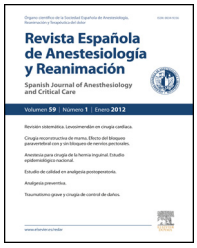
Rev Esp Anestesiol Reanim. 2015;xxx(xx):xxx–xxx

Revista Española de Anestesiología y Reanimación

www.elsevier.es/redar



ORIGINAL ARTICLE

Mortality risk factors in critical post-surgical patients treated using continuous renal replacement techniques☆

J.C. Estupiñán-Jiménez[a,*], J.M. Castro-Rincón[a], O. González[a], D. Lora[b], E. López[a], F. Pérez-Cerdà[a]

[a] *Servicio de Anestesiología y Reanimación, Hospital Universitario 12 de Octubre, Madrid, Spain*
[b] *Estadístico i + 12, Instituto de Investigación del Hospital 12 de Octubre, Madrid, Spain*

Received 4 November 2013; accepted 5 May 2014

KEYWORDS
Post-operative care;
Acute renal failure;
Renal replacement therapy;
Mortality;
Post-operative complications;
Critically ill

Abstract
Objective: To determine the influence of demographics, medical, and surgical variables on 30-day mortality in patients who need continuous renal replacement therapy (CRRT).
Materials and methods: A retrospectively-followed study was conducted using the data of 112 patients admitted to the postoperative intensive care unit who required CRRT, between August 2006 and August 2011, and followed-up for 30 days. The following information was collected: age, gender, history of HBP, DM, cardiovascular disease, CKD, urgent surgery, surgical speciality, organic dysfunction according to the SOFA scale, the number of organs with dysfunction, use of mechanical ventilation, diagnostic and origin of sepsis, type of CRRT, and 30-day mortality. General linear models were used for estimating the strength of association (relative risk [RR], and 95% confidence interval [CI]) between variables and 30-day mortality.
Results: In the univariant analysis, the following variables were identified as risk factors for 30-day mortality: *age* (RR 1.04; 95% CI 1.01–1.06; $p = .0005$), and *history of cardiovascular disease* (RR 1.57; 95% CI 1.02–2.41; $p = .039$). Among the variables included in the multivariable analysis (age, history of cardiovascular disease, sepsis, and number of organs with dysfunction), only age was identified as an independent risk factor for 30-day mortality (RR 1.03; 95% CI 1.00–1.05; $p = .007$).
Conclusion: Thirty-day mortality in postoperative, critically ill patients who require CRRT is high (41.07%). Age has been identified as an independent risk factor, with renal failure as the most common indication for the use of these therapies.

☆ Please cite this article as: Estupiñán-Jiménez JC, Castro-Rincón JM, González O, Lora D, López E, Pérez-Cerdà F. Factores de riesgo para mortalidad en pacientes críticos posquirúrgicos tratados con técnicas continuas de reemplazo renal. Rev Esp Anestesiol Reanim. 2015. http://dx.doi.org/10.1016/j.redar.2014.05.005

* Corresponding author.
E-mail address: jucares99@yahoo.com (J.C. Estupiñán-Jiménez).

PALABRAS CLAVE
Cuidado posoperatorio;
Fallo renal agudo;
Terapia de reemplazo renal;
Mortalidad;
Complicaciones posoperatorias;
Enfermo crítico

Factores de riesgo para mortalidad en pacientes críticos posquirúrgicos tratados con técnicas continuas de reemplazo renal

