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Aetiological Spectrum of Acute Hepatitis in Children: Experience of a Tertiary Care Hospital of Bangladesh

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ABSTRACT

Introduction: *Acute hepatitis may be caused by a variety of insults which may also progress to acute liver failure a condition associated with high morbidity and mortality without a liver transplant. It is important to establish the underlying etiology of acute hepatitis, as the outcome varies according to etiology and the risk of progression to acute liver failure also differs accordingly.* ***Objectives:*** *The present study was undertaken to identify the underlying etiology of Acute Hepatitis in children under16 years of age admitted at the Department of Paediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University, Dhaka, a tertiary care hospital of Bangladesh.* ***Methodology:*** *It was a retrospective review of medical records from November 2014 through October 2016.* ***Results:*** *During this period a total of 126 patients were diagnosed to have acute hepatitis. Etiology was established in 87.3% of cases of acute hepatitis. Among them, 52.4% were due to Hepatitis A Virus infection, 12.7% due to Wilson's disease and only 6.4% were due to hepatitis B virus infection. Hepatitis A virus infection was found to be the most common cause (52.4%) of acute hepatitis in children in this study.* ***Conclusions:*** *Hepatitis-A virus infection was found to be the most common cause of acute hepatitis in Bangladeshi children which is preventable. An intervention like universal immunization against the hepatitis A virus may effectively reduce morbidity from acute hepatitis and mortality associated with acute liver failure in Bangladeshi children.*

Keywords: Acute hepatitis, Etiology, Bangladesh, Children

INTRODUCTION

Acute hepatitis is an abrupt onset of diffuse inflammation of the hepatocytes associated with hepatocellular necrosis and a characteristic constellation of clinical (jaundice, nausea, vomiting, right hypochondriac pain) biochemical (elevated serum bilirubin, transaminase) and pathological (hepatocellular inflammation and necrosis) features. Acute hepatitis may occur due to infective (virus, bacteria, protozoa, tuberculosis, etc.) or non-infective causes (drugs, autoimmune, metabolic), but most often caused by a virus that is hepatotropic (hepatitis A, B, C, D, and E). Other viral infections may also occasionally affect the liver, such as Cytomegalovirus (CMV), herpes simplex, coxsackie, and adenovirus. Infective causes are more common than the non-infective cause. Viral infection shares an important subset among the infections in this subcontinent [1]. Acute Viral Hepatitis (AVH) is an endemic public health problem in developing countries which is an important cause of morbidity and associated mortality from Acute Liver Failure (ALF) in children. AVH in children is typically an acute illness associated with general, non-specific symptoms, such as fever, malaise, anorexia, vomiting, nausea, abdominal pain/discomfort, and some become jaundiced due to diffuse inflammation and/or necrosis of hepatocytes, with spontaneous resolution of illness within 4 weeks. Hepatitis

A and E are usually self-limiting infections (a few cases may turn to ALF), but infection with hepatitis C and to a lesser extent hepatitis B usually become chronic [2]. Massive necro-inflammation of hepatocyte may progress to ALF or continue injury beyond six months resulting in chronic hepatitis [3]. Acute liver failure is a rapidly progressive, potentially fatal syndrome resulting from rapid death or injury to a large proportion of hepatocytes, caused by a variety of insults, leading to insufficient hepatic parenchymal mass to sustain liver function. Pediatric ALF is defined as the presence of biochemical evidence of liver injury (deranged transaminases) and coagulopathy not corrected by one dose of parenteral vitamin K administration with International Normalized Ratio (INR) of >1.5 in the presence of encephalopathy or an INR of >2 with no evidence of encephalopathy within 8 weeks of the onset of liver injury without prior known existing liver disease [4]. The etiology of ALF varies according to the age of the patient and the development of the country [5-7]. The outcome of ALF also varies according to etiology: survival is better in a few aetiologies like paracetamol poisoning, hepatitis A, whereas it is poor in metabolic diseases, needs a liver transplant in a specialized center [7,8]. A recent study in Bangladeshi children with ALF showed, viral hepatitis is the underlying cause in 34.3% of cases and the survival rate was 43% [9]. So it is essential to know the etiology of acute hepatitis for management purposes. There are few studies regarding the etiology of acute hepatitis in children of Bangladesh. So the study was carried out to observe the underlying etiology of acute hepatitis in children under 16 years of age admitted at the Department of Paediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, a tertiary care hospital of Bangladesh.

