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REVIEW ARTICLE

Acquired neuromuscular dysfunction in the intensive care unit☆

L. Sánchez Solana (MSN, RN)*, I. Goñi Bilbao (MSN, RN), P. Ruiz García (MSN, RN), J.L. Díaz Agea (PhD, RN), C. Leal Costa (PhD, RN)

Facultad de Enfermería, Universidad Católica de Murcia (UCAM), Murcia, Spain

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Abstract
Introduction: Polyneuropathy and myopathy, grouped under the term ''intensive care unit-acquired weakness'' (ICUAW), are neuromuscular pathologies to which patients in the intensive care unit (ICU) are susceptible. They are multifactorial pathologies, prolonged connection to a ventilator is one of the most common. The objective of this review was to identify the efficacy of different rehabilitative treatments in patients with ICUAW, and the relationship between ICUAW and a series of indicators.
Methods: A systematic review of the primary studies selected from the Medline, Scielo, Web of Science, Cochrane, Cuiden and Science Direct databases was carried out, following the guidelines of the PRISMA statement, by which the search protocol was established.
Results and conclusions: Of 161 articles, only 10 were selected to be part of this review, in which a total of 717 patients admitted to the ICU were studied. A statistically significant relationship was observed between ICUAW and failure in ventilator disconnection, mortality, increase in ICU stay and the time that the patients required mechanical ventilation. Moreover, all this improved in this type of patients with the application of a rehabilitation therapy. The use of corticosteroids, was not shown to be related to neuromuscular alteration.

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* Corresponding author.
E-mail address: lorenasanchezsolana@gmail.com (L. Sánchez Solana).

PALABRAS CLAVE
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Mortalidad;
Corticoesteroides

Disfunción neuromuscular adquirida en la unidad de cuidados intensivos

Resumen
Introducción: La polineuropatía y la miopatía, agrupadas bajo el término «polineuromiopatía del paciente crítico» (PNMPC), son enfermedades neuromusculares que los pacientes de la unidad de cuidados intensivos (UCI) son susceptibles de presentar. Son enfermedades multifactoriales: la conexión prolongada al ventilador es uno de los factores más comunes. El objetivo de esta revisión ha sido identificar la eficacia de diferentes tratamientos rehabilitadores en pacientes con PNMPC y la relación entre esta y una serie de indicadores hospitalarios.
Metodología: Se ha realizado una revisión sistemática de los estudios primarios seleccionados de las bases de datos Medline, Scielo, Web of Science, Cochrane, Cuiden y Science Direct, siguiendo las directrices de la declaración PRISMA, a través de la cual se estableció el protocolo de búsqueda.
Resultados y conclusiones: De 161 artículos, solo 10 fueron seleccionados para formar parte de esta revisión, en la cual se estudiaron un total de 717 pacientes ingresados en la UCI. Se ha observado una relación estadísticamente significativa entre la PNMPC y el fallo en la desconexión del ventilador, la mortalidad, el aumento de estancia en UCI y del tiempo que los pacientes necesitan ventilación mecánica. Además, todo ello mejora en este tipo de pacientes con la aplicación de alguna terapia rehabilitadora. El uso de corticoides, por el contrario, no ha demostrado tener relación con la alteración neuromuscular.

Introduction

Several different advances in the treatments applied to patients who have been admitted to the intensive care unit (ICU) has led to an improvement in the prognosis and survival of these patients. However, neuromuscular diseases may present which the patients did not previously suffer from. These diseases are directly related to prolonged stays in the ICU, the severity of the illnesses for which the patients were admitted into hospital and the treatment used to combat them.[1]

A series of neurological problems are included in this group of diseases, and these affect the peripheral nerve system. The most common and well known of these is the critically ill patient polyneuropathy (CPP) which may present in between 50% and 80% of these patients.[2] Even so, doubts exist regarding their aetiology, pathology, prognosis and treatment.[3] This alteration leads to a degeneration of the myelin sheaths which may delay nerve signal flow. If this occurs in the axon or the complete neuron the nerve may stop functioning. All of this may affect the striated muscle fibres due to the denervation they suffer and these may lead to the onset of symptoms and signs in the patient: a reduction in sensitivity, general muscular weakness, difficulty swallowing or breathing, muscular spasms, and a reduction in reflexes and neuralgias. The facial muscles usually remain intact, although they may also be affected.[4]

At present, several authors use the concept ''critically ill polyneuropathy and myopathy patient'', which covers the terms critical illness polyneuropathy (CIP) and critical illness myopathy (CIM), another type of condition of the peripheral neuromuscular system where atrophy of muscular fibres occur and there is a reduction in the potential for action. This is due to the difficulty in carrying out neurological examinations in patients who have been admitted to the ICU, to the similarities between the clinical signs and the frequency with which they simultaneously present.[3] In this systematic review, we use the term ''critical illness polyneuromyopathy'' (CIPNM). This illness has a multifactorial aetiology: the most common factors associated with it are a prolonged stay in ICU, sepsis, multi organ failure and connection to the ventilator, which lead to failures in disconnection, an increase in the treatment time with mechanical ventilation (MV), changes to the respiratory musculature and an increase in mortality after 30 days. Other factors such as treatment with neuromuscular blockers, corticosteroids, sedatives or muscle relaxants continue under debate. However, blood glucose control and early mobility therapy have proven to drastically reduce this neuropathy.[4,5]

During the acute phase of the illness, for which these patients are admitted into the ICU, the signs of CIPNM may be concealed with the use of muscle relaxants and sedatives. Generally, the healthcare personnel who work with critically ill patients acknowledge that this illness is a major cause of muscle weakness which presents due to the impossibility of disconnecting them from the ventilator once the critical condition for which they were admitted to the ICU has been resolved. Up to 62% of these patients show signs of sufficiently significant neuromuscular dysfunction to explain the persistent respiratory failure of these patients, which could even begin at after 18 h from the start of MV.[4,6]

In these cases scales of measurement are highly useful as they help us to make a definitive diagnosis based on the patient's clinical condition. The assessment method regularly used in clinical practice is the modified scale of muscle strength published by the Medical Research Council