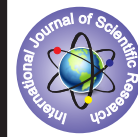


Isolated Left Ventricular Endomyocardial Fibrosis with Sub-Valvular Thickening: A Common Case in an Uncommon Region



Cardiology

KEYWORDS: : Endomyocardial fibrosis; eosinophilia; eosinophils; left ventricle

Kavya Pingali

Post Graduate, Department of Cardiology, Osmania General Hospital, Hyderabad-500012, Telangana, India

ABSTRACT

Endomyocardial fibrosis (EMF) is a common presentation in tropical population but in other areas its incidence is meager. Yet, we present a case of isolated left ventricular EMF due to eosinophilia in an area where occurrence of EMF is a rarity. The diagnosis of EMF was corroborated using chest x-ray, echocardiography, and cardiac MRI. The patient was managed therapeutically without the need of surgery or valve replacement and there were no further complications observed during eight month follow-up.

Introduction

Endomyocardial fibrosis (EMF) is a restrictive cardiomyopathy characterized by fibrous atrophy of the apical wall, sub-valvular tissues, endocardium, and sub-endocardial myocardium of either an isolated ventricle or both the ventricles (Bukhman et al., 2008; Niino et al., 2002). The EMF is highly pervasive in tropical and sub-tropical countries like Africa, South Asia, South America and some parts of Europe (Uenishi et al., 2014). By and large, the etiology of EMF is yet unresolved. Moreover, no characteristic symptoms of EMF make the matter worse. However, poverty, malnutrition, infections, autoimmunity, eosinophilia, toxins and heredity have been associated with occurrence of EMF (Madi et al., 2013). Eosinophilia is a common engender for development of EMF. Increased frequency of parasitic infections in tropical areas is anticipated to be the cause of an ephemeral or enduring eosinophilia (Séguéla et al., 2015). It has been postulated that this infection triggers activation of eosinophils in genetically susceptible individuals (Cilliers et al., 2011). The activated eosinophils instigate toxic injuries to heart, leading to three stages of advancement of the disease, i.e., eosinophilic infiltration, thrombosis and fibrosis (Alizadeh-Sani et al., 2013). The prognosis of EMF is poor as its progression is related to involvement of atrioventricular valve regurgitation, atrial dilatation, atrial fibrillation and ventricular arrhythmias (Sivasankaran, 2009). The mortality rate of untreated EMF patients is about 75%, three years after diagnosis of disease (Yaméogo et al., 2015). At present, the management of EMF is mostly based on symptomatic therapy. Usually, therapeutic management along with endocardectomy has been implemented (Niino et al., 2002). However, an early diagnosis and treatment can limit the irreversible damage to heart. Thus, we present a case of left ventricular EMF with sub-valvular thickening due to eosinophilia, in a patient who has been diagnosed at a relatively early stage that further manifestations due to disease have been controlled by appropriate management. The patient has been followed up since eight months without any further complications.

Case Report

A 37-year-old female from Hyderabad (India) presented with puffiness of face and swelling of both lower limbs since 15 days. She complained of dyspnea, orthopnea, and paroxysmal nocturnal dyspnea indicating NYHA class IV presentation. On examination, her jugular vein pressure was found to be raised, heart rate was 80 beats per minute, and blood pressure was 90/60 mm Hg. Grade III parasternal and epigastric pulsations were felt. There was a loud end systolic murmur in left 2nd intercostal space and pansystolic murmur in mitral area. On hematological investigation, hemoglobin was found to be 9 gm/dl, total white blood cell (WBC) count was 8000 cells/cmm and absolute eosinophil count (AEC) was found to be 74169 cells/dl.

Test for anti-nuclear antibodies was negative; test for p210, 190, p230 transcripts were negative; and fluorescence in situ hybridization was also negative. Thus, presence of an autoimmune disease, leukemia or breast cancer was ruled out. Moreover, trephine biopsy showed marrow eosinophilia. Chest x-ray demonstrated cardiothoracic ratio greater than 0.5, indicating cardiomegaly. The electrocardiogram

indicated right and left atrial enlargement with non-specific ST wave changes. Two-dimensional echocardiography showed thickened moderator band, endocardial plaques in the right ventricle (RV) and sub-mitral thickening (**Figure 1**). The left ventricle as well as left atrium (4 cm) was dilated, RA pressure and LV end diastolic pressure were raised and there was a restricted inflow across mitral valve indicating grade II diastolic dysfunction. Ejection fraction was 55%. Further, cardiac magnetic resonance imaging (MRI) showed sub endocardial enlargement, endocardial plaques with sub-mitral thickening and prominent moderator band obliteration of RV cavity (**Figure 2 and 3**). Thus, diagnosis of isolated left ventricular endomyocardial fibrosis accompanied with sub-mitral thickening was established. As per the criteria for diagnosing severity of EMF, the patient had moderate to severe type of EMF. The patient is being managed with steroids and is followed up since eight months without any further complications.

