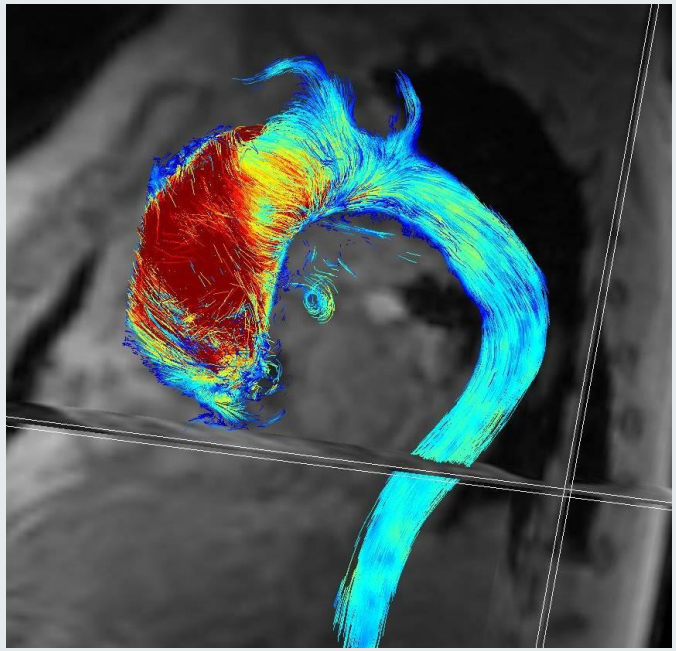
Cardiology Update 2013, Davos, Switzerland

February 2013

Clinical Decision Seminar Imaging



Dr. med. Robert Manka
Cardiovascular MRI and Interventional Cardiology
University Hospital Zurich
Institute for Biomedical Engineering
University and ETH Zurich
Switzerland

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University of Zurich[UZH]

Case I: 42 yo male patient (emergency department)

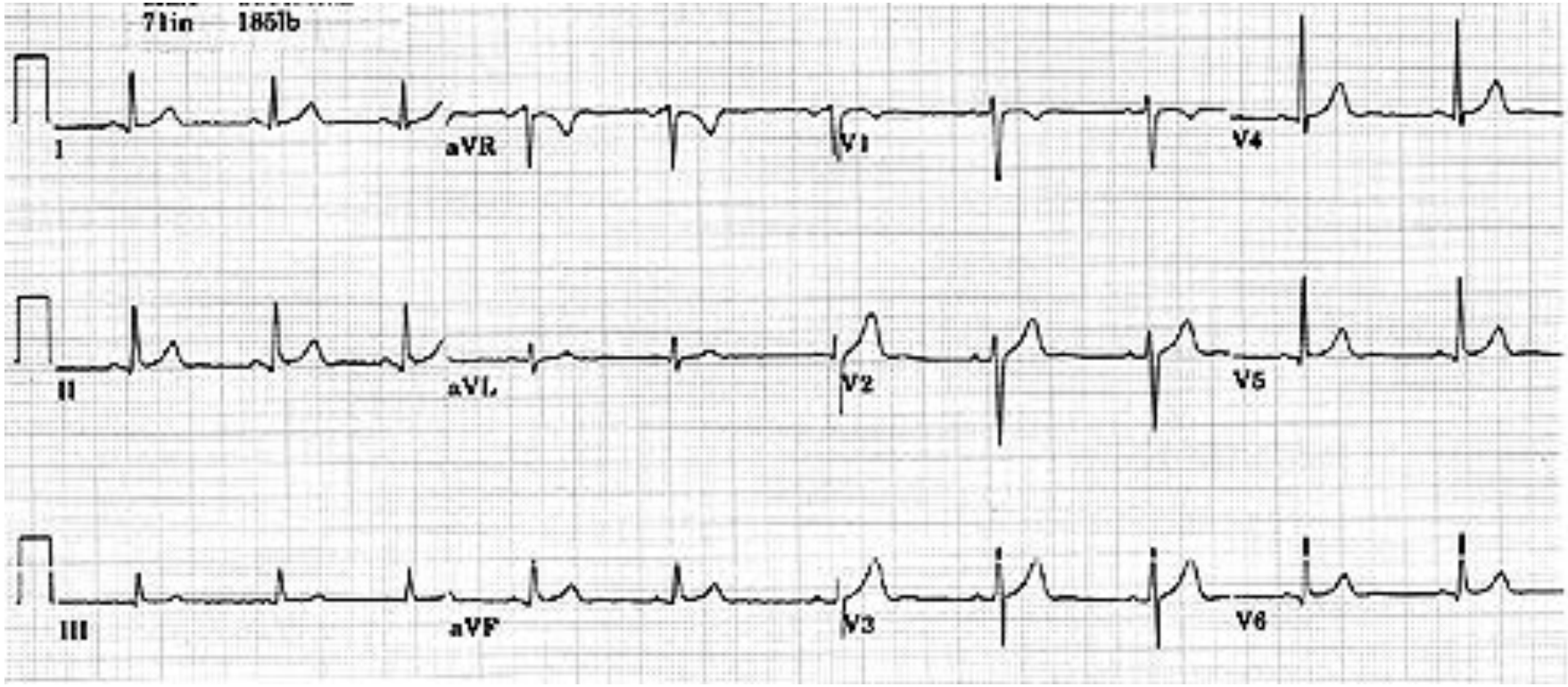
Early in the morning at the ER, no past medical history

CVRF: no
Status: BMI 23; BP 145/95 mmHg; HR 71 bpm, cardiopulmonary system unremarkable

→Symptoms: substernal burning chest pain radiating to the left elbow. Symptoms started two days before and subside spontaneously. No increase of pain on inspiration or on change of position. Patient suffered from a cold with sore throat and pyrexia of 39 C° a week before the chest pain had started.

