ISSN (electrónico): 1699-5198 - ISSN (papel): 0212-1611 - CODEN NUHOEQ S.V.R. 318

ARÁN

Nutrición Hospitalaria

Grupo de trabajo SENPE

Standards of the nutritional support process in Spain — Towards benchmarking

Estándares del proceso de soporte nutricional en España: hacia el "benchmarking"

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Abstract

Introduction: quality indicators have been proposed in Spain for assessing the various stages of clinical nutrition. However, reference standards for these indicators (feasible and relevant) based on daily practice of artificial nutrition are not available.

Goals: the goal of this study was to propose quality indicators standards for their routine application to artificial nutrition in clinical practice.

Material and methods: a multicenter, cross-sectional study—based on a survey applied to health professionals in the field of clinical nutrition—on the fulfilment of eight quality criteria was carried out during 2018 and 2019. The total number of processes and those that were correctly accomplished were assessed and compared with the corresponding proposed theoretical standard.

Results: fifteen centers were assessed. Of eight indicators assessed, five were within the theoretical standard (correct identification of parenteral nutrition bags, semi-upright position of patients on enteral nutrition, administration of micronutrients in ready-to-use parenteral nutrition bags, checking placement of feeding tubes, and days with glycemia below 60 mg/dL). Two indicators were very close to the theoretical standard. One indicator, hyperglycemia in patients with parenteral nutrition, was far removed from its theoretical standard (15.7 % vs. 5 %).

Conclusion: the administration of artificial nutrition in Spanish hospitals was performed with a high quality level. Therefore, standards based on daily clinical practice regarding artificial nutrition in Spain are proposed.

Keywords:

Quality indicators. Health care. Healthcare surveys. Nutrition therapy. Standards. Patient care team.

Resumen

Introducción: en España se han propuesto indicadores de calidad para evaluar las diversas etapas de la asistencia en nutrición clínica. Sin embargo, no se encuentran disponibles estándares de referencia de estos indicadores (factibles y relevantes) basados en la práctica diaria de la nutrición artificial.

Objetivos: ofrecer estándares de indicadores de calidad para su aplicación rutinaria en la práctica clínica de la nutrición artificial.

Material y métodos: estudio transversal multicéntrico, basado en una encuesta remitida a profesionales sanitarios del ámbito de la nutrición clínica, sobre el cumplimiento de 8 criterios de calidad durante el año 2018 y 2019. Se analizó el número total de procesos evaluados y los que se cumplieron correctamente, y se compararon con el estándar teórico propuesto.

Resultados: se estudiaron 15 centros. De los 8 indicadores estudiados, 5 estuvieron dentro del estándar teórico (identificación correcta de las bolsas de nutrición parenteral, posición semi-incorporada de los pacientes con nutrición enteral, administración de micronutrientes en las bolsas de nutrición parenteral "listas para su uso", comprobación de la colocación de las sondas, y días de glucemia por debajo de 60 mg/dl); dos indicadores estuvieron muy próximos al estándar teórico y, uno, la hiperglucemia en los pacientes con nutrición parenteral, lejos del estándar teórico (15,7 % *vs.* 5 %).

Conclusión: la aplicación de la nutrición artificial se realiza en los hospitales españoles con un elevado nivel de calidad. De esta manera, se ofrecen unos estándares basados en la práctica clínica diaria de la nutrición artificial en España.

Palabras clave:

Indicadores de calidad. Cuidados sanitarios. Encuestas de salud. Terapia nutricional. Estándares. Equipos de salud.

Received: 25/01/2021 • Accepted: 27/01/2021

Conflict of interest: the authors declare no conflict of interest.

