Nutritional Status and its Impact on Clinical Outcomes for Patients Admitted to Hospital with Cirrhosis

Chalermrat Bunchorntavakul MD*,**,
Ruamthip Supanun MD*, Amporn Atsawarungruangkit MD*,**

** Department of Medicine, Rajavithi Hospital, College of Medicine, Rangsit University, Bangkok, Thailand*
*** College of Medicine, Rangsit University, Bangkok, Thailand*

Background: *In patients with cirrhosis, nutritional status is an important predictor of clinical outcomes that can be assessed in clinical practice using conventional methods. Previous studies have shown that malnutrition is associated with increased morbidity and mortality in patients with cirrhosis. However, there have been very few reports from Southeast Asia.*
Objective: *To determine the prevalence of malnutrition in patients with cirrhosis who are admitted to hospital and to assess its correlation with mortality, complications, length of stay, and total cost of hospitalization.*
Material and Method: *This prospective non-interventional study included 60 consecutive patients with cirrhosis admitted to Rajavithi Hospital, Bangkok, Thailand, from August 2013 to February 2014. Baseline demographic and clinical data during their hospitalizations were collected prospectively. Nutritional status was assessed by subjective global assessment (SGA) and anthropometry (body mass index (BMI) and mid-arm circumference (MAC)). Malnutrition was defined as SGA class B/C and MAC of <5th percentile of the age- and gender-matched reference population.*
Results: *Of the 60 patients, 70% were male. The most common causes of cirrhosis were alcohol (50%) and hepatitis C infection (35%). Most patients were classified as Child-Pugh class B (41.7%) or C (36.7%). The mortality rate was 26.7%, and the most common complications were infections (60%) and renal failure (43.3%). The median length of stay in hospital was 8.5 (1-51) days, with a median cost of 1,163 (183-9,969) US dollars. The prevalence of malnutrition varied between 18% and 92% depending on the assessment method employed: 18% were considered malnourished when assessed by BMI, 63% by MAC, 78% by serum albumin, 65% by absolute lymphocyte count, and 92% by SGA. Patients with malnutrition showed a trend toward increased mortality, complications, length of hospital stay and cost; however, the differences were not statistically significant. Significant predictors of mortality included Child-Pugh class B (16% mortality) and C (50% mortality), severe malnutrition as assessed by SGA (35% mortality), presence of ascites (relative risk, RR: 2.3), hepatic encephalopathy (RR: 2.5), hepatorenal syndrome (RR: 4.1) and renal failure (RR: 3.3).*
Conclusion: *Malnutrition is common in hospitalized patients with cirrhosis, and patients with malnutrition showed a trend toward increased complications and mortality. Severe malnutrition, as identified by SGA, and advanced cirrhosis were predictors of in-hospital mortality.*

Keywords: *Nutritional status, Cirrhosis, Malnutrition, Mortality, Complications, Hospital stay length, Hospitalization costs*

J Med Assoc Thai 2016; 99 (Suppl. 2): S47-S55
Full text. e-Journal: *http://www.jmatonline.com*

Cirrhosis is the result of chronic liver damage. It can have various etiologies, such as chronic viral hepatitis, excessive alcohol consumption, autoimmune disease, or fatty liver disease. Patients with cirrhosis are at risk of developing complications from portal hypertension (e.g. ascites, variceal bleeding, and hepatorenal syndrome) and liver failure (e.g. encephalopathy and coagulopathy), as well as infections and hepatocellular carcinoma. The most widely used system for the classification of cirrhosis and the determination of its prognosis is the Child-Pugh score, which classifies patients with cirrhosis into class A (mean survival 15-20 years), class B (mean survival 3-5 years), and class C (mean survival 1-3 years).

Protein-calorie malnutrition (PCM) is common in patients with cirrhosis. The prevalence of PCM appears to be correlated with the severity of cirrhosis (23% in Child-Pugh class A, 40-50% in Child-Pugh class B, and 60-85% in Child-Pugh class C)[1,2]. Several factors can contribute to malnutrition in patients with cirrhosis, including reduced dietary intake (e.g. because of anorexia, nausea, impaired gastric expansion by

Correspondence to:
Bunchorntavakul C, Division of Gastroenterology, Department of Medicine, Rajavithi Hospital, 2 Phyathai Road, Rajathewi, Bangkok 10400, Thailand.
Phone: +66-2-3548108 ext. 5101
E-mail: dr.chalermrat@gmail.com

ascites, or unpalatable diet due to altered taste and salt restriction), altered protein/energy metabolism (e.g. increased gluconeogenesis, increased proteolysis, decreased glycogen storage, or hypermetabolic state), and maldigestion or malabsorption (e.g. portosystemic shunting, or bile salt deficiency). Nutritional status can be measured clinically using various methods, such as body mass index (BMI), mid-arm circumference (MAC), serum albumin, absolute lymphocyte count (ALC), and subjective global assessments (SGA). However, there is no gold standard nutritional assessment method for patients with cirrhosis, and many of the usual tools have limitations when applied to patients with decompensated cirrhosis. For example, the presence of third-space fluid due to salt and water retention can affect the measurement of BMI and anthropometry. Additionally, several serum markers, such as albumin and retinol-binding proteins, are often unreliable in patients with advanced cirrhosis because of impaired hepatic protein synthesis. More sophisticated techniques, such as bioelectrical impedance analysis (BIA) and dual energy x-ray absorptiometry (DEXA), more accurately quantify nutritional status in these patients; however, the usefulness of these tools is limited, mainly due to lack of availability and high cost. Despite the limitations of conventional methods, current guidelines recommend their use in the assessment of nutritional status in patients with cirrhosis[3-5].

