AKS bez STE – kdy indikovat SKG

ESC guidelines 2023

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IKEM

ACS encompasses a spectrum

Unstable angina   NSTEMI   STEMI

1 Think 'A.C.S.' at initial assessment

A — Abnormal ECG?

C — Clinical context?

S — Stable patient?

2 Think invasive management

STEMI

Primary PCI   OR   Fibrinolysis
(If timely primary PCI not feasible)

Very high-risk NSTE-ACS

Immediate angiography ± PCI

High-risk NSTE-ACS

Early (<24 h) angiography should be considered

3 Think antithrombotic therapy

Antiplatelet therapy   AND   Anticoagulant therapy

Aspirin + P2Y$_{12}$ inhibitor

UFH   OR   LMWH   OR   Bivalirudin   OR   Fondaparinux

4 Think revascularization

Based on clinical status, co-morbidities, and disease complexity

PCI   OR   CABG

Aim for complete revascularization

Consider adjunctive tests to guide revascularization

Intravascular imaging   Intravascular physiology

5 Think secondary prevention

Antithrombotic therapy   Lipid lowering therapy   Smoking cessation   Cardiac rehabilitation   Risk factor management   Psychosocial considerations

Clinical presentation

ECG

If a patient has signs/symptoms suggestive of ACS, perform an ECG within 10 min of FMC

Working diagnosis[a]

STEMI

NSTE-ACS

Further investigations

hs-cTn levels

± Angiography

± Imaging

Final diagnosis[b]

STEMI

NSTEMI

Unstable angina

Non-ACS diagnosis

Figure S3

Electrocardiographic abnormalities in patients with non-ST-segment elevation acute coronary syndrome
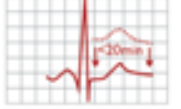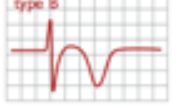

ECG pattern	Criteria	Signifying	Figure
a Isolated T-wave inversion	T-wave inversion >1 mm in ≥5 leads including I, II, aVL, and V2–V6	Only mildly impaired prognosis	I, II, aVL,or V2 to V6
b ST-segment depression	J point depressed by ≥0.05 mm in leads V2 and V3 or ≥1 mm in all other leads followed by a horizontal or downsloping ST-segment for ≥0.08 s in ≥1 leads (except aVR)	More severe ischaemia	≥ 1 leads / ≥ 1 leads
c Transient ST-segment elevation	ST segment elevation in ≥2 contiguous leads of ≥2.5 mm in men <40 years, ≥2 mm in men ≥40 years, or ≥1.5 mm in women regardless of age in leads V2–V3 and/or ≥1 mm in the other leads lasting <20 min	Only mildly impaired prognosis	<20min ≥ 2 contiguous leads
d De Winter ST-T	1–3 mm upsloping ST-segment depression at the J point in leads V1–V6 that continue into tall, positive, and symmetrical T waves	Proximal LAD occlusion/ severe stenosis	V1–V6
e Wellens sign	Isoelectric or minimally elevated J point (<1 mm) + biphasic T wave in leads V2 and V3 (type A) or symmetric and deeply inverted T waves in leads V2 and V3, occasionally in leads V1, V4, V5, and V6 (type B)	Proximal LAD occlusion/ severe stenosis	type A (V1-)V2-V3(-V4) type B (V1-)V2-V3(-V4)