Case: 42 yo male patient (SR, HF 71bpm)

ECG



Case I: 42 yo male patient

→ECG: normal

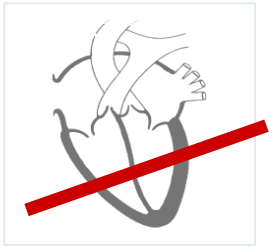
→Blood results: CK 627 U/l, Troponin T 1.1ug/l, proBNP 772 ng/l

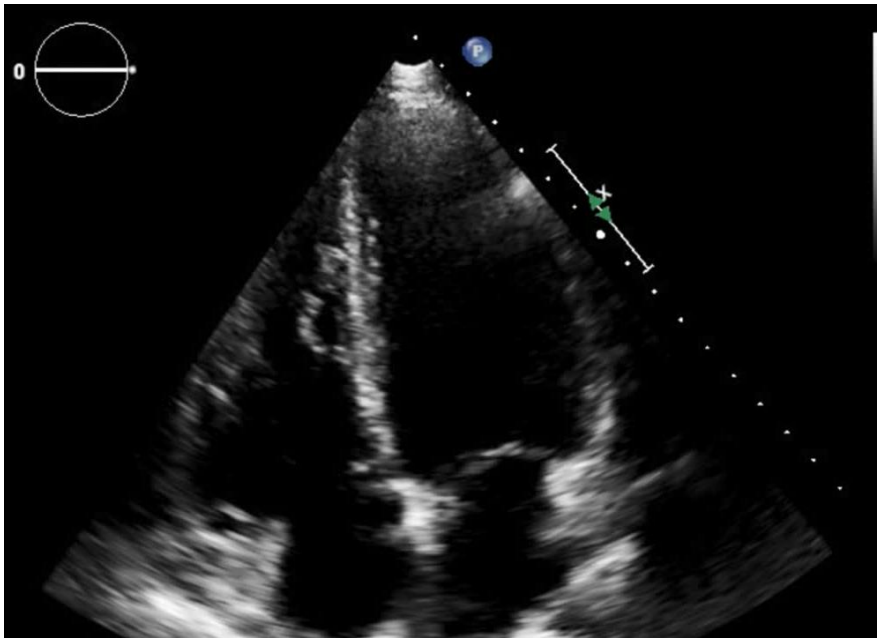
→Medication: no

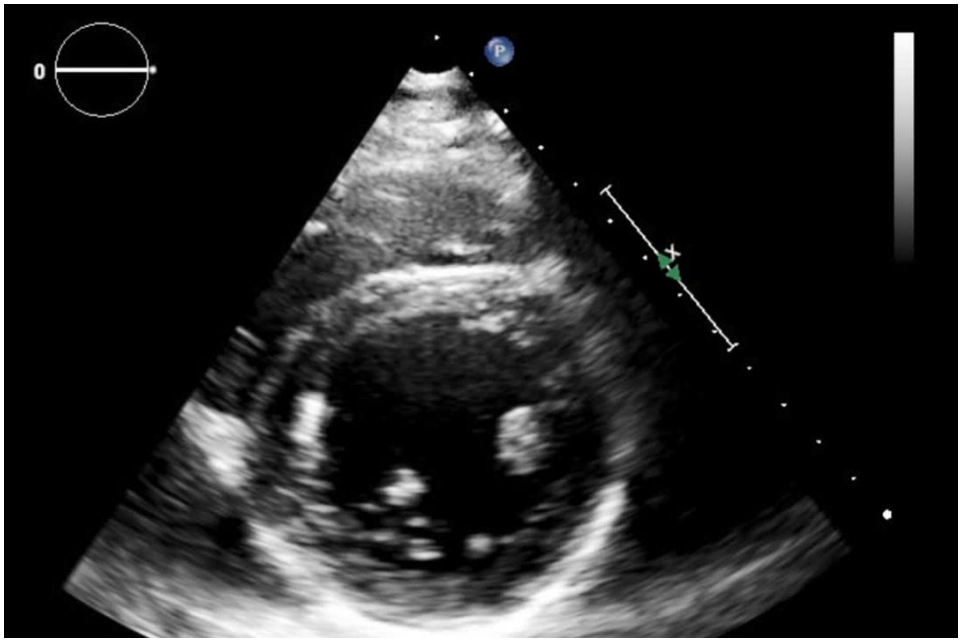
What would you do next?

1. Perform emergency bypass surgery
2. Perform second troponin test
3. Perform imaging
4. Perform coronary angiography
5. Nothing

