

A case of heart failure with normal ejection fraction

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A 75 year-old female patient visited for exertional dyspnea. The symptom has been worsening for the last 6-months. Initial chest radiography and computed tomography (CT) showed pulmonary congestion with cardiomegaly. Echocardiography revealed normal left ventricular ejection fraction, dilated left atrium (AP diameter 4.9 cm), elevated $E/e'(20)$, elevated right ventricular systolic pressure (58mmHg) without left ventricular hypertrophy. Serum N-terminal brain natriuretic peptide level was markedly elevated. Nuclear imaging test showed no inducible myocardial ischemia and CT scan showed intact both renal artery. Despite aggressive diuretics therapy, the volume status was not easily improved. After a few weeks, the symptom of the patients was getting worse so much that it was difficult to walk a few steps despite the decongested lung. Cardiac catheterization demonstrated elevated mean pulmonary artery pressure, elevated pulmonary capillary wedge pressure, and markedly high cardiac output with decreased systemic vascular resistance. The patients finally diagnosed as high-cardiac output heart failure multiple myeloma. High-output heart failure is likely under-diagnosed in patients with multiple myeloma. The underlying pathophysiology is not clearly understood. Possible hypotheses are increased splenic flow due to splenomegaly, small diffuse intramedullary arteriovenous fistula, and cytokine mediated process. High-output heart failure resulted from myeloproliferative disease should be considered in patients with normal or hyperdynamic left ventricular function without any specific causes, especially when diuretics response is poor.