

Case Report

Nutritional Management of a Patient suffering with Non Alcoholic Steato-hepatitis related Chronic Liver Disease

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Abstract

Liver patients suffer from malnutrition very commonly. It has been observed in many researches that these patients lose their lean body mass, fat mass, muscle strength and thus overall functional capacity. Through adequate diet, these modifiable symptoms can be reduced to some extent. Therefore, present case study was taken to find out nutritional status and nutritional management of a 55 years old male suffering from decompensated chronic liver disease. It was observed that the patient was severely malnourished on the basis of dry body weight, impaired liver function test, presence of jaundice, portal hypertension, ascitis, anorexia, poor dietary intake. The patient was given high calorie high protein diet during hospitalization and was motivated to eat more food. At the time of discharge, his liver function test, creatinine, total protein and haemoglobin were found to be improved with a simultaneous increase in diet intake. Thus timely nutritional assessment and tailored intervention proves fruitful for better outcome.

Keywords: Chronic liver disease, Nutritional management, Diet, Calories, NASH

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Introduction

Chronic liver disease is closely associated with malnutrition with multiple contributing factors. It has been reported in many researches that 20% of compensated liver disease and 50% of decompensated liver disease patients suffer from malnutrition. ^[1] It is measured in form of depleted fat mass and lean body mass. Etiological factors contributing to malnutrition are portal hypertension, ascitis, hepatic encephalopathy. ^[2] Sometimes in case of obesity, loss of lean body mass may be overlooked due to high fat mass and high body mass index (BMI). BMI is a false indicator of body composition many times. ^[3] Timely nutritional assessment and nutritional management may prove an important tool to prevent further morbidity and mortality. By keeping these points in mind, present case was selected to study nutritional status and nutritional management and to find out improvement in patient's status.

Case Description

Chief Complaints at the time of admission:

- A 55 yrs old male was admitted with complaint of worsening abdomen distension x 1 week
- Patient was in altered sensorium with excessive drowsiness
- He was suffering with anorexia and nausea
- He also reported decreased urine output post paracentesis

Medical History: There was no history of diabetes, hypertension, tuberculosis, heart disease and Asthma

Investigations: All routine investigations were done including Complete blood count, Liver function test, Renal function test, Electrolytes and whole body PET CT

Final medical diagnosis was -

- Chronic Liver Disease (Non alcoholic steato hepatitis related), portal hypertension, non bleeder, residual esophageal varices

- Decompensated - ascites (Grade 3 - Severe), Hepatic encephalopathy
- Hepato-cellular Carcinoma in segment 8th of liver
- Acute kidney injury with hepato renal syndrome which was recovering

Nutrition care process for the present case includes:

- Nutritional Assessment
- Nutrition Diagnosis
- Nutrition Intervention
- Nutrition monitoring and evaluation

- **Nutritional Assessment**

- a) Anthropometric measurements: Patient's height and weight were measured and BMI, ideal body weight and dry body weight were calculated as shown in table 1. Dry body weight was calculated ^[4] by subtracting a percentage of weight based upon the severity of ascites (mild 5%; moderate 10%; severe 15%), with an additional 5% subtracted if bilateral pedal edema is present.

Height	173 cm
Weight	63.2 kg
BMI	21.1 kg/m ²
IBW	73 kg
Dry body weight	53.8 Kg

Table 1: Anthropometric measurements of the patient

- b) Biochemical Investigations: These have been presented in table 2. Parameters have been presented both at the time of admission and at the time of discharge with reference values.

Investigation	At the time of admission	At the time of discharge	Normal value
CBC			
WBC	5.55 $10^3/\text{ul}$	4.6 $10^3/\text{ul}$	4.0-10.00 $10^3/\text{ul}$
RBC	2.42 $10^6/\text{ul}$	2.32 $10^6/\text{ul}$	Adult: 3.8 - 4.8 $10^6/\text{ul}$
Hemoglobin (Hb)	7.8 g/dl	12.4 g/dl	13.0-17.0 g/dl
Platelets Count	66 $10^3/\text{ul}$	44 $10^3/\text{ul}$	150-410 $10^3/\text{ul}$
Electrolytes			
Serum sodium	134 mmol/L	141 mmol/L	137.0-145.0 mmol/L
Serum potassium	3.1 mmol/L	3.2 mmol/L	3.5-5.1 mmol/L
Serum Chloride	106 mmol/L	99.7 mmol/L	98.0-107.0 mmol/L
LFT with total protein			
Serum Bilirubin Total	2.5 mg/dL	1.9 mg/dL	0.2 – 1.3 mg/dl
Serum Bilirubin Direct	0.8 mg/dL	0.6 mg/dL	< 0.3 mg/dL
Serum Bilirubin Indirect	1.7 mg/dL	1.3 mg/dL	0.1 - 0.9 mg/dL
SGOT/AST	58.8 U/L	62.2 U/L	15.0 - 46.0 U/L
SGPT/ALT	64.2 U/L	54.2 U/L	13.0 - 69.0 U/L
Serum ALK Phosphatase	139.1 U/L	143.4 U/L	38 - 126 U/L
Serum Total Proteins	8.0 g/dL	8.2 g/dL	6.3 - 8.2 g/dL
RFT			

