Takotsubo Cardiomyopathy in Chronic Kidney Disease

Dear Editor,

A 59-year-old female with prolonged history of analgesic abuse was diagnosed with chronic kidney disease (CKD) stage 5 while being evaluated for generalized weakness and normocytic normochromic anemia. Twice-weekly maintenance hemodialysis was initiated with tunneled hemodialysis catheter. She presented with sudden-onset palpitations and shortness of breath. She had pallor, sinus tachycardia, tachypnea, and hypoxia and her blood pressure was 140/90 mmHg. Jugular veins were distended. On systemic examination, breath sounds were diminished in bilateral lung bases and S3 gallop was heard. A 12-lead electrocardiogram (ECG) revealed sinus tachycardia. Cardiac biomarkers were normal. A 2-D echocardiogram revealed large right-sided pleural effusion, severe dysfunction and ballooning of the left ventricle, and mild pulmonary hypertension. Wall motion pattern revealed akinetic true apex, hypokinetic antero-apical and infero-apical segments, and normal basal segments. A coronary angiogram revealed normal coronaries. Right heart catheterization revealed mild ventricular hypertrophy and patent pulmonary artery. A diagnosis of nonischemic cardiomyopathy, possibly takotsubo cardiomyopathy (TKCM), was made. She was treated with diuretics, beta-blockers, and dialysis. A clinical psychologist helped her recover from emotional stress that she faced while initiating hemodialysis. She recovered well with treatment, and a follow-up echocardiogram after 3 months revealed normal heart function.

CKD patients are at risk for cardiovascular disease (CVD). Sympathetic nervous system (SNS) hyperactivity and elevated catecholamine levels are commonly seen in CKD.[1,2] Elevated catecholamine level in CKD is associated with increased risk of CVD and all-cause mortality.[1] SNS overactivity and elevated catecholamines are known to play key role in the pathogenesis of TKCM (also known as stress cardiomyopathy).[1,2]

TKCM, derived from the Japanese term “octopus pot,” is predominantly reported in elderly women and rarely in men, who suffer emotional or physical stress.[2] and is characterized by left ventricular dysfunction, ECG changes of ST-segment elevation, deep T wave inversion, and elevated cardiac biomarkers.[3] Complete recovery of the left ventricular function has been reported in almost all cases of TKCM.[2] Catecholamine-mediated plaque rupture and wrap around left anterior descending (LAD) artery were initially thought to cause TKCM. However, due to low plaque burden in TKCM patients and as the non-apical variants of TKCM could not be explained by wrap-around LAD, these theories were disregarded.[4] Myocardial stunning secondary to coronary microvascular spasm-induced ischemia has been attributed to apical ballooning and midventricular variety of TKCM.[4] This theory derives justification further from the fact that the ventricular dysfunction in TKCM is not restricted to a single coronary artery territory.[3,4] Coronary microvascular dysfunction secondary to neurohumoral changes has been noted in TKCM.[3,4] However, it is not clear if microvascular dysfunction is a cause or an effect of TKCM. Reduced SERCA2 activity, which has a key function in intracellular calcium homeostasis, has been observed in TKCM.[5] The role of estrogen deficiency on heart in stressful states is yet to be understood and may possibly explain the gender predilection in TKCM.[5] Studies have revealed the protective effect of estradiol in emotional stress-induced structural changes of heart.[5] Mental and physical stress add to the burden of SNS hyperactivity and possibly contribute to the propensity for TKCM.[6] Low levels of serum antioxidants are noted in patients with CKD, and hemodialysis may further deplete their levels. and trigger TKCM.[7] Acute kidney injury is also reported in TKCM.[7] The prognosis of patients with TKCM is generally favorable; however, complications occur in about 20% of cases, and a case of left ventricular free wall rupture and death associated with TKCM has been reported.[3,4]

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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