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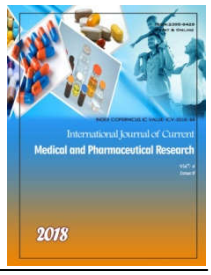


# PROFILE OF CHILDREN WITH FULMINANT HEPATIC FAILURE OF VIRAL ETIOLOGY ADMITTED IN A TERTIARY CARE HOSPITAL OF NORTH INDIA

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**ABSTRACT**

**Back ground:** Viral hepatitis is a major health problem endemic in all parts of the world including India. Fulminant hepatic failure occurs in about one percent of patients hospitalized with acute viral hepatitis. In children the predominant causative agent appears to be hepatitis A virus alone or in combination with other infectious agents .Keeping such patients in intensive care units has achieved survival rates upto 30-40 percent. There is a paucity of literature describing spectrum of fulminant hepatic failure in Indian children. Hence the present study was conducted to determine the pattern of fulminant hepatic failure in children of Punjab region.

**Aims & Objectives:** To determine the pattern of viral markers in children with fulminant hepatic failure of viral etiology and to correlate the clinical and biochemical profile with etiological agents.

**Materials & Methods:** This study was conducted on children aged 1-15 years admitted in a tertiary care hospital, in north Indian province of Punjab. This was a prospective study conducted over a time period of one and half year. Children of fulminant hepatic failure of viral etiology were only included.

**Observations:** In this study total of 30 children with fulminant hepatic failure of viral etiology were studied. Male to female ratio was 2.3:1.Hepatitis A was the commonest virus associated with fulminant hepatic failure. The prolonged jaundice at admission and greater time interval between onset of jaundice and onset of encephalopathy indicated poor prognosis. Mortality rate was 26.6 percent in our study. Non survivors as a group had significantly lower platelet counts. Majority of children were not vaccinated against hepatitis A.

**Conclusions:** Hepatitis A was the most common etiological agent in the cases of fulminant hepatic failure in children. As it is transmitted by feco-oral route, hand washing and proper hygiene especially while cooking will go a long way in keeping this virus away. Most importantly all children must be vaccinated against hepatitis A virus and this vaccine should be included in national immunization schedule. Timely ICU care will also save many a children with fulminant hepatic failure.



## INTRODUCTION

Viral hepatitis is a major health problem endemic in all parts of the world. It involves predominantly liver but may affect various other organs also. Fulminant hepatic failure occurs in only one percent of patients hospitalized with acute viral hepatitis. Only those patients in whom signs of fulminant hepatic failure appear within eight weeks of the onset of illness and in whom there has been no evidence of liver disease previously are included within this definition.[22]The etiology of fulminant hepatic failure is homogeneously distributed throughout the world and the main causes include acute viral hepatitis, toxins, drugs, ischemia, hypoxia et.[19]The fulminant hepatic failure is one of the leading causes of death among hospitalized children in India.[10]The hepatotropic viruses are the most common etiological agents responsible for fulminant hepatic failure in children in tropical countries[1].Viral hepatitis A and E are common causes of fulminant hepatic failure in the developing world[1,2,10,16] whereas hepatitis B is predominant in the far east and hepatitis C in Japan.[18,23]In children predominant causative agent appears to be hepatitis A alone or in combination with other infectious agents.[1,3,10,23] Hepatitis A leads to fulminant hepatic failure in 0.1 to 0.3 % of patients.[13] Usual presentation of fulminant hepatic failure is with non specific symptoms malaise, nausea and anorexia that is followed by appearance of jaundice and thereafter altered mental status and coma. Early development of ascites indicates a poor prognosis.[24] Keeping such patients in intensive care units has achieved survival rates of 30-40 % by meticulous attention to symptomatic management and nursing care.[11,20]There is a paucity of literature describing spectrum of fulminant hepatic failure in Indian children. The present study was therefore conducted to determine the pattern of viral markers and there correlation with clinical and biochemical

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profile in children of fulminant hepatic failure of viral etiology.