METHODOLOGY

It was a retrospective review of medical records. All cases of acute hepatitis diagnosed at the Department of Paediatric Gastroenterology and Nutrition, BSMMU, from November 2012 through October 2014, aged below 15 years were reviewed in this study after approval from the departmental ethical committee. Diagnosis of acute hepatitis was based on a short history of jaundice in a patient with no known pre-existing liver disease. All patients with a history of liver disease or had stigmata of chronic liver disease during physical examinations were excluded from this study. Clinical information was collected from hospital records. All patients were tested for liver functions (serum bilirubin, alanine aminotransferase/ALT, aspartate aminotransferase/ALT, serum albumin, prothrombin time/PT) and viral markers (anti-HAV IgM for hepatitis A virus, HBsAg and anti-HBcIgM for hepatitis B, anti-HEV IgM for hepatitis E, anti-HCV and HCV RNA for hepatitis C virus). Screening for Wilson disease (serum ceruloplasmin, slit-lamp examination of eyes for KF ring) and autoimmune hepatitis (anti-nuclear, anti-smooth muscle, and liver-kidney microsomal antibody) was done when viral markers were found negative or suspected. All the patients were managed according to the standard departmental protocol. The etiology of acute hepatitis was divided into two groups Group-A (where the underlying cause was identified) and Group-B (where no cause was found), group-A was subdivided according to identified causes. Data were analyzed by using SPSS software, p-value assessed by z-test, <0.05 were considered significant.

RESULTS

During the study period total of 126 patients were diagnosed to have acute hepatitis, among them, twenty-eight (22.2%) were below 5 years,70 (55.6%) between 5 to 10 years, and 28 (22.2%) above 10 years (Table 1). mean age was 7.2 ± 3 years. Of the 126 cases of acute hepatitis 82 (65%) were male and 44 (34.9%) female difference is statistically significant (Table 2). Etiology was identified (Group-A) in 110 (87.3%) and no cause was found (indeterminate, Group-B) in 16 (12.7%) cases of acute hepatitis. The difference between Group-A and B was statistically significant ($p<0.05$, Table 3). Hepatitis-A virus was found to be the cause of acute hepatitis in 66 (52.38%) cases, among the other causes, Wilson's Disease (WD) was found in 16 (12.7%), Hepatitis-B in 8 (6.4%), *salmonella* hepatitis in 8 (6.4%), Cytomegalovirus infection in 4 (3.2%), *Salmonella* and hepatitis A virus co-infection in 2 (1.6%), combined hepatitis A and hepatitis B in 1 (0.8%) and celiac disease 1 (0.8%) cases (Table 4). Hepatitis-A virus infection was found to be the most common cause (52.38%) of acute hepatitis and hepatitis-B virus infection was found only in 6.3% of cases, the difference is statistically significant ($p<0.05$, Table 2). We found no case of hepatitis C virus infection in the study.

Table 1 Age distribution of studied patients

Age	Acute hepatitis (n=126) no (%)
<5 yrs	28 (22.2)
5-10 yrs	70 (55.6)
>10 yrs	28 (22.2)

Table 2 Sex distribution of studied patients with acute hepatitis

Sex	No (%)	p-value
Male	82 (65%)	<0.001
Female	44 (34.9%)	

Table 3 Number distribution of causes of acute hepatitis patients (n=126)

		p-value
Group-A/cause identified 110 (87.3%)	Group B/indeterminate cause 16 (12.7%)	<0.001
Hepatitis A 66 (52.39%)	Hepatitis B 3 (8.6%)	<0.001

Table 4 Showing number distribution of causes of acute hepatitis

Causes	Acute hepatitis (n=126) No. %
Hepatitis A	66 (52.38)
Hepatitis B	8 (6.34)
Hepatitis E	4 (3.2)
Salmonella hepatitis	8 (6.34)
CMV hepatitis	4 (3.17)
Co-infection Salmonella and HAV	2 (1.58)
Combined HAV and HEV	1 (0.8)
Wilson disease	16 (12.69)
Coeliac disease	1 (0.8)
Galactossaemia and A1AT	0
Unknown etiology	16 (12.7)

DISCUSSION

Acute hepatitis is a common health-related problem in developing countries, causes are divergent. In the present study, the cause was identified in 87.3 % of acute hepatitis cases, and only in 12.7% cases (significantly lower), no underlying cause was found. The underlying cause was identified in 64.5% of cases of acute hepatitis in a neighbouring country which is closer to our study [10]. Results of the present study high lights the fact that Hepatitis-A Virus (HAV) remains the most common cause (52.4%) of acute hepatitis in children of Bangladesh, which is 64.55% in our neighbouring country that is also nearer to our study, this may be due to sharing of nearly similar socioeconomic status [10]. Surprisingly Hepatitis A virus infection is around 1% in developed countries, which is very far from our figure (52.4%) [11]. The high figure of HAV infection as the underlying cause in acute hepatitis (52%) may be explained by poor sanitation and personal hygiene, lack of health education and safe water supply, above all lack of universal immunization against Hepatitis A Virus. Hepatitis-B Virus (HBV) infection was found in a very small number of children with acute hepatitis (6.4%), which is significantly lower ($p<0.05$) than HAV infection (52.39%) in this study. The rate of HBV infection in Bangladesh was 1.5%-12% among under-five years according to a study during the pre-