Martín-Folgueras T, Vidal-Casariego A, Benítez-Brito N, Luengo-Pérez LM, Segurola-Gurrutxaga H, Velasco-Gimeno C, Burgos-Peláez R, Álvarez-Hernández J, Irles-Rocamora JA. Standards of the nutritional support process in Spain — Towards benchmarking. Nutr Hosp 2021;38(3):661-666

DOI: http://dx.doi.org/10.20960/nh.03543

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INTRODUCTION

In recent years, the need to improve the quality and efficiency of health systems has led to a growing interest in the application of various tools for achieving a better management. Quality indicators that express the extent of achievement for key objectives in organizations stand out among these instruments. In general terms, these indicators focus on specific quality dimensions (accessibility, patient satisfaction, health outcomes, safety, etc.). They are intended to meet key requirements such as relevance, feasibility, and reliability, and meant to be based on evidence (1).

In order to achieve correct interpretations, the results of the indicators should be compared with reference standards that indicate the limit beyond which the levels of compliance can be considered adequate. This comparison allows determining corrective measures to improve outcomes in organizations. The standards are intended for use in practice. When they are defined, not only the level of compliance that is convenient from a theoretical point of view should be taken into account, but also the degree of real difficulty they pose. In this sense, there are many factors that can promote compliance with quality indicators. These factors may depend on: the organizations (management involvement, leadership style, institutional culture of quality improvement, and availability of resources); the professionals (awareness and recognition of recommendations in clinical guidelines, time restrictions, previous experiences); or the activity being monitored (coherence and strength of scientific evidence, associated technical complexity) (2).

In Spain, quality indicators have been proposed for assessing the various stages of clinical nutrition care (3,4). The reference standards for these indicators are mostly theoretical values obtained from arbitrary criteria or from research studies. Therefore, the goal of the present study was to obtain sufficient information to determine standards, based on daily practice, for relevant and feasible indicators in routine application.

MATERIALS AND METHODS

The present multicentre cross-sectional study was conducted between 2018 and 2019. First, a questionnaire was prepared and sent to the members of the Spanish Society of Clinical Nutrition and Metabolism (SENPE) by email. Subsequently, the responses included in the study were those sent by health professionals that belonged to SENPE and were performing their professional activity in the field of clinical nutrition, either in public or private hospitals nationwide.

The questionnaire included eight quality criteria (29 items in total) extracted from the document "Process of Clinical Nutrition. Self-assessment guide" prepared by the SENPE Management working group. It was based on the relevance and feasibility criteria for indicators used in nutrition units that were obtained in 2012 (5).

Table I shows the quality indicators included in the survey. The level of compliance with each indicator (process completed/process assessed x 100) was compared with the theoretical standard proposed by the existing literature (theoretical standard). Based on this result, but also taking into account the relevance of compliance with indicators and the difficulty they entail, standards were proposed for each indicator (proposed standard).

RESULTS

Responses were obtained from 15 health centers, of which: one had less than 200 beds (6.7 %); three had 201 to 500 beds (20.0 %); six had 501 to 1,000 beds (40.0 %); and five had more than 1,000 beds (33.3 %). Nutrition units or multidisciplinary nutritional support teams were responsible for nutritional support in 13 of the centers (86.7 %). In the other two centers nutritional support was in the hands of professionals not organized in a functional unit.

IDENTIFICATION OF PARENTERAL NUTRITION BAGS

Data were obtained from 12 centers. The assessment included 2,380 parenteral nutrition bags, which meant an average of 198.5 (330.5) bags per center assessed (minimum 4 bags/center, maximum 1,101 bags/center). Of these bags, 2,374 had an identifying label. This fact indicated a degree of compliance of 99.7 % (theoretical standard = 100 %).

SEMI-UPRIGHT POSITION OF PATIENTS WITH ENTERAL NUTRITION BY NASOGASTRIC TUBE

Data were obtained from 12 centers, with a total of 620 patients (mean, 57.7 [82.4] patients/center; minimum 6 patients/center, maximum 278 patients/center). The degree of compliance was 96.8 % (theoretical standard > 90 %).

CORRECT MONITORING OF NUTRITIONAL SUPPORT

This item was answered by 13 centers. A total of 1,050 visits to patients were analyzed, corresponding approximately to 80.7 (107.8) visits per center (minimum 9, maximum 400), of which 988 were considered correct according to the definition of the criterion. Compliance with the standard was 94.1 % (theoretical standard = 100 %).

