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Faisal Wasim Ismail

Aga Khan University, faisal.ismail@aku.edu

Rustam A. Khan

Aga Khan University, khan.rustam@aku.edu

Lubna Kamani

Aga Khan University, lubna.kamani@aku.edu

Ashfaq A. Wadalawala

Aga Khan University, ashfaq.wadalawala@aku.edu

Hasnain Ali Shah

Aga Khan University, hasnain.alishah@aku.edu

See next page for additional authors

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Authors

Faisal Wasim Ismail, Rustam A. Khan, Lubna Kamani, Ashfaq A. Wadalawala, Hasnain Ali Shah, Saeed Hamid, and Wasim Jafri

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ABSTRACT

Objective: To assess the nutritional status via the SGA (subjective global assessment) screening tool of patients at all stages of hepatitis C virus (HCV) liver disease.

Study Design: Descriptive study.

Place and Duration of Study: Out-patient Clinics of the Aga Khan University Hospital, Karachi, conducted from October 2009 to January 2011.

Methodology: Patients with hepatitis C virus infection and their HCV-negative attendants were enrolled from the out-patient clinics, and categorized into 4 groups of 100 patients each: healthy controls (HC), those with chronic hepatitis C infection (CHC), compensated cirrhotics (CC) and decompensated cirrhotics (DC). The validated subjective global assessment (SGA) tool was used to assess nutritional status.

Results: A total of 400 patients were enrolled. Most of the patients in the HC group were class 'A' (best nutritional status). In contrast, the majority (64%) in the DC group were in the class 'C' (worst status). The compensated cirrhosis (CC) group showed that 90% of patients were malnourished, while 98% of all patients were malnourished in the DC group, predominantly class 'C'. Most importantly, 14% of patients with chronic hepatitis C (CHC) also scored a 'B' on the SGA; which when compared to HC was statistically significant ($p=0.005$). As the groups progressed in their disease from CHC to DC, the transition in nutritional status from 'A' to 'C' between groups was statistically significant.

Conclusion: Malnutrition occurs early in the course of HCV, and progresses relentlessly throughout the spectrum of HCV disease.

Key words: Chronic liver disease. HCV. Nutritional status.

INTRODUCTION

The relationship between malnutrition and liver disease has been assuming greater significance due to the recognition that it is associated with adverse clinical outcomes. Malnutrition is present in 65-90% of patients with advanced liver disease and in almost 100% of candidates for liver transplantation.^{1,2} Cirrhotic patients who are malnourished not only have a higher morbidity, but also an increased mortality rate.^{3,4} The severity of malnutrition correlates directly with the progression of the liver disease.^{5,6}

The chief reason for the malnutrition in these patients is poor oral intake, which may be due to a variety of causes. Vitamin A and or Zinc deficiency may give rise to an altered sense of taste.⁷ The dietary restrictions that are frequently advised to these patients, such as restriction of salt, protein, and fats, can discourage adequate oral intake by rendering food a bland taste. Weakness, fatigue, and encephalopathy may also contribute to decreased oral intake.⁸

Malabsorption is another vital reason why patients with advanced hepatic disease become malnourished. A reduction in the bile-salt pool may lead to fat malabsorption,⁹ or bacterial overgrowth may result from impaired small-bowel motility.¹⁰ Portal hypertension has also been named as a cause of malabsorption and protein loss from the gastrointestinal tract.^{11,12} In addition, the administration of medications used in the treatment of hepatic encephalopathy may also contribute to malabsorption.¹³

Hepatitis C virus liver disease spans a spectrum from chronic hepatitis C to compensated cirrhosis, and to finally decompensated cirrhosis. While, the overt malnutrition associated with cirrhosis has been documented in literature, there is little data regarding the nutritional status of patients who have simple chronic hepatitis C, with no evidence of severe liver dysfunction, apart from raised transaminases, or the compensated cirrhotic, and how they compare to the normal population.

The rationale for this study is all the more relevant in the developing world, where lack of education and awareness, and inaccessibility to good health care lead to misinformation. Often faith healers, traditional medicine specialists, quacks and family members enforce strict and unnecessary dietary restrictions, predominantly of fat and protein, which initiate and worsen nutritional status. Given these facts, it would be prudent to screen all patients with liver disease for

Department of Medicine, The Aga Khan University Hospital, Karachi.

Correspondence: Dr. Faisal Wasim Ismail, Department of Medicine, Faculty Office Building, 1st Floor, the Aga Khan University Hospital, Stadium Road, Karachi.

