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Brief report

Benefits of early specialized nutritional support in malnourished patients☆

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ABSTRACT

Introduction and objective: Disease related malnutrition (DRM) is highly prevalent in Spain, affecting 23% of in-hospital patients, and is associated with clinical complications. Specialized nutritional support (SNS) can reduce these complications.
Material and methods: Prospective study carried out in standard clinical practice conditions to test if SNS during the first 5 days of hospitalization, or subsequently, was associated to a lower length of stay or reduced complications in patients with a NRS-2002 score ≥ 3 points.
Results: In the group of patients who initiated early SNS, the length of stay was 8.83 days shorter than in the group with a later introduction (95% CI 3.55–14.10); nevertheless, the higher prevalence of male and oncological patients in this group could have impacted the results. A tendency towards a statistically significant lower mortality rate and a reduced amount of total complications was described.
Conclusion: The early introduction of SNS (within the first 5 days of hospitalization) in patients with DRM was associated with a 32.4% reduction in the length of stay.

Beneficios del soporte nutricional especializado precoz en pacientes con criterios de desnutrición

Palabras clave:
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Complicaciones

RESUMEN

Introducción y objetivo: La desnutrición relacionada con la enfermedad (DRE) presenta una prevalencia del 23% en el medio hospitalario español y se asocia a complicaciones clínicas. El soporte nutricional especializado (SNE) puede reducir estas complicaciones.
Material y métodos: Estudio prospectivo en condiciones de práctica clínica habitual que compara la reducción de la estancia y las complicaciones en pacientes con NRS-2002 ≥ 3 puntos que recibieron SNE durante los 5 primeros días de ingreso (precoz) o posteriormente.
Resultados: El grupo con SNE precoz presentó una estancia media 8,83 días inferior al grupo con introducción tardía (IC 95% 3,55-14,10), si bien este grupo mostró un predominio de pacientes varones y con enfermedad oncológica que pudo influir en los resultados. Se describió una tendencia no estadísticamente significativa a la reducción de la mortalidad y las complicaciones totales.
Conclusión: La introducción precoz (primeros 5 días) del SNE en DRE se asoció a una reducción del 32,4% de la estancia.

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Introduction

Disease-related malnutrition (DRM) is a highly prevalent disease within the hospital environment. According to the series, between 20 and 50% of patients admitted in Spanish hospitals have DRM depending on the population studied and the assessment tool used.[1] To date, only a national multicenter study has been published, the PREDyCES study,[2] which described that 23% of patients admitted to Spanish hospitals meet malnutrition criteria according to the NRS-2002 screening tool.[3] DRM is associated with a worse clinical outcome, longer hospital stay and higher costs.[4] In summary, the main clinical consequences of this entity relate to DRM inducing a delayed callus and wound healing, the appearance of bedsores, increased incidence of respiratory infections and surgical wounds, and decreased muscle mass and strength, which involves changes in respiratory and heart function and even death.[4] The PREDyCES study described that malnourished patients resulted in higher average hospital stays and costs when compared to normally nourished patients, and that this was more pronounced in patients who became malnourished during admission, doubling the stay and costs compared to normally nourished patients.[2] Specialized nutritional support (SNS) has proved effective in reducing complications associated with DRM,[5,6] and not all types of nutritional support can be considered equivalent; it has been described that any nutritional contributions below what is required leads to the development of DRM.[7,8] When prescribing and monitoring this type of treatment, the professionals with more expertise are usually Endocrinology and Nutrition specialists, compared to international standards and doctors who are not specialized in Endocrinology and Nutrition.[9]

Objectives of the study

- *Primary endpoint:* to determine, if applicable, any clinical benefit (defined as decreased hospital stay) associated with an early SNS plan (within the first 5 days of hospitalization) prescribed and monitored by a specialist in endocrinology and nutrition compared to a delayed establishment of the same, in patients with nutritional risk at admission, defined as a score greater than or equal to 3 points in the NRS-2002 test.
- *Secondary endpoints:* to determine, if applicable, any clinical benefits (defined as reducing morbidity and mortality) associated with an early SNS plan (within the first 5 days of hospitalization) prescribed and monitored by a specialist in endocrinology and nutrition compared to a delayed establishment of the same, in patients with nutritional risk at admission, defined as a score greater than or equal to 3 points in the NRS-2002 test.

