

Subclinical Target Damage of Organ and Creatinine Clearance in Patients with Primary Hypertension

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ABSTRACT

Background: In spite of the broadly documented risk-factors of uncontrolled hypertension, this ailment is still not cured in most patients. This may be due largely to the symptomless disease nature in the initial 15-20 years, also with progressive damage to the cardio-vascular system. Therefore, the valuation of target damage of organs due to hypertension subclinically is an important procedure for diagnosis of risk-factors stratification in patients with hypertension. The aim of this study is to determine the subclinical target damage of organ among patients with primary hypertension

Study Design: A prospective case-control study.

Methods: A total of 120 patients were included in this study. Patients with >60 creatinine clearance rate were taken as controls and < 60 creatinine clearance rate as the case group. The 2 groups were made of equal patients 60 in each group. The Cockcroft-Gault formula was applied for determination of renal function and echocardiography was used for valuation of Left ventricular hypertrophy. Direct ophthalmoscopy was done in all patients to assess the retinal vascular changes. Urine microalbumin was evaluated from the morning spot sample.

Results: 120 total patients were included in this study. There were 55 males and 65 females. 52.50 ± 8.61 years was the mean age in the control group and in the case group it was 62.20 ± 7.99 years. The incidence of left ventricular hypertrophy with CCR <60 was 23.3% and 48.3% in patients with CCR >60 ($p = 0.001$). The incidence of microalbuminuria in this analysis was 41.6% in the case group ($p = 0.004$) and it was 16.7% in the control group. Of the 120 patients in the study, 65 (54.2%) were taking medications for hypertension while 73.3% of the patients in the control group were using drugs for hypertension, the proportion of patients using antihypertensive drugs was 63.7%. Blood pressure was controlled in only 25.8% of the cases taking antihypertensive drugs

Conclusions: The obtained outcomes indicate that decreased clearance of creatinine and / or the existence of microalbuminuria is indication of subclinical damage of organ and taken as a marker among individuals with essential hypertension and standard creatinine clearance, independent of BP burden and additional risk factors.

Keywords: Target organ damage, primary hypertension, subclinical and creatinine clearance.

INTRODUCTION

As the people ages and obesity increases, the hypertension prevalence may rise, not solitary in established regions but similarly in underdeveloping countries¹⁻². In spite of the broadly documented risk-factors of uncontrolled hypertension, most patients remain untreated³⁻⁴. Asymptomatic patients are often reluctant to change their lifestyle or take medications to avoid distant and poorly perceived dangers, especially when they feel not comfortable in the procedure⁵⁻⁶. So, the valuation of subclinical target damage of organ due to hypertension is a vital analytic technique in the hypertensive patient's stratification conferring to their risk profile of cardiovascular system⁷. Current strategies published co-operatively by the European Society of Cardiology and Hypertension (ESC-ESH) have highlighted the signs, therapeutic implications and rationale of this assessment⁸. Augmenting the analytical method to detect the target damage of organs is critical for the rational and cost-effective distribution of financial incomes⁹⁻¹⁰.

While a large diagnostic test may identify more patients at risk, routine target organ injury ultrasound assessment can be very costly and impractical when performed on a huge scale¹¹. Therefore, the expansion of innovative, low-cost and integrated tools for identifying the highest-risk patients can be of great benefit in medical

exercise¹². This analysis is probable to aid compliance in patients with asymptomatic hypertension by raising awareness of subclinical damage of organ. It additionally projected to support the purpose of the microalbuminuria and creatinine clearance rate (CCR) as a daily-routine practice for assessing patients with hypertension, as these tests are less expensive and readily available.

METHODS

This is a prospective case-control analysis was held in the Department of Internal Medicine, Islam Medical and Dental College Sialkot for six-months duration from July 2021 to December 2021. The patients with normal serum creatinine and primary hypertension were involved in the study. A total of 120 patients were included in this study. Patients with >60 creatinine clearance rate were taken as controls and < 60 creatinine clearance rate as the case group. The 2 groups were made of equal patients 60 in each group. The subjects with hypertension and significant damage of organ, severe obesity and diabetes mellitus (DM) were omitted from the analysis. The Cockcroft-Gault formula was applied for determination of renal function and echocardiography was used for valuation of Left ventricular hypertrophy. Direct ophthalmoscopy was done in all patients to assess the retinal vascular changes. Urine

microalbumin was evaluated from the morning spot sample. All analyses were achieved with SPSS v 21.0.

RESULTS

The M:F ratio of the patients studied was 1: 1.3. There were 55 males and 65 females. 52.50 ± 8.61 years was the mean age in the control group and in the case group it was

62.20 ± 7.99 years. The hypertension mean duration in years was 5.18 ± 2.11 in the control group and 7.22 ± 3.97 in the case group. 75.88 ± 10.01 ml / min per 1.73 m^2 was the mean CCR in the control group and in the case group; it was 51.05 ± 5.87 ml / min with 1.73 m^2 . The incidence of microalbuminuria, retinopathy and LVH was significantly greater in cases with CCR <60 (Table-I).

