Journal of Cardiothoracic Surgery

CASE REPORT

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Giant cardiac tumor resection combined with left ventricular reconstruction

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Abstract

Reports of large tumors of the left ventricle are rare. In this instance, we present a situation where a 57-year-old woman underwent surgical intervention for a sizable mass in her left ventricle. The mass was attached to the walls of the left ventricle and the apex of the left ventricle, almost filling the entire left ventricle. The individual had elective cardiac surgery. Fortunately, the patient survived, and this case may help in the treatment of cardiac sarcoma.

Keywords Malignant cardiac tumor, Cardiac sarcoma, Cardiac surgery, Left ventricular tumor

Introduction

Since the discovery of cardiac tumor, it is still a difficult diagnosis and treatment challenge [1]. Cardiac tumor is a rare disease with 90% benign and 10% malignant [2]. In addition, tumor infiltration into the heart wall may produce hypertrophic or restrictive cardiomyopathy symptoms. The main clinical manifestations were heart failure [1]. For malignant heart tumors, the main treatment is surgical resection combined with chemoradiotherapy.

Herein we presented a rare case of a 57-year-old middle-aged female with a large left ventricular mass invaded the myocardium and the anterior mitral papillary muscle.

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Case report

A 57-year-old woman was hospitalized because of worsening nocturnal chest tightness and difficulty breathing while upright for more than 10 days. The patient claimed to have no long-term history of hypertension, diabetes, coronary heart disease, etc. She had no family history of tumor disease. A significant tumor measuring 65 × 57 mm was detected in the left ventricle during a transthoracic echocardiography, found to be connected to the walls and apex of the left ventricle (Fig. 1A).

Consequently, the individual had elective cardiac surgery. Intraoperative apical incision of the left ventricular wall showed that the tumor tissue adhered closely to the left ventricular membrane without obvious boundary, especially to the anterior wall, lateral wall and apex of the left ventricle (Fig S1A and B). In addition, the tumor was fused with the anterior papillary muscle of the mitral valve. At the same time, bovine pericardial slices were used to reconstruct the left ventricular endocardium (Fig S1C and D). The mitral valve attached to papillary muscles was removed and replaced with a 27# mechanical valve (Fig. 1B, Fig S1E). The intact tumor was about 80 × 70 × 70 mm (Fig. 1C).

Myocardial involvement near the anterior descending branch was serious, in order to ensure myocardial

