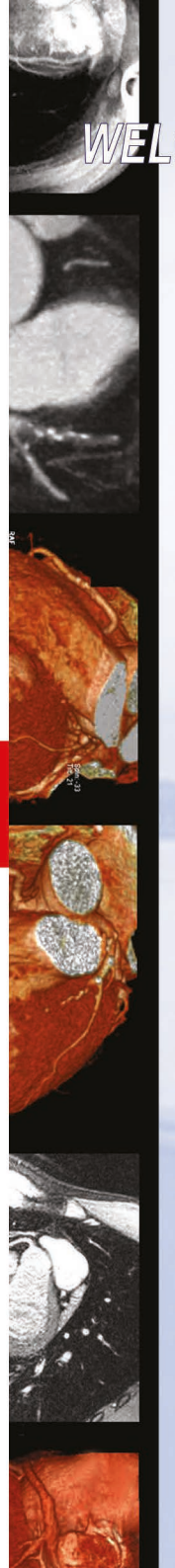
International Meeting — *Clinical Update 2017*

CardiacMRI & CT

5-7 October 2017 - Cannes, France

Final Program



WELCOME

International Meeting — Clinical Update 2017
CardiacMRI & CT
5-7 October 2017 - Cannes, France

Dear Friends and Colleagues!

We are pleased to welcome you to the 13th Clinical Update on Cardiac MRI & CT in Cannes, France.

This international meeting will offer new perspectives on the implementation of the newest cardiac MR and CT technology into patient management.

A distinguished international faculty will provide a comprehensive review of the latest cardiac MR and CT technology including hands-on presentations, updates on clinical trials, and case presentations.

The main focus of the meeting will be the potential of exciting non-invasive techniques to improve patient care. Personal interaction with world renown experts in both cardiac MRI and CT will guarantee a unique view on many sometimes controversial topics.

Welcome to Cardiac MRI & CT - Clinical Update 2017!

Herbert Frank, MD

Udo Hoffmann, MD

ORGANIZATION

Course Directors

Herbert Frank, MD
Head, University Hospital for Internal Medicine, Universitätsklinikum Tulln
Professor in Medicine, Karl Landsteiner University and Medical University of Vienna, Austria

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Professor of Radiology, Harvard Medical School
Division Chief, Cardiovascular Imaging Director Cardiac MR PET CT Program
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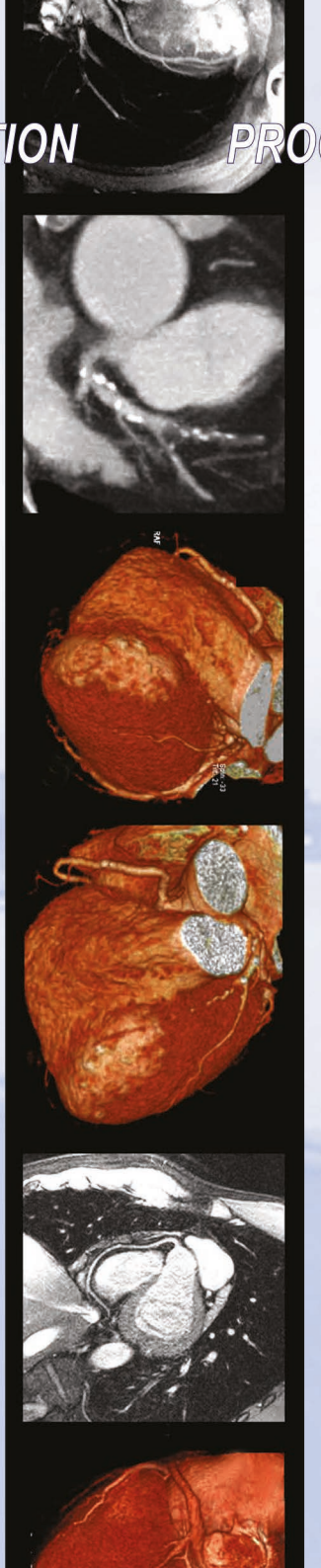
Thomas Brunner *(Vienna, AT)*
Peter Buser *(Basel, CH)*
John-Paul Carpenter *(Poole, UK)*
Filippo Civaia *(Monaco)*
Herbert Frank *(Tulln, AT)*
Martin Grabenwöger *(Vienna, AT)*
Udo Hoffmann *(Boston, USA)*
Pal M. Horvat *(Budapest, HU)*
Sanjay Prasad *(London, UK)*
Udo Sechtem *(Stuttgart, DE)*
Ahmed Tawakol *(Boston, USA)*



