

Original Research Article

Study of nutritional status and nutritional care in post liver transplant patients

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Abstract

Decompensated liver disease is a leading cause of mortality around the world that can be prevented by liver transplant. Present study aimed at study of nutritional status and nutritional care in post liver transplant patients. A collective data of 30 male and female patients was taken. It was seen that all patients were showing same signs and symptoms such as anaemia, portal hypertension, ascitis and jaundice. Nutritional assessment was done in which 56-57% male and female patients were found at risk of malnutrition. They were provided a high calorie, high protein diet with vitamin C and other micronutrients for faster healing and to prevent post-surgical complications. Majority of the patients showed good diet compliance and presented with better recovery in comparison to those who showed non-compliance to the diet.

Keywords: Liver, Chronic liver disease, Ascites, Jaundice, Cirrhosis, Liver transplant, Sarcopenia, Malnutrition, End stage liver disease, Sclerosis

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Introduction

The liver is the major organ of the body that performs more than 500 vital functions. Some important functions of the liver have been shown as following:

- Albumin Production
- Bile Production
- Filters Blood
- Regulates Amino Acids
- Regulates Blood Clotting
- Resists Infections
- Stores Vitamins and Minerals
- Processes Glucose

Decompensated chronic liver disease is the most common and fatal liver disease. It causes progressive damage to liver functions due to fibrosis and cirrhosis. Cirrhosis is the end stage of chronic liver disease that is characterized with inflammation, nodules formation, vascular problems and accumulation of extracellular fluid. There are a number of etiological factors for development of chronic liver diseases such as toxins, excessive intake of alcohol, infection, autoimmune disorders, genetics etc. With technological advancements in the medical sciences liver transplantation has proved most promising solution for liver cirrhosis.^[1]

Transplant process: A lot of tests are performed for recipient and donor to ascertain positive health outcome. Age, blood type, organ size etc. are matched to ensure compatibility and avoid graft rejection. The recipient is on lifetime immunosuppressants after transplant to avoid rejection.^[2]

Risks involved in a liver transplant: There are some probable risks associated with liver transplant such as graft rejection, infection, impaired liver functions, bile duct related complications, side effects of immunosuppressants.^[3]

Nutrition therapy after transplant: Diet after liver transplant aim to achieve and maintain ideal body weight, while gaining faster recovery and normal liver function. Zinc deficiency, hyperglycemia, loss of appetite, PEM due to prolonged nil per os for many reasons are

some of the problems that should be taken care of. Protein losses due to bleeding and malnutrition increases protein demand to maintain positive nitrogen balance. Low plasma levels of insulin growth factor (IGF-1) have been documented in liver cirrhosis patients in many studies.^[4]

Research methodology

A prospective observational study was planned and conducted on 30 patients admitted at Mahatma Gandhi Medical College and Hospital. Sample selection was done using purposive random sampling technique. Following criteria were taken for patient selection.

Inclusion criteria

- Age between 30 to 70 years of age
- Both males & females
- Patient willing to participate

Exclusion criteria

- Patient < 30 years and 70 > years of age.
- Non cooperative patients.
- Patients suffering from any other serious medical complication.

Data collection was done as per following format -

Part 1: General Information: Patient's general information was noted as per following format.

S.No.	Name	Age	Gender	Education	Working status	Types of activity	Economic status	Marital status
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Part 2: Anthropometric measurements: Nutritional assessment was done by anthropometric measurements. Height was measured using heightometer. Weight was measured using digital weighing balance. Body mass index was calculated by the formula:

Weight (Kg)/ Height (m²)

Waist, hip circumference and mid upper arm circumference were measured using a non-stretchable measuring tape.

Part 3: Biochemical investigations: As patients were taken post liver transplant, who were chronically suffering with decompensated liver disease, therefore, their electrolytes, liver function test, hemoglobin, albumen and platelet counts were noted as shown below

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S.No.	Patient name	Sodium (Na)	Potassium (K)	SGOT	SGPT	Hemoglobin (Hb)	Albumin (Alb)	Platelets (Plt)
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Part 4: Clinical signs and symptoms: Patient's clinical signs and symptoms were recorded from patient's file or by clinical examination of the patient, such as weakness, portal hypertension, abdominal distension, jaundice, ascites, anemia and anything else that was reported by the patient.

Part 5: Dietary history: Patient's 24 hours dietary recall was noted and nutrient intake was compared to the requirements, In this order, adequacy of the diet can be evaluated. Simultaneously, their empty calorie intake was noted using food frequency questionnaire.

Results & Discussion

Data collected has been presented under following subheadings:

1. General information of patients

Parameters	No of patients (N = 30)	Percentage
Age		
19 – 30 years	0	0%
31 – 50 years	16	53.3%
51 – 70 years	13	43.3%
>70 years	2	3.4%
Gender		
Male	23	76.6%
Female	7	23.3%
Marital status		
Married	30	100%
Unmarried	0	0%
Economic status		
LIG	8	26.6%
MIG	13	43.3%
HIG	9	30%
Activity pattern		
Sedentary	11	36.6%
Moderate	17	56.6%
Heavy	2	6.8%

Table 1. Data interpretation for general information of the patients

From overall data of 30 patients, it was observed that there were 23 males i.e. 76.6% and 7 female patients i.e.23.3%. Maximum number of patients were seen between the age of 31-50 year's i.e.53.3%. From economic point of view, 43.3% patients were from middle income group. 56% patients were engaged in moderate activity.

