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ROLE OF CARDIAC MAGNETIC RESONANCE IN DIAGNOSIS AND TREATMENT OF BALL THROMBUS IN LEFT ATRIUM – TRUST BUT VERIFY! – CASE REPORT

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ABSTRACT

Male patient with left atrial cardiac mass was in need of a quick diagnosis for individualized and effective treatment. Transthoracic echocardiography showed presence of a giant left atrial cardiac mass with atypical location for thrombus. Cardiac Magnetic Resonance (CMR) Imaging was performed for histological discrimination, and showed a large cardiac mass wall attached in the left atrium, homogeneous, with diameter of 3.4cm x 3.2cm. Late Gadolinium Enhancement sequences revealed black avascular tissue without signal, confirming the characterization of a thrombus.

The patient refused hospital initiation of low molecular weight heparin treatment and started treatment with Rivaroxaban. Six weeks later he presented with NYHA class II, almost complete dissolving of the thrombus on CMR scan. Seven months from the initial CMR scan, echocardiography screen was done showing complete absence of the left atrial mass. With this case report we have demonstrated the significance of the CMR as one step further in the precise diagnostics of cardiac masses, solving critical clinical dilemma.

Keywords: left atrial cardiac mass, ball thrombus, CMR, Echocardiography

INTRODUCTION

Despite being a rare condition, the ball thrombus in the left atrium represents a major mortality risk. It demands fast diagnosis and a challenging therapeutic approach. Once accurate diagnosis of the thrombus is clearly established the race for treatment starts. Both the risk and benefits from surgical and conservative treatment must be weighed for each patient individually [1,2,3,4].

CASE REPORT

Male patient at the age of 70 presented with worsened heart failure (severe shortness of breath, signs of fluid retention in the lower extremities and in the lungs – the New York Heart Association (NYHA) class IV. The medical history consisted of ischemic heart disease, rheumatic mitral valve stenosis, persistent atrial fibrillation, past implantation of mitral valve bio prosthesis and coronary artery bypass. Due to the low compliance, the vitamin K antagonists were stopped a couple of months ago. The transthoracic ECHO showed presence of a giant left atrial cardiac mass with atypical location for thrombus. Cardiac Magnetic Resonance (CMR) Imaging was performed for histological discrimination. The cine Steady State Free Precession (SSFP) showed a homogeneous large cardiac mass wall attached in the left atrium with diameter of 3.4cm x 3.2cm (Figure 1: A). The Late Gadolinium Enhancement (LGE) sequences revealed black avascular tissue without

signal, confirming the characterization of a fresh thrombus (Figure 1: B, C).

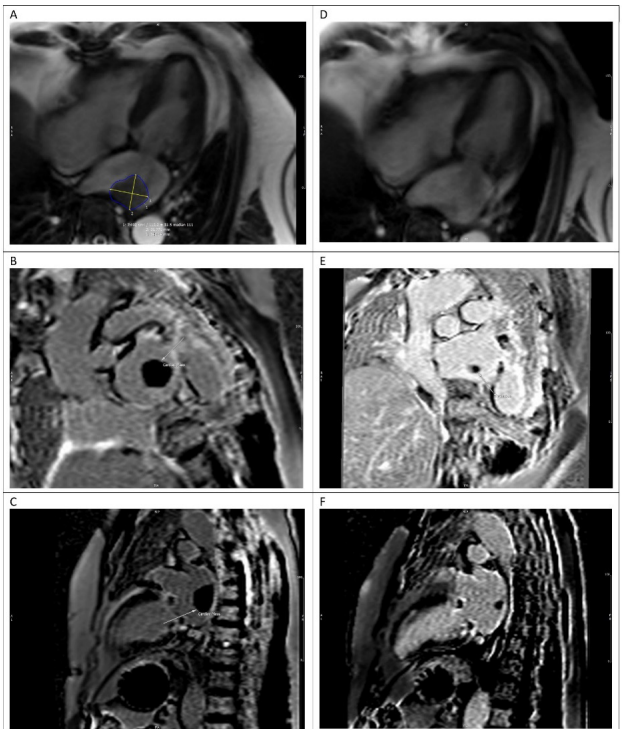


Figure 1. *Cardiac Magnetic Resonance showing Left atrial thrombus (arrow): two-chamber Steady State Free Precession (SSFP) sequence (A); Late Gadolinium Enhancement (LGE) imaging sequence with Phase Sensitive Inversion Recovery (PSIR) (B, C); Left Atrial thrombus dissolution: two-chamber Steady State Free Precession (SSFP) sequence (D); Late Gadolinium Enhancement (LGE) imaging sequence with Phase Sensitive Inversion Recovery (PSIR) (E, F)*