A number of studies have demonstrated that PCM is associated with an increased number of complications, including ascites, variceal bleeding, increased surgical morbidity and mortality, reduced survival, and worsening of hepatic function[6-8]. In the US nationwide analysis of hospitalized patients with cirrhosis and portal hypertension (n = 114,703), patients with PCM were more commonly associated with ascites (65% vs. 48%, $p<0.0001$), hepatorenal syndrome (5% vs. 3%, $p<0.0001$), longer hospitalization (8.7 vs. 5.7 days, $p<0.0001$), greater hospital costs (US$ 36,818 vs. US$ 22,673, $p<0.0001$), and in-hospital mortality (2-fold increase) compared with well-nourished patients[9].

It should be noted that there are significant differences in the characteristics of patients with cirrhosis between geographic locations that may affect nutritional status and clinical outcomes, such as body habitus, local dietary intake, comorbidities, and etiology. Further, there are marked differences between developed and developing countries in the hospital management of patients with cirrhosis, such as access to medication, nutritional support, intensive care, rate of infection, and the availability of liver transplantation. By considering these issues, this study aimed to determine the prevalence and importance of malnutrition in patients with cirrhosis admitted to our hospital, which is one of the main referral centers in Thailand.

Material and Method

Patients

Adult patients with cirrhosis admitted to Rajavithi Hospital, Bangkok, Thailand, due to various indications were included in the study. Cirrhosis was diagnosed based on a combination of clinical features from the biochemical profile, radiological imaging, and/or liver biopsy results. Clinical features indicative of the presence of cirrhosis are cutaneous liver stigmata (palmar erythema, spider nevi, parotid gland enlargement, gynecomastia, and testicular atrophy), and signs of portal hypertension (ascites, superficial vein dilatations, splenomegaly, and gastroesophageal varices). The biochemical profile included evidence of reversed albumin-to-globulin ratio, thrombocytopenia, and/or coagulopathy. Radiological imaging, by either transabdominal ultrasound or computerized tomography, demonstrated a small shrunken liver, nodular surface, increased left-to-right lobe ratio, splenomegaly, and/or intra-abdominal collateral vessels and varices. The severity of liver disease was graded according to the Child-Pugh system with class A (mild, score 5-6), class B (moderate, score 7-9), and class C (severe, score 10-15) indicating the degree of hepatic reserve and function. Patients in a moribund condition upon admission who had an expected survival of fewer than 2 days, those with a do-not-resuscitate order, and those who did not provide consent to participate in the study were excluded.

Methods

This prospective, non-interventional study was conducted at a single tertiary-care hospital (Rajavithi Hospital) between August 2013 and February 2014. The study protocol was reviewed and approved by the Medical Ethics Committee of Rajavithi Hospital (No. 145/2556) and the Research Subcommittee of the Royal College of Physicians of Thailand. All participants (n = 60) provided informed consent before enrollment. Past and present medical histories were recorded, including hospitalizations, cirrhosis, medication, food intake, supplementary product intake, and other medical records. During hospitalization, clinical and laboratory

data were collected prospectively, including treatment, complications, mortality, length of hospital stay, cost of hospitalization, discharge status, use of beta-blockers, supplementation of branched-chain amino acids (BCAA), and fasting state.

Nutritional assessments

Nutritional assessments were performed on admission by a single investigator (RS). The assessment included SGA, BMI, and MAC. Blood samples were collected to be tested for albumin, complete blood count, and ALC. The SGA used in this study was modified from the standard English-language version, which was previously validated for use in Thai patients with chronic liver disease[2]. Several general and nutritional aspects were integrated into the checklists, including history of weight loss, reduced daily calorie intake, gastrointestinal symptoms, functional capacity, physical signs of malnutrition (e.g. edema and ascites), and serum albumin. The patients were classified as: well-nourished (A), moderately malnourished (B), and severely malnourished (C), according to their SGA scores[10,11].

Baseline weight and height were recorded for all of the patients in the study. BMI was calculated using the standard formula: BMI = weight in kg/(height in m^2). MAC was measured at the mid-point between the tip of the shoulder (the acromion process) and the tip of the elbow (the olecranon process) to the nearest centimeter with a graduated, non-retracting, flexible measuring tape. Malnutrition status was defined as BMI <18.5 kg/m^2, MAC of <5th percentile of the age- and gender-matched healthy population, SGA group B or C, serum albumin <3.5 g/dL, and ALC <1,500 cells/mm^3. Patients with SGA group C were classified as having severe malnutrition.

