Letter to the Editor

Watery cyst of the right ventricle: a case description

Hongwei Tan[1#]^, Jinping Li[1#], Li Wang[2], Fengxu Yu[1]

[1]Department of Cardiovascular Surgery, The Affiliated Hospital of Southwest Medical University, Luzhou, China; [2]Department of Cardiology, Zigong Hospital of Traditional Chinese Medicine, Zigong, China

[#]These authors contributed equally to this work.

Correspondence to: Fengxu Yu, MD. Department of Cardiovascular Surgery, The Affiliated Hospital of Southwest Medical University, 8 Kangcheng Road, Jiangyang District, Luzhou 646000, China. Email: 616859195@qq.com.

Submitted Mar 09, 2023. Accepted for publication Jun 16, 2023. Published online Jul 03, 2023.
doi: 10.21037/qims-23-298
View this article at: https://dx.doi.org/10.21037/qims-23-298

Introduction

Among cardiac primary tumors, benign tumors are the most common, and the tumor components are primarily located in the left atrium. Mucinous tumor is the most common type of tumor pathology. Cardiac hydatid cysts are common among right ventricular tumors (1-3). The clinical manifestations of cardiac tumors are diverse and lack specificity; chest tightness and shortness of breath are the predominant symptoms (4,5). In the case described here, the patient's right ventricular cyst was neither a hydatid cyst nor a myxoma, but a rare watery cyst. Right ventricular myxoma or watery cyst may have no clinical symptoms in the early stage, but clinical signs of myocardial infiltration or obstruction may appear as the mass grows. These include fever, chest tightness, shortness of breath, palpitations, anemia, syncope, and embolism. In this case, the patient presented with shortness of breath and cough. The tumor mass may obstruct the inflow or outflow tract of the right ventricle, resulting in hemodynamic disorders. In addition to echocardiography, it is necessary to perform a magnetic resonance imaging (MRI) examination to determine the signal intensity of the mass content. The low signal intensity of a watery cyst helps to distinguish it from myxoma. The critical points of the surgical intervention are to maximally define the boundary of the tumor capsule and its relationship with the surrounding tissue structure before the operation, suction as much of the cystic fluid as possible, and altogether remove the mass. If the leaflet and chordae tendineae are resected, chordae tendineae and valve reconstruction should be performed as necessary. Following intervention, the prognosis of this case was good, and there was no need for the patient to take other drugs except for surgical treatment; the long-term prognosis requires continuous follow-up.

Case presentation

A 65-year-old female with an uneventful history was hospitalized due to shortness of breath and cough. Physical examination revealed the following: body temperature (BT): 36.8 ℃, blood pressure (BP): 116/67 mmHg, heart rate (HR): 82/min, respiratory rate (R): 16/min, and her vital signs were stable. Liver function, kidney function, coagulation function, tumor markers, myocardial enzymes, and other laboratory results were unremarkable. This patient had not been previously diagnosed with cardiac pathology, her family had no genetic history, and she had no history of tumor-related disease. Upon completion of the relevant examinations, computed tomography (CT) showed that the patient had multiple hepatic cysts. Transthoracic echocardiogram (TTE) showed a round hypoechoic mass (2.3 cm × 2.6 cm) under the tricuspid valve with clear margins, part of which closely connected with the right ventricular wall (*Figure 1A*), and there was no blood flow signal inside (*Figure 1B*). The mass did not communicate

^ ORCID: 0000-0003-4513-4435.

