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ORIGINAL RESEARCH

To assess prevalence of renal dysfunction among patients of liver cirrhosis and correlation of severity of liver cirrhosis with the occurrence of hepatorenal syndrome

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Abstract

Backgroud: Renal failure is often a common complication of patients with liver cirrhosis. Renal dysfunction is detected in 20–50% of patients who are admitted to the hospital. The short-term mortality of cirrhotic patients who develop renal dysfunction is unacceptably high, and early management of this condition is an unmet need.

Objectives: To assess the prevalence of renal dysfunction along with severity of renal dysfunction in cirrhosis of liver.

Methodology: This was a facility based longitudinal follow up study conducted in all patients with liver cirrhosis admitted to Tertiary Care Hospital. The patients were enrolled using a pre-structured Proforma and questionnaire to obtain demographic data and information on symptoms of decompensated chronic liver disease, symptoms suggestive of renal impairment ,causes of renal failure The Child- Turcotte- Pugh (CTP) and Model for End-Stage Liver disease (MELD) scores were used to assess the severity of liver cirrhosis.

Results: The study shows that the most of the subjects who are having deranged creatinine (33) Levels fall in Class B (16) and CLASS C (17) of CPS scores respectively and when analyzed statistically the result came out to be significant.

Conclusion: The study concludes that the patients with deranged RFTs fall under class B and C of CPS Score.

Keywords: Hepatorenal syndrome, acute kidney injury,

Introduction

Globally the burden of cirrhosis is enormous. Prevalence of decompensated cirrhosis worldwide is 10·6 million (2017), of which 6·42 million cases were in males and 4·23 million were in females.[1] Cirrhosis currently causes 1.16 million deaths worldwide. India accounts for one-fifth of deaths globally.[2] Renal failure is often a common complication of patients with liver cirrhosis.[3] Renal dysfunction is detected in 20–50% of patients who are admitted to the hospital.[4] The short-term mortality of cirrhotic patients who develop renal dysfunction is unacceptably high, and early management of this condition is an unmet need. Etiology of renal dysfunction is very varied. Besides acute kidney injury (AKI), chronic kidney failure can be induced by co morbidities like diabetes mellitus, arterial hypertension,

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or specific causes such as IgA nephropathy or glomerulopathy. Outcome depends on the cause of AKI.[5]

Hepatorenal syndrome (HRS) is a type of acute kidney injury (AKI) due to decompensated cirrhosis.[6] Large volume depletion secondary to diuretic use, gastrointestinal (GI) losses secondary to lactulose therapy, GI bleed, large volume paracentesis leading to circulatory disturbances are among the other causes of HRS. Chronic hepatitis B and C can also directly cause glomerular diseases.[7]

The new definition of AKI is now based on the known scoring system of the Kidney Disease Improving Global Outcomes (KDIGO) group and is based on an increase of serum creatinine.10 Novel biomarkers like urinary neutrophil gelatinase-associated lipocalin (NGAL) or interleukin-18 (IL-18) could help to differentiate the causes of renal failure in cirrhosis patients.[8]

Risk factors and causes of hepatorenal syndrome could be different according to setting and this topic has not been studied in depth at our setting hence we have undertaken this study to assess the prevalence of renal dysfunction along with severity of renal dysfunction in cirrhosis of liver.

Aim & objectives

1. To study the prevalence of renal dysfunction in cirrhosis of the liver.
2. To correlate the severity of liver cirrhosis with the occurrence of hepatorenal syndrome.

Methodology

Study area: This was a facility based longitudinal follow up study.

Study population: The study was conducted in all patients with liver cirrhosis admitted to Tertiary Care Hospital.

Inclusion criterion

1. More than 18 years of age
2. Patients who were admitted to tertiary care hospital with cirrhosis of the liver
3. Patients willing to give written informed consent for the study

Exclusion criterion

1. Pregnancy
2. Known case of hepatorenal syndrome.
3. Known case of renal dysfunction
4. Patients who were not willing to participate in the study.

Study design

A cross-sectional study design

Sample size

The sample size will be decided taking into account the

a. Prevalence of renal dysfunction in liver cirrhosis patients was 40 %(TwikleChandrakar (2017)
b. Confidence limit of 95%
c. Margin of sampling error 8%

With reference to the study of Twikle Chandrakar7 (2017) prevalence of renal dysfunction in liver cirrhosis patients was 40%. The sample size was calculated by presuming the prevalence of renal dysfunction in liver cirrhosis patients was 40%. The sample size came out to be 145.