PROGRAM

Thursday 5 October

14:00 ***WELCOME***
Herbert Frank | Tulln, Austria

14:10 - 15:00 ***Session I:***
MY PERSONAL EXPERIENCE CT/MR
Chair: Herbert Frank | Tulln, Austria
Udo Hoffmann | Boston, USA

14:10 - 14:35 **Tips and Tricks CMR**
John-Paul Carpenter | Poole, UK

14:35 - 15:00 **Tips and Tricks CT**
Udo Hoffmann | Boston, USA

15:00 - 16:36 ***Session II:***
CLINICAL CASE PRESENTATIONS I
Chair: Udo Sechtem | Stuttgart, Germany
Udo Hoffmann | Boston, USA

15:00 - 15:48 **CT case presentations**
15:00 - 15:12 Udo Hoffmann | Boston, USA
15:12 - 15:24 Udo Hoffmann | Boston, USA
15:24 - 15:36 Filippo Civaia | Monaco
15:36 - 15:48 Filippo Civaia | Monaco

15:48 - 16:36 **CMR case presentations**
15:48 - 16:00 Peter Buser | Basel, Switzerland
16:00 - 16:12 Udo Sechtem | Stuttgart, Germany
16:12 - 16:24 John-Paul Carpenter | Poole, UK
16:24 - 16:36 Oliver Bruder | Essen, Germany

16:36 - 17:00 ***Coffee Break***

Thursday 5 October

17:00 - 17:40 ***Session III:***
ACUTE AORTIC SYNDROMES

Chair: Oliver Bruder | Essen, Germany
Filippo Civaia | Monaco

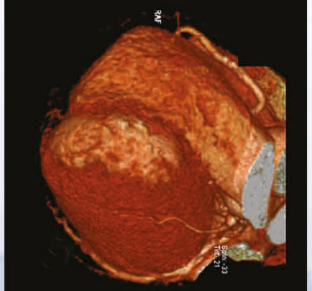
17:00 - 17:20 *Main Lecture:* **Influencing arterial inflammation and aortic distensibility**
Ahmed Tawakol | Boston, USA

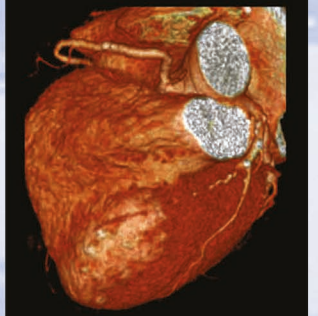
17:20 - 17:40 **CT and CMR Criteria in AAS**
Udo Sechtem | Stuttgart, Germany

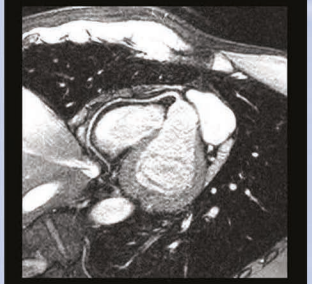
17:40 - 18:00 **Surgeon's view on imaging in AAS and in the follow-up**
Martin Grabenwöger | Vienna, Austria

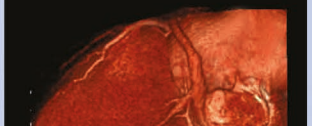
18:00 RECEPTION

PROGRAM









Friday 6 October

09:00 - 10:35 ***Session IV:***
HEART FAILURE IMAGING

Chair: Ahmed Tawakol | Boston, USA
Herbert Frank | Tulln, Austria

09:00 - 09:20 **CT and CMR in heart failure**
Udo Sechtem | Stuttgart, Germany

09:20 - 09:40 **Substrate of arrhythmias and sudden death**
Sanjay Prasad | London, UK

09:40 - 10:00 **CMR and CT for ICD and CRT planning**
Peter Buser | Basel, Switzerland

10:00 - 10:35 **Parametric mapping - Clinical application in heart failure**
John-Paul Carpenter | Poole, UK

10:35 - 10:50 ***Coffee Break***

10:50 - 11:10 ***Session V:***
INDUSTRY FORUM - CT

Chair: Pal Maurovich Horvat | Budapest, Hungary
Thomas Brunner | Vienna, Austria

Siemens & Toshiba

PROGRAM

Friday 6 October

11:10 - 12:10 ***Session VI:***
STRUCTURAL HEART DISEASE
Chair: Sanjay Prasad | London, UK
Herbert Frank | Tulln, Austria

11:10 - 11:30 *Main Lecture:* **HFpEF - the forgotten disease**
Udo Sechtem | Stuttgart, Germany

