

Can the liver tell us about the heart? An old story revisited

Sang-Ho Jo

Division of Cardiology,
Department of Internal Medicine,
Hallym University Sacred Heart
Hospital, Anyang, Korea

See Article on Page 300-305

Heart failure is a systemic disease based on its chronic inflammation status and because it affects other organs, including the kidneys, lungs, and liver. Acute decompensated heart failure (ADHF) is a more severe form of heart failure that causes an acute change in hemodynamics. ADHF negatively affects renal, hepatic, and pulmonary function and causes peripheral soft tissue edema.

Repeated hospital admissions for ADHF is one indicator of a poor clinical outcome in chronic heart failure patients [1,2]. The predictors of readmission and death have been investigated, and major risk factors are a low left ventricular ejection function (LVEF), low initial serum sodium level, increased serum creatinine, anemia, and low admission blood pressure [1,2].

These are markers of hemodynamic change, fluid and electrolyte imbalance, and reduced organ perfusion and function caused by depressed left and right ventricular function.

The predictors that indirectly reflect low cardiac function include hepatic congestion, which can be detected with liver function tests (LFTs), including serum bilirubin, alkaline phosphatase, and aminotransferases. These have been suggested as risk fac-

tors for future death, cardiovascular events, and readmission [3-6]. Furthermore, recent publications have reported that the type of death from heart failure can be discriminated using the bilirubin level: increased total bilirubin was associated with death from pump failure and not with sudden death [5].

Chronic hepatic congestion due to right ventricular dysfunction might increase the possibility of liver cirrhosis, so-called cardiac cirrhosis.

In a recent *post hoc* analysis, the prevalence of LFT abnormalities in ADHF was as much as 46% [2]. The liver and heart are connected intimately, similar to the relationship between the heart and kidney, usually called "cardiorenal syndrome," in patients with chronic and acute heart failure.

In this issue of *Korean Journal of Internal Medicine*, Chintanaboina et al. [7] reported an association between serum total bilirubin and readmission due to ADHF. They demonstrated that patients with a high serum bilirubin on admission had a high risk of readmission owing to decompensation, and that patients with a bilirubin >1.3 mg/dL or LVEF <35% were at higher risk.

This study once again confirmed the old story that hepatic congestion, which implies advanced heart failure, indicates a poor prognosis in acute

Received: April 17, 2013
Accepted: April 18, 2013

Correspondence to
Sang-Ho Jo, M.D.

Division of Cardiology,
Department of Internal
Medicine, Hallym University
Sacred Heart Hospital, 22
Gwanpyeong-ro 170beon-gil,
Dongan-gu, Anyang 431-796,
Korea
Tel: +82-31-380-3722
Fax: +82-31-386-2269
E-mail: sophisneo@gmail.com

and chronic heart failure patients [1-6,8].

Surprisingly, alleged poor risk predictors such as LVEF, serum creatinine, low serum sodium, and B-natriuretic peptide were not independent risk factors for readmission in a multiple regression analysis, as presented in Table 3.

Nevertheless, I feel that this small retrospective study had many confounding factors that could not be controlled. Therefore, a refined statistical method should have been applied, and this process should be described in more detail in this article.

Although it has substantial limitations, this study has value in that it confirms the correlation between total bilirubin and hospitalization in ADHF patients, who comprise a small portion of patients compared with those with chronic heart failure in terms of "bilirubin and heart failure prognosis."

Serum bilirubin is a potential indicator of risk stratification for rehospitalization, along with other prognostic markers such as low sodium and low initial blood pressure in ADHF. Moreover, it might help to guide the therapeutic options for ADHF.

Future studies should aim at improving the prognosis of ADHF patients with the guidance of liver function.

Conflict of interest

No potential conflict of interest relevant to this article is reported.

REFERENCES

1. Zile MR, Bennett TD, St John Sutton M, et al. Transition from chronic compensated to acute decompensated heart failure: pathophysiological insights obtained from continuous monitoring of intracardiac pressures. *Circulation* 2008;118:1433-1441.
2. Lassus J, Gayat E, Mueller C, et al. Incremental value of biomarkers to clinical variables for mortality prediction in acutely decompensated heart failure: the Multi-national Observational Cohort on Acute Heart Failure (MOCA) study. *Int J Cardiol.* 2013 Mar 25 [Epub]. <http://dx.doi.org/10.1016/j.ijcard.2013.01.228>.
3. Nikolaou M, Parissis J, Yilmaz MB, et al. Liver function abnormalities, clinical profile, and outcome in acute decompensated heart failure. *Eur Heart J* 2013;34:742-749.
4. van Deursen VM, Damman K, Hillege HL, van Beek AP, van Veldhuisen DJ, Voors AA. Abnormal liver function in relation to hemodynamic profile in heart failure patients. *J Card Fail* 2010;16:84-90.
5. Shinagawa H, Inomata T, Koitabashi T, et al. Prognostic significance of increased serum bilirubin levels coincident with cardiac decompensation in chronic heart failure. *Circ J* 2008;72:364-369.
6. Batin P, Wickens M, McEntegart D, Fullwood L, Cowley AJ. The importance of abnormalities of liver function tests in predicting mortality in chronic heart failure. *Eur Heart J* 1995;16:1613-1618.
7. Chintanaboina J, Haner MS, Sethi A, et al. Serum bilirubin as a prognostic marker in patients with acute decompensated heart failure. *Korean J Intern Med* 2013;28:300-305.
8. Ambrosy AP, Vaduganathan M, Huffman MD, et al. Clinical course and predictive value of liver function tests in patients hospitalized for worsening heart failure with reduced ejection fraction: an analysis of the EVEREST trial. *Eur J Heart Fail* 2012;14:302-311.