Echocardiography





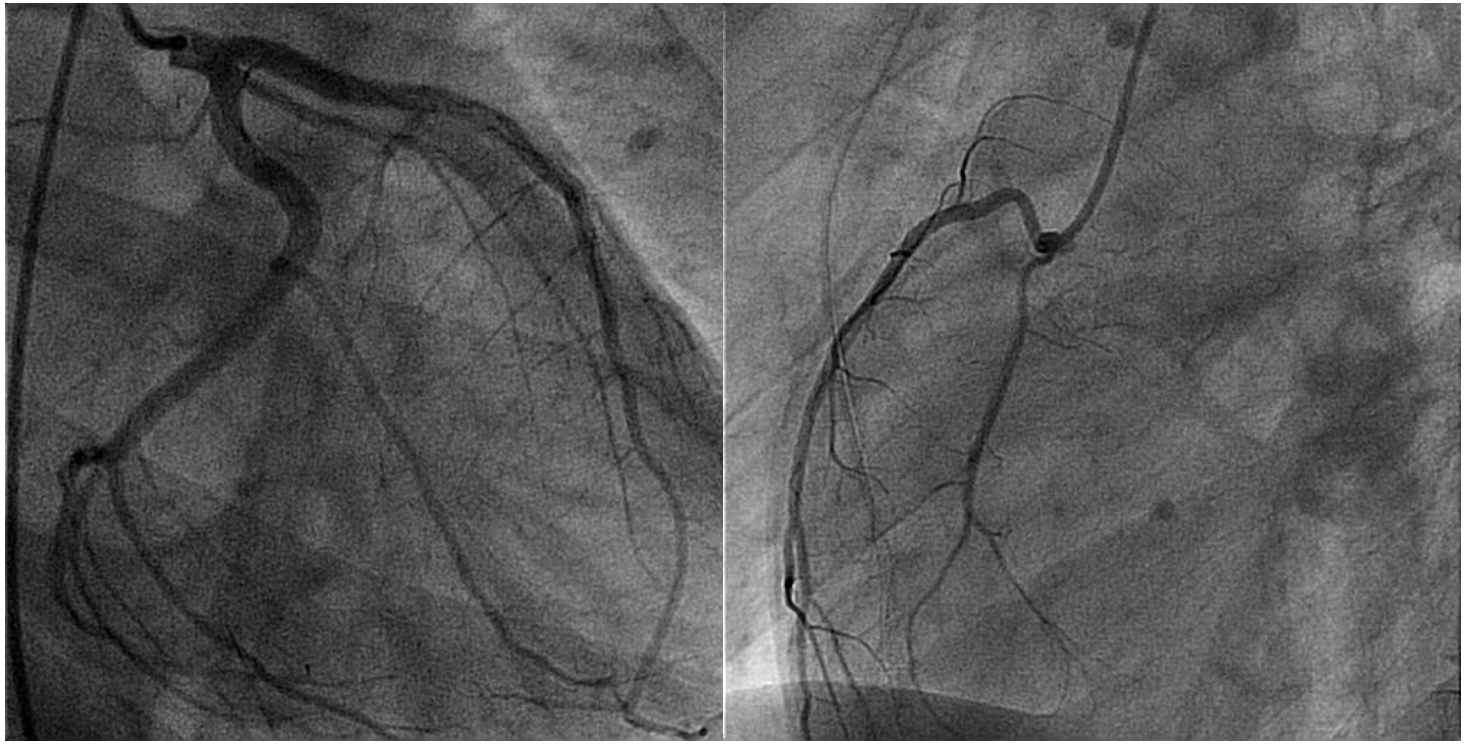


EF 60%, no regional wall motion abnormality, normal valves

What would you do next? (Patient still has chest pain)

1. Perform emergency bypass surgery
2. Perform second troponin test
3. Perform imaging
4. Perform coronary angiography
5. Nothing

