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ORIGINAL ARTICLE

Extracorporeal membrane oxygenation in circulatory and respiratory failure – A single-center experience[☆]

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KEYWORDS

Extracorporeal membrane oxygenation;
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Abstract

Introduction: Extracorporeal membrane oxygenation (ECMO) provides mechanical pulmonary and circulatory support for patients with shock refractory to conventional medical therapy. In this study we aim to describe the indications, clinical characteristics, complications and mortality associated with use of ECMO in a single tertiary hospital.

Methods: We conducted a retrospective observational cohort study of all patients supported with ECMO in two different intensive care units (general and cardiac), from the first patient cannulated in April 2011 up to October 2016.

Results: Overall, 48 patients underwent ECMO: 29 venoarterial ECMO (VA-ECMO) and 19 venovenous ECMO (VV-ECMO). In VA-ECMO, acute myocardial infarction was the main reason for placement. The most frequent complication was lower limb ischemia and the most common organ dysfunction was acute renal failure. In VV-ECMO, acute respiratory distress syndrome after viral infection was the leading reason for device placement. Access site bleeding and hematology dysfunction were the most prevalent complication and organ dysfunction, respectively.

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Almost 70% of ECMO episodes were successfully weaned in each group. Survival to discharge was 37.9% for VA-ECMO and 63.2% for VV-ECMO. In VA-ECMO, the number of inotropic agents was a predictor of mortality.

Conclusion: Patients with respiratory indications for ECMO experienced better survival than cardiac patients. The need for more inotropic drugs was a predictor of mortality in VA-ECMO. This is the first published record of the overall experience with ECMO in a Portuguese tertiary hospital.

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PALAVRAS-CHAVE

Oxigenação por membrana extracorporeal;
Choque cardiogénico;
Falência respiratória;
Complicações;
Resultados

Oxigenação por membrana extracorporeal na falência circulatória e respiratória – experiência de um centro

Resumo

Introdução: A oxigenação por membrana extracorporeal (ECMO) permite o suporte mecânico em doentes com falência cardiovascular e/ou pulmonar. Neste estudo pretendemos descrever as indicações, características clínicas, complicações e mortalidade associadas ao uso de ECMO num hospital terciário.

Métodos: Foi realizado um estudo de coorte retrospectivo e observacional de todos os doentes que implantaram ECMO, em duas unidades de cuidados intensivos (polivalente e cardíaca), desde o primeiro doente canulado em abril/2011 até outubro/2016.

Resultados: Quarenta e oito doentes colocaram ECMO: 29 ECMO venoarterial (ECMO-VA) e 19 ECMO venovenoso (ECMO-VV). No ECMO-VA, o enfarte agudo do miocárdio foi a principal indicação para a sua implantação. A complicação mais frequente foi a isquemia do membro inferior e a disfunção de órgão associada mais comum foi a renal. No ECMO-VV, a síndrome de dificuldade respiratória aguda secundária a infeção viral foi o motivo dominante para a utilização do dispositivo. A hemorragia pelo local de acesso e a disfunção hematológica foram, respetivamente, a complicação e a disfunção de órgão mais prevalentes. Foram descanulados com sucesso quase 70% dos doentes, em ambos os grupos. Os doentes em ECMO-VA tiveram sobrevivência hospitalar de 37,9% e os em ECMO-VV 63,2%. O número de agentes inotrópicos foi preditor de mortalidade no ECMO-VA.

Conclusão: Os doentes que colocaram ECMO após falência respiratória tiveram sobrevivência superior aos que colocaram após falência cardíaca. No ECMO-VA, a necessidade de mais fármacos inotrópicos foi preditor de mortalidade. Este é o primeiro registo publicado com a experiência global com ECMO num hospital terciário, em Portugal.

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Introduction

Extracorporeal membrane oxygenation (ECMO) is a rescue therapy used to support patients with severe cardiac and/or pulmonary dysfunction refractory to conventional treatment. It was first used successfully in adults over 40 years ago, but its use has only recently become widespread, with technological advances in the available devices and with growing evidence of its effectiveness.^{1,2}

The basic elements of an ECMO circuit are two cannulas (inflow and outflow), a centrifugal pump and an oxygenator. The latter is a gas exchanger containing a semipermeable membrane separating two chambers, one for blood and the other for gas. Deoxygenated blood is drained by the external pump, passes through the oxygenator, in which carbon dioxide is exchanged for oxygen, and is returned to the patient. When the blood is both drained from and returned to the

venous system, the circuit is termed venovenous (VV) ECMO and only provides respiratory support; if it is drained from the venous system and returned via an artery, it is termed venoarterial (VA) ECMO and provides both respiratory and circulatory support.²

ECMO devices are light and portable, and so patients undergoing the treatment are relatively mobile, facilitating transport within and between hospitals, and the cannulas can be placed percutaneously or centrally, depending on clinical circumstances; the technique can be used in cases of cardiac arrest. Although ECMO provides only temporary support and has limitations, its versatility makes it useful in a variety of clinical situations, from clinical stabilization leading to complete recovery to situations requiring a bridge to decision, whether for long-term ventricular support or transplantation, or for suspension of support.³ The latest European Society of Cardiology guidelines on heart failure

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