## MATERIAL & METHODS

In this study all the consecutive children aged 1-15 years admitted with fulminant hepatic failure of viral etiology, to the emergency department of our hospital were include over a period of 18 months. Fulminant hepatic failure was defined as occurrence of encephalopathy within 8 weeks of onset of jaundice in a child with no prior evidence of liver disease.[22]The detailed clinical profile and laboratory investigations were recorded at admission and subsequently. Only cases with at least one positive viral marker (IgM anti HAV, IgM anti HEV, anti HCV, HBsAg, IgM anti HBcAg) were included. Other investigations included complete blood count, liver function tests and additional investigations like copper studies, widal test, blood culture. Various stastical tools were applied to arrive at the conclusion of the data. These included Z-test, chi-square test and t-test.

### *Observations*

In our study 30 consecutive cases of fulminant hepatic failure were taken over a period of 18 months. They were aged 2-14 years. Out of them 21 were males and 9 females. In maximum cases (20/30) hepatitis A virus was isolated in isolation (table 1).

**Table 1** Etiology viral fulminant hepatic failure

| Etiology | Total(n=30) | Survivors(n=22) | Non survivors(n=8) | Z-value |
|---|---|---|---|---|
| HAV | 20(66.67) | 17(77.27) | 3(37.50) | 2.04** |
| HBV | _ | _ | _ | _ |
| HEV | 1(3.33) | _ | 1(12.50) | 1.69** |
| HAV+HBV | 1(3.33) | _ | 1(12.50) | 1.69** |
| HAV+HEV | 4(13.33) | 2(9.09) | 2(25) | 1.13 NS |
| HAV+HBV+HEV | 2(2.67) | 2(9.09) | 0 | 0.88 NS |
| HAV+Salmonella typhi | 1(3.33) | _ | 1(12.50) | 1.69** |
| HBV+Wilson disease | 1(3.33) | 1(4.55) | _ | 0.61 NS |

The majority of children (60 %) were between the ages of 5-10 years. The mortality was also least in this group (table 2).

**Table 2** Age distribution and survival rates in fulminant hepatic failure

| Age(years) | Total(n=30) | Survivors(n=22) | Non survivors(n=8) |
|---|---|---|---|
| 1-5 | 2(6.67) | 1(4.6) | 1(12.5) |
| 5-10 | 18(60) | 15(68.2) | 3937.5) |
| >10 | 10(33.33) | 6(27.3) | 4(50.0) |
| Mean±SD (years) | 8.77±2.7 | 10.00±3.7 | t 0.96,p>0.1 |

Fever and jaundice were present in all the 30(100%) patients. Other signs and symptoms are depicted in table 3.

**Table 3** Distribution of cases as per symptoms and complications

| Complication/symptoms | Total(n=30) | Survivors(n=22) | Non survivors(n=8) | Z values |
|---|---|---|---|---|
| fever | 30(100) | 22(100) | 8(100) | NS |
| Jaundice | 30(100) | 22(100) | 8(100) | NS |
| Anorexia | 25(83.33) | 21(95.5) | 4(50) | 2.95** |
| Vomiting | 23(76.67) | 19(86.4) | 4(50) | 2.08** |
| Nausea | 22(73.3) | 17(77.3) | 5(62.50) | NS |
| Decreased urinary output | 9(30) | 5(22.7) | 4(50) | NS |
| Cerebral edema | 16(53.33) | 8(36.4) | 8(100) | 8.59** |
| Gastrointestinal bleed | 5(16.67) | 1(4.6) | 4(50) | 2.95** |

The mean duration of jaundice in survivors(3.14±2.90 days) was significantly less as compared to non survivors(22.88±22-88).Similarly time interval between jaundice and encephalopathy was significantly less in survivors(2.59±4.51) as compared to non survivors(21.25±22-37).Out of 30 cases,7(23.3%) were in stage IV encephalopathy. Overall survival rate was 73.3%. There was statistically significant difference between the mean platelet counts of survivors (263.23±87.94) as compared to non survivors(174.38±96.23). The mean serum bilirubin level was 10.08±12.73 mg/dl in survivors and 18.94±12.32 mg/dl in non survivors. This difference was statistically significant. Similarly mean prothrombin time at admission among survivors (27.96±11.77) was statistically less than mean prothrombin time among non survivors (75.40±34.73). International normalized ratio(INR) and partial thromboplastin time(APTT) were also statistically different among survivors and non survivors(table 2,3).