Table 1: Incidence of Target organ damage (TOD) in patients conferring to creatinine clearance rate

Patients	LVH	LVDD	MICROALBUMINURIA	RETINO
With CCR				
	Freq. %	Freq. %	Freq. %	Freq. %
>60n=60	14(23.3)	11(18.3)	10(16.7)	26(43.3)
<60n=60	29(48.3)	18(30)	25(41.6)	42(70)
r value	-0.359	-0.318		
P-value	0.001	NS	0.003	0.001

Correspondingly, worsening of renal function, left ventricular hypertrophy and retinopathy were greater significantly in cases with microalbuminuria (Table 2).

Table 2: Incidence of TOD in patients with microalbuminuria

MICROALBUMINURIA	LVH	CCR<60	RETINO
	Freq. %	Freq. %	Freq. %
(+) (n=43)	26(60.5)	28(65.1)	39(90.7)
(-) (n=77)	11(14.3)	30(38.9)	37(48.1)
r value	0.668	-0.315	
p value	0.000	0.003	0.001

Of the 120 patients in the study, 65 (54.2%) were taking medications for hypertension while 73.3% of the patients in the control group were using drugs for hypertension, the proportion of patients using antihypertensive drugs was 63.7%. Blood pressure was controlled in only 25.8% of the cases taking antihypertensive drugs. Blood pressure was comparatively well controlled in the control group, while it was managed in 51.7% of the patients on treatment. The worsening of renal function, left ventricular hypertrophy, retinopathy and microalbuminuria were higher significantly in untreated patients and among those whose blood pressure was not controlled with medication.

DISCUSSION

This study shows that the slight decrease in CCR is related with subclinical target damage of organ, specifically retinal vascular changes, LVH and microalbuminuria in the primary hypertension people with normal levels of serum creatinine¹³. This information refers to earlier reports showing a relation between poor cardiovascular prognosis and mild renal dysfunction in patients with hypertension¹⁴⁻¹⁵. In the Follow-up Program and Hypertension Detection, a rectilinear relationship between cardiovascular mortality and serum creatinine was pragmatic during the five years of follow-up, and the risk of death was 2-fold higher in subjects with > 1.7 mg / dL level of serum creatinine¹⁶. Currently in the study of HOT, a small rise in serum creatinine was related with a 3.3-fold rise in the death rate, irrespective of common cardiovascular risk factors¹⁷⁻¹⁸. GFR assessment in individuals with isolated systolic hypertension and in patients with associated CVS risk factors contributing in the analysis by HOPE¹⁹. Amongst the quantifiable target organ damage (TOD) markers, the analytical value of echocardiographically established left ventricular hypertrophy in high blood pressure is well

recognized. Left ventricular hypertrophy is usually considered as "blood pressure haemoglobin A1C" because it is an impartial assessment of severity and the elevated blood pressure²⁰⁻²¹. The incidence of left ventricular hypertrophy with CCR <60 was 23.3% and 48.3% in patients with CCR >60 (p = 0.001). This value is somewhat lesser than revealed by Giovanna Leoncini et al. (43% vs 72%, p = 0.0001)²². Cesare Cuspidi et al exhibited LVH pervasiveness of twenty percent. Fagard R et al institute symptomless LVDD in 34% of subjects deprived of LVH. There was a substantial positive association amid microalbuminuria and LVH (r = 0.668, p = 0.000), smoking (r = 0.449, p = 0.000) and duration of hypertension (r = 0.352, p = 0.001) and uncontrolled blood pressure (r = 0.314, p = 0.019)²³. There was a substantial negative association amid CCR and LVH (r = -0.359, p = 0.001). Likewise, the incidence of microalbuminuria in this analysis was 41.6% in the case group (p = 0.004) and it was 16.7% in the control group. Although these values are greater than those reported by Giovanna Leoncini et al., They are dependable with the values reported by Bigazzi R et al and Hsegholm A et al²⁴. In their analysis, the incidence of microalbuminuria in patients with essential hypertension selected from hypertension clinics ranged from 25% to 40%.

In our analysis, we institute a substantial negative correlation amid CCR and microalbuminuria (r = -0.314, p = 0.004). This conclusion was similar to that of De La Sierra et al who exhibited that serum creatinine > 89 pmol / L (95% CI: 1.40-6.85, Odds Ratio: 3.08) was independently related with raised excretion of albumin in urine. Cesare Cuspidi et al. Demonstrated a variable degree of retinopathy in 81% of individuals²³⁻²⁴. G. MULÉ et al exhibited an advanced incidence of hypertensive retinopathy in subjects with metabolic syndrome and hypertension (48.4% vs 87.7%; p < 0.00001)²⁵.

CONCLUSION

Decreased creatinine clearance is an indicator of subclinical damage of organ among patients with normal serum creatinine concentration and primary hypertension independent of traditional risk factors and BP load. Therefore, due to its low cost and easy availability, this test

can be accomplished on daily basis not only to evaluate renal function, but also to attain a more sensitive assessment of damage of cardiovascular system in subjects with hypertension.

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