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Abordaje nutricional en pacientes hospitalizados con Covid-19

Nutritional approach in patients hospitalized with Covid-19

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SUMMARY

Introduction: Nutritional support is a central pillar of comprehensive treatment. The recommendations suggest starting with protein supplements and enteral nutrition specific for respiratory distress.

Objectives: To characterize patients with nutritional risk admitted by COVID-19, describe nutritional procedures, and assess the impact of admission on nutritional status.

Material and methods: Observational, descriptive and retrospective study of admissions by COVID-19 from March 15 to April 25, 2020 Inclusion criteria: income > 3 days and PCR, protein and albumin values at admission and discharge. Computer tools: FarHo® and HCI® del. Statistics: SPSS®.

Results: 45 patients in the study, 55% men with an average age of **65 years.** The average values of protein and albumin at entry and discharge were in range, with a slight decrease for the high values, especially of albumin. (p>0.05). The average number of days of admission is **7.32 days.** 40% were patients with nutritional risk. Nutritional intervention was carried out on 46% of the patients and 50%managed to increase the protein figures at discharge. The differences are not statistically significant. (p>0.05). There are no significant differences between the values in the entry and discharge over time (p>0.05).

Discussion: We should consider protocolizing a correct approach to hospital malnutrition in our center and systematize nutritional care in this vulnerable population.

Conclusions:

1. Forty% of the patients admitted for COVID-19 presented nutritional risk.
2. The nutritional interventions carried out consisted of providing hypercaloric and hyperprotein supplements and specific enteral diets for respiratory failure. The differences in protein and albumin, at admission and discharge are not significant.
3. Time in hospital for COVID has no effect on the nutritional status of patients.

KEYWORDS

Nutritional Status

COVID-19

INTRODUCTION

At present, a pandemic has been declared worldwide, caused by a virus of the Coronavirus family, which has not been found in humans before.

The most frequent symptoms are fever and respiratory symptoms. In the most severe cases, they can cause pneumonia, severe acute respiratory syndrome, kidney failure, and even, death.

The usual recommendations for not spreading the infection are good hand and respiratory hygiene and complete cooking of meat and eggs. Avoid close contact with anyone who shows signs of a respiratory condition, such as coughing or sneezing[1].

There are currently 205,905 cases of people affected in Spain, with more than 22,000 deaths, according to Ministry of Health figures updated to 24 April 2020[2]. There are many re-

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commendations and clinical guidelines issued by the Ministry on prevention and control, patient management, and measures for vulnerable groups (dialysis, oncology, and institutionalized elderly). The update on drug therapy to combat the disease is in full swing and there are several open clinical trials worldwide with the firm goal of finding the treatment that shows the greatest clinical efficacy[3,4,5,6].

The vast majority of scientific societies in the world are focusing their efforts on issuing recommendations regarding the pandemic. With regard to nutritional therapy, the Spanish Society of Endocrinology and Nutrition (SEEN) has issued several recommendations to the general population (vitamin D, physical exercise, healthy menus to avoid weight gain, treatment of diarrhoea)[7].

The Official General Council of Associations of Dietitians has also prepared the *"Document of Nutritional Recommendations for the Spanish population in view of the COVID-19 health crisis"*[8]. Nutrition recommendations are issued to patients with IDOC in all care areas (from mild symptoms at home to critical patients admitted to intensive care units). It also gives guidelines on healthy shopping, and advice for pregnant and nursing women[8].

Given the current situation in Spanish hospitals, which have seen an increase in healthcare activity, it is especially interesting to know the nutritional approach to patients admitted with COVID infection. Hospital malnutrition in Spain is 80%%, if in addition in most cases they are patients of advanced age, vulnerable population and with previous pathologies, the scenario becomes even more complicated. The high nutritional risk is due to increased requirements for severe acute inflammatory conditions and difficulty in meeting them due to hyporexia and feeding difficulties[9].

The recommendations made by the General Council of the Colleges of Dieticians-Nutritionists can be listed in[8]:

1. Nutritional support should be one of the central measures of comprehensive treatment for patients with IDOC-19.

2. Most current guidelines recommend early assessment of nutritional risk for these patients and setting nutritional support goals.

