

## **SUPPLEMENTARY DATA**

### **List of the BOCADOS-IC investigators**

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### **Supplementary recommendations**

#### **Specific nutritional recommendations on nutrition in malnourished patients with HF**

The nutritional objectives in older people with heart failure are the same as those for older people with malnutrition, generally with a high calorie and protein intake. A caloric intake of 30 to 40 kcal/kg/d is recommended, with a distribution of 20% to 25% proteins (1.2-1.5 g/d), 55% to 60% carbohydrates (preferably complex) and 20% to 25% fat (Calvo Aguirre J.J, Gómez Busto F, Artaza Artabe, I. Nutritional support protocols in nursing homes. Glosa, 2012. Pages 91-98).

#### **GENERAL RECOMMENDATIONS**

- Eat 4 to 6 times daily (breakfast, mid-morning, lunch, snack, dinner, and before bed).
- Chew well and eat slowly, taking as much time as you need.
- Eat meals in a quiet environment, sitting at the table. Don't skip any meals.

- Prepare the foods you like the most that are tastiest to you.
- If you have a poor appetite, try to ALWAYS start with a protein food, regardless of whether you make a single high-density dish or 2. Do not base your diet on soups or broths; they will only provide you with water, not nutrients.
- Add raw olive oil to lunches and dinners in vegetables, sauces, slices of bread, etc.
- Avoid eating low-fat or low-calorie foods.

### MAKING HYPERCALORIC AND HYPERPROTEIN SNACKS

- Enrich 1 liter of whole milk with a glass of skimmed milk powder and use this milk to make smoothies with flavorings, such as chocolate, coffee, vanilla or fruit syrups.
- A glass of orange juice, vanilla ice cream and sugar.
- A glass of natural yoghurt or milk, honey or sugar, peach in syrup or banana.
- A glass of yoghurt or fresh cheese, banana with strawberries and honey or sugar.
- A glass of milk or yoghurt or fresh cheese with nougat or chocolate ice cream.
- A glass of orange juice, banana, strawberries and sugar.
- A glass of milk or yoghurt with muesli, cereal, apple, sugar, or honey.
- A glass of milk or yoghurt with cookies, banana, sugar, or honey.

### TIPS TO ENRICH YOUR DIET IN CALORIES AND PROTEINS

| Food and dishes                                                  | To increase calorie intake                                                                                                                                                                                                   | To increase proteins                                     |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| <i>Milk, yoghurt and fruit juices</i><br><br><i>Enrich with:</i> | -Sugar, honey, jam, marmalade, cocoa powder<br>-Instant cereals (type 8 kinds of cereal, multifruit), breakfast cereals, chopped corn flour<br>-Biscuits, muffins, bread (sliced, toast, etc)<br>-Nuts or dried fruit powder | - Liquid or powdered milk<br>-Nuts or dried fruit powder |

|                                                                |                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                            |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Soups and broths</i><br><br><i>Enrich with:</i>             | <ul style="list-style-type: none"> <li>-Tapioca meal, maize flour</li> <li>-Grated cheese, milk powder</li> <li>-Olive oil</li> <li>-Croutons or bread slices with olive oil</li> <li>-Nuts or dried fruit powder</li> </ul>                                                                                                                                                                          | <ul style="list-style-type: none"> <li>-Grated cheese, milk powder</li> <li>-Grated or diced egg</li> <li>-Nuts or dried fruit powder</li> </ul>                                                                                           |
| <i>Consommés, creams, or purees</i><br><br><i>Enrich with:</i> | <ul style="list-style-type: none"> <li>-Whole or semiskimmed milk, powdered milk, liquid cream, buttermilk, buttermilk powder, liquid cream, buttercream</li> <li>-Creamy or melted cheese; grated, powdered, diced and shredded.</li> <li>-Corn flour</li> <li>-Croutons or bread slices with olive oil</li> <li>-Nuts, crushed or powdered</li> <li>-Olive oil, butter</li> </ul>                   | <ul style="list-style-type: none"> <li>-Liquid or powdered milk</li> <li>-Grated cheese, milk powder</li> <li>-Cooked crushed egg</li> <li>-Cooked minced chicken</li> <li>- Nuts, crushed or powdered</li> <li>-Crushed pulses</li> </ul> |
| <i>Various desserts</i><br><br><i>Enrich with:</i>             | <ul style="list-style-type: none"> <li>-Liquid caramel</li> <li>-Liquid or powdered milk, condensed milk, cream, liquid cream, butter.</li> <li>-Nuts, crushed or powdered</li> <li>-Dried fruits (sultanas, prunes, etc)</li> </ul>                                                                                                                                                                  | <ul style="list-style-type: none"> <li>-Liquid or powdered milk</li> <li>-Dried fruits and nuts, chopped, crushed or powdered</li> </ul>                                                                                                   |
| <i>Meat and fish**</i><br><br><i>Enrich with:</i>              | <ul style="list-style-type: none"> <li>-Breading, battering, stewing</li> <li>-Soaking in milk before cooking</li> <li>-Chop or grind in vegetable dishes, salads, sauces, soups, creams, etc.</li> <li>-As a filling in omelets, potato, aubergine, courgette, etc.</li> <li>-In stews and vegetable stews</li> <li>-Use chorizo or ham sofritos with pulses, pasta, potatoes, rice, etc.</li> </ul> |                                                                                                                                                                                                                                            |

