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ORIGINAL ARTICLE

Acute myocardial infarction complicated by cardiogenic shock: What changed over a 10-year time span☆

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KEYWORDS
Cardiogenic shock;
Left ventricular pump failure;
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Abstract
Background: Despite improvements in treatment, mortality associated with cardiogenic shock (CS) following acute myocardial infarction remains high.
Aim: To compare two groups of patients admitted with CS over a 10-year time span.
Methods: We performed a retrospective analysis of two patient populations presenting with CS admitted in the periods May 1998-May 2001 (group A) and May 2008-May 2011 (group B). Clinical characteristics, diagnostic methods, treatment and outcomes were compared, and independent predictors of death at six months were analyzed.
Results: The incidence of CS was 3.7% in group A (n=25) and 4.8% in group B (n=42). There were no significant differences in clinical characteristics except for age (60.2±12.3 vs. 66.5±11.3 years; p=0.043) and the proportion of patients admitted within six hours of symptom onset (29.2% vs. 54.8%, p=0.045). There was a reduction in use of pulmonary artery catheterization (52.0% vs. 19.0%, p=0.005) but an increase in dialysis (4.0% vs. 28.6%, p=0.014). There was no difference in the proportion of patients reperfused within 12 hours or revascularized, but use of percutaneous coronary intervention (PCI) increased (75.0% vs. 92.9%, p=0.042). There were no differences in outcomes, including mortality at 30 days (32.0 vs. 35.7%; p=0.757) and six months (36.0 vs. 42.9%; p=0.683). Diabetes was the sole baseline characteristic identified as an independent predictor of death at six months (hazard ratio [HR] 3.02; 95% confidence interval [CI] 1.38-6.60; p=0.006) and mortality was lower among revascularized patients (HR 0.11; 95% CI 0.03-0.42; p=0.001).
Conclusions: Over a 10-year time span, despite earlier hospital admission and increased use of support therapies and PCI, short- and medium-term mortality remained unchanged.

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PALAVRAS-CHAVE
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Choque cardiogénico no enfarte agudo do miocárdio: o que mudou nos últimos 10 anos?

Resumo
Introdução: Apesar dos avanços terapêuticos, a letalidade do choque cardiogénico (CC) associado ao enfarte agudo do miocárdio (EAM) permanece elevada.
Objetivo: Comparar 2 grupos de doentes com CC associado ao EAM, admitidos com um intervalo de 10 anos.
Métodos: Análise retrospetiva de 2 populações de doentes com CC associado ao EAM admitidos entre maio/1998-maio/2001 (Grupo A) e maio/2008-maio/2011 (Grupo B). Compararam-se as características clínicas, diagnóstico, tratamento e complicações e analisaram-se os preditores de morte aos 6 meses.
Resultados: A incidência de CC foi 3,7% no Grupo A (n = 25) e 4,8% no Grupo B (n = 42). Não existiram diferenças significativas nas características demográficas e clínicas, exceto na idade (60,2 ± 12,3 *versus* 66,5 ± 11,3 anos; p = 0,043) e doentes admitidos com < 6 h de sintomas (29,2 *versus* 54,8%, p = 0,045). O cateterismo da artéria pulmonar diminuiu (52,0 *versus* 19,0%, p = 0,005) e as técnicas dialíticas aumentaram (4,0 *versus* 28,6%, p = 0,014). A proporção de doentes reperfundidos nas primeiras 12 h ou revascularizados foi semelhante, mas a intervenção coronária percutânea (ICP) aumentou (75,0 *versus* 92,9%, p = 0,042). As complicações intra-hospitalares, mortalidade aos 30 d (32,0 *versus* 35,7%; p = 0,757) e 6 meses (36,0 *versus* 42,9%; p = 0,683) não diferiram. A diabetes foi a única característica basal preditora independente de morte aos 6 meses (HR 3,02; IC 95% 1,38-6,60; p = 0,006) e os doentes revascularizados apresentaram menor mortalidade (HR 0,11; IC95% 0,03-0,42; p = 0,001).
Conclusão: Nos últimos 10 anos, apesar da chegada mais precoce dos doentes ao hospital, da maior utilização de algumas medidas de suporte e acesso à ICP, a mortalidade a curto e médio prazo não se alterou.

Introduction

Cardiogenic shock (CS) due to left ventricular pump failure remains a major challenge in cardiology, and is the main cause of in-hospital death following myocardial infarction (MI).[1,2] The incidence of CS associated with ST-segment MI is 5%-8%, a third of cases being diagnosed at hospital admission.[1,2]

Left ventricular pump failure, generally the result of anterior MI, triggers various mechanisms involved in the genesis and perpetuation of CS. Of these, neurohumoral cascade activation plays a central role, leading to the release of pro-inflammatory mediators such as cytokines and nitric oxide (NO) that are involved in the systemic inflammatory response seen in CS, resulting in systemic hypoperfusion and multiple organ failure.[3,4] A high level of clinical suspicion, based mainly on signs of hemodynamic instability, is crucial to appropriate management of these patients.

The only treatment that has been shown to reduce mortality in MI complicated by CS is early coronary revascularization,[5] which should not be delayed, irrespective of whether thrombolysis has been performed.[6] The number of patients undergoing percutaneous coronary intervention (PCI) in the context of CS has progressively increased in recent years.[2] Unlike MI patients who are not hemodynamically unstable, in whom only the culprit lesion should be treated, complete revascularization of all critical coronary lesions is a class I recommendation, level of evidence B, for patients with CS in the European Society of Cardiology guidelines on myocardial revascularization,[7] which reflects the fact that two or more coronary territories are frequently involved in the genesis of CS due to pump failure.[8]

Besides revascularization, other diagnostic and therapeutic measures are also crucial to management of CS, particularly vasopressor and inotropic agents, invasive mechanical ventilation, renal replacement therapy and mechanical support therapies such as intra-aortic balloon pump counterpulsation.[4] When necessary, some of these measures can be begun in a pre-hospital context. Invasive hemodynamic monitoring, insertion of an arterial line and pulmonary artery catheterization to measure right and left pressures and outputs and calculate pulmonary and systemic vascular resistance are essential in assessing the efficacy of such measures.

Despite advances in the management and treatment of patients with CS, mortality has not changed significantly in recent years and remains high: around 50% of MI patients who suffer CS die in hospital.[2] On the other hand, those who recover have good long-term survival, which makes it imperative to develop strategies to stabilize these patients, especially in the first hours following the event.

The aim of this study was to analyze changes in the clinical characteristics, treatment and mortality of patients with