3. Although WHO has included initiation of enteral nutrition within 24-48 hours of ICU stay, according to a Cochrane review, the low quality of evidence does not make it clear whether early enteral nutrition (within the initial 48h), compared to late enteral nutrition (after 48h), affects the risk of mortality within 30 days, feeding intolerance, gastrointestinal complications, or pneumonia. For its part, ESPEN suggests that nutritional therapy should be considered after a 48-hour stay in the ICU.

4. The indicators to be monitored include mainly **energy and protein** and the maintenance of fluid balance. Based on indirect evidence, an oral diet versus enteral or parenteral nutrition is generally recommended, and it is recommended to be given according to the severity of the disease, at a rate of **20 ~ 30 kcal/kg/d**. Based on a Cochrane review, it is not clear that prescribing low calorie nutritional support is a beneficial approach in terms of mortality (in ICU or at 30 days), or length of ICU or hospital stay. Most guidelines consider the protein requirement to be adequate in the range of **1.2 to 2.0 g/kg/day**. Severe patients have muscle atrophy due to increased protein catabolism, which affects survival and prognosis.

5. Due to the characteristics of the subjects admitted (patients >70 years old, loss of consciousness, poor oral care, prone position, gastro-oesophageal reflux) the risk of bronchoaspiration and loss of airway protection should be considered.

6. Because microbial dysbiosis was identified in several patients with COVID-19, it is possible that the use of **prebiotics or probiotics** could prevent secondary infection by bacterial translocation.

Indirect evidence from a Cochrane review suggests that there are uncertainties in whether or not critical patients should be supplemented with **selenium** to enhance their immune system.

Indirect evidence from a Cochrane review suggests that there is moderate evidence that **glutamine supplements** reduce the rate of infection and days of mechanical ventilation, and low quality evidence that glutamine supplements reduced the length of hospital stay in severely ill patients. However, they appear to have little or no effect on mortality risk and length of stay in the ICU. The effects on the risk of serious side effects were unclear.

In reference to the nutrient or compound that helps to combat COVID, they state that it is unlikely that for the management of COVID-19, it is an option to boost the consumption of the nutrients indicated by the 'European Food Safety Authority' (EFSA) as nutrients with a health declaration approved in relation to their contribution to the normal functioning of the immune system (copper, folates, iron, selenium, vitamin A, vitamin B12, vitamin B6, vitamin C, vitamin D and zinc. Therefore, their consumption should NOT be encouraged for this purpose. The use of any other nutrients or other compounds called nutraceuticals, including ferulic acid, lipoic acid, spirulina, N-Acetylcysteine, glucosamine, beta-glucans, or elderberry, to help fight the virus has not been proven effective. This conclusion holds even after careful review of a review article on potential dietary interventions in coronavirus[8].

Similarly, it is NOT recommended that you eat any herbs that promise to help fight the coronavirus. Using indirect evidence of SARS, a 2012 Cochrane review concludes that the use of Chinese herbs from traditional medicine did not provide benefits in this condition in terms of mortality, and the remai-

ning possible beneficial effects (symptom improvement) were questioned due to the low quality of the evidence[8].

The Spanish Society of Endocrinology and Nutrition (SEEN), suggests an estimated nutritional requirement of 25-30 Kcal/Kg of weight and **1.5 g protein/kg/day**[10]. In addition, it is recommended **from the time of admission**, HIGH NUTRITIONAL DENSITY DIET and HYPERPROTEIC SUPPLEMENTARY VALUE IN 2-3 intakes/day, which provides at least 18 grams of protein per intake. If tolerance is low, titrate protein modules. They suggest contacting the Nutrition Unit (not always available in all hospitals) to adapt the treatment to the particular conditions (poorly controlled diabetes mellitus, dysphagia, kidney disease etc)[9].

IF REQUIREMENTS ARE NOT MET despite nutritional supplementation (assess every 48-72 hours), the SEEN recommends:

1. Assess whether you need enteral nutrition in addition to oral or complete nutrition: by means of hypercaloric and hyperproteic formulas adjusting requirements and if respiratory distress, to evaluate the hypercaloric and hyperproteic formula specific for the distress.