Surgical removal was considered and was declined by the patient and the surgical team. He was offered a hospital initiation of low molecular weight heparin treatment as a first anticoagulation choice in the treatment of gigantic free left atrial thrombus. A direct oral anticoagulation Rivaroxaban was initiated and a regular treatment of Ischemic Heart Failure was continued. Considering the high risk of embolization and the patient's prior history of therapy nonadherence, strict follow-up was planned by weekly telephone contact with a cardiologist. Six weeks later he was referred to our hospital for reevaluation when he presented with NYHA class II. A control CMR scan was performed confirming almost complete dissolving of the thrombus (Figure 1: E, F).

Seven months from the initial CMR scan, ECHO screen was done showing complete absence of left atrial mass (Figure 2)



Figure 2, *Echocardiography 2chamber apical view – complete absence of left atrial mass*

DISCUSSION

The differential diagnosis of cardiac mass is a clinical challenge.5 In standard practice Echocardiography is the first imaging modality. Atrial ball mases are mostly considered thrombi, but the thrombus formation is a time dynamic process with consecutive changes in its architecture and Echo characteristics6. Also, the position and attachment are variable [3]. All this implies the need of advanced imaging tools for more precise diagnosis, since clinical presentation demands quick decision for conservative or operative treatment.

In our case the wall-attached gigantic cardiac mass was analyzed by CMR Imaging. Unlike two-dimensional echocardiography, CMR has the potential to some extent for tissue characterization by comparing the T1 and T2 values of the mass to a reference tissue [7]. SSFP sequence showed presence of homogeneous structure. LGE sequences were indicative for fresh LA thrombus. In another case report of a single atrium ball mass by SA Luis et al. the absence of signal in the cardiac mass on LGE confirmed that it was a large thrombus [8]. Chan's study involved 126 patients with another clinical scenario of neoplasms and cardiac masses with a need of exact target therapeutic approaches. The analysis elucidated the inevitable need of CMR for discrimination between neoplasm and thrombus that anatomically appear similar in the heart [5]. The latest pragmatic review on cardiac masses and differential diagnosis of thrombus in different cardiac chambers showed large span of sensitivity (more than 21%) and specificity (more

than 95%) when using the transthoracic echo. The most accurate modality to achieve better sensitivity (more than 82%) and specificity (more than 99%) is seen with CMR and the Late Gadolinium Enhancement as analyzed by Parato, et al. No matter how much we believe the cardiac mass could be thrombus in some clinical scenario, when possible, CMR verification should be performed.

The treatment options of intracardiac thrombi are still a challenge [4,10] because of the embolization risk, the presence of malignancy and the patient's preference. In our case CMR clearly excluded the presence of free-floating or organized ball thrombus and malignancy that would require surgical removal. The therapy with Rivaroxaban was safe and clinical improvement was noted. There are a few published cases of left atrial ball thrombus successfully treated with oral anticoagulation [8,11]. Decision to remove the cardiac mass by surgical way, instead of the medical management with oral anticoagulation, could expose the patient to an unnecessary surgical risk. Inappropriate oral anticoagulation could mean waste of time and life-threatening outcome in case of malignancy. It is of outmost importance to find the exact diagnosis and to start an immediate treatment.

CONCLUSION

With this case report we have demonstrated the significance of the CMR as one step further in the precise diagnostics of cardiac masses, solving critical clinical dilemma.

Informed Consent

Informed consent for publication of the case report and accompanying data has been obtained from the patient.