E-mail: faisal.ismail@aku.edu

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nutritional abnormalities to identify those at risk of developing malnutrition.¹⁴

Subjective global assessment (SGA) is a tool that combines multiple elements of nutritional assessment to classify the severity of malnutrition from mild to severe.¹⁵ These components are recent weight loss, changes in dietary intake, gastrointestinal symptoms, functional capacity, signs of muscle wasting, and the presence of presacral or pedal oedema. The SGA is an excellent tool to assess nutritional status in many diseases, and has an interobserver reproducibility rate of 80%.¹⁶ Simple bedside methods like the SGA have been shown to identify malnutrition adequately; the use of more complex scoring systems has not proved superior.¹⁷

The objective of this study was to assess the nutritional status via the SGA (subjective global assessment) screening tool of patients at all stages of hepatitis C virus (HCV) liver disease.

METHODOLOGY

Patients were enrolled from the Out-patient Hepatology Clinics at the Aga Khan University Hospital in a prospective manner during 15 months from October 2009 till January 2011. After a detailed assessment by the physician which included a history and examination, patients were categorized into 4 distinct populations of 100 patients each: healthy controls (HC), those with chronic hepatitis C infection (CHC), compensated cirrhotics (CC) and decompensated cirrhotics (DC).

Healthy controls (HC) were the accompanying household members (gender and closest age matched) of the patients who were assessed to be healthy after a history, examination and a negative HCV antibody screening test. No other tests were performed, as they were asymptomatic and were negative for HCV disease. The controls were exposed to the same socioeconomic conditions as the patients, and screening of family members of the index patient is standard practice at the study centre.

Chronic hepatitis C infection (CHC) patients were those who had evidence of HCV viremia, raised transaminases, normal liver synthetic function, and an ultrasound of the liver showing absence of portal hypertension, such as a dilated portal vein, or splenomegaly.

Compensated cirrhotics (CC) were patients who had no history of decompensation, and an ultrasound showing features of cirrhosis ± portal hypertension, but no ascites.

Finally, decompensated cirrhotics (DC) were those who had either a history or physical examination compatible with a diagnosis of decompensation, or ultrasound demonstrating free fluid in the abdomen.

Decompensation was defined as any episode of variceal bleeding, ascites, or porto-systemic encephalopathy. The SGA form was filled in all instances by the consultant physician himself. A nutritional history was also noted, with particular reference to any protein or fat restriction. Written, informed consent was taken from all the study participants, and the study was approved by the University Ethics Committee.

A descriptive analysis was done for demographic features and results are presented as mean ± standard deviation for quantitative variables and number (percentage) for qualitative variables among the different groups (CHC, CC, DC and HC). Analysis of variance (ANOVA) was performed to determine any statistical difference among the groups and the age, total bilirubin, prothrombin time and serum albumin. Differences in proportions were assessed among the groups and gender by using the chi-square test. Difference in proportion among the nutritional classes and groups were assessed by chi-square test.

All analyses were conducted by using the Statistical Package for Social Science [SPSS - Release 18.0, standard version, copyright © SPSS; 1989-02]. All p-values were two sided and considered as statistically significant if $p < 0.05$.

RESULTS

A total of 400 patients were enrolled, equally divided amongst the 4 groups. Gender was comparable in all 4 groups. The values of serum total bilirubin, albumin and prothrombin time became worse as the disease progressed from CHC to DC (Table I).

The HC group had a mean age of 31.56 ± 4.67 years. Most of the healthy control group (HC) was in SGA class 'A', and there were none in class 'C'. In contrast, the majority (64%) in the decompensated cirrhosis (DC) group were in the class 'C', while only 2% (n=2) were

Table I: Comparison of variables among the studied groups.

Characteristics	CHC (n=100)	CC (n=100)	DC (n=100)	HC (n=100)	p-value
Age (years)	33.63 ± 4.51	45.56 ± 2.79	50.66 ± 4.73	31.56 ± 4.67	< 0.001
Gender					
Male	68 (68)	71 (71)	67 (67)	68 (68)	0.93
Female	32 (32)	29 (29)	33 (33)	32 (32)	–
Total bilirubin (mg/dl)	1.10 ± 0.15	1.60 ± 0.24	2.63 ± 0.44	–	< 0.001
Serum albumin (mg/dl)	3.53 ± 0.23	2.98 ± 0.34	2.46 ± 0.38	–	< 0.001
Prothrombin time prolongation from control in seconds	2.35 ± 0.29	3.48 ± 0.33	6.22 ± 0.58	–	< 0.001

CHC: Chronic hepatitis C; CC: Compensated cirrhosis; DC: Decompensated cirrhosis; HC: Healthy controls.

in the 'A' category. The compensated cirrhosis (CC) group showed that 90% of patients were malnourished, while 98% of all patients were malnourished in the DC group, predominantly class 'C'. Most importantly, 14% of patients with chronic hepatitis C (CHC) also scored a 'B' on the SGA; which when compared to HC was statistically significant ($p=0.005$). As the groups progressed in their disease from CHC to DC, the transition in nutritional status from 'A' to 'C' between groups was statistically significant (Figure 1).