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Figure 6

The 0 h/1 h or 0 h/2 h rule-out and rule-in algorithms using high-sensitivity cardiac troponin assays in patients presenting to the emergency department with suspected NSTEMI and without an indication for immediate invasive angiography
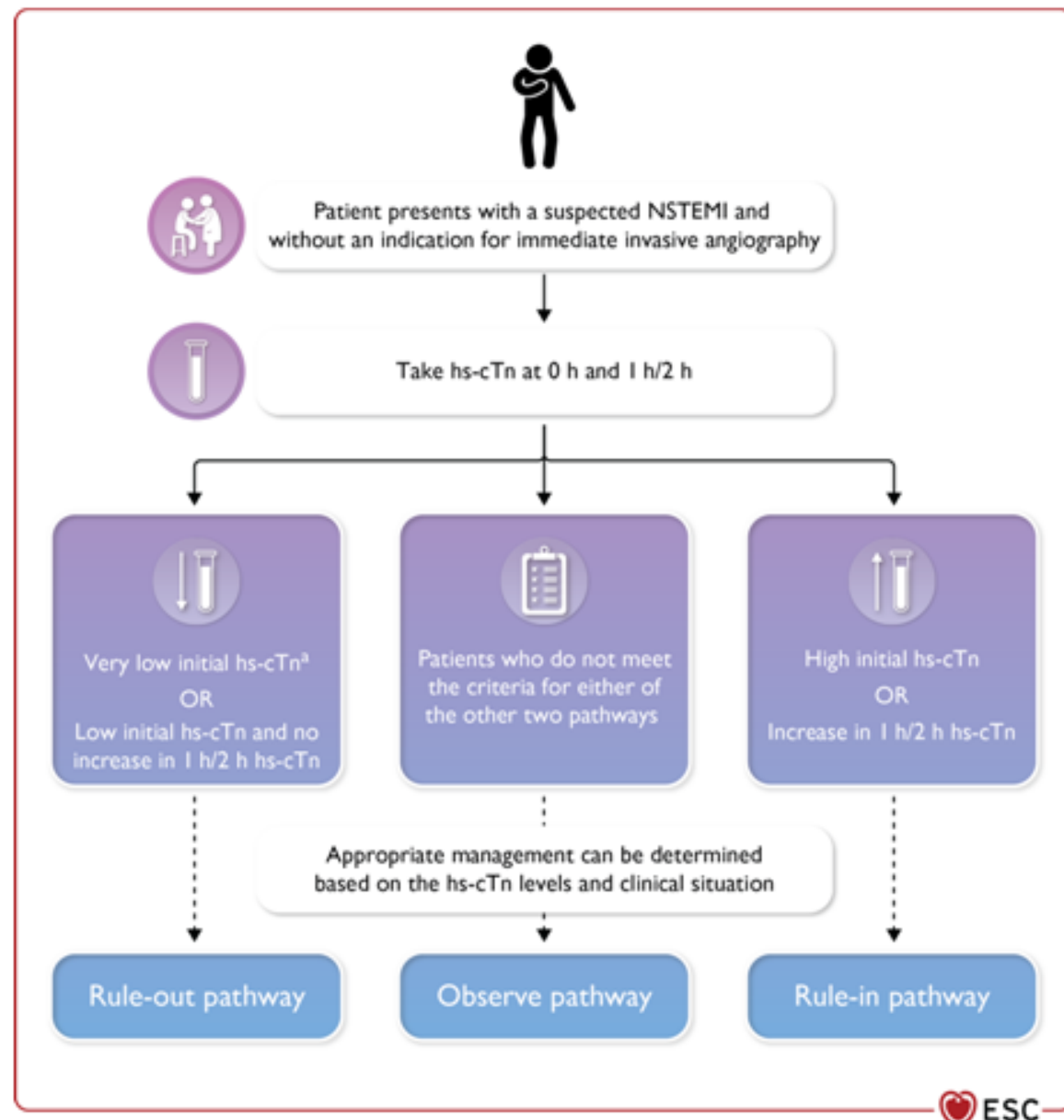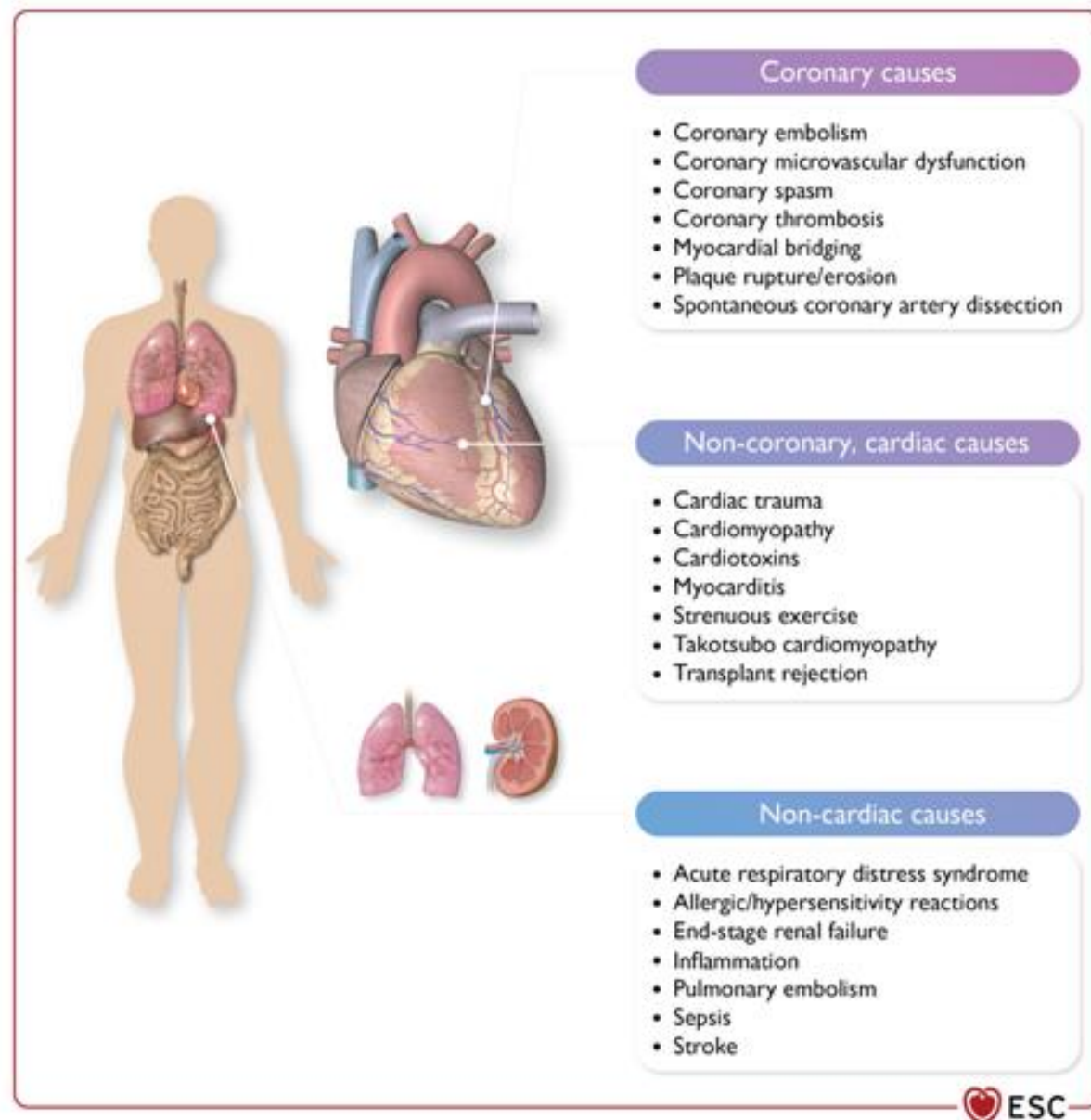
Patient presents with a suspected NSTEMI and without an indication for immediate invasive angiography

Take hs-cTn at 0 h and 1 h/2 h

| Very low initial hs-cTn[a] OR Low initial hs-cTn and no increase in 1 h/2 h hs-cTn | Patients who do not meet the criteria for either of the other two pathways | High initial hs-cTn OR Increase in 1 h/2 h hs-cTn |

Appropriate management can be determined based on the hs-cTn levels and clinical situation

| Rule-out pathway | Observe pathway | Rule-in pathway |

Figure 15

Underlying causes for patients with a working diagnosis of myocardial infarction with non-obstructive coronary arteries

Coronary causes

- Coronary embolism
- Coronary microvascular dysfunction
- Coronary spasm
- Coronary thrombosis
- Myocardial bridging
- Plaque rupture/erosion
- Spontaneous coronary artery dissection

Non-coronary, cardiac causes

- Cardiac trauma
- Cardiomyopathy
- Cardiotoxins
- Myocarditis
- Strenuous exercise
- Takotsubo cardiomyopathy
- Transplant rejection

Non-cardiac causes

- Acute respiratory distress syndrome
- Allergic/hypersensitivity reactions
- End-stage renal failure
- Inflammation
- Pulmonary embolism
- Sepsis
- Stroke

Invasive strategy in NSTE-ACS

| Invasive strategy in NSTE-ACS		
An invasive strategy during hospital admission is recommended in NSTE-ACS patients with high-risk criteria or a high index of suspicion for unstable angina.[196–200]	I	A
A selective invasive approach is recommended in patients without very high- or high-risk NSTE-ACS criteria and with a low index of suspicion for NSTE-ACS.[196–200]	I	A

Revised recommendations (1)

ESC

2017 and 2020	Class	Level	2023	Class	Level
Recommendations for imaging for patients with suspected NSTE-ACS					
In patients with no recurrence of chest pain, normal ECG findings, and normal levels of cardiac troponin (preferably high sensitivity), but still with suspected ACS, a non-invasive stress test (preferably with imaging) for inducible ischaemia or CCTA is recommended before deciding on an invasive approach.	I	B	In patients with suspected ACS, non-elevated (or uncertain) hs-cTn, no ECG changes and no recurrence of pain, incorporating CCTA or a non-invasive stress imaging test as part of the initial workup should be considered.	IIa	A

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Immediate invasive strategy (ASAP)

	I	C
An immediate invasive strategy is recommended in patients with a working diagnosis of NSTE-ACS and with at least one of the following very high-risk criteria: • Haemodynamic instability or cardiogenic shock • Recurrent or refractory chest pain despite medical treatment • In-hospital life-threatening arrhythmias • Mechanical complications of MI • Acute heart failure presumed secondary to ongoing myocardial ischaemia • *Recurrent* dynamic ST-segment or T wave changes, particularly intermittent ST-segment elevation.	I	C

