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Comparing assessment tools for detecting undernutrition in patients with liver cirrhosis

M. McFarlane [a, *], C. Hammond [a], T. Roper [a], J. Mukarati [a], R. Ford [b], J. Burrell [b], V. Gordon [a], N. Burch [a]

[a] Department of Gastroenterology, UHCW, Clifford Bridge Road, Coventry, UK
[b] Department of Dietetics, UHCW, Clifford Bridge Road, Coventry, UK

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SUMMARY

Background and aims: Undernutrition in cirrhotic patients is often poorly recognised until late-stages. The current UK screening tool, the Malnutrition Universal Screening Tool, can miss undernutrition in patients with ascites/fluid retention. A 6-question Liver Disease Undernutrition Screening Tool (LDUST) has been developed in America.

Methods: We sought to compare LDUST with MUST in the detection of undernutrition in 50 inpatients and 50 outpatients with liver cirrhosis in a secondary care setting. This was then validated by a dietitian assessment.

Results: Similar patient demographics and liver disease aetiologies were found in the two cohorts. Mean Child-Pugh scores were higher for inpatients, 8.3 (SD 1.9) vs 5.9 (SD 1.2). LDUST detected undernutrition in 45/50 inpatients (90%) and 34/50 outpatients (68%). MUST scores $\geq$2 were present in 19/50 (38%) inpatients and 9/50 (18%) outpatients. In those with a MUST score <2, LDUST detected undernutrition in 26/31 (84%) inpatients and 27/41 (66%) outpatients. 26 inpatients had undernutrition using LDUST but had a MUST score <2, 20 (76%) of these were deemed to be undernourished by dietetics assessment. LDUST was mostly completed independently or with minimal assistance (80% inpatients, 100% outpatients), with mean completion times of 4 and 3 min for in- and outpatients respectively.

Conclusion: LDUST is a quick and easy screening tool, which appears better able than MUST to detect undernutrition in cirrhotic patients, including undernutrition missed by MUST. Importantly the tool was validated against dietitian assessments. The high rates of undernutrition among cirrhotic inpatients suggest that screening this cohort is unnecessary, and instead all should undergo dietitian review, with LDUST utilised in an outpatient setting.

1. Introduction

Chronic liver disease (CLD) and liver cirrhosis are the fifth largest cause of death in the United Kingdom [1]. Over the last two decades hospital admissions have increased by 71% for males and 43% for females from all liver diseases, whilst CLD mortality rates have more than doubled [2]. One of the main contributors is alcohol related liver disease (ARLD), with admission rates increasing by >100% over the same period [2]. Other causes of CLD include viral hepatitis (B and C) and non-alcoholic fatty liver disease (NAFLD). NAFLD was found in 94% of obese patients (body mass index >30 kg/m^2) and 25% of normal weight patients in one European study [3]. As obesity rates rise, cirrhosis due to NAFLD is expected to increase markedly.

One of the commonest complications of cirrhosis is malnutrition with the prevalence reported at 10%–100% dependent on assessment method and the liver disease severity, but most studies report 60–85% [4–8].

Malnutrition in cirrhosis results from a variable combination of inadequate intake, poor digestion and absorption, combined with altered metabolic processes. Inadequate intake has been linked to micronutrient deficiencies (vitamin A and zinc) affecting taste perception, making some foods unpalatable, often exacerbated by recommended sodium restriction [5,7–9]. Cirrhotic individuals also have decreased ghrelin, but increased leptin and tumour

* Corresponding author. Department of Gastroenterology, UHCW, Clifford Bridge Road, Coventry CV2 2DX, UK.
E-mail addresses: Michael.mcfarlane@uhcw.nhs.uk, mmcf1982@doctors.org.uk (M. McFarlane).

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necrosis factor α (TNF-α) levels, leading to reduced appetite. Early satiety can result from gastric compression (ascites, splenomegaly) and delayed gastric emptying [5,7–9]. Maldigestion and malabsorption can result from portal hypertension, with nutrients bypassing the hepatic circulation. Portal hypertension and cholestasis reduce bile production, contributing to fat malabsorption. Pancreatic insufficiency can exacerbate malabsorption, as can the effects of non-absorbable disaccharides: such as lactulose, on the intestinal microbiome. Normal metabolism is significantly affected, with hepatocytes having reduced capacity to store, synthesize and breakdown glycogen. Increased insulin resistance reduces carbohydrate utilisation, this increases gluconeogenesis, using substrates comprising of amino acids and free fatty acids produced by muscle catabolism and lipolysis, leading to sarcopenia and reduced body fat stores [5,7–9].

Malnutrition in cirrhosis leads to poorer quality of life, increased rates of ascites, hepatic encephalopathy, infections, including spontaneous bacterial peritonitis, longer inpatient stays and is independently linked to mortality [7,8,10].

