

Case Report

A CASE OF PROBABLE ACUTE MYOCARDITIS IN THE SETTING OF DIABETIC CARDIOMYOPATHY WITH OBESITY HYPOVENTILATION SYNDROME

***Sajit Varghese**

Department of Medicine, Smt. N.H.L. Municipal Medical College, Ahmedabad, Gujarat

**Author for Correspondence*

ABSTRACT

A 30 year old male with subacute onset of breathlessness on exertion and bilateral lower limb swelling with oliguria, was found to have symptoms and signs typically fitting into the famous Pickwickian syndrome. On further evaluation, he turned out to have a newly diagnosed metabolic syndrome with type 2 diabetes mellitus along with obesity hypoventilation syndrome and the distinct entity called diabetic cardiomyopathy. His presenting symptoms were the result of a probable acute myocarditis.

Keywords: *Cardiomyopathy, Hypoventilation*

INTRODUCTION

Ventricular dysfunction occurring in diabetic persons, independently of hypertension and coronary artery disease, is termed as diabetic cardiomyopathy, an entity defined by the echocardiographic evidence of primarily left ventricular diastolic dysfunction with or without left atrial dilatation. Its pathogenetic mechanisms include impaired calcium homeostasis, up regulation of the renin-angiotensin system, increased oxidative stress, altered substrate metabolism, and mitochondrial dysfunction (Boudina *et al.*, 2007). Obesity hypoventilation syndrome (or the Pickwickian syndrome) is defined as a combination of obesity (body mass index more than 30) and awake arterial hypercapnia ($\text{PaCO}_2 > 45$ mm Hg) in the absence of other known causes of hypoventilation, which is associated with pulmonary arterial hypertension and right-sided congestive heart failure (cor pulmonale). It can be associated with the obstructive sleep apnea-hypopnea syndrome (Olson *et al.*, 2005). Metabolic syndrome is defined by NCEP-ATPIII criteria: any of 3 out of the following 5 features: – Central or abdominal obesity (measured by waist circumference, men ≥ 102 cm and women ≥ 88 cm), Fasting blood triglycerides (≥ 150 mg/dl), Fasting Blood HDL cholesterol (Men < 40 mg/dl, women < 50 mg/dl), Hypertension (blood pressure $\geq 130/85$ mmHg), Fasting plasma glucose ≥ 100 mg/dl (Grundy *et al.*, 2005). Probable acute myocarditis is a clinical suspicion, based on symptoms and signs of acute cardiac dysfunction following a viral prodromal illness, without endomyocardial biopsy confirmation (Baughman KL, 2006). The following single case is a novel combination of all these.

CASES

A 30 year old male was admitted with complaints of breathlessness on exertion since 1 week, bilateral lower limb swelling and oliguria since last 3 days. He had history of upper respiratory tract infection 2 weeks before. He was a computer engineer, with a sedentary office lifestyle since last 3 years. He had considerable weight gain in these last few years. Past history revealed that he had difficulty sleeping at night, with multiple episodes of getting up at night, with a feeling of choking, since last 1 year. Associated day-time somnolence and fatigue was present. Family history was insignificant with none of his first-degree relatives having any heart disease or diabetes or obesity. On general examination, we found patient to be obese (BMI 31 with body weight 96 kg and waist circumference 105 cm), and with peculiar snoring and day-time sleepiness. Bilateral pitting pedal edema was present upto just below knee. Rest of the examination was insignificant except for mildly raised jugular venous pressure and apex beat displaced outwards to the left. Hemoglobin was 14.1 gm/dl with total white cell counts 17000/cubic millimeter while renal, liver, thyroid function tests were normal. Anti-nuclear antibody (ANA) and 24 hour Urinary free cortisol as well as Low-dose dexamethasone stimulation tests, were within normal

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limits while pulmonary function tests did not reveal any obstructive or restrictive parenchymal pathology. Glycosylated hemoglobin (HBA1C) was 7.7 while 24 hour urine collection showed microalbuminuria. Fasting lipid levels showed high density lipoproteins to be very low (HDL 27 mg/dl) while rest of the profile was within normal limits. Arterial blood gas analysis was done both in daytime and at night during sleep, and these confirmed awake arterial hypercapnia. Initial chest x-ray revealed large heart size with extensive pulmonary edema while repeat chest x-ray after 8 days of treatment revealed large heart size with clear lung fields. Ultrasonography abdomen showed fatty liver and rest viscera were within normal limits. Electrocardiography (ECG) findings suggested poor R-wave progression and mild P-pulmonale with right axis deviation. 2D echocardiography on admission showed Left ventricular ejection fraction (LVEF) 27 % with dilated left atrium(LA) and enlarged left ventricle(LV) while right ventricular systolic pressure(RVSP) was 56 mm Hg with moderate Pulmonary artery hypertension, along with a thin rim of pericardial effusion. Repeat 2D echocardiography after 8 days of treatment revealed normal LA size with 60% LVEF with mild LVH and slightly reduced diastolic compliance, with no pericardial effusion.

We treated the patient as a classical congestive heart failure patient with diuretics and nitrates while also added regular nebulisation, insulin therapy for blood glucose control, sildenafil 50 mg thrice a day and higher antibiotics for 8 days. Patient improved dramatically, as was evident from the repeat chest x-ray and echocardiography before discharge, as mentioned above. Only symptoms remaining were night-time insomnia and day-time sleepiness, for which we had advised nasal oxygen via continuous positive airway pressure at night time.

DISCUSSION

The diagnosis of probable acute myocarditis is supported by the history of viral upper respiratory tract infection 2 weeks before, followed by the acute decompensation of left ventricular function, which gradually improved on treatment. The appearance and disappearance of myocarditis unveiled before us the entity of diabetic cardiomyopathy, which was developing insidiously in this patient, as is evident from the reduced left ventricular diastolic compliance and left atrial dilatation on sequential echocardiographic imaging. Also, the patient was basically a prototype of Pickwickian syndrome. The newly diagnosed metabolic syndrome in this 30 year old male with sedentary lifestyle is also a grave reminder of today's growing trends of early onset adverse cardiovascular events.

Conclusion

This case depicts a chance occurrence of meeting of three distinct entities – obesity hypoventilation syndrome (Pickwickian syndrome) with early onset metabolic syndrome and diabetic cardiomyopathy, and biventricular cardiac dysfunction due to a superadded myocarditis. The successful reversal of cardiac function within a week denotes the importance of both primary and secondary prevention in such conditions.

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