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Original Article

Etiology and Outcome of Hepatic Encephalopathy in Bangladeshi Children

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Abstract:

Hepatic encephalopathy is one of the complications of liver failure which causes increase mortality and morbidity in children. This cross sectional type of observation study was conducted in the department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University of Bangladesh to determine the etiology and outcome of hepatic encephalopathy in Bangladeshi children. Patients between 1 to 18 years were included who fulfilled the West Heaven clinical criteria of hepatic encephalopathy. The data were collected and recorded questionnaire after IRB approval and was analyzed accordingly. Total 32 patients were included in this study; among which 20 were males and 12 were female with a mean age was 8.1±3.5 years. The most common etiologies were Wilson disease (47%), followed by cryptogenic (25%) and Hepatitis A virus (18.8%). Total 9 patients out of 32 were expired, another 8 got discharge with advice, 1 patient recovered after liver transplantation and others were improved with advice of follow up. All the patients were expired who developed hepatic encephalopathy due to Hepatitis A virus except one patient who received liver transplantation from abroad. This study highlights that hepatic encephalopathy from infective diseases as hepatitis A virus leads higher mortality rate in children. Though liver transplantation facility is not available in the developing countries, maintenance of hygiene and vaccination is the main preventive measures to reduce the mortality in children.

Key words: Hepatic encephalopathy, Etiology, Outcome.

Introduction:

Liver failure (LF) in pediatric patients is a public health burden which often requires prolonged hospitalization and liver transplantation[1]. Hepatic encephalopathy (HE) is the serious complication of both acute and chronic liver failure. There is a broad range of neuropsychiatric abnormalities of varying severity. Affected patients may have alterations in psychomotor, intellectual, cognitive, emotional, behavioral and also fine motor functions[2]. HE is challenging to identify in children with liver failure. So, improved assessment of neurological injury

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and pediatric acute liver failure prognostication schema are needed[3].

Colonic bacteria produces ammonia from dietary nitrogen. About 85% of it is detoxified by the liver and excreted as urea in urine whereas 15% is metabolized by muscle and brain tissue. The process is mainly mediated by urea cycle which prevents accumulation of metabolic product in the body. But the nitrogenous toxins including ammonia remains elevated in the systemic circulation in CLD and HE patients due to hepatocellular dysfunction and/or portosystemic shunting[4]. There is a wide variation in the etiology of fulminant hepatic failure depending on the age group and geographical location. Among them acute viral hepatitis, drugs and toxin are the leading causes but other causes are seronegative hepatitis, metabolic liver diseases, autoimmune hepatitis, hemophagocytic lymphohistiocytosis and sepsis[5].

HE is classified according to manifestations and underlying disease. It can be classified as type A, type B, type C and type D[6].

The World Organization of Gastroenterology introduced a multi-axial definition of HE which categorized HE according to etiology as Type A-Acute Liver failure, Type B-Portosystemic bypass without intrinsic liver disease and Type C-Cirrhosis[5].

Aim of this study was to investigate etiology, clinical presentation, and outcome after the diagnosis of hepatic encephalopathy in children.

Materials and Methods:

This cross-sectional observational study was conducted at the Department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka Bangladesh from November 2017 to September 2019. All the pediatric patients aged 1-18 years of both sexes diagnosed as HE due to liver disease on the basis of clinical criteria were selected as the study population. HE was classified on the basis of West Heaven Criteria and on the basis of liver dysfunction. Who were unwilling to give consent and encephalopathy other than the liver disease were excluded from the study.

A total of 32 patients who fulfilled the inclusion criteria were included in the study. Before enrollment, written informed consent from the parents was taken. After that a detailed history and physical examinations of the patients were recorded in a structured questionnaire. Investigations were done to identify the causes of hepatic encephalopathy. Results of the investigations were collected and recorded in the structured data sheet. After collection of data they were checked manually and were analyzed by SPSS (Statistical Package for Social Science) Version 20 (SPSS Inc., Chicago, IL USA).

Results:

Among total 32 patients majority were male (Table I).

Table I: Distribution of patients according to age and sex (n=32)

Characteristics	Findings
Age (years)	**Number of patients (%)**
≤5	8(25)
>5-10	14(43.75)
>10-18	10(31.25)
Sex	**Number of patients (%)**
Male	20(62.50)
Female	12(37.50)

Wilson disease was the most common etiology (15, 47%), followed by cryptogenic (8, 25%) (Figure 1).

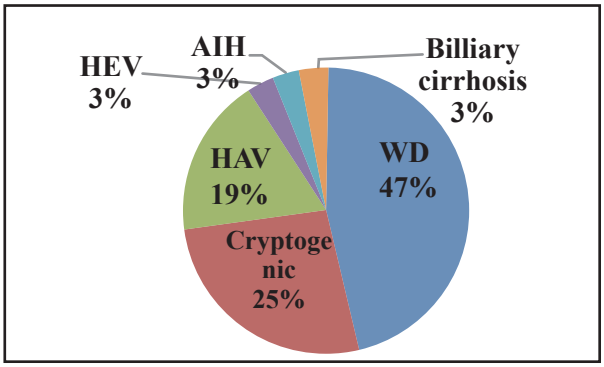

Figure 1: Distribution of patients according to etiology of hepatic encephalopathy (n=32).