Statistical analysis

All statistical analyses in this article were performed using SPSS version 17.0. The continuous and categorical data are presented in terms of mean ± standard deviation (SD) and frequency (percentage) respectively. The association of each assessment method with nutritional status is summarized using Spearman's correlation coefficient. Relative risk is used to show the relationship between mortality and other factors, such as nutritional status and complications. The differences in two dichotomous groups were evaluated using the Chi-square test or the two-sided Fisher's exact test, with a significance level (alpha) of 0.05. Survival analysis was calculated with the use of the Kaplan-Meier method and the log-rank test.

Results

Sixty patients with cirrhosis were enrolled into this study. Of these patients, 70% were male with an average age of 57.5±11.3 year and BMI of 21.42±3.75 kg/m^2 (Table 1). Based on the modified Child-Pugh score, 21.7% of patients were in class A, 41.7% were in class

Table 1. Demographic data and clinical characteristics of the study population

Characteristics	Patients (n = 60)
Age (years), mean ± SD	57.45±11.33
Male: female, n (%)	42 (70):18 (30)
Weight (kg), mean ± SD	57.20±11.59
Height (cm), mean ± SD	163.38±8.09
BMI (kg/m^2), mean ± SD	21.42±3.75
<18.5, n (%)	11 (18.3)
18.5-23.9, n (%)	36 (60.0)
≥24.0, n (%)	13 (21.7)
MAC, mean ± SD	24.2±3.75
<25.3 cm, n (%)	38 (63.3)
≥25.3 cm, n (%)	22 (26.7)
Albumin (g/dL), mean ± SD	2.63±0.73
<2.5 g/dL, n (%)	28 (46.7)
2.5-3.4 g/dL, n (%)	19 (31.7)
≥3.5 g/dL, n (%)	13 (21.6)
ALC (cells/mm^3), median (range)	1,168 (366-3,990)
<1,500, n (%)	39 (65.0)
≥1,500, n (%)	21 (35.0)
SGA	
Group A, n (%)	5 (8.3)
Group B, n (%)	15 (25.0)
Group C, n (%)	40 (66.7)
Modified child-pugh score, median (min-max)	8 (5-14)
Class A (score 5-6), n (%)	13 (21.7)
Class B (score 7-9), n (%)	25 (41.7)
Class C (score 10-15), n (%)	22 (36.6)
Etiology of cirrhosis	
Excessive alcohol consumption, n (%)	30 (50.0)
Chronic hepatitis C, n (%)	21 (35.0)
Chronic hepatitis B, n (%)	20 (33.3)
Cryptogenic/NASH, n (%)	3 (5.0)
Cholestatic liver disease, n (%)	2 (3.3)
Hepatocellular carcinoma, n (%)	25 (41.8)

ALC = absolute lymphocyte count; BMI = body mass index; MAC = mid-arm circumference; NASH = nonalcoholic steatohepatitis; SD = standard deviation; SGA = subjective global assessment

B, and 36.7% were in class C (Table 1). Clinical data and complications during hospitalization are shown in Table 2.

The prevalence of malnutrition varied between 18 and 92% depending on the assessment method employed. When patients were assessed by BMI, 18.3% were considered to be malnourished; 63.3% were considered to be malnourished when assessed by MAC; 78.4%, by serum albumin; 65.0%, by ALC, and 91.7%, by SGA (Fig. 1). The correlations between the methods of nutritional assessment are shown in Table 3. Among the five methods, the SGA showed a significant correlation with albumin (p<0.001) and MAC (p = 0.022). BMI and MAC also showed a significant correlation (p<0.001). ALC did not demonstrate any relationship with the other four methods (Table 3). The prevalence, as assessed by SGA and MAC, and the severity of malnutrition, defined by the SGA, correlated with the severity of cirrhosis, classified by Child-Pugh score (Fig. 2, 3).

Sixteen patients (26.7%) died during the study. Factors associated with hospital mortality were analyzed and the results are summarized in Table 4. Hospital mortality was significantly associated with severity of cirrhosis (p = 0.007, Fig. 4), but it was not

Table 2. Clinical data and complications during hospitalization

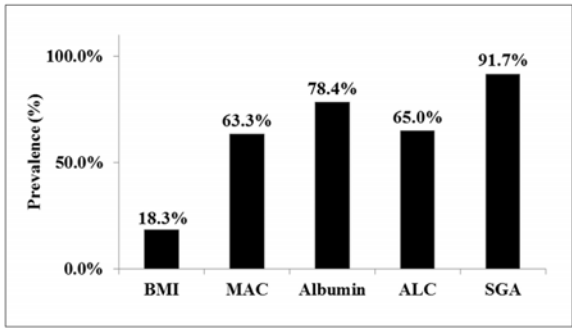
Characteristic	Patients (n = 60)
Complications	
Infections, n (%)	36 (60.0)
Renal failure, n (%)	24 (40.0)
Gastrointestinal bleeding, n (%)	21 (35.0)
Ascites (new or progressive), n (%)	18 (30.0)
Hepatic encephalopathy, n (%)	17 (28.3)
Hepatorenal syndrome, n (%)	2 (3.3)
Mortality rate, n (%)	16 (26.7)
Length of hospital stay (days), median (min-max)	8.5 (1-51)
Cost of hospitalization (US dollar), median (min-max)	1,163 (183-9,969)
Other factors	
BCAA (oral/NG tube), n (%)	18 (30.0)
NPO for >12 hours, n (%)	13 (21.7)
Non-selective beta-blocker, n (%)	12 (20.0)