Early invasive strategy (within 24 hrs)

An early invasive strategy within 24 h should be considered in patients with at least one of the following high-risk criteria:

- Confirmed diagnosis of NSTEMI based on current recommended ESC hs-cTn algorithms
- Dynamic ST-segment or T wave changes
- Transient ST-segment elevation
- GRACE risk score >140[202,226-230]

IIa **A**

Revised recommendations (2)

ESC

2017 and 2020	Class	Level	2023	Class	Level
Recommendations for timing of invasive strategy in NSTE-ACS					
An early invasive strategy within 24 h is recommended in patients with any of the following high-risk criteria: • Diagnosis of NSTEMI suggested by the diagnostic algorithm recommended in guidelines • Dynamic or presumably new contiguous ST/T-segment changes suggesting ongoing ischaemia • Transient ST-segment elevation. • GRACE risk score >140	I	A	An early invasive strategy within 24 h should be considered in patients with at least one of the following high-risk criteria: • Confirmed diagnosis of NSTEMI based on current recommended ESC hs-cTn algorithms • Dynamic ST-segment or T wave changes • Transient ST-segment elevation • GRACE risk score >140	IIa	A

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Recommendations	Class	Level
Patients with cancer		
An invasive strategy is recommended in cancer patients presenting with high-risk ACS with expected survival ≥6 months.	I	B
A temporary interruption of cancer therapy is recommended in patients in whom the cancer therapy is suspected to be a contributing cause of ACS.	I	C
A conservative non-invasive strategy should be considered in ACS patients with poor cancer prognosis (i.e. with expected survival <6 months) and/or very high bleeding risk.	IIa	C
Aspirin is not recommended in cancer patients with a platelet count <10 000/µL.	III	C
Clopidogrel is not recommended in cancer patients with a platelet count <30 000/µL.	III	C
In ACS patients with cancer and <50 000/µL platelet count, prasugrel or ticagrelor are not recommended.	III	C

