



CMR24

LONDON

25-27 JANUARY
PRECONFERENCE – 24 JANUARY

THE GLOBAL CMR CONFERENCE



Submission Title: Correlation between CMR and chest CT in assessment of constrictive pericarditis

SUBMISSION PREVIEW

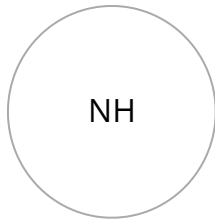
Correlation between CMR and chest CT in assessment of constrictive pericarditis

Submission ID: 1627270

Submission Category: Cases

Submission Status: Complete

Participant(s)



Natasha Hadji Nikolova Alchinova, MD (she/her/hers)

Position:

Radiologist

Department:

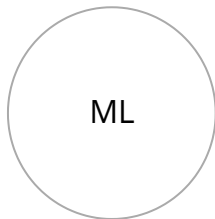
Cardiovascular departement

Organization:

University institute of Radiology, Skopje

Role:

Presenting Author;Primary Author



Menka Lazareska, MD, PhD (she/her/hers)

Position:

Assis. Prof./ Subspecialist neuroradiologist

Department:

Radiology

Organization:

Clinical Hospital Acibadem Sistina

Role:

Co-Author



Ivana Panchevska, MD (she/her/hers)

Position:

Radiologist

Department:

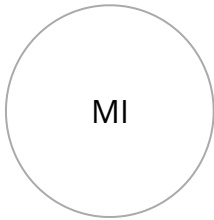
Thoracic radiology

Organization:

University Institute of Radiology, Skopje

Role:

Co-Author



Mitko Ilievski, MD (he/him/his)

Position:

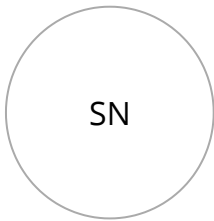
Radiologist

Organization:

Private Hospital Acibadem Sistina

Role:

Co-Author



Sonja Nikolova, MD

Position:

Assistant/Radiologist

Department:

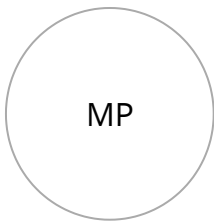
Thoracic radiology

Organization:

University Institute of Radiology, Skopje

Role:

Co-Author



Milkica Pasoska, MD (she/her/hers)

Position:

Assistant/Radiologist

Department:

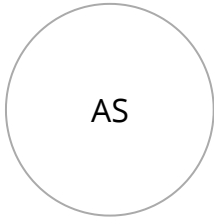
Pediatric Radiology

Organization:

University Institute of Radiology, Skopje

Role:

Co-Author

**Aleksandar Stojkoski, MD (he/him/his)****Position:**

Assistant/Radiologist

Department:

Thoracic radiology

Organization:

University Institute of Radiology, Skopje

Role:

Co-Author

**Vjolca Aliji, MD (she/her/hers)****Position:**

Assistant/Radiologist

Department:

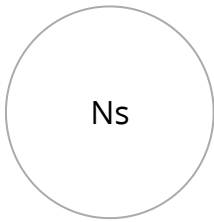
Neuro vascular radiology

Organization:

University Institute of Radiology, Skopje

Role:

Co-Author

**Nikola stamenkovski, MD (he/him/his)****Position:**

Radiology resident

Organization:

University Institute of Radiology, Skopje

Role:

Co-Author

Case

Topic

Pericardial Disease - Cases

In addition to selecting a Topic Category, please also select which of the following

descriptive categories best matches your presentation:

