The Impact of Hypertension and Anaemia on the Abnormalities of Left Ventricular Geometry in Chronic Renal Disease Patients

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Introduction

The abnormalities of the left ventricular geometry are one of the major pathological conditions that determine the prevalence of cardio-vascular diseases in patients with chronic renal disease (CRD) (1-3). Between the risks factors that contribute in the implementation of left ventricular abnormalities, hypertension and anemia are the major determinants (4, 5).

Hypertension is a leading cause of left ventricular hypertrophy (LVH) in CRD patients and is more closely related to systolic than to diastolic pressure (6). The clinical characteristics of hypertension depend on the dominant factors altering arterial impedance (7). Increased peripheral resistance is characterized by increased mean blood pressure and diastolic pressure, whereas increased arterial stiffness is characterized by increased systolic pressure and wide pulse pressure, with normal or low diastolic pressure (8).

Anemia has been shown to be a key component not only of dialysis and CRD but also of cardiac disease including LHV and chronic heart failure (CHF) (9, 10). The increased cardiac output induced by anemia is associated with left ventricular hypertrophy and cardiac disease in renal patients (11). Prospective studies in pre-dialysis and dialysis patients have identified as significant risk factor for LHV and CHF (12). Reduction in Hb concentration was associated with left ventricular grown even in patients with early renal disease (13). Overall, the effects of anemia on LV geometry probably contribute to the increased mortality observed in patients with renal anemia despite adequate renal replacement therapy (14).

The aim of this study is the evaluation of the impact of hypertension and anemia on the implementation of the abnormalities of left ventricular geometry.

Materials and methods

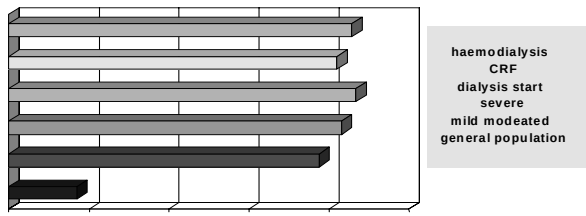
We studied 146 patients in different stages of CRD admitted at the service of nephrology and dialysis in the period from January 2000 - February 2002. The prevalence of left ventricular abnormalities has been determined by bidimensional echocardiography. We determine the level of blood pressure for each patient. We evaluated anemia for each patient by the level of hemoglobin.

The patients were devised in 4 groups. The first group comprises the patients presenting mild to moderate CRF, (ClCr 25-75 ml/min), the second group the patients presenting severe CRF, (ClCr 10-25 ml/min), the third group the patients at the dialysis start (ClCr < 10ml/min) and the last one the patients presenting end stage of CRF (haemodialysis).

Results

There were 40 patients in the first group, 35 in the second, 41 in the third and 30 in the fourth group. The echocardiographicly determined prevalence of left ventricular abnormalities was 77,5% in the mild-moderated CRF; 83,0% in severe CRF; 86,7% at the dialysis start and 85,7% in the hemodialysis group (Fig. 1).

Fig. 1 ECHOCARDIOGRAPHYC ANOMALIES IN DIFFERENT STAGE OF CRD



The overall blood pressure was 155/97,25mmHg; 141,2 / 94,4 mmHg; 150,5 / 97,7 mmHg; 146,9 / 88,4 mmHg in each category of patients with CRD (Tab. 1).

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Tab. 1 Prevalence of hypertension in different stages of CRD and by different anomalies of LV

	Mild-mod	severe	dial start	haemodial
Normal	**33,3%**	**28,6%**	**0,0%**	**20,0%**
c LVH	**77,7%**	**88,9%**	**100%**	**50%**
e LVH	**100%**	**33,4%**	**--**	**37,5%**
LV dil	**94,4%**	**68,1%**	**94,4%**	**100%**
overall	**67,5%**	**63,5%**	**83,4%**	**68,6%**

The overall haemoglobin was 8,6gr/dL; 8,1gr/dL; 7,5gr/dL and 9,24gr/dL.

The evaluation of the specific role of hypertension and anaemia on the implementation of left ventricular abnormalities has been determined using the ANOVA multifactorial analysis that resulted y (LVM) = 0,324 + 1,258(HBP) + 0,258 (anemia).

Conclusions

1- The prevalence of hypertension and anemia is very high in patients with CRD.

2- The high prevalence of the LV anomalies is influenced by the high prevalence of hypertension and anemia.

3- The influence of hypertension in inducing changes for the LV geometry is more important than the influence of anemia.

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