

Pediatric Fulminant Hepatic Failure: Insights from a Tertiary Care Hospital in Pakistan on Etiology, Clinical Presentation, and Prognosis

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ABSTRACT

Objective: The purpose of this study was to examine the causes, clinical manifestations, and outcomes of fulminant hepatic failure in children treated at a tertiary care facility in Pakistan.

Study Design: Retrospective/observational study

Place and Duration: Department of Pediatrics, LMC, Loralai Medical College Loralai, Balochistan in the duration from May, 2022 to October, 2022.

Methods: Total 66 children of age 1 months to 14 years with fulminant hepatic failure were included in this study. Case enrollment included collecting thorough demographic information after receiving informed written consent. Acute liver failure (INR>2.0) with or without hepatic encephalopathy within 8 weeks of the beginning of clinical liver illness was considered to be indicative of FHF. SPSS 20.0 was used to analyze all data.

Results: Mean age of the children was 5.8±7.26 years. There were majority 42 (63.6%) males and 24 (36.4%) females among all cases. Most common etiology was infection found in 35 (53.03%) cases followed by drug induced, autoimmune hepatitis, undetermined etiology and metabolic etiology. As per lab findings, mean bilirubin of the patients was 22.3±6.30 mg/dl, mean ALT was 1106.2±4.88 U/L, mean AST was 1495.11±6.90 U/L and mean INR was 5.2±3.14. Outcomes were good, 51 (77.3%) patients were discharged and 15 (22.7%) patients were died.

Conclusion: The study shows that viral infections are the main cause of severe liver failure in kids. We found that infant and child mortality rates were low.

Keywords: Pediatric fulminant hepatic failure, Clinical spectrum, Etiology

INTRODUCTION

Fulminant hepatic failure is a clinical condition that, in the absence of any underlying hepatic illness, is defined by a wide spectrum of abnormalities in liver function tests. This syndrome is extremely specific and can eventually be fatal. Both hepatic encephalopathy and coagulopathy can be factors in a deterioration of liver function as well as a change in one's state of consciousness. Nevertheless, the presence of signs of encephalopathy is not a component of diagnostic criteria in children, in contrast to adults. This is due to the fact that hepatic encephalopathy in very young children and infants can be difficult to diagnose. [1-3] While acute viral hepatitis [4] and certain medicines are among the leading causes of fulminant hepatic failure, the precise reasons might vary greatly depending on age and geographic location. [5] Fulminant hepatic failure can also be caused by a variety of different conditions, including seronegative hepatitis, metabolic liver diseases, autoimmune hepatitis, hemophagocytic lymphohistiocytosis, and sepsis. There have been reports that the number of fatalities caused by this terrible disaster ranged from 50[6] to 70 percent. [7]

The causes of ALF in children are distinct from those observed in adults and also change depending on the age of the kid. This is due to their young age, weak immune systems, underdeveloped organs and systems (particularly in neonates and newborns), or potentially life-threatening childhood-specific infections (metabolic disorders). In infants and babies, viral etiologies and metabolic abnormalities are more common; but, in later children and adolescents, toxic causes, autoimmune disorders, and Wilson's disease (WD) are more prevalent. In prosperous nations like the United States of America, the cause of more than 45 percent of ALF cases that occur in children is still unknown [8,9]. (USA). In addition, the factors that lead to ALF in children vary depending on the geography as well as the child's family's socioeconomic status. Toxins are the major cause of ALF in poor nations [10], despite the fact that infections, particularly those caused by the hepatitis A (HAV) and B (HBV) viruses, are the leading cause of ALF in countries that have a low socio-economic level. Although though ALF is relatively uncommon in

children, the condition has a high mortality risk if the child does not undergo an emergency liver transplant.

We need to identify poor prognostic signs for the development of the sickness since there are not enough liver transplant hospitals in the country nor are there enough people willing to donate their livers. The severity of the encephalopathy, aberrant liver enzyme levels, coagulopathy, hyponatremia, and renal failure have all been found to have an impact on the prognosis [11,12]. In underdeveloped nations like Pakistan, there is a lack of awareness on the clinical spectrum and the pathophysiology of FHF in children. The goal of this study was to determine the clinical spectrum and etiology of juvenile FHF so that its early detection might alert doctors to the need for rapid therapy and referral to the relevant experts throughout the nation.

MATERIAL AND METHODS

This Retrospective/observational study was conducted at Department of Pediatrics, LMC, Loralai Medical College Loralai, Balochistan in the duration from May, 2022 to October, 2022. and comprised of 66 patients. Case enrollment included collecting thorough demographic information after receiving informed written consent. Individuals having a history of liver illness, as well as those with systemic diseases such hemophagocytic lymphohistiocytosis or leukemia, were not considered for inclusion.

Patients aged 1 month to 14 years old who met the FHF criteria and were admitted to the unit throughout the research period were included after parental consent was obtained using a sequential sampling method. Within 8 weeks after the development of clinical liver illness, FHF was defined as the presence of acute liver failure (INR>2.0) with or without hepatic encephalopathy.

Each patient's vitals (including medical history, physical exam results, age, gender, height, weight, liver function tests, INR, serum albumin, and blood sugar levels) were entered on a standard form. Standard departmental policy called for the individual sending of advanced diagnostic testing to ascertain the precise cause, including serum ceruloplasmin, 24-hour urine copper, autoimmune profile, metabolic work up, blood culture, and

septic work up. SPSS 23 was used for both data entry and analysis.