11:30 - 11:50 **Role of imaging in non-ischemic cardiomyopathy**
Herbert Frank | Tulln, Austria

11:50 - 12:10 **Imaging of myocardial fibrosis**
Sanjay Prasad | London, UK

12:10 - 13:30 **Lunch** | *Hotel Majestic Salon Dinard*

13:30 - 14:50 ***Session VII:***
CV IMAGING IN PRIMARY PREVENTION

Chair: Filippo Civaia | Monaco
Thomas Brunner | Vienna, Austria

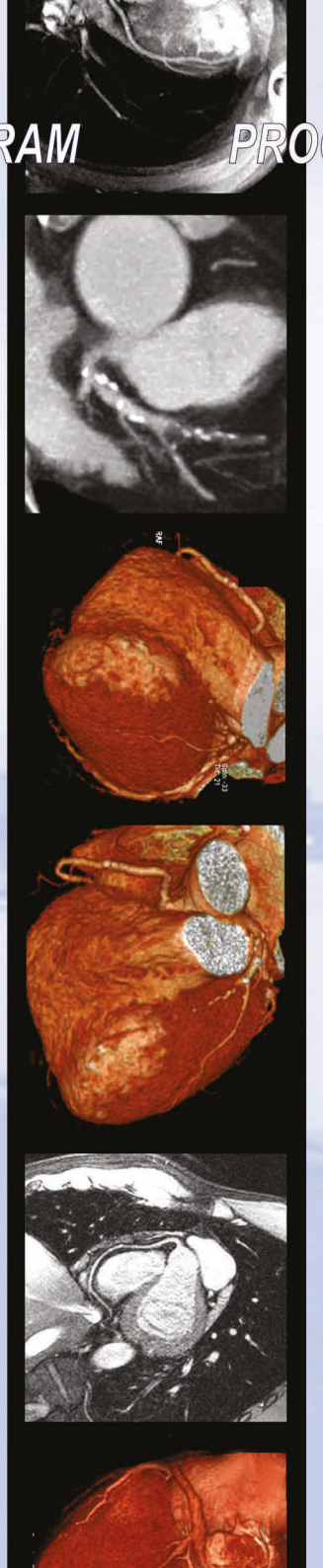
13:30 - 13:50 *Main Lecture:* **Are we starting therapy too late in atherosclerosis?**
Herbert Frank | Tulln, Austria

13:50 - 14:10 **Prognostic value of coronary CTA versus calcium score**
Pal Maurovich Horvat | Budapest, Hungary

14:10 - 14:30 **Population CV imaging studies**
Udo Hoffmann | Boston, USA

14:30 - 14:50 ***Panel:*** Herbert Frank | Tulln, Austria
Pal Maurovich Horvat | Budapest, Hungary
Udo Hoffmann | Boston, USA

14:50 - 15:20 **Coffee Break**



PROGRAM

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Friday 6 October

15:20 - 17:00 ***Session VIII:***
CORONARY ARTERY DISEASE: HOW TO DETERMINE THERAPY

Chair: Pal Maurovich Horvat | Budapest, Hungary
Ahmed Tawakol | Boston, USA

15:20 - 15:40 **We still need the invasive assessment of hemodynamic significance in CAD**
Thomas Brunner | Vienna, Austria

15:40 - 16:00 **Anatomic vs. Functional assessment for prognosis and intervention**
Udo Hoffmann | Boston, USA

16:00 - 16:20 **CMR vs. SPECT: What is needed to determine hemodynamic significance**
John-Paul Carpenter | Poole, UK

16:20 - 16:40 **Myocardial perfusion or coronary blood flow measurements - what is more accurate**
Sanjay Prasad | London, UK

16:40 - 17:00 ***Panel:*** Thomas Brunner | Vienna, Austria
Udo Hoffmann | Boston, USA
John-Paul Carpenter | Poole, UK

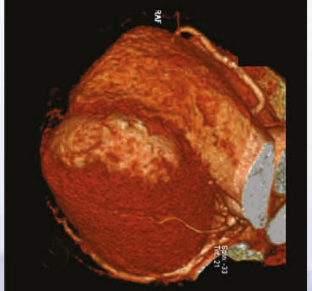
17:00 - 18:00 ***Session IX:***
HOT ISSUES IN CARDIAC IMAGING

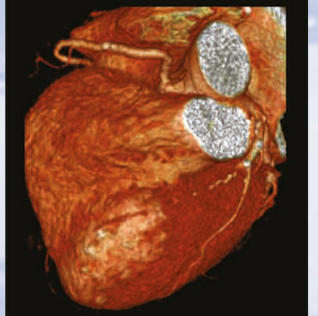
Chair: John-Paul Carpenter | Poole, UK
Peter Buser | Basel, Switzerland

