

Original Article

A Study of Acute Renal Failure in Patients Associated with Acute Liver Dysfunction at Vims Combined Hospital

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Abstract

Background and Objectives: Renal dysfunction is common in liver diseases, either as part of multi-organ involvement in acute illness or secondary to advanced liver disease. The presence of renal impairment in both groups is a poor prognostic indicator. The main aim of the current study is to find out the etiology, clinical features, and incidence of patients who develop both acute liver failure and acute renal failure (ARF). **Materials and Methods:** This is a prospective observational study conducted for patients admitted in VIMS combined hospital from December 2010 to June 2012. All the patients with both ARF and acute liver dysfunction who met the inclusion criteria were included in the study. Data were collected after obtaining informed/written consent from patient. After detailed history, detailed clinical examination, general physical and systemic examination and relevant laboratory investigations were done. **Results:** Studies showed that the maximum number of patients were in the age group of 21-30 years with increased incidence in males, farm workers, lower income group. Most patients presented with nonspecific symptoms like fever and myalgia with more than 90% patients had abnormal urine findings and ultrasound findings implying the need for simple investigations to identify this fatal condition. This study had an overall mortality of 26.67%, with the highest mortality noted in patients with septicemia. **Conclusion:** Our study shows leptospirosis, malaria and sepsis as common causes of combined hepatic and renal dysfunction in this part of the country. Acute cases had a comparatively better prognosis and outcome than chronic cases of combined hepatic and renal dysfunction. Early diagnosis and apt treatment will reduce mortality.

Key words: Acute renal failure, leptospirosis, liver dysfunction, malaria, sepsis

INTRODUCTION

The changing lifestyles of human beings have created various new medical challenges. Of late, in our day to day clinical practice, we are seeing many patients with a basic liver disease, presenting with various renal disease. The incidence of such

patients is on a constant rise. The type of renal dysfunction encountered in patients with associated liver disease is varying in nature. Ischemic insult has similar effects on both kidney and liver because of their structural similarities.^[1] Large endothelial surface area in kidney and liver facilitates many interactions with drugs and toxins.^[2] The acidic pH of most nephron segments affects the ionisation of toxins render them insoluble.^[3] The most common renal damages are tubular necrosis, desquamation of tubular cells.^[4] Hepatic injury is more common among chronic alcoholics and malnourished people.^[5]

Combined renal and hepatic damage can occur due to drugs, heavy metal agents, systemic diseases and various infections.^[6-8] Among the infections hepatitis B and leptospirosis have high frequency of hepatic infection with renal involvement.^[9,10] In spite of improved surgical care, we are still seeing patients with obstructive jaundice develop renal failure in the postoperative period with high mortality.

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Hence, we intend to study the etiology, clinical manifestations and incidence of renal dysfunction associated with various liver diseases in our setup.

MATERIALS AND METHODS

This study was carried out for patients admitted in VIMS combined hospital Bellary from December 2010 to June 2012. A total of 30 in-patients with combined hepatic and renal dysfunction have been the subjects of the study. The study protocol was approved by institutional ethics committee. All the patients were in the age between 15 and 60 years suffering from acute renal failure (ARF) with serum creatinine >3 mg% and acute liver failure were included in the study. Patients with chronic liver and kidney failures, history of alcoholism and those who did not consent for participation in the study were excluded. Detailed history was taken from all the patients and a thorough physical examination was done as per the proforma. All the patients were investigated for complete hemogram, bleeding time, clotting time, random blood sugar, blood urea and serum creatinine, serum electrolytes, liver function tests, blood culture, smear for malaria, serology — hepatitis B antigen, human immunodeficiency virus, leptospira antibodies, urine analysis, electrocardiography, chest X-ray and ultrasound abdomen. Optional investigations as warranted by the patients' condition were blood grouping and Rh typing, Widal test, urine culture and ascitic fluid analysis. The clinical outcome at the time of discharge from the hospital or otherwise were documented. All the patients were advised to come for follow-up, and the follow-up records of these patients were also documented. Data obtained by the above method was analyzed.