## DISCUSSION

The major cause of fulminant hepatic failure in our study was Hepatitis A. It was the sole causative agent in 20(66.67%) patients while in 8(26.67%) it was in combination with other viruses. Similar findings have been reported from Chile[9] where 72% of the patients had hepatitis A as the cause of fulminant hepatic failure. A recent Indian study from Pune[16] has shown that 82% of their children with fulminant hepatic failure had hepatitis A virus as causative agent. The prevalence of hepatitis A infection is slightly more striking in our study as compared to other Indian studies on fulminant hepatic failure.[3,16,20]This may be due to regional differences. In our study hepatitis B infection was seen in 4(13.33%) cases. The results are comparable to other Indian studies.[3,16]In contrast to a study from Taiwan[6], hepatitis B was seen in 65% of all cases of fulminant hepatic failure. The clinical features of our patients like fever, jaundice, anorexia etc and complications like cerebral edema, gastrointestinal bleeds etc were comparable to some other studies.[25,16] In our study the interval between onset of jaundice and encephalopathy was significantly different among survivors and non survivors. In a study by Srivastave *et al*[20] this time interval was not statistically different among survivors and non survivors. In our study gastrointestinal bleed was significantly different between survivors and non survivors. Various other studies have also shown gastrointestinal bleed to be a poor prognostic factor.[14,20]Decreased /normal liver span was observed in 21(70%) of the children. Similar finding was found in a study from France where 60% of patients did not have a palpable liver. No study is available where only fulminant hepatic failure of viral etiology has been studied. The higher stage of encephalopathy in fulminant hepatic failure at presentation is a poor prognostic sign and has been emphasized in various studies.[16,20] Similar results were found in our study also. In our study hypoglycemia was seen in 5(16.67%) patients and 3 out of these died. Hypoglycemia was shown to be a bad prognostic sign. This finding is similar to that reported by other workers.[14,20] In our study serum bilirubin levels at admission were statistically different among survivors and non survivors. In a study from India Dhiman *et al*[7] have reported similar findings. Coagulation factor activities are among the most stiking indicators of prognosis in patients with encephalopathy. This has been shown in our studies and other studies[1,4,8,15] also. In our study survivors as a group had lower prothrombin time than non survivors(t 4.37,p<0.01).Various other authors have also found similar results.[3,16,20,21]The overall survival rate of

patients in the study was 73.33%.This was similar to a study from Pune, India[16] where survival was 61.1% in fulminant hepatic failure. survival rates varying from 10-39% have been reported from various studies.[5,12,20] The variation may be due to differencein etiology, stage of disease and availability of intensive care facilities.[20]The outcome of fulminant hepatic failure due to hepatitis A is better than other conditions as is shown by our study and other studies.[16,17]

## CONCLUSIONS

The overall survival rate of fulminant hepatic failure in an intensive care setting at a tertiary care hospital like ours was 73.3%.Since majority of patients had hepatitis A infection,the vaccination of children with hepatitis A vaccine and improvement in sanitation facilities would go a long way in preventing hepatitis A infection.

