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ORIGINAL ARTICLE

Worsening or 'pseudo-worsening' renal function? The prognostic value of hemoconcentration in patients admitted with acute heart failure

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KEYWORDS

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syndrome;
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Abstract

Introduction: Renal insufficiency, as evidenced by an increase in creatinine, is associated with higher mortality in patients with acute heart failure (AHF). Conversely, hemoconcentration (HC) in AHF is associated with lower mortality, but can also cause an increase in creatinine. Our aim was to assess the prognosis of HC in patients hospitalized for AHF presenting with or without worsening renal function (WRF).

Methods: A total of 618 consecutive patients admitted for AHF were included. WRF was defined according to the Kidney Disease Improving Global Outcomes (KDIGO) criteria and HC was defined as an elevation of hemoglobin during hospitalization compared to the admission value. Six-month all-cause mortality was analyzed.

Results: The patients' mean age was 79 ± 11 years; 58% were women. Mortality at six months was 38% and 49% of patients had WRF. HC occurred in 38.9% of patients with WRF and was associated with improved survival (HR 1.6, 95% CI 1.10-2.34; $p=0.02$) compared to WRF without HC. HC was associated with better survival in KDIGO stages 1 and 2 (HR 1.8; 95% CI 1.1-2.8; $p=0.01$). For patients without chronic kidney disease (CKD) with WRF in stages 1 and 2, HC was associated with significantly better survival (HR 2.3; 95% CI 1.2-4.2; $p=0.01$).

Conclusion: In patients admitted for AHF without renal failure or CKD, WRF with HC is associated with a better prognosis, similar to that of patients without WRF, and should therefore be reclassified as 'pseudo-WRF'.

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PALAVRAS-CHAVE

Síndrome
cardiorrenal;
Agravamento
da função renal;
Hemoconcentração

Agravamento da função renal ou «pseudo-agravamento da função renal?». O impacto prognóstico da hemoconcentração em doentes admitidos com insuficiência cardíaca aguda

Resumo

Introdução: Alterações na função renal com aumento da creatinina têm sido associadas a maior mortalidade em doentes com insuficiência cardíaca aguda (ICA). Já a hemoconcentração na ICA tem-se associado a redução da mortalidade, é também uma causa de elevação da creatinina. Avaliar o prognóstico da hemoconcentração (HC) em doentes hospitalizados por ICA com e sem agravamento da função renal (AFR).

Métodos: Analisados 618 doentes consecutivos admitidos por ICA. Definido agravamento da função renal de acordo com os critérios KDIGO e HC como elevação da hemoglobina durante a hospitalização comparativamente à admissão. Avaliada morte por qualquer causa aos seis meses.

Resultados: A idade média foi 79 ± 11 anos; 58% mulheres. A mortalidade aos seis meses foi de 38%; 49% dos doentes tiveram AFR. HC ocorreu em 38,9% dos doentes com AFR e associou-se a maior sobrevivência após ajuste de fatores demográficos e comorbilidades (HR 1,6; IC95%: 1,06–2,33; $p=0,026$), comparativamente a AFR sem HC. Na avaliação por estádios KDIGO, HC associou-se a maior sobrevivência nos estádios 1 e 2 (HR 1,8; IC95%: 1,1–2,8; $p=0,01$). Nos doentes com doença renal crónica (DRC) com AFR nos estádios 1 e 2, a HC esteve associada a maior sobrevivência (HR 2,3, IC95%: 1,2–4,2, $p=0,01$).

Conclusão: Em doentes admitidos por ICA sem falência renal ou DRC, o AFR com HC está associada a bom prognóstico. O seu prognóstico é similar a doentes sem AFR e deverá assim ser reclassificado como «pseudo-AFR».

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Introduction

Heart failure is a chronic systemic disease, the symptoms and natural history of which are related to neurohormonal dysregulation impacting water and sodium retention.¹ Kidney disease is one of the most important comorbidities and its presence is a powerful predictor of poor outcomes in patients with heart failure.¹ Only 9% of the 118 465 patients admitted with acute heart failure (AHF) in the Acute Decompensated Heart Failure National Registry (ADHERE) had normal renal function (defined as glomerular filtration rate [GFR] ≥ 90 ml/min/1.73 m²).²

Worsening renal function (WRF) occurs in 30–50% of patients admitted with heart failure, depending on the definition used. It is associated with higher rehospitalization rates, increased length of hospital stay, higher mortality (with one-year mortality around 30%), and greater health costs.^{3–5}

Historically, impairment of renal function has been attributed to low cardiac output and resulting renal hypoperfusion.^{6,7} Nevertheless, there is growing evidence that other factors, such as tubular structural damage, systemic venous congestion and elevated intra-abdominal pressure, are strongly associated with WRF.^{6–13}

It has been suggested that AHF patients with mild creatinine elevation but without established renal failure have a better prognosis, since these changes are due to hemoconcentration (HC) rather than to true WRF.^{14–18}

Our aim was to assess HC in patients hospitalized for AHF presenting with or without WRF and to determine its prognostic value.

Methods

Study design

This was a single-center retrospective study of patients admitted for AHF. Clinical, laboratory, and echocardiographic data were collected.

The protocol was approved by the head of our institution's cardiology department and the ethics committee in March 2014, in accordance with the principles of the Helsinki Declaration and national regulations.

Patients and eligibility criteria

We enrolled 618 consecutive patients admitted to our cardiology department for AHF between January 1 and December 31, 2012.

AHF was defined as the rapid onset of symptoms and signs secondary to abnormal cardiac function and the presence of objective evidence of a structural or functional abnormality of the heart at rest (cardiomegaly, third heart sound, cardiac murmur, echocardiographic abnormality or elevated natriuretic peptides). These diagnostic criteria were in accordance with the 2016 European Society of Cardiology heart failure guidelines.⁷

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