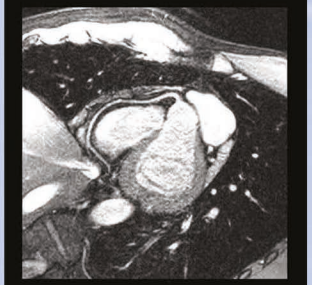
17:00 - 17:20 **Safety aspects during cardiac imaging in PM or ICD patients**
Oliver Bruder | Essen, Germany

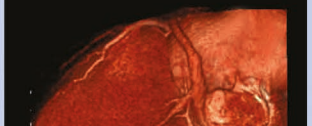
17:20 - 17:40 **How safe is imaging using CMR and CT (radiation, Gd-brain, DNA breaks, NSF)?**
Ahmed Tawakol | Boston, USA

17:40 - 18:00 ***Panel:*** Oliver Bruder | Essen, Germany
Ahmed Tawakol | Boston, USA









Saturday 7 October

09:00 - 09:40 ***Session X:***
BEST ABSTRACT PRESENTATION & AWARD

Chair: Herbert Frank | Tulln, Austria
Udo Hoffmann | Boston, USA

09:00 - 09:08 *(ID 1685)* P1: **Using Radiomics to Identify Napkin-ring Sign Positive Plaques - A Proof of Concept**
Márton Kolossváry | Budapest, Hungary

09:08 - 09:16 *(ID 1686)* P2: **CAD-RADS classification in the clinical routine: manual vs. automated approach**
Szilveszter Balint | Budapest, Hungary

09:16 - 09:24 *(ID 1688)* P3: **Primary cardiac lymphoma: a case report mimicking acute coronary syndrome**
Aldis Strelnieks | Riga, Latvia

09:24 - 09:32 *(ID 1689)* P4: **Myocardial perfusion scintigraphy - important diagnostic tool for managing the patients with coronary artery disease**
Iveta Mintale | Riga, Latvia

09:32 - 09:40 *(ID 1691)* P5: **The role of CMR in patients with Myocardial Infarction with non-obstructed coronary arteries (MINOCA)**
Zsofia Dora Drobni | Budapest, Hungary

09:40 **BEST ABSTRACT AWARD**

(see Abstracts published on pages 14-18)

PROGRAM

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Saturday 7 October

09:40 - 10:28 ***Session XI:***
CLINICAL CASE PRESENTATIONS II

Chair: Peter Buser | Basel, Switzerland
Pal Maurovich Horvat | Budapest, Hungary

09:40 - 10:28 **CT & MR case presentations**

09:40 - 09:52 Pal Maurovich Horvat | Budapest, Hungary
09:52 - 10:04 Pal Maurovich Horvat | Budapest, Hungary
10:04 - 10:16 Peter Buser | Basel, Switzerland
10:16 - 10:28 John-Paul Carpenter | Poole, UK

10:28 - 10:55 ***Coffee Break***

10:55 - 11:15 ***Session XII:***
INDUSTRY FORUM - CMR

Chair: Udo Hoffmann | Boston, USA
Peter Buser | Basel, Switzerland

Toshiba

11:15 - 11:55 ***Session XIII:***
MY TOP TEN CLINICAL INDICATIONS

Chair: Herbert Frank | Tulln, Austria
Udo Hoffmann | Boston, USA

11:15 - 11:35 **Cardiovascular CT - Top ten indications**
Pal Maurovich Horvat | Budapest, Hungary

11:35 - 11:55 **Cardiovascular MR - Top ten indications**
Peter Buser | Basel, Switzerland

11:55 ***ADJOURN***
Udo Hoffmann | Boston, USA

European Board for Accredidation in Cardiology

Accreditation

The event "CardiacMRI&CT-Clinical Update 2017" is accredited by the European Board for Accreditation in Cardiology (EBAC) for **15 hours** of External CME credits.