MEETING THE CALORIC GOAL WITH ENTERAL NUTRITION

Data from seven centers were analyzed, with a total of 429 days of enteral nutrition (61.3 [54.4] days/center; minimum 15 days/center, maximum 137 days/center).

Table I. Data and quality indicators included in the survey

Organizational criteria	
– Affiliation data – Center size – Organizational structure: • Nutrition unit nutritional support team • Group of professionals belonging to one or more services (without nutrition units) • Other professionals	
Quality criteria	
Criterion 1:	Patient identification in parenteral nutrition bags. *Method:* visual confirmation of correct labeling in patients with parenteral nutrition on the day of referral. *Instruction:* correct identification must include the following items: hospitalization unit; room and bed; composition; date of preparation
Criterion 2:	Semi-upright position in patients with enteral nutrition via a nasogastric tube. *Method:* visual verification of the correct position of patients with enteral nutrition on the day of referral. *Instruction:* semi-upright position: patient with the torso at > 30 ° with respect to the horizontal plane during the administration of enteral nutrition and one hour afterwards
Criterion 3:	Correct monitoring of patients receiving artificial nutrition (enteral or parenteral). *Method:* checking by reviewing the patient's medical records for evidence on the correct monitoring of patients with artificial nutrition. *Instruction:* each visit counts independently, so more than one event (monitoring visit) can be performed per patient. Visits for intercurrent events, e.g., due to loss of enteral access, do not count. Correct monitoring should include assessment of tolerance and compliance with nutritional requirements, as well as periodic laboratory determinations. Assessment of tolerance involves a systematic screening of the most frequent complications caused by enteral nutrition (gastrointestinal problems, etc.) and parenteral nutrition (fluid status, hyperglycemia, etc.)
Criterion 4:	Meeting caloric goals in patients with artificial nutrition (enteral or parenteral). *Method:* checking by reviewing the patient's medical records regarding the administration of an artificial nutrition formula in sufficient amount to meet nutritional requirements. *Instruction:* all treatment days are taken into account, so more than one event per patient can be considered. Interruptions justified by the protocol or periods of artificial nutrition do not count. Compliance implies a systematic calculation of caloric requirements. The goal is considered reached when the necessary calories were administered (± 10 %)
Criterion 5:	Checking the placement of enteral feeding tubes before start of enteral nutrition. *Method:* checking out in medical records the corresponding radiological technique before start of enteral nutrition. *Instruction:* the reference technique to ascertain an enteral tube's correct position is radiography. Valid only for nasogastric and nasoenteral tubes. Tubes placed under radiological or endoscopic control are not included in the calculation
Criterion 6:	Checking the administered 'ready-to-use' parenteral nutrition bags do provide micronutrients. *Method:* visually checking the records related to micronutrient contents in the 'ready-to-use' parenteral nutrition bags administered on the day of referral. *Instruction:* micronutrients should include: electrolytes, vitamins, and trace elements
Criterion 7:	Glycemic control in patients with parenteral nutrition. *Method:* checking by reviewing medical records for maintenance of adequate glycemic levels in patients with parenteral nutrition, on the day of referral. *Instruction:* each day with parenteral nutrition counts as an isolated event (regardless of the number of glycemic determinations performed)
Criterion 8:	Control of venous access-related infections for parenteral nutrition. *Method:* assessment by reviewing medical records and the microbiological results of catheter removals due to suspected infection and its possible confirmation. *Instruction:* each day of parenteral nutrition counts in isolation. The confirmation of catheter-related infection is given by the existence of a positive culture of its tip or by bacteremia. Different types of catheters (jugular, subclavian, PICC) are assessed independently

Caloric requirements were met in 369 days, which represented a standard of 86.0 % (theoretical standard > 90 %).

MEETING THE CALORIC GOAL WITH PARENTERAL NUTRITION

Six centers submitted data for this criterion, including 380 days of parenteral nutrition (63.3 [50.8] days/center; minimum 12 days/center, maximum 148 days/center). Caloric requirements were met by administering parenteral nutrition for 335 days (88.2 %) (theoretical standard > 90 %).

