

Lobulated Hemangioma as a Rare Cause of Tricuspid Regurgitation

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ABSTRACT

INTRODUCTION: Cardiac hemangioma is one of the rarest tumors, with only a few cases described. Unlike other cardiac tumors, its symptoms are nonspecific, making misdiagnosis easy. Cardiac hemangioma can present with various clinical manifestations, including valve disorder, arrhythmia, pericardial effusion, and embolism. Echocardiography is the most direct examination, and surgical resection the simplest and most effective treatment.

PATIENTS AND METHODS: We present a new case of lobulated cardiac hemangioma causing tricuspid regurgitation and discuss the clinical features, diagnosis, and treatment of this rare tumor.

RESULTS: After surgical resection and tricuspid valve replacement, the patient recovered well.

CONCLUSION: For cardiac hemangiomas involving the tricuspid valve, tumor resection combined with valve surgery is an effective treatment option.

KEYWORDS: Cardiac tumor, hemangioma, tricuspid regurgitation

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Introduction

Hemangioma is a type of tumor or tumor-like lesion, which arises from vascular tissue and is a common occurrence, though it can appear in various parts of the body, including the heart and pericardium. It is a relatively uncommon condition, however, with an incidence rate of primary cardiac tumors being as low as 0.0017% to 0.19% in autopsy findings. Even more uncommon, cardiac hemangiomas account for a mere 2% to 3% of primary cardiac tumors.^{1,2} Cardiac hemangioma is a distinct type of benign vascular tumor which originates within the heart and can be categorized into capillary, cavernous, and arteriovenous types, based on morphology.³ Whilst histologically benign, it carries a significant clinical risk and can result in sudden patient death. Echocardiography is a useful tool for detecting cardiac hemangioma, although its clinical manifestations and imaging lack specificity, making it difficult to distinguish from myxoma or other related conditions. As with other types of tumors, surgical resection is the most direct and effective treatment method, due to the impacts on cardiac structure and hemodynamics.

We present a case study of a 41-year-old female patient with tricuspid valve hemangioma who made a good recovery following surgical treatment.

Case Description

A 41-year-old female was admitted to the hospital with complaints of chest distress, which somewhat limited her daily

activities. Her initial workup, including an electrocardiogram and a chest X-ray, failed to reveal any abnormalities. However, upon close physical examination, a grade 3/6 systolic murmur was detected, most prominently over the xiphoid cartilage. Further investigation via transthoracic echocardiogram uncovered a mobile lobulated polypoid mass, originating from the anterior leaflet of the tricuspid valve. Remarkably, the shape of this mass was observed to alter throughout the cardiac cycle. During right ventricular systole, a portion of the mass prolapsed into the right atrium, obstructing the tricuspid orifice and leading to severe tricuspid regurgitation (Figure 1 Panel A and B).

During surgery, a 2.5 cm × 2.5 cm × 2.0 cm pink, lobulated mass was noted, attached to the anterior leaflet of the tricuspid valve. The leaflet and chordae tendinae were eroded by the mass (Figure 1 Panel C and D). To remove the tumor completely, the mass and part of the valve were resected. As reconstructing the tricuspid valve was deemed impossible, a bioprosthetic valve replacement was performed. Anatomopathological examination showed a rare, benign cardiac tumor: hemangioma (Figure 1 Panel E, HE stained, original magnification ×40). Immunohistochemistry demonstrated lining cells in the tumor expressed CD34, desmin, and SMA (Figure 1 Panel F, original magnification ×40). The patient tolerated the procedure well and was discharged in 7 days. Unfortunately, the patient experienced bioprosthetic valve failure 2 years after surgery and underwent



