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ORIGINAL

Extracorporeal lung support in patients with severe respiratory failure secondary to the 2010–2011 winter seasonal outbreak of influenza A (H1N1) in Spain☆

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KEYWORDS
Extracorporeal membrane oxygenation (ECMO);
Influenza A (H1N1);
Critically ill patients

Abstract
Objective: To describe the use of extracorporeal membrane oxygenation (ECMO) in refractory respiratory failure.
Design: A prospective, observational, multi-center study was carried out.
Setting: Intensive Care Units (ICU) in 148 Spanish hospitals.
Patients: Subjects admitted during epidemic weeks 50–52 of 2010 and weeks 1–4 of 2011, receiving respiratory support with ECMO.
Main variables of interest: Clinical and blood gas features, complications and survival of patients with ECMO.
Results: Out of 300 ICU admitted patients, 239 (79.6%) were mechanically ventilated. ECMO was available in only 5 ICUs. Nine patients were treated with ECMO (3% of the total and 3.2% of the ventilated patients). In 77.7% of the cases some hypoxemia rescue technique was previously used. ECMO was initiated when ARDS proved refractory to standard treatment. ECMO therapy was started a median of 4.5 days after the onset of mechanical ventilation. The median duration of ECMO was 6 days. Veno-venous (VV) ECMO was the most frequent cannulation mode (88.9%).

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Four patients had complications associated with ECMO therapy. The median ICU and hospital stay was 17 and 29 days, respectively. In five patients (55.5%), ECMO assistance was satisfactory suspended. The ICU and hospital survival rate was 44.4%.
Conclusions: The use of ECMO in refractory respiratory failure in patients with influenza A (H1N1) is rare in Spain. The hospital survival achieved with its use allows it to be regarded as a possible rescue technique in these patients.

PALABRAS CLAVE
Oxigenador de membrana extracorpórea (ECMO);
Gripe A (H1N1);
Paciente crítico

Uso de oxigenador de membrana extracorpóreo en pacientes con insuficiencia respiratoria aguda grave refractaria en la epidemia de gripe estacional 2010–2011 por influenza A (H1N1) en España

Resumen
Objetivo: Describir la utilización de la oxigenación por membrana extracorpórea (ECMO) en la insuficiencia respiratoria refractaria.
Diseño: Estudio prospectivo, observacional y multicéntrico.
Ámbito: Servicios de Medicina Intensiva (SMI) de 148 hospitales españoles.
Pacientes: Enfermos ingresados entre las semanas 50-52 del 2010 y la 1-4 del 2011 con el diagnóstico de gripe A (H1N1) que recibieron soporte respiratorio con ECMO.
Principales variables de interés: características clínicas, gasométricas, complicaciones y supervivencia de los pacientes con ECMO.
Resultados: Ingresaron 300 pacientes y se ventilaron 239 (79,6%). Sólo cinco SMI disponían de la técnica. Se indicó la ECMO en nueve (3% del total y 3,2% de los ventilados). En el 77,7% se empleó previamente alguna técnica de rescate frente a la hipoxemia. La canulación mayoritaria fue veno-venosa (88,9%). Su colocación fue precoz, tras una mediana de 4,5 días de ventilación mecánica. La duración mediana de la asistencia fue de seis días. Cuatro pacientes presentaron complicaciones asociadas a la ECMO. La mediana de estancia en el SMI y hospitalaria fue 17 y 29 días respectivamente. En cinco pacientes (55,5%) se pudo retirar la asistencia con la ECMO. La supervivencia tanto del SMI como hospitalaria fue del 44,4%.
Conclusiones: El uso de la ECMO en la insuficiencia respiratoria refractaria en pacientes con gripe A (H1N1) es poco frecuente en nuestro país. La supervivencia hospitalaria lograda con su uso permite considerarla como una posible técnica de rescate en estos pacientes.

Introduction

The salient characteristic of the pandemic caused by the influenza A (H1N1) virus is the frequent appearance of acute respiratory failure episodes, associated to high mortality rates.[1–3] The principal underlying etiology in both the Spanish national and international clinical series is rapidly progressive viral pneumonia—this being the leading reason for admission to Intensive Care among such patients.[4–8] The seriousness of the patient condition, often characterized by hypoxemia refractory to conventional treatment, has led to the adoption of rescue treatment measures in such cases, with both drugs (e.g., corticosteroids) and non-pharmacological measures, including different supportive and ventilation strategies (alveolar recruitment maneuvers, ventilation in prone decubitus, nitric oxide (NO), etc.). Extracorporeal membrane oxygenation (ECMO) is an example of such supportive therapy.[9,10] The present article describes the experience gained with the utilization of ECMO in patients admitted to the Spanish Intensive Care Units (ICUs) during the seasonal influenza outbreak of the year 2010, produced by the influenza A (H1N1) virus.[8]

Material and methods

This prospective and observational study of patients admitted to the ICU was carried out in a total of 148 Spanish hospitals. The data were obtained from a voluntary registry created and auspiced by the Spanish Society of Intensive Care Medicine and Coronary Units (*Sociedad Española de Medicina Intensiva Crítica y Unidades Coronarias*, SEMICYUC), the Spanish Research Network in Infectious Disease (REIPI), and the Networked Research Center of Respiratory Diseases (CIBERES). The study was approved by the Ethics Committee of Juan XXIII University Hospital in Tarragona (Spain) (IRB NEMAGRIP/11809). Patient identity was kept confidential, and no informed consent was required, given the observational nature of the study. The data were reported by the physician attending the patients. Information was collected on all the patients consecutively admitted with a diagnosis of influenza A (H1N1) between weeks 50–52 of the year 2010, and weeks 1–4 of the year 2011. All included patients were $\geq$15 years of age. In all cases, the diagnosis of influenza A (H1N1) infection was confirmed by real time, reverse transcription polymerase chain reaction (RT-PCR) testing of nasopharyngeal secretions and/or