BCAA = branched-chain amino acids; NG = nasogastric; NPO = nothing per oral

Table 3. Spearman's correlation between the five nutrition assessment methods

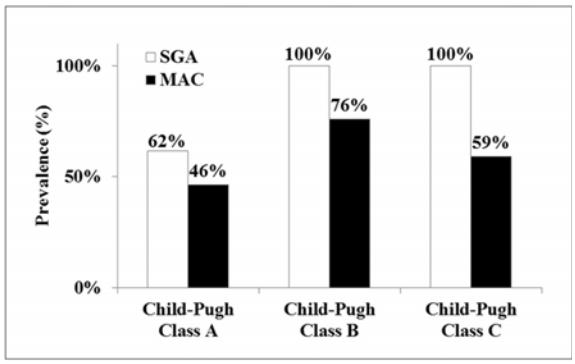
	BMI	MAC	Albumin	ALC	SGA
BMI		<0.001**	0.572	0.489	0.324
MAC	0.531		0.072	0.741	0.022*
Albumin	0.074	0.234		0.379	<0.001**
ALC	-0.091	-0.044	-0.116		0.963
SGA	-0.13	-0.296	-0.006	-0.639	

* p<0.05, ** p<0.001
The value below the diagonal is the correlation coefficient; the value above the diagonal is the p-value.
ALC = absolute lymphocyte count; BMI = body mass index; MAC = mid-arm circumference; SGA = subjective global assessment



BMI = body mass index; MAC = mid-arm circumference; ALC = absolute lymphocyte count; SGA = subjective global assessment

Fig. 1 The prevalence of malnutrition in patients with cirrhosis based on various conventional assessment methods.



MAC = mid-arm circumference; SGA = subjective global assessment

Fig. 2 The prevalence of malnutrition as assessed by the SGA and MAC according to the severity of cirrhosis.

Table 4. Factors associated with mortality

Factors	Relative risk ratio (95% CI)	*p*-value
Malnutrition parameters		
BMI	1.03 (0.35-3.00)	0.614
MAC	1.27 (0.51-3.12)	0.417
Albumin	1.94 (0.50-7.46)	0.253
ALC	0.89 (0.38-2.13)	0.518
SGA	0.71 (0.60-0.84)	0.048*
Complications		
Ascites	2.33 (1.04-5.24)	0.045*
Hepatorenal syndrome	4.14 (2.63-6.54)	0.018*
Hepatic encephalopathy	2.53 (1.13-5.65)	0.026*
Renal failure	3.30 (1.31-8.3)	0.007*
Gastrointestinal bleed	1.86 (0.82-4.23)	0.123
Infections	2.00 (0.73-5.47)	0.128
Hepatocellular carcinoma	0.64 (0.25-1.60)	0.247
Other factors		
Receiving propranolol	0.76 (0.46-1.25)	0.170
BCAA (oral/NG tube)	1.33 (0.80-1.75)	0.067
NPO for >12 hours	1.64 (0.69-3.89)	0.228

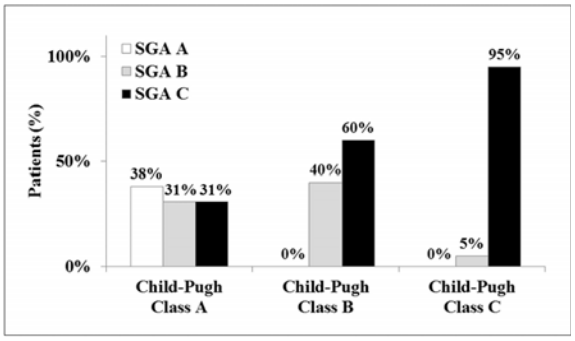
* $p<0.05$

ALC = absolute lymphocyte count; BCAA = branched-chain amino acids; BMI = body mass index; CI = confidence interval; MAC = mid-arm circumference; NG = nasogastric; NPO = nothing per oral; SGA = subjective global assessment

significantly associated with nutritional parameters, the presence of malnutrition, receiving propranolol, receiving BCAA supplementation (ether by mouth or nasogastric tube), or abstaining from food and water (Table 4). As shown in Fig. 4, patients with Child-Pugh class A, B and C had hospital mortality rates of 8%, 16%, and 50%, respectively ($p = 0.007$). Upon further analysis by severity of malnutrition, severe malnutrition (SGA C) was found to be significantly associated with hospital mortality ($p = 0.007$) (Fig. 5, 6). In addition, mortality was significantly associated with complications including ascites ($p = 0.045$), hepatic encephalopathy ($p = 0.03$), hepatorenal syndrome ($p = 0.018$), and renal failure ($p = 0.007$) (Table 4). The relationships between malnutrition and the length or cost of hospitalization were not statistically significant.

Discussion

This study included patients with cirrhosis caused by various etiologies, mainly excessive alcohol consumption and viral hepatitis. The patients were mostly in the advanced stages of cirrhosis, and had been admitted to the hospital for the treatment of



SGA A = well-nourished; SGA B = moderately (or suspected of being) malnourished; SGA C = severely malnourished

Fig. 3 The severity of malnutrition as assessed by subjective global assessment (SGA) according to the severity of cirrhosis.

