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GENERAL INFORMATION

Metabolic control in the critically ill patient an update: Hyperglycemia, glucose variability hypoglycemia and relative hypoglycemia☆

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KEYWORDS
Hyperglycemia;
Glucose variability;
Hypoglycemia;
Glycemic control

Abstract
Background: Metabolic changes of glucose in critically ill patients increase morbidity and mortality. The appropriate level of blood glucose has not been established so far and should be adjusted for different populations. However concepts such as glucose variability and relative hypoglycemia of critically ill patients are concepts that are changing management methods and achieving closer monitoring.
Objectives: The purpose of this review is to present new data about the management and metabolic control of patients in critical areas.

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Conclusions: Currently glucose can no longer be regarded as an innocent element in critical patients; both hyperglycemia and hypoglycemia increase morbidity and mortality of patients. Protocols and better instruments for continuous measurement are necessary to achieve the metabolic control of our patients.

PALABRAS CLAVE
Hiperglucemia;
Variabilidad de la glucosa;
Hipoglucemia;
Control de la glucemia

Actualidades en el control metabólico del paciente crítico: hiperglucemia, variabilidad de la glucosa, hipoglucemia e hipoglucemia relativa

Resumen
Antecedentes: Las alteraciones metabólicas de la glucosa en pacientes críticamente enfermos pueden aumentar la morbimortalidad. El nivel adecuado de glucosa en sangre no se ha establecido hasta el momento y debe ajustarse para diferentes poblaciones. Sin embargo conceptos como la variabilidad de la glucosa e hipoglucemia relativa del paciente crítico son conceptos que están cambiando el manejo y logrando métodos de monitorización más estrechos.
Objetivo: El propósito de esta revisión es dar a conocer las actualidades en el manejo y control metabólico de pacientes en áreas críticas.
Conclusiones: En la actualidad la glucosa ya no puede considerarse como un elemento inocente para el paciente crítico; tanto la hiperglucemia como la hipoglucemia incrementan la morbimortalidad de los pacientes. Protocolos de actuación y mejores instrumentos de medición continua son necesarios para lograr el control metabólico de nuestros pacientes.

Background

Hyperglycemia is common in critically ill patients, even in those who have not been diagnosed as having diabetes. There is evidence that developing hyperglycemia during an illness or acute surgery increases morbimortality, the number of days spent in the intensive care unit (ICU) and in hospital, as well as the number of days with mechanically assisted respiration.[1]

Alterations in glucose metabolism arise during critical illnesses due to a range of factors, including increased insulin resistance, changes in the production of the said hormone and the activation of cytokines. A hypermetabolic state occurs in patients in a critical condition due to their disease, with intense activation of contraregulating hormones and cytokines, such as tumour necrosis factor alpha (TNF-α), interleukin 1 (IL-1) and interleukin 6 (IL-6), which are important insulin resistance mediators, thereby causing hyperglycemia. The great majority of the patients in an ICU will have stress-induced hyperglycemia, in the form of transitory hyperglycemia during the disease which is generally restricted to patients with no previous sign of diabetes.[2–4]

When they are admitted to hospital, patients without diabetes are at greater risk of mortality than those patients with a previous diagnosis of diabetes.[1]

Hypoglycemia is significantly greater in patients with strict control of glucose by intensive intravenous insulin therapy. The current recommendation is for strict glycemia control to focus on hyperglycemia secondary to critical disease, while at the same time avoiding hypoglycemia, so that management protocols have now been set in the majority of ICUs.[5]

The purpose of this review is to publish the latest developments in patient metabolic control and management in critical areas.

Methods

The aim of this review is to publish the latest developments in patient metabolic control and management in critical areas. PubMed was searched using the terms MeSH glycemia, metabolic control and critical, with 5-year filters in humans and including systematic reviews, reviews and clinical studies. 884 results were found, of which 59 fulfilled the search criteria and were included in this review.

Epidemiology

It is difficult to estimate the prevalence of hyperglycemia in critically ill patients as the diagnosis is variable. Approximately 75% of all patients, including diabetic ones, have blood concentrations of glucose higher than 110 mg/dl at the moment of admission to the ICU, while 12% of all patients have blood concentrations of glucose higher than