Currently there is no universally accepted malnutrition screening tool for cirrhotic patients. In the UK, the Malnutrition Universal Screening Tool (MUST), is the current National Institute for Health and Care Excellence (NICE) approved screening tool in primary and secondary care [11]. Developed in 2003 by the British Association of Parenteral and Enteral Nutrition (BAPEN), it assesses patients BMI, weight loss over the last 6 months and effects of acute illness [12] (see Fig. 1). It has been validated in several studies, including cancer patients [11–14]. Unfortunately, MUST is less accurate in patients with ascites/fluid retention, as ascites may conceal weight loss occurring from muscle or fat loss. This makes MUST and other tools centred on weight loss and BMI unreliable at identifying malnutrition in patients with cirrhosis, advanced renal failure or congestive cardiac failure. As such, alternatives need to be considered [5].

To address the absence of a simple screening tool, Booi et al. sought to develop one for cirrhosis [5]. It is based on six parameters: recent oral intake; weight loss (over 12 months); body fat loss; muscle loss; fluid retention/ascites and effects on daily activities. These factors were agreed by the American Society for Parenteral and Enteral Nutrition (ASPEN) and the Academy of Nutrition and Dietetics (AND) in a consensus statement, as having the strongest malnutrition links [15]. The Liver Disease Undernutrition Screening Tool (LDUST) (see Fig. 2), was validated against dietitian assessments in 22 outpatients, giving a sensitivity and specificity of 72% and 75% respectively within positive predictive value of 93% [5].

We sought to compare MUST and LDUST screening of cirrhotic inpatients and outpatients to determine whether LDUST could be a more disease specific undernutrition screening tool in these patients, and validated the tool against dietitian assessments.

2. Methods

Fifty consecutive outpatients with cirrhosis were identified from outpatient gastroenterology clinics using the Clinical Results Reporting System (CRRS) at University Hospitals Coventry and Warwickshire (UHCW). To be included they required clinical, radiological or histological diagnosis of cirrhosis. Patients had MUST scores calculated using successive clinic weights. The LDUST form was completed in a researcher's presence. If they required assistance, minimal assistance was defined as the researcher providing clarification, significant assistance was defined as the patient being unable to read or complete the form.

Fifty consecutive cirrhotic inpatients were identified from the gastroenterology ward, medical admission unit and inpatient referrals to gastroenterology at UHCW. For inclusion they required clinical, histological or radiological diagnosis of cirrhosis and have been admitted/referred with a complication of cirrhosis. Patients were excluded if there were no documented weights prior to

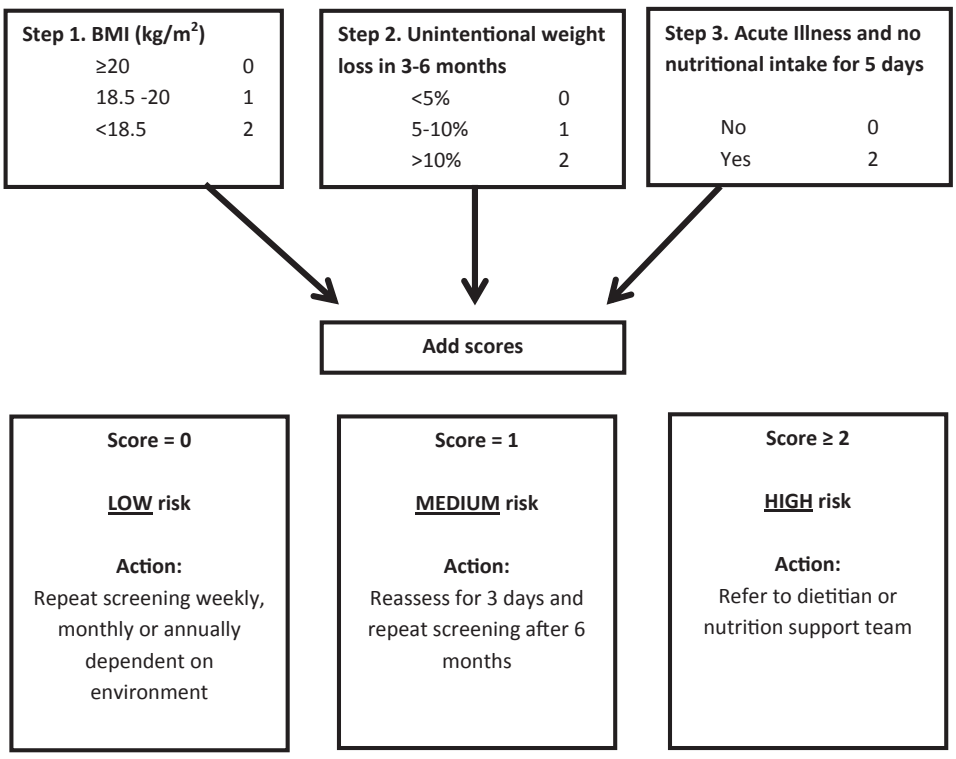

Fig. 1. MUST scoring algorithm. Adapted from BAPEN [12].

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