

Does hepatic impairment influence renal function parameters in liver cirrhosis?

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TO THE EDITOR

Renal function parameters are important for the evaluation of prognosis of liver cirrhosis patients.^[1] Serum creatinine (SCr) is the most commonly used index for the clinical evaluation of renal function. Dynamic evaluation of SCr is one of the most important diagnostic criteria for acute kidney injury in liver cirrhosis.^[2] A systematic review showed that SCr was a powerful predictor of death in the decompensated patients with cirrhosis.^[3]

Cystatin C is considered as an ideal endogenous marker reflecting the glomerular filtration rate,^[4] because the kidney is the only organ where Cystatin C filtered and metabolized. Cystatin C provided an early diagnosis of moderate renal impairment in patients with liver cirrhosis (especially Child-Pugh C).^[5] Evidence suggests that the diagnostic accuracy of Cystatin C is significantly better than that of SCr in patients with reduced glomerular filtration rate.^[6] Recent study found that Cystatin C might be a more accurate parameter for assessing the prognosis and mortality of liver cirrhosis.^[7] Similarly, in cirrhotic patients with ascites, the level cystatin C was an independent predictor of mortality and development of HRS-1.^[8]

Serum β 2 microglobulin is another renal function parameter that correlates with glomerular filtration rate. A study showed that serum β 2 microglobulin concentration

was significantly increased in patients with liver cirrhosis (especially non-alcoholic cirrhosis).^[9] Serum β 2 microglobulin level was elevated in HCV-related chronic liver disease, and may also be used as a marker for progression towards liver cirrhosis and hepatocellular carcinoma.^[10]

Herein, we conducted a preliminary retrospective observational study to explore the influence of hepatic impairment on renal function parameters in patients with liver cirrhosis.

This single-center retrospective study was approved by the medical committee of General Hospital of Shenyang Military Area. The number of ethical approval is k (2017) 26. The patient written informed consent was not required. All the patients who were diagnosed with liver cirrhosis and consecutively treated by an attending physician, Dr. Xingshun Qi at the Department of Gastroenterology of the Shenyang General Hospital of Military Area from February 2016 to November 2017 were eligible. We collected the data regarding renal and hepatic function parameters, which were detected at the same time during hospitalization. The normal ranges of laboratory tests were: SCr (44–133 μ mol/L), Cystatin C (0–1.03 mg/L) and serum β 2 microglobulin (0.9–3mg/L). Statistical analyses were performed using SPSS version 20.0.0 software (SPSS Inc., Chicago, IL, USA). Continuous data were expressed as mean \pm standard deviation

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(SD) and median (range). Categorical data were expressed as frequency (%). Spearman non-parametric tests and Pearson chi-square tests were used to perform the correlation analysis. Correlation coefficient was calculated. A two-tailed $P < 0.05$ was considered to have a significantly statistical difference.

One hundred patients with liver cirrhosis were enrolled, of whom 64 (64%) were male and 36 (36%) were female. The average of age was 60.53 ± 11.38 years (range 32–88 years). SCr was detected for 224 times, and the average SCr concentration was 69.71 ± 27.90 (range 31.85–314.00). Cystatin C was detected for 223 times, and the average Cystatin C concentration was 1.22 ± 0.69 (range 0.44–6.00). Serum β 2 microglobulin was detected for 33 times, and the average serum β 2 microglobulin concentration was 3.00 ± 1.28 (range 1.56–7.19).

Correlation analyses of renal function indexes were summarized in Table 1. SCr positively correlated with Cystatin C, serum β 2 microglobulin, total bilirubin, direct bilirubin, and pre-albumin. Cystatin C positively correlated with serum β 2 microglobulin, total bilirubin, direct bilirubin, fucosidase, total bile acid, and total protein. Serum β 2 microglobulin positively correlated with pre-albumin and total protein.

In conclusion, we found that hepatic impairment might marginally influence the renal function parameters in liver cirrhosis. We could not establish any parallel correlation of renal and hepatic function parameters in liver cirrhosis.

Conflict of Interest

The authors declare no conflict of interest.

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Table 1: Correlation analysis of renal function indexes in patients with liver cirrhosis

Variables	No. groups of data	Pearson coefficient or Spearman coefficient	P value
Correlation analysis of serum creatine in patients of liver cirrhosis			
Cystatin C (mg/L)	223	0.31	0.000002
Serum β 2 microglobulin (mg/L)	32	0.526	0.002
Total bilirubin (μ mol/L)	218	0.194	0.004
Direct bilirubin (μ mol/L)	218	0.163	0.016
Alanine aminotransferase (U/L)	217	-0.021	0.756
Aspartate aminotransferase (U/L)	218	-0.01	0.881
Alkaline phosphatase (U/L)	218	-0.07	0.305
Glutaryl transpeptidase (U/L)	217	-0.111	0.102
Fucosidase (U/L)	217	0.12	0.078
Total bile acid (μ mol/L)	216	0.113	0.098
Pre-albumin (mg/L)	204	0.164	0.019
Total protein (g/L)	206	0.022	0.749
Albumin (g/L)	207	-0.018	0.8
PT (s)	174	0.069	0.363
INR	174	0.074	0.335
Correlation analysis of Cystatin C in patients liver cirrhosis			
Serum β 2 microglobulin (mg/L)	32	0.367	0.039
Total bilirubin (μ mol/L)	217	0.156	0.021
Direct bilirubin (μ mol/L)	217	0.146	0.032
Alanine aminotransferase (U/L)	217	-0.026	0.707
Aspartate aminotransferase (U/L)	217	0.06	0.376
Alkaline phosphatase (U/L)	217	0.027	0.688
Glutaryl transpeptidase (U/L)	217	-0.061	0.37
Fucosidase (U/L)	217	0.139	0.04
Total bile acid (μ mol/L)	216	0.194	0.004
Pre-albumin (mg/L)	204	0.033	0.641
Total protein (g/L)	205	0.161	0.021
Albumin (g/L)	206	-0.037	0.597
PT (s)	173	0.065	0.399
INR	173	0.058	0.45
Correlation analysis of serum β 2 microglobulin in patients of liver cirrhosis			
Total bilirubin (μ mol/L)	31	-0.219	0.237
Direct bilirubin (μ mol/L)	31	-0.228	0.218
Alanine aminotransferase (U/L)	31	-0.16	0.389
Aspartate aminotransferase (U/L)	31	-0.17	0.359
Alkaline phosphatase (U/L)	31	-0.192	0.301
Glutaryl transpeptidase (U/L)	31	-0.216	0.244
Fucosidase (U/L)	31	0.049	0.792
Total bile acid (μ mol/L)	31	-0.071	0.706
Pre-albumin (mg/L)	31	0.362	0.045
Total protein (g/L)	31	0.492	0.005
Albumin (g/L)	31	0.1	0.592
PT (s)	30	-0.059	0.756
INR	30	-0.122	0.522

PT: prothrombin time; INR: international normalized ratio.