2. Assess the need for parenteral nutrition if nutrition is not possible or does not meet nutritional requirements (e.g., due to the need for prone positioning or inadequate gastrointestinal tolerance).

The pandemic has forced an exemplary reaction from all health professionals who have been immersed in a new, unknown disease. As such, they have been adapted to the protocols and recommendations issued by the Ministry of Health[2] and the Spanish Drug Agency for drug treatment with certain antivirals, antimicrobials, corticoids and new anti-IL6[molecules 11]. There are several clinical trials being carried out in our country in relation to COVID-19 therapy. The Spanish Ministry of Health's Clinical Trials Registry lists 51 trials[12].

The population most vulnerable to infection are patients over 65 years old with previous pathologies (respiratory, cardiac, cancer, immunosuppression)[1,2] and by entity, it is also a population especially sensitive to malnutrition. Therefore, the patient's history on admission must include a detailed record of nutritional status and an assessment of the need for protein supplements or artificial nutrition·.

The need to evaluate the nutritional status of the population admitted by COVID is presented, as well as the nutritional support treatment provided and to analyze the evolution of the patients in order to have a firm objective of action in the hospital environment.

OBJECTIVES

- Quantify and characterize patients with nutritional risk admitted by COVID-19.
- Describe the nutritional procedures performed on patients with nutritional risk.
- To assess whether admission for COVID-19 has an impact on the patients' basal nutritional status

MATERIAL AND METHODS

Descriptive and retrospective observational study of all patients admitted to the Garcia Orcoyen Regional Hospital of the Navarra Health Service with positive test for COVID-19 during the period from March 15 to April 25, 2020.

The Estella Health Area is located in the west of Navarre and provides coverage to a population of 64,328 inhabitants, distributed in 136 municipalities that are grouped into 8 Basic Health Areas (Estella, Villatuerta, Allo, Ancín-Améscoa, Los Arcos, Viana, Lodosa and San Adrián). The reference hospital is the Garcia Orcoyen Hospital, which belongs to the Navarra Health Service and has just over 100 beds.

In the health area of Estella, 21% (13,906 inhabitants) of the total population registered is over 65 years old.

During the period from March 15 to April 25, 2020, more than 60 patients have required hospital admission and treatment for COVID-19.

The study population will be all those patients who have required specialized care in the period described above. As criteria for inclusion they must be met: hospital admission with PCR test for COVID, admission for more than 3 days, protein and albumin analysis on admission and discharge, feasibility of monitoring therapeutic history, with evolutionary monitoring. Patients who were positive for CRP did not require admission and were attended from primary care while maintaining isolation in their homes are excluded. The reason for this is the difficulty in monitoring developments from the hospitalised area.

They will be analysed as quantitative variables: age, protein and albumin at entry (g/L), and at discharge (g/L). They were analysed as qualitative variables: sex, ICU admission, nutritional intervention, type of nutritional intervention and outcome.

The analysis of nutritional status will be performed by measuring the analytical value of protein and albumin in blood (g/L) on admission and discharge of the patient, taking into account the length of hospital stay.

The following software was used to obtain the data: The Government of Navarra's FarHo® and HCI® pharmaceutical dispensing and validation programme for access to all evolutionary notes during admission, analyses, prescriptions and follow-up on discharge. Statistical analysis is performed using SPSS® version 25.

RESULTS

A total sample of 60 patients admitted to the Hospital who had received some treatment for COVID-19 in the study period from March 15 to April 25, 2020 was obtained. 15 patients were excluded. The sample was divided into 20 women (44.4%) and 25 men (55.5%).

The average age recorded is **65 years**. The average age for women is 65 and for men is 66.

To analyze nutritional status, analytical values of protein and albumin were measured at entry and discharge. The average values of protein and albumin are shown in Table 1. In both cases the average values are in the range, with a slight decrease for the high values, especially in the case of albumin. (p >0.005).