RESULTS

The age of patients in this study ranged from 15 years to 60 years. Youngest patient in the present study was 18 years, and oldest was 63 years. Maximum number of cases occurred in the 21-30 year age group. Mean age was 36.1 years. There were 22 males and 8 females in our study. The male to female ratio was 2.75:1.

Of 30 patients, 17 (56.67%) belonged to lower income group and 12 (40%) to middle income group. Only one patient was from upper income group. The occupation of various patients is provided in Table 1. The common symptoms seen with these patients at the time of admission are shown in Table 2. The general physical examination findings are shown in Table 3.

Under systemic examination, hepatomegaly was observed in 46.67% of patients and splenomegaly was seen in 13.33% of patients. Ascites was present in 50% of the patients. 3.33%

patient had muffled heart sounds. Systolic murmur was present in 20% of the patients. Pericardial rub was noted in 10% of the patients. Pleural effusion was noted on the right side in 3 (10%) patients and on both sides in 2 (6.67%) patients. Rales were present in 2 (6.67%) and rhonchi in 3 (10%) patients. About 60% of the patients had altered sensorium. None of the patients had neck rigidity or convulsions. Focal neurodeficit in the form of right hemiplegia was present in one

Table 1: The occupation of the patients

Occupation	Number of patients	Percentage
Accountant	1	3.33
Artist	1	3.33
Carpenter	1	3.33
Electrician	1	3.33
Housewife	7	23.33
Farm workers	14	46.67
Painter	1	3.33
Retired government employees	1	3.33
Police sub-inspector	1	3.33
Teacher	1	3.33
Unemployed	1	3.33

Table 2: The symptoms present at the time of admission

Symptoms	Number of patients	Percentage
Fever	26	86.67
Bodyache	26	86.67
Reduced urine output	20	66.67
Jaundice	23	76.67
Oedema	10	33.33
Loose stools	10	33.33
Nausea and vomiting	24	80
Abdominal distension	15	50
Abdominal pain	11	36.67
Cough	3	10
Breathlessness	11	36.67
Bleeding	13	43.33
Drowsiness	14	46.67

Table 3: General physical examination findings at the time of admission

Signs	Number of patients	Percentage
Anaemia	24	80
Jaundice	27	90
Oedema	13	43.33
Purpura	5	16.67
Lymphadenopathy	1	3.33
Asterixis	13	43.33
Fever	14	46.67
Dehydration	12	40
Altered sensorium	18	60

patient. Examination of the optic fundus revealed background diabetic retinopathy in one patient and Grade II hypertensive changes in one patient. The various investigations done to patients are shown in Table 4.

The course of the disease was assessed for the patients, while they were in the hospital and at follow-up. Only one patient of HELLP syndrome, came for follow-up after discharge. She was asymptomatic and had normal biochemical parameters at follow-up. The overall mortality in patients with combined renal and hepatic disease in this study was 26.67% as shown in Tables 5 and 6. In our study, Septicemia had the highest mortality (75%). One patient with hepatorenal syndrome got discharged against medical advice and was lost to follow-up. All three patients with ARF and jaundice following delivery recovered completely. There were no cases of obstructive jaundice in our study.

DISCUSSION

The age distribution of the patients ranged from 15 years to 65 years (mean = 36 years) with maximum number of patients in the age group 21-30 years. The increased incidence in this age group may be because of outdoor activities and mobility of the population for economic reasons. The male to female ratio was 2.75:1. The increased incidence in male population may be because of outdoor activities and mobility of the population for economic reasons thereby exposing them to infections like leptospirosis. Farm workers (46.67%) and housewives (23.33%) formed the majority of patients in the present study. The increased incidence in farm workers is because of the various agricultural practices they are involved in, that facilitate infections such as malaria and leptospirosis. The highest number of patients were from lower income group (56.67%), followed by patients from middle income group (40%). This bias may be because patients who attend our outpatient are from the low economic status.

