

Right atrial mass of unclear origin in patient with ventriculoatrial shunt

Mateusz Dziarmaga^{1*}, Mateusz Puślecki^{2*}, Sebastian Stefaniak³, Justyna Rajewska-Tabor⁴, Sławomir Katarzyński³, Aleksander Araszkiwicz⁴, Andrzej Minczykowski¹, Krzysztof Sobczyk⁵, Katarzyna Cebrowska¹, Oskar Wiśniewski¹, Marek Jemielity², Małgorzata Pyda⁴, Andrzej Wykrętowicz¹

¹Department of Cardiology Intensive Therapy and Internal Medicine, Poznan University of Medical Sciences, Poznań, Poland

²Department of Medical Rescue, Poznan University of Medical Sciences, Poznań, Poland

³Department of Cardiac Surgery and Transplantology, Poznan University of Medical Sciences, Poznań, Poland

⁴^{1st} Department of Cardiology, Cardiac Magnetic Resonance Unit, Poznan University of Medical Sciences, Poznań, Poland

⁵Faculty of Medicine, Poznan University of Medical Sciences, Poznań, Poland

*Both authors equally contributed to the study.

Correspondence to:

Mateusz Dziarmaga, MD, PhD,
Department of Cardiology
Intensive Therapy,
Poznan University of Medical
Sciences,
Przybyszewskiego 49, 60–355
Poznań, Poland,
phone: + 48 61 869 13 91,
e-mail: dziarmaga.mateusz@
gmail.com

Copyright by the Author(s), 2024

DOI: 10.33963/v.phj.101805

Received:

June 2, 2024

Accepted:

July 29, 2024

Early publication date:

August 1, 2024

Cardiac masses are relatively rare, but still form an important part of cardiology practice [1]. Their accurate diagnosis can be challenging, but it is crucial to determine the appropriate treatment.

A 52-year-old female was admitted to the Cardiology Department for further evaluation of a mass in the right atrium (RA) incidentally detected during a transthoracic echocardiography (Figure 1A). In 2020, the patient had suffered a subarachnoid hemorrhage resulting in hydrocephalus. She was treated by embolization of the ruptured aneurysm in the left vertebral artery and placement of a ventriculoperitoneal shunt, which allows the flow of cerebrospinal fluid from the cerebral ventricular system to the peritoneal space [2]. Due to recurrent peritonitis, the shunt was repositioned to the RA.

Transesophageal echocardiography (TEE) confirmed a 9 × 18 mm pedunculated mass originating from the wall of the RA (Figure 1B). TEE also showed the tip of the ventriculoatrial shunt pointing toward the RA wall (Supplementary material, Video S1). A cardiac myxoma was initially suspected, which although rare can occur in this location [3]. The patient was referred for cardiac magnetic resonance (CMR) imaging to characterize the morphology and extent of the mass. CMR showed an additional irregular floating structure attached to the wall of the right atrium, with low signal intensity in T1- and T2-weighted images, non-enhancing on early gadolinium

enhancement sequences with long inversion time (600 ms), which indicated thrombus (Figure 1C; Supplementary material, Video S3, S4, Figure S1). Oral anticoagulant (OAC) treatment with vitamin K antagonist was initiated, and the patient was consulted by the Heart Team, which qualified her for catheter-directed mechanical aspiration thrombectomy via the AngioVac system (Angio Dynamics, Latham, NY, US) in the Department of Cardiac Surgery and Transplantology. A short 18 Fr cannula (Edwards, Irvine, CA, US) was inserted through the left common femoral vein for blood reinfusion from the circuit. The AngioVac 0-180 system was inserted into the RA through a right CVF approach using the GORE Flex 26 Fr sheet. In the perioperative period, OAC was switched to unfractionated heparin at a dose of 100 units/kg. The device tip was positioned near the mass with the control in TEE and fluoroscopy (Figure 1D). Extracorporeal perfusion was started with a centrifugal pump (RotaFlow, Getinge, Germany) with an initial speed of 500 rotations per minute (rpm), then increased to over 3000 rpm. Successful mass aspiration was subsequently achieved and confirmed in TEE (Supplementary material, Video S4). After blood reinfusion, the mass was observed in the filter chamber (Figure 1F). Postoperative histopathological examination confirmed the formation of a thrombus. The patient was discharged on the third day after the procedure, and referred to the medical center where the shunt had been inserted,