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Sampling technique

Simple random sampling technique was used for sample collection. The data was collected by interviewing the patients after taking an informed and written consent.

Study tool

1. A pre-structured Proforma and questionnaire to obtain demographic data and information on symptoms of decompensated chronic liver disease, symptoms suggestive of renal impairment such as reduced urinary output, periorbital oedema, and haematuria.
2. A pre-structured Proforma andQuestionnaire related to risk factors of hepatorenal dysfunction and prognosis of that in liver cirrhosis patients. General & systemic examination was conducted on cirrhosis patients.
3. The Child- Turcotte- Pugh (CTP) scale comprises the clinical grading of the presence of ascites and encephalopathy and the evaluation of serum albumin, serum bilirubin, and prothrombin time (PT) or international normalized ratio (INR). Class A reflects good hepatic function, mostly asymptomatic with an excellent prognosis. The score for this class is 5-6. Class B has significant impairment of hepatic reserve with mild to moderate features of liver decompensation, the score is 7-9. Class C has advanced and decompensated liver disease with a poor long-term prognosis with a score of 10 and above.

Results

Table 1: Distribution of subjects according to age and sex.

S.no	Sociodemographic profile		Frequency	Percentage
1	AGE	20-30 YEARS	3	2.1
		30-40YEARS	11	7.6
		40-50YEARS	39	27.1
		50-60 YEARS	91	63.2
2	SEX	MALE	70	48.6
		FEMALE	74	51.4

Table 1 shows the distribution of subjects according to age and sex which shows that majority 91(63.2%)of subjects among study population belongs to age group 50-60 years followed by 39(27.1%)40-50years of age. There were 74(51.4%) female and 70(48.6%)male among the study population.

Fig 1: Distribution of cases according to history of alcohol consumption

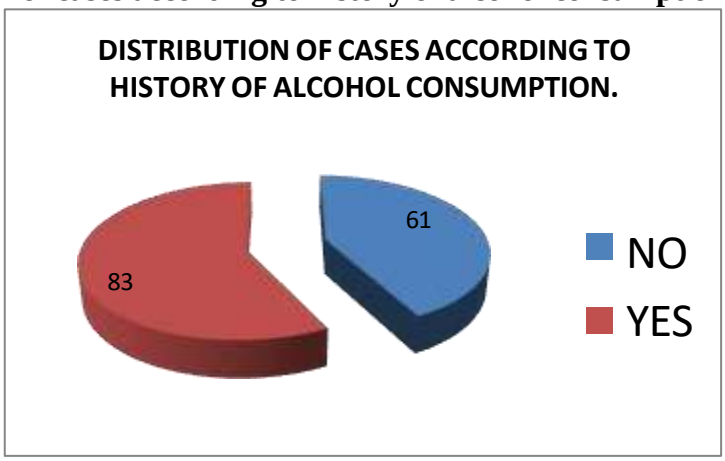

FIG 1 shows the distribution of subjects according to history of alcohol consumption which shows that mostly 83(58%)of subjects among study population consume alcohol followed by 61(42%) do not consume alcohol.

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Table 2: Distribution of cases according to mean values of RFT parameters among cases.

S.no	Parameters	Mean RFT values	Frequency	Percentage
1	UREA	10-45	117	81.3
		MORE THAN 45	27	18.8
2	CREATININE	LESS THAN 0.5	7	4.9
		0.5-1.5	104	72.2
		MORE THAN 1.5	33	22.9
3	SODIUM	LESS THAN 135	83	57.6
		135-155	61	42.4
4	POTASSIUM	LESS THAN 3.5	34	23.6
		3.5-5.5	110	76.4

Table 2 shows the distribution of subjects according to mean values of RFT parameters among cases. Which shows that majority 117(81.3%)of subjects among study population have blood urea level in normal range while 27 (18.8%) have raised levels. Majority 104(72.2%) and 7(4.9%)of subjects among study population have serum creatinine levels either in normal range or less than the normal range respectively while 33(22.9%)subjects have raised levels of serum creatinine.

Most 61(42.4%) subjects have serum sodium level in normal range while83(57.6%) of the study subjects have serum sodium level less than normal range. Similarly Most 110 (76.4%) subjects have serum potassium level in normal range while34(23.6%) of the study subjects have serum potassium level less than normal range

Table 3: Distribution of cases according to mean values of LFT parameters among cases.