\*If you have diabetes or glucose intolerance, avoid sweet products and use sweeteners.

\*\*Especially pork, lamb, veal, tuna, salmon, sardine, anchovy, herring

## EXAMPLES OF MENUS

### *BREAKFAST*

- A glass of whole milk: add powdered milk, sugar, honey, instant cereals, or cocoa.
- Choose and toggle between the following options:
  - 2 slices of cereal, seed or raisin bread, or sliced bread.
  - 3 biscuits.
  - 3 tablespoons of cereals.
  - 1 serving of cake or 2 muffins (preferably homemade).

You can add oil, jam, butter, quince, cheese spread, cocoa cream, etc.

### *LUNCH AND SNACK*

- Option 1: sandwich (minimum half a bread roll) with 1 of the following options:
  - Cold meat (cooked ham, turkey breast, chicken breast, etc). Serrano ham.
  - Cheese or fresh cheese.
  - Canned: tuna, sardines, mussels, etc.
  - Tortilla stick.
- Option 2: (choose at least 2 options from the following):
  - A glass of milk or a dairy dessert (flan, custard, Greek yoghurt, rice pudding, etc).
  - A piece of natural fruit in syrup, cooked, roasted, or crushed.
  - A handful of nuts, 3 or 4 ounces of chocolate.

## *FOOD AND DINNER*

Preferably a single dish, with a protein food and accompaniment.

- Single dish:

1. Protein food (choose 1 of the following options):

- Meat: a beef steak, stewed meat, chicken breast, pork loin, meatballs, etc.
- Fish (3-4 servings per week).
- 2 to 3 servings of blue fish (salmon, sardines, etc) and 1 to 2 white fish (cod, conger eel, hake, squid, cuttlefish, mussels, monkfish, etc).
- 2 eggs to which you can add tuna, ham, cheese, shrimp, etc. They can be prepared cooked, fried, scrambled or in an omelet. Avoid consuming raw or undercooked eggs.

2. Garnish/accompaniment:

- 3 days a week: vegetables with potatoes.
- 2 to 3 days per week: legumes cooked with vegetables or vegetables you like, adding rice and a little broth.
- 1 to 2 days per week: pasta or rice. Add sauces, grated cheese, etc.

- Dessert (choose 1 of the following options):

- A piece of natural fruit or fruit in syrup.
- A Greek yoghurt or dairy dessert.

- Bread.

- Olive oil (2 tablespoons).

### 1. **Oral nutritional supplementation (ONS) protocol:**

Medical treatment teams were instructed to consider prescribing 1 to 2 units per day of oral nutritional supplements under the following specific objective criteria:

- Severe malnutrition or high risk defined by a Mini Nutritional Assessment Short-Form score (MNA-SF < 7 points).
- Body mass index (BMI < 20 kg/m<sup>2</sup>) and/or documented unintentional weight loss > 20% within the previous 6 months.
- Objective barriers to standard oral intake (eg, severe social isolation, clinical dysphagia, or persistent anorexia).
- *Supplement characteristics:* Standard formulas were hypercaloric, hyperprotein, and **strictly low-sodium** to prevent fluid overload. Specific adaptations were mandatory for comorbidities: low-carbohydrate formulas for patients with diabetes mellitus, and reduced protein/phosphorus formulas for patients with advanced chronic kidney disease.

