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Correspondence to:
 Mohammad Reza Ganji, MD
 Department of Nephrology, Shariati Hospital, Tehran University of Medical Sciences, Tehran, Iran
 E-mail: mrezaGANJI@yahoo.com

Assessment of Peripheral Vascular Disease in Patients With Chronic Kidney Disease

Mohsen Sadeghi Ghahrodi, Behzad Einollahi

Nephrology and Urology Research Center, Baqiyatallah University of Medical Sciences, Tehran, Iran

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Cardiovascular disease (CVD) is the leading cause of death and a major cause of morbidity in patients

with chronic kidney disease (CKD).¹ Multiple indexes are used to predict severity and prognosis

of CVD in this population. The ankle-brachial index (ABI), a marker of peripheral vascular disease (PVD), carotid intima-media thickness (CIMT), and left ventricular hypertrophy (LVH) or left ventricular mass index are available tools for the assessment of CVD. Peripheral vascular disease, defined as an ABI less than 0.9, is a common complication in CKD patients, and accounts for 22% to 24% of all patients with CKD.² The association of a low ABI with renal insufficiency is independent of age, diabetes mellitus, hypertension, coronary artery disease, stroke history, and hypercholesterolemia.^{2,3} The prevalence of asymptomatic PVD increases with more advanced stages of CKD.⁴

Low or declining ABI is a strong predictor of all-cause and cardiovascular mortality of CKD, hemodialysis, and peritoneal dialysis patients.⁵⁻⁷ Measurement of ABI with Doppler ultrasonography may help identify a high-risk group of rapid kidney function impairment or death.⁸ Higher ABI with conventional risk factors can significantly improve the prediction of 3-year mortality compared to conventional risk factors alone.⁹ An ABI less than 0.9 is significantly associated with increased risk of vascular access failure, peritoneal dialysis technique failure, and worsened kidney transplant survivals.^{7,10,11}

In the current issue of the *Iranian Journal of Kidney Diseases*, Jabbari and colleagues¹² reported a low prevalence of PVD (10%) in hemodialysis patients. However, Luo and associates investigated 3732 adults aged 35 years old and greater and found that the prevalence of peripheral arterial disease in patients with and without CKD was 41.9% and 22.3%, respectively ($P < .001$).¹³ Moreover, Jabbari and colleagues report that a low ABI correlates with traditional risk factors for atherosclerosis such as elevated low-density lipoprotein value and increased amount of serum triglycerides ($P < .05$).¹² Lower prevalence of PVD in this study, and the discrepancy of high-density lipoprotein level in PVD compared with other studies may be due to small sample size and heterogeneity in risk factors.¹²

Peripheral vascular disease in CKD is highly correlated with both traditional risk factors, such as advanced age, diabetes mellitus, CVD, serum triglyceride, residual renal clearance, and novel risk factors such as inflammation, prothrombotic state, oxidative stress, insulin resistance, cystatin C, proteinuria, and high phosphorus levels.^{4,7,8} It is

important to note that kidney failure independent on other risk factors has a powerful impact on PVD.^{2,3} In addition, kidney failure is a common complication in patients suffering from PVD.¹⁴ In one study, kidney function impairment was present in 40% of patients with PVD and they had a high cardiovascular risk profile.¹⁵

The CIMT is also increasingly used as predictor of atherosclerosis. It is a strong predictor of future vascular events, stroke, and myocardial infarction in patients without CKD.¹⁶ Furthermore, the risks of myocardial infarction and stroke and the severity of CAD are increasing with higher CIMT.¹⁷ Many investigators suggested that arterial changes occur early in the course of kidney disease progression and may be related to dyslipidemia in the early stages.¹⁸ Measurement of CIMT with pulse-wave Doppler ultrasonography is the arterial index that independently associated with cardiovascular outcome in patients with CKD.¹⁹ Kastarinen and colleagues found in 247 men and 258 women aged 40 to 62 years that deterioration of kidney function was independently associated with increased CIMT in the middle-aged male population and in the postmenopausal women.²⁰

In a study of Chinese population older than 40 years, it was shown that CIMT was significantly higher in subjects with early stages of CKD, and it correlated with higher prevalence of cardiovascular disease risk factors.²¹ In addition, Ishizaka and colleagues reported that after adjusting for age, fasting plasma glucose, and smoking status, both albuminuria and low estimated glomerular filtration rate are significantly associated with CIMT in CKD patients with hypertension and in individuals with high fasting glucose levels.²²

