Original Article

Intracardiac Masses

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ABSTRACT

Objectives : To find out the incidence of intracardiac masses (ICM) and study its nature by echocardiographic examination.

Methods : Patients sent for 2D echo examination and found to have intracardiac mass were included in the study.

Results : Out of 4800 patients referred for 2D echo, 60 (1.25%) were detected to have ICM. Age of the patients ranged from 10 yrs. to 70 yrs. with a mean of 45.4 ± 5.2 yrs. Male to female ratio was 1.5:1. Rheumatic heart disease (RHD) was found in 35 cases (58.33%), followed by ischemic heart disease (IHD) in 17 (28.33%), primary cardiac tumor, myxoma in 3 (5.0%), metastasis in 3 (5.0%) and chronic cor pulmonale in 2 cases (3.33%).Thrombus was the most commonly observed ICM in 47cases (78.33%) followed by vegetations in 7 (14.89%) and tumor in 6 (12.77%). Site of the thrombus was left atrial appendage (LAA) in 20 cases (42.55 %) followed by left ventricle (LV) in 17 (36.17%), left atrium (LA) in 8 (17.02 %) and RV in 2 (4.25%) cases. Out of 17 patients with LV thrombus, 15 (86.23%) had left ventricular ejection fraction (LVEF) = 40%. Vegetations were common on mitral valve (6 cases) than on aortic valve (1 case). Atrial fibrillation (AF) was observed in 21 cases (60%) of RHD with LA/LAA thrombus.

Conclusion : The most commonly observed ICM's are thrombi, followed by vegetations and tumor. Poor LV function is associated with LV thrombi. Patients of RHD with AF are at a high risk of development of LA/LAA thrombi.

Key words : Intracardiac masses, Thrombi, Vegetations, Tumor.

Introduction -

Echocardiography allows dynamic evaluation of intracardiac masses with the advantage compared to other tomographic techniques, that both the anatomic & the physiologic consequences of the mass can be evaluated. Magnetic resonance Imaging (MRI) has proved to be the gold standard for the assessment of these masses. However, the widespread availability, portability, and additional functional information provided by echocardiography makes it the initial investigation of choice for the assessment of cardiac masses.[1]

Abnormal masses (tumors, thrombi, vegetations) must be distinguished from normal cardiac structures that may mimic a mass. The Eustachian valve, Chiari network, crista terminalis, pectinate muscles, moderator band, trabeculations, interatrial septal aneurysm and lipomatous hypertrophy of the interatrial septum are some examples of normal structures that are frequently mistaken for pathologic entities[2].

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Material and Methods -

Study Patients : 4800 patients were referred for two dimensional echocardiographic examination at Govt. Medical College, Aurangabad during January 2009 to December 2013. Out of these, 60 patients detected to have intracardiac mass, were included in the study.

Transthoracic Echocardiography : The transthoracic study was done by using Philips HD 11 XE Machine with a multifrequency S4-2 transducer. The echocardiographic examination included use of various views - parasternal long axis view, parasternal short axis view, apical four chamber view, apical two chamber view and sub costal view if necessary. Thrombus, vegetation and tumor were diagnosed by following underlying echocardiographic criteria[2].

Thrombus : LV thrombus on echocardiography was defined as a discrete echo dense mass in the left ventricle with defined margins that are distinct from the endocardium and seen throughout systole and diastole. It should be located adjacent to an area of the LV wall which is hypo kinetic or a kinetic and seen from at least two views (usually apical and short axis). Thrombi may form anywhere in LA, but appendage is the most likely site. The basal short axis view can be manipulated to visualize the LAA in some patient. In other cases, the apical two chamber view will permit recording of the LAA.

Vegetation : Vegetations typically are irregularly shaped, attached to the upstream side of the valve leaflet (e.g. Left atrial side of the mitral valve, left ventricular side of the aortic valve), and exhibit chaotic motion that differs from that of the leaflets themselves.

Tumor : This is an irregularly shaped, smooth surfaced mass, mobile or fixed to the underlying myocardium, usually without any underlying wall motion abnormalities.