The average number of days is **7.32 days.**

Characterization of patients with nutritional risk

Of the total sample, 40% were considered patients with nutritional risk. The population characteristics to be noted were: 74 years old (higher than the average sample of patients admitted by COVID), 8 were women (53%), the average number of days of admission was 9.25 days. Nutritional intervention was performed in 46% of the patients.

Statistical analysis was performed using T student for related tests to assess differences between analytical values for protein and albumin at admission and discharge in patients at nutritional risk and p values of 0.931 and 0.428 were obtained. Therefore, the difference in values is not significant, so it cannot be related to hospital admission.

Nutritional interventions consisted of oral protein supplements (57%) and enteral nutrition in more specific cases (43%) mostly of respiratory failure.

The nutritional contributions in each case are shown in table 2.

The average length of stay in hospital for patients considered to be at nutritional risk was 9.25 days.

Twenty% of these patients were admitted to the ICU, with an average stay of 31 days (20-45). The total number of patients admitted to the ICU during this period had low protein and albumin values: 63.2 and 34.9 g/L (mean values).

Fifty% percent of the patients who were given nutritional supplementation managed to increase their protein numbers at the end of their admission. Despite this, the average value of protein and albumin after admission is lower than before. The differences between pre- and post-admission test values were evaluated by T student in all those patients who had received some type of nutritional intervention. The differences are not statistically significant. (p > 0.05). This variation in the figures cannot be related to any factor.

The outcome for the population at greatest nutritional risk is shown in **Figure 1.**

Most of the patients admitted to the Garcia Orcoyen Hospital in treatment for COVID-19 and at nutritional risk were discharged with home isolation guidelines. One of the patients required subsequent admission, another was referred to another hospital centre, and another required admission to the ICU. Three of the patients in the study were exitus.

Effect of income from COVID on the population's nutritional status: Relationship of variables with time.

Pearson's correlation coefficient is performed to correlate the protein and albumin variables before and after admission.

For protein (g/L), a correlation coefficient of 0.733 is obtained and for albumin (g/L), 0.693. The correlation is positive.

Table 1. Average protein and albumin values (g/L).

	Protein (g/L)	Albumin (g/L)
At the entrance	67.85	37.05
At discharge	67.25	36.03
Range	64-83	35-52
p-value(*)	0.455	0.059

* no statistical significance.

Table 2. Nutritional contributions provided.

	Presentation	Taste	Heat density (kcal/mL)	Kcal NP/gN2	Prot	HC	Lip	Na/k (meq/unit)	Fiber (g/100mL)	Osm (mOs/l)
Protein supplements	Bottle 200mL	Vanilla Cocoa	1.6 (320/unit)	77/1	25%	39%	36%	5/10	No	510/540
Respiratory Insufficiency	500mL bottle		1,52	129/1	17%	28%	56%	28/25	x	384

The differences between before and after values are reflected in table 3.

Table 3. Analytical values of patients at nutritional risk.

	Average protein (g/L)	Average albumin (g/L)
Prior to admission	62.96	34.01
After admission	58.91	30.60
P value(*)	0.128	0.117

* no statistical significance.

There are no statistically significant differences between the values at entry and discharge over time. Time cannot be related as a factor of variation in nutritional status.

Figure 2 shows the evolution of protein figures at admission and discharge in chronological order of days of admission. **Figure 3** corresponds to the evolution in the albumin figures.

Of all the patients admitted by COVID to the García Orcoyen Hospital between March 15 and April 25, 2020, 75% of the patients were discharged and the destination was their home (including isolation measures and home treatment), 11% were exitus, 7% required readmission, and 2% were transferred to another centre (hospital or geriatric).

DISCUSSION

This study allows us to describe the nutritional status of patients who have been admitted to our centre with COVID-19. It can be seen that this is a vulnerable population and that nutritional status needs to be considered as a pillar of treatment.

The values available at this time in our center to give notion of the nutritional status are only the absolute values of protein and albumin. It is also considered necessary to have weight and height measurements in order to have an anthropometric analysis of the patient. In any case, protein values at income may be sufficient to provide the nutritional supplements recommended by the guidelines[7,8,9].