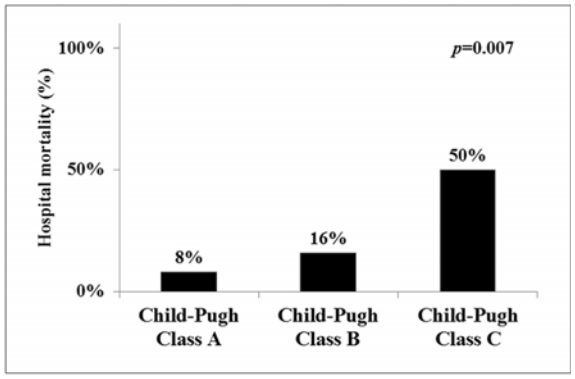
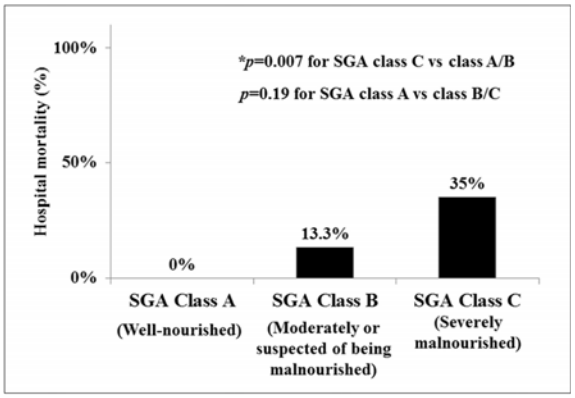


Fig. 4 Mortality rate according to the severity of cirrhosis.



SGA = Subjective Global Assessment

Fig. 5 Mortality rate according to the severity of malnutrition as assessed by Subjective Global Assessment (SGA).

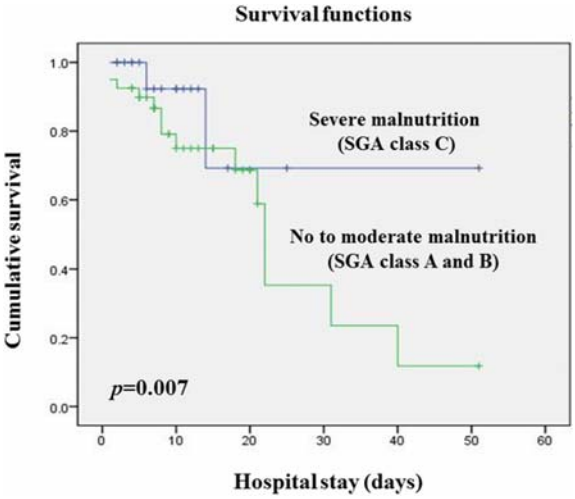


Fig. 6 The survival rate for cirrhotic patients with non-severe and severe malnutrition as assessed by Subjective Global Assessment (SGA).

infections and gastrointestinal bleeding. The authors believe that this study population is representative of patients with cirrhosis admitted to tertiary hospitals in Thailand. Conventional nutritional assessment methods, for example, SGA and MAC, were utilized to define malnutrition in this study. These methods are simple, inexpensive, and easy to use in clinical practice. Furthermore, SGA and MAC have been shown in a previous study of 85 patients with cirrhosis, mostly Child-Pugh class A, to have an acceptable correlation with BIA[2].

In this study, malnutrition was prevalent among patients with cirrhosis admitted to hospital (63% as assessed by MAC and 92% by the SGA). A previous study of 159 patients with cirrhosis awaiting liver transplantation reported that SGA was reliable in the evaluation of malnutrition in patients with cirrhosis, and that the prevalence of malnutrition was increased in patients with more advanced stages of liver disease. The prevalence of malnutrition was 50%, 75%, and 82% in patients with Child-Pugh class A, B, and C cirrhosis, respectively[12]. Similarly, in the present study, the prevalence of malnutrition in patients with Child-Pugh class A, B, and C cirrhosis was 46%, 76%, and 59% respectively, when using MAC, and 62%, 100%, and 100% respectively, when using SGA.

Studies have shown that malnutrition is correlated with morbidity, mortality, complications, length of hospital stay, and cost of hospitalization[9,13,14]. However, the current study did not find a significant correlation between malnutrition and nutritional parameters (BMI, MAC, albumin, ALC, and the SGA), mortality, length of hospital stay, or cost of hospitalization. In this study, patients with malnutrition tended to have higher mortality rates compared to those without it, but this was not statistically significant. However, with further analysis by severity of malnutrition, severe malnutrition (SGA C) was found to be significantly associated with hospital mortality. This study has illustrated that the hospitalization of patients with cirrhosis is a major concern for patients, physicians, and payers because of high morbidity and mortality (approximately 27%), as well as high costs (averaging approximately 1,500 US dollars per admission). Unsurprisingly, hospital mortality is associated with more advanced stages of cirrhosis (Child-Pugh class B and C), severe malnutrition (SGA C), ascites (RR: 2.3), hepatic encephalopathy (RR: 2.5), and renal failure (RR: 3.3).