Observations : Out of 4800 cases referred for 2 D echo, 60 were detected to have ICM (1.25%). Age of the patients ranged from 10 yrs. to 70 yrs. with a mean of 45.4 ± 5.2 yrs. Male to female ratio was 1.5:1. Rheumatic heart disease (RHD) was the commonest cardiac lesion found in 35 cases (58.33%), followed by ischemic heart disease (IHD) in 17 (28.33%), primary cardiac tumor, myxoma in 3 (5.0%), metastasis in 3 (5.0%) and chronic cor pulmonale in 2 cases (3.33%).Congestive heart failure was observed in 35 (58.33%) cases. 21 patients (35%) had AF. Thromboembolisation was observed in 3 cases (5%).

Thrombus was the most commonly encountered ICM in 47 (78.33%) cases followed by vegetations in 7 (14.89%) and tumor in 6 (12.77%) cases. The site of thrombus was LA/LAA ***(Fig.1 and 2)*** in 28 cases (66.67 %), LV ***(Fig.3)*** in 17 cases (36.17 %) and RV ***(fig.4)*** in 2 cases (4.25%). LVEF = 40% was observed in 15 cases (86.23%) with LV thrombus. Dilatation of LA was noticed in all the 28 cases with LA/LAA thrombus. Spontaneous echo contrast was observed in 18 cases (64.28%) with LA/LAA thrombus. 21 patients had AF and all of them had thrombus in LA/LAA.

Out of 7 cases with vegetations 6 were observed on mitral valve and 1 on aortic valve. ***(Fig.5)***

Intracardiac tumor was observed in 6 cases. 3 patients had left atrial myxoma ***(Fig.6)***. Out of these one had associated mitral stenosis and one had undergone patch closure of ostium secundum atrial septal defect 14 years ago. 3 cases had metastatic deposits in RA via inferior venacava, one was a case of Wilm's tumor in a 10 year old girl and in the other two the diagnosis was renal cell and hepatocellular carcinoma. ***(Fig.7& 8)***

Discussion -

The incidence of ICM's in the present study was found to be 1.25%. Studies in the past had recorded frequency ranging from 0.001-0.71% at autopsies[3,4]. Most of the studies were on cardiac tumors and not necessarily cardiac masses. Smalwoski et al[5] and Ejim et al[6] have reported incidence to be 1.0% and 0.7% respectively. The higher incidence observed in the present study may be due to high prevalence of RHD in our country. CHF was found to be the commonest presenting feature seen in 35 cases (58.33%) as has been observed by Assadian et al[7] and Odim et al[8]. 21 (35%) patients were having AF and thrombus in LA/LAA. Similar results have been reported by Shrestha et al[9] and Kaymaz etal[10].

Thrombus (78.33%) was the most commonly encountered ICM followed by vegetations (14.89%) and tumor (12.77%). Similar results have been observed by Smialowski et al[5] and Ejma et al[6]. Mugge et al[11] found equal incidence of thrombi and tumors. They had excluded patients with infective endocarditis. Siwach et al[12] observed tumor (35.71%) as the most common ICM followed by thrombi (21.57%) and vegetations (21.42%).

The documented frequency of LA/LAA thrombi in patients with RHD varies from 16-64% and 1/3rd to more than ½ of the thrombi have been reported to be limited to the LAA[13].Shreshtha et al[9] in a study of 21 cases of RHD found thrombi in LAA in 11 (52.38%) and 10 (47.61%) in LA. Kaymaz et al[10] found SEC in LA in 44.50% cases by 2D and TEE. In this study 18

(56.25%) patients showed presence of SEC. AF was noticed in 20 cases (62.50%) of LA/LAA thrombi. Shrestha et al[9] and Kaymaz et al[10] found AF in 88.23% and 56.30% cases respectively. Though AF predisposes thrombi in LA/LAA; they are not uncommon in patients with sinus rhythm.

RV thrombi are rare, usually seen in patients with dilated cardiomyopathy and endomyocardial fibrosis[14]. They are also seen in the setting of dilated RA and RV secondary to pulmonary hypertension. In this study 2 cases (4.25%) of chronic cor pulmonale who had dilated RA and RV showed thrombus in RV. Ejim et al[6] and Smialowski et al[5] have described RV thrombi in 10% and 2% cases respectively.

