APICAL HCM WITH A LEMON SIGN AND CLASSICAL SPADELIKE CONFIGURATION DETECTED ON MDCT ANGIOGRAM: A CASE REPORT

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ABSTRACT

We report of a case with apical type cardiomyopathy detected by 16 sliced multidetector CT, with not only clinical and ECG criteria diagnosis but also confirmed by CT findings shown in axial images, 2D reformation and 3D volume rendering. Axial 2D images shows a lemon sign at the apex of the heart. 3D volume rendering with 2 chambers and 4 chambers views of the left ventricle demonstrated classical spade like configuration, which are morphological features of classical apical HCM. In our experience this is our first paper that is shown by multidetector CT and demonstrates a lemon sign, which is a very useful for axial diagnosis of this disease.

Key words: Apical type cardiomyopathy, 16 slices, multidetectors, computed tomogram, spade like configuration

HCM = Hypertrophic CardioMyopathy

HISTORY

A 49 year-old male presented with atypical chest pain, ECG shows inverted T waves (negativity: 7 mm = 0.7 mV) with high peaked R waves (Figure 1) Coronary CT angiogram was requested to rule out coronary artery stenosis.

Technique for Coronary CT angiogram with LV assessement

Coronary CT angiogram(MX 8000 IDT 16, Philips) was acquired in a single breath-hold of less than 30 seconds covering from transverse aorta to the base of the heart using 0.75 mm collimation with 0.42 rotation time. One hundred ml of non-ionic contrast agent by a power injector at flow rate of 4 ml/sec. was administered. Eight volume data sets were selected by retrospective ECG synchronized method and were reconstructed at 0, 12.5, 25, 37.5, 50, 62.5, 75, and 87.5 % of the R-R cycle for CINE imaging. The best phase was chosen for 2D and 3D reconstruction (at 75% R-R interval). Post processing with CINE imaging , 2 and 3 dimensional reconstruction were done in an independent workstation(MX 8000 IDT).

3D volume rendering of the heart could be rendered not only for the coronary artery but also the left ventriculogram to delineate the left ventricular wall and its configuration.

Short axis CINE of 8 phases and 4D images (not shown) are also done in the workstation in both short axis, long axis axial imaging and left ventriculogram cine.

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Fig.1 ECG shows inverted T waves (negativity: 7 mm = 0.7 mV) with high peaked R waves

FINDINGS

The heart is of normal size (not shown). Coronary artery calcification and CT angiogram shows no evidence of soft and hard atherosclerotic plaque (calcium score = 0). Axial images, 2D curve reformation and 3D volume images reconstruction of the left main, proximal and mid LAD and LCX, and visualized proximal and proximal mid RCA are within normal limits (Figure 2). The axial view demonstrates a lemon sign at its apex which is very useful for detection of the apical type of cardiomyopathy (Figure 3 a and b)

3D volume rendering of 2- chamber and 4 -chamber view of the left ventricle demonstrates classical spade-like configuration, which is a morphological feature of classical apical HCM.(Figure 4).

LAD = Left Anterior Descending
RCA = Right Coronary Artery
LCX = Left Circumflex Artery

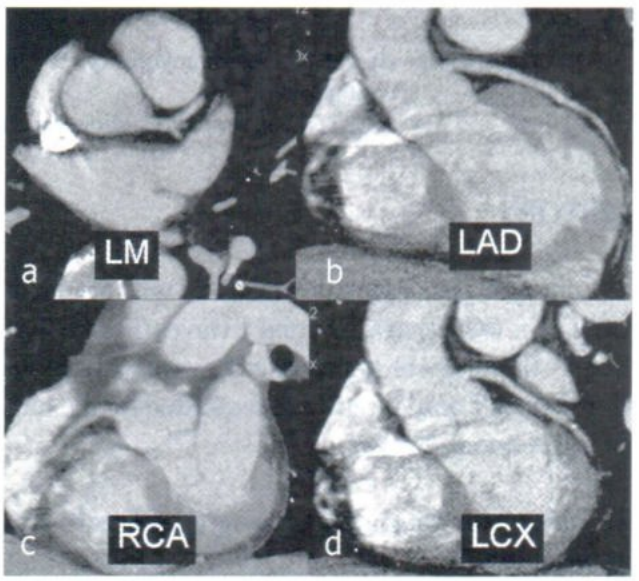

Fig.2 Normal appearance of left main proximal, (a), and mid left anterior descending artery (LAD), (b), proximal mid and right coronary artery (RCA), (c), and proximal and mid left circumflex artery (LCX) (d), and proximal RCA are observed. Motion artifact of distal mid RCA is seen.

