asymptomatic to fulminant hepatic failure in the pediatric age group. Fever was the most common presenting symptom in 92.6% and diarrhea in 56% of children with HAV. This finding was similar to a few studies which showed fever and diarrhea to

be the presenting complaints.[10-12]

In this study, comparatively less number of patients were admitted due to Hepatitis A than in previous years. The probable reason could be the improved sanitation among the population due to the COVID times. No case of COVID co-infection with Hepatitis A was present in the patients. One of the patients presented with Bell's palsy with Hepatitis. He was provided with the anti-viral treatment acyclovir and recovered in five days. The raised level of AST and ALT did not determine the severity of the cases of hepatitis A, it was similar to that of findings of previous studies.[10]

There has been improvement in sanitary conditions and hygienic practices, accompanied by the Hepatitis A vaccine (HepA) vaccination, the incidence rate of hepatitis A is decreasing and the average age at infection is increasing worldwide.[13] HepA was first used worldwide in 1992 and its role in hepatitis A control has been proven in many countries[14] HepA was first licensed in 1992. Both inactivated HepA (HepA-I) and live attenuated HepA (HepA-L) are highly immunogenic.

Immunization with Hepatitis A virus vaccine among children has shown to reduce the potential for the manifestations of severe complications. Previous studies have shown that Hepatitis A incidence was seen to decline 92% with universal vaccination of young children in United States.[14] Nearly 100% of people develop protective levels of antibodies to the virus within one month after a single dose of the vaccine. Even though a single dose of the vaccine has protective effects; still, two doses of vaccine are recommended to ensure a longer-term protection of about five to eight years after vaccination.[15]

Immune protection post-vaccination can persist for at least 20 years. HepA is effective for both pre-exposure and post-exposure prophylaxis, especially among children and young adults. The incidence of hepatitis A has decreased greatly in many countries in the last 30 years, but hepatitis A outbreaks frequently occur among high-risk populations and those who have not been covered by universal child vaccination programs in recent years.[16-18]

For highly endemic regions of hepatitis A, it is necessary to improve the sanitary conditions and hygienic conditions. Clean drinking water and food are critical for decreasing the incidence of foodborne infectious diseases including hepatitis A. Lack of awareness and poor sanitation has led to increased infection of Hepatitis A mainly among many rural areas. Since there are fewer studies of Hepatitis A in children and its associated complications. It is imperative to conduct such a study in our country so that the effects of Hepatitis A, its altered blood parameters, and its associated complications can be analyzed and further address its associated morbidities and mortalities.

The limitations of this study were that it was a cross-sectional study, the post-treatment improvement couldn't be analyzed, and the sample size of the study was less due to the reduced flow of patients than usual due to the COVID outbreak times.

CONCLUSIONS

Jaundice and vomiting were the predominant symptoms found in this study population with the most common age group of 5 to 12 years. The most common complications were ascites, gall bladder wall thickening, and reduced echogenicity of the liver. Hepatitis A immunization programs play a crucial role in reducing incidences of Hepatitis A infections and its associated complications. Therefore, it is recommended to provide immunization to children above one year against Hepatitis A with two dosages in six months intervals.

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AUTHORS' CONTRIBUTIONS

NS did conceptualization, project administration, formal analysis, investigation, methodology, original draft preparation, reviewing & editing the manuscript, BS did the investigation, methodology, reviewing & editing of the manuscript, AB did the investigation, methodology, reviewing & editing the manuscript, SP did the formal analysis, resources, visualization, review & editing the manuscript and NK did formal analysis, resources, review & editing the manuscript

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