



ORIGINAL ARTICLE

Hydroelectrolytic and infectious complications in one year of parenteral nutrition in critical care[☆]



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Received 14 December 2017; accepted 4 March 2018

Available online 6 July 2018

KEYWORDS

Parenteral Nutrition;
Ions;
Metabolism;
Complications;
Bacteremia

Abstract

Objective: Parenteral nutrition consists of the intravenous administration of macronutrients, micronutrients and electrolytes. Our objectives were to evaluate the biochemical alterations during the first ten days of initiation and to quantify the bacteremia related to the central venous catheter during the administration of parenteral nutrition.

Material and methods: Retrospective study of incidence and prevalence. We included 51 patients who started intravenous nutritional support therapy at Critical Care. We intend to know the infectious complications of the central line associated with parenteral nutrition, to evaluate the most frequent hydroelectrolytic complications of parenteral nutrition, and to identify minimum control points in the detection of hydroelectrolytic alterations.

Results: Statistically significant daily variations were found for glucose, magnesium, potassium and creatinine, and bordering on the statistical significance for albumin and phosphate, the alterations occurring between the second and third days fundamentally. Hypoalbuminemia and hypocalcemia were very frequent. GGT was the liver enzyme that increased more frequently. The infection rate was 14.86 per 1000 days of central venous catheter.

Conclusions: We found daily variations in glucose, potassium and magnesium, as well as a decrease in creatinine. We emphasize the frequency of hypoalbuminemia, hypocalcemia and elevation of GGT. The most important variations occurred between the second and third day, highlighting the precocity of potassium alteration and the peak of glycemia. The rate of infection related to the central venous catheter in patients with parenteral nutrition was high.

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[☆] Please cite this article as: López A, Varela JJ, Cid MM, Couñago M, Gago N. Complicaciones hidroelectrolíticas e infecciosas en un año de nutrición parenteral en cuidados críticos. Rev Esp Anesthesiol Reanim. 2018;65:373–379.

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PALABRAS CLAVE

Nutrición parenteral;
Iones;
Metabolismo;
Complicaciones;
Bacteriemia

Complicaciones hidroelectrolíticas e infecciosas en un año de nutrición parenteral en cuidados críticos

Resumen

Objetivo: La nutrición parenteral consiste en la administración intravenosa de macronutrientes, micronutrientes y electrolitos. Nuestros objetivos fueron evaluar las alteraciones bioquímicas durante los diez primeros días de inicio y cuantificar las bacteriemias relacionadas con el catéter venoso central durante la administración de la nutrición parenteral.

Material y métodos: Estudio retrospectivo de incidencia y de prevalencia. Se incluyeron 51 pacientes que iniciaron terapia de soporte nutricional intravenosa en la Unidad de Reanimación. Pretendemos conocer las complicaciones infecciosas de la vía central asociadas a nutrición parenteral, evaluar las complicaciones hidroelectrolíticas más frecuentes de la nutrición parenteral, e identificar puntos mínimos de control en la detección de las alteraciones hidroelectrolíticas.

Resultados: Se encontraron variaciones diarias estadísticamente significativas para la glucosa, magnesio, potasio y creatinina, y rozando la significación estadística para la albúmina y el fosfato, ocurriendo las alteraciones entre el segundo y tercer día fundamentalmente. La hipoalbuminemia y la hipocalcemia fueron muy frecuentes. La GGT fue la enzima hepática que se elevó con más frecuencia. La tasa de infección fue de 14,86 por cada 1.000 días de catéter venoso central.

Conclusiones: Encontramos variaciones diarias en la glucosa, potasio y magnesio, así como también un descenso de creatinina. Destacamos la frecuencia de hipoalbuminemia, hipocalcemia y de elevación de GGT. Las variaciones más importantes ocurrieron entre el segundo y tercer día, destacando la precocidad de alteración del potasio y el pico de glucemia. La tasa de infección relacionada con el catéter venoso central en los pacientes con nutrición parenteral fue alta.

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Introduction

Malnutrition is a prevalent condition in severely ill patients admitted to the ICU. It is found in up to 47% of cases,^{1,2} and is associated with an increase in morbidity and mortality,³ mainly due to an increase in the average stay and a higher incidence of nosocomial infections. The benefits of nutritional support to prevent or at least alleviate nutritional deficiencies have been amply demonstrated, although this therapy is not without its complications.⁴ Parenteral nutrition (PN) consists of the intravenous administration of macronutrients, micronutrients and electrolytes. Total parenteral nutrition is only superior to conventional fluid therapy in terms of infectious morbidity and mortality in seriously ill and undernourished patients.⁴

The main complications of PN can be summarized in 4 main groups: noninfectious central venous catheter complications, metabolic complications, hepatic dysfunction, and septic complications.⁴ Metabolic complications include blood glucose alterations, osmolarity, heart failure, dyselectrolytaemia, hipertrigliceridaemia, and uraemia. One of the most important complications is refeeding syndrome, defined as the metabolic abnormalities that can occur after the reintroduction of carbohydrates in chronically malnourished or acutely hypermetabolic patients as

a result of a rapid shift to glucose utilization as an energy source.⁵⁻⁸

There are few descriptions in the literature⁵⁻⁸ of the electrolyte alterations that can occur during total PN. The few references available are limited to recommendations for the administration of ions, vitamins and trace elements to avoid micronutrient-related disorders.

For this reason, we set out to determine the most frequent electrolyte alterations and their time of onset relative to the start of PN and during the first 10 days of therapy. This would enable us to predict onset of these changes with respect to the start of PN and to take appropriate measures for other types of complications. We also measured changes in creatinine and urea over time in order to evaluate the evolution of renal function.

We also collected data on central venous catheter complications, since this is the direct route of administration of the PN. For this purpose, we followed the definition of catheter-related infection established in the Bacteriemia Zero project.⁹

The aim of this study has been to determine the central-line infectious complications associated with PN, evaluate the most frequent electrolyte complications associated with PN, and establish minimum monitoring points for the early detection of electrolyte alterations.

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