Majority of the patients 14 (44%) had chronic liver disease, 11 (34%) patients presented with acute on chronic liver failure and 7 (22%) patients with acute liver failure (Figure 2).

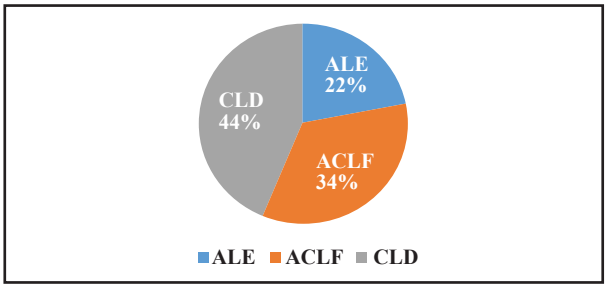

Figure 2: Distribution of patients according to clinical presentation.

Among 32 patients, majority were in grade III hepatic encephalopathy (13), followed by grade II (9) (Figure 3).

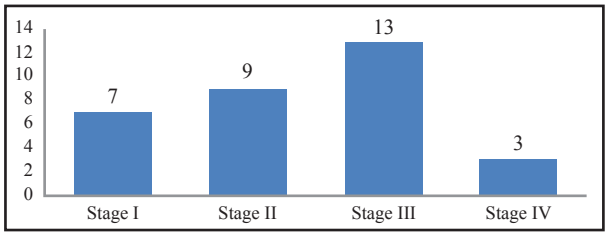

Figure 3: Distribution of patients according to grading of hepatic encephalopathy.

Total 9 patients out of 32 were expired, another 8 got discharge without advice, 1 patient recovered after liver transplantation and rests were improved with advice of follow up. All the patients were expired who developed hepatic encephalopathy due to Hepatitis A except one patient who received liver transplantation from abroad (In Figure 4).

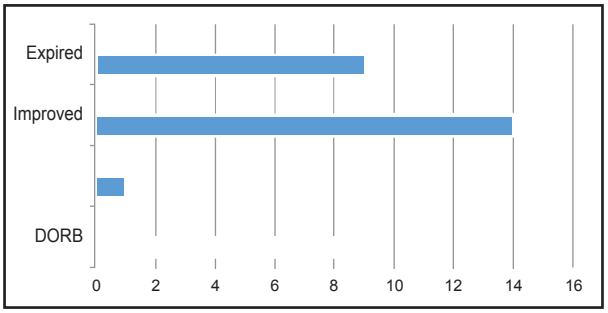

Figure-4: Distribution of patient according to outcome of hepatic encephalopathy (n=32).

Discussion:

HE is the brain dysfunction caused by liver insufficiency and /or porto-systemic shunt. It manifests as a wide spectrum of neurological or psychiatric abnormalities ranging from subclinical alterations to coma[7].

A total of 32 patients with hepatic encephalopathy were included in this study. They were between 1 to 18 years of age. Diagnosis and staging are difficult to do in young infants, so age of less than 1 year were excluded from the study. Diagnosis of encephalopathy was done on the basis of clinical features. Most (75%) of the patients were in the age group between 5-18 years and male to female ratio was 1.6:1. In Foerster et al; age range was between 9-19 years with female predominance[8].

In this study, Wilson disease was the most common (in 46.9%) cause and presented with features of decompensation. Among the metabolic causes Wilson disease mainly present as CLD with portal hypertension (in 33.73% cases) and also without portal hypertension in (42.2%)[9].

Six (18.8%) patients had Hepatitis A virus infection; all of them presented as acute hepatitis, 25% were cryptogenic, 1 (3.12%) had Hepatitis E virus infection, 1 (3.12%) was autoimmune hepatitis and 1 (3.12%) was biliary cirrhosis. In Sharma et al; they found autoimmune hepatitis in 8 cases, hepatitis B in 8, cryptogenic in 4 and Wilson disease in 2 patients[10].

We found 7 (22%) patients with type A and 25 (78%) with type C encephalopathy.

Among the ALF patients, 6 were due to hepatitis A virus infection, 5 died and 1 patient received liver transplantation abroad and survived. Another 1 patient had ALF due to hepatitis E virus infection.

Onyekwere et al, in their study found that two patients had acute encephalopathy (type A), while 19 had acute on chronic liver disease (type C) in adult patients[11].

In the study population, 7 were with stage I, 9 were with stage II, 13 were with stage III and 3 were with stage IV hepatic encephalopathy. One Bangladeshi study by Mazumder MW et al shows the outcome of liver failure and encephalopathy which varies according to aetiology: Survival is better in paracetamol poisoning whereas it is poor in metabolic diseases. In that study 41.7% of death were due to viral hepatitis, 25% due to Wilson's disease and 33.3% cases no cause could be identified.. Immunization against the hepatitis A virus may effectively reduce the morbidity and mortality[12].

Conclusion:

To reduce the mortality in the children with hepatic encephalopathy, early diagnosis and prompt management is important. HE due to metabolic cause need early diagnosis, treatment and regular follow up, whereas proper hygiene and vaccination coverage can reduce the mortality in infective causes as Hepatitis A virus.

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