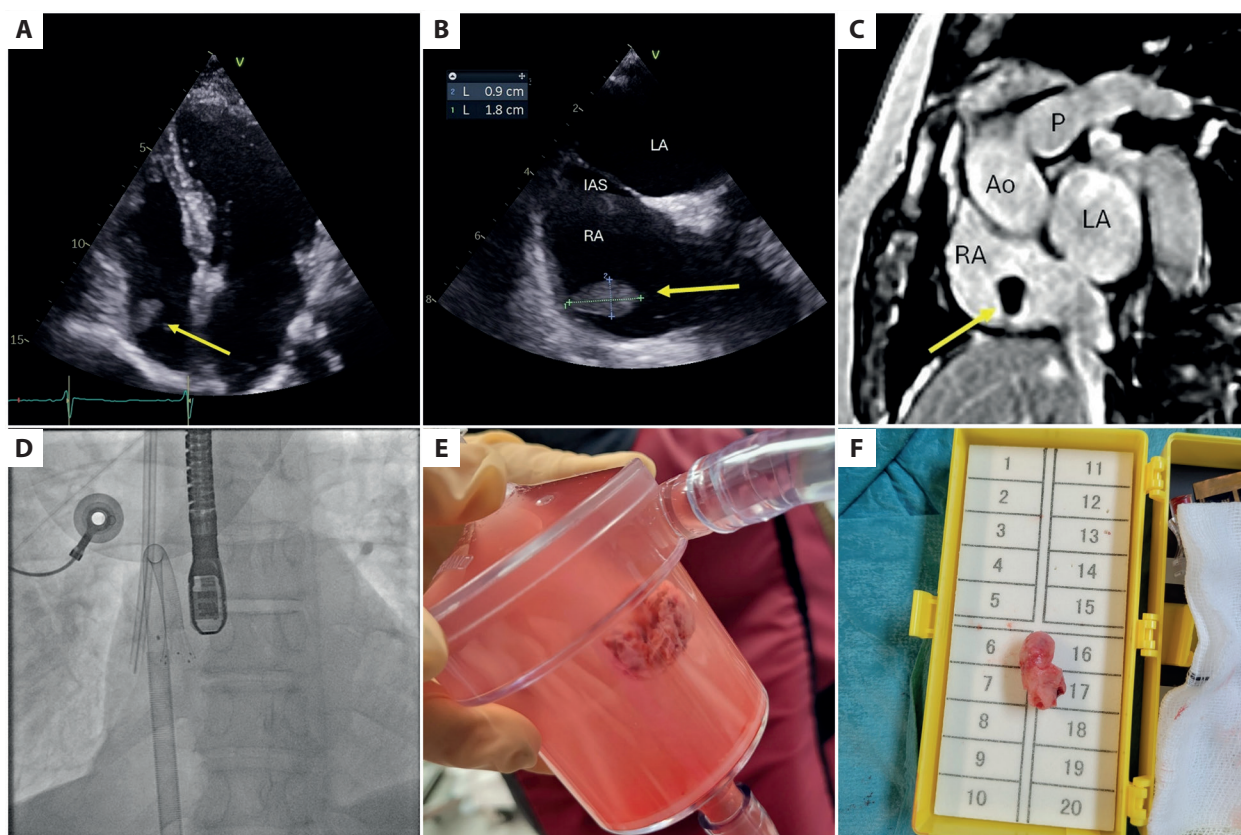


Figure 1. Right atrial mass (arrows) visualized in: **A.** Transthoracic echocardiogram four-chamber view, and **B.** Transesophageal echocardiogram mid-esophageal view. **C.** Thrombus in right atrium: homogeneously low signal intensity mass on early gadolinium enhancement sequence with long inversion time. **D.** Fluoroscopy image anterior-posterior view, AngioVac system introduced into right atrium. **E.** Fibrotic thrombus in filter chamber. **F.** Removed clot with measured length of 20 mm

Abbreviations: Ao, aorta; IAS, interatrial septum; LA, left atrium; P, pulmonary trunk; RA, right atrium

to consider its repositioning. Until then, it was decided to continue OAC treatment with vitamin K antagonist. There were no adverse events during the 1-month follow-up.

Intracardiac masses may occasionally be thromboses related to the use of central venous catheters. Advanced imaging techniques, such as TEE and CMR, are essential for their diagnosis. In recent years, the AngioVac system has emerged as a promising and safe treatment for the endovascular removal of pathological masses located on the right side of the heart and large vessels [4, 5].

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/polish_heart_journal.

Article information

Conflict of interest: None declared.

Funding: None.

Open access: This article is available in open access under Creative Commons Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, which allows downloading and sharing articles with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially. For commercial use, please contact the journal office at polishheartjournal@ptkardio.pl

REFERENCES

1. Tyebally S, Chen D, Bhattacharyya S, et al. Cardiac Tumors: State-of-the-Art Review. *JACC CardioOncol.* 2020; 2(2): 293–311, doi: [10.1016/j.jacc.2020.05.009](https://doi.org/10.1016/j.jacc.2020.05.009), indexed in Pubmed: [34396236](https://pubmed.ncbi.nlm.nih.gov/34396236/).
2. Fowler JB, De Jesus O, Mesfin FB. Ventriculoperitoneal Shunt. Treasure Island (FL): StatPearls Publishing; Copyright © 2024.
3. Reynen K. Cardiac myxomas. *N Engl J Med.* 1995; 333(24): 1610–1617, doi: [10.1056/NEJM199512143332407](https://doi.org/10.1056/NEJM199512143332407), indexed in Pubmed: [8495646](https://pubmed.ncbi.nlm.nih.gov/8495646/).
4. Moriarty JM, Rueda V, Liao M, et al. Endovascular Removal of thrombus and right heart masses using the AngioVac system: Results of 234 Patients from the prospective, multicenter registry of AngioVac procedures in detail (RAPID). *J Vasc Interv Radiol.* 2021; 32(4): 549–557.e3, doi: [10.1016/j.jvir.2020.09.012](https://doi.org/10.1016/j.jvir.2020.09.012), indexed in Pubmed: [33526346](https://pubmed.ncbi.nlm.nih.gov/33526346/).
5. Puślecki M, Stefaniak S, Katarzyński S, et al. AngioVac: The first in Poland percutaneous solid thrombus aspiration from the right atrium. *Kardiol Pol.* 2022; 80(1): 103–104, doi: [10.33963/KP.a2021.0128](https://doi.org/10.33963/KP.a2021.0128), indexed in Pubmed: [34643258](https://pubmed.ncbi.nlm.nih.gov/34643258/).