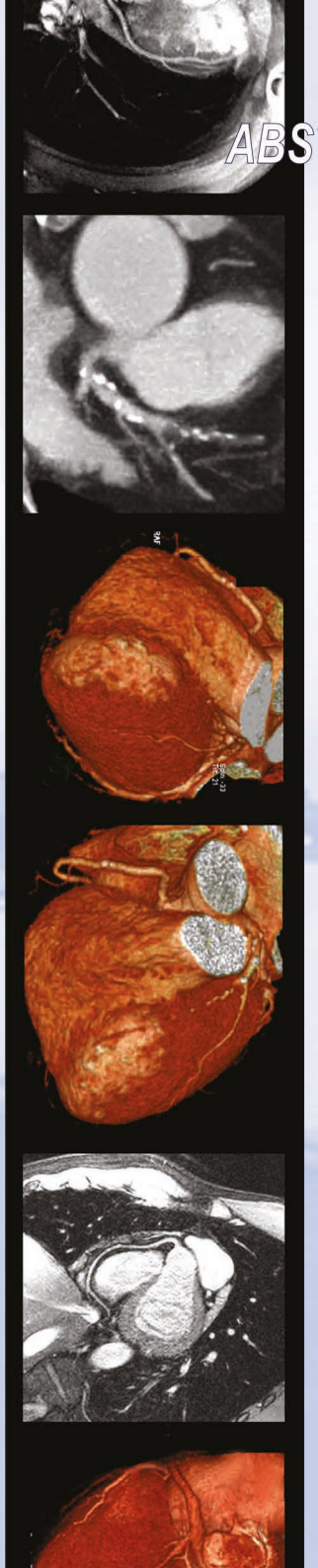
Each participant should claim only those hours of credit that have actually been spent in the educational activity. EBAC works according to the quality standards of the European Accreditation Council for Continuing Medical Education (EACCME), which is an institution of the European Union of Medical Specialists (UEMS).

Disclosure

In compliance with EBAC/ EACCME guidelines, all speakers/chairpersons participating in this program have disclosed potential conflicts of interest that might cause a bias in the presentations.The Organising Committee is responsible for ensuring that all potential conflicts of interest relevant to the program are declared to the audience prior to the CME activities.

Certificates

Certificates of Attendance reflecting the credits earned with Cardiac MRI&CT will be handed out on Saturday 7 October from 10:00 am until shortly after concluding the meeting.



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ABSTRACT PUBLICATION

Please see all Abstracts from the
BEST ABSTRACT PRESENTATION
in their original submission format on the following pages

Abstract P1 | ID 1685

Abstract Title

Using Radiomics to Identify Napkin-ring Sign Positive Plaques – A Proof of Concept

Institution(s)

1: MTA-SE Cardiovascular Imaging Research Group, Budapest, Hungary
2: Medis medical imaging systems bv, Leiden, The Netherlands

Author(s)

Márton Kolossváry1, Julia Karády1, Bálint Szilveszter1, Pieter Kitslaar2, Béla Merkely1, Pál Maurovich-Horvat1

Abstract Text & Images
(max 2500 characters incl spaces; images can be imported into the form field using PDF tools

Background:
The NRS is an independent prognostic imaging marker of major adverse cardiac events. However, identification of NRS is challenging due to its qualitative nature and therefore depends on reader experience. A more quantitative and reproducible approach is desirable. Therefore, our aim was to assess whether radiomic parameters can differentiate between plaques with or without the napkin-ring sign (NRS).

Methods:
From 2674 coronary CT angiographies (CTA) we identified 30 plaques with NRS. We matched these with 30 non-NRS plaques with similar degree of calcification and stenosis, localization, tube voltage and image reconstruction settings. We segmented the coronary vessel wall and extracted voxels containing plaque. Overall 8 conventional and 4440 radiomic parameters were calculated for each lesion. We used the permutation test of symmetry for matched samples using Monte Carlo simulation to assess differences between NRS and non-NRS plaques, while we calculated receiver operating characteristics' area under the curve (AUC) values to evaluate diagnostic accuracy. We used hierarchical clustering with the silhouette method to evaluate the optimal number different information clusters among radiomic parameters. Bonferroni corrected $p<0.0012$ was considered significant.

Results:
None of the conventional quantitative parameters, while 20.6% (916/4440) of radiomic parameters showed a significant difference between NRS vs. non-NRS plaques. Among conventional plaque metrics none had an AUC value above 0.80, whereas 9.9% (440/4440) of all radiomic parameters had an AUC value greater than 0.80. Short and long run low gray level emphasis, and surface ratio of component 2 to total surface had the highest AUC values (0.918; 0.894 and 0.890, respectively). Cluster analysis revealed 44 different information clusters in our radiomic dataset.

Conclusions:
Radiomics can identify NRS plaques with excellent diagnostic accuracy. The presence of several different information clusters in our dataset implies the potential of radiomics to identify new imaging biomarkers of high-risk plaques.