Resumen
Objetivo: Determinar la influencia de las variables demográficas, médicas y quirúrgicas sobre la mortalidad a 30 días en pacientes que requieren la aplicación de técnicas continuas de reemplazo renal (TCRR) en la Unidad de Cuidados Intensivos Posquirúrgicos.
Materiales y métodos: Estudio de seguimiento retrospectivo. Datos de 112 pacientes admitidos en la Unidad de Cuidados Intensivos que requirieron TCRR, entre agosto de 2006 y agosto de 2011 y seguidos durante 30 días. Se recogió la siguiente información: edad, género, historia de HTA, DM, enfermedad cardiovascular e IRC, cirugía urgente, especialidad quirúrgica, disfunción orgánica de acuerdo con la escala SOFA, número de órganos con disfunción, uso de ventilación mecánica, diagnóstico y origen de la sepsis, modalidad de TCRR y mortalidad a 30 días. Se utilizaron modelos lineales generales para estimar la fuerza de la asociación (riesgo relativo [RR] e intervalo de confianza [IC] al 95%) entre las diferentes variables y la mortalidad a 30 días.
Resultados: En el análisis univariante se identificaron como factores de riesgo para la mortalidad a 30 días la *edad* (RR 1,04; IC 95% 1,01-1,06; p = 0,0005) y la presencia de *enfermedad cardiovascular previa* (RR 1,57; IC 95% 1,02-2,41; p = 0,039). Entre las variables incluidas en el análisis multivariante (edad, historia de enfermedad cardiovascular previa, presencia de sepsis y número de órganos con disfunción), solo la edad se identificó como factor de riesgo independiente para mortalidad a 30 días (RR 1,03; IC 95% 1,00-1,05; p = 0,007).
Conclusión: La mortalidad a 30 días en los pacientes críticos posquirúrgicos que necesitan TCRR es alta (41,07%), identificándose la edad como factor de riesgo independiente, siendo la insuficiencia renal aguda la principal indicación para el uso de estas terapias.

Introduction

Critical postoperative patients present multiple risk factors for mortality. Acute kidney injury (AKI) and decompensated chronic renal failure requiring continuous renal replacement therapy (CRRT) are among the principle risk factors, and the need for some kind of continuous renal replacement therapy has already been shown to be, in itself, an independent mortality risk factor.[1]

The aim of CRRTs is to replace the lost glomerular filtration function of the kidneys, but not their endocrine, metabolic and tubular functions, and to dialyse patients over a 24 h period, 7 days a week. There are several different types of CRRT, the most commonly used in our setting being slow continuous ultrafiltration (SCUF), continuous venovenous hemofiltration (CVVH) and continuous venovenous haemodialysis. SCUF removes fluids without the need for replacement fluids by pumping the blood through a highly permeable filter (convection mechanism). The most widely used treatment type in Spain is CVVH, which removes fluids and electrolytes using a convection mechanism. Unlike SCUF, CVVH uses a substitution solution to replace part of the fluids and electrolytes, removed before (pre-filter) or after (post-filter) the blood is pumped through the filter. Excess solutes are not replaced, thereby reducing blood fluid levels. CVVH combines convection and diffusion to eliminate both high and low molecular weight solutes.

CRRTs are widely used in critical care units because they allow for better haemodynamic tolerance. These therapies are not only used in AKI, but are also extremely useful in treating fluid overload refractory to diuretics, ionic changes, intoxications, etc.

Postoperative patients have typically undergone an aggressive procedure, and depending on a variety of factors such as their baseline situation, the severity of the surgical disease, the surgical procedure, and the degree of emergency, they are at risk of requiring CRRT.

In the literature, CRRT is usually described in the context of studies that include patients with medical and surgical diseases. In view of this, we believe it will be of interest to exclusively analyse and present our experience with postoperative patients.

The main aim of this study has been to determine the risk factors associated with 30-day mortality in critical postoperative patients requiring CRRT. The secondary aims were to describe the clinical characteristics, main indications for CRRT, and the type of CRRT used.

Patients and methods

This is a retrospective chart review of postoperative patients requiring some type of CRRT between August 2006 and August 2011.

Inclusion criteria were: aged over 18 years, undergoing any type of surgery except heart surgery, and admitted to the Postoperative Intensive Care Unit for more than 24 h.

Exclusion criteria were: chronic need for haemodialysis, and receiving iatrogenic CRRT (for example, due to