### 2. **Monitoring and adherence strategies:**

- **Follow-up schedule:** face-to-face core evaluations scheduled at baseline, 3 months, and 6 months, matching routine outpatient cardiology consultations.
- **Adherence enforcement:** patients assigned to the intervention group received structured **biweekly telephone follow-up calls** from the research team to reinforce dietary guidelines, resolve barriers, and monitor adherence.
- **Adherence assessment:** formal validated therapeutic adherence questionnaires were administered at the 3- and 6-month visits.

### 3. **Physical exercise recommendations:**

In alignment with the pragmatic nature of the trial, physical exercise was not restricted to a single rigid, center-supervised routine. Instead, treating physicians prescribed individualized physical activity following the European Society of Cardiology (ESC) Guidelines for heart failure. This consisted of tailored, progressive aerobic activities (eg, walking) adapted to the patient's baseline functional status, which was objectively tracked using the SARC-F, FRAIL scale, and Barthel Index at baseline, 3, and 6 months.

## **Supplementary list of variables**

### **1.- BASELINE VARIABLES**

#### Demographic and clinical variables

Date of birth

Inclusion date

Sex

#### Personal history

Hypertension

Hyperlipidemia

Smoking

Alcoholism

Diabetes mellitus

Previous ischemic heart disease

Previous myocardial infarction

Previous coronary revascularization

Previous moderate/severe valve disease

Active cancer

Chronic obstructive pulmonary disease

Previous stroke

#### Heart failure characteristics

Approximate time since onset of heart failure

Previous admissions for heart failure

Number of previous admissions for heart failure in the last 6 months

Date of last admission for heart failure

Functional classification (New York Heart Association)

History of atrial fibrillation

Etiology of heart failure (ischemic, hypertensive, valvular disease, idiopathic/alcoholic dilated cardiomyopathy, others)

Devices (pacemaker, cardiac resynchronization therapy, implantable cardioverter-defibrillator).

### Electrocardiogram

Rhythm: sinus, atrial fibrillation, atrial flutter, others

QRS: narrow, bundle branch block, paced

### Echocardiogram

Date

Left ventricular ejection fraction

Telediastolic and telesystolic volumes

Interventricular septum

Left atrial volume/dimension

Mitral regurgitation > grade II

### Pharmacotherapy

Diuretic

Angiotensin converting-enzyme inhibitors/angiotensin receptor blockers

Sacubitril/valsartan

Beta-blocker

Mineralocorticoid receptor antagonist

Sodium-glucose cotransporter 2 inhibitors

Digoxin

Statin

Ivabradine

Vericiguat

Intravenous iron

Levosimendan cycles

### Scales

FRAIL: baseline and 6 months

BARTHEL: baseline

Baseline Minnesota: 3 and 6 months

MNA-SF: baseline 3 and 6 months

SARC-F: baseline, 3 and 6 months

Baseline Charlson Index score

### Biochemical variables

Hemoglobin (g/dl)

Creatinine (mg/dl)

Sodium (mEq/L)

Potassium (mEq/L)

C-reactive protein (mg/dl)

Total cholesterol (mg/dl)

Triglycerides (mg/dl)

Total proteins (g/dl)

Albumin (g/dl)

Prealbumin (g/dl)

Ferritin (mg/dl)

Transferrin saturation (%)

Number of leukocytes per  $\mu$ l

Number of lymphocytes per  $\mu$ l

N-terminal pro-B-type natriuretic peptide (pg/ml)

Estimated glomerular filtration rate-CKD-EPI (ml/min/1.73 m<sup>2</sup>)

Alanine aminotransferase (U/l)

Aspartate aminotransferase (U/l)

Total bilirubin (mg/dl)

### Anthropometric parameters (baseline and 3 and 6 months)

Weight (kg)

Height (cm)

Tricipital fold (mm)

Mid-brachial circumference (cm)

Arm muscle perimeter (cm): according to the Jelliffe equation:  $PMB = CMB - (\pi \times PT)$ , in cm.