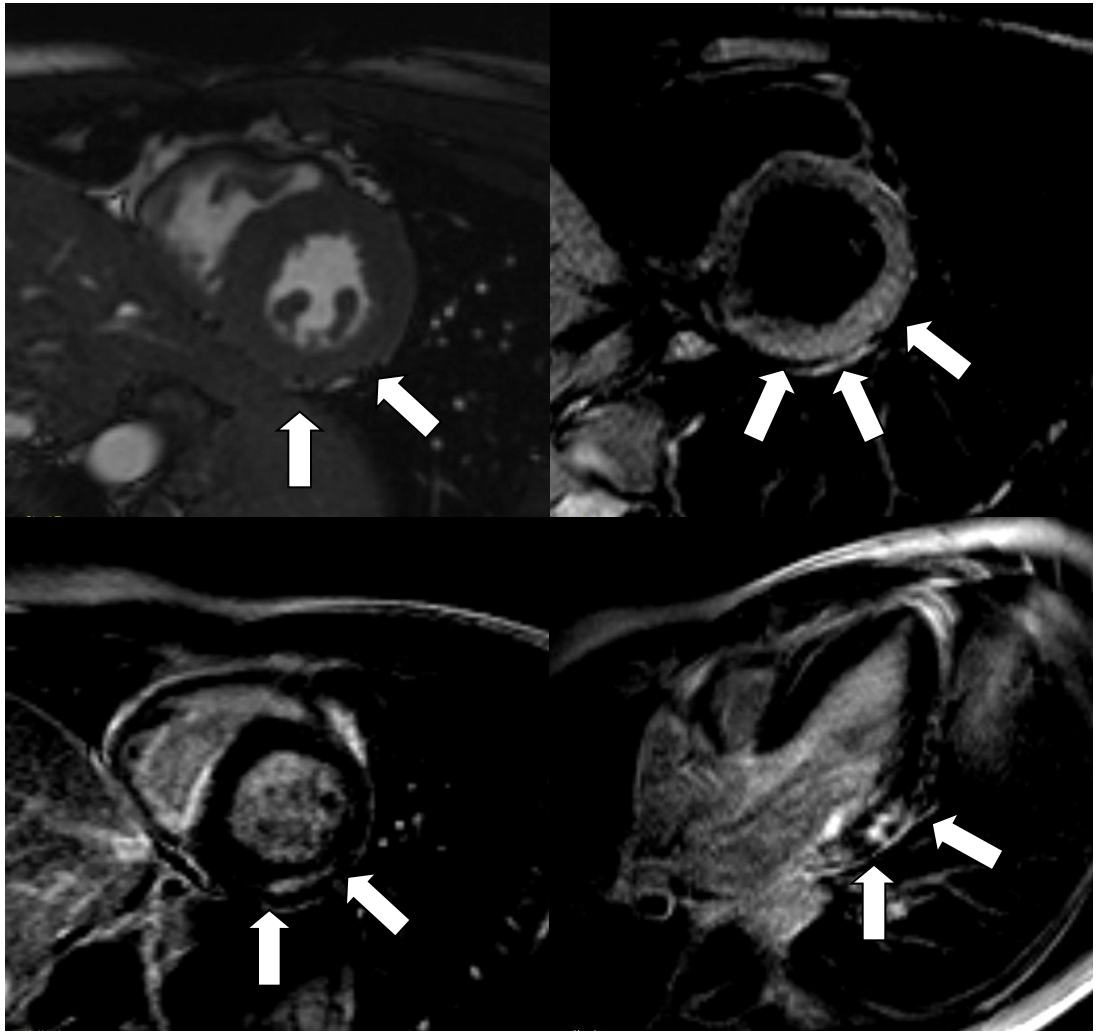
Coronary angiography



LAD/RCX **RCA**

Cardiovascular MRI

Cine



T2-Edema

Delayed enhancement

UniversityHospital Zurich

What is the diagnosis?

1. Myocarditis
2. Tako Tsubo
3. Acute coronary syndrome (ACS)
4. Pneumonia
5. I have no clue

Causes of myocarditis

Viruses: Enteroviruses
Influenza A and B
Adenovirus
Herpes
HIV

Bacteria: Beta-hemolytic Streptococcus
Corynebacterium diphtheria
Borrelia burgdorferi
Enterococcus spp
Chlamydia psittaci
Neisseria meningitidis
Mycoplasma pneumonia
Staphylococcus aureus

Protozoa: Trypanosoma cruzii
Toxoplasma gondi

Helminths: Trichinella spiralis
Echinococcus

Autoimmunity: Infection associated
Auto-immune disease associated
Primary autoimmunity

Hypersensitivity: Penicillins
Methyldopa
Sulfamethoxazole

Toxicity: Catecholamines
Cocaine
Ethanol

Clinical Presentation

- Asymptomatic to cardiogenic shock.
- May include a viral prodrome of fevers, myalgias, respiratory symptoms or gastroenteritis.
- May present with rapidly deteriorating LV function or arrhythmias and heart block.
- However, asymptomatic myocarditis may be a cause of unexplained deaths in 1% of cases

Management of myocarditis

- Management is dictated by clinical signs and symptoms.
- Conventional heart failure therapy is currently the only accepted therapy for myocarditis including ACE inhibitors, angiotensin receptor blocking agents, diuretics, β-blockers or amiodarone.
- Abstain from vigorous exercise for the next 2-3 months

European Heart Journal (2007) 28, 1242–1249
doi:10.1093/eurheartj/ehm113

Clinical research
Imaging

The role of cardiovascular magnetic resonance in patients presenting with chest pain, raised troponin, and unobstructed coronary arteries

Ravi G. Assomull[1,2], Jonathan C. Lyne[1], Niall Keenan[1], Ankur Gulati[1], Nicholas H. Bunce[3], Simon W. Davies[1], Dudley J. Pennell[1,2], and Sanjay K. Prasad*

Table 2 Cardiovascular magnetic resonance findings

CMR findings	*n* (%)
Myocarditis	30 (50.0)
Acute	19 (31.7)
Non-acute	11 (18.3)
Myocardial infarction	7 (11.6)
Takotsubo cardiomyopathy	1 (1.7)
Dilated cardiomyopathy	1 (1.7)
Normal CMR findings	21 (35)

Abbreviations as in *Table 1*.

65%

Case II: 75 yo female patient (outpatient clinic)

Known coronary artery disease, PCI/Stenting 6 months ago, unknown vessel (different hospital)

CVRF: Hypertension, Hyperlipidemia

Status: BMI 21; BP 125/65 mmHg; HR 75 bpm, cardiopulmonary system unremarkable

→Symptoms: since two weeks intermittent chest pain, sometimes at rest, sometimes during effort, during the examination no symptoms

Case II: 75 yo female patient

→ECG: negative T-Waves V3-V5

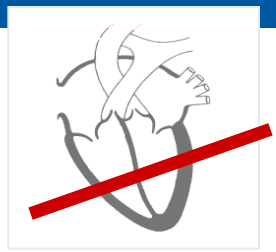
→Blood results: normal

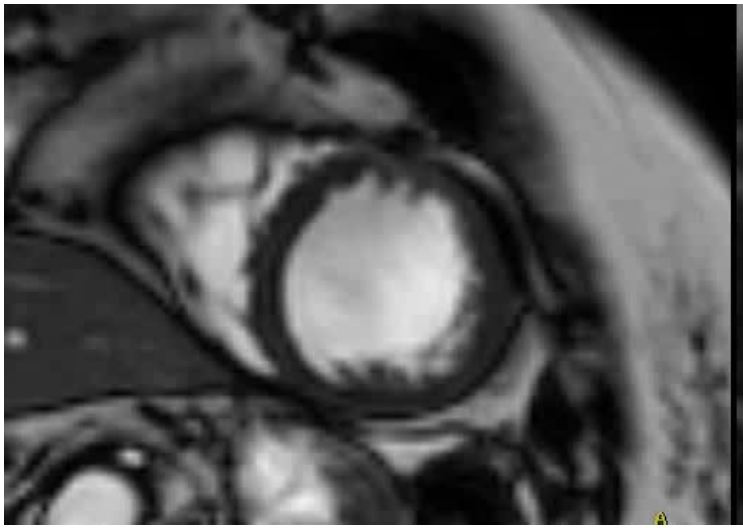
→Medication: Aspirin, Clopidogrel, Simvastatin, Metoprolol, Pantoprazol

