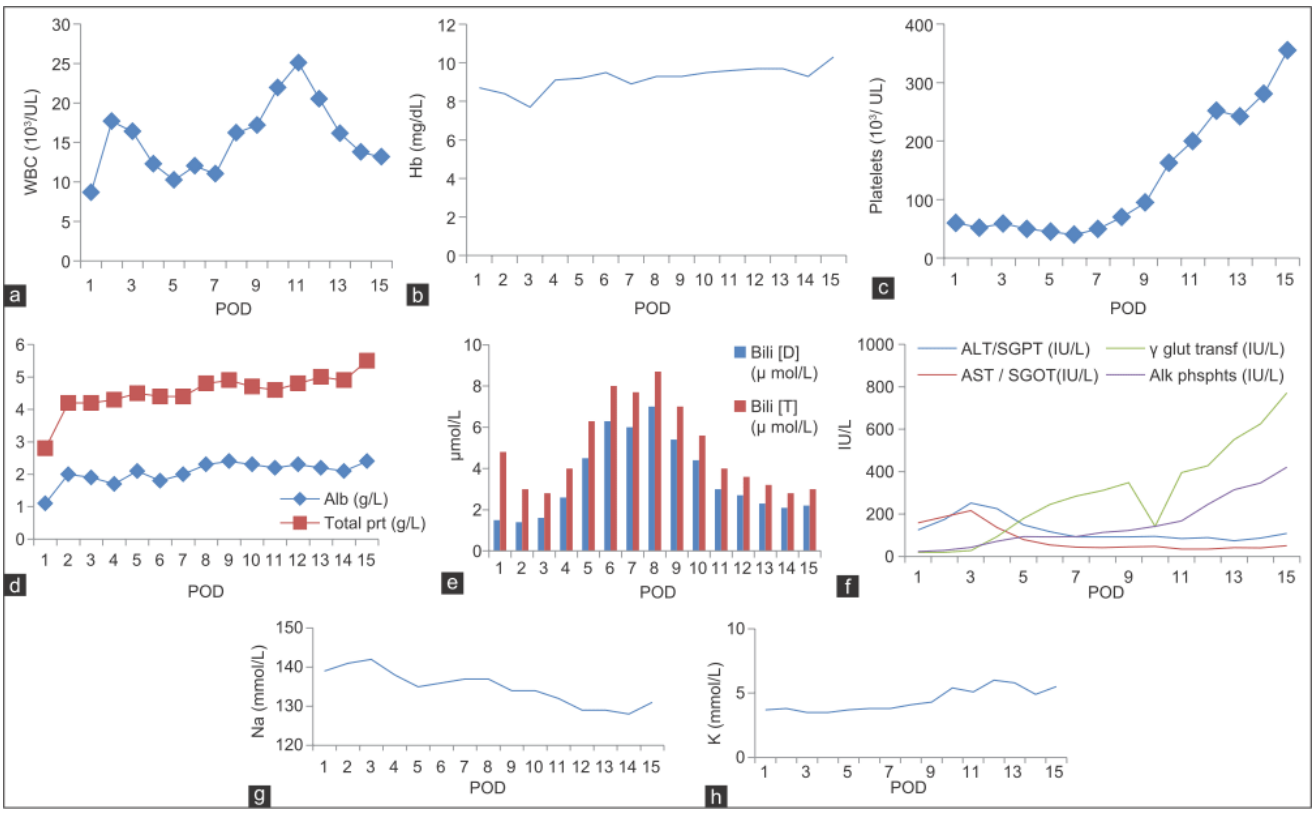


**Figure 2:** Each panel depicts acute post-operative patient profile of WBC (a), hemoglobin (b), platelets (c), albumin and total protein (d), bilirubin (D and T) (e), AST, ALT, γ glutamyl transpeptidase and alkaline phosphates (f), sodium (g), and potassium (h), respectively. Hb: hemoglobin; WBC: white blood cell; Alb: albumin; Bili: bilirubin; AST: aspartate aminotransferase; ALT: alanine aminotransferase; POD: post-operation day