Primary tumor of heart is uncommon but not rare. Cardiac tumors are a challenging and bizarre clinical situation. They are differentiated into primary and secondary (metastatic). The prevalence of primary cardiac tumors is 0.0010.03% in autopsy series[15]. Seventy five percent of primary tumors are benign in origin, with myxoma being the most frequent (>50%). From the remaining 25% of malignant cardiac tumors, most frequent are cardiac sarcomas[16]. Secondary tumors are from 20 to 40 fold more common than primary tumors, and 15% of patients suffering from any form of cancer exhibit metastases in the heart[17]. The classic triad of myxoma is intracardiac obstruction with CHF (67%), signs of embolization (29%), systemic or constitutional symptoms of fever (19%) and weight loss or fatigue (17%) and immunological manifestations of myalgia, weakness and arthralgia (5%) with all patients presenting with one or more of these symptoms[18].

In this study the three cases of left atrial myxoma presented with features of pulmonary hypertension. One of them had associated rheumatic mitral stenosis. One patient had history of undergoing cardiac surgery in the form of septal closure for ostium secundum atrial septal defect 14 years prior and had history of developing hemiplegia ,an embolic episode. Suzuki etal[19] have reported a case of right atrial myxoma developing 4 years following patch closure of atrial septal defect.

Metastatic tumors of the heart have been described in up to 20% of patients with malignancies of other organ systems. Metastasis can reach the heart through hematogenous spread via coronary arteries, lymphatic system, direct extension from adjacent lung, breast, esophageal and thymic tumors and from subdiaphragmatic venacava.

Wilm's tumor, uterine leiomyosarcomas and hepatomas may also metastasize to the heart by the inferior venacava. Up to 10% of renal cell carcinomas invade the IVC and up to 43% of patients with this tumor demonstrate right atrium involvement[20]. In this study metastatic lesion in RA was observed in a case of Wilm's tumor, renal cell carcinoma and hepatocellular carcinoma.

Conflicts of Interest : The author has nothing to declare.

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Illustrations

Fig. 1 : PSAX view in a patient of RHD showing presence of SEC and clot in LAA

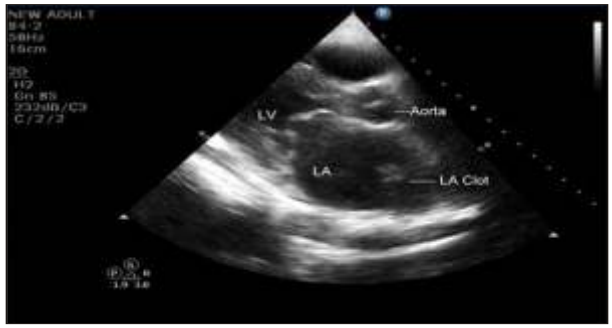

Fig. 2 : PLAX view in a patient of RHD showing dilated LA with a clot

Fig. 3 : A4CH view in a patient of IHD showing aneurysmal dilatation of LV & a clot at LV apex

Fig. 4 : PLAX view in a patient of Chronic cor pulmonale showing dilateded RV and presence of thrombus

Fig. 5 : PLAX view in a patient of RHD showing presence of vegetation on PML

Fig. 6 : A4CH view in a patient with LA myxoma. Note attachment of the tumor to IAS

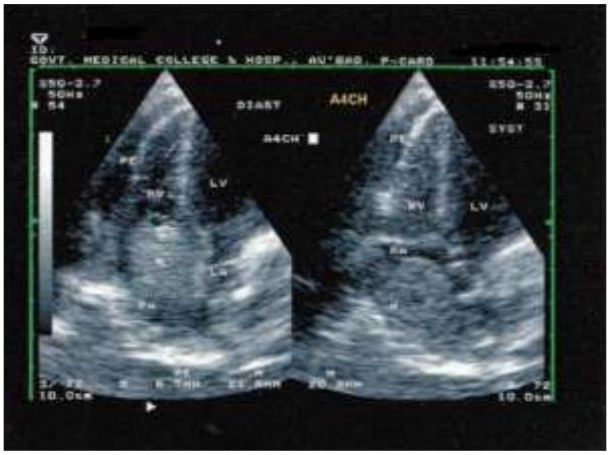

Fig. 7 : A4CH view in a patient of Wilm's tumor during systole and diastole. Note tumor mass in RA and presence of mild pericardial effusion

Fig. 8 : Subcostal view from the same patient showing IVC filled up with tumor cells extending to RA