Low Insulin-like Growth Factor-1 as a Predictor of Poor Prognosis in Liver Cirrhosis

I Ketut Mariadi, Reza S, IDN Wibawa

Gastroentero-Hepatology Division, Department of Internal Medicine, Faculty of Medicine. Udayana University, Bali Indonesia

ABSTRACT

Insulin-like growth factor 1 (IGF1) disturbances are observed in liver cirrhosis. IGF1 deficiency resulting variety of metabolic complications. Changes in IGF1 concentrations depend on the clinical stage of liver cirrhosis. This study aimed to prove the role of IGF1 as a predictor for prognosis in Liver cirrhosis.

A cross-sectional analytic study was performed on liver cirrhosis patients. Serum IGF-1 levels were measured using the Bioassay Technology with the Enzyme-Linked Immunosorbent Assay (ELISA). Patient's prognosis determines using the Child-Pugh-Turcotte score (CTP). CTP B-C is assigned a poor prognosis with a mortality risk of 20-55% at 1 year. The cut-off for IGF1 is determined by the ROC curve.

The research subjects consisted of 62 males (80.5%) and 15 females (19.5%), with a mean age of 47.64 ± 7.47 years. Based on the ROC curve, IGF1 levels greater than or equal to 1.62 ng/mL were defined as high levels. There was a significant relationship between IGF1 levels and CTP scores (p<0.001; OR=6.7, 95%CI: 2.4-18.4). Low IGF1 levels are associated with poor prognosis. Liver cirrhosis patients with IGF1 values less than 1.62 ng/mL are 6.7 times more likely to have a 20-55% mortality risk at 1 year.
Based on the results of this study, it can be concluded that low IGF1 is a predictor of poor prognosis in patients with liver cirrhosis.

I Ketut Mariadi, MD
Department of Internal
Medicine, Faculty of Medicine.
Udayana University
Email: ketutmariadi@yahoo.com
Phone: +628123853700

INTRODUCTION

Insulin-like growth factor 1 (IGF1) disturbances are observed in liver cirrhosis. IGF1 deficiency resulting variety of metabolic complications. Changes in IGF1 concentrations, depending on the clinical stage of liver cirrhosis. This study aimed to prove the role of IGF1 as predictor for prognosis in Liver cirrhosis.

METHODS AND MATERIALS

A cross-sectional analytic study was performed in liver cirrhosis patients. Serum IGF-1 levels were measured using the Bioassay Technology with the Enzyme-Linked Immunosorbent Assay (ELISA) method. The results were expressed in units of ng/ml. Patient's prognosis determine using the Child-Pugh-Turcotte score (CTP). CTP B-C are assigned a poor prognosis with a mortality risk of 20-55% at 1 year. The cut off for IGF1 is determined by the ROC curve. Data were analyzed using computer software.
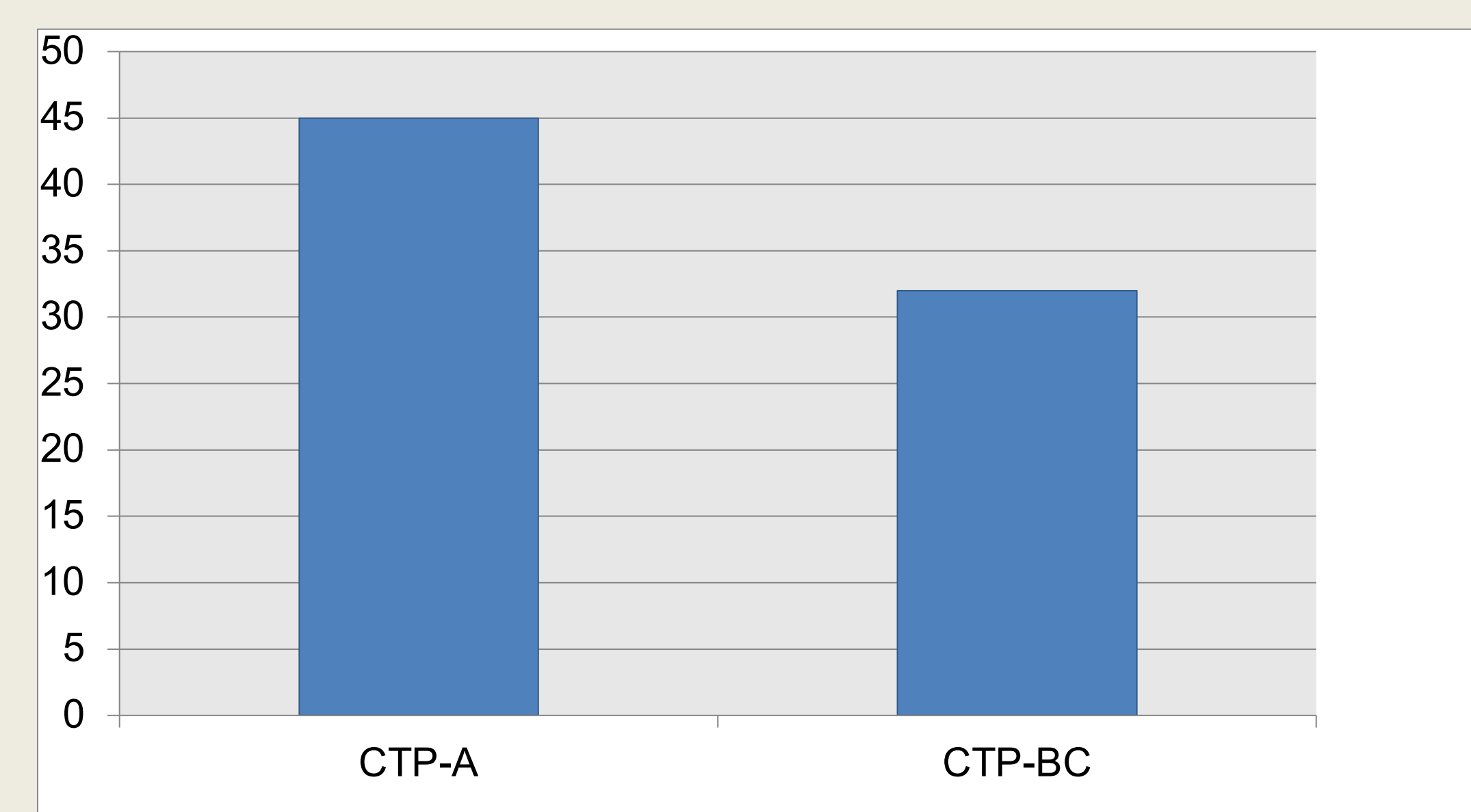

