CARDIAC MYXOMA- A STUDY OF 10 CASES

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ABSTRACT

BACKGROUND

Myxoma is the most common primary tumour of the heart in adults with age range of 30 to 60 years. About 90% of them are situated in left atrium. Here we present a study of 10 cases of cardiac myxomas.

MATERIALS AND METHODS

A retrospective analysis of 10 cases of cardiac myxomas received in Department of Pathology, Government Medical College, Miraj between December 2007 to November 2016 was done. All the surgical specimens were fixed in 10% formalin. After fixation, gross examination was done which included size, shape, color, consistency and cut surface. The gross histopathological tissue sampling was done as per the standard procedures. After routine tissue processing the slides were stained with haematoxylin and eosin.

RESULTS

On gross examination all the specimens were received in multiple pieces of varying sizes. The external surface of all pieces were smooth and whitish. Cut surface of all specimens were gelatinous and few showed dark brown areas. Microscopy of all the cases showed similar histomorphological features. Sections showed a well circumscribed tumour composed of oval to spindle or stellate shaped (myxoma) cells having bland vesicular nuclei and eosinophilic cytoplasm arranged singly as well as in syncytium, cords, solid clusters and at places forming rings in close association with the blood vessels. The cells were set in abundant myxoid and hyalinised stroma. Some sections showed extensive areas of haemorrhage, focal areas of fibrosis, focal dense infiltration by mononuclear cells, polymorphs and haemosiderophages.

CONCLUSION

Myxoma is the most common cardiac tumour with left atrium being the commonest site.

KEYWORDS

Myxoma, Cardiac, Atrium.

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BACKGROUND

Primary tumours of the heart are rare, in contrast to metastatic tumours. The prevalence of cardiac tumours at autopsy ranges from 0.001 to 0.3%. According to the literature evidence, myxomas are the most common primary tumours of the heart accounting for 20-50% of cases and are usually found in the left atrium.[1-2] Myxomas arising at other sites such as right atrium, ventricles, superior venacava or pulmonary veins are rare and are sometimes designated as atypical myxomas.[3-5]

Histopathologically, the tumour cells were stellate, fusiform, or polygonal in shape; had small clusters, strips, cords, and mesh-like arrangement with pink or light blue staining myxoid material. Some concomitant morphological changes such as calcification, ossification, adenoid metaplasia are very rare.[6]

The cell of origin is considered to be multipotential mesenchymal cell that persists as embryonal residues during septation of the heart.[7-8] They also are thought to arise from cardiomyocyte progenitor cells, subendothelial vasoformative reserve cells or primitive cells which reside in the fossa ovalis and surrounding endocardium or endocardial sensory nerve.[9-12] Myxoma cells usually express IL-6.[13] A C769T, PRKAR1a mutation has been observed in "familial myxomas."[14]

We present a retrospective review of 10 cases of cardiac myxomas.

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MATERIALS AND METHODS

General Information

This study was designed to conduct a retrospective analysis of 10 cases of cardiac myxoma received in Department of Pathology, Government Medical College, Miraj between December 2007 to November 2016.

Clinical Manifestations

The patients presented with varied symptoms like; palpitation after exercise, dyspnea on exertion, chest tightness, leg oedema, fever, easy fatigability, anaemia, loss of weight and limitation of activity.

Diagnosis and Surgical Treatment

All 10 cases were diagnosed with echocardiography showing quasi-circular ground shape echo with varying sizes in atrial and ventricular cavity which had clear boundary and the reciprocating movement in the heart cavity with the heartbeat.

Histopathological Examination

All the surgical specimens were fixed in 10% formalin. After fixation, gross examination was done which included size, shape, color, consistency and cut surface. The gross histopathological tissue sampling was done as per the standard procedures. After routine tissue processing the slides were stained with hematoxylin and eosin.

RESULTS

Total 10 cases were studied retrospectively during the period of 9 years. The age of patients ranged from 11 to 56 years. The median age was 35.3 years old. Maximum number of patients were seen in age group of 31-40 years.

There was equal gender distribution (5 males and 5 females).

Left atrium was the most commonly involved site. Out of 10 specimens 8 were from left atrium and 2 from right atrium.

There were two categories of symptoms found: (1) symptoms of flow obstruction like palpitation after exercises, dyspnea on exertion, chest tightness, leg oedema; (2) systemic symptoms like fever, easy fatigability, anaemia, loss of weight, limitation of activity.