RESULTS

Mean age of the children was 5.8±7.26 years. There were majority 42 (63.6%) males and 24 (36.4%) females among all cases.(table 1)

Table-1: Age and gender of included cases

Variables	Frequency	Percentage
Mean age (years)	5.8±7.26	
Gender		
Male	42	63.6
Female	24	36.4

Most common etiology was infection found in 35 (53.03%) cases followed by drug induced, autoimmune hepatitis, undetermined etiology and metabolic etiology.(table 2)

Table-2: Association of etiology among all cases

Variables	Frequency	Percentage
Etiology		
Infection	35	53.03
drug induced	9	13.6
autoimmune hepatitis	8	12.1
undetermined etiology	8	12.1
metabolic etiology	6	9.1

Among 35 cases of infection, 25 cases were had hepatitis A, 5 cases had hepatitis E, hepatitis B found in 3 cases and enteric fever found in 2 cases.(figure 1)

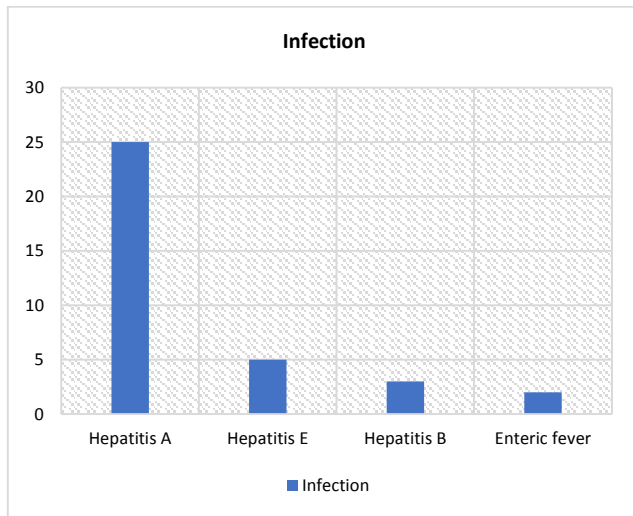


Figure-1: Types of infection among 35 cases

As per lab findings, mean bilirubin of the patients was 22.3±6.30 mg/dl, mean ALT was 1106.2±4.88 U/L, mean AST was 1495.11±6.90 U/L and mean INR was 5.2±3.14.(table 3)

Table-3: Laboratory findings among all cases

Variables	Mean	Std.
Lab results		
bilirubin (mg/dl)	22.3	6.30
ALT (U/L)	1106.2	4.88
AST (U/L)	1495.11	6.90
INR	5.2	3.14
PT (sec)	37.4	2.63
Albumin (gm/l)	3.1	1.28

Outcomes were good, 51 (77.3%) patients were discharged and 15 (22.7%) patients were died.(table 4)

Table-4: Outcomes among all cases

Variables	Frequency	Percentage
Outcomes		
Discharge	51	77.3
Died	15	22.7
Total	66	100

DISCUSSION

Disorders like FHF are incredibly rare, yet their effects are enormous when they do occur. The factors that lead to FHF in children vary from country to country. Viral hepatitis is the most common cause of FHF in developing countries, while medication and toxin use, notably acetaminophen, is the top cause in Western Europe and other industrialized regions [13-15]

In current study 66 children were presented. Mean age of the children was 5.8±7.26 years. There were majority 42 (63.6%) males and 24 (36.4%) females among all cases. These findings were comparable to the previous studies.[16,17] In our study, mean bilirubin of the patients was 22.3±6.30 mg/dl, mean ALT was 1106.2±4.88 U/L, mean AST was 1495.11±6.90 U/L and mean INR was 5.2±3.14.[15] Most common etiology was infection found in 35 (53.03%) cases followed by drug induced, autoimmune hepatitis, undetermined etiology and metabolic etiology. According to the findings of our research, the most common cause of FHF is the Hepatitis A virus. According to a number of regional studies that were carried out in both the United States and the nations that are immediately around it [18,19], hepatitis A is the most common cause of FHF in children. Despite this, Nabi and her colleagues found that HEV was the most prevalent (22.5% of study participants). According to the findings of research carried out in the United Kingdom, an overdose of acetaminophen is the most common reason for deadly heart failure. [20]

In current study, outcomes were good, 51 (77.3%) patients were discharged and 15 (22.7%) patients were died.[20] Liver transplantation is the only treatment option left for people whose condition does not improve while receiving supportive care. [21] Despite this, our liver transplant rate is rather low, which is common for research carried out in nations with limited access to medical resources. This happens as a result of a number of reasons, including a delay in the referral process, an illness that is worsening fast, and the restrictions of the transplant surgery itself .[22,23] The findings of this study indicate that infectious etiologies are the most common cause of fulminant hepatitis in Pakistani children. In light of these findings, there is an urgent need to enhance sanitation, water supply, hand and food cleanliness, as well as immunization and awareness.

The only way to save a patient's life and prevent a return to intensive care is to find out what caused FHF in the first place. Although though pediatric liver transplant clinics in Pakistan are few and far between, orthotopic liver transplant is now a viable therapy option. FHF patients also benefit from N-acetylcysteine therapy.[24]

CONCLUSION

The study shows that viral infections are the main cause of severe liver failure in kids. We found that infant and child mortality rates were low.

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