A correlation between malnutrition and negative clinical outcomes was not demonstrated in this study. This may be explained by a number of reasons such as: (1) the sample size was too small, (2) most of the patients had Child-Pugh class B/C cirrhosis and were already malnourished, (3) a variety of indications and clinical severity at admission might have had a more substantial impact on hospital complications and short-term mortality than malnutrition; and (4) the accuracy of conventional nutritional assessment methods in patients with severe cirrhosis might not be sufficient. For example, BMI and MAC could be inaccurate in patients with ascites and edema; additionally, serum albumin can be lower in patients with advanced cirrhosis due to deterioration in liver function. In a prospective study of 1,053 patients with cirrhosis, a decrease in BMI had a positive correlation with mortality in patients with cirrhosis Child-Pugh class A and B, but not in those with class C[1].

Patients with cirrhosis are at-risk of developing a negative nitrogen balance following fasting for more than 6 hours or overnight due to decreased glycogen storage and increased gluconeogenesis and proteolysis, similar to that of a healthy person following starvation for 2-3 days[7,8,15]. Oral supplementation of BCAA in patients with advanced cirrhosis, particularly long-term administration at doses of 12-30 g/day, may have beneficial effects on nutritional parameters, encephalopathy, complications, and survival[16-19]. Non-selective beta-blockers can decrease energy expenditure and catecholamine levels in patients with

cirrhosis[20]. Theoretically, these nutrition-related factors may have effects on morbidity and mortality in hospitalized patients with cirrhosis, but this hypothesis has not been prospectively evaluated. In this study, we found no significant correlation between the use of beta-blockers, supplementation of BCAA, and fasting state (nothing per oral >12 hours) and hospital mortality or complications.

There were several limitations of this study. The limited number and heterogeneity of patients enrolled in this study could compromise the statistical power for identifying a correlation between nutritional parameters and clinical outcomes. We also included a small number of patients, and this may have compromised the analysis of clinical outcomes including those of patients who abruptly deteriorated and died shortly after enrollment (n = 4) and patients with hepatocellular carcinoma who were admitted to the hospital for scheduled transarterial chemoembolization (n = 5). In addition, as previously discussed, there are concerns regarding the reliability of the conventional nutritional assessment methods in patients with advanced cirrhosis, and confirmation by more sophisticated measurements such as BIA or DEXA, was not obtained.

The strengths of this study include the following: (1) it was a prospective study, (2) the study used simple and universally available methods for nutritional assessment, and (3) the study was conducted in a real-world setting, which means that the data are applicable to Thailand. Based on our findings, we recommend that the presence of malnutrition should be promptly identified among hospitalized patients with cirrhosis using conventional methods, such as SGA and/or MAC. Patients with severe malnutrition are at a high risk of developing complications and of mortality during hospitalization. Appropriate nutritional therapy to prevent and correct malnutrition in patients with cirrhosis may improve the outcomes of hospitalization.

Conclusion

The prevalence of malnutrition in hospitalized patients with cirrhosis varies depending on the assessment method employed; however, it is clearly common. Hospitalized cirrhotic patients with malnutrition had an increased risk of complications and mortality compared to well-nourished patients, but these differences were not statistically significant. Severe malnutrition and advanced cirrhosis were predictors of in-hospital mortality.

What is already known on this topic ?

Malnutrition is common in patients with cirrhosis admitted to a hospital.

Malnutrition in patients with cirrhosis is associated with poor outcomes.

Prospective data regarding this issue from Southeast Asia are very limited.

What this study adds ?

The prevalence of malnutrition in Thai patients admitted to a tertiary hospital is high and varies according to the assessment methods.

Hospital admissions of patients with cirrhosis are associated with high morbidity, high mortality and high cost. Malnutrition in patients with cirrhosis is associated with poor outcomes.

Severe malnutrition and advanced cirrhosis were predictors of in-hospital mortality in Thai patients.

This study emphasizes the importance of nutritional assessment and management for patients with cirrhosis admitted to a hospital.

Potential conflicts of interest

None.

References

1. Merli M, Riggio O, Dally L. Does malnutrition affect survival in cirrhosis? PINC (Policentrica Italiana Nutrizione Cirrosi). Hepatology 1996; 23: 1041-6.
2. Chanpiwat K, Bunchorntavakul C. Nutritional assessment in patients with cirrhosis: comparison between different methods. Thai J Gastroenterol 2014; 15: 90-8.
3. Plauth M, Cabre E, Riggio O, Assis-Camilo M, Pirlich M, Kondrup J, et al. ESPEN Guidelines on Enteral Nutrition: Liver disease. Clin Nutr 2006; 25: 285-94.
4. Amodio P, Bemeur C, Butterworth R, Cordoba J, Kato A, Montagnese S, et al. The nutritional management of hepatic encephalopathy in patients with cirrhosis: International Society for Hepatic Encephalopathy and Nitrogen Metabolism Consensus. Hepatology 2013; 58: 325-36.
5. Morgan MY, Madden AM, Soulsby CT, Morris RW. Derivation and validation of a new global method for assessing nutritional status in patients with cirrhosis. Hepatology 2006; 44: 823-35.
6. Juakiem W, Torres DM, Harrison SA. Nutrition in cirrhosis and chronic liver disease. Clin Liver Dis 2014; 18: 179-90.
7. O'Brien A, Williams R. Nutrition in end-stage liver