- Clinical

Description of Clinical Presentation

A 35-year-old adult presented to the cardiology department with shortness of breath, coughing, and fatigue. He had a history of recurrent colds with high fever, but their recent cold led to worsening symptoms. Tests revealed atrial fibrillation with a heart rate of 150 bpm, enlarged atria, and reduced systolic function. Laboratory results showed thrombocytopenia, elevated GGT, and high bilirubin, with no elevated Troponin levels. CMR showed systemic volume overload, with passive liver congestion and left pleural effusion, no pericardial effusion, but thickening with dimensions of 4,6mm. SSFP sequences showed left and right ventricle hypokinesia with impaired diastolic filling, severe diastolic septal bounce and abnormal contour of left lateral wall which was akinetic. The T2-STIR sequence showed hypersignal intensity in the basal anterolateral and inferolateral segments, distributed within the subepicardial and mid-wall regions. Additionally, focal pericardial involvement was observed in these segments, along with two central hypo signal lesions that showed identical signal characteristics across all sequences. On delayed enhancement PSIR sequences, there was increased signal intensity in the specific areas on the T2-STIR sequence, suggesting gadolinium accumulation and in the mid and apical inferior and inferolateral segments with subepicardial distribution. There was pericardial enhancement dominantly at the basal ventricular segments, along with focal pericardial enhancement at the left apex also featuring a central hypo signal lesion. The patient underwent a native chest CT examination, revealing circumferential thickening of the pericardium with linear diffuse calcifications. This finding was correlated with the MRI results, indicating a state of subacute to chronic inflammatory/fibrotic constrictive pericarditis with constriction throughout the entire heart with concomitant myocarditis changes dominantly at the left lateral wall.

Diagnostic Techniques and Their Most Important Findings

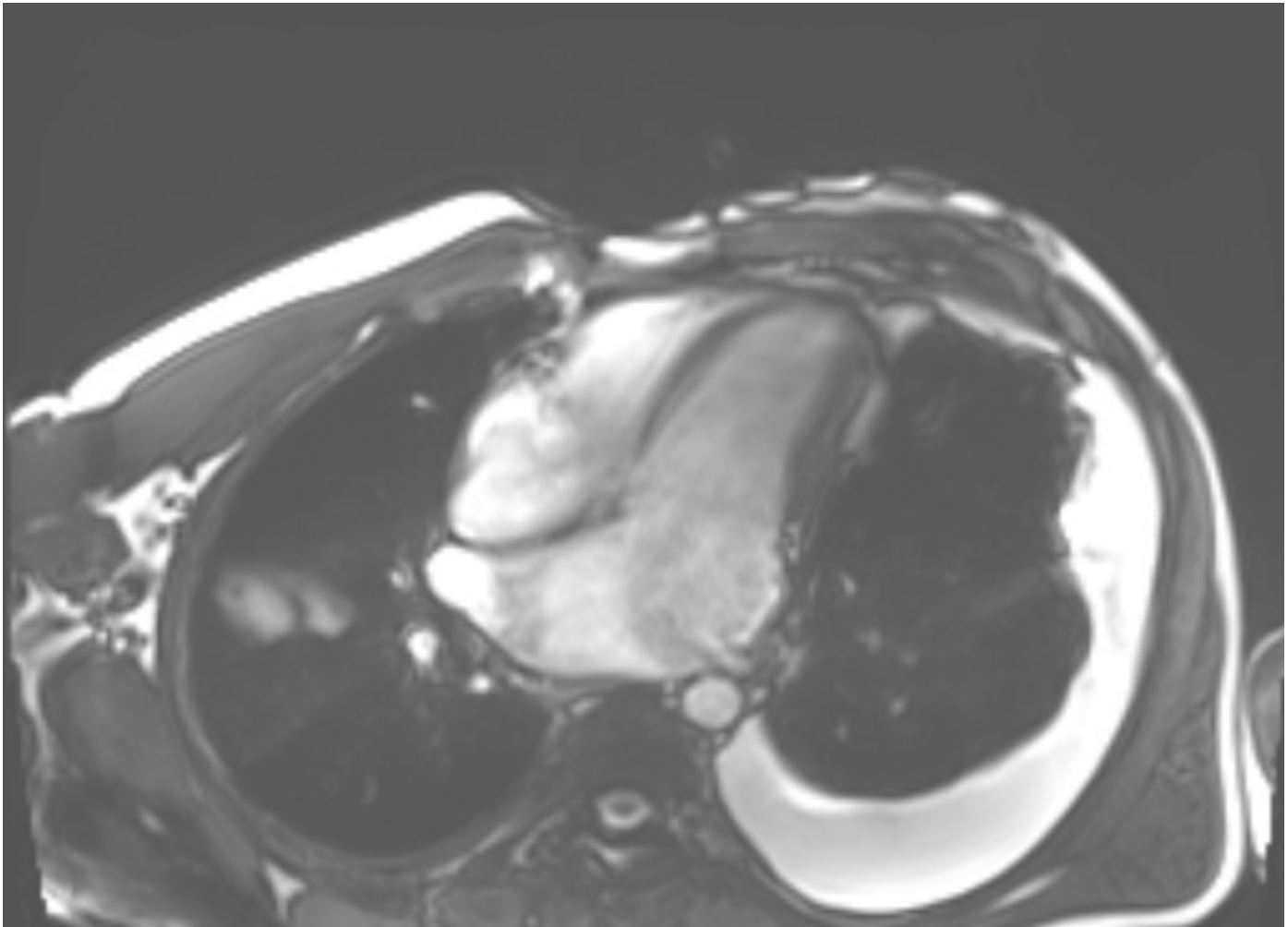
Cardiac MRI is a valuable tool for diagnosis of pericardial constriction where the ventricles may appear compressed or have a "square root sign" appearance, reflecting impaired ventricular filling during diastole. T1 and T2 mapping, can provide insights into the tissue characteristics of the pericardium and myocardium. These techniques can help differentiate between pericardial and myocardial involvement and assess the degree of fibrosis. Cardiac MRI can assess respirophasic variation in ventricular filling, which is a hallmark feature of pericardial constriction. During inspiration, there may be an exaggerated increase in ventricular filling due to reduced compliance of the constricted pericardium.