Abstract P2 | ID 1686

Abstract Title

CAD-RADS classification in the clinical routine: manual vs. automated approach

Institution(s)

(1)MTA-SE Cardiovascular Imaging Research Group, Semmelweis University Hungary (2) Miami Cardiac and Vascular Institute, Baptist Hospital of Miami, United States (3) Department of Radiology, St. Paul's Hospital, Vancouver, Canada

Author(s)

Bálint Szilveszter1, Márton Kolossváry1, Júlia Karády1, Ádám L. Jermendy1, Mihály Károlyi1, Alexisz Panajotu1, Zsolt Bagyura1, Milán Vecsey-Nagy1, Ricardo C. Cury2, Jonathon A. Leipsic3, Béla Merkely1, Pál Maurovich-Horvat1

Abstract Text & Images
(max 2500 characters incl spaces; images can be imported into the form field using PDF tools

Objectives: A common language in reporting coronary findings is strongly encouraged to reduce reporting inconsistency and ambiguity in the management of coronary artery disease (CAD). The Coronary Artery Disease – Reporting and Data System (CAD-RADS) reporting method has been recently introduced to facilitate interdisciplinary communication of coronary CT angiography (CTA) results. However, it has not been tested whether readers are able to reliably classify patients into various CAD-RADS categories. We aimed to test how well readers are able to classify patients versus an automated CAD-RADS scoring tool.
Methods: We prospectively read 500 consecutive coronary CTAs. Five readers evaluated the coronary CTA images using a structured reporting platform that automatically determined the CAD-RADS categories based on reader-input. The readers were blinded to the "machine's" CAD-RADS values. The readers recorded manually the CAD-RADS stenosis categories (0,1,2,3,4A,4B,5) and modifiers (N,S,V,G). We evaluated factors influencing reader's performance such as clinical load, experience level and time of the day.
Results: Total agreement between "man" and "machine" was found in 80.2 % of the cases. The agreement in stenosis categories was 86.7%, whereas the agreement in modifiers was 95.8% for N, 96.8% for S, 95.6% for V and 99.4% for G, respectively. The stenosis categories were described as follows: 0: 17.4% vs. 18.0%, 1: 24.4% vs. 22.8%, 2: 20.0% vs. 18.6%, 3: 11.6% vs. 12.2%, 4A: 6.4% vs. 9.8%, 4B: 0.6% vs. 1.0% and 5: 3.8% vs. 5.0%; "man" vs "machine", respectively ($p=0.008$). Readers have misclassified cases into non-existing CAD-RADS categories in 4.6 %. Distribution of modifiers was N: 15.0% vs. 17.2%, S: 6.0% vs 9.2%, V: 11.8% vs 15.4%, G: 1.8% vs 2.4%, for "man" vs "machine", respectively ($p<0.05$ for N, S, V and $p=0.250$ for G).
Conclusions: Despite the fact that automated CAD-RADS classification uses data filled in by the readers it performs better than the clinicians by preventing human errors due to inattention. Structured reporting platforms with automated score calculations might improve data quality and support standardization and clinical decision making.

Abstract P3 | ID 1688

Abstract Title

Primary cardiac lymphoma: a case report mimicking acute coronary syndrome

Institution(s)

Riga Austrumu Clinical University hospital "Gaiļezers" Department of Cardiology, Pauls Stradins Clinical University hospital Deparment of Radiology, Riga Stradins University

Author(s)

MD A. Strēlnieks, MD L. Zvaigzne, medical student L. Rancāne

Abstract Text & Images
(max 2500 characters incl spaces; images can be imported into the form field using PDF tools

Introduction: Primary cardiac lymphoma (PCL) is extremely rare, accounting for about 2% of all primary cardiac tumors and charactersised by poor outcome. It belongs to extra-nodal non Hodgkin's lyphomas, most common type of this tumor is diffuse large B-cell lymphoma. Primary cardiac tumors usually couse embolization, pericardial effusion, dyspnea, arrhythmia, leading to heart failure. While echocardiography remains the first-line imaging modality, cardiac computed tomography has become an increasingly utilized modality for the assessment of cardiac masses, especially when other imaging modalities are non-diagnostic or contraindicated. Here we report a case PCL presented with reduced effort tolerance, dyspnea, mimicking atherosclerosis in angiography.
Methods: For this case we used patient's information from medical history, laboratory, visual diagnostic and autopsy results.
Case report: 76 year old male was admited to hospital with suspecian of therapy resistant pneumonia. A ECG was performed, due to elevated ST segment, patient was admited to a cardiologic profile clinic. Note, patient hasn't complained about any chest pain .Only dysnpea, fever and night sweats over a month. Elevated troponin and CRP levels were found. Acute coronography was perfomed and 90% stenosis of LAD 1/3 distal part was located and a stent was implanted. At the time of the procedure changes in pericardium were visualized, an Eho-CG was appointed. A mass was localised durring the exam. Next a heart CT was performed. Durring the exam a pathological hypervascular neoplasia with central necrosis was localised in the left ventricule infiltrating the right chamber and atrium. Patient died do to sudden heart failure. Histology revieled a diffuse large B-cell lyphoma.
Conclusions: ST segment elevations don't always point to myocardial infarction. Coronal artery embolism can also be the cause of heart tumours and compression of the coronal arteries, which can mimic arteriosclerosis. CT can provide useful anatomic and functional information as an adjunct to echocardiography in the evaluation of cardiac masses. Also CT may have specific advantages in defining the cardiovascular extent of the mass and excluding coronary artery disease prior to surgical intervention.

