Clinical Decision Seminar
Imaging

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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
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 gondii

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


### Table 2 Cardiovascular magnetic resonance findings

<table>
<thead>
<tr>
<th>CMR findings</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocarditis</td>
<td>30 (50.0)</td>
</tr>
<tr>
<td>Acute</td>
<td>19 (31.7)</td>
</tr>
<tr>
<td>Non-acute</td>
<td>11 (18.3)</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>7 (11.6)</td>
</tr>
<tr>
<td>Takotsubo cardiomyopathy</td>
<td>1 (1.7)</td>
</tr>
<tr>
<td>Dilated cardiomyopathy</td>
<td>1 (1.7)</td>
</tr>
<tr>
<td>Normal CMR findings</td>
<td>21 (35)</td>
</tr>
</tbody>
</table>

Abbreviations as in Table 1.
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
Cardiovascular MRI

ACS with acute stunning

Cine  Rest Perfusion  Delayed enhancement
Coronary angiography

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**
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.
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

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