Microalbuminuria and Left Ventricular Hypertrophy in Essential Hypertension
Consequence or Cause

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See article on page 192

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Essential hypertension (EH) is one of the most common medical problems in the general population and is one of the most important modifiable cardiovascular risk factors. Left ventricular hypertrophy (LVH) has also a prognostic value in patients with EH that strongly correlates with adverse cardiovascular outcome. It is identified that presence of LVH is associated with an increased risk of sudden cardiac death, myocardial infarction, arrhythmia, progression of congestive heart failure, stroke, and abdominal aorta enlargement. [1,2] The monitoring of the 24-hour blood pressure level and blood pressure variation, especially early morning blood pressure rising, is more predictive of LVH than a single measurement in clinic. Blood pressure control with most classes of antihypertensive drugs, except for minoxidil and hydralazine, can help LVH regression and reduction of cardiovascular risk.[1] Ramipril, an angiotensin-converting enzyme inhibitor, decreases the development and causes regression of echocardiography-LVH independent of blood pressure reduction, and these changes are associated with reduced risk of death, myocardial infarction, stroke, and congestive heart failure.[3]

Albuminuria, particularly microalbuminuria, is a common finding in EH and it a predictor of cardiovascular risk. Microalbuminuria is more common in individuals with longer duration and greater severity of hypertension. Age, dyslipidemia, and higher body mass index are the other risk factors for microalbuminuria.[4] Hypertensive patients with microalbuminuria manifest a greater incidence of cardiovascular events and a greater decline in kidney function than do patients without microalbuminuria,[5] and patients with microalbuminuria have a higher risk for target organ damage in future, such as stroke, LVH, and hypertensive retinopathy.[4] Serum levels of cholesterol, triglycerides, and uric acid in patients with microalbuminuria are higher than levels in those without microalbuminuria, whereas levels of high-density lipoprotein cholesterol in patients with microalbuminuria is lower than the levels in patients with normal urine albumin excretion.[5]

Epidemiological and experimental data show that microalbuminuria is associated with an increased risk for all-cause and cardiovascular mortality, cardiac abnormalities, cerebrovascular disease, and, possibly, peripheral arterial disease.[6] In hypertensive children and adolescents, microalbuminuria also is a predictor of LVH, and microalbuminuria lowering may stop the progression and even persuades the regression of LVH.[7] In a recent study that is published in this issue of the *Iranian Journal of Kidney Diseases*, Monfared and colleagues[8] reported the correlation of microalbuminuria and LVH in patients with EH. They have found that the frequency of microalbuminuria in hypertensive patients with LVH is higher than in those without LVH. Ibsen and coworkers found in 8206 hypertensive patients with LVH and 39 122 patient.years follow-up that cardiovascular mortality and morbidity increased continuously with increases of the amount of albuminuria.[9] Microalbuminuria is not only associated with LVH, but also corelated with a 5-fold greater risk of inappropriate LVH and global myocardial performance impairment.[10,11] Albuminuria and LVH reflect different aspects of cardiovascular damage and are modifiable cardiovascular risk factors.[12]

These may be consequences or causes of organ damage in hypertensive patients. Some different hypotheses are described; albuminuria and LVH may be signs of target organ damage and reflect the severity and complication of hypertension or results of a common underlying pathologic cause.

