Original article:

Evaluation of Renal Profile in Liver Cirrhosis Patients: A Clinical Study

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Abstract

Background: Liver cirrhosis is one of the commonly encountered liver pathology these days. Renal parameters are known to show some alterations in liver cirrhosis patients. Hence; the present study was planned to assess the renal profile in liver cirrhosis patients.

Materials & Methods: The present study included investigation of renal parameters in liver cirrhosis patients. A total of 20 liver cirrhosis patients with mean age of 48.2 years were included in the present study. All the patients were graded on the basis of severity according to Child Pugh Score (CPS) grading system. Renal parameters were assessed from the blood samples obtained from the patients. All the results were analyzed by SPSS software.

Results: Alcohol was the most common etiologic agent encountered in the present study. Significant correlation was observed in between renal parameters and severity of patients with liver cirrhosis.

Conclusion: Significant correlation exists in between renal profile and severity of diseases in patients with liver cirrhosis.

Key words: Cirrhosis, Correlation, Renal Profile.

INTRODUCTION

Chronic liver disease and primary liver cancer account for 1 in 40 deaths worldwide, with hepatitis B the commonest cause in the developing world, followed by alcoholic liver disease and hepatitis C in the Western world. Non-alcoholic steato-hepatitis and non-alcoholic fatty liver disease are increasing causes of chronic liver disease in the general population of Western countries with prevalence rates of 1-5% and 10-24%, respectively.[1-4]

Over the years, many clinical and biochemical parameters have been suggested in order to more accurately predict the prognosis of cirrhotic patients and correctly assess their short and medium term survival. The Child-Pugh score is still considered the cornerstone in the prognostic evaluation of cirrhotic patients although it was formulated more than 30 years ago.[5,6]

Autosomal-dominant polycystic kidney disease is associated with polycystic liver disease in up to 75-90% of cases. There are a number of risk factors for liver involvement, including female gender, age, and degree of renal dysfunction.[7]

Hence; the present study was planned to assess the renal profile in liver cirrhosis patients.

MATERIALS & METHODS

The present study was planned in the Department of General Medicine, TeerthankerMahaveer Medical College & Research Centre, Moradabad, UP, India. It included investigation of renal parameters in liver cirrhosis patients. Written consent was obtained from all the liver cirrhosis patients after explaining them in detail the entire research protocol. A total of 20 liver cirrhosis patients with mean age of 48.2 years were included in the

present study. Patients with any other form of liver pathology were excluded from the present study. Patients with any other systemic illness or any other underlying metabolic or renal disorder were also excluded from the present study. Along with this, the patients which were on drug with known renal effects were also excluded. Complete clinical and demographic details of all the subjects were obtained. All the patients were graded on the basis of severity according to Child Pugh Score (CPS) grading system, as grade A, B and C; with C being the most severe.[8]Renal parameters were assessed from the blood samples obtained from the patients. All the results were analyzed by SPSS software. Chi- square test was used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

A total of 20 liver cirrhosis patients with mean age of 48.2 years were included in the present study. Out of 20, 14 patients were males while the remaining were females. Alcohol was the most common etiologic agent encountered in the present study. Majority of the patients (60 percent) belonged to the CPS C. Significant correlation was observed in between renal parameters and severity of patients with liver cirrhosis.

DISCUSSION

In the present study, it was observed that significant correlation was observed in between renal parameters and severity of patients with liver cirrhosis. Cholongitas E et al reviewed the accuracy of the surrogate markers for the assessment of renal function, i.e. glomerular filtration rate, particularly in patients with cirrhosis. They reviewed the available literature in PubMed regarding the markers for GFR evaluation and the factors which affect their accuracy in cirrhosis. Although creatinine is widely available, it is an unreliable marker of glomerular filtration rate, particularly in patients with cirrhosis. Clearance of exogenous markers is considered the 'gold standard', but this methodology has many drawbacks, particularly poor applicability. Several mathematical formulae for estimated glomerular filtration rate are used to overcome some of these limitations: Cockcroft-Gault and Modification of Diet in Renal Disease formulae are the most frequently applied, but they are based on serum creatinine. Due to the inaccuracy of serum creatinine and its derived formulae in estimating glomerular filtration rate, alternative serum markers, such as cystatin C, and new formulae are desirable. These need formal evaluation in patients with cirrhosis so as to have a reliable surrogate of glomerular filtration rate, and to obviate many problems that are associated with using creatinine and estimated glomerular filtration rate.[9]