Finally, LVH is a very common finding in CKD and is another surrogate of CVD. The prevalence of LVH increases at each stage of CKD, reaching 75% at the time of dialysis initiation. An increase in left ventricular mass predicts a higher incidence of clinical events, including all cause and cardiovascular death.²³ Left ventricular enlargement is most probably attributable to chronic volume and flow overload due to anemia, arteriovenous fistula, and sodium-water retention. In CKD patients, hypertension is the most common cause of LVH, but neurohormonal factors such as angiotensin II, parathyroid hormone, endothelin, aldosterone, increased sympathetic activity and increased

plasma catecholamines may play significant roles in myocardial fibrosis and structural changes of the left ventricle.²⁴ Control of modifiable risk factor such as hypertension, anemia and volume overload together with regulation of metabolic and clinical indices may prevent and even reverse of LVH.²⁵

In summary, ABI measurement is useful to identification of high risk CKD patients for cardiovascular events. Low ABI may be as marker of tight cardiovascular risk factor modification to reduction of PVD and cardiovascular events. It is recommended that routine ABI determinations can be useful in patients with CKD for early detection of PVD; however, its cost effectiveness should be investigated in long term prospective studies. CIMT also is a predictor of future cardiovascular events, and may be useful for detection of atherosclerosis in early stage CKD disease. In addition, left ventricular mass index and LVH is an independent predictor of morbidity and mortality of CKD population, and management of risk factors may protect and reverse this abnormality. Serial evaluation of left ventricular indexes with echocardiography may be helpful for cardiovascular risk factors monitoring in CKD patients.

CONFLICT OF INTEREST

None declared.

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Correspondence to:
 Mohsen Sadeghi Ghahrody, MD
 Department of Cardiovascular Medicine, Baqiyatallah University of Medical Sciences,
 Baqiyatallah Hospital, Mollasadra Ave, Vanak Sq, Tehran, Iran
 E-mail: sadeghimg@yahoo.com

Depression Among Dialysis Patients Barriers to Good Care

Farhat Farrokhi

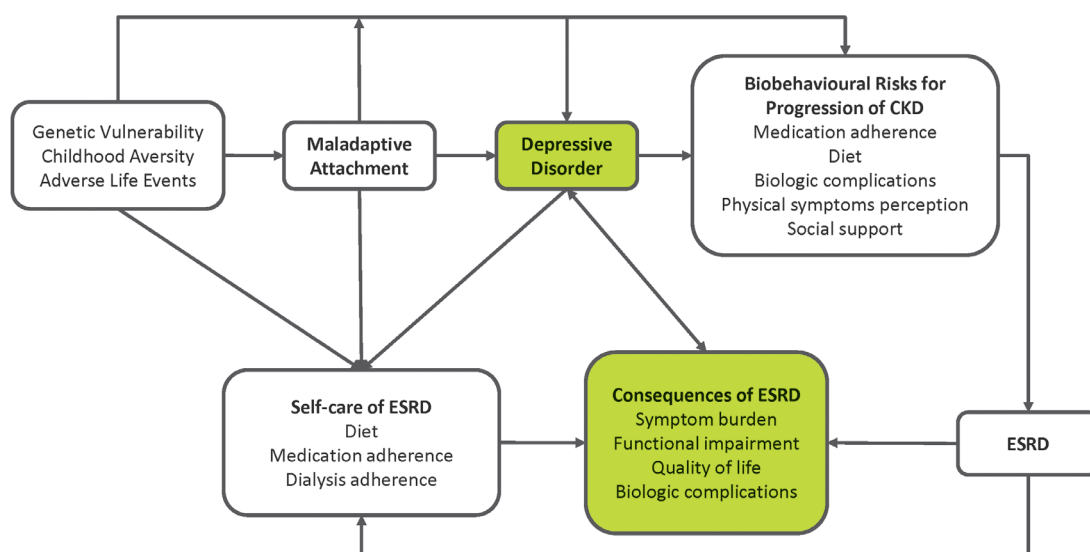
Institute of Health Policy, Management, and Evaluation, University of Toronto, Toronto, Canada

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A patient on dialysis suffers from enormous burden of several somatic symptoms. These are sometimes accompanied with psychological distress; more than 70% have complaints about fatigue, nearly half of the patients experience anorexia and sleep disturbances, and one-fourth of them report ‘feeling down’ or ‘having no interest in doing things.’^{1,2} This puts forward the question to what extent these symptoms are because of an underlying course of depression rather than the uremic state or ‘normal sadness’ because of the

chronic illness. Interestingly, it has been shown that somatic symptoms are the presenting complaint of the majority of patients with chronic conditions who are eventually diagnosed with depression.³ Depression warrants clinical attention as an independent entity among medically ill patients.

The interaction between depression and chronic illnesses is well described by Katon.⁴ Adapting his model for end-stage renal disease (ESRD), we can identify three pathways through which depression and ESRD affect each other (Figure):



A conceptual model for interaction between depression and ESRD. Adapted from the model proposed by Katon.⁴