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Case Report

Malignant Tumor of Small Round Cells in the Pericardium

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Abstract

Background: Malignant tumors of the pericardium are rare. **Case:** A twelve-year-old girl went to the hospital due to coughing and easy fatigue after exercise. Echocardiography indicated a space-occupying lesion in the pericardium. The pathological diagnosis was a small round cell malignant tumor in the pericardium after surgical resection, and radiotherapy was further given. **Conclusion:** Malignant tumors of small round cells in the pericardium require surgical resection, supplemented by comprehensive treatment with postoperative radiotherapy.

Keywords: pericardial tumor; surgery; pericardium; case report

1. Introduction

This case is a twelve-year-old girl, a junior high school student, who went to the hospital due to coughing in the past month. She had a cough and easy fatigue after exercise, and was restricted from intense exercise. After examination at another hospital, a paraventricular space-occupying lesion was suspected. She came to our hospital for further treatment and was diagnosed with an intraventricular space-occupying lesion. After admission, echocardiography and computed tomography (CT) were completed before surgery: a huge pericardial mass and pulmonary artery compression.

The chest X-ray, echocardiogram and intraoperative photos are as follows (Fig. 1):

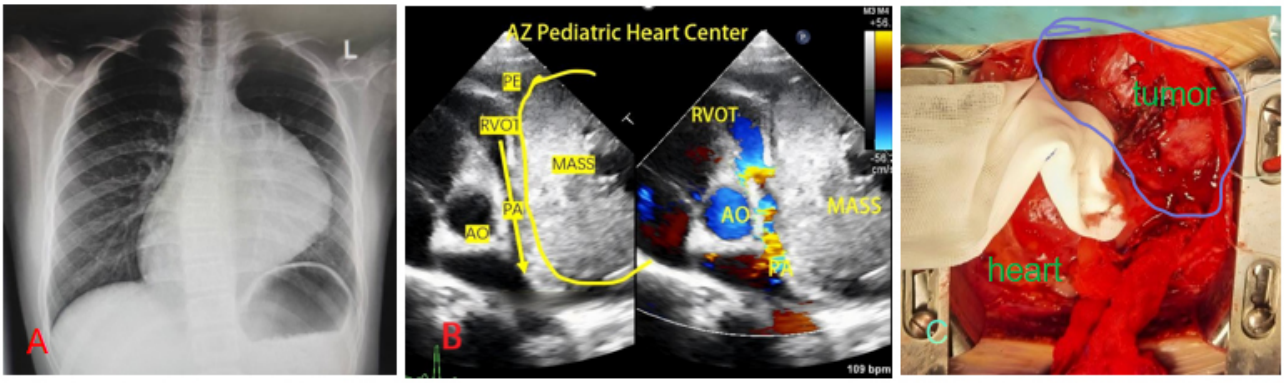


Fig. 1. The chest X-ray, echocardiogram and intraoperative photos. PE, pericardial effusion; RVOT, right ventricular outflow tract; PA, pulmonary artery; AO, aorta. (A) Chest X-ray. (B) Echocardiography of the tumor. (C) Tumor photo during the operation.

2. Surgical Procedure

Intraoperative findings: The whole heart was compressed. The left atrium, left ventricle and pulmonary artery were severely compressed. There was a solid mass of 10 × 10 × 20 cm from the front of the aorta and pulmonary artery to the

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apex of the left ventricle. The tumor was intact, with a clear boundary from the surrounding tissues and abundant blood supply.