Blood Urea	135.3 mg/dL	143.5 mg/dL	15.0-45.0 mg/dl
Serum Creatinine	1.8 mg/dL	1.1 mg/dL	0.52 -1.25 mg/dl
Serum Uric Acid	12.7 mg/dL	12.3 mg/dL	2.5 – 6.2 mg/dl
Ammonia	42.0 µmol/L		9.0 - 30.0 µmol/L
Prothrombin time	15.600 Seconds	18.4 Seconds	10.3 - 12.5 Seconds
INR	1.402	1.665	

Table 2: Biochemical investigations of the patient at the time of admission and discharge

c) Clinical Signs have been shown in table 3: Patient was found to have following clinical signs and symptoms that were related to poor food intake and decreased functional capacity.

Anorexia
Muscle wasting
Abdominal distension
Shortness of breath
Fatigue and weakness
Peripheral edema

Table 3: Clinical signs and symptoms

d) Dietary Intake: Patient's 24 hrs. home diet recall was noted as shown in table 4. It was done to find out whether his nutritional needs were fulfilled through oral diet or not.

Time	Meal	Menu	Quantity (g/ml)	Energy (kcal)	Protein (grams)	CHO (g)	Fat (g)	Na (mg)	K (mg)
7 AM	Early morning	Tea	100	48	1.6	7.3	1.5	22	0
8 AM	Break Fast	Breakfast	1 bowl	96.08	3.17	13.8	0.2	0.61	93.3
		Vegetable	100	23.18	0.8	4	0.1	8.8	253
11 AM	Mid Meal	Fruits	100	62.3	0.2	13.1	0.6	1.4	116
1 PM	Lunch	Chapati	2 pc	192	6.2	34	0.8	1.2	189
		Vegetable	100	23.18	0.8	4	0.1	8.8	253
		Dal	30	97	7.1	15.7	0.4	3	380
		Curd	100	60	3.18	3	4	32	130
5 PM	Evening Tea	Tea	100	48	1.6	7.3	1.5	22	0
		Paneer	80	206	15	8	10.4	11	37.6
8 PM	Dinner	Chapati	2	192	6.2	34	0.8	1.2	189
		Vegetable	1 bowl	23.18	0.8	4	0.1	8.8	253
		Salad	1 plate	38	1.4	3.4	0.1	12.6	366
9:30 PM	Bed Time	Milk	1 glass	112	5.2	7.2	6	44	0
		Fat	20	180	0	0	20	0	0
		Sugar	10	40	0	0	0	0	0
		TOTAL		1384.92	54.4	158.8	46.6	177.4	2256.3

Table 4: Mean intake of 3 day's home diet recall of the patient

- **Nutritional Diagnosis**

Problem	Etiology	Symptoms
Inadequate oral intake	Related to poor appetite secondary to ascites and nausea from hepatic dysfunction	As evidenced by a dietary recall showing low protein intake, complaints of abdominal pain, early satiety, and decreased intake over the past week

Table 5: Nutritional diagnosis of the patient

- **Nutrition intervention**

A high calorie high protein diet was prescribed as per standard guidelines for chronic liver disease patients ^[5]

Short term goals:

- To improve & monitor the dietary intake of the patient
- To provide nutritional support according to the clinical signs & symptoms
- To educate about the importance of nutrition in the disease

Long term goals:

- To improve the nutritional status and patient education (in terms of dietary habits)
- To prevent patient from the progression of disease
- To improve the quality of life

Nutritional Requirements:

- Energy: $IBW \times 35$ i.e. $(73 \times 35) = 2555$ kcal
- Proteins: $IBW \times 1.5$ i.e. $(73 \times 1.5) = 109.5$ g
- Carbohydrates: 383.2 g (60% of total calories)
- Fats (sources of fats) = (oil/ghee) = 56.7 ml (20% of total calories)
- Sodium: 2000 mg (2g salt)
- Fluid requirements: 1 to 1.5 L