The nutritional status of all patients admitted with low protein value needs to be assessed and, if necessary, additional dietary supplements provided to restore optimal status as much as possible. In this sense, of all the patients admitted in the study period, the percentage of patients who

Figure 1. Outcome after admission for IDOC in population with higher nutritional risk.

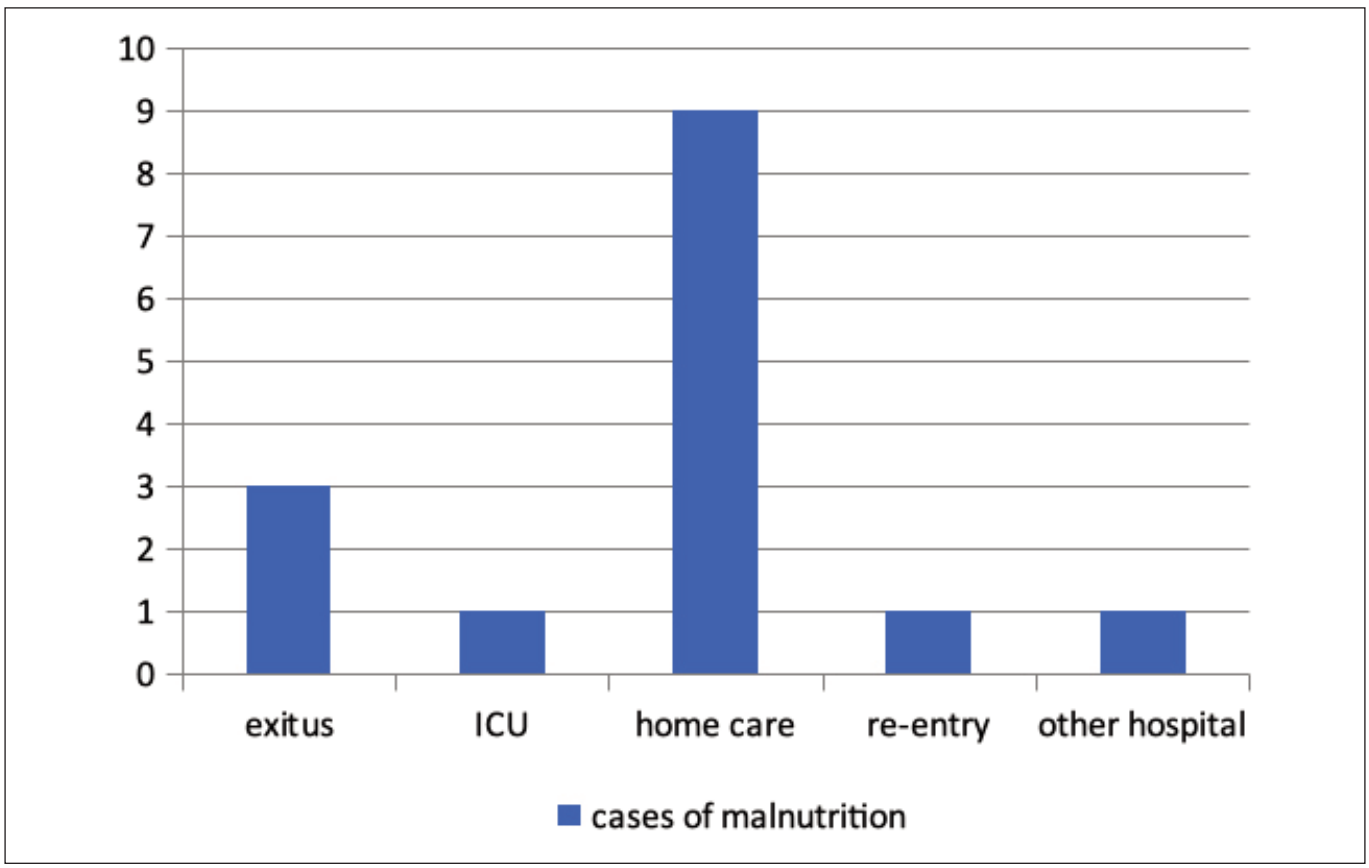


Figure 2. Evolution of proteins on admission and discharge of COVID patients.