2. Nutritional status of patients: Assessment of nutritional status was done on the basis of anthropometric measurements, biochemical reports. Results obtained have been discussed below:

2.1 Anthropometry: Patients anthropometric data has been presented in table 2.

Parameters	Total no of male patients	Total no of female patients
Mean Height	169	162
Mean weight	69	62
BMI		
Normal (18.5- 22.9 Kg/m ²)	8	5
Underweight (16 - 17.9 Kg/m ²)	1	0
Overweight (23 - 24.9 Kg/m ²)	6	0
Obese (>25 Kg/m ²)	8	2
Waist to hip ratio (WHR)		
<1	11	4
1	8	2
>1	3	2

Table 2: Anthropometric measurement of the participants.

The average height and weight of male patients were seen as 169 cm and 69kg. The average height and weight of female patients were seen as 162 cm and 62 kg. The average BMI of 8 male patients was found with in normal range. Six male patients were found overweight and 8 males were assessed as obese on the basis of BMI. Out of 8, 2 females were obese, rest were in normal BMI range.

2.2 Biochemical data of patients: Table 3 is showing interpretation of the biochemical data of the post liver transplant patients.

Parameters	Total no of male	Percentage	Total no of female	Percentage
Haemoglobin				
< 10	23	76.6%	7	23.4%
12 – 14	0	-	0	-
>14	0	-	0	-
Albumin				
< 3	6	26.2%	1	14.2%
3 – 3.5	10	43.4%	5	71.42%
>3.5	7	30.4%	1	14.2%
Sodium				
< 135	9	39.2%	2	28.5%
135 – 145	14	60.8%	5	71.5%
>145	0	-	0	-
Potassium				
< 3.5	6	26.7%	2	28.57%
3.5 – 5.1	13	56.5%	4	57.14%
>5.1	4	17.4%	1	14.2%
Platelets				
< 80	21	91.4%	6	85.8%
80 – 100	2	8.6%	1	14.2%
>100	0	-	0	-

Table 3: Data interpretation for biochemical assessment.

As seen from the data taken from table 3, all patients were found anemic as evidenced by haemoglobin levels. Hypoalbuminemia was seen in 23.33% patients. Nine patients were seen with low level of sodium i.e. 39.2%, i.e. hyponatremia. Potassium levels were found normal in majority of the patients. Majority of the patients showed thrombocytopenia as 91.4% males and 85.8% females showed low platelet count.

3. **Nutritional Diagnosis:** Nutritional diagnosis was derived as per SGA rating as shown in table 4.

SGA ratings	Total male	Percentage	Total female	Percentage
A	8	34.8%	2	28.5%
B	13	56.6%	4	57.1%
C	2	8.6%	1	14.4%

Table 4: SGA ratings of the patients

Table 4 is showing the subjective global assessment rating for post liver transplant patients. It was seen that 8.6% males and 14.4% females were malnourished, while 56.6% males and 57.1% females were found at risk of malnutrition.

On the basis of nutritional status, patient's requirements were calculated and as per the requirements, diet chart was given as following recommendations with special considerations for certain nutrients:

- Daily weight monitoring
- Always wash and peel if taking fresh fruits and vegetables
- Do not eat cheese made from unpasteurized milk and avoid cheeses with mold
- Only buy small amounts of food products at one time
- Limit sodium intake and sodium containing foods such as papad, chips, namkeen, pickles
- **Carbohydrates:** 50–60% of non-protein energy requirements should be fulfilled by carbohydrate. Glucose infusion should supply 2–3 g/kg body weight per day

- **Fat:** Fat should not be restricted as it is very important to fulfil calorie needs by providing a palatable diet
- **Protein:** Adequate protein intake is important for faster healing of sutures as well as for regeneration of liver cells and to keep body in positive nitrogen balance.

Conclusion

It was found that out of 30, 93.33% patients showed positive outcome post liver transplant. Graft disfunction was not seen in any patient. Medical advancements and increased awareness for right nutrition have improved post -transplant survival dramatically. Present study was planned to study nutritional status of post liver transplant cases. With this aim, 30 male and female patients were selected.

Patient's general information revealed that 23 were males and 7 female patients came for transplant during study period. Majority of them belonged to middle income group and engaged in moderate activity. All patients were married and most of them were between 31- 50 years of age. Anthropometric measurements showed mean BMI as most of the male patients were in overweight or obese category, while females showed normal BMI. All patients were found anemic and low platelet count and low protein profile. SGA grading was found B for 56 – 57% patients, i.e. they were at risk of malnutrition. Diet compliance in most of the patients was found satisfactory which reflected in faster healing of sutures and returning to normal liver function that was evidenced by liver function test, patient's improved mobility and functional status.

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