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Accelerated Cardiovascular-Kidney Metabolic Syndrome Development in a Young Adult with Diabetic Kidney Disease

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Case Study : A 29-year-old male patient with obesity was admitted to our healthcare institution with acute heart failure. Cardiovascular magnetic resonance imaging elucidated non-ischaemic dilated cardiomyopathy (NIDCM) and demonstrated imaging characteristics consistent with the recovery phase of myocarditis. Given the temporal context of the COVID-19 pandemic, it was postulated that the myocarditis may represent a sequela of SARS-CoV-2 infection. The patient concurrently exhibited acute kidney injury, leading to a diagnosis of acute cardiorenal syndrome. During subsequent follow-up, there was a notable amelioration of his heart failure symptoms; however, his renal function progressively deteriorated, culminating in end-stage renal disease within two years of the initial presentation, which ultimately required renal replacement therapy. To investigate the swift progression of renal failure, a renal biopsy was performed. The histological findings were unexpected, diffuse glomerulosclerosis attributed to diabetic nephropathy, despite the patient never having been diagnosed with diabetes. In order to confirm whether diabetes as the underlying cause of nephropathy, a retinal examination was conducted to check for the presence of diabetic retinopathy. The examination indicated severe non-proliferative diabetic retinopathy. This clinical vignette suggests that undiagnosed diabetes may serve as the primary etiological factor underlying the deterioration of renal function. The rapid transition from cardiac failure to renal failure in this patient may be indicative of cardiovascular-kidney-metabolic (CKM) syndrome, which encapsulates the intricate interrelationships among obesity, diabetes mellitus, chronic kidney disease (CKD), and cardiovascular disease (CVD). We aim to discuss CKM syndrome, delineating its potential pathophysiological mechanisms, while providing a synthesis of relevant literature. This case emphasizes the urgent need for systematic screening of CKM risk factors, particularly given the pervasive unawareness of diabetes mellitus among individuals with obesity. Early identification of

these risk factors through structured screening protocols could facilitate timely intervention and significantly improve patient outcomes.

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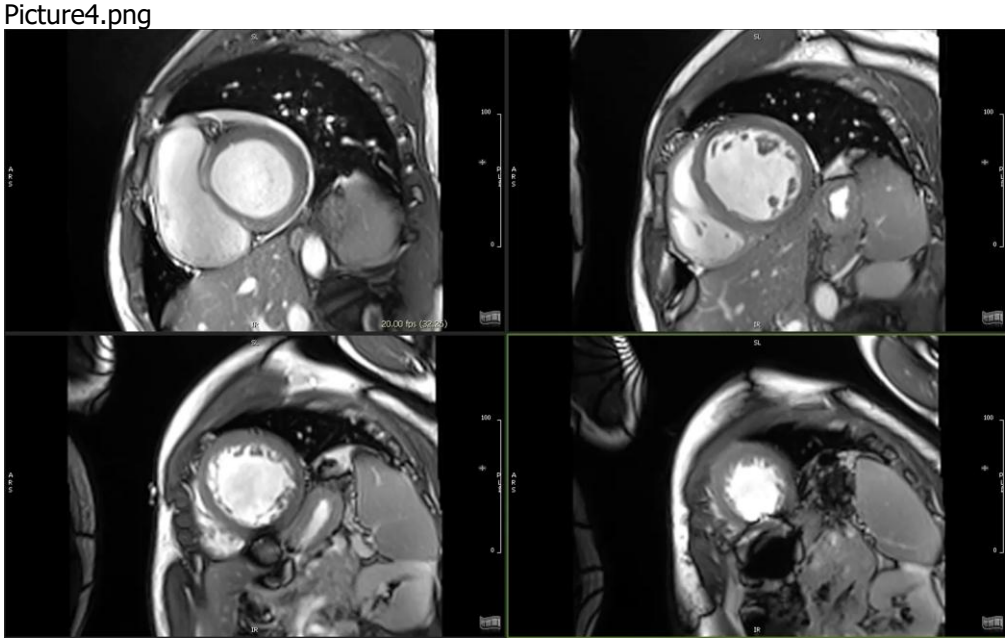

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