Chart 1. Distribution of sample based on CTP.

RESULTS

The research subjects consisted of 62 males (80.5%) and 15 females (19.5%), with a mean age of 47.64 ± 7.47 years. Based on CTP scores, 32 (41.5%) samples had CTP B-C and 45 (58.4%) had CTP A. The mean IGF1 levels were 2.06 ± 1.08 ng/mL (0.46 ng/ml - 5.73 ng/ ml). The mean CTP score was 6.84 ± 2.18 (5-13). The mean IGF1 in CTP A and BC was 2.43 ± 1.08 ng/mL and 1.54 ± 0.82 ng/mL (p<0.001; 95% CI 0.43-1.34). Based on the ROC curve, IGF1 levels greater than or equal to 1.62 ng/mL were defined as high levels. There was a significant relationship between IGF1 levels and CTP scores (p<0.001; OR=6.7, 95%CI: 2.4-18.4). Low IGF1 levels are associated with poor prognosis. Liver cirrhosis patients with IGF1 values less than 1.62 ng/mL are 6.7 times more likely to have a 20-55% mortality risk at 1 year.

Table 1. Characteristic samples.

Characteristics	Value
Age Mean $\pm SD$	47.64 ±7.47
Sex n (%)	
Male	62 (80.5%)
Female	15 (19.5%)
Antiviral n (%)	
Yes	51 (66,1%)
No	26 (33.8%)
Body Mass Index n (%)	
Low	4 (5.2%)
Normal	41 (53.2%)
Obese	32 (41.6%)

Table 2. Crosstab between IGF-1 level and the Prognosis base on CTP .

IGF-1 level	CTP-A	CTP-BC	Total
Low	10 (32.3)	21 (67.7)	31 (100)
High	35 (76.1)	11 (23.9)	46 (100)

(p<0.001; OR=6.7, 95%CI: 2.4-18.4).

DISCUSSION

Mean IGF1 levels were significantly lower in CTP B-C than in CTP A, and low IGF1 levels suggest a possibly poorer prognosis in patients with liver cirrhosis. IGF1 concentration decreased with the severity of cirrhosis (Child–Pugh score), reaching significantly low values in class C. The CTP score has been validated as a predictor of postoperative mortality after portocaval shunt surgery and predicts mortality risk associated with other major operations. The CTP score can help predict all-cause mortality risk and development of other complications from liver dysfunction, such as variceal bleeding, as well. Reported the overall mortality for these patients at 1 year was 0% for Child class A, 20% for Child class B, and 55% for Child class C.

CONCLUSIONS

Based on the results of this study, it can be concluded that low IGF1 is a predictor of poor prognosis in patients with liver cirrhosis.

REFERENCES

1. Adamek A., Kasprzak A., Insulin-Like Growth Factor (IGF) System in Liver Diseases. Int. J. Mol. Sci. 2018, 19, 1308
2. Rivard CI., Esnaola S., Villeneuve JP., Clinical and statistical validity of conventional prognostic factor in predicting short-term survival among cirrhotics. Hepatology, 1987; 7(4): 660-664
3. Garza R.G., Garza LAM., Estal IM., Cortazar IC. Insulin-like Growth Factor-1 Deficiency and Cirrhosis Establishment. J Clin Med Res. 2017; 9(4):233-247
4. Chisima S., Kogiso T., Matsushita N., Hashimoto E., Tokushige K. The Relationship between the Growth Hormone/Insulin-like Growth Factor System and the Histological Features of Nonalcoholic Fatty Liver Disease. Intern Med. 2017;56: 473-480
5. Ditchel S., Corey, K.E., Misdraji, J., Bredella, M.A., Schorr, M., Osganian, S.A., et al. The Association between IGF-1 Levels and the Histologic Severity of Nonalcoholic Fatty Liver Disease. *Clinical and Translational Gastroenterology*, 2017;8: 1-9