Case No.	Age	Sex	Location	Symptoms	Tumour Size	Histopathology
1.	40	Female	Left atrium	Dyspnoea Palpitation Giddiness Left hemiplegia	3x3x1 cm	Left atrial myxoma
2.	34	Male	Left atrium	Dyspnoea Palpitation Claudication Limitation of activity	4x3x1 cm	Left atrial myxoma
3.	56	Male	Left atrium	Dyspnoea Palpitation Easy fatigability	3x2x1 cm	Left atrial myxoma
4.	20	Male	Right atrium	Dyspnoea Palpitation Giddiness Loss of weight	6x3x2 cm	Right atrial myxoma
5.	49	Female	Left atrium	Dyspnoea Palpitation Pain in upper limb	4x3x2 cm	Left atrial myxoma
6.	40	Female	Left atrium	Dyspnoea Palpitation Limitation of activity	3x3x2 cm	Left atrial myxoma
7.	23	Female	Left atrium	Dyspnoea Palpitation Easy fatigability	5x3x2 cm	Left atrial myxoma
8.	40	Male	Left atrium	Dyspnoea Palpitation Loss of weight Limitation of activity	4x3x2 cm	Left atrial myxoma
9.	40	Male	Left atrium	Dyspnoea Palpitation Loss of weight Limitation of activity	6x3x2 cm	Left atrial myxoma
10.	11	Female	Right atrium	Dyspnoea Loss of weight Limitation of activity	5x3x1 cm	Right atrial myxoma

Table 1. Clinicopathologic Features of all 10 Cardiac Myxomas

Pathological Features

On gross examination all the specimens were received in multiple pieces of varying sizes. The pieces were spherical, lobulated or irregular-shaped. The external surface of all pieces were smooth and whitish. Cut surface of all specimens were gelatinous and few showed dark brown areas - areas of haemorrhage (Figure 1). In few cases the tumour showed variably sized cysts (0.2 cm- 1.0 cm) containing dark red blood clot-like material. Some tumours had gray tan areas and areas of calcification.

Microscopy of all the cases showed similar histomorphological features. Sections showed a well circumscribed tumour composed of oval to spindle or stellate shaped (myxoma) cells having bland vesicular nuclei and eosinophilic cytoplasm arranged singly as well as in syncytium, cords, solid clusters and at places forming rings in close association with the blood vessels (Figure 2). The cells were set in abundant myxoid and hyalinised stroma (Figure 3). Some sections showed extensive areas of haemorrhage, focal areas of fibrosis, focal dense collection of mononuclear cells, polymorphs and haemosiderophages (Figure 4).

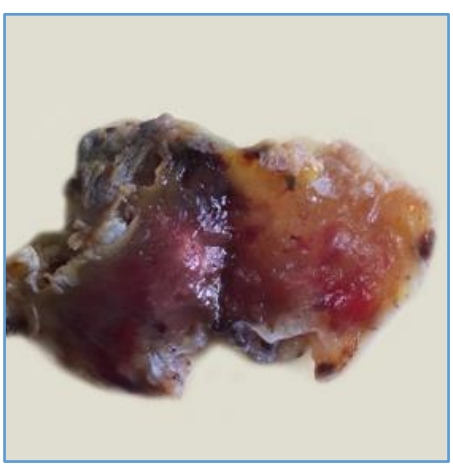

Figure 1. Cut Surface Showing Gelatinous Appearance with Areas of Haemorrhage

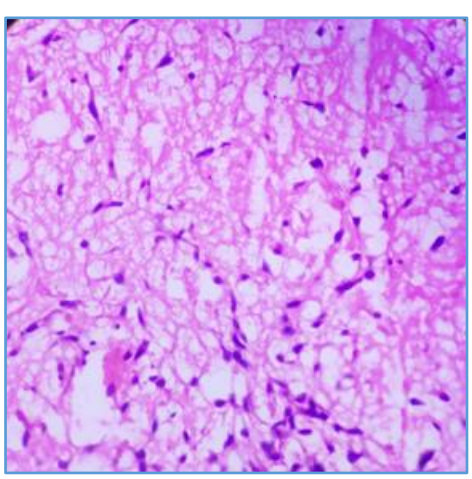

Figure 2. Spindle Cells Forming Rings in Close Association with Blood Vessels (H/E, 400X)

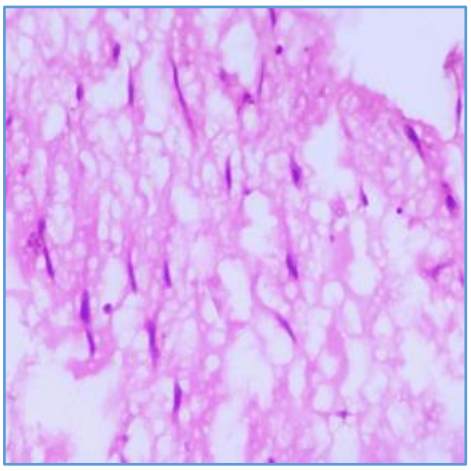

Figure 3. Stellate Shaped Cells on Myxoid Background (H/E, 400X)

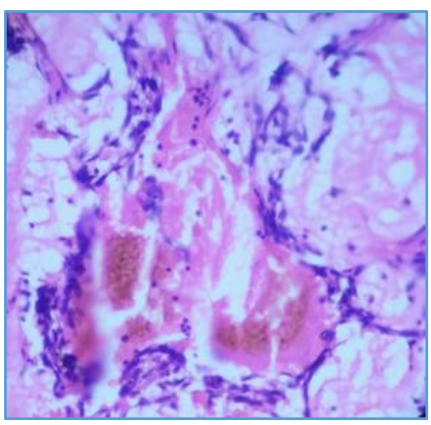

Figure 4. Spindle to Stellate Shaped Cells with Myxoid Background and Areas of Haemorrhage (H/E, 400X)