Learning Points from this Case

Pericardial constriction, characterized by impaired diastolic filling due to thickened, fibrotic, and/or calcified pericardium, can be a diagnostic challenge, often requiring the use of multiple imaging modalities which within this case with the correlation between TTE, CMR and CT scan a noninvasive diagnosis can be made.

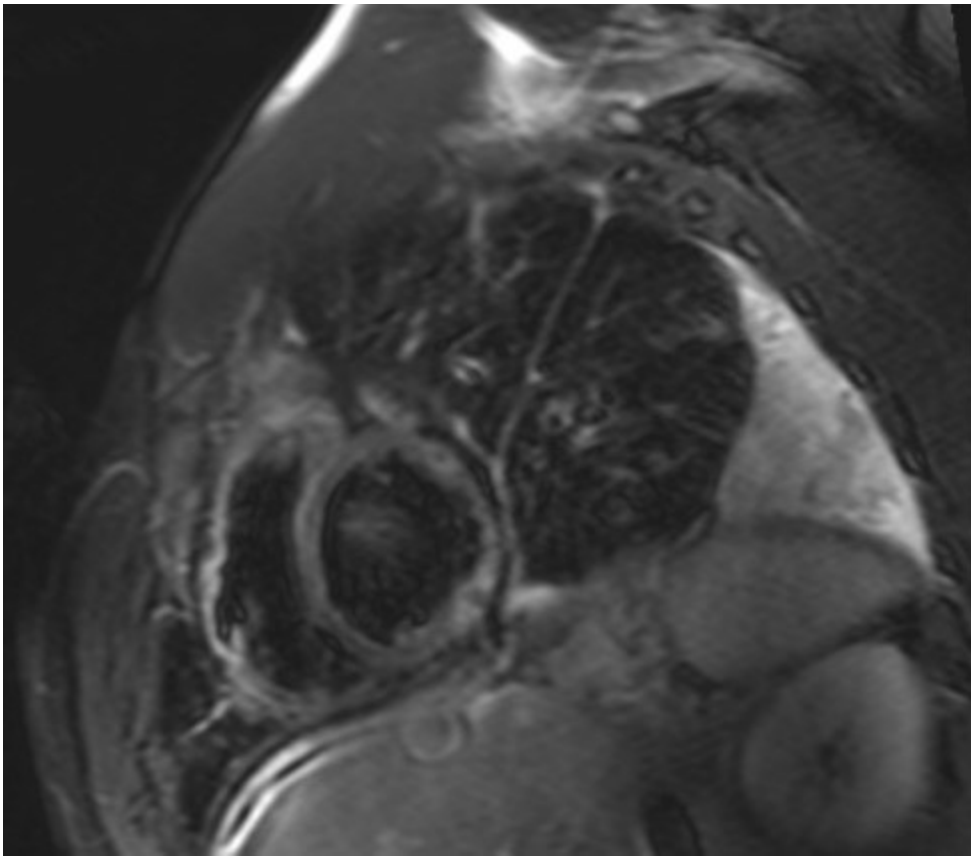
Uploaded File(s)