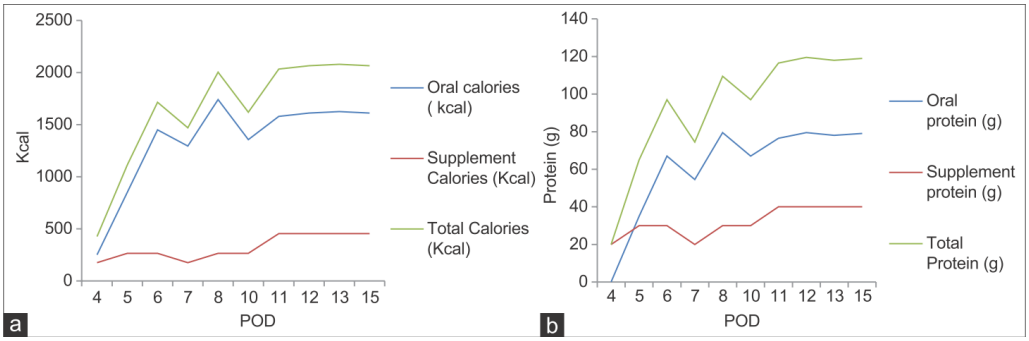


**Figure 3:** Energy (a) and protein (b) intake of the patient during the hospital stay after the transplant. POD: post-operation day

source of infection.

### Chronic post-transplant phase

Gradual improvement in all the biochemical parameters was seen after 3 months of LT [Table 3]. The patient regularly visited the hepatologist after the surgery but never visited the dietician. The patient's intake was 1983 kcal and 78.9 g protein from the oral diet without any nutritional supplement. The recommended intake amounts to 2,280 kcal and 76 g of protein.[4] Hence, patient met 83.9% of calorie requirements.

The patient was not having any GI problem; he was able to perform daily routine functions. The SNAQ score was 16 which showed no significant risk of at least 5% weight loss within 6 months.[11] QOL assessment depicted improvement of all the eight dimensions 3 months after LT [Figure 1].[14] The performance status assessment by ECOG improved from a score of 3 to 1 which indicated that the patient was restricted in physically strenuous activity but was ambulatory and able to carry out work of a light or sedentary nature.[13] Nutrition status assessment is depicted in Table 4. Anthropometric examination through, MAMC[7] showed similar results as in pre-transplant phase, which is mild malnutrition. Triceps measurement improved from severe malnutrition to normal range.[7] SGA scores improved from moderate malnutrition to normal.[8] Body composition analysis depicted higher levels of fat percentage and FFM after 3 months of LT.[10] Hand grip

Table 3: Patients' biochemical profile after discharge

| Days after discharge | Hb (mg/dL) | WBC ($10^3$/UL) | Platelets ($10^3$/UL) | Bil (T) (mg/dL) | Bil (D) (mg/dL) | AST (IU/L) | ALT (IU/L) | Alkaline phosphates | γ glutamyl transferase (IU/L) | Alb (g/dL) | Na (mmol/L) | K (mmol/L) | Cr (mg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 9.5 | 12.02 | 40 | 8 | 6.3 | 54 | 117 | 92 | 245 | 1.8 | 136 | 3.8 | 0.8 |
| 2 | 8.9 | 11.02 | 50 | 7.7 | 6 | 44 | 92 | 94 | 284 | 2 | 137 | 3.8 | |
| 3 | 9.3 | 16.2 | 70 | 8.7 | 7 | 41 | 92 | 113 | 311 | 2.3 | 137 | 4.1 | 0.8 |
| 4 | 9.3 | 17.18 | 95 | 7 | 5.4 | 45 | 92 | 122 | 348 | 2.4 | 134 | 4.3 | 0.8 |
| 5 | 9.5 | 21.93 | 163 | 5.6 | 4.4 | 47 | 95 | | 362 | 2.4 | 134 | 5.4 | 0.8 |
| 6 | 9.6 | 25.6 | 200 | 4 | 3 | 34 | 84 | 167 | 396 | 2.2 | 132 | 5.1 | 0.9 |
| 7 | 9.7 | 20.51 | 252 | 3.6 | 2.7 | 35 | 89 | 245 | 428 | 2.3 | 129 | 6 | 1 |
| 8 | 9.6 | 16.13 | 242 | 3.2 | 2.3 | 41 | 74 | 314 | 552 | 2.2 | 129 | 5.8 | 1 |
| 9 | 9.2 | 8.09 | 185 | 1.5 | 0.9 | 30 | 117 | 82 | 195 | 1.9 | 131 | 4.6 | 0.8 |
| 10 | 10.3 | 10.17 | 355 | 3 | 2.2 | 51 | 109 | 421 | 772 | 2.4 | 131 | 5.5 | 0.9 |
| 12 | 9 | 13.14 | 305 | 2.1 | 1.6 | 52 | 78 | 287 | 733 | 2.2 | 133 | 4.1 | 1 |
| 15 | 9 | 13.19 | 300 | 2.3 | 2 | 105 | 196 | 294 | 737 | 2.3 | 137 | 3.3 | 0.9 |
| 19 | 9.8 | 17.86 | 373 | 2 | 1.7 | 67 | 221 | 325 | 828 | 2.6 | 138 | 3.7 | 0.9 |
| 26 | 11.20 | 15.48 | 301 | 1.0 | 0.8 | 57 | 119 | 213 | 623 | 2.50 | | | 1.0 |
| 33 | 11.30 | 17.37 | 312 | 0.7 | 0.7 | 42 | 86 | 178 | 474 | 2.50 | | 4.0 | 0.8 |
| 34 | 11.70 | 13.27 | 311 | 0.7 | 0.5 | 39 | 83 | 162 | 449 | 2.60 | | | |
| 41 | 12.40 | 14.80 | 326 | 0.6 | | 44 | 91 | 169 | 382 | 2.90 | 135 | 5.3 | 0.9 |
| 53 | 11.30 | 13.05 | 328 | 0.3 | 0.2 | 38 | 69 | | | | | | |
| 54 | 12.20 | 13.22 | 308 | 0.5 | 0.4 | 55 | 102 | 160 | 283 | 2.70 | | | |
| 72 | 10.90 | 22.63 | | 0.6 | 0.2 | 29 | 42 | 220 | | 4.90 | 146 | 4.2 | 1.3 |
| 88 | | | | 0.4 | 0.3 | 23 | 32 | 116 | 107 | 3.10 | 140 | 4.8 | |