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58 let, muž, dosud zcela asymptomatický
bolest na hrudi, ekg bez známek ischemie, Tn positivní, TTE normální
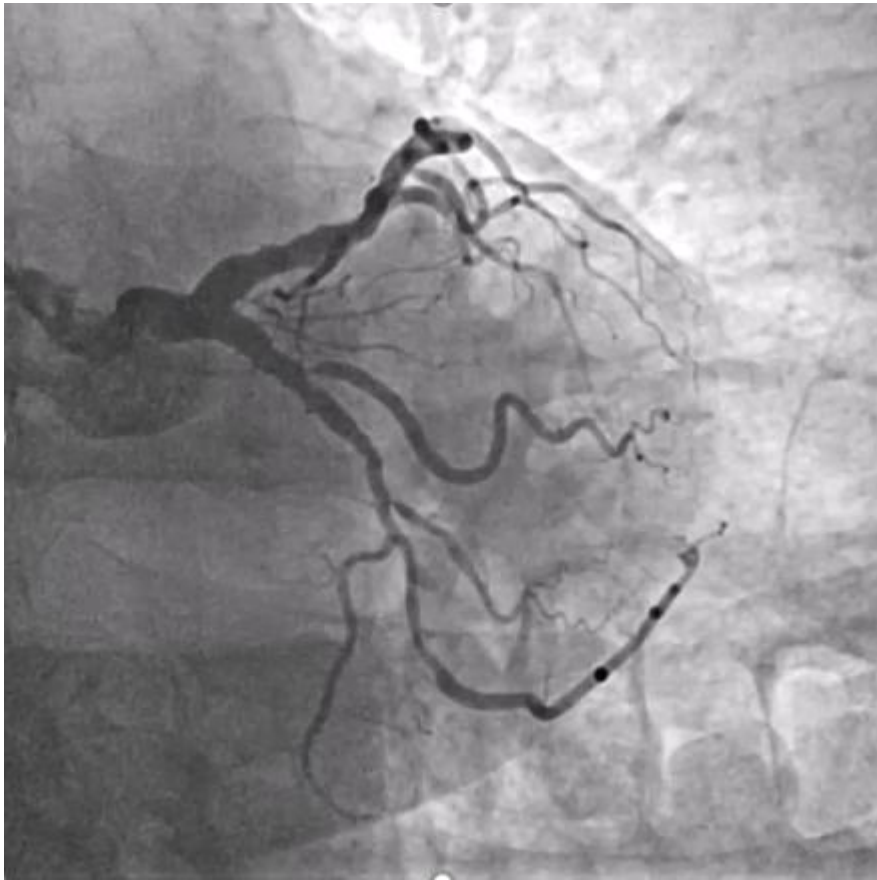SKG provedena časně (48 hodin)
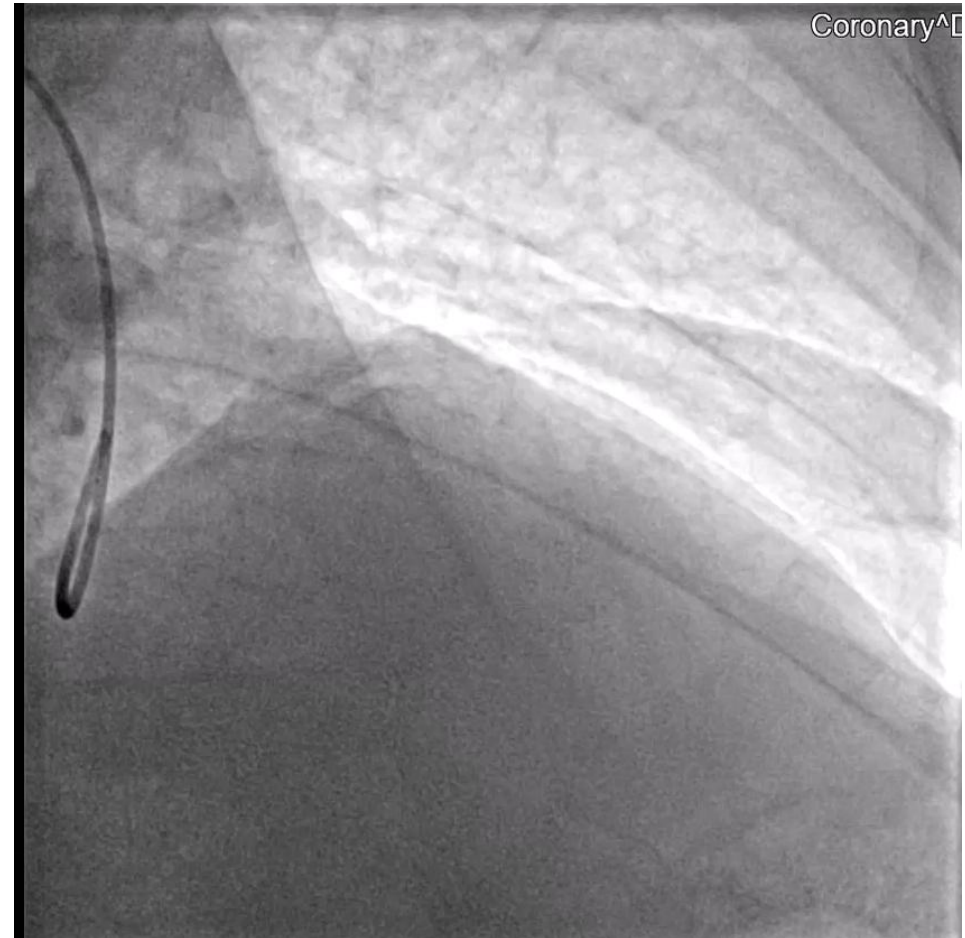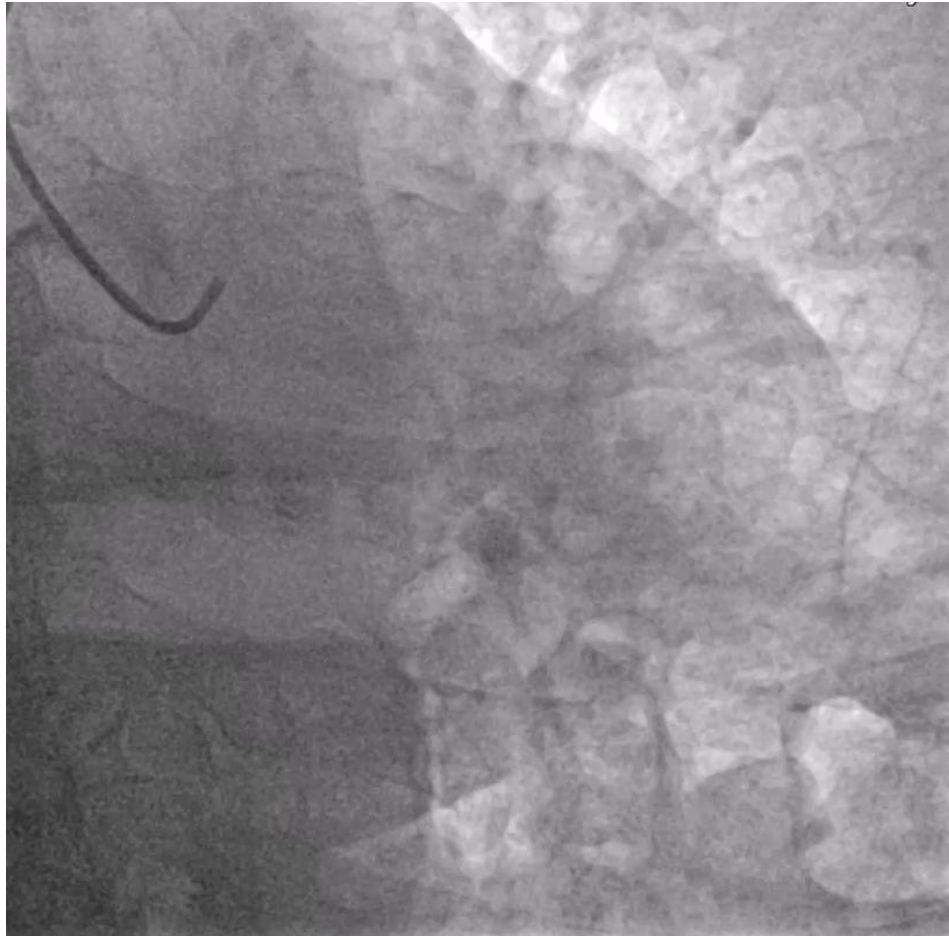
MVD: RC/RMS I, II, ACD, RIA < 50%
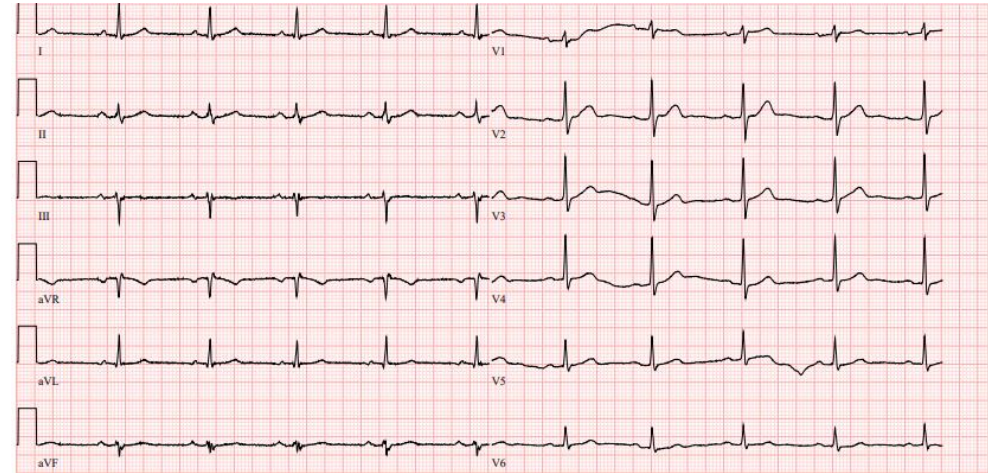
- Další postup
  - Konzervativně
  - Zátěžový test
  - FFR/iFR/AngioFR
 - CABG
  - PCI