Images



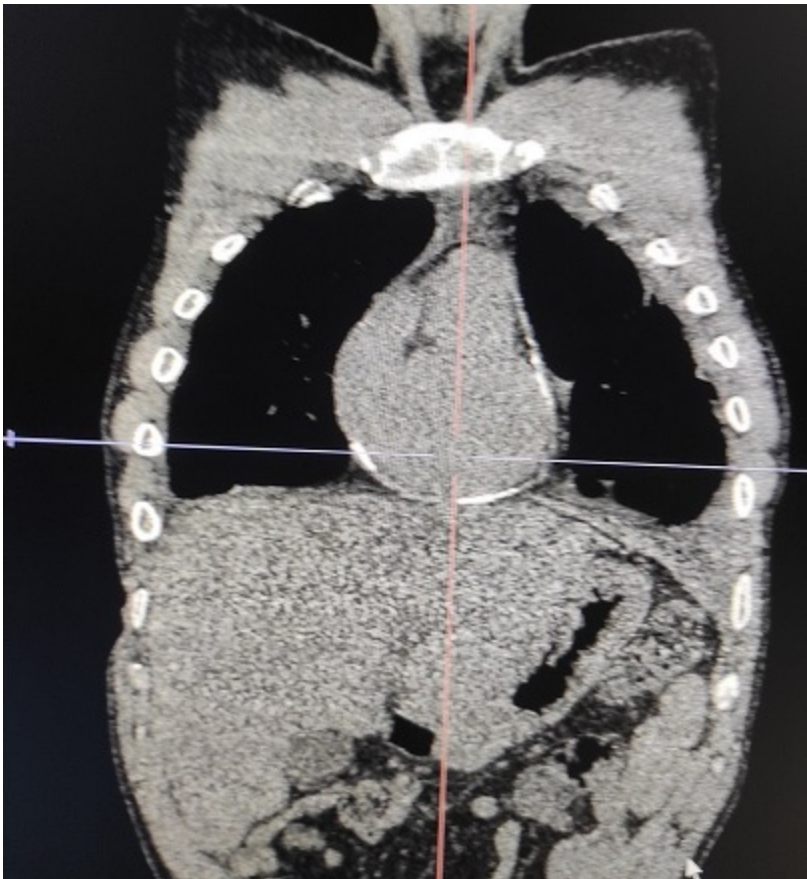
4-chamber SSFP image that showed abnormal ventricle contours with enlarged atria with left pleural effusion and encapsulation in right oblique fissure.

IMG-0003-00001.jpg



T2-STIR sequence showed high signal intensity with mid wall and epicardial distribution at basal anterolateral and inferolateral segments with central low signal intensities.

IMG-0004-00001.jpg



Native CT scan coronal plane showed circumferential thickening of the pericardium with diffuse calcifications.