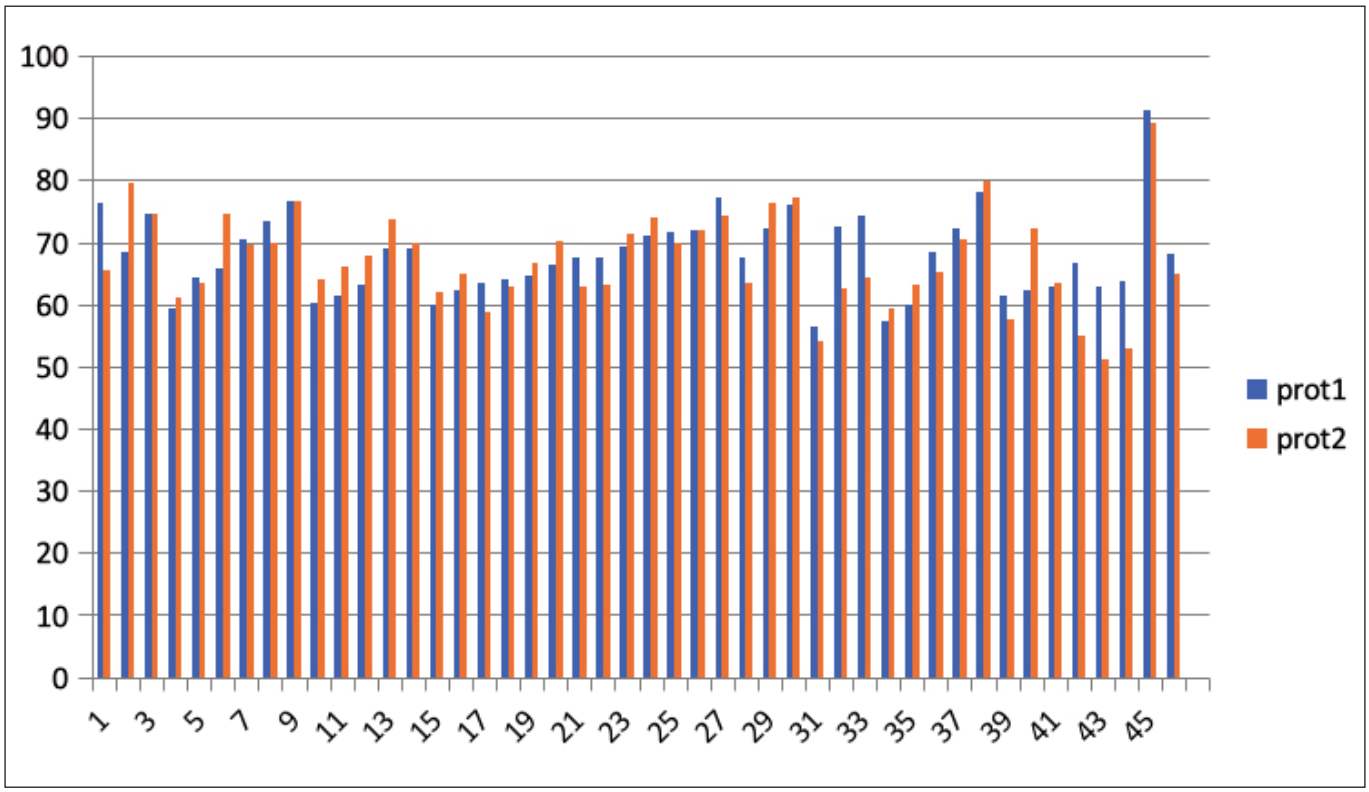


Figure 3. Evolution of albumin values on admission and discharge in COVID patients.