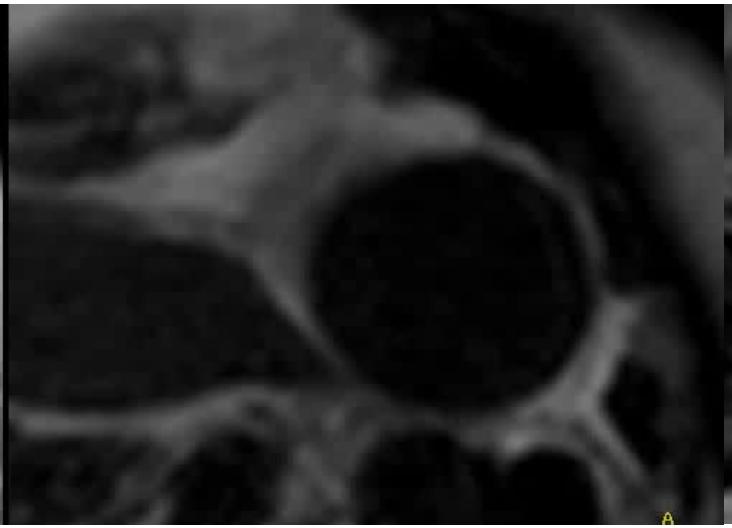
What would you do next?

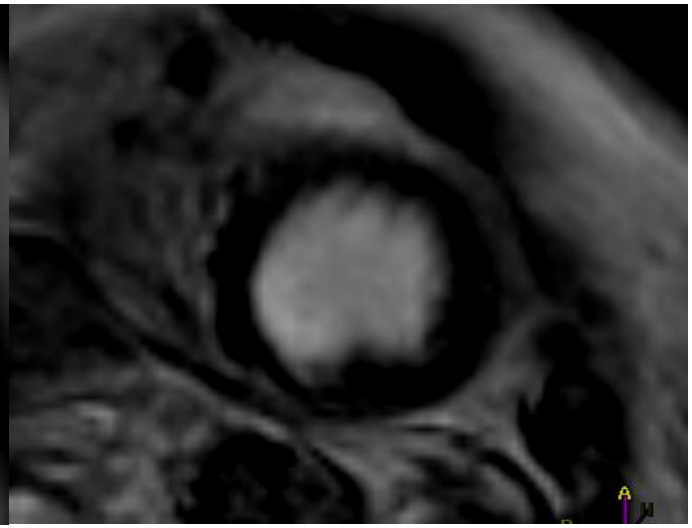
1. Perform emergency bypass surgery
2. Perform second troponin test
3. Perform imaging
4. Perform coronary angiography
5. Nothing

Cardiovascular MRI









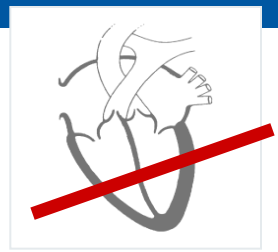
Cine

Rest Perfusion

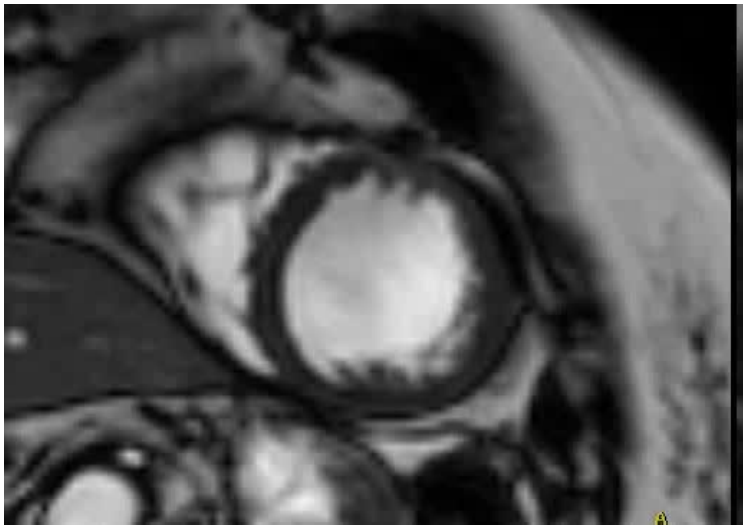
Delayed enhancement

What is the diagnosis?