20230912_014609 rsz.jpg

References

References

1. Johnson KT, Julsrud PR, Johnson CD. Constrictive pericarditis at abdominal CT: a commonly overlooked diagnosis. *Abdom Imaging*. 2008;33:349–352. doi: 10.1007/s00261-007-9246-9;
2. Giorgi B, Mollet NR, Dymarkowski S, Rademakers FE, Bogaert J. Clinically suspected constrictive pericarditis: MR imaging assessment of ventricular septal motion and configuration in patients and healthy subjects. *Radiology*. 2003;228:417–424. doi: 10.1148/radiol.2282020345;
3. Hanneman K, Thavendiranathan P, Nguyen ET, Moshonov H, Paul NS, Wintersperger BJ, Crean AM. Cardiovascular CT in the diagnosis of pericardial constriction: predictive value of inferior vena cava cross-sectional area. *J Cardiovasc Comput Tomogr*. 2014;8:149–157. doi:10.1016/j.jcct.2013.12.017;
4. Ling LH, Oh JK, Schaff HV, Danielson GK, Mahoney DW, Seward JB, Tajik AJ. Constrictive pericarditis in the modern era: evolving clinical spectrum and impact on outcome after pericardiectomy. *Circulation*. 1999;100:1380–1386;
5. Anavekar NS, Wong BF, Foley TA, Bishu K, Kolipaka A, Koo CW, Khandaker MH, Oh JK, Young PM. Index of biventricular interdependence calculated using cardiac MRI: a proof of concept study in patients with and without constrictive pericarditis. *Int J Cardiovasc Imaging*. 2013;29:363–369. doi: 10.1007/s10554-012-0101-x;
6. Rienmüller R, Doppman JL, Lissner J, Kemkes BM, Strauer BE. Constrictive pericardial disease: prognostic significance of a nonvisualized left ventricular wall. *Radiology*. 1985;156:753–755. doi:10.1148/radiology.156.3.4023238;
7. Zurick AO, Bolen MA, Kwon DH, Tan CD, Popovic ZB, Rajeswaran J, Rodriguez ER, Flamm SD, Klein AL. Pericardial delayed hyperenhancement with CMR imaging in patients with constrictive pericarditis undergoing surgical pericardiectomy: a case series with histopathological correlation. *JACC Cardiovasc Imaging*. 2011;4:1180–1191. doi: 10.1016/j.jcmg.2011.08.011;
8. Syed FF, Schaff HV, Oh JK. Constrictive pericarditis—a curable diastolic heart failure. *Nat Rev Cardiol*. 2014;11:530–544. doi: 10.1038/nrcardio.2014.100;
9. Feng D, Glockner J, Kim K, Martinez M, Syed IS, Araoz P, Breen J, Espinosa RE, Sundt T, Schaff HV, Oh JK. Cardiac magnetic resonance imaging pericardial late gadolinium enhancement and elevated inflammatory markers can predict the reversibility of constrictive pericarditis after antiinflammatory medical therapy: a pilot study. *Circulation*. 2011;124:1830–1837. doi: 10.1161/CIRCULATIONAHA.111.026070;
10. Bogaert J, Francone M. Pericardial disease: value of CT and MR Imaging. *Radiology* 2013;267(2):340–356;
11. Verhaert D, Gabriel RS, Johnston D, Lytle BW, Desai MY, Klein AL. The role of multimodality imaging in the management of pericardial disease. *Circ Cardiovasc Imaging*. 2010;3:333. doi: 10.1161/CIRCIMAGING.109.921791;
12. Senapati A, Isma'eel HA, Kumar A, Ayache A, Ala CK, Phelan D,

Schoenhagen P, Johnston D, and Klein AL. Disparity in spatial distribution of pericardial calcifications in constrictive pericarditis. *Open Heart*.2018;5:e000835;

Keywords

Keyword One:

Calcification

Keyword Two:

Pericardial Constriction

Keyword Three:

Myocarditis