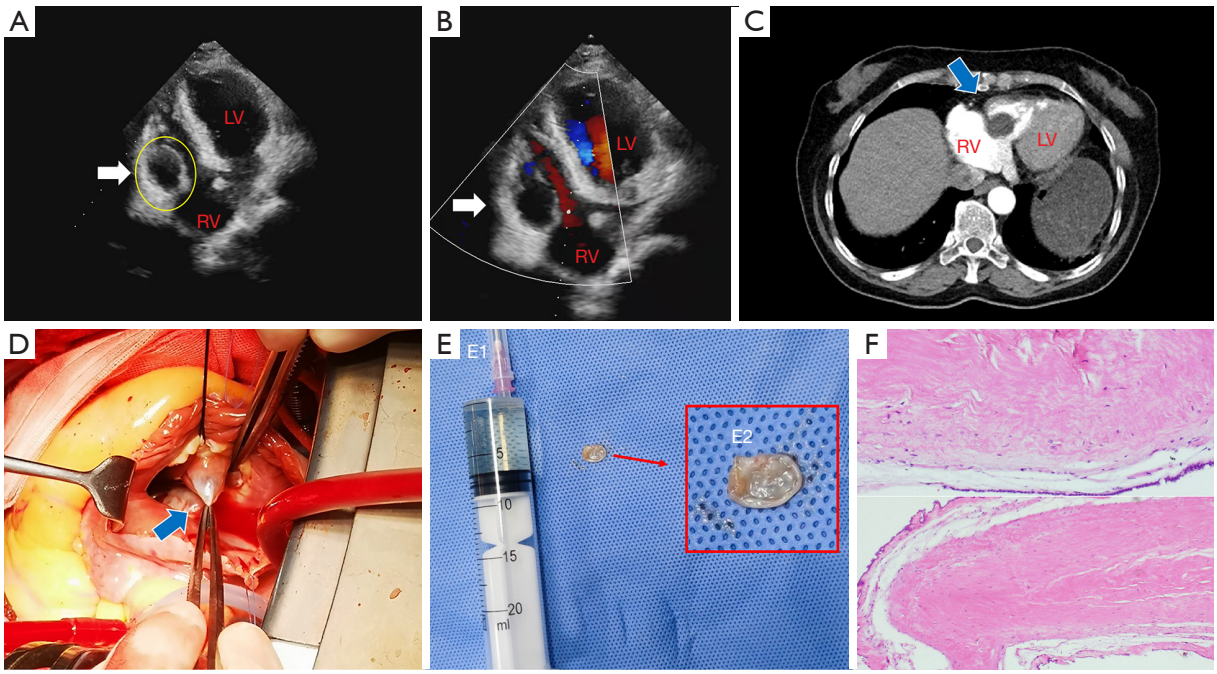

Figure 1 Imaging images and postoperative pathological sections of the patients. (A,B) TTE shows the location and blood flow of the cyst. The white arrow indicates the cyst of the right ventricle. (C) Contrast-enhanced CT shows that the cyst is a low-density shadow. (C,D) The blue arrows indicate the location of the right ventricular cyst. (D,E) The location of the cyst and part of the cyst wall were seen during the operation. (F) The cyst pathological section of the wall. HE stain, ×40. TTE, transesophageal echocardiography; CT, computed tomography. LV, left ventricle; RV, right ventricle; HE, hematoxylin and eosin.

with the heart's chambers and was shown to affect blood flow in the inflow tract of the right ventricle. Contrast-enhanced CT revealed a low-density round mass in the right ventricle, which did not enhance after intravenous contrast media injection (*Figure 1C*).

The TTE and CT results were highly indicative of right ventricular mucinous tumor. Therefore, with the patient's consent, we planned to operate to remove the right ventricular cyst. The patient underwent right ventricular mass resection under cardiopulmonary bypass. The tricuspid valve was suspended during the operation to expose the cyst below the tricuspid valve. The cyst wall was almost transparent (*Figure 1D*). Approximately 7 mL of pellucid fluid was withdrawn from the cyst with a syringe (*Figure 1E,* E1). Then, the exposed cyst wall was wholly resected (*Figure 1E,* E2), but it was found that the right ventricle wall comprised part of the cyst wall. This part of the cyst wall could not be removed entirely. Finally, histopathological examination revealed that the cystic wall was covered by low cuboidal epithelium, and the cystic wall comprised glassy fibrous tissue consistent with cystic changes (*Figure 1F*). The inner wall of the ventricle exhibited normal tissue. Therefore, the patient was diagnosed with a watery cyst of the right ventricle. After surgery, the patients' respiratory symptoms gradually improved, and her condition recovered. After 3 months, the patient exhibited no abnormalities in the TTE. Her shortness of breath and cough had improved significantly, and the postoperative recovery was satisfactory. A timeline summary of the major clinical events in this case is shown in *Figure 2*. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Declaration of Helsinki (as revised in 2013). Written informed consent was provided by the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