Hojs R et al compared our serum cystatin C-based equation (cystatin C formula) and serum creatinine-based equations for a large group of patients with chronic kidney disease (CKD). In this study, 592 adult patients with CKD were enrolled. In each patient, serum creatinine was determined and creatinine clearance was calculated using the Cockcroft-Gault (CG) and modification of diet in renal disease (MDRD) formulas. The serum cystatin C was determined by an immunonephelometric method and our own cystatin C formula (GFR = 90.63 x cystatin C-1.192) for estimation of GFR was developed. GFR was measured using 51CrEDTA clearance, and the correlation, accuracy, bias and precision were determined. Ability to correctly estimate the patient's GFR with different equations compared to gold standard below and above 60 ml/min/1.73 m2; was analyzed. The mean 51CrEDTA clearance was 47 ml/min/1.73 m2, the mean serum creatinine was 269 micromol/l and the mean serum cystatin C was 2.68 mg/l. Statistically significant correlation between 51CrEDTA clearance with the CG ($r = 0.861$) and MDRD ($r = 0.909$) formulas and the cystatin C formula ($r = 0.899$) was found. The receiver operating characteristic (ROC) curve analysis (cut-off for GFR 60 ml/min/1.73 m2) showed that the cystatin C formula had a significantly higher diagnostic accuracy than the CG formula ($p < 0.003$). All equations

underestimated the measured GFR and lacked precision. Analysis of ability to correctly predict the patient's GFR below or above 60/ml/min/1.73 m2 showed a higher prediction for the cystatin C formula than the MDRD formula (91.6 versus 84.1%, $p < 0.0005$) and a higher prediction trend than the CG formula (91.6 versus 88.3%, $p = 0.078$). Our results indicate that serum cystatin C-based equation is a reliable marker of GFR with a very high diagnostic accuracy and ability to predict patients with CKD and GFR under 60/ml/min/1.73 m2.[10]

Francoz C et al reassessed correlations between creatinine-based equations and measured glomerular filtration rate (GFR) and to investigate the impact of inaccuracies on the Model for End-Stage Liver Disease (MELD) score. GFR was measured using iohexol clearance and calculated with creatinine-based equations in 157 patients with cirrhosis during pretransplant evaluation. We compared the accuracy of creatinine to that of true GFR in a prognostic score also including bilirubin and the international normalized ratio. In patients with creatinine below 1 mg/dL, true GFR ranged from 34-163 mL/minute/1.73 m(2). Cockcroft and Modification of Diet in Renal Disease (MDRD) significantly overestimated true GFR. On multivariate analysis, younger age and ascites were significantly correlated with the overestimation of true GFR by 20% or more. Body mass index was an independent risk factor of overestimation of GFR with Cockcroft but not with MDRD. The accuracy of a prognostic score combining bilirubin, international normalized ratio, and true GFR was superior to that of MELD, whether creatinine was rounded to 1 mg/dL when lower than 1 mg/dL or not (c-statistic of 0.8 versus 0.75 and 0.73, respectively). Creatinine-based formulas overestimate true GFR, especially in patients younger than 50 years or with ascites. In patients with serum creatinine below 1 mg/dL, the spectrum of true GFR is large. True GFR seems to have a better prognostic value than creatinine and creatinine-based equations. Specific equations are needed in patients with cirrhosis to improve prognostic scores.[11]

CONCLUSION

Under the light of above results, it can be concluded that significant correlation exist in between renal profile and severity of diseases in patients with liver cirrhosis.

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Table 1: Distribution of subjects according to Aetiology Code

Parameter	Number of patients	Percentage
Alcohol	12	60
NASH	4	20
Hepatitis C	3	15
Others	1	5
Total	20	100

NASH: Nonalcoholic steatohepatitis

Table 2: Distribution of subjects according to Child Pugh Score

CPS	Number of patients	Percentage
A	5	25
B	12	60
C	3	15
Total	20	100

Table 3: Distribution of patients with Blood urea and severity of liver cirrhosis

Blood urea	Child Pugh Score			Total	P- value
	A	B	C		
Normal	4	6	2	12	0.00
Raised	1	6	1	8	
Total	5	12	3	20	

*: Significant

Table 4: Distribution of patients with Serum creatinine and severity of liver cirrhosis

Serum creatinine	Child Pugh Score			Total	P- value
	A	B	C		
Normal	4	6	2	12	0.00
Raised	1	6	1	8	
Total	5	12	3	20	

*: Significant