Operation process: Extracorporeal circulation wasn't used, the strategy used for this tumor was to remove it as thoroughly as possible. A median sternotomy was undertaken, the pericardium was cut, and it was freed along the surface of the tumor. The tumor was gradually removed. Some tumor tissues are fish-flesh-like appearance. Neither the heart nor the pericardium was injured. Rapid pathological examination was performed after the tumor was completely removed during the operation, the result suggested a small round cell malignant tumor. Pathological result (Fig. 2):

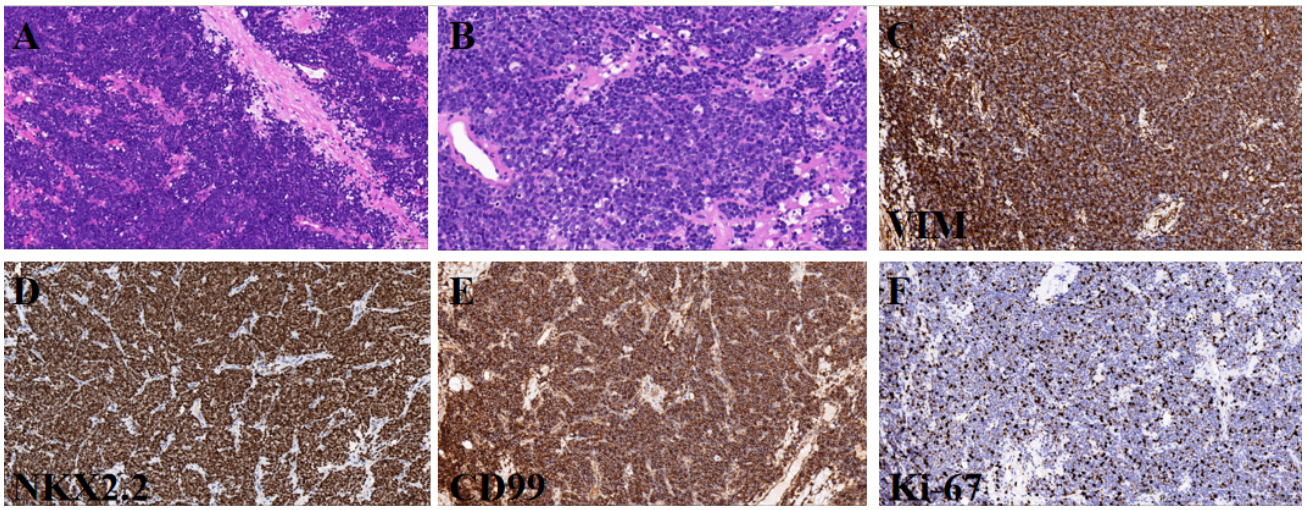


Fig. 2. Pathological section of the tumor. HE, Hematoxylin and Eosin; VIM, Vimentin. (A) The tumor is mainly composed of small round cells, diffusely distributed in nested sheet-like structures, and moderately magnified in HE staining (scale bar = 100 μm). (B) The tumor cells are round, with relatively uniform sizes. The nuclei are round, the chromatin is fine and granular, and the nucleolus is not obvious and is highly magnified by HE staining (scale bar = 20 μm). (C) Vimentin staining showed positive cytoplasm of tumor cells by medium-magnification EnVision method (scale bar = 50 μm); (D) NKX2.2 staining showed positive tumor cell nuclei by medium-magnification EnVision method (scale bar = 50 μm); (E) CD99 staining showed positive tumor cell membranes by medium-magnification EnVision method (scale bar = 50 μm). (F) Ki-67 staining showed positive tumor cell nuclei by medium-magnification EnVision method (scale bar = 50 μm).

Postoperative treatment: Tracheal intubation was removed on the first day after the operation. One week after the operation, the patient was transferred to the Department of Oncology for further radiotherapy, in accordance with the treatment strategy of the oncology department. The one year follow-up is very well.

3. Discussion

In children, primary cardiac tumors are predominant, and most of them are benign [1]. Their clinical manifestations vary greatly. Pericardial tumors are part of cardiac tumors, accounting for only 6.7% to 12.8% of all cardiac tumors. Primary pericardial tumors are rare, and small round cell malignant tumors are even rarer. This is the first time that the author has seen such tumor in many years of clinical work [2].

