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Metabolic syndrome-related features in controlled and resistant hypertensive subjects

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Abstract

Objective: The purpose of this study was to evaluate the prevalence of metabolic syndrome (MetS) and the clinical features associated with it in resistant and mild to moderate hypertensives. **Methods:** This cross-sectional study included 236 patients, (i) 129 mild to moderate hypertensive patients and (ii) 107 patients with resistant hypertension (RHTN). We determined blood pressure measurements and adipokines levels. Target organ damages such as microalbuminuria (MA), cardiac hypertrophy and arterial stiffness were also assessed. **Results:** We found a prevalence of 73% in resistant and 60% in mild-to-moderate hypertensive patients. The patients with MetS showed a higher prevalence of MA $\geq 30\text{mg.g}^{-1}$ compared to their counterparts (20% vs. 4%). Adiponectin levels were significantly lower in patients with MetS (5.30 vs. $7.50 \mu\text{g.mL}^{-1}$), while leptin demonstrated to be increased in those patients, compared to the subjects without MetS (21.0 vs. 15.7 ng.mL^{-1}). Finally, in a multiple regression analysis MA (OR=8.51; $p=0.01$), leptin/adiponectin ratio (LAR) (OR=4.13; $p=0.01$) and RHTN (OR=3.75; $p=0.03$) were independently associated with the presence of MetS, apart from potential confounders. **Conclusions:** Our findings suggest that the metabolic derangements present in MetS tend to develop early signs of end-organ damage with hormonal changes in hypertensive patients. Indeed, LAR may be useful as a reliable biomarker for identifying those who are at risk for developing MetS.

Key words:

Hypertension, Adipokines, Obesity.

Introduction

High blood pressure and resistance to antihypertensive therapy are associated with various anthropometric and metabolic abnormalities¹ including abdominal obesity, elevated triglycerides, reduced high-density lipoprotein cholesterol, glucose intolerance and insulin resistance. The mechanisms of obesity-related hypertension include, among others, inflammatory adipokines² and overactivation of the renin-angiotensin system, which have demonstrated a significant role in the pathogenesis of metabolic syndrome (MetS) and resistant hypertension (RH). The purpose of this study was to evaluate the prevalence of MetS and the clinical features associated with it in resistant and mild to moderate hypertensives.

Results and Discussion

This cross-sectional study included 236 patients, (i) 129 mild to moderate hypertensive patients and (ii) 107 patients with RH. We determined blood pressure measurements and adipokines levels. Target organ damages such as microalbuminuria (MA), cardiac hypertrophy and arterial stiffness were also assessed.

We found a MetS prevalence of 66% in all hypertensive population. Neither office and ambulatory BP levels nor the proportion of patients with uncontrolled office BP ($>140/90\text{mmHg}$) were different between groups. The patients with MetS showed a higher prevalence of MA compared to their counterparts. Additionally, adiponectin levels were significantly lower in patients with MetS, while leptin demonstrated to be increased in those patients, compared to the subjects without MetS.

Finally, the multiple logistic regression revealed that MA, leptin/adiponectin ratio and resistance to antihypertensive treatment were independently associated with the presence of MetS (Table 1)

Table 1 – Multiple logistic regression for the presence of MetS*

	Odds ratio	95% CI	p-value
LAR >3.7	4.13	1.38 – 12.34	0.01*
HR (bpm)	0.97	0.92 – 1.03	0.39
MA >30 (mg.g $^{-1}$)	8.51	1.53 – 47.14	0.01*
hs-CRP (mg.dL $^{-1}$)	2.92	0.83 – 10.19	0.09
RHTN	3.75	1.09 – 12.92	0.03*

*Also adjusted for age, gender and race. Abbreviations: MetS, metabolic syndrome; hs-CRP, high-sensitivity c-reactive protein; HR, heart rate; MA, microalbuminuria; RHTN, resistant hypertension; LAR >3.7 , leptin adiponectin ratio (LAR) >3.7 (the cutoff value was determined by median value). * $p<0.05$

Conclusions

Our findings suggest that the metabolic derangements present in MetS tend to develop early signs of end-organ damage with hormonal changes in hypertensive patients. Indeed, LAR may be useful as a reliable biomarker for identifying those who are at risk for developing MetS.

Acknowledgement

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