DISCUSSION

Cardiac myxoma is the most important cardiac tumour. The annual incidence was 0.5 per million. This tumour can occur at any age, but more common in adults aged 30 to 60 years and women have a higher incidence. The ratio of female to male is 2:1 to 3:1. About 4.5% to 10% of patients show the familial preponderance. The youngest patient in our study was 11 years old with equal female to male ratio. The median age was 35.3 years old. Those were consistent with reports in the literature.[13]

According to the studies, myxoma is the most common primary tumour. Roughly 90% of the tumours are located in the atria, with the left atrium accounting for 80% of those.[14] Only 3-4% of myxomas are detected in the left ventricle, and only 3-4% in the right.[15] Multilocular myxomas are extremely rare, which often result in local recurrences.[16] Familial myxomas are estimated to account for 7% of atrial myxomas,[17] are more often multiple, recurrent and right sided, as compared to sporadic myxomas. The affected patients are also younger, most presenting at 20-30 years of age.[18-20]

In this group of 10 cases, 8 tumours occurred in the left atrium accounting for 80% while 2 tumours occurred in the right atrium accounting for 20%.

The clinical presentation of myxomas is diverse and dependent upon the tumour location, size and mobility.[21-24] According to a previous study, the most common symptom is dyspnea (54%), and then followed by palpitation (35%).[25] Dyspnea and oedema of lower limbs are thought to a consequence of atrioventricular valve obstruction. Nevertheless, the intracardiac obstruction may also lead to narrowing outflow tract and atrial fibrillation, which could contribute to dyspnea and palpitation. Cough is thought to result in pulmonary venous hypertension and frank pulmonary oedema. Angina may be caused by insufficient blood supply.

Signs of cardiac myxoma vary with the tumour size and location in heart chamber. The tumour can present with heart murmur due to blood flow obstruction within the heart. Due to blocked atrioventricular canal, left ventricular or right ventricular dysfunction may occur, and the patients may have orthostatic syncope or sudden death. Pathology observed cardiac myxoma specimens were soft, crunchy, and had the jelly-like appearance with the uneven surface. Thus, tumour debris and tumour thrombus emboli can easily fall off to cause embolism. Due to hemodynamic factors, the right atrial myxoma mainly causes pulmonary embolism, while the left atrial myxoma can cause systemic embolism, of which the most common is cerebral embolism.[26]

About 20% of cardiac myxomas are asymptomatic; they are usually smaller than 4 cm.[27-28] This may be due to the small tumour size or long growth course, which results in adaptation to the tumour.

Microscopically the myxoma cells may be arranged singly, in cords, or in vasoformative ring structures. The cells can be elongated, fusiform or stellate (Fig.2). They contain modest amounts of eosinophilic cytoplasm. Nuclei are oval, round, or elongated and mitoses are very rare. The cells are set in abundant myxoid stroma (Fig. 4). Myxoma cells have a tendency to form primitive or differentiated vessels, reflected in expression of endothelial markers. Less myxoid stroma often forms a halo around the vascular formations. The stroma contains variable amounts of proteoglycans, collagen and elastin. It shows strong reactivity with Alcian blue, resistant to predigestion by hyaluronidase. The vessels within the tumour are thin-walled and lack pericytes. Occasionally, cavernous vascular spaces containing blood or proteinaceous material are encountered. Thick walled blood vessels with prominent muscular walls are present predominantly at the base of tumour and in the stalk. Extravasated red cells, foci of recent and organizing haemorrhage (Fig.2) and hemosiderin deposition are frequent. Hemosiderin is seen free within the stroma, within histiocytes and myxoma cells. Variable numbers of lymphocytes, plasma cells, macrophages, dendritic cells, and mast cells may be present. Gamna-Gandy bodies as seen in chronic venous congestion of the spleen maybe encountered infrequently. Calcification and metaplastic bone formation may also occur. The latter are more frequent in right atrial myxomas. The surface is usually composed of a single layer of flattened cells, but multilayering and tufting may occur.

The cell of origin of cardiac myxoma: (1) derived from pluripotent primitive mesenchymal cells; (2) from the endocardial nerve tissue.[29] Some study put forward the idea that Herpes simplex virus type I (HSV-1) infection may be related with sporadic atrial myxoma.

Bone and brain metastases from glandular cardiac myxomas have been reported in the recent literature.[30-34] The most frequent metastatic site for cardiac myxomas is cerebrum.[32] Several reports have reviewed cerebral metastasis cases.[33-34] Since most myxomas are located in the left atrium, systemic embolism is particularly frequent. The tumour fragments metastasized to cerebral vessel walls may penetrate through the vessel wall, forming intra-atrial metastases. Some cytokines, such as CXC chemokines, may explain the metastasis potential of morphologically benign myxomas. In our study, no metastatic case was observed.

CONCLUSION

In conclusion, we have retrospectively reviewed 10 cases of cardiac myxomas. The clinical presentations and pathological characteristics were investigated. Myxoma is the most common cardiac tumour with left atrium being the commonest site.

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