## **2.- NUTRITIONAL SUPPLEMENTS YES/NO**

## **3.- MORBIMORTALITY (AT 6 MONTHS)**

Death from any cause and time since randomization

Cardiovascular death and time since randomization

Admission for heart failure and time since randomization

Admission for any reason and time since randomization

Death from any cause or admission for heart failure and time since randomization

SUPPLEMENTARY FIGURES

Figure S1. CONSORT flow diagram

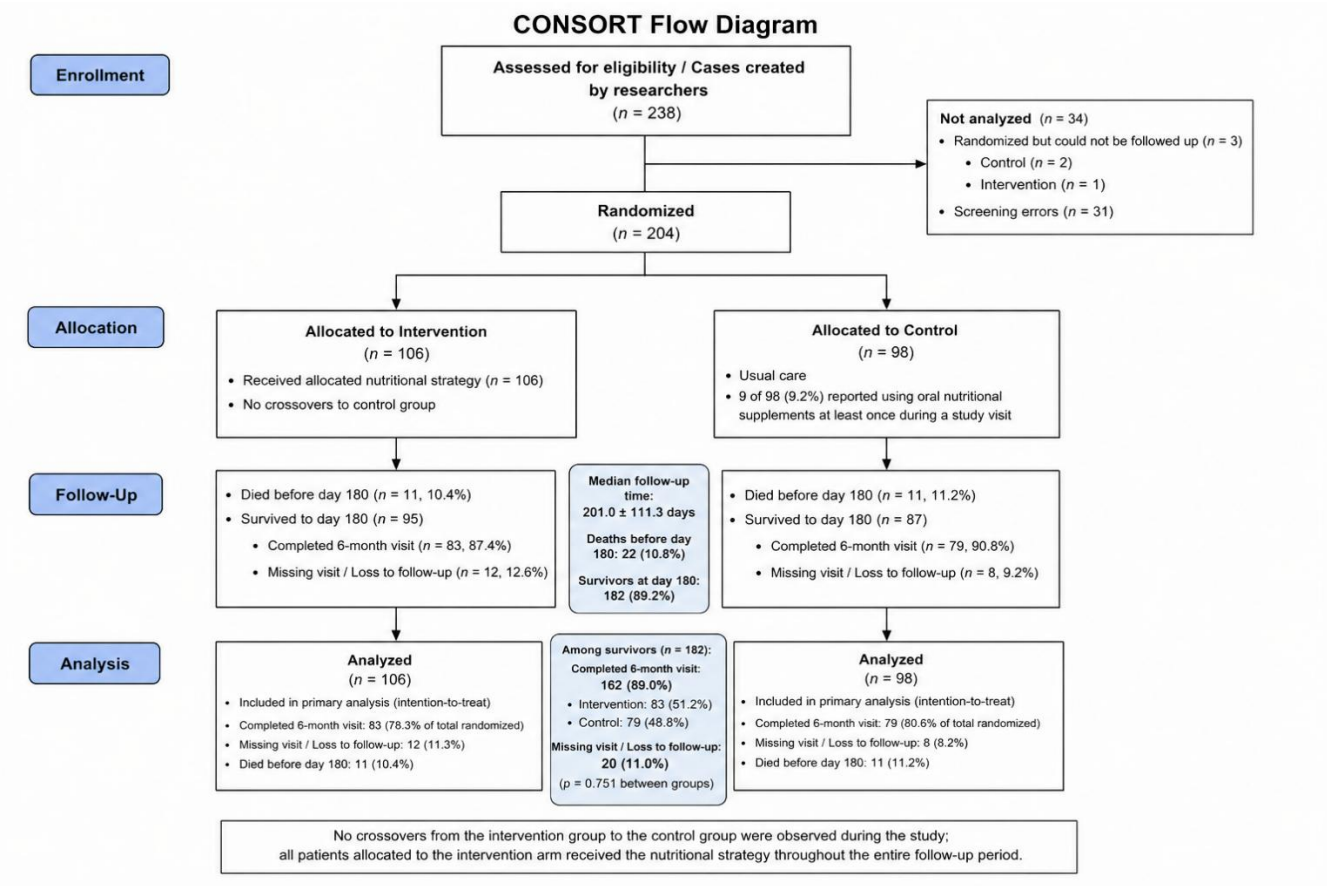


Figure S2. Changes in anthropometric parameters and scales

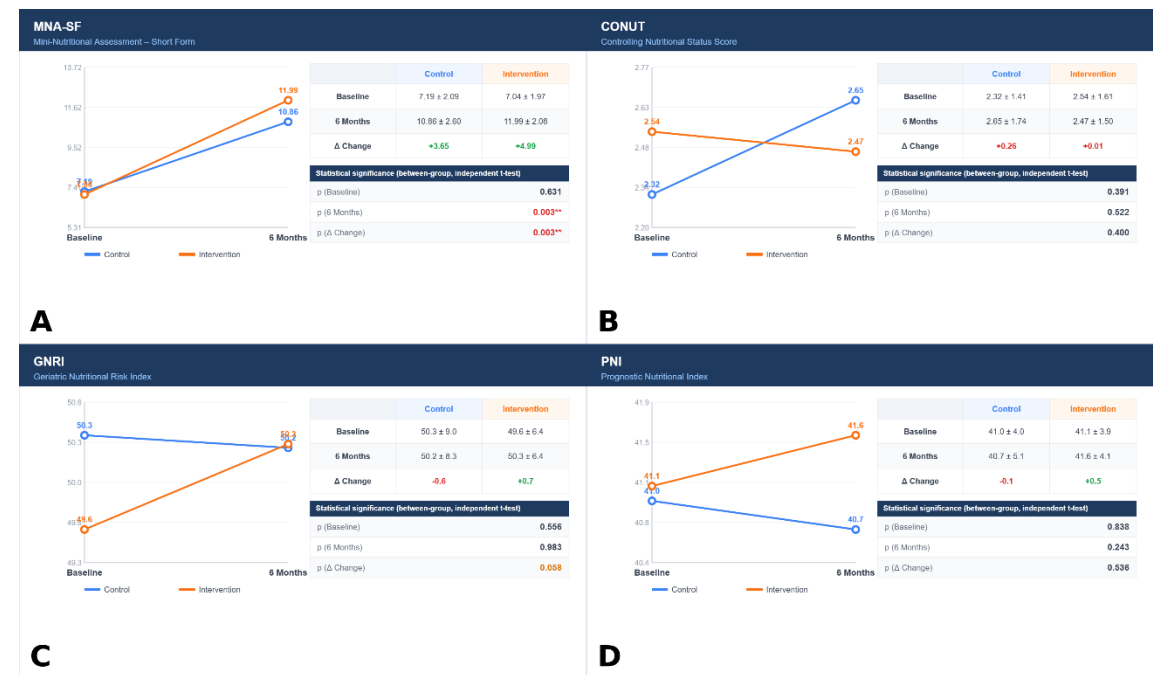


Figure S3. Changes in anthropometric and nutritional parameters

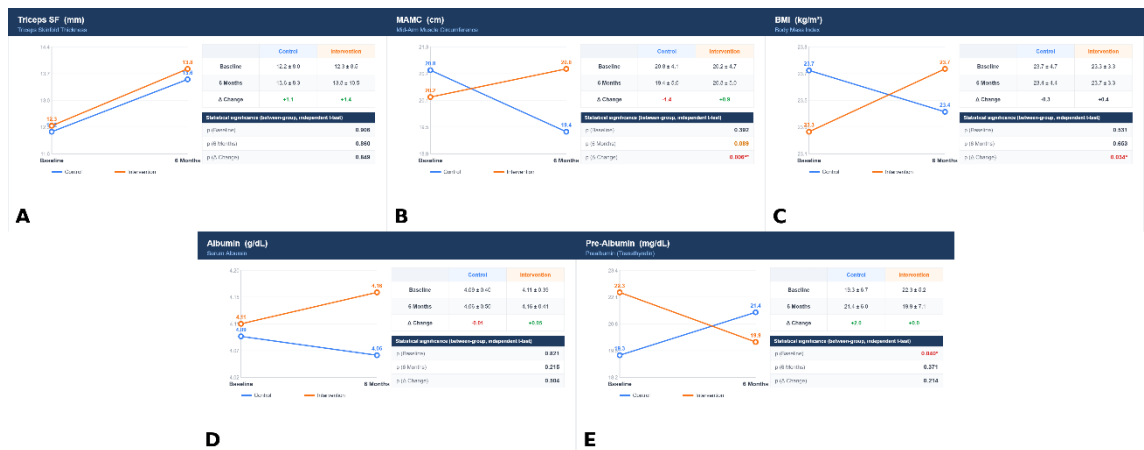


Figure supplementary 4. Changes in clinical scales