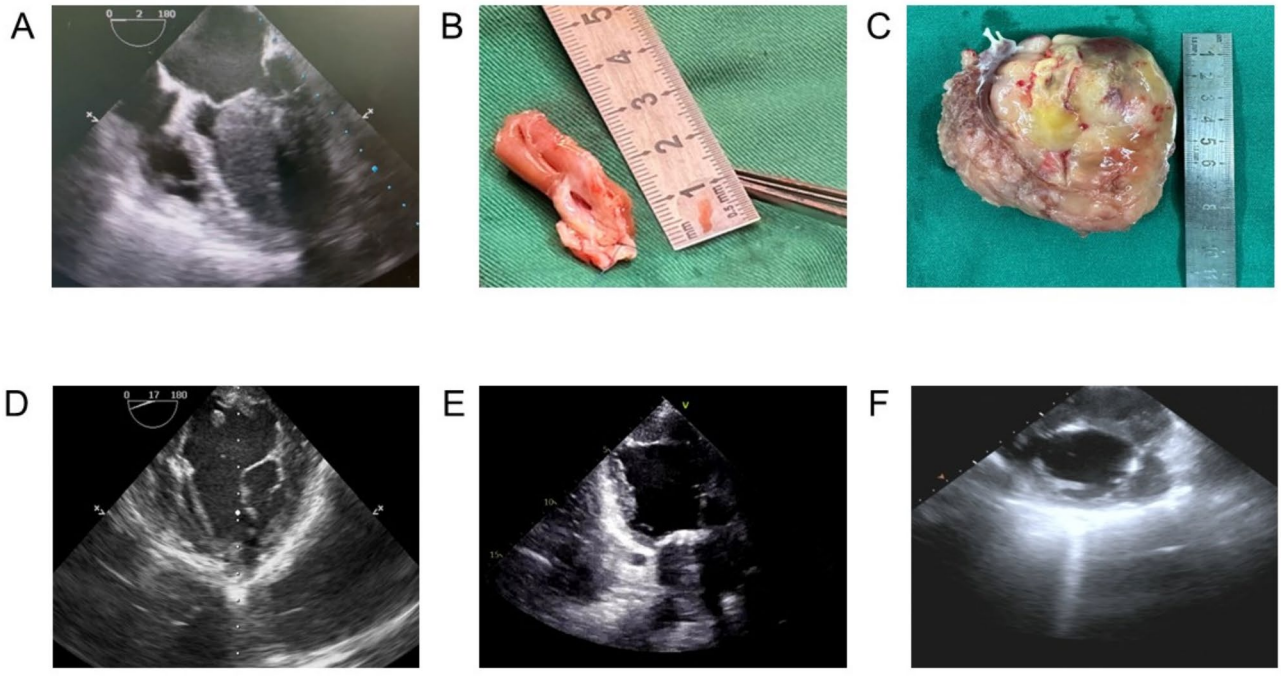

Fig. 1 (**A**) Huge left ventricular mass. (**B**) The mitral valve attached to papillary muscles. (**C**) Left ventricular tumor. (**D**) Cardiac ultrasound three days after surgery. (**E**) Cardiac ultrasound 8 months after surgery. (**F**) Cardiac ultrasound 8 months after two courses of administration of anrotinib

Table 1 Tumor-related gene testing reports associated sarcoma signature genes (fusio)

Fusion Gene	Results
ALK	Negative
CAMTA1	Negative
CCNB3	Negative
CIC	Negative
EWSR1	Negative
FUS	Negative
NCOA2	Negative
NR4A3	Negative
NTRK1	Negative
NTRK2	Negative
NTRK3	Negative
PAX3	Negative
PAX7	Negative
PDGFB	Negative
SS18	Negative
STAT6	Negative
TFE3	Negative
YWHAE	Negative

blood supply, coronary artery bypass surgery (AO-SV-LAD) was performed. Considering the weak tissue of the left ventricular apex and anterior ventricle wall and large endocardial reconstruction, we decided to perform ECMO assisted circulation in order to reduce the pressure load of the left ventricle in the early stage after surgery. The patient's cardiac function improved 3 days after surgery (Fig. 1D), ECMO was removed successfully.

The tissue samples taken during surgery were examined pathologically and diagnosed as an undifferentiated cardiac sarcoma. Immunohistochemical analysis showed positive staining for CD68, CDK4, and Vimentin (Fig S2A), with negative results for other markers including Desmin, CD31, and CD34 (Fig S2B). Ki67 highlighted > 50% (Fig S2B). Ki67 highlighted > 50% (Fig S2C). In addition, tumor-related gene testing reports showed no significant differences in associated sarcoma signature genes (fusio) (Table 1).

Later follow-up showed that the patient survived, all indexes improved, and the systolic function gradually recovered. However, after 8 months of postoperative follow-up, we found that the cardiac function of the patient was significantly decreased (EF:22%) compared with that at discharge (Fig. 1E). The results of echocardiography showed abnormal structure and echo of the left ventricular wall, considering tumor recurrence. Antitumor therapy of antitumor anrotinib was given after consultation in oncology department. After two courses of administration, the patient's heart function improved significantly (Fig. 1F).

Discussion

A patient was diagnosed with a cancerous heart tumor in the left ventricle, resulting in the patient's survival. As previously stated, primary heart tumors are very rare (with rates reported between 0.001 and 0.28% in different postmortem studies) [3, 4]. Individuals diagnosed with

a cardiac sarcoma frequently exhibit symptoms such as shortness of breath, unusual or sharp chest discomfort, fainting, near-fainting, and tiredness [5, 6]. In this case, the patient presented with persistent and aggravated nighttime chest tightness asthma and upright breathing.

Diagnostic criteria consist of the existence of characteristic spindle and polygonal cells containing a plentiful eosinophilic cytoplasm and, notably, showing desmin and myoglobin positivity in immunoreactivity [3, 7]. CD68 negative results were observed on immunohistochemistry for these cells [8]. However, in this case, the histological results of the sarcoma showed the opposite result.

Conclusion

The diagnosis of cardiac tumors mainly depends on cardiac ultrasound and pathological diagnosis. Surgically removing a malignant heart tumor can provide instant relief, but it may also lead to an unpredictable future for the individual. Drug therapy can reduce the probability of tumor recurrence after surgery. Patients must undergo regular imaging tests to monitor for any signs of recurrence or metastasis during close follow-up examinations.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13019-025-03429-3.

Supplementary Material 1

Author contributions

Ganyi Chen collects the patient's clinical results and writes this article. Ran Hong is in charge of the preoperative and postoperative echocardiography of the patient. Cunhua Su and Xin Chen perform the patient's operation, adjusted and followed up the patient's postoperative status.

Funding

The authors did not receive support from any organization for the submitted work. Informed consent was obtained from legal guardian.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Conflict of interest

There is no conflict of interest regarding the publication of this paper.

Competing interests

The authors declare no competing interests.

Received: 12 November 2024 / Accepted: 6 April 2025
Published online: 21 April 2025

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