disease: principles and practice. Gastroenterology 2008; 134: 1729-40.
8. Zhao VM, Ziegler TR. Nutrition support in end-stage liver disease. Crit Care Nurs Clin North Am 2010; 22: 369-80.
9. Sam J, Nguyen GC. Protein-calorie malnutrition as a prognostic indicator of mortality among patients hospitalized with cirrhosis and portal hypertension. Liver Int 2009; 29: 1396-402.
10. Makhija S, Baker J. The Subjective Global Assessment: a review of its use in clinical practice. Nutr Clin Pract 2008; 23: 405-9.
11. Putadechakum S, Klangjareonchai T, Soponsaritsuk A, Roongpisuthipong C. Nutritional status assessment in cirrhotic patients after protein supplementation. ISRN Gastroenterol 2012; 2012: 1-4.
12. Ferreira LG, Anastacio LR, Lima AS, Correia MI. Assessment of nutritional status of patients waiting for liver transplantation. Clin Transplant 2011; 25: 248-54.
13. Sanchez AJ, Aranda-Michel J. Nutrition for the liver transplant patient. Liver Transpl 2006; 12: 1310-6.
14. Mendenhall CL, Tosch T, Weesner RE, Garcia-Pont P, Goldberg SJ, Kiernan T, et al. VA cooperative study on alcoholic hepatitis. II: Prognostic significance of protein-calorie malnutrition. Am J Clin Nutr 1986; 43: 213-8.
15. Owen OE, Trapp VE, Reichard GA Jr, Mozzoli MA, Moctezuma J, Paul P, et al. Nature and quantity of fuels consumed in patients with alcoholic cirrhosis. J Clin Invest 1983; 72: 1821-32.
16. Marchesini G, Bianchi G, Merli M, Amodio P, Panella C, Loguercio C, et al. Nutritional supplementation with branched-chain amino acids in advanced cirrhosis: a double-blind, randomized trial. Gastroenterology 2003; 124: 1792-801.
17. Cheung K, Lee SS, Raman M. Prevalence and mechanisms of malnutrition in patients with advanced liver disease, and nutrition management strategies. Clin Gastroenterol Hepatol 2012; 10: 117-25.
18. Muto Y, Sato S, Watanabe A, Moriwaki H, Suzuki K, Kato A, et al. Effects of oral branched-chain amino acid granules on event-free survival in patients with liver cirrhosis. Clin Gastroenterol Hepatol 2005; 3: 705-13.
19. Les I, Doval E, Garcia-Martinez R, Planas M, Cardenas G, Gomez P, et al. Effects of branched-chain amino acids supplementation in patients with cirrhosis and a previous episode of hepatic encephalopathy: a randomized study. Am J Gastroenterol 2011; 106: 1081-8.
20. Donaghy A. Issues of malnutrition and bone disease in patients with cirrhosis. J Gastroenterol Hepatol 2002; 17: 462-6.

ภาวะโภชนาการและผลลัพธ์ทางคลินิกของผู้ป่วยโรคตับแข็งที่เข้ารับการรักษาในโรงพยาบาล

เฉลิมรัฐ บัญชรเทวกุล, รวมทิพย์ สุภานันท์, อัมพร อัศวรุ่งเรืองกิจ

ภูมิหลัง: สภาวะโภชนาการถือเป็นสิ่งที่มีความสำคัญในการพยากรณ์ผลลัพธ์ทางคลินิกในผู้ป่วยโรคตับแข็ง ซึ่งในทางปฏิบัติมีแนวทางดั้งเดิมในการประเมินค่าดังกล่าวอยู่แล้ว งานศึกษาก่อนหน้าแสดงให้เห็นว่าภาวะทุพโภชนาการมีความเกี่ยวข้องกับอัตราทุพพลภาพที่เพิ่มขึ้น และอัตราการเสียชีวิตในผู้ป่วยที่เป็นโรคตับแข็ง อย่างไรก็ตามยังมีงานศึกษาน้อยมากในเอเชียตะวันออกเฉียงใต้

วัตถุประสงค์: เพื่อหาความชุกของภาวะทุพโภชนาการในผู้ป่วยตับแข็งที่เข้ารับการรักษาในโรงพยาบาล และประเมินความสัมพันธ์ระหว่างภาวะทุพโภชนาการกับปัจจัยต่างๆ เช่น อัตราการเสียชีวิต ภาวะแทรกซ้อน ระยะเวลาพักรักษา และค่าใช้จ่ายสุทธิในการรักษา เป็นต้น