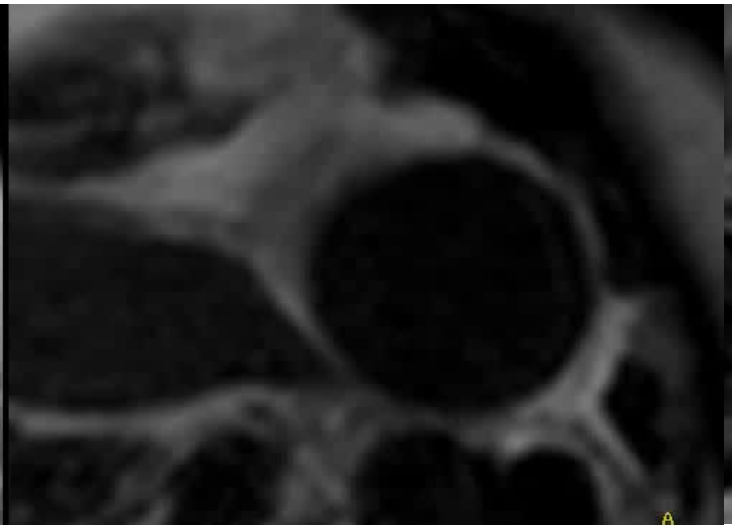
1. Myocarditis
2. Tako Tsubo
3. Acute coronary syndrome (ACS)
4. Asthma bronchiale
5. I have no clue



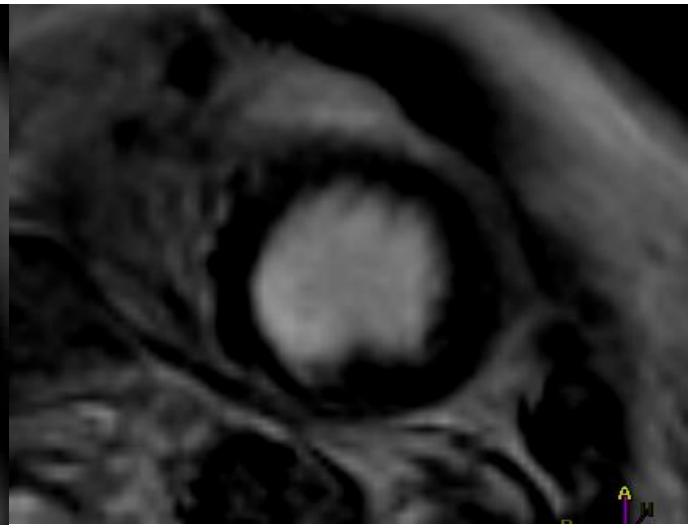
ACS with acute stunning



Cine

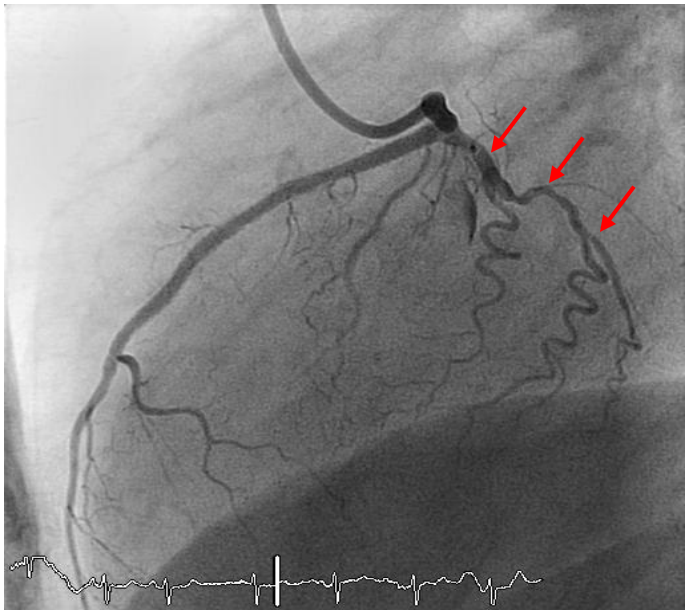


Rest Perfusion

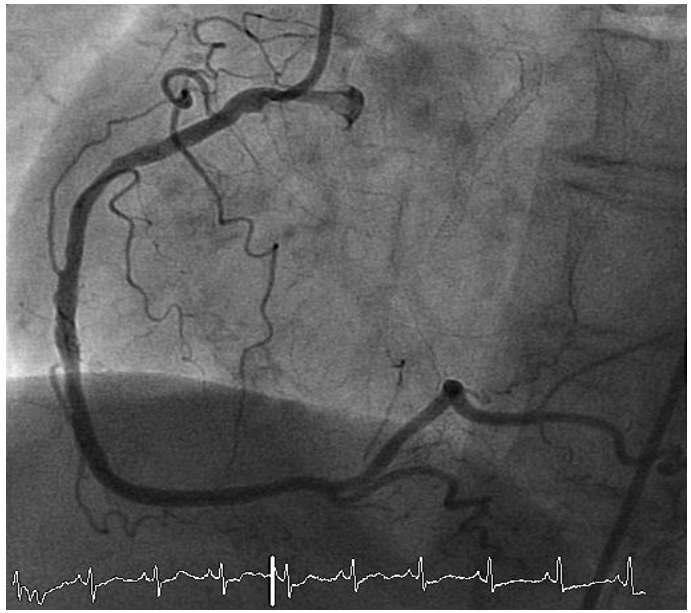


Delayed enhancement

Coronary angiography



LAD/RCX



RCA

In-Stent-Thrombosis

Case III: 45 yo male patient (emergency department)

First time in hospital, no medical history

CVRF: no

Status: BMI 24; BP 135/75 mmHg; HR 85 bpm, cardiopulmonary system unremarkable

→Symptoms: since 4 hours chest pain

Case III: 45 yo male patient

→ECG: negative T-Waves V3-V5

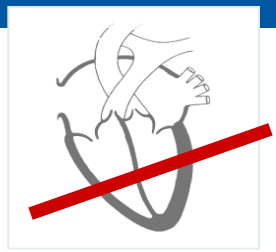
→Blood results: Troponin I 1.3ng/l

→Medication: no

What would you do next?