S.no	Parameters	Mean LFT values	Frequency	Percentage%
1	SGOT	0-35	43	29.9
		MORE THAN 35	101	70.1
2	SGPT	0-41	33	22.9
		MORE THAN 41	111	77.1
3	TOTAL BILIRUBIN	0.1-1.2	21	14.6
		MORE THAN 1.2	123	85.4
4	TOTAL PROTEIN	LESS THAN 6.6	80	55.6
		6.6-8.8	64	44.4
5	ALBUMIN	LESS THAN 3.5	127	88.2
		3.5-5.2	17	11.8

Table 3 shows the distribution of subjects according to mean values of LFT parameters among cases. Which shows that majority 101(70.1%)of subjects among study population have SGOT level more than normal range while 43 (29.9%) have normal levels. Majority 111(77.1%) of subjects among study population have SGPT levels more than normal range while 33 (22.9%) subjects have normal levels of SGPT.

Most 123(85.4%) subjects have Total Bilirubin level more than the normal range while21(14.6%) of the study subjects have Total Bilirubin level in normal range. Similarly Most 80 (55.6 %) subjects have Total Protein level less than the normal range while64(44.4%) of the study subjects have Total Protein level in normal range. 127(88.2%)of study subjects have albumin level less than the normal range while 17(11.8%) have normal levels.

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Table 4: Distribution of cases according to child pugh score (CPS).

S.no	Child pugh score (CPS) class	Frequency	Percentage
1	**CLASS A (SCORE 5-6)**	7	4.9
2	**CLASS B (SCORE 7-9)**	49	34
3	**CLASS C (SCORE >10)**	88	61.1

Table 4: shows the distribution of subjects according to **CHILD PUGH SCORE (CPS)**which shows that mostly 88(61.1%) of subjects among study population falls in Class C followed by 49(34%) in CLASS B and 7(4.9%) in CLASS A.

Table 5: Distribution of RFT parameters according to child pugh score (CPS).

S.no	Parameters	Mean RFT values	Child pugh score (CPS)			P-value
			Class a (score 5-6)	Class b (score 7-9)	Class c (score >10)	
1	UREA	10-45	**7**	**41**	**69**	χ^2=2.270 P=0.321 NON SIGNIFICANT
		MORE THAN 45	**0**	**8**	**19**	
2	CREATININE	LESS THAN 0.5	**0**	**0**	**7**	χ^2=9.495 P=0.050 SIGNIFICANT
		0.5-1.5	**7**	**33**	**64**	
		MORE THAN 1.5	**0**	**16**	**17**	
3	SODIUM	LESS THAN 135	**5**	**20**	**58**	χ^2=8.690 P=0.013 HIGHLY SIGNIFICANT
		135-155	**2**	**29**	**30**	
4	POTASSIUM	LESS THAN 3.5	**2**	**6**	**26**	χ^2=5.475 P=0.060 NON SIGNIFICANT
		3.5-5.5	**5**	**43**	**61**	

Table 5: shows the distribution of RFT parameters according to **CHILD PUGH SCORE (CPS)**which shows that most of the subjects who are having deranged blood urea (27) levels fall in Class C (19) of CPS score and when analyzed statistically the result came out to be **insignificant**.

Most of the subjects who are having deranged creatinine (33) levels fall in Class B (16) and CLASS C (17) of CPS score respectively and when analyzed statistically the result came out to be **significant**.

Most of the subjects who are having deranged serum sodium (83) levels fall in Class B (20) and CLASS C(58) of CPS score respectively and when analyzed statistically the result came out to be **Highly significant.**

Most of the subjects who are having deranged serum potassium (34) levels fall in Class B (6) and CLASS C (26) of CPS score respectively and when analyzed statistically the result came out to be **insignificant.**

Discussion

Majority 91(63.2%)of subjects among study population belongs to age group 50-60 years followed by 39(27.1%)40-50years of age in our study. A similar trend was observed in previous studies conducted by Thapa et al. [13]in Nepal where the mean age of their study groups was 51.8 years. In a study conducted by Gessolo Lins et al.[14], it was similarly noted

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that the primary cause of AKI in patients with liver cirrhosis is alcohol consumption.

Our study was similar to study conducted by Metha et al.[15], Duah et al.[16], and Lasheen et al.[17], where laboratory parameters like bilirubin, potassium, creatinine, and INR were associated with AKI. In the present study, we observed significant decrease in serum albumin, globulin, and sodium ($p < 0.05$) which was in line with the study recently conducted by Duah et al.[16]

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