วัสดุและวิธีการ: ศึกษาแบบ Prospective non-interventional ทำการศึกษาในผู้ป่วยตับแข็งที่เข้ารับการรักษาเป็นผู้ป่วยในโรงพยาบาลราชวิถี ซึ่งตั้งอยู่ในกรุงเทพฯ ประเทศไทย จำนวน 60 รายติดต่อกันระหว่าง เดือนสิงหาคม พ.ศ. 2556 ถึง เดือนกุมภาพันธ์ พ.ศ. 2557 โดยเก็บข้อมูลประชากรพื้นฐานและข้อมูลทางคลินิกระหว่างการเข้ารับรักษาตัวในโรงพยาบาลแบบ Prospective ทั้งนี้การประเมินสภาวะทางโภชนาการได้ทำโดย Subjective global assessment (SGA) Anthropometry (เพื่อหาค่าดัชนีมวลกาย และ Mid-arm circumference (MAC)) โดยนิยามสภาพะทุพโภชนาการจาก SGA ระดับ B/C หรือมีค่า MAC น้อยกว่า 5 เปอร์เซ็นต์ไทล์ของกลุ่มประชากรอ้างอิงที่มีอายุและเพศตรงกัน

ผลการศึกษา: จากผู้ป่วยทั้งหมด 60 คน เป็นชาย ร้อยละ 70 สาเหตุของโรคตับแข็งที่พบมากสุดคือ แอลกอฮอล์ (ร้อยละ 50) และ การติดเชื้อไวรัสตับอักเสบซี (ร้อยละ 35) ผู้ป่วยส่วนใหญ่มีความรุนแรงของตับแข็งอยู่ใน Child-Pugh ระดับ B (ร้อยละ 41.7) และ C (ร้อยละ 36.7) อัตราการเสียชีวิตในโรงพยาบาลอยู่ที่ 26.7% และภาวะแทรกซ้อนที่พบมากสุดคือ การติดเชื้อ (ร้อยละ 60) และภาวะไตวาย (ร้อยละ 43.3) ผู้ป่วยมีค่ามัธยฐานของระยะเวลาพักรักษาตัวในโรงพยาบาลเท่ากับ 8.5 (1-51) วัน และมีค่ามัธยฐานของค่าใช้จ่ายในการรักษาพยาบาลเท่ากับ 1,163 (183-9,969) ดอลลาร์สหรัฐ ความชุกของภาวะทุพโภชนาการอยู่ระหว่างร้อยละ 18 ถึง 92 ซึ่งขึ้นอยู่กับวิธีประเมินโดยเท่ากับร้อยละ 18 เมื่อประเมินโดยใช้ค่าดัชนีมวลกายเท่ากับร้อยละ 63 เมื่อใช้ MAC เท่ากับร้อยละ 78 เมื่อประเมินโดยค่าอัลบูมินในซีรัมเท่ากับร้อยละ 65 เมื่อประเมินโดยค่า Absolute lymphocyte count และเท่ากับร้อยละ 92 เมื่อประเมินโดยใช้ SGA นอกจากนี้ผู้ป่วยโรคตับแข็งที่มีภาวะทุพโภชนาการมีแนวโน้มที่จะพบอัตราการเสียชีวิตสูงขึ้น ภาวะแทรกซ้อนสูงขึ้น ระยะเวลาการพักรักษาในโรงพยาบาลสูงขึ้น และค่าใช้จ่ายในการรักษาพยาบาลสูงขึ้น อย่างไรก็ตามปัจจัยเหล่านี้ยังไม่มีนัยสำคัญทางสถิติ ทั้งนี้ปัจจัยพยากรณ์ที่มีนัยสำคัญต่ออัตราการเสียชีวิตในโรงพยาบาลได้แก่ การมี Child-Pugh ระดับ B (อัตราการเสียชีวิตเท่ากับร้อยละ 16) การมี Child-Pugh ระดับ C (อัตราการเสียชีวิตเท่ากับร้อยละ 50) การมีภาวะทุพโภชนาขั้นรุนแรงที่ประเมินโดยใช้ SGA (อัตราการเสียชีวิตเท่ากับร้อยละ 35) ภาวะท้องมาน (ความเสี่ยงเพิ่มขึ้น 2.3 เท่า) การมี hepatic encephalopathy (ความเสี่ยงเพิ่มขึ้น 2.5 เท่า) hepatorenal syndrome (ความเสี่ยงเพิ่มขึ้น 4.1 เท่า) และการมีภาวะไตวาย (ความเสี่ยงเพิ่มขึ้น 3.3 เท่า)

สรุป: แม้ว่าค่าความชุกของภาวะทุพโภชนาการจะมีความหลากหลายตามวิธีการประเมินแต่ละวิธีที่ใช้ภาวะทุพโภชนาการถือว่าเป็นเรื่องที่พบบ่อย ในผู้ป่วยโรคตับแข็งที่เข้ารับการรักษาในโรงพยาบาลอย่างชัดเจน ผู้ป่วยที่มีภาวะทุพโภชนาการยังมีแนวโน้มที่จะมีภาวะแทรกซ้อนและอัตราการเสียชีวิตในโรงพยาบาลเพิ่มมากขึ้น ทว่าความสัมพันธ์ดังกล่าวยังไม่มีนัยสำคัญทางสถิติ ทั้งนี้การมีภาวะทุพโภชนาการรุนแรงจากการประเมินโดย SGA และการเป็นโรคตับแข็งระยะสุดท้ายถือเป็นปัจจัยทำนายการเสียชีวิตในโรงพยาบาลได้อีกด้วย