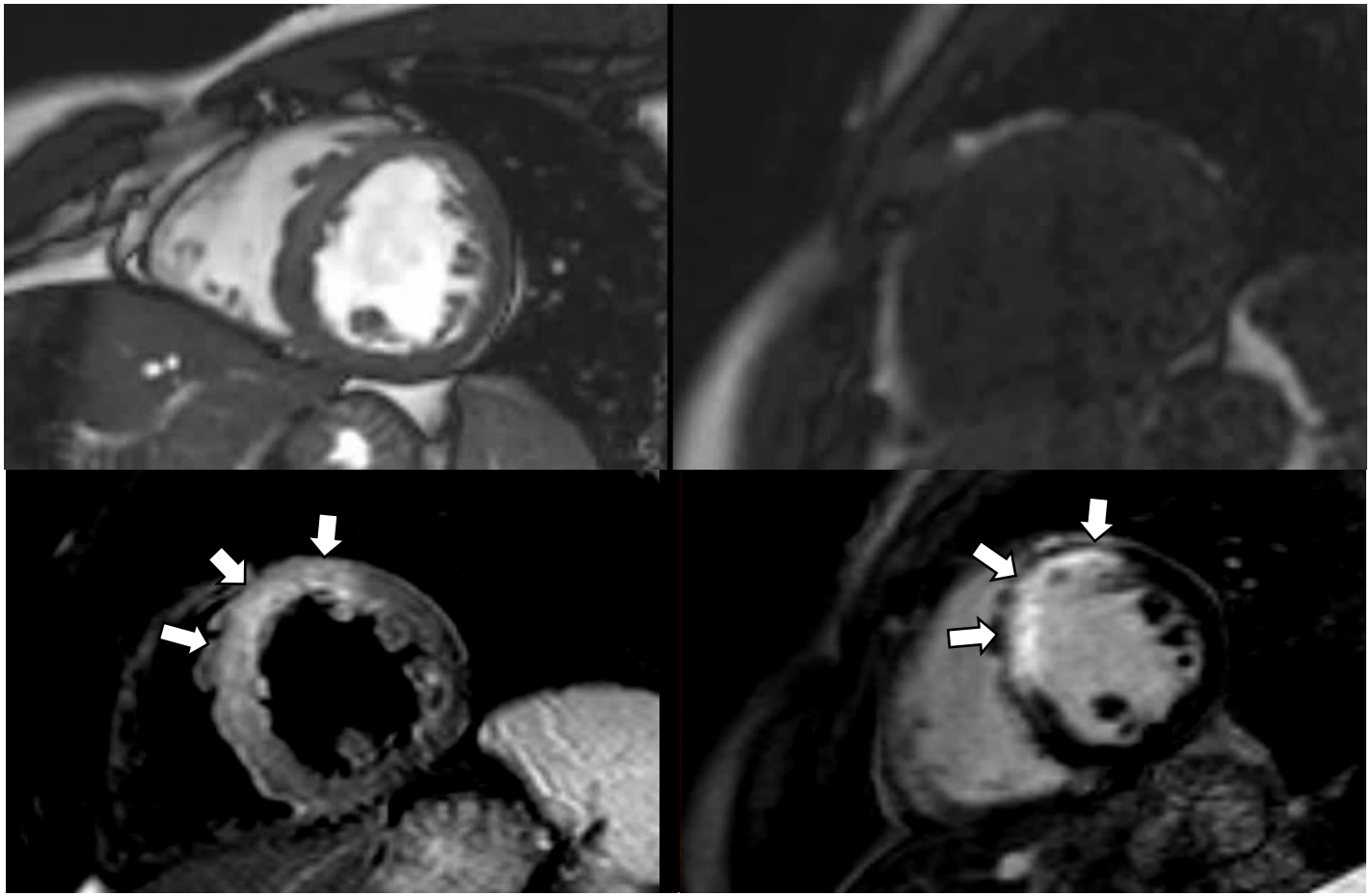
1. Perform emergency bypass surgery
2. Perform second troponin test
3. Perform imaging
4. Perform coronary angiography
5. Nothing

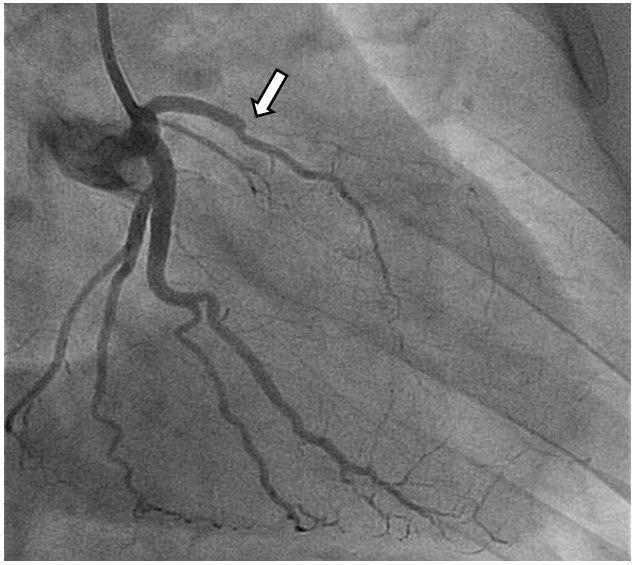
Cardiovascular MRI



Cine

Rest Perfusion





T2-Edema

Delayed Enhancement

UniversityHospital Zurich

Detecting Acute Coronary Syndrome in the Emergency Department With Cardiac Magnetic Resonance Imaging