CHECKING THE PLACEMENT OF ENTERAL FEEDING TUBES

Eleven centers answered this item, with a total of 218 patients and a mean of 19.8 (18.2) patients per center (minimum 5 patients/center, maximum 61 patients/center). Correct probe checking had been performed in 188 patients, which represented a standard of 86.2 % (theoretical standard = 100 %).

MICRONUTRIENT SUPPLY IN 'READY-TO-USE' PARENTERAL NUTRITION BAGS

These data were only obtained from four hospitals, and a total of 160 bags of parenteral nutrition were assessed (40.0 [72.0] bags/center; minimum 2 bags/center, maximum 148 bags/center). Micronutrients had been added to 158 bags (98.8 %) (theoretical standard = 100 %).

GLYCEMIC CONTROL IN PATIENTS WITH PARENTERAL NUTRITION

Twelve centers sent data related to glycemic control. A total of 3,782 days with parenteral nutrition could be assessed, with 315.2 (424.2) days/center (minimum 5 days/center, maximum 1,226 days/center). Hyperglycemia (> 180 mg/dL) was observed during 595 days (15.7 %), and hypoglycemia (< 60 mg/dL) during 18 days of follow-up (0.5 %) (theoretical standard = 5 % in both cases).

INFECTION OF PARENTERAL NUTRITION CATHETERS

Data from six hospitals were analyzed. The results are shown in table II. Table III shows the theoretical and proposed standards for the most relevant indicators of a hospital's artificial nutritional support process.

DISCUSSION

In the last decade, quality management has been progressively established in health systems. This fact promoted important changes in their organization. These changes have directly affected clinicians, whose objectives have gone from providing healthcare based on the best available scientific evidence to also incorporating the satisfaction of different stakeholders (patients, relatives, managers, providers, healthcare teams, and society). This way, in recent years, both scientific societies and health agencies have created indicators for controlling healthcare quality.

In conjunction with the Spanish Society of Hospital Pharmacy (SEFH), the Spanish Society of Clinical Nutrition and Metabolism (SENPE) has developed the "Guidelines for the assessment of the clinical nutrition process", which discusses the sub-processes involved in nutritional support for hospitalized patients (3). Each sub-process is accompanied by one or more quality criteria, with their definition, indicators, and theoretical standards.

The goal of the present study was to propose standards based on clinical practice, applying those quality indicators considered most relevant and feasible (5). Responses were obtained from 15 centers distributed throughout the different Spanish auton-

Table II. Parenteral nutrition catheter-related infection

Indicator	No.	No. of days with PN	Recorded incidence	Theoretical standard
Total catheters removed due to suspected infection	20	2852	0.7/100 days	-
Confirmed infections*	24	2852	0.8/100 days	5/100 days
Jugular catheters removed due to suspected infection (jugular)	1	105	0.9/100 days	-
Confirmed infection caused by jugular catheters	0	105	0/100 days	5/100 days
Subclavian catheters removed due to suspected infection	2	158	1.3/100 days	-
Confirmed infection caused by subclavian catheters*	3	158	1.9/100 days	5/100 days
PICC removals due to suspected infection	0	31	0/100 days	-
Confirmed infections caused by PICC	0	31	0/100 days	5/100 days

**Confirmed infections outnumber catheters removed due to suspected infection as a result of culturing the tip of catheters removed for other reasons. The frequency of infection is expressed per 100 days of use; PICC: peripherally inserted central catheter; PN: parenteral nutrition.*

Table III. Theoretical and proposed standards for the most relevant indicators of a hospital's nutritional support process