ABBREVIATIONS:

CMR Cardiac Magnetic Resonance
NYHA The New York Heart Association
LGE Late Gadolinium Enhancement
PSIR Phase Sensitive Inversion Recovery
SSFP Steady State Free Precession

REFERENCES

1. Tsioufis CP, Stefanadis CI, Tsiamis EG, Kallikazaros IE, Toutouzas PK. A free-floating ball thrombus in the left atrial cavity. The Journal of Thoracic and Cardiovascular Surgery. 1999;118(6):1120–1122
2. Htwe KK, Aung TT. Diagnostic Challenges of a Mass in the Left Atrium. Cureus. 2020;14(6):e8620.
3. Fukuda S, Watanabe H, Shimada K, et al. Left atrial thrombus and prognosis after anticoagulation therapy in patients with atrial fibrillation. J Cardiol. 2011;58(3):266-77.
4. Mathew EN, Pang PYK, Mori M, Chua YL, Sin YK. Successful anticoagulation therapy for a giant left atrial thrombus following mitral valve repair. J Thorac Dis. 2017;9(7):640-643.
5. Chan AT, Plodkowski AJ, Pun SC, et al. Prognostic utility of differential tissue characterization of cardiac neoplasm and thrombus via late gadolinium enhancement cardiovascular magnetic resonance among patients with advanced systemic cancer. J Cardiovasc Magn Reson. 2017;19(1):76.
6. Wrisley D, Giambartolomei A, Lee I, Brownlee W. Left atrial ball thrombus: review of clinical and echocardiographic manifestations with suggestions for management. Am Heart J. 1991;121(6 Pt 1):1784-1790.
7. Frank H, Sykora T, Alpendurada F, 38 - Cardiac and Paracardiac Masses, Editor(s): Manning WJ, Pennell DJ, Cardiovascular Magnetic Resonance (Third Edition), Elsevier, 2019:440-453
8. Luis SA, Poon K, Luis C, Shukla A, Bett N, Hamilton-Craig C. Massive left atrial thrombus in a patient with rheumatic mitral stenosis and atrial fibrillation while anticoagulated with dabigatran. Circ Cardiovasc Imaging. 2013;6(3):491-492.
9. Parato VM, Nocco S, Alunni G, Becherini F, Conti S, Cucchini U, Di Giannuario G, Di Nora C, Fabiani D, La Carrubba S, Leonetti S, Montericcio V, Tota A, Petrella L. Imaging of Cardiac Masses: An Updated Overview. J Cardiovasc Echogr. 2022 Apr-Jun;32(2):65-75. doi: 10.4103/jcecho.jcecho_18_22. Epub 2022 Aug 17. PMID: 36249434; PMCID: PMC9558634.
10. Lin AN, Lin S, Lin K, Gokhroo R. A giant left atrial thrombus. BMJ Case Rep. 2017 3;2017:bcr2017219792.
11. Kato T, Yasaka M, Yabuki T, Adachi T, Toyoda S, Inoue T. Two-week administration of rivaroxaban resolved left atrial thrombus. J Cardiol Cases. 2014;10(6):238-240.

Резиме

УЛОГАТА НА СРЦЕВАТА МАГНЕТНА РЕЗОНАНЦА ВО ДИЈАГНОЗАТА И ТРЕТМАНОТ НА ТОПЧЕСТ ТРОМБ ВО ЛЕВАТА ПРЕТКОМОРА – ПРИКАЗ НА СЛУЧАЈ

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Пациент, маж со срцева маса во левата преткомора, имаше потреба од брза дијагноза за индивидуализиран и ефикасен третман. Трансторакалното ехо покажа присуство на огромна срцева маса во левата преткомора со атипична локација за тромб. Снимањето со срцева магнетна резонанца се направи за хистолошко диференцирање, кое покажа голема хомогена маса прикачена за слободниот ѕид на левата преткомора со дијаметар од 3,4 cm x 3,2 cm. Секвенцата на доцногадолиниумско интензивирање прикажа црно неваскуларизирано ткиво без сигнал, потврдувајќи присуство на тромб.

Пациентот одби хоспитална иницијализација на третман со нискомолекуларен хепарин, поради што се отпочна третман со ривароксабан. Шест недели подоцна пациентот се презентираше во NYHA класа II, со речиси целосно разграден тромб на скенот со магнетна резонанца, ехакардиографскиот скрининг покажа комплетно отсуство на маса во левата преткомора. Со овој приказ на случај демонстрираме дека срцевата магнетна резонанца претставува чекор напред во прецизното дијагностицирање на срцевите маси и во донесувањето одлука во околности на критична дилема.

Клучни зборови: срцева маса во левата преткомора, топчест тромб, срцева магнетна резонанца (CMR), ехокардиографија