Hb: haemoglobin; WBC: white blood cell; Alb: albumin; Bili: bilirubin; AST: aspartate aminotransferase; ALT: alanine aminotransferase; Cr: creatinine

Table 4: Comparison of nutritional status in pre-transplant and chronic post-transplant phase (3 months after LT)

| | Pre-transplant | Post-transplant (3 months after transplant) |
|---|---|---|
| Anthropometric evaluation | | |
| Weight (kg) | 73.9 | 78.6 |
| Height (cm) | 176 | 176 |
| Triceps[7] (cm) | 0.56 | 1.5 |
| MAMC[7] (cm) | 22 | 21.2 |
| SGA[8] | | |
| SGA[8] (score) | 6 | 2 |
| Body composition analysis by bioelectrical impedance analysis[9] | | |
| Weight (kg) | 72.55 | 76.6 |
| Fat (%) | 22.5 | 28 |
| Fat mass (kg) | 16.3 | 21.45 |
| FFM (kg) | 56.25 | 55.15 |
| Muscle mass (kg) | 53.35 | 52.3 |
| TBW (%) | 53.5 | 47.6 |
| BMI | 23.2 | 24.5 |
| Bone mass (kg) | 2.90 | 2.85 |

MAMC: mid-arm muscle circumference; SGA: subjective global assessment; FFM: fat-free mass; TBW: total body water; BMI: body mass index; LT: liver transplantation

strength (both hands) showed severe malnutrition similar to pre-transplant phase.[9]

## DISCUSSION

A high incidence of malnutrition has been seen in LT recipients.[5,14,15] Accurate estimation of the nutritional status of patients with ESLD presents a major challenge due to fluid retention found in patients and the effect of liver function on protein synthesis.[16] Malnutrition has also been associated with poor surgery outcome and increased morbidity and mortality. In India, LT is a relatively new area, and there is a lack of data about the general and nutritional profile of patients undergoing LT. It is essential to identify and correct nutritional deficiencies in LT recipients. Hence, this case report provides information on the day to day nutrition profile and the medical nutrition therapy of a LT recipient with the aim of improving outcomes.

A gradual improvement in the nutrition, biochemical, and functional parameters was seen after 3 months of transplant. Nutrition assessment by SGA, triceps, and body composition analysis showed better nutrition status 3 months after LT. During the acute post-transplant phase, continuous observation by medical and nutrition experts helped to fulfill nutritional needs through various feeding routes. However, the difference in calorie and protein intake in chronic post-transplant phase is due to lack of counseling from nutrition experts. Hence, proper nutrition monitoring is required during all phases of transplant to maintain the overall health of the patient.

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