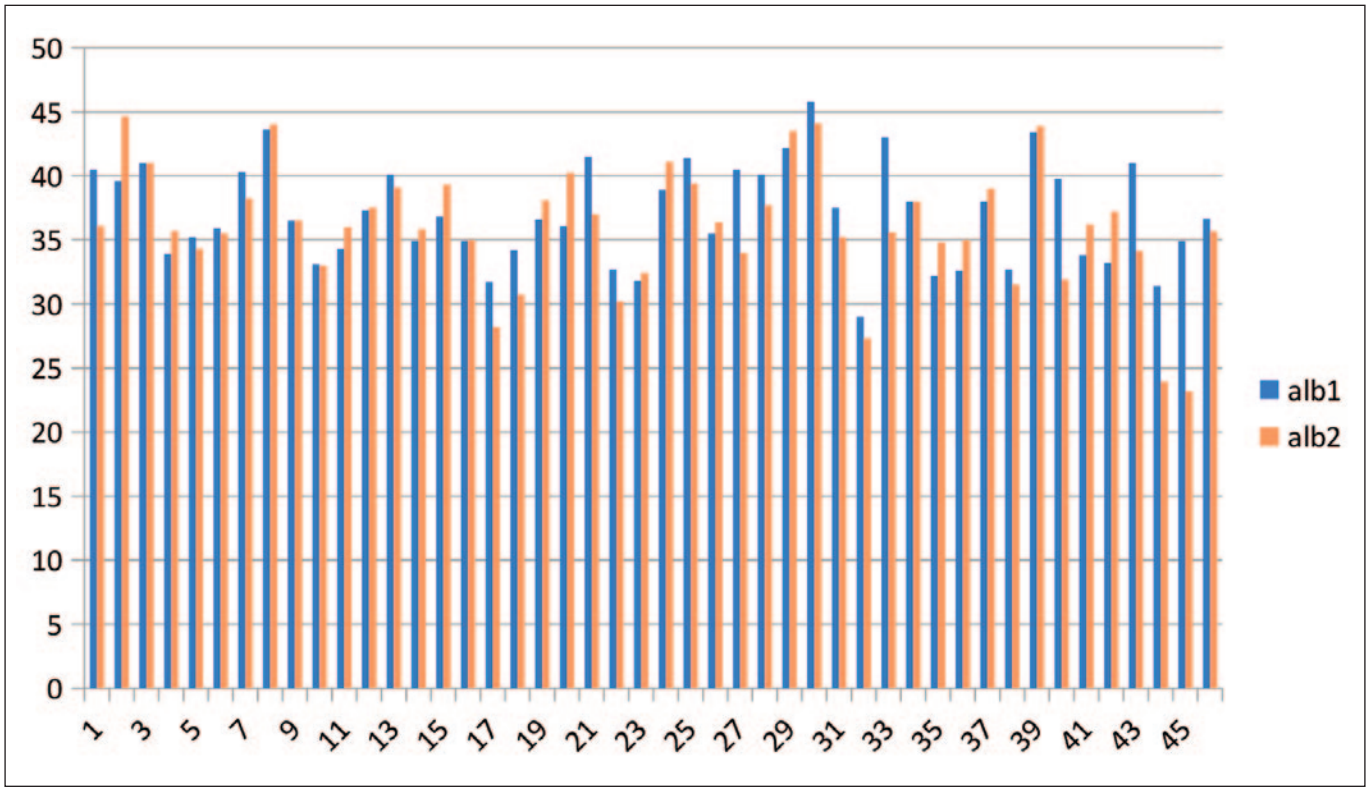
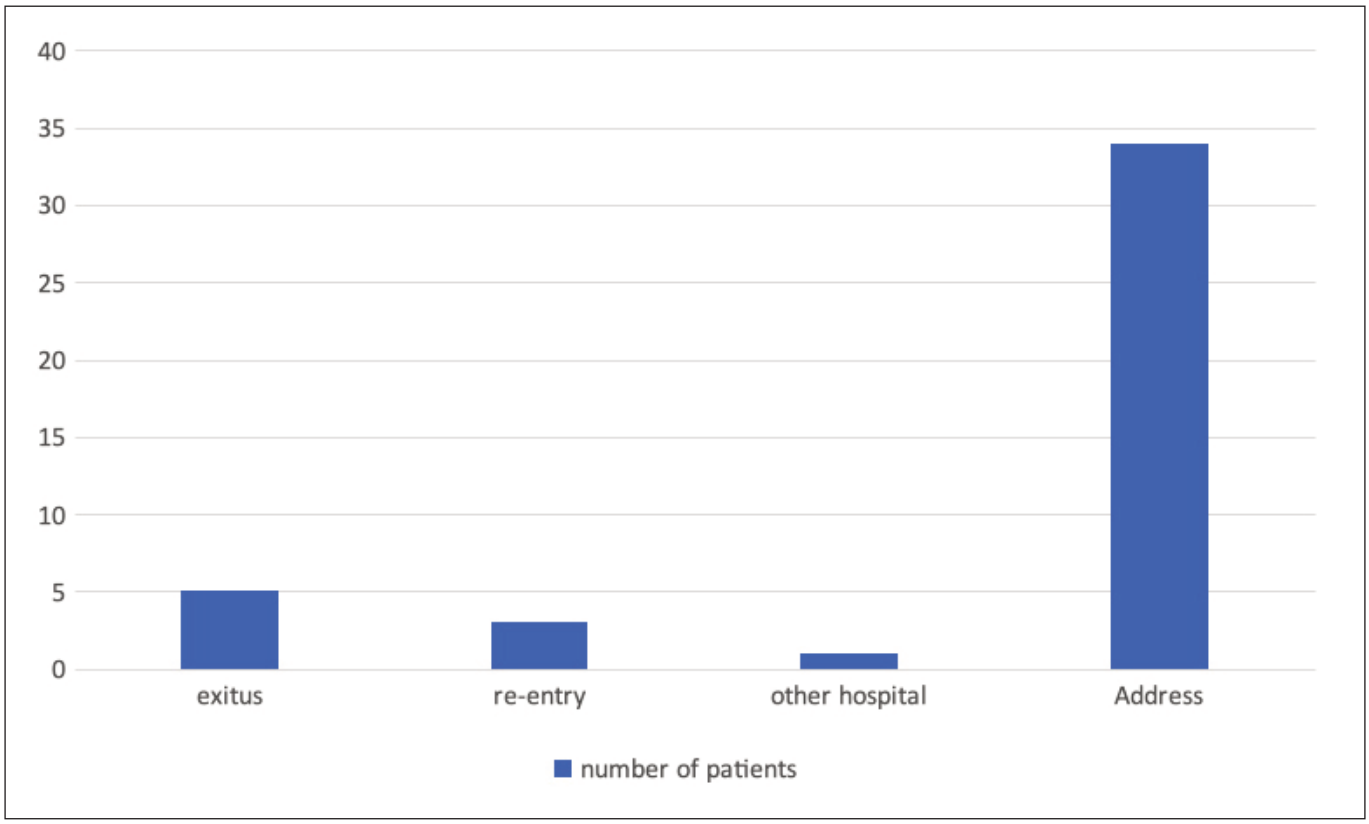