Indicator	Theoretical standard	Proposed standard
PN bags correctly identified	100 %	100 %
Patients with EN in semi-upright position	> 90 %	> 90 %
Days of correct PN/EN monitoring	100 %	> 90 %
Days of compliance with caloric goals (EN)	> 90 %	> 85 %
Days of compliance with caloric goals (PN)	> 90 %	> 85 %
Nasogastric tubes checked by radiologic imaging before initiating EN	100 %	> 90 %
Ready-to-use PN bags with micronutrients	100 %	100 %
Days with glycaemia > 180 mg/dL in patients with PN	< 5 %	< 10 %
Days with glycemia < 60 mg/dL in patients with PN	< 5 %	< 1 %
Catheter removal due to suspected infection after 100 days of use		< 2
Confirmed infection caused by catheters per 100 days of use	< 5	< 2

PN: parenteral nutrition; EN: enteral nutrition.

omous communities, 11 of which had more than 500 beds and a nutrition unit. This fact indicates that the data presented can be considered representative of the nutritional care provided by medium/large centers with structured and recognized units for nutritional support (2).

Among the results obtained, the high degree of compliance with some of the indicators stood out, namely: correct identification of parenteral nutrition bags; semi-upright position of patients with enteral nutrition; administration of micronutrients in ready-to-use parenteral nutrition bags; and days of glycemia below 60 mg/dL. Use of protocols and systematization of activities, mainly in hospital pharmacies, may have contributed to these results.

On the other hand, compliance with other indicators was slightly lower. Examples are: correct monitoring of artificial nutrition; radiographic assessment of the correct position of feeding tubes; and compliance with caloric goals in parenteral and enteral nutrition. Therefore, it is considered advisable to propose a lowering of the standard because, possibly, the underlying difficulties were fundamentally due to the workloads for the case of monitoring. The interruption of support may have occurred due to various complications and diagnostic or therapeutic procedures in the case of compliance with caloric goals. Radiographic probe testing should be performed due to frequent pull-outs that can make further compliance difficult in some cases.

Regarding the control of hyperglycemia, the proposed standard was raised to 10 % of days instead of the 5 % theoretically proposed. During the administration of parenteral nutrition, 50 % of patients exhibited some elevated glycemia values, especially those with previous diabetes, greater intravenous blood glucose supply, hyperglycemic drugs, or infectious complications (6). Hyperglycemia during parenteral nutrition is an independent factor for in-hospital mortality, hence the relevance of its control (7). The control of hyperglycemia is counterbalanced by the risk of developing hypoglycemia. The latter has been addressed by studies in up to 7 % of patients with parenteral nutrition, and is also a risk factor for mortality in hospitalized patients (8,9). The lower degree of hyperglycemia control with respect to hypoglycemia may have resulted from a conservative use of hypoglycemic treatment, in addition to the difficulty in controlling it due to clinical factors and hyperglycemic drugs.

Regarding the infection rate of the central venous catheters used for administering parenteral nutrition, multiple data are available on the rate of complications of these catheters in home parenteral nutrition. In Spain, the most frequent complication in patients with home parenteral nutrition has been infection, with a rate of 0.64 infections per 1,000 days of central venous catheter use (10). In hospitalized patients, the reported infection rate has been highly variable, between 0 and 4.9 infections per 1,000 days (11-13). Variability may depend on factors such as the type of central venous catheter, local catheter management protocols, underlying diseases, or the definition of infection associated with the catheter used. According to the data found in the present study, infection rates have been lower than reported in other studies, which could be due to the lower number of hospitals that provided data for this indicator, their having implemented infection control programs, or a different recording method. Even so, the standard has been significantly lowered in the present proposal.

The strengths of the present study include the number of centers that answered the survey and, above all, the number of patients included. Among its limitations, the fact stands out that responses were mainly obtained from larger hospitals that had nutrition units among their healthcare services. However, the study did not provide enough data about nutritional support in smaller hospitals without a defined structure for the provision of nutritional support, nor were data recorded for all the indicators analyzed in all hospitals.

In conclusion, the data obtained in the present study suggest that nutrition units in Spain perform their activity with a high quality degree. In addition, this work promotes the creation of initiatives to assess the quality of nutritional support in Spain, providing quality standards based on actual data. An immediate objective for the future should be obtaining information from the maximum number of centers possible, determining which are the best ones, learning from them, and ultimately benchmarking.

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