



ORIGINAL ARTICLE

Changes in albumin-to-creatinine ratio at 12-month follow-up in patients undergoing renal denervation



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KEYWORDS

Resistant hypertension;
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Abstract

Introduction: Sympathetic renal denervation (RDN) was developed as a treatment for the management of patients with resistant hypertension. This procedure may have a positive impact on hypertension-related target organ damage, particularly renal disease, but the evidence is still limited.

Objective: To assess the impact of RDN on the albumin-to-creatinine ratio (ACR) at 12-month follow-up.

Methods and Results: From a single-center prospective registry including 65 patients with resistant hypertension undergoing renal denervation, 31 patients with complete baseline and 12-month follow-up blood pressure (BP) measurements (both office and 24-h ambulatory blood pressure monitoring [ABPM]) and ACR were included in the present study. Mean age was 65 ± 7 years, 52% were female, most (90%) had been diagnosed with hypertension for more than 10 years, 71% had type 2 diabetes and 33% had vascular disease in at least one territory. Mean estimated glomerular filtration rate was 73.6 ± 25.1 ml/min/1.73 m² and 15 patients (48%) had an ACR >30 mg/g. After 12 months, 22 patients were considered BP responders (73%). ACR decreased significantly from a median of 25.8 mg/g (interquartile range [IQR] 9.0–574.0 mg/g) to 14.8 mg/g (IQR 4.5–61.0 mg/g, $p=0.007$). When the results were split according to systolic BP responder status on ABPM, we found a significant reduction in responders (from 25.6 mg/g [IQR 8.7–382.8 mg/g] to 15.9 mg/g [IQR 4.4–55.0 mg/g], $p=0.009$), and a numerical decrease in the non-responder subgroup (from 165.0 mg/g [IQR 8.8–1423.5 mg/g] to 13.6 mg/dl [IQR 5.7–1417.0 mg/g], $p=0.345$).

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PALAVRAS-CHAVE

Hipertensão arterial resistente;
Desnervação renal;
Albuminúria;
Pressão arterial

Conclusions: Besides significant reductions in blood pressure (both office and 24-h ABPM), renal denervation was associated with a significant reduction in ACR, a recognized marker of target organ damage.

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Rácio albumina-creatinina aos 12 meses de seguimento após desnervação renal**Resumo**

Introdução: A desnervação simpática renal (RDN) foi desenvolvida como uma forma de tratamento para os doentes com hipertensão arterial resistente (R-HTN). Este procedimento poderá ter um impacto favorável nas lesões de órgão alvo relacionadas com a hipertensão, nomeadamente a doença renal, no entanto, a evidência disponível ainda é escassa.

Objetivo: Avaliar o impacto da RDN no rácio albumina-creatinina (ACR) aos 12 meses de seguimento após RDN.

Métodos e resultados: Registo prospetivo de centro único incluindo 65 doentes com R-HTN submetidos a RDN, dos quais 31 doentes com avaliação basal e a um ano completa da pressão arterial (na consulta e na monitorização ambulatória [ABPM]) e da ACR foram incluídos no presente estudo. A idade média foi de 65 ± 7 anos, 52% do sexo feminino. A maioria da população tinha diagnóstico de HTN há >10 anos, 71% tinha diabetes tipo 2 e 33% tinham doença vascular em pelo menos um território. A taxa de filtração glomerular estimada foi de $73,6 \pm 25,1$ ml/min/1,73 m² e 48% (15 doentes) tinham uma ACR >30 mg/g. Aos 12 meses de seguimento, 22 doentes foram considerados respondedores na pressão arterial (73%). A ACR teve uma descida significativa de uma mediana de 25,8 mg/g (IQR 9,0-574,0 mg/g) para 14,8 mg/g (IQR 4,5-61,0 mg/g, $p=0,007$). Quando os resultados foram divididos em subgrupos, de acordo com o estado de respondedor à pressão arterial na ABPM, verificou-se uma redução significativa nos respondedores (de 25,6 mg/g [IQR 8,7-382,8 mg/g] para 15,9 mg/g [IQR 4,4-55,0 mg/g], $p=0,009$), e uma tendência no subgrupo de não respondedores (de 165,0 mg/g [IQR 8,8-1423,5 mg/g] para 13,6 mg/dl [IQR 5,7-1417,0 mg/g], $p=0,345$).

Conclusão: Para além da descida significativa da pressão arterial (quer na consulta quer na monitorização ambulatória de 24 h), a desnervação renal associou-se a uma redução significativa da ACR, um reconhecido marcador de lesão de órgão alvo na hipertensão arterial.

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Introduction

Cardiovascular disease is the leading cause of morbidity and mortality in developed countries and hypertension is one of its most important risk factors.¹ Some hypertensive patients have drug-resistant hypertension and are at a higher risk of events.^{2,3} Besides clinical events, assessment of target organ damage can provide earlier insights into the biological impact of hypertension. For several years, albuminuria has been recognized as an indicator of cardiovascular risk, although the pathophysiology behind this association is still not fully understood.⁴⁻⁶

In recent years sympathetic renal denervation (RDN) has been developed as a treatment for the management of patients with resistant hypertension^{7,8} and it may have a positive impact on hypertension-related target organ damage. An example is recently published reports of reductions in left ventricular hypertrophy after RDN.⁹⁻¹¹ The kidney is also an important organ in this context, but evidence on the

effect of RDN on proteinuria is still limited and results are conflicting.^{12,13} The aim of the present study was to assess the impact of RDN on the albumin-to-creatinine ratio (ACR) at 12-month follow-up.

Methods**Study design and patient population**

From a single-center prospective registry including 318 patients with resistant hypertension referred for RDN between July 2011 and April 2015, we included for the purpose of the present study 31 patients with complete information on blood pressure (BP) measurements (both office and 24-h ambulatory blood pressure monitoring [ABPM]) at baseline and 12 months, transthoracic echocardiogram and renal function (creatinine clearance and ACR), out of 65 patients who were considered good candidates and underwent RDN (Figure 1).

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