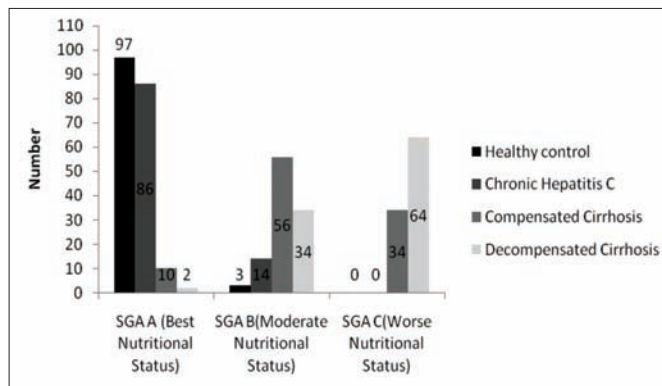


Figure 1: Comparison of nutritional status among the groups based on subjective global assessment (SGA) tool.

HC vs. CHC, p -value=0.005

CHC vs. CC, $p < 0.001$

CC vs. DC, $p < 0.001$

DISCUSSION

This is the first study to document the nutritional status of patients across the whole spectrum of hepatitis C virus infection. Most of the literature has been devoted to the nutritional aspects of cirrhotic and pre-transplant patients.^{18,19} This study shows that the downslide begins much earlier, even before cirrhosis sets in. Even when these patients visit their physicians for other ailments, the nutritional deficiency may not be realized, so the process continues unabated, until frank malnutrition sets in.

The vast majority of patients across all the cohorts were on a diet that was restricted in protein and fat content in varying amounts. This stems from the false but firm belief that when the liver is affected, it should not be "burdened" with calories. This practice, which is endorsed not only by patients and their families, but also unfortunately by ill-informed physicians, is likely the reason why upto 14% of patients with just CHC are moderately malnourished, and that the majority of CC patients are moderately or overtly malnourished (90%).

The most important finding in this study was seen between the HC and the CHC cohort of patients, and this is where the focus of nutritional intervention should be. Patients with CHC should be expected to have the same level of nutrition as HC, as no significant liver

damage has occurred, but this was not the case. Upto 14% of such patients had a moderate nutritional value, most likely a result of caloric and protein restriction, which was statistically significant when compared to HC. Poor nutritional status contributes to fatigue, anaemia, and infection, all of which impair successful HCV treatment, as treatment itself causes cytopenias and profound fatigue. Patients who are in better nutritional health are more likely to tolerate treatment side-effects, require less disruption of treatment, or dose reductions, and, therefore, have a more successful outcome, as compared to those who are nutritionally depleted.^{20,21}

The CC group also had a very alarmingly small number of patients who were well nourished (10%). The vast majority (56%) were moderately nourished, and a significant number (34%) were malnourished. The main reason for such a high number of cirrhotics to be malnourished is protein caloric malnutrition, which promotes catabolism and hypoalbuminemia. This is a very delicate group of patients. While they are compensated, they already have extensive hepatic damage. Malnutrition accelerates their slide towards decompensation, as there is a direct correlation between the progression of the liver disease and the severity of malnutrition.^{5,20}

Patients with cirrhosis who are malnourished have a higher rate of hepatic encephalopathy, infection, and variceal bleeding.^{18,22} They are also twice as likely to have refractory ascites.¹ All of these events in a cirrhotic have high mortality rates. Multiple studies have reported a correlation between poor nutritional status and mortality, and malnutrition is an independent predictor of mortality in patients with cirrhosis.^{3,23} It is no wonder then that the nutritionally worst group has the maximum number of patients who have decompensated cirrhosis, followed by CC.

Only 2 patients had a SGA score of 'A' in the DC group. The majority (64%) were scoring the worst in malnutrition, while a significant number (34%) were moderately malnourished. Thus the slide into malnourishment that begins in the stage of CHC becomes complete when patients have DC.

The results also show that the transition from CHC to DC is accompanied at all levels by worsening in nutritional states, which was statistically significant. Therefore, the need for nutritional intervention exists at all stages. Utilizing modalities such as media campaigns, out-patient counselling of patients, and awareness camps may all serve to fight the disinformation that takes the place of correct information, when it is not supplied by the health care provider. Physicians should also be made aware of not only the importance of nutritional evaluation and counselling in all patients with hepatitis C infection but also its regular assessment at follow-up visits.

Patients should be encouraged to take as normal and balanced a diet as possible, including protein, which is routinely restricted in our local setting. The institution of a bland, protein and calorie restricted diet is not warranted, and should be counselled against at every encounter with the patient and their attendants. Even in advanced cirrhosis, protein should only be restricted during a period of encephalopathy, and salt should be restricted if there is pedal oedema and/or ascites.^{23,24} This study documents the baseline nutritional status of a large cohort of patients in our setting, and provides data upon which other nutrition interventional studies may be based.

CONCLUSION

Patients at all stages of hepatitis C virus infection are malnourished. It is imperative to assess the nutritional status of all patients with HCV related liver disease and to optimize nutrition in these patients.

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