DES RMS I + kissing RC/RMS I
DES RC-RMS II
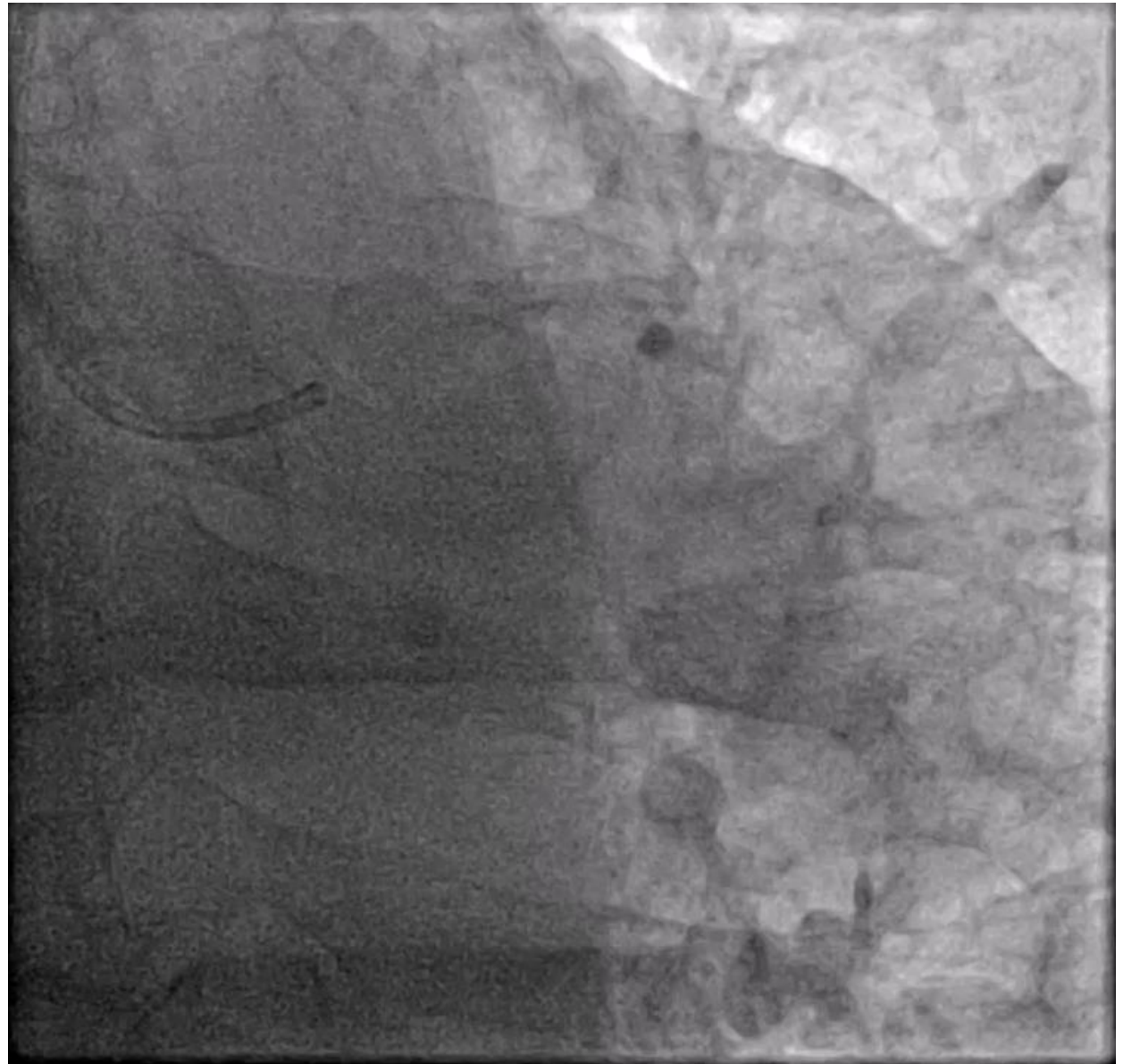
# Recommendations for technical aspects of invasive strategies (1)

Recommendations	Class	Level
Radial access is recommended as the standard approach, unless there are overriding procedural considerations.	I	A
PCI with stent deployment in the IRA during the index procedure is recommended in patients undergoing PPCI.	I	A
Drug-eluting stents are recommended in preference to bare metal stents in all cases.	I	A
In patients with spontaneous coronary artery dissection, PCI is recommended only for patients with symptoms and signs of ongoing myocardial ischaemia, a large area of myocardium in jeopardy, and reduced antegrade flow.	I	C
Intravascular imaging should be considered to guide PCI.	IIa	A
Coronary artery bypass grafting should be considered in patients with an occluded IRA when PPCI is not feasible/unsuccessful and there is a large area of myocardium in jeopardy.	IIa	C