## Bibliography


1. Acharya SK, Dasarathy S, Kumar TL, Sushma S, Prasanna KS, Tandon A. Fulminant hepatic failure in tropical population: Clinical course, causes and early predictors of outcome. Hepatology 1996; 23: 1448-1456.
2. Arankalle VA, Jha J, Favorov O, Chaudhari A, Fields HA, Banerjee K. Contribution of HEV and HCV in causing fulminant non-A, non – B hepatitis in Western India. J Viral Hep 1995; 2: 189-193.
3. Arora Nk, Nanda Sk. Acute viral hepatitis type E, A and B singly and in combination in acute liver failure in children in North India. J Med Vir 1996; 48:215-221.
4. Bernuau J, Benhamou JP. Fulminant and subfulminant liver failure.In: Oxyford Textbook of Clinical Hepatology. McIntyre N, Benhamou JP, *et al*., (eds) Oxford University Press 1998: 1341=1372.
5. Bernuau J, Goudeau A Poynard T, *et al*. Multivariate analysis of prognostic factors in fulminant hepatitis B. Hepatology 1986; 6: 648-651.
6. Chang MH, Lee Cy, Chen DS, el at l. Fulminant hepatitis in children in Taiwan: the important role of hepatitis B virus. J Pediatr 1986; 3:34-38.
7. Dhiman RK, Seth AK, Jain S, *et al*. Prognostic indicators of early indicators in FHF by multivariate ananlysis. Dig Dis Sci 1998: 43:1311-1316.
8. Feray C, Gigou M,S amuel D, *et al*. Hepatitis C virus RNA and hepatitis B virus DNA in serum and liver of patients with fulminant hepatitis Gastroenterolgoy 1993: 104: 549-555.
9. Jeffers J. Etiologic of fulminant hepatitis in Pediatric patients in Santiago. *Chile, Ped Infec Dis J* 1987: 6 (7) 686-87.
10. Kapil D, Arvind B. The profile and outcome of patients admitted in Pediatric Intensive Care Unit. *Indian J Pediatr* 1993; 60:5-10
11. Langley PG, Forbes A Hughes RD, *et al*. Thrombin-antithrombin III complex in fulminant Hepatic failure: Evidence for disseminated intravascular coagulation and relationship to outcome. Eur J Clin Invest 1990; 20: 629.
12. Nanda SK, Yaleinkaya K, Paningrahi AK, *et al*. Etiology role of hepatitis E virus in sporadic fulminant hepatitis. Med Virol 1994; 42: 133-137.
13. Pappas Chris S. Fulminant viral hepatitis. Gastro Clinics North Am 1995; 24: 161-173.
14. Psacharopoulos HT, Mowat AP, Devies M, *et al*. Fulmiannt hepatic failure in childhood: an analysis of 31 cases. Arch Dis Child 1980; 55:252-258.
15. Ritt DJ, Whelan G, Warner DK, *et al*.. Acute hepatic necrosis with stupor or coma. Medicine 1969; 48: 151.
16. Sachin V Bendre, Ashish R, Bavdekar, *et al*. Fulminant hepatic failure: Etiology, viral markers and outcome. Indian Pediatr 1999; 36: 1107-1112.
17. Shah U, abib Z. Liver failure attributable to hepatitis A infection in developing country. Pediatrics 2000; 105 (2): 436-438.
18. Shapiro CN, Margoles HS. World epidemiology of hepatitis A virus infection. J Hepatology 1993; 18 (Suppl 2): S11-S-14.
19. Sokol RJ. Fulminant hepatic failure and hepatic coma In: Pediatric clinical Gastroenterology. Roy CC, Arnold S, Daneal A, (eds.): 1995; Mosby year book, pp 734-760.
20. Srivastava KL, Mittal A, Kumar A, Gupta S, Nat SM, Kumar R, Govil YC. Predictors of outcome in FHP in children. Indian J Gastroenterol 1998; 17: 43-45.
21. Takahashi Y, Kumada H *et al*. A multicenter study on the prognosis of Fulminant viral hepatitis. Early Prediction for Liver transplantation. Hepatology 1994: 19:1065-1071.
22. Trey C, Davidson CS. The management of fulminant hepatic failure. In: Progress in liver disease. Popper H, Schaffner F, (eds): New York, 1970 Grune & Stratton, pp 282-298.
23. Williams R, Classification, etiology and considerations of outcome in acute liver failure. Semin Liver Dis 1996; 16: 343-349.
24. Whitington PF.Fulminant hepatic failure in children.In: Liver disease in children. Suchy FJ,(ed.):St. Louis: Mosby –Year Book,1993;180-213.
25. Devictor D, Desplanques L, Debray D,Ozier Y,Dobousset AM, Valayer J, *et al*. Emergency liver transplantation for fulminant hepatic failure in infants and children. Hepatology 1992; 16:1156-62.


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