hepatitis B vaccine era [12]. After the introduction of the hepatitis-B vaccine into the routine childhood vaccination schedule, the rate of seropositivity for HBV infection in Bangladesh dramatically reduced to <0.1% in the post-vaccine era [13]. This fact explains that universal immunization against HBV infection might be responsible for the minimal contribution of HBV infection as the cause in acute hepatitis, this fact also suggests that universal immunization against HAV infection may significantly reduce the major contribution of HAV infection in acute hepatitis. The current study showed, Hepatitis-E Virus (HEV), *Salmonella* with HAV co-infection, combined HAV and HEV infection also occurred in 3.2%, 6.4%, 1.6%, 0.8% of acute hepatitis cases respectively, all are a feco-orally transmissible disease which could be prevented by providing sanitary latrine & safe water supply. Among the metabolic causes, Wilson's Disease (WD) was the second most common cause of acute hepatitis (12.7%). Early diagnosis and screening of family members may reduce the disease burden of acute hepatitis from Wilson's disease.

CONCLUSION

Hepatitis-A virus infection was found as the commonest cause of acute hepatitis in Bangladeshi children which is preventable by the provision of sanitation, personal hygiene, and safe water supply by adopting and implementing universal immunization against hepatitis-A.

Recommendations

Universal immunization against hepatitis-A and above all raising social awareness against viral hepatitis may effectively decrease morbidity and mortality from acute hepatitis and acute liver failure from hepatitis-A in the pediatric age group of Bangladesh.

Limitations

The limitations of the study include a single-center study, small sample size, and retrospective design.

DECLARATIONS

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

[1] Sibal, Anupam, and Sarath Gopalan. "Textbook of pediatric gastroenterology, hepatology and nutrition." *JP Medical Ltd*, 2015.

[2] Haethcote, J., et al. "World Gastroenterology Organisation Practice Guidelines: Management of Acute Viral Hepatitis." World Gastroenterology Organisation, 2003. https://www.worldgastroenterology.org/guidelines/management-of-acute-viral-hepatitis/acute-viral-hepatitis-english

[3] Sherlock, Sheila, James Dooley, and A. S. F. Lok. "Sherlock's diseases of the liver and biliary system." *Wiley-Blackwell*, 2011.

[4] Bucuvalas, John, Nada Yazigi, and Robert H. Squires. "Acute liver failure in children." *Clinics in Liver Disease,* Vol. 10, No. 1, 2006, pp. 149-68.

[5] Acharya, Subrat Kumar, et al. "Fulminant hepatitis in a tropical population: Clinical course, cause, and early predictors of outcome." *Hepatology,* Vol. 23, No. 6, 1996, pp. 1448-55.

[6] Ostapowicz, George, and William M. Lee. "Acute hepatic failure: A Western perspective." *Journal of Gastroenterology and Hepatology,* Vol. 15, No. 5, 2000, pp. 480-88.

[7] Dhiman, R. K., et al. "Prognostic evaluation of early indicators in fulminant hepatic failure by multivariate analysis." *Digestive Diseases and Sciences,* Vol. 43, No. 6, 1998, pp. 1311-16.

[8] Lee, Way Seah, Patrick McKiernan, and Deirdre Anne Kelly. "Etiology, outcome and prognostic indicators of childhood fulminant hepatic failure in the United Kingdom." *Journal of Pediatric Gastroenterology and Nutrition,* Vol. 40, No. 5, 2005, pp. 575-81.

[9] Mazumder, M. W., et al. "Aetiology and outcome of acute liver failure in children: Experience at a tertiary care hospital of Bangladesh." *Mymensingh Medical Journal: MMJ,* Vol. 25, No. 3, 2016, pp. 492-94.

[10] Poddar, Ujjal, et al. "Changing spectrum of sporadic acute viral hepatitis in Indian children." *Journal of Tropical Pediatrics,* Vol. 48, No. 4, 2002, pp. 210-13.

[11] Squires Jr, Robert H., et al. "Acute liver failure in children: The first 348 patients in the pediatric acute liver failure study group." *The Journal of Pediatrics,* Vol. 148, No. 5, 2006, pp. 652-58.

[12] Alam, Mohd Shamsul, et al. "The seroprevalence of hepatitis B virus among children attending urban and rural hospitals." *Bangladesh Journal of Child Health,* Vol. 30, No. 1, 2006, pp. 17-21.

[13] "Impact of Hepatitis B vaccination programme in Bangladesh" *Health and Science Bulletin*, Vol. 11, No. 1, 2013 pp. 1-8.