Right ventricular watery cyst is a rare intracardiac cyst

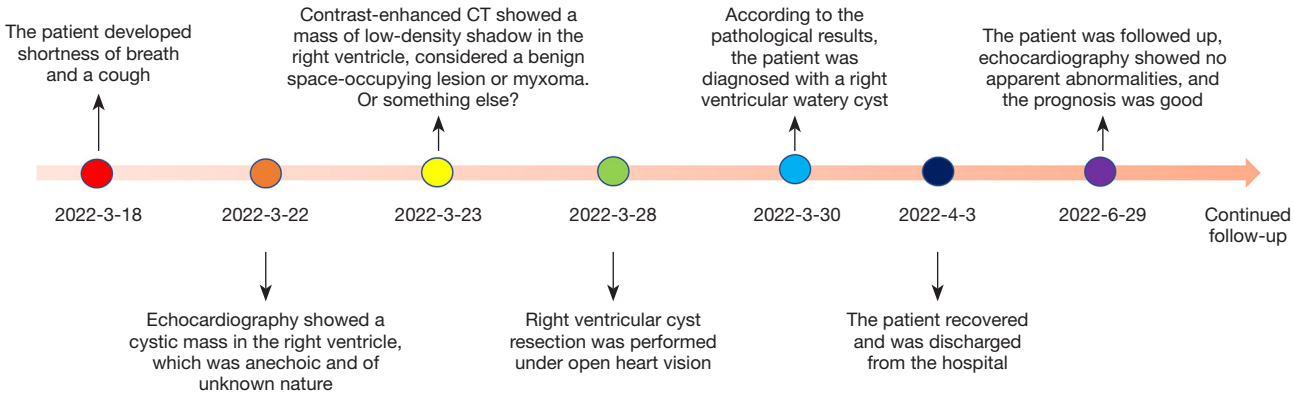

Figure 2 Timeline of major clinical events in the patient. CT, computed tomography.

that can easily be mistaken for a myxoma. Unfortunately, little detail has been recorded in the literature on surgical intervention solutions, pathological diagnosis results, follow-up treatment, and results after querying the information. This case reminds us that when encountering a mass in a unique location, a diagnosis cannot be made relying only on echocardiography. Enhanced CT or MRI should be improved to clarify the anatomical relationship between the boundary of the mass and the surrounding tissue and the nature of the mass content to make a careful surgical plan. A precise preoperative examination can reduce the occurrence of intraoperative accidents. This was a case of right ventricular cyst which we had initially defined as requiring ordinary mucinous tumor treatment. However, during the operation, the surgeon discovered that some of the cyst wall was composed of right ventricular wall and decisively retained it to protect the right ventricular wall from myocardial muscle damage. Except for the resection of the cyst wall of the lesion, the surgeon performed no other operations and additional treatments were not required. Therefore, the patient recovered relatively quickly and was discharged from hospital a few days later. It is noteworthy that this patient had multiple cysts in the liver and that his right ventricular cyst was also composed of normal endocardial tissue. This led us to infer that this patient had a specific polycystic constitution. Whether similar cysts will develop in other chambers of the heart in this patient is unknown, but whether this cyst will recur is worthy of long-term follow-up. This case highlights that cardiac MRI should be performed when cardiac echocardiography and enhanced CT suggest the presence of cardiac myxoma in unusual locations. MRI can clearly show the structural relationship between myxoma and surrounding tissue and can determine the location and width of the myxoma pedicle. If the pedicle width is larger, we should query whether the mass is another type of lesion, remind the surgeon to complete full preparation and planning before surgery, and try to completely remove the pedicle and tumor. This case gives us a new understanding and experience in the diagnosis and treatment of cardiac masses in rare places.

Acknowledgments

Funding: None.

Footnote

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://qims.amegroups.com/article/view/10.21037/qims-23-298/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Declaration of Helsinki (as revised in 2013). Written informed consent was provided by the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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Cite this article as: Tan H, Li J, Wang L, Yu F. Watery cyst of the right ventricle: a case description. Quant Imaging Med Surg 2023;13(8):5468-5471. doi: 10.21037/qims-23-298