Figure 13

A practical algorithm to guide intravascular imaging in acute coronary syndrome patients
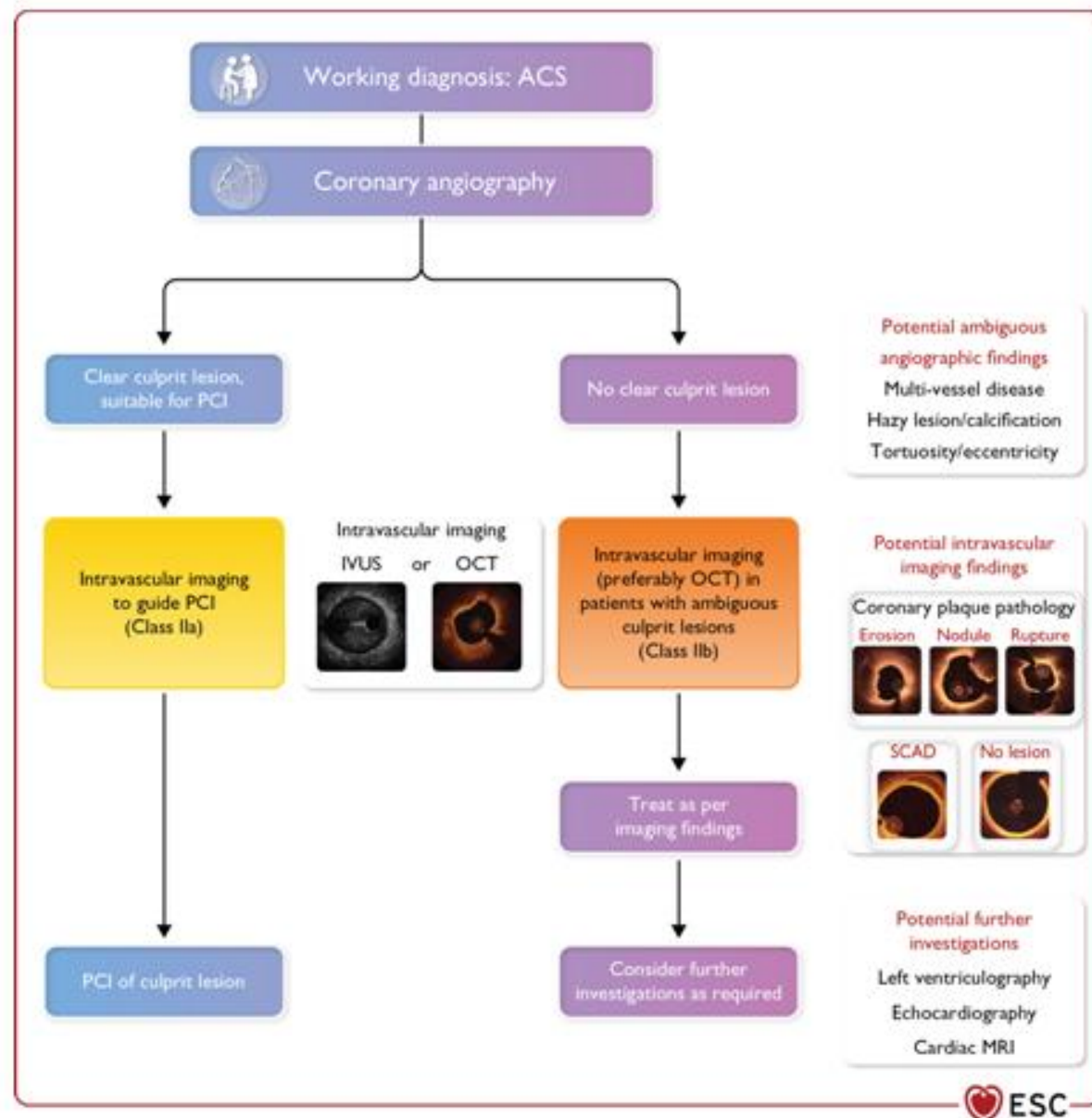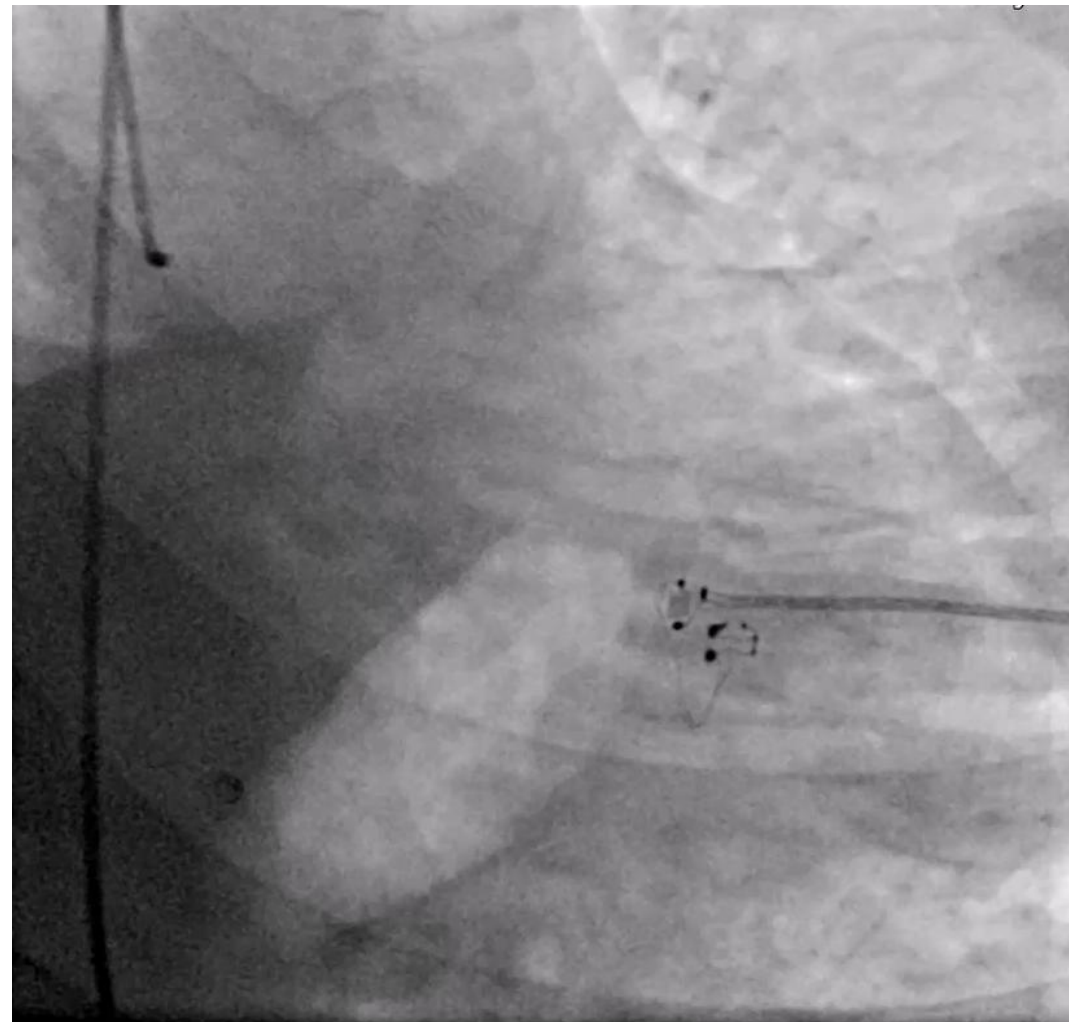
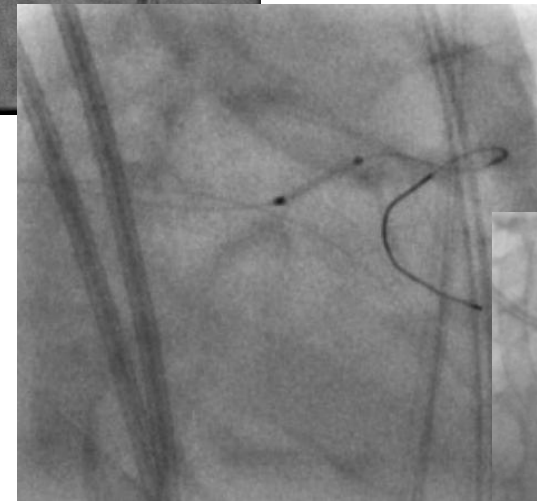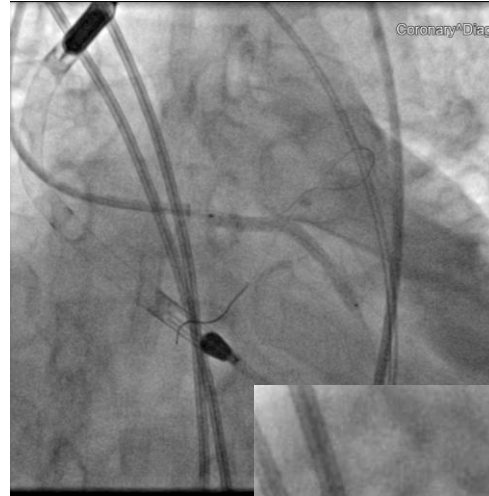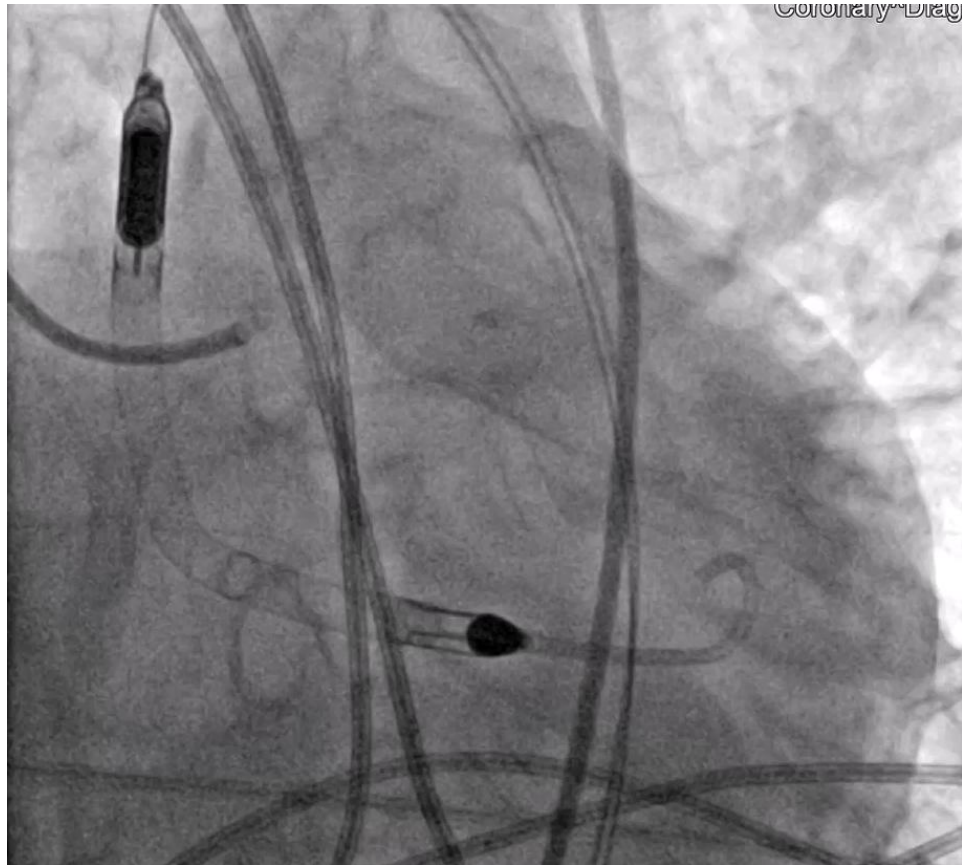# ACS with multivessel coronary artery disease
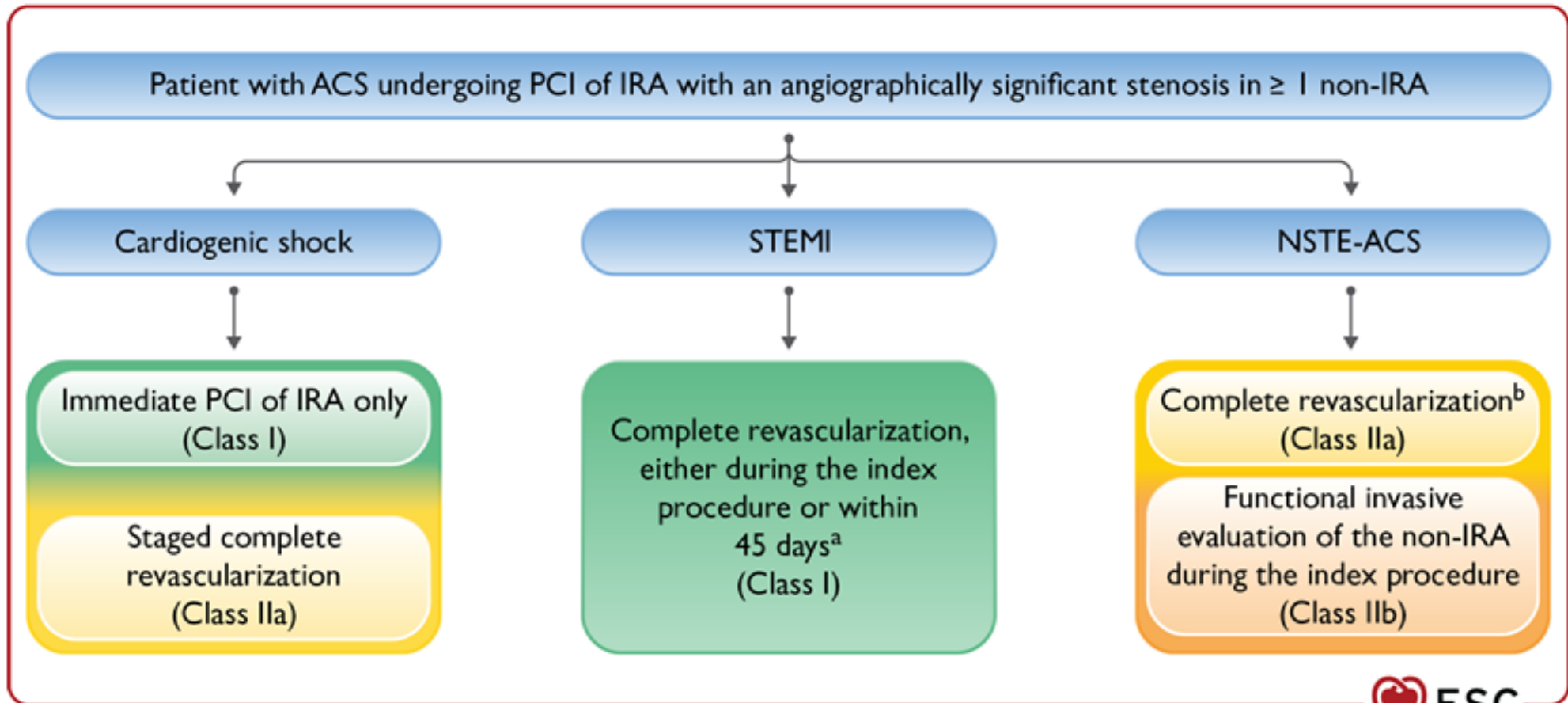
Muž, 73 let, 1999 IM
Přijat pro NSTEMI, plicní edém
EF 20%, MR 2/4, SF 122, hypotenze
Rozvoj kardiogenního šoku

