

Management of a Primary Cardiac Neoplasm with Tumor Blush by a Stent Graft

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Primary cardiac tumors are rare. When they do occur, their symptoms and signs depend on the location and size of the tumor. Imaging multimodalities play an important role in evaluating cardiac tumors. “Tumor blush” is a specific character of certain cardiac tumors on coronary angiography. The current treatment of these tumors is associated with observed clinical symptoms, and the main treatment option is surgical resection. Coronary stent grafts have been used for treatment of coronary artery perforation, coronary pseudoaneurysm, and coronary artery fistula. In this article, we presented a 53-year-old woman who had a cardiac tumor with tumor blush complicated by pericardial effusion which was medically managed by use of a stent graft.

Key Words: Cardiac neoplasm • Stent graft • Tumor blush

INTRODUCTION

Primary cardiac tumors are rare and estimated to occur only in 0.001% to 0.03% of the general population as determined by autopsy. Approximately 75% of these primary cardiac tumors are benign.¹ Although most cardiac tumors are silent and discovered inadvertently, the clinical symptoms can appear at any age and vary according to the size and location of the tumors.² The main clinical presentations of primary cardiac tumors include pericardial effusion, tamponade, arrhythmia, congestive heart failure, right heart ventricular outflow tract obstruction, coronary steal, and even sudden death.² Multiple imaging modalities are available to assess car-

diac tumors and cardiac catheters are often used to evaluate the coronary artery anatomy.³ Characteristic “tumor blush” may be available to help diagnose the presence of cardiac tumors and identify which tumor type is involved.⁴ The current and most effective treatment option for symptomatic cardiac tumors remains surgical resection.^{5,6} Coronary stent grafts have been applied in a variety of situations including treatment of coronary artery perforation, coronary pseudoaneurysm, and coronary artery fistula.^{7,8} We herein report a case in which a primary cardiac tumor with tumor blush complicated by pericardial effusion was managed by using a stent graft to obliterate the feeding artery.

CASE REPORT

A 53-year-old woman presented to the emergency department because of several episodes of atypical chest pain and palpitations. Her general physical examination showed decreased heart sounds. Her electrocardiogram, chest x-ray, and blood laboratory tests were all unremarkable. Transthoracic echocardiography revealed a moderate amount of pericardial effusion and a hyperechoic mass measuring 2.3 cm in length located on

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the left heart (Figure 1A). Consequently, the patient was admitted to the cardiac intensive care unit for further evaluation. Advanced investigation of the mass was performed using cardiac magnetic resonance imaging (MRI) and 256-slice computed tomography (CT). Cardiac MRI showed a moving ovoid-shaped and well-defined mass measuring 3.9×2.6 cm in the left pericardial space which was favored to be a benign tumor. In a CT of the patient's chest with intravenous contrast, the results disclosed a tumor with an ample blood supply along with pericardial effusion. This tumor was heterogeneous at the unenhanced phase (Figure 1D), mildly enhanced at the arterial phase (Figure 1C, E) and intensely enhanced at the venous phase after injection of contrast medium. (Figure 1F). Coronary angiography revealed a small tortuous feeding artery arising from the left circumflex artery and vascular lakes with "tumor blush" (Figure 2A) at the corresponding location. Surgical resection was suggested to this patient. However, the patient refused surgical intervention and preferred a less invasive intervention. Hence, percutaneous coronary intervention was arranged. A 7-Fr JL4 guiding catheter was inserted into the left coronary artery, and a 0.014-inch floppy guide wire was placed

into the distal left circumflex artery (LCX). The feeding artery of the cardiac hemangioma was too small to perform coil embolization. Therefore, a 3.5×19 -mm Jostent GraftMaster (coronary graft stent, Jomed, Helsingborg, Sweden) was advanced into the LCX without predilatation to close the orifice of the feeding artery. The stent graft was deployed at 14 atmospheres and was dilated using a 4.0×12 -mm balloon to obliterate the coronary blood flow into the feeding artery of the cardiac hemangioma (Figure 2B). After deployment of the stent graft, the patient received dual antiplatelet therapy with aspirin 100 mg and clopidogrel 75 mg per day for three months, after which the patient was maintained on clopidogrel 75 mg per day. Eight months later, echocardiography showed resolution of the pericardial effusion and no hyperechoic mass (Figure 2C). The cardiac CT revealed a smaller devascularized soft tissue mass and no in-stent stenosis in the stent graft (Figure 2D, E).