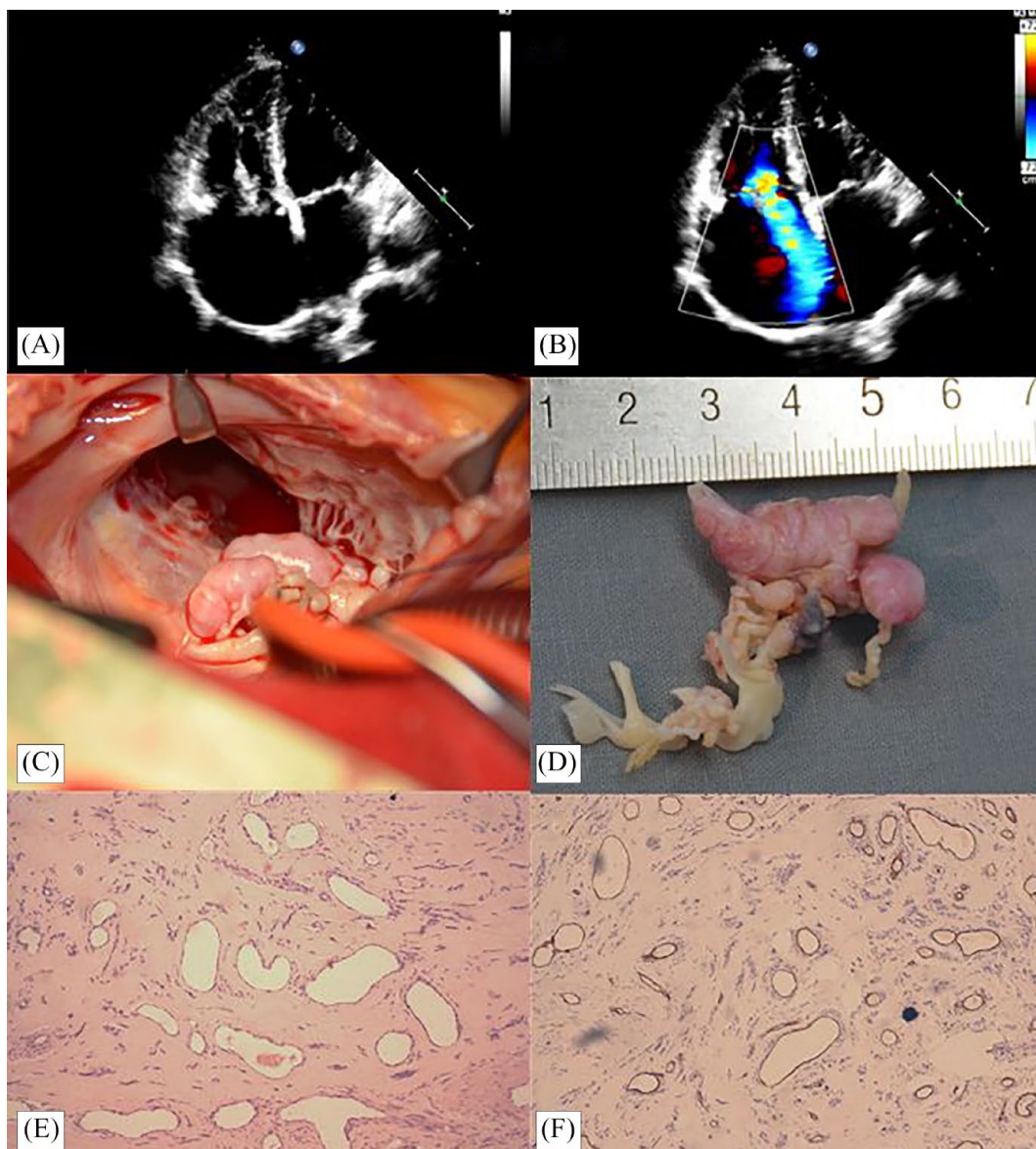


Figure 1. (A): Echocardiogram showed a mobile lobulated polypoid mass, originating from the anterior leaflet of the tricuspid valve. (B): Echocardiogram showed severe tricuspid regurgitation caused by the mass. (C): The tricuspid valve leaflet and chordae tendinae were eroded by the mass. (D): Part of the tricuspid valve and the mass were resected. (E): Anatomopathological examination of the tumor (HE stained, original magnification $\times 40$). (F): Immunohistochemical examination of the tumor (original magnification $\times 40$).

mechanical valve replacement again. Currently, 12 years after surgery, the patient's general condition is good.