SKG
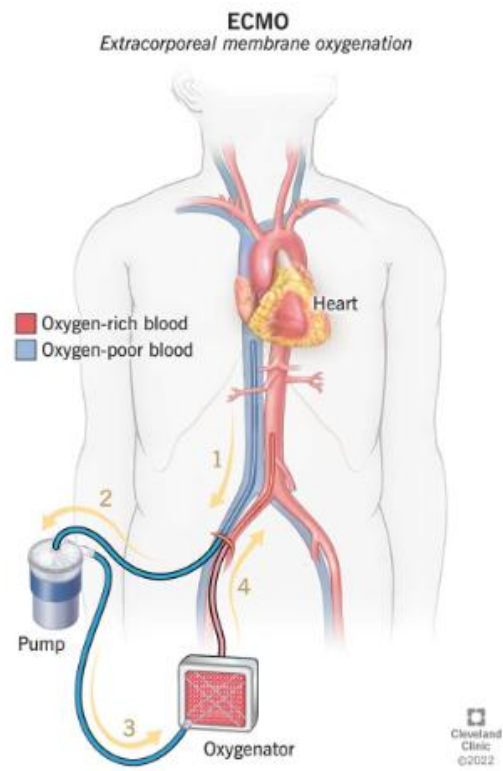
PCI kmene ACS s podporou systému Impella CP

Hemodynamika

	Před PCI	Impella CP + PCI
CO	2,8	5,2
CI	1,45	2,7
PA	35/26/30	23/6/12
PCW	29 (v=32)	5
SF	122	92