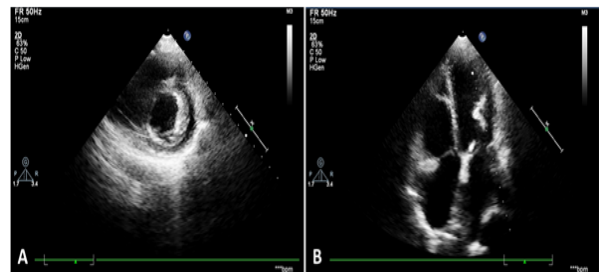


Figure 1: Two-dimensional echocardiography showing endocardial plaque (A) and sub-mitral thickening (B)

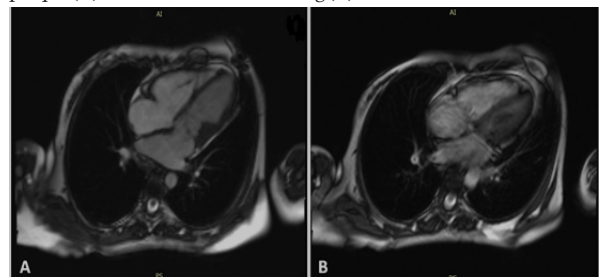


Figure 2: Four chamber cine cardiac MRI in diastole (A) and systole (B). An innermost dark layer of thickened endocardium, especially in sub-valvular region is seen distinctive from normal myocardium

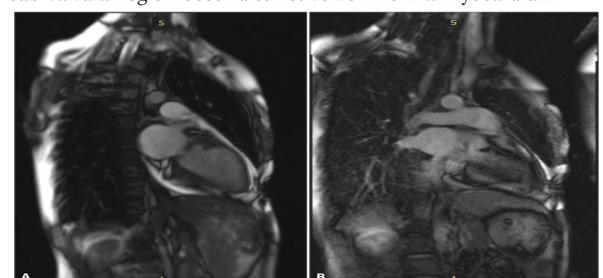


Figure 3: Two chamber cine cardiac MRI in diastole (A) and systole (B)

Discussion

The EMF still prevails as a major health issue in various African countries. However, the incidences in India have been depreciated in past years presumably due to improvement in standard of living of the people in endemic areas (Mocumbi, 2014). This dwindle of the disease from India, specially Kerala adds certainty to the effect of nutritional and inflammatory components proposed in genesis of the disease (Tharakan et al., 2009). Tropical EMF and eosinophilic EMF have been associated with common pathogenesis concerning eosinophilic toxicity (Andy, 2000). The exact mechanism behind targeting heart is unknown, but it is supposed that granules of eosinophils induce tissue damage and dysfunction which in turn instigates an immune stimulus (Séguéla et al., 2015).

We present a case of eosinophilic EMF in a female living in Hyderabad. Previously, in India, cases from K Kerala (Kutty et al., 1996), Chandigarh (Datta et al., 1977) and Tamil Nadu (Cherian et al., 2006) have been reported; the occurrence rate was reported to be 1.5%, 0.9% and rare, in Kerala, Chandigarh and Tamil Nadu, respectively. It has been hypothesized that magnesium deficiency and high levels of monazite element cerium in drinking water and soil at southern areas of Kerala have led to cardio-toxic effects (Kutty et al., 1996). However, in this case the cause of eosinophilic EMF was not geochemical toxicity, parasitic infection, etc.; rather it was probably the increased production of eosinophils in bone marrow.

Biventricular EMF is usually observed, and the rarest form is isolated left ventricular EMF (Saran et al., 2016). Previously, Vijayaraghavan G et al. had reported eight cases of left ventricular EMF investigated during a period of 10 years at a hospital in Tamil Nadu. Of these, 3 had isolated left ventricular involvement and 5 had biventricular EMF (Vijayaraghavan et al., 1977).

Particular treatment for EMF is not yet established. Therefore, its management is dependent on every individual's condition. Niino T et al. had reported a case of eosinophilic left ventricular EMF along with presence of tumor in left ventricle which was managed successfully with tumorectomy and endocardectomy (Niino et al., 2002). Similarly, Russo PA et al. had successfully managed two patients of left ventricular EMF, by attempting endocardectomy. Of these patients one had eosinophilic EMF. Moreover, they proposed to attempt endocardectomy in all EMF patients and to continue anti-coagulants throughout life (Russo et al., 1985). Recently, two cases of calcified left ventricular EMF have been reported, which were managed successfully with pharmacological treatment (Renilla et al., 2015; Saran et al., 2016).

Proper and timely diagnosis has been the mainstay behind the progression of this disease. Grimaldi A et al. reported a case with challenging clinical manifestations which on diagnosis presented with calcified left ventricular EMF accompanied by right heart failure but without the presence of right ventricular fibrosis (Grimaldi et al., 2012). In another case, Canesin MF et al. have reported EMF with extremely calcified left ventricle. Patient had been experiencing dyspnea since five years which has been escalating as time passed. Timely diagnosis was not possible due to absence of apt clinical signs which ultimately lead to death of the patient (Canesin et al., 1999). Diagnosis at advanced stage of the disease had led to choice of surgery which had documented about 15% to 30% mortality rates after endocardectomy or valve replacement. However, in present case diagnosis of the disease was done at an optimal stage and the patient has been managed successfully with appropriate medications in addition to favorable progression of disease.

Conclusion

The advancement in diagnostic technology has been a boon for detection of the diseases at early stages such that mortality rates due to untreated disease have greatly diminished. Similarly, in this case timely diagnosis and treatment of the patient with isolated left ventricular EMF due to eosinophilia have resulted into favorable condition of the patient at follow-up.

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