At present, there is relatively little data on this disease in clinical practice and it has not been widely studied [3]. The differential diagnosis of pericardial tumors mainly relies on medical history and multimodal imaging techniques. Transthoracic echocardiography is the preferred examination method, which can preliminarily assess the size, contour, location, adjacent tissues and activity of the tumor. CT, magnetic resonance imaging (MRI) and other examinations can also be performed [4]. Pathological examination is the gold standard for confirming the nature of tumors. In this case, some examinations were conducted. The preoperative examination of this patient indicated that the tumor boundary was relatively clear, there were no tumors from other sources, and there was no family history. It was inferred that the possibility of a benign tumor was high, and the pathological examination after surgical resection was the only means of diagnosis. During the operation, the mass was found to be grayish-white and fish-like, not quite like a benign tumor. The rapid pathological section during the operation suggested a small round cell malignant tumor, which was quite different from the possibility of being benign considered before the operation.

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Pericardial tumor usually do not require cardiopulmonary bypass to achieve a good prognosis. If the tumor does not clearly show the edge of the cardiac structure, it indicates that the tumor may have invaded the heart and needs to be removed under cardiopulmonary bypass to achieve better therapeutic effects and prognosis. There is a study has pointed out that ERBB2/HER2 may be a therapeutic target for small round cell tumors [5].

4. Limitations

This study is limited by its single-case design and short one-year follow-up. Molecular genetic testing was not performed, so the exact subtype, including DSRCT, and potential therapeutic targets could not be confirmed. A metastatic origin could not be completely excluded. In addition, the surgery was performed without cardiopulmonary bypass, and details of radiotherapy and chemotherapy were limited. Therefore, the long-term efficacy and generalizability of this treatment strategy remain uncertain.

5. Conclusion

Malignant tumors of the pericardium are extremely rare. Whether it is a benign or malignant tumor, surgical removal is required after diagnosis. Domestic and foreign literature reports that a comprehensive treatment mainly based on surgical resection and supplemented by radiotherapy is uniformly adopted.

Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Author Contributions

YL: Conceptualization, Methodology, Writing – original draft, review & editing; QL and YC: Investigation, Data curation, Formal analysis, Writing – review & editing; QW: Conceptualized and designed the study, Supervised the research, Interpreted the data, and critically revised the manuscript. All authors contributed to critical revision of the manuscript for important intellectual content. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The study was carried out in accordance with the guidelines of the Declaration of Helsinki and was approved by the Ethics Committee of Beijing Anzhen Hospital, No.20251876235. We have obtained written informed consent from the participant and her parents.

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Conflicts of Interest

The authors declare no conflicts of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.31083/HSF47407.

References

[1] Medina Perez M, Lichtenberger JP, Huppmann AR, Gomez M, Ramirez Suarez KI, Foran A, et al. Cardiac and Pericardial Neoplasms in Children: Radiologic-Pathologic Correlation. Radiographics. 2023; 43: e230010. https://doi.org/10.1148/rg.230010

[2] Restrepo CS, Vargas D, Ocazionez D, Martínez-Jiménez S, Betancourt Cuellar SL, Gutierrez FR. Primary pericardial tumors. Radiographics. 2013; 33: 1613–1630. https://doi.org/10.1148/rg.336135512

[3] Xu K, Chen Y, Shen W, Liu F, Wu R, Ni J, et al. Desmoplastic Small Round Cell Tumor: a study of CT, MRI, PET/CT multimodal imaging features and their correlations with pathology. BMC Medical Imaging. 2024; 24: 336. https://doi.org/10.1186/s12880-024-01500-4

[4] Tsujimura N, Tei M, Umeda D, Ishimaru K, Minamiura S, Yamamoto T, et al. Multiple Desmoplastic Small Round Cell Tumor in the Intestine: A Case Report. Surgical Case Reports. 2025; 11: 24–135. https://doi.org/10.70352/scrj.cr.24-0135
[5] Zhang T, Febres-Aldana CA, Liu Z, Dix JM, Cheng R, Dematteo RG, et al. HER2 Antibody-Drug Conjugates Are Active against Desmoplastic Small Round Cell Tumor. Clinical Cancer Research : an Official Journal of the American Association for Cancer Research. 2024; 30: 4701–4713. https://doi.org/10.1158/1078-0432.CCR-24-1835