Fever and body ache were the most common presenting symptoms (86.67%), followed by nausea and vomiting (80%), jaundice (76.67%) and oliguria (66.67%). Jaundice (90%) was the most common general physical finding, followed by anemia (80%) and altered sensorium (60%). Fever was noted in 46.67% of the patients. Hepatomegaly was observed in 46.67% of patients and splenomegaly was seen in 13.33% of patients. About 60% of the patients had altered sensorium. Hypoglycemia was noted in 20% of patients, mostly in patients with severe malaria. Hemoglobin less than 10 g% was present in 73.33% of patients. Leukocytosis (33.33%) was present in cases of leptospirosis and suspected septicemia. Coagulation

abnormalities were found in 20% of the cases. Among the six patients diagnosed as Weil's disease in our study, 100% had serum antibodies. In a study by Sharma *et al.*, 94% had positive serology. All patients of suspected malaria were smear positive. None of the five septicemia cases yielded microbial growth on blood culture. This could be because they had been treated with antibiotics before referral to our hospital. Abnormal urine examination was seen in 90% of patients. Abdominal ultrasound study was abnormal in 93.33% of patients as shown in Table 7.

Hemodialysis was required in 26.67% of the patients. The overall mortality in this study was 26.67%. Sural *et al.* have reported an overall mortality of 49% in their study. Among patients with acute renal and hepatic dysfunction, mortality

Table 4: The various investigations in the study

Investigations	Number of patients	Percentage
Hypoglycemia	6	20
Hemoglobin <10 g%	22	73.33
Leukocytosis	10	33.33
Abnormal coagulation profile	6	20
Smear for malarial parasite		
<i>Plasmodium vivax</i>	1	3.33
<i>Plasmodium falciparum</i>	5	16.67
Urine examination		
Normal	3	10
Abnormal	27	90
Abnormal electrocardiogram	9	30
Abnormal CXR	6	20
Ultrasound abdomen		
Normal	2	6.67
Abnormal	28	93.33

CXR: Chest X-ray

Table 5: Outcome of the patients in this study

Outcome	Number of cases	Percentage
Improved	3	10
Recovered	18	60
Discharged against advise	1	3.33
Death	8	26.67

Table 6: Type of presentation and mortality

Type of presentation	Number	Mortality (%)
Weil's syndrome	5	1 (16.67)
Malaria	6	1 (16.67)
Septicemia	9	3 (40)
Fulminant hepatitis	3	1 (16.67)
HELLP syndrome	1	0
Febrile thrombocytopenia and ARF of uncertain origin	6	2 (20)

ARF: Acute renal failure

Table 7: Results of abdominal ultrasound study in our study

Ultrasound	Number	Percentage
Normal	2	6.67
Hepatomegaly	6	20
Splenomegaly	9	30
Ascites	15	50
Shrunken liver	5	16.67
Increased renal echogenicity	17	56.67
Bulky uterus	2	6.67
Multiple cavities in the liver	1	3.33

was highest in patients with septicemia and multi-organ failure (40%). In patients with acute liver diseases who presented with ARF, septicemia had the highest mortality (75%). Moore *et al.* have reported mortality in excess of 90% in the absence of liver transplantation. Agarwal *et al.* have reported a mortality of 45% in patients with malaria who had the hepatorenal dysfunction. Shukla *et al.* have reported a mortality of 32.2% and Bajija *et al.* have quoted the mortality of 33.5% in their studies on malaria.

Early diagnosis and institution of appropriate therapy can significantly reduce the mortality. Avoidance of dehydration, hypotension, sepsis and nephrotoxic drugs along with proper dialytic support can reduce mortality in patients of ARF with liver disease.

CONCLUSIONS

Among patients with acute renal and hepatic dysfunction, mortality was highest in patients with septicemia and multi-organ failure (40%). Acute cases had a comparatively better prognosis and outcome than chronic cases of combined hepatic and renal dysfunction. Early diagnosis and institution of appropriate therapy can significantly reduce the mortality. Avoidance of dehydration, hypotension,

sepsis, and nephrotoxic drugs along with proper dialytic support can reduce mortality in patients of ARF with liver disease.

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