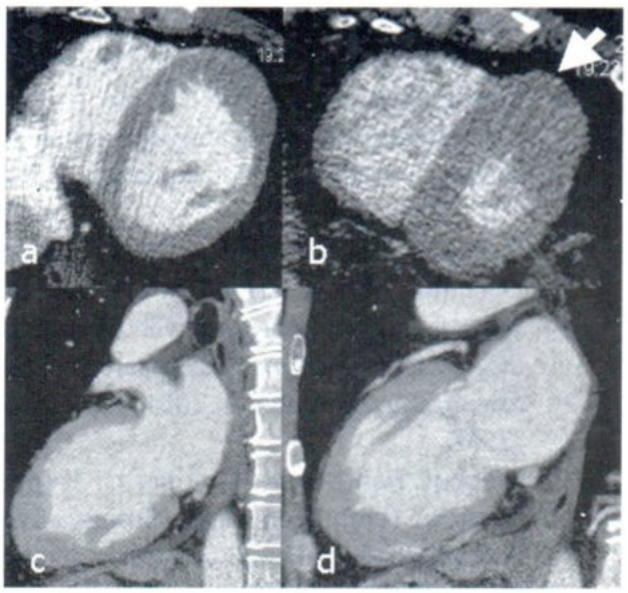

Fig.3 Axial and 2D reformat of the left ventricle demonstrates hypertrophy of left apical part of the ventricle with a lemon sign at its apex on axial view (b), and classical, spade like configuration(c and d), which is morphological features of classical apical HCM suggestive of apical type.

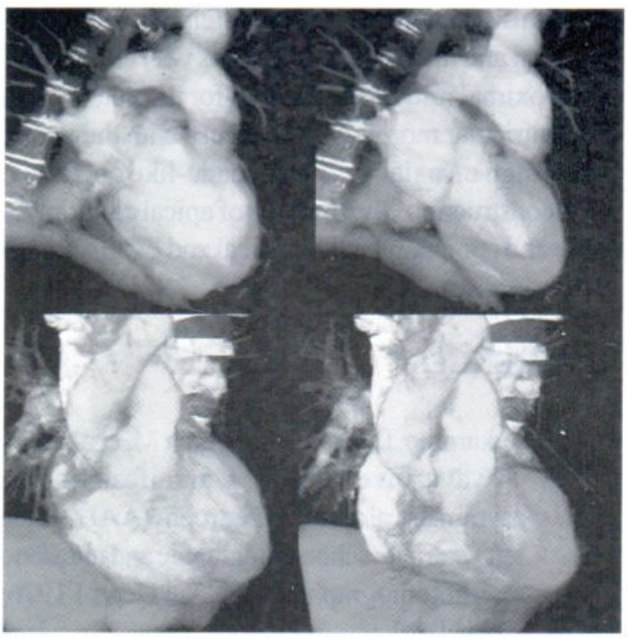

Fig.4 3D volume rendering of the left ventricle with LV outflow tract view at 0% R-R interval (diastolic phase)and 37.5% R-R interval (systolic phase), showing left ventricular wall hypertrophy with spade like configuration, which is morphological features of classical apical HCM.

DISCUSSION

Asymmetrical apical LV hypertrophy toward the apex on M-mode echocardiography in patients with giant negative T waves was first reported in 1976 by Sakamoto et al.[1] Spade like configuration of the left ventricular cavity on end diastolic LVG in the right anterior oblique projection was described in 1979 by Yamaguci et al.[2] NMR demonstrates that the distribution of the hypertrophied myocardium is circumferential at the apical level in patients with the spade like configuration.[3] Apical wall thickness in the normal subjects was 9+ 2 mm.[4] The apical wall thickness > 15 mm was considered to indicate hypertrophic.[4] A non-spade subtype was identified as a new underlying disorder for markedly inverted T waves whose hypertrophied myocardium is confined to some region at the apical level in 1993 identified by short axis NMR images.[5] It is possible that the process of growth of myocardium hypertrophy from onset to the classical HCM with spade like configuration is not circumferentially homogenous at the apical level but is segmented starting mainly from the lateral wall and expanding to the anterior wall and finally to the posterior wall at the apical level.[3]

MDCT imaging is a new non-invasive cardiac imaging. It has shown to be useful for detection of the atherosclerosis of the coronary arteries in term of soft and calcified plaques.[6,7,8,9] LV assessment of the left ventricle has been reported.[10,11,12]

This is the report of a case showing the usefulness of the MDCT angiogram not only for ruling

out significant coronary artery stenosis of the LM, proximal and mid LAD and LCX as well as proximal and proximal mid RCA, but also for the detection of left ventricular morphology of a case with the classic lemon sign on axial view and spade-like on 2D and 3D reconstruction , the findings of apical cardiomyopathy and compatible with clinical and ECG findings of this disease.

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