On the basis of above nutritional needs, diet was provided from the hospital. Nutrient intake from 3 days diet during hospitalization has been presented below in table 6:

3 Days Diet Recall	ENERGY (Kcal)	PROTEIN (grams)	CHO (grams)	FAT (grams)	Na (mg)	K (mg)
DAY 1	1733.4	93.8	128.7	50.9	298.4	1361.1
DAY 2	1966	105.2	150.4	48.7	306.3	254
DAY 3	2492	120.5	174.2	53.9	308	2758
Total	6191.4	319.5	453.3	153.5	912.7	4373.1
Average	2063.8	106.5	151.1	51.6	304.2	1457.7
Percentage of Requirement	80.7	97.2	39.4	91	15.2	48.5

Table 6: Nutrient intake of 3 day's hospital diet

Discharge diet: High calorie High protein diet was recommended at the time of discharge for better recovery of the patient.

Type of diet: Vegetarian

Energy: 2423 kcal

Proteins: 111 g

Carbohydrates: 363.4 g (60% of total calories)

Fats (oil/ghee): 53.8 g (20% of total calories)

Sodium: 2000 mg

Fluid requirements: 1000 – 1500 ml

Food group exchanges in discharge diet have been mentioned in table 7:

Food Groups	No. of Exchange	Energy (kcal)	Protein (grams)	Na (mg)	K (mg)
Cereals	7	672	21.7	4.27	653.1
Pulses	2	194	14.2	6	780
Vegetables	5	207	5.4	34.6	1841
Milk & products	5	360	16.5	125.5	575
Fruits	2	124	0.4	2.8	232
Paneer	50	128	9.4	9	31.7
Nuts	1	182	5.5	0.4	209.7
Dates	1	94	0.7	0.9	234
Lamino GI	6	222	36	-	-
Fat	4	180	0	0	0
Sugar	3	60	0	0	0
Salt	2 tsp	-	-	2000	-
TOTAL		2423	111	2182	4555

Table 7: Food group exchanges for discharge diet prescription

Sample menu: Sample menu of discharge diet has been shown in table 8:

Time	Meal	Menu	Amount (g/ml)
7 am	Morning	Nuts Dates	30 g 30 g
8.30 am	Breakfast	Upma Milk Lamino GI	150 g 150 ml 2 scp
11 am	Mid meal	Fruits	200 g
2 pm	Lunch	Chapati Rice Dal Vegetable Salad Curd	2 100 g 30 g 100 g 100 g 100 g
5 pm	Evening	Roasted paneer Milk Lamino GI	50 g 100 ml 2 scp
8 pm	Dinner	Chapati Rice Dal Vegetable Salad	2 100 g 30 g 100 g 100 g
9.30 pm	Bed time	Milk Lamino GI	100 ml 2 scp

Table 8: Sample menu at the time of discharge

Dietary recommendations

- Take calorie dense food
- Salt restriction (2g/day)
- Limited fluid intake (1 - 1.5 litre/day)
- Daily weight charting
- Input output monitoring
- Small frequent meals

- Manage fat: Use medium-chain triglycerides (MCTs) if fat malabsorption is present. Emphasize healthy fats like seeds, nuts, and avocados

Follow up time and criteria: Follow up will be done after 1 month or before if there is any diet related that will be modified according to the weight, LFT, ascitis, PHTN and compliance of the prescribed diet.

Discussion

At the time of admission, the patient was very drowsy, in altered sensorium, anorexic, abdomen distension. These symptoms were enough to decrease his diet intake to a much significant levels. Therefore it was a very challenging task to fulfill his nutritional needs. His anthropometric measurements showed that although he was in the range of normal body mass index, yet there was a huge gap between his dry body weight and ideal body weight. There was a history of >10% weight loss during last 6 months. It's consequences were depicted in blood picture as well. Patient was found anaemic, thrombocytopenic with impaired renal and liver function test. Fatigue, weakness, anorexia, muscle wasting, peripheral edema were quiet evident. His diet intake was reduced to a significant lower level. Similar profile was reported by other studies as well. [6, 7] Timely nutritional assessment and diet intervention, counseling, motivation brought some positive outcomes in the present case as the patient was discharged on full diet. He was fully conscious, oriented, was able to walk self and responses to the commands were better in comparison to the time of admission.

Conclusion

It is evident from the above case study that timely and appropriate nutrition intervention with motivating counselling can bring about positive outcomes in patient's condition.

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