Kardiogenní šok a STEMI
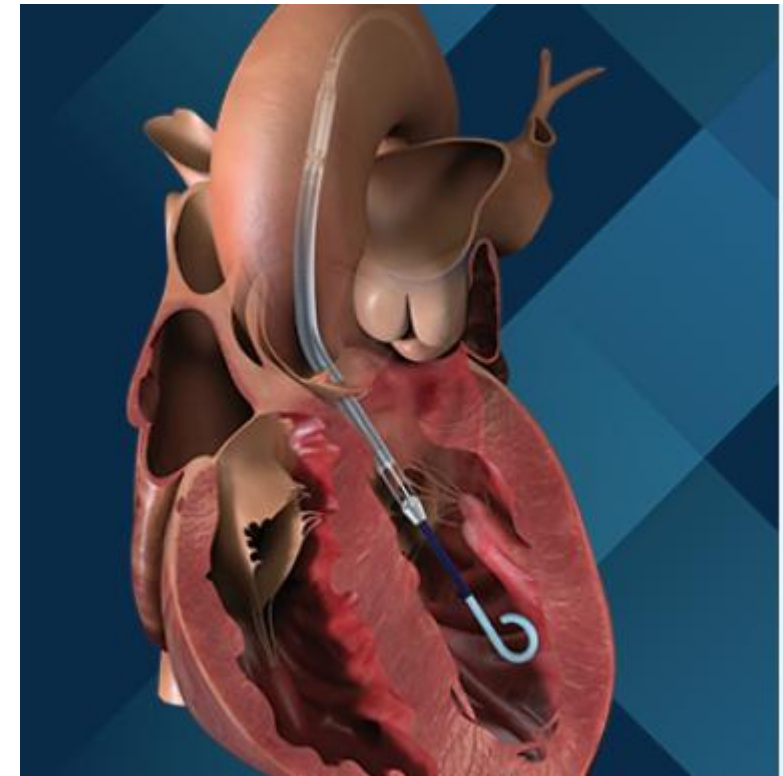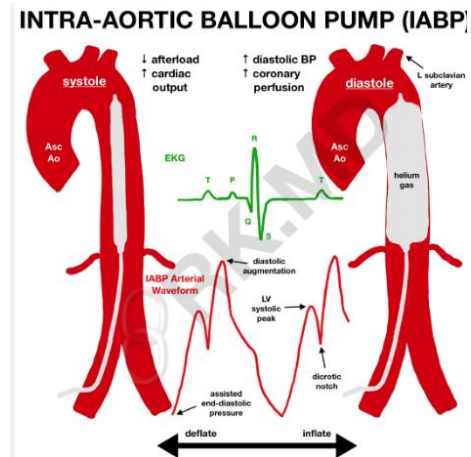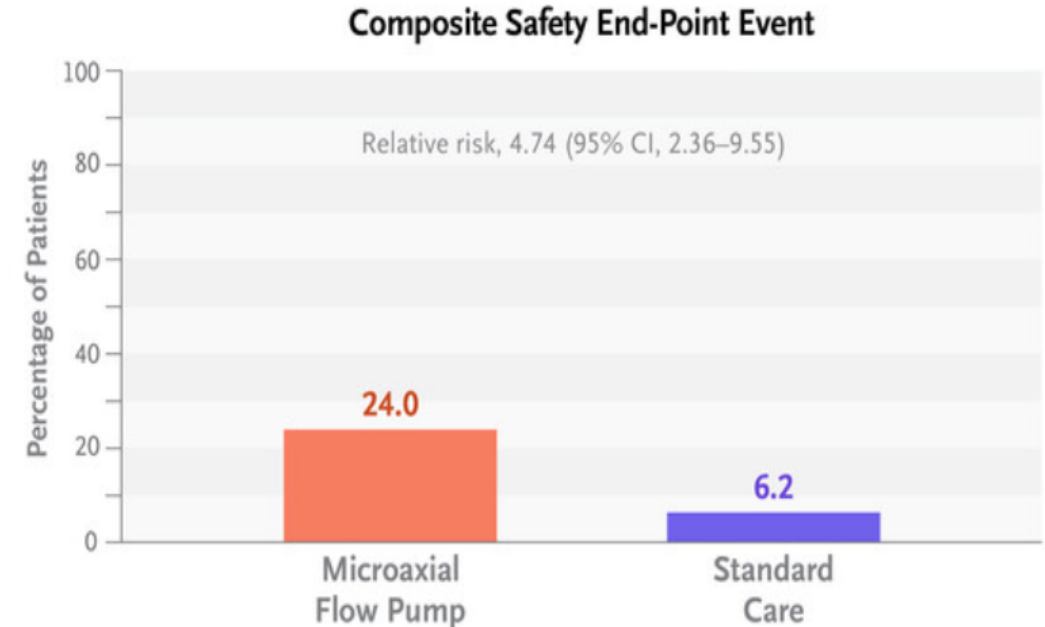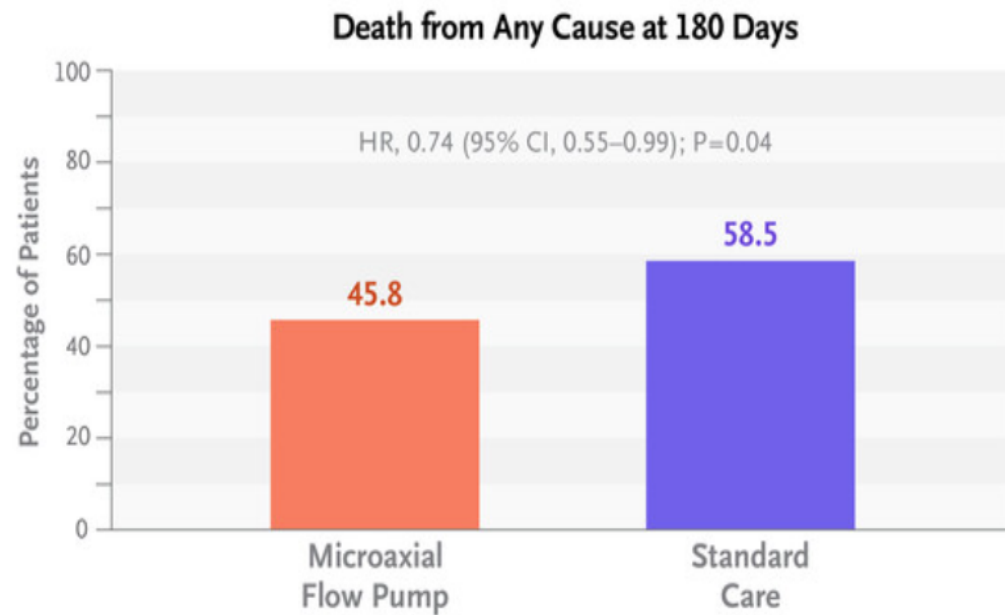
IABP
ECMO

IMPELLA

ECMO ↑ afterload

Impella: unