Nutritional management for post-stroke sarcopenia risk and multi-comorbidities patient via Percutaneous Endoscopic Gastrotomy: A case report and review of the literature

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Introduction

Stroke was the second leading cause of death globally in 2019, with cases in Europe projected to increase by 27% by 2047 (Feigin et al., 2022; Wafa et al., 2020). Risk factors include modifiable ones, such as hypertension, and non-modifiable factors like age, race, and genetics (Kuriakose & Xiao, 2020). Ischemic stroke results from blood vessel blockage, causing tissue damage and symptoms like hemiparesis and aphasia (Kuriakose & Xiao, 2020; Musuka et al., 2015). Post-stroke malnutrition, affecting 20% of patients, is often linked to dysphagia (42% of cases), which can lead to sarcopenia. Nutritional assessment is critical, and percutaneous endoscopic gastrostomy (PEG) may be necessary to improve nutritional status (Sguanci et al., 2023; Banda et al., 2022; Mas et al., 2020).

Case description

Patient diagnosis and clinical history

The patient was 78 years old and male. His main pathologies were hypertension, dyslipidaemia, vascular epilepsy and ischaemic stroke. On physical examination, the patient had right hemiparesis with loss of mobility, dysphagia and a state of global aphasia. The timeline of the clinical parameters and the nutritional assessment and interventions are shown in Figure 1.

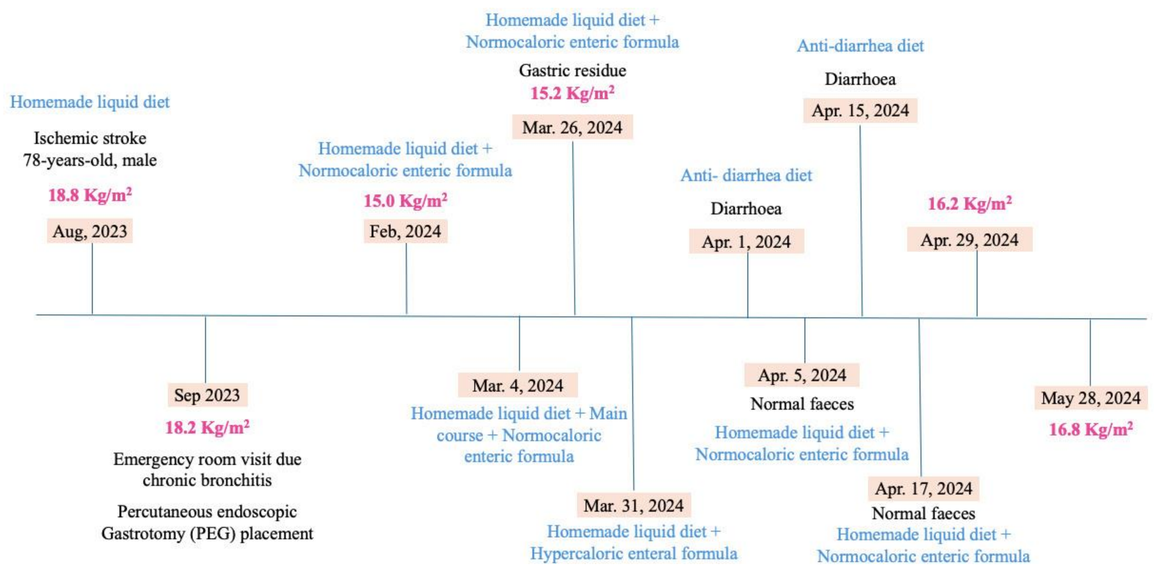

Figure 1- Timeline of nutritional status, dietary parameters and clinical features.

Nutritional assessment

Table 1- Anthropometric parameters of patient for 10 months of follow-up.

Anthropometric parameters	1st month (August, 2023)	2rd month (September, 2023)	7th month (February, 2024)	8th month (March, 2024)	9th month (April, 2024)	10th month (May, 2024)
Mid-upper-arm circumference, cm (Normal value < 24 cm) (31)	26.0	25.4	22.3	22.5	23.5	24.0
Calf circumference, cm (Normal value < 31 cm) (18)	31.5	31	26	27	28	27.8
Estimated weight (Kg) (16)	55.7	53.9	44.4	45.0	48.0	49.6
Body Mass Index, kg/m² (Normal weight 22-27 kg/m²) (17)	18.8	18.2	15	15.2	16.2	16.8

Table 2 - Laboratory biochemical parameters of patient for 10 months of follow-up.

Laboratory parameters (normal range)	1st month (August, 2023)	7th Month (February, 2024)	9th month (April, 2024)
Glucose, mg/dL (74-106 mg/dL)	97	184.9	77
Urea, mg/dL (19-49 mg/dL)	14	21	18
Creatinine, mg/dL (0.70-1.30 mg/dL)	0.5	0.8	0.59
Hemoglobin, g/dL (13.7 -17.2 g/dL)	10.9	12.2	12.1
Hematocrit, % (40-50%)	32	37.2	35
MCV, fL (83-98 fL)	86	90.2	90
MCH, µg (28-32 µg)	29	29.6	31
MCHC, g/dL (32-36 g/dL)	34	32.8	35
RDW, % (11.6-14.1%)	16	15.8	14.6
Neutrophils (1.50-6.50 X 10^9/L)	3.10	5.3	2.09
Eosinophils (0.02-0.67 x 10^9/L)	0.40	0.05	0.08
Basophils (< 0.13 x 10^9/L)	0.04	0.02	0.01
Lymphocytes (1.10-3.5 x 10^9/L)	1.32	2.01	1.54
Monocytes (0.21-0.92 x 10^9/L)	0.52	0.32	0.46
Platelets (170-430 x 10^9/L)	350	278	198
Sodium, mmol/L (136-145 mmol/L)	136	137	141
Potassium, mmol/L (3.5-5.1 mmol/L)	4.3	4,3	3.4
C-reactive protein, mg/dL (< 0.50 mg/dL)	2.09	0.34	2.53

MCV- Mean Corpuscular Volume; **MCH -** Mean Corpuscular Hemoglobin; **MCHC -** Mean Corpuscular Hemoglobin Concentration; **RDW -** Red Cell Distribution Width;

Discussion

Anthropometric and biochemical parameters

Table 1 shows the patient initially had a BMI of 18.8 kg/m², classifying them as underweight (<22 kg/m²), a status that persisted (Lipschitz, 1994). By February 2024, both mid-upper-arm and calf circumferences were below reference values, indicating continued underweight and sarcopenia (<24 cm and <31 cm, respectively) (Tang et al., 2020; Cruz-Jentoft et al., 2019).

Table 2 shows some abnormal values. Only one elevated glucose and one low potassium value were recorded, which is insufficient for conclusions. Regarding urea and creatinine, the patient's protein-rich diet makes inadequate intake an unlikely cause for low urea levels. Reduced muscle mass, common in sarcopenia, is a more probable explanation, leading to lower metabolites such as those from the urea cycle and creatinine (Peng et al., 2021; Kameda et al., 2021). Low haemoglobin and haematocrit levels suggest anaemia (<13.0 g/dL in men) (Vmnis, 2011; Zhang et al., 2021). Elevated C-reactive protein (CRP) levels may be due to adjacent epilepsy or prolonged post-stroke inflammation, although clinical evidence is insufficient to confirm these links (Zhong et al., 2019; Noonan et al., 2013).

Malnutrition and energy needs

According to the GLIM criteria, the patient was classified with moderate malnutrition (stage 1) due to a 20% weight loss over more than 6 months (Cederholm et al., 2019). Initially, there was a calorie deficit, but the addition of a normocaloric enteral formula provided a recommended calorie surplus of 250-500 kcal per day, leading to healthy weight gain (Yoshimura et al., 2021).

Conclusion

In conclusion, regular nutritional assessments and dietary adjustments have proven to be essential for improving clinical outcomes in post-stroke patients. Effective communication between professionals is then crucial for personalised care, highlighting the importance of the multidisciplinary approach.

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