Abstract P4 | ID 1689

Abstract Title

Myocardial perfusion scintigraphy – important diagnostic tool for managing the patients with coronary artery disease

Institution(s)

1: MTA-SE Cardiovascular Imaging Research Group, Budapest, Hungary
2: Medis medical imaging systems bv, Leiden, The Netherlands

Author(s)

Iveta Mintale, Inguna Ausmane, Maija Ratniece, Milana Sorokina, Andrejs Erglis

Abstract Text & Images
(max 2500 characters incl spaces; images can be imported into the form field using PDF tools

Background.
The assessment of pretest probability of coronary artery disease (CAD) is pivotal for selection of appropriate stress test in patients' diagnostic algorithm – the estimation of the likelihood of CAD based upon the age, gender and clinical characteristics. The evaluation of pretest likelihood of CAD should be used to guide subsequent testing, to determine diagnostic and prognostic accuracy, so defining the most appropriate test to prove the diagnosis, reduce the need for futher investigations and save money.The non-invasive imaging is most valuable for patients with intermediate pretest probability of CAD according the guidelines of the European Society of Cardiology. Non-invasive stress testing is employed for both – the diagnosis of suspected CAD and in the assessment of prognosis in a patient with known CAD.

The aim of the study
was to evaluate the role of myocardial perfusion scintigraphy (MPS) in patients diagnostic algorithm and to prove its usefullness and efficacy for the initial diagnosis of CAD and for prognostification in patients with known CAD in Latvia.

Methods.
Retrospective study was held at Pauls Stradins Clinical University Hospital Latvian Centre of Cardiology. The study included 620 patients with performed MPS in 2014. The data of prior history of CAD, symptoms characteristics, cardiovascular risk factors, pretest probability of CAD and results of stress testing have been evaluated. Two groups were selected – patients with suspected and with known CAD. Patients with unknown CAD and typical symptoms were selected separately. Cardiovascular risk was evaluated by defining the amount of myocardial ischemia on MPS and subsequent decision was made: optimal medical therapy and/or invasive diagnostics and treatment.

Results.
Results of the study show the role of MPS in investigation process – there were no indications for performing the coronary angiography in 69.9% of patients with known CAD and in 78% of patients without CAD. The MPS value for prognosis of obstructive CAD has been proven by cardiovascular risk marker – SDS and its association with presence of obstructive CAD on coronary angiography. The higher is SDS, the higher is the rate of obstructive CAD on coronarography: for patients with very high risk (SDS>12) – in 67% of cases and for patients with high risk (SDS 9-12) – in 46% of cases, in turn, for patients with intermediate (SDS 5-8) and low (SDS 0-4) CAD risk the rate of obstructive CAD is lower (43% and 5%, respectively).

Conclusions.
1) MPS is valuable and informative non-invasive modality in patients with intermediate pretest probability of CAD, which proves the need for algorithm application in Latvia defined by guidelines;

2) MPS is important test in decision making of subsequent diagnostics and management in patients with low cardiovascular risk – best performed to identify the patients who will not benefit from further invasive intervention.

Abstract
P5 | ID 1691

Abstract Title

The role of CMR in patients with Myocardial Infarction with non-obstructed coronary arteries (MINOCA)

Institution(s)

1,NIHR Bristol Cardiovascular Biomedical Research Unit, Bristol Heart Institute, UK
2,MTA- SE Lendulet Cardiovascular Imaging Research Group, Heart and Vascular Center, Semmelweis University, HU