DISCUSSION

Primary cardiac tumors are rare and consist of be-

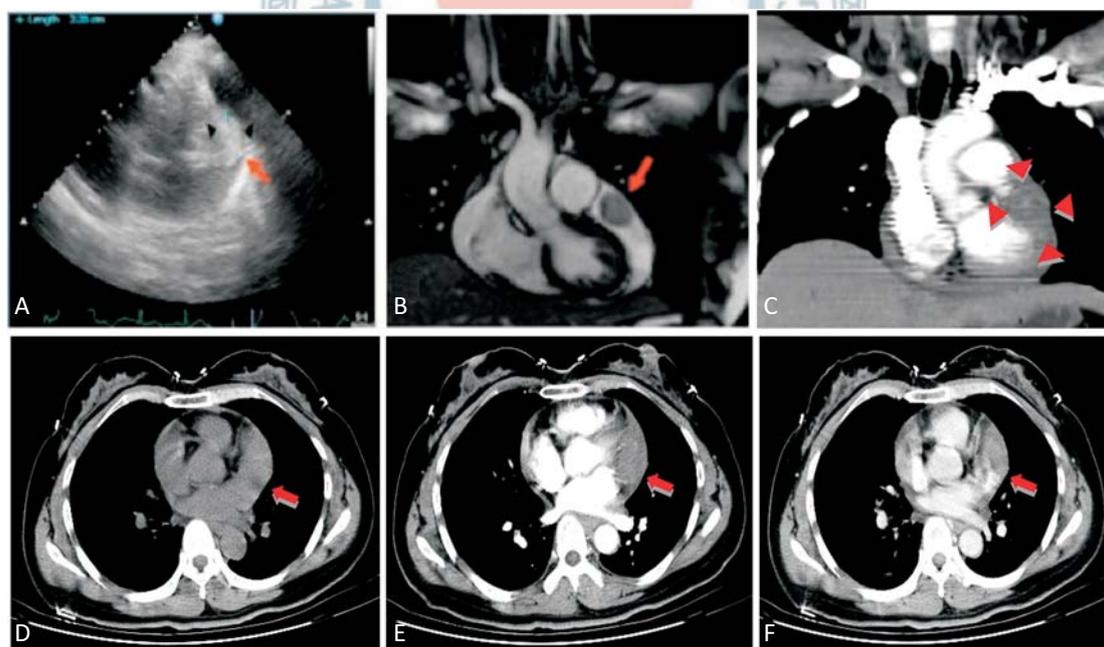


Figure 1. (A) Transthoracic echocardiography showed a hyperechoic mass in the left side of the pericardial space, with a moderate pericardial effusion. (B) Cardiac magnetic resonance imaging (FIESTA) showed a moving ovoid shaped and well-defined mass measuring 3.9×2.6 cm in the left sided pericardial space on the coronal view. (C, D, E, F) Computed tomography demonstrated a cardiac tumor measuring 5.6×3.0 cm, which was heterogeneous on unenhanced phase (D), mildly enhanced on arterial phase (C, E) and intensely enhanced on venous phase after injection of contrast medium (F).

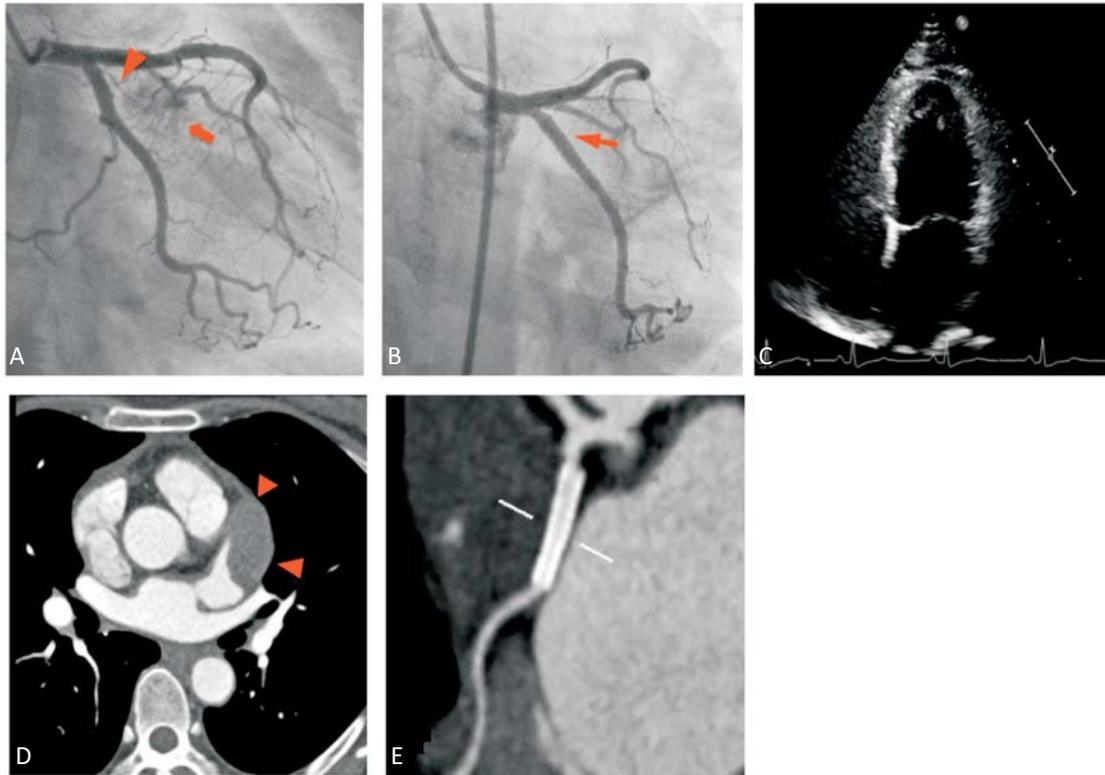


Figure 2. (A) Left coronary angiography revealed a small tortuous feeding artery arising from the left circumflex artery (arrowhead) and 'tumor blush' (arrow). (B) Left coronary angiography showed that the stent graft totally obliterated the coronary flow into the feeding artery of this cardiac tumor with tumor blush. (C) Echocardiography revealed resolution of the pericardial effusion and the hyperechoic mass. (D) Cardiac computed tomography revealed a devascularized/thrombosed tumor measuring 4.0×2.3 cm, which was located in the pericardium rather than arising from the left atrial appendage. (E) Cardiac computed tomography disclosed no in-stent stenosis after eight months.

nign and malignant histology. Atrial myxoma is the most common primary benign tumor, accounting for approximately 30-50% of all primary benign tumors. Other benign cardiac tumors include lipomas, hemanionas, fibromas, rhabdomyomas, teratomas, hamartomas and papillary fibroelastomas. Additionally, malignant tumors include lymphoma, leiomyosarcomas, rhabdomyosarcomas, osteosarcomas and pheochromocytomas. Cardiac tumors can be diagnosed based on their echocardiographic and radiologic imaging characteristics. Echocardiography is a convenient and easily accessible modality for screening cardiac tumors. Computed tomography is very helpful for the evaluation of the extent of the tumor and invasion of the adjacent tissue. Magnetic resonance imaging can provide additional diagnostic clues because the different image weightings may show the distinctive characteristics of the various tumors. Coronary angiography plays a prominent role in the assessment of the feeding artery, encasement of

coronary vessels near the tumor or occlusion of the coronary artery.

Tumor neovascularization and angiogenesis are necessary for tumors to grow in size. Characteristically, coronary angiography of tumors reveals late opacification of a well-vascularized cardiac tumor, called 'tumor blush'. Characteristic "tumor blush" has been described in certain cardiac neoplasm: 1) benign atrial myxomas, rhabdomyomas and vascular malformations; and 2) malignant pheochromocytomas and angiosarcomas.^{4,5}

Treatment of cardiac tumors depends on the clinical symptoms, and the predominant choice is surgical resection.^{6,7} Though surgical resection is effective, some patients may prefer a less invasive intervention. Stent grafts have recently been used for the treatment of coronary artery perforation, coronary artery pseudoaneurysm, and coronary artery fistula.^{8,9} Stent grafts are generally safe and effective, but there are risks of in-

stent stenosis, complications of angiography, and bleeding due to antiplatelet therapy.

In our case, the clinical diagnosis favored a primary and benign cardiac tumor with tumor blush, according to multiple imaging modalities. Atrial myxoma, vascular anomalies, including hemangioma and arteriovenous malformation or rhabdomyoma was the most probable diagnosis and surgical resection is the main choice for these benign cardiac tumors.^{7,10} However, this patient refused advance surgery and preferred a less invasive intervention. Transcatheter intervention with a stent graft was used to seal the orifice of the feeding artery, and the patient received antiplatelet treatment without any bleeding sequelae. After follow-up for several months, the cardiac tumor and pericardial effusion had regressed, and no in-stent stenosis of the graft stent had occurred.

CONCLUSIONS

Primary cardiac tumors are uncommon. Clinically, diagnosis is difficult but tumor blush on angiography can suggest which type of tumor is likely involved. Surgical resection remains the first choice of treatment, but coronary stent graft implantation may be a management option for patients who need a less invasive treatment for cardiac tumors with tumor blush.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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