Figure 4. Outcome after entry by COVID in the sample studied.



have received contributions is not the whole. As a present objective, we should consider protocolizing a correct approach to hospital malnutrition in our center.

More studies are needed to evaluate the correlation of nutritional status (completeness) with days of admission. In our sample, there are more notable differences, especially in albumin decrease values related to the passage of time.

CONCLUSIONS

From our experience and according to data from the study, the following conclusions can be drawn:

1. About 40% percent of patients admitted for COVID-19 are at nutritional risk. The average age of this at-risk population is 74 years old and the majority of them are women, with an average income of 9.25 days. In all these cases, nutritional risk was measured as the value of protein and albumin at entry and discharge, with no significant differences between the two values. Most patients were discharged with home isolation guidelines. Minority, the remaining destinations were: exitus (30%), extended ICU, readmission and referral (10%)
2. The nutritional interventions carried out consisted of supplementing the diet with hypercaloric and hyperprotein supplements (1.6 kcal/ml, 25% protein, 39% HC, 36% lipids) and specific enteral diets for respiratory failure (1.52 kcal/ml, 17% protein, 28% carbohydrates and 56% lipids). About half of these patients managed to increase their protein numbers at the end of their admission. The differences in values at entry and discharge are not statistically significant.
3. It cannot be said that hospital admission for COVID has any effect on the nutritional status of patients.

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