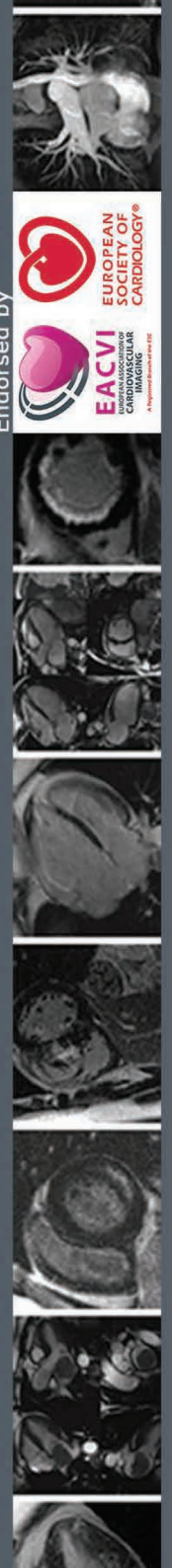
Author(s)

Zsofia D. Drobni1,2, Amardeep Ghosh Dastidar1, Estefania De Garate1, Priyanka Singhal1, Anna Baritussio1, Chiara Bucciarelli-Ducci1

Abstract Text & Images
(max 2500 characters incl spaces; images can be imported into the form field using PDF tools

Objectives:
Definite diagnosis of patients with myocardial infarction with non-obstructed coronaries (MINOCA) has a vital role in management. MINOCA represents a diagnostic challenge, and CMR could play an important role given its ability to identify different underlying diverse aetiologies. However, robust evidence of the role of CMR in MINOCA is lacking. Our goal was to evaluate the role of CMR in decision making in patients presenting with MINOCA in comparison with the traditional diagnostic markers.
Methods:
We retrospectively searched our CMR database for patients who were referred with MINOCA indication between 09/2011 and 01/2016. 402 consecutive patients (mean age 55.816.8 yrs, 48% female) were identified. 1.5T CMR was performed using a comprehensive protocol including cines, T2-weighted, and late gadolinium enhancement (LGE) sequences. Patients were grouped into 4 categories based on their CMR findings: myocardial infarction (MI), myocarditis, cardiomyopathy (CM) and normal CMR. Statistical analysis was performed using Graphpad Quickcalc version.
Results:
In 106 (26.4%) cases, the CMR scan was normal, myocardial infarction was reported in 105 (26.1%), cardiomyopathy in 94 (23.4%), myocarditis in 97 (24.1%) cases. Scans were performed after the admission in a median of 37.5 (IQR: 7–55.75) days. The mean BMI was 26.54±4.92, and 19.1% (77/402) of the patients presented with STEMI. Cardiomyopathy patients had significantly lower Troponin-T 423.5 ng/L (IQR: 64.0–1000.0 ng/L) levels as compared to MI group (660.0 ng/L (IQR: 218.0–1038.2 ng/L) p=0.041, and to myocarditis 900.0 ng/L (IQR: 254.0–1295.0 ng/L) p=0.001. Troponin-T was higher in myocarditis and MI group when compared to normal 182.0 ng/L (IQR: 62.0–688.3) p <0.001. Myocarditis was less common in females (23%) as compared to normal scans (51%), to cardiomyopathy (63%) or to MI (55%), p<0.001 in all three cases. Patients with myocarditis were younger than any other group. Patients with MI were older (62.012.5 years) as compared to myocarditis (42.817.7) (p<0.001), and to normal (54.015.5) (p=0.001). Cardiomyopathy (64.412.0) patients were older than normal scan patients p<0.001.

Conclusion: In a large cohort (largest to date) of consecutive patients with MINOCA, CMR established a definitive diagnosis in 73% of cases with subsequent important clinical implications. CMR has an inevitable role in finding the definite diagnosis and thereby guiding in the proper therapy for patients with MINOCA.



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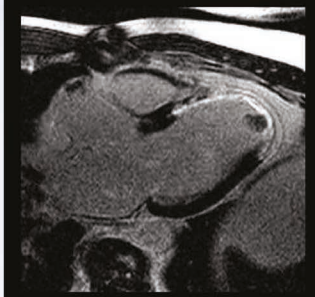

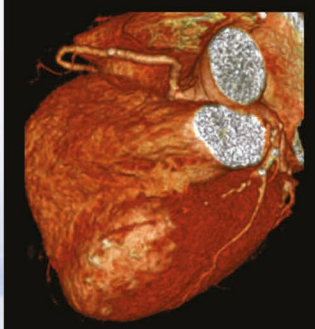

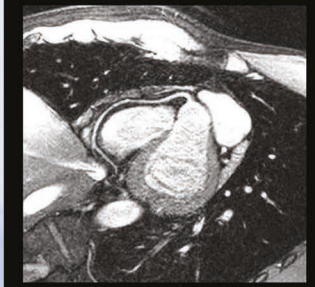

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