Individuals with microalbuminuria and EH show evidence of atherosclerosis and inflammation. Cottone and colleagues showed that plasma levels of intercellular adhesion molecule-1 ($P < .001$) and vascular cell adhesion molecule vascular cellular adhesion molecule-1 ($P < .001$) were higher in individuals with EH than in a control group, and these levels were higher in patients that had microalbuminuria than those without microalbuminuria (intercellular adhesion molecule-1, $P = .04$; vascular cellular adhesion molecule-1, $P = .02$). This may reflect activation of endothelial adhesion molecules in atherosclerosis process.[13] In another study, urinary tumor necrosis factor (TNF)-α excretion in hypertensive patients without microalbuminuria and LVH was higher than that in the healthy control group, whereas patients with LVH had higher levels of high-sensitivity C-reactive protein (CRP) and urinary TNF-α excretion. In the this study, albuminuria was significantly associated with the mean blood pressure, LVH, high-sensitivity CRP and urinary TNF-α excretion (adjusted $R^2 = 0.77$, $P < .001$).[13] This suggests that inflammation may play a role in target organ damage in hypertension.[14] Moreover, Yarlioglues and associates reported that the mean platelet volume levels (a marker of platelet activity) in hypertensive patients correlated with the severity of subclinical organ damage, carotid atherosclerosis, LVH, renal damage, and high-sensitivity CRP level.[15]

Low-level microalbuminuria (< 30 µg/mg) even in nonhypertensive nondiabetic individuals with normal kidney function predict the development of cardiovascular disease,[16] and it has been shown that it predisposes the patient to future heart failure in old men within a 9-year follow-up.[17]

In summary, microalbuminuria is significantly correlated with the presence of LVH. These are significant predictors and risk factors of cardiovascular diseases. This may be related to the evidence of the underlying systemic pathologies such as atherosclerosis or another genetic or metabolic disease. Future studies are needed to answer these questions.

CONFLICT OF INTEREST

None declared.

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Postmenopausal Osteoporosis Treatment and Risk of Urinary Calculus Development

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See article on page 210

Osteoporosis is a chronic progressive bone disease in which bone resorption exceeds bone formation, leading to a reduction in bone mineral density and disruption of bone micro-architecture. It becomes a serious health threat for postmenopausal women by predisposing them to an increased risk of fracture. Osteoporotic fractures are associated with substantial morbidity and mortality, especially in elderly women. The incidence of osteoporosis increases with age and occurs most frequently in this group, because the decrease in ovarian estrogen associated with the menopause accelerates bone loss and increases bone remodeling.[1] The evaluation of postmenopausal women for osteoporosis risk requires a medical history, physical examination, and diagnostic tests. Major risk factors for postmenopausal osteoporosis include advanced age, genetics, lifestyle factors (such as low calcium and vitamin D intake and smoking), and thinness. The most common risk factors for osteoporotic fracture are advanced age, low bone mineral density, and previous fracture as an adult. Management of osteoporosis focuses first on nonpharmacologic measures, such as a a balanced diet, adequate calcium and vitamin D intake, adequate exercise, smoking cessation, avoidance of excessive alcohol intake, fall prevention, and pharmacologic interventions.[2]

In this issue of the *Iranian Journal Of Kidney Diseases*, Haghighi and colleagues[3] show that calcium and vitamin D replacement has no risk for kidney stone formation through evaluating 53 postmenopausal women followed up for 1 year. There is a threshold between low circulating levels of 25-hydroxyvitamin D and increased secretion of parathyroid hormone (PTH), which induces bone loss in the elderly through increased bone resorption.[2,4] Published studies estimate the level of circulating 25-hydroxyvitamin D required to maintain normal levels of PTH ranges between 30 nmol/L and 100 nmol/L.[5] In a study of 8532 postmenopausal osteoporotic European women, 79.6% were found to have vitamin D insufficiency where the serum 25-hydroxyvitamin D threshold was considered to be 80 nmol/L, and 32.1% if the threshold was set at 50 nmol/L.[6] After discussion of current evidence, it was agreed that 80 nmol/L may be an overestimate and that 50 nmol/L to 80 nmol/L (20 ng/mL to 32 ng/mL) was a more conservative and acceptable threshold. The majority of studies that have investigated the effects of combined calcium and vitamin D in postmenopausal women have shown a reduction in fracture risk, providing that sufficient patient adherence to treatment (75% to 80%) was reached.[7]

Dietary intake of calcium and vitamin D generally