Discussion

Cardiac hemangioma is exceedingly rare. First described by Uskoff, it is a type of benign vascular tumor of the heart composed of mature blood vessels.⁴ Most patients lack overt symptoms and are often incidentally discovered; however, symptoms may arise from hemodynamic changes or local tumor invasion.⁵ In our case, the patient sought medical attention for chest discomfort, and the symptoms were nonspecific. No abnormalities were palpated. The electrocardiogram, chest X-ray, and other examinations lacked significant specificity. Only echocardiography indicated a tricuspid valve mass, and owing to its impact on the tricuspid valve, a systolic murmur was heard over the

precordium. At present, the gold standard for diagnosing cardiac hemangioma remains pathological examination.⁶ Cardiac hemangioma can occur across any age group, exhibiting no significant gender differences. This condition can manifest in various layers of the heart, including the epicardium, myocardium, and endocardium.⁷ Studies have observed that hemangiomas are most frequently located in the ventricles, with comparable incidence rates in the left and right ventricles. This is followed by the right atrium.³ Cardiac hemangioma can be categorized into three distinct types based on histological classification. Typical capillary hemangioma occurs primarily in the endocardium. By contrast, cavernous hemangioma and arteriovenous hemangioma manifest between muscle walls.

Echocardiography has emerged as the most important screening and diagnostic tool for cardiac diseases, owing

to its accuracy and non-invasiveness. Compared to other imaging modalities, echocardiography offers the unique advantage of real-time dynamic observation. In our case, echocardiography revealed a mass with altered shape during the cardiac cycle. During right ventricular contraction, the mass obstructed the tricuspid orifice, causing severe tricuspid regurgitation. According to literature reports, the diagnostic accuracy of echocardiography for non-autopsy-discovered cardiac tumors is 94%.⁸ Consistent with most benign cardiac tumors, cardiac hemangioma manifests on ultrasound with regular morphology, clear borders, and lack of infiltration into surrounding tissues. For cardiac hemangioma detection, echocardiography is indeed a sensitive, non-invasive method. It can display tumor size, location, extent, and basic characteristics, as well as whether the mass compresses or obstructs the heart. However, echocardiography lacks specificity.⁹ Therefore, differential diagnosis requires consideration of primary benign cardiac tumors like cardiac myxoma, lipoma, rhabdomyoma, and fibroma, particularly intermuscular benign tumors.

The natural prognosis of cardiac hemangioma, a rare yet potentially serious condition, varies significantly, with the tumor potentially exhibiting regression, stabilization, or even growth over the course of time. The absence of clear guidelines for treating cardiac hemangioma in adults presents a challenge for physicians. However, literature reports suggest that surgery remains an effective and viable option, providing both diagnostic specificity regarding the tumor type and alleviating symptoms.¹⁰ In the majority of cases, surgical resection is the preferred treatment, often yielding a good prognosis for patients.^{11,12} Generally, the mass can be completely removed, and symptoms can be alleviated. However, in severe cases of mass infiltration, a simple mass biopsy or tumor reduction surgery may be necessary, with sufficient cardiac structural reconstruction methods available, such as repair techniques if valves or other important cardiac structures are involved. In our reported case, the tricuspid valve leaflet and chordae tendineae were eroded by the mass. To completely remove the tumor, we had to remove the valve and perform valve replacement. Although the patient underwent valve replacement again 2 years later, she is doing well now. Therefore, surgical treatment is an effective option for cardiac hemangioma, consistent with literature reports.^{13,14}

Author Contributions

FL: Writing the article; MD: Collection of data, and data analysis; QL: Critical revision of the article, and final approval of article.

Ethical Approval

This report was prepared in accordance with the ethical standards of the institutional ethics committee and with the 1964 Helsinki Declaration. Our institution does not require ethical approval for reporting individual cases or case series.

Informed Consent

Written informed consent was obtained from the patient for publication of this case report.

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