Material and methods

Study design

Prospective study in routine clinical practice performed at the Hospital San Pedro de Alcantara (HSPA), Caceres, Spain. A randomization of patients into groups with early and delayed SNS onset was not considered ethical, therefore, their allocation to both groups was performed according to the SNS's request date (before or after the fifth day of admission).

Those who had a NRS-2002 score equal or higher than 3 points at admission, for whom SNS was requested and who had given consent to the publication of the results were considered candidate patients. Those patients admitted for procedures whose average expected stay was less than 2 days (performing percutaneous endoscopic gastrostomy) and being directly admitted into the Intensive Care Unit (ICU) were excluded. The services that participated in the study were those available at HSPA.

We define the intervention group as that in which the SNS had been initiated in a period shorter than 5 days from the date of admission, and control group as that in which the SNS had begun after day 5.

Sample size determination

In the absence of studies to determine the average stay of patients malnourished at admission according to the NRS-2002 screening tool who do not receive SNS in the first 5 days after admission, our study considered that the average stay of this group (control group) represented 100% of the reference stay or control stay. To calculate the study's sample size to determine if the specialist nutritional intervention could reduce by 20% the average stay, and assuming an α error of 5% and β error of 20%, a sample of 21 people was estimated for each group in order to prove our hypothesis concerning the primary endpoint. All the patients treated over a period of 10 months (September 2013 to June 2014) were included to increase the statistical power.

Study protocol

Nutritional intervention started the day on which the SNS request was made. The clinical investigator visited each patient, introduced himself and requested authorization for the collection of data.

The following data were collected: history number, age, sex, minimum set of hospital basic data, date of admission and date of nutritional support onset, and the patient was assigned to one of the following categories according to the reason for admission: oncological, neurological, cardiovascular, endocrine-metabolic or septic.

NRS-2002 test was performed at that time, and retrospectively to determine their score at the time of hospital admission.

The anthropometric assessment was performed by collecting the following measurements: heel-knee (HK), leg circumference (LC), arm circumference (AC) and triceps skinfold (TS). Weight and height measurement was performed using a Seca 769 scale with telescopic stadiometer (Seca GmbH & Co., Hamburg, Germany). If it was not possible to determine them, the height was estimated by HK length and the weight using the following predictive formula: Male weight = $(AC \times 1{:}37) + (0.98 \times LC) + (0.37 \times TS) + (1.16\ HK) - 81.69$. Female weight = $(0.98 \times AC) + (1.27 \times LC) + (0.4 \times TS) + (0.87 \times HK) - 62.39$.

Blood and urine tests were performed in order to determine the levels of glucose, urea, creatinine, uric acid, GOT, GPT, GGT, FA, LDH, total bilirubin, total protein, albumin, transthyretin, transferrin, Na, K, Ca, P, Mg, Zn, Tg, total cholesterol, complete blood count, CRP, B_{12}, folic acid and 24 h urine urea.

Calories, proteins, pharmaconutrients and electrolytes were supplied following the clinical practice guidelines of the 2009 *European Society of Parenteral and Enteral Nutrition* (ESPEN) for parenteral nutrition (PN),[10] and 2006 ESPEN[11] for enteral nutrition (EN). The contributions were adjusted to ideal weight in the case of low weight (body mass index [BMI] less than 19 kg/m^2) or weight corresponding to BMI = 25 kg/m^2 in the case of BMI equal or above grade 2 overweight according to the World Health Organization.

The preferred route of nutrient supply was oral, then enteral if the first was not possible and finally the parenteral route.

In patients with a high risk of refeeding syndrome, supplementation began with thiamine 100 μg IV for 3 days, electrolytes were replaced and an initial caloric intake not exceeding its basal energy expenditure was implemented, calculated by the Harris–Benedict equation. Supplies were progressively increased with the idea of reaching the estimated requirements in 5–7 days.