Raymond Y. Kwong, MD; Adam E. Schussheim, MD; Suresh Rekhraj, MD; Anthony H. Aletras, PhD; Nancy Geller, PhD; Janice Davis, RN; Timothy F. Christian, MD; Robert S. Balaban, PhD; Andrew E. Arai, MD

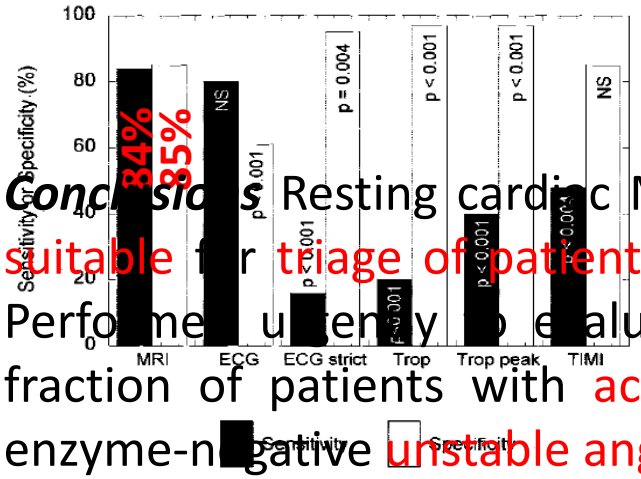


Figure 2. Sensitivity and specificity of various parameters for ACS. Probability values summarize the z-test, which was 2-tailed and adjusted for tests performed on same subjects. Sensitivity is shown by dark bars and specificity by white bars. ECG indicates abnormal ECG; ECG strict, strict electrocardiographic evidence of ischemia defined as ST depression >1 mm or T-wave inversion >3 mm; Trop, initial troponin-I; Trop peak, peak troponin-I; TIMI, TIMI risk score; and NS, not significant.

TABLE 3. Logistic Regression Models for ACS

Variable	DF	Coefficient Estimate	Wald χ^2	P	Odds Ratio
Model a for Probability of ACS Without MRI (25 events)*					
Intercept	1	−4.1026	20.18	0.0001	
TICRF	1	0.3718	4.57	0.0325	1.5
AbECG	1	1.7685	14.71	0.0001	5.9
AbTn	1	2.2689	7.67	0.0056	9.7
Model b for Probability of ACS With MRI (25 events)†					
Intercept	1	−3.8704	22.27	0.0001	
TICRF	1	−0.0196	0.0093	0.92	1.0
AbECG	1	0.9136	1.99	0.16	2.5
AbTn	1	2.0402	4.14	0.042	7.7
AbMRI	1	3.0754	19.12	0.0001	21.7

TICRF indicates total cardiac risk factors; AbECG, abnormal ECG; AbTn, abnormal initial troponin; AbMRI, abnormal MRI (see Methods for defining criteria for each variable); and DF, degrees of freedom.

*−2 Log Likelihood=28.00 with 3 DF (P=0.0001).

†−2 Log Likelihood=53.36 with 4 DF (p=0.0001).

Conclusions Resting cardiac MRI exhibited diagnostic operating characteristics suitable for triage of patients with chest pain in the emergency department. Performed urgently to evaluate chest pain, MRI accurately detected a high fraction of patients with acute coronary syndrome, including patients with enzyme-negative unstable angina

Kwong et al. Circulation 2003

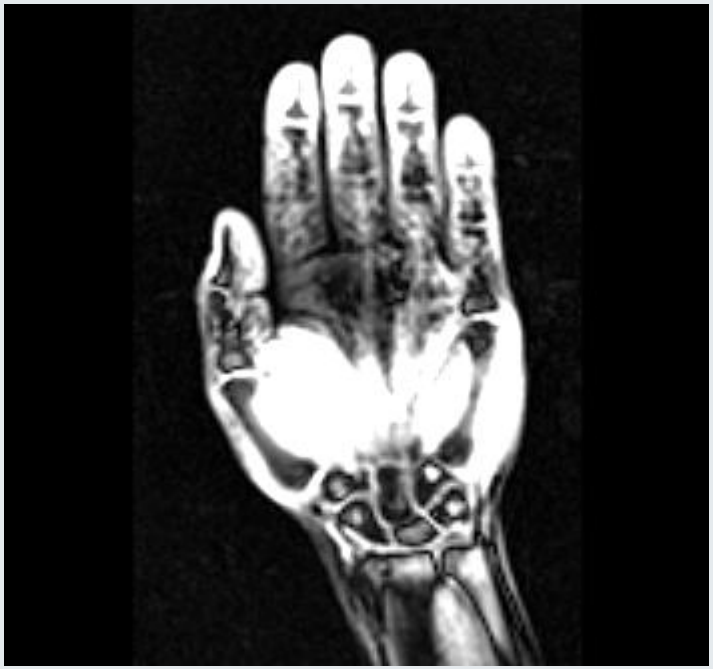
Take home message

Cardiovascular MRI

- is a useful tool to determine the underlying aetiology of ACS in Patients with unobstructed coronaries

- is suitable for triage of patients with chest pain in the emergency department. MRI accurately detects a high fraction of patients with acute coronary syndrome, including patients with enzyme-negative unstable angina

Thank You



Dr. med. Robert Manka
Cardiovascular MRI and Interventional Cardiology
University Hospital Zurich
Institute for Biomedical Engineering
University and ETH Zurich
Switzerland
robert.manka@usz.ch

UniversityHospital
Zurich