Imaging Findings of Lipomatous Hypertrophy of the Interventricular Septum: A Case Report

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ABSTRACT: Primary cardiac tumors are rare. We report a case of lipomatous hypertrophy of the interventricular septum in a healthy, asymptomatic, 16 year old female, diagnosed initially by echocardiogram. Non contrast Computed tomography (CT) and Cardiac magnetic resonance imaging (CMR) were also performed to confirm the diagnosis of this rarely reported condition. Lipomatous hypertrophy of the interventricular septum is a rare form of benign cardiac tumor characterized by the proliferation of adipose tissue (fat) in the interventricular septum. This clinical entity has to be differentiated from cardiac lipoma which is a benign, encapsulated tumor. CMR helps in differentiating between the 2 conditions. As the lesion was neither causing compression of the ventricle nor obstruction to blood flow, she was managed conservatively and advised follow up.

KEYWORDS: Lipomatous hypertrophy of IVS, cardiac tumor, cardiac lipoma, CMR

Introduction
Primary cardiac tumors are rare with incidence of 0.2% to 0.4% in an autopsy series. About 75% of primary cardiac tumors are benign and lipomas are 8% among them. Prevalence rate is <1 of 1000 benign cardiac tumors. Cardiac lipomatous hypertrophy is nearly always confined to the interatrial septum (IAS). Lipomatous hypertrophy of the IVS is seldomly seen and hence we present the case. Patients are usually asymptomatic and often detected incidentally. If symptomatic, the clinical symptoms are related to their location and size. Lipomatous hypertrophy should be differentiated from cardiac lipoma, the latter is usually encapsulated, round shaped, and do not infiltrate the myocardial fibers.

Lipomatous hypertrophy of IVS has been associated with atrial or ventricular arrhythmias, following variable degree of conduction system infiltration, and rarely even sudden death. Surgical resection of the tumor is done when it is causing ventricular outflow obstruction. Conservative management is followed when patient remains asymptomatic.

Case Report
An asymptomatic 16 year old healthy girl, with no family history of any cardiac disease, underwent a routine health examination at school. On general examination, she was well built, well nourished and her vitals were stable. On cardiovascular examination, a wide, fixed splitting of the second heart sound was detected. She was followed up in our institute and evaluated to find out the cause of the cardiac murmur. Electrocardiography was done which showed evidence of right bundle branch block. On transthoracic echocardiogram (Figure 1), a large homogeneously hyper echoic lesion was seen in the interventricular septum. Further characterization of the lesion was done using non contrast Cardiac Computed Tomography (CT) and Cardiac Magnetic Resonance (CMR).

The non contrast Cardiac CT (Figure 2) confirmed the presence of a solid infiltrative lesion with fat density (−90HU) in the interventricular septum, confirming its lipomatous origin. The lung fields were clear and no other obvious abnormality was noted in the pericardium or mediastinum.

Non contrast Cardiac magnetic resonance was performed on 1.5T MRI and it revealed an inhomogeneous mass in the interventricular septum. Its borders were not sharply delineated and an infiltrating pattern between the lipid mass and the muscular septum was prominent. The lesion was hyperintense on T1 (Figure 3) and T2 weighted sequences, with a complete suppression of the signal on fat suppression sequence (STIR).
Figure 4), confirming it to be a fat containing mass. The lesion did not cause ventricular compression or obstruction to left ventricular outflow tract.

**Discussion**

Lipomatous hypertrophy of the interventricular septum is characterized by diffuse infiltration of the interventricular septum by fat cells. Lipomatous hypertrophy of the IVS is seldomly seen as it is asymptomatic and detected incidentally.3 Transthoracic echocardiogram is the primary screening modality for evaluation of patients with known or suspected intra cardiac tumors. The lesion appears diffusely echogenic. Cardiac computed tomography helps in identifying the morphology of the lesion and in detecting small tumors, which may be missed out on Echocardiogram. Lipomatous tissue appears as hypodense lesions with Hounsfield Unit ranging between −90 and −120 HU. Cardiac magnetic resonance imaging with its higher rate of accuracy and various imaging sequences helps in characterization of the lesion.4 Fat typically appears hyper intense on $T_1$ and $T_2$ weighted images with complete suppression of the fat signal on fat saturation sequences like $T_2$ FS or STIR.

Cardiac lipomatous hypertrophy is more commonly seen in the Interatrial Septum (IAS). It was first described as a distinct entity by Prior in 1964. They are generally found in older patients and have no gender predilection. They are usually located in the interatrial septum, right atrium, left ventricle, and in the pericardial space.5 Involvement of the interventricular septum is very rare and seldomly reported. Cardiac lipomatous hypertrophy differs from a lipoma by its absence of a capsule and infiltrative pattern.

An important differential of lipomatous hypertrophy of the interventricular septum is Cardiac lipoma, the second most common benign cardiac tumor. They may arise in epicardial and endocardial location and the majority of them are subepicardial, expanding into the pericardial space.6 They are well encapsulated, round, sessile masses composed of fat. It is usually detected incidentally as the patients are asymptomatic. But symptoms can occur based on the size and location of the lesion. These include syncope, heart failure, palpitations, and breathlessness caused by flow obstruction, valvular dysfunctions, and arrhythmias.

Management involves surgical resection of the tumor in symptomatic patients. The septal surface is reached and the tumor is almost completely excised without damaging the chordate tendinae of the septal leaflet of tricuspid valve. If complete excision is not possible the mass is carefully trimmed from the septum and the obstruction causing the symptom is relieved. The patients usually recover well after surgery. However patients with large symptomatic mass with severe co morbidities succumb to this major surgery.1,7 Asymptomatic patients are managed conservatively and advised regular follow up with imaging, to assess for growth of the lesion. Primary neoplasm of the heart requires a thorough evaluation and CMR is the modality of choice for evaluating cardiac tumors as it helps in characterizing and differentiating the cardiac tumors.
Conclusion
Lipomatous hypertrophy of the interventricular septum is a seldomly seen disease entity. It is seen incidentally as they are asymptomatic. Symptoms depend on the location and size of the lesion. Transthoracic ECHO remains the initial screening modality and CMR is the modality of choice for diagnosis and characterization of the lesion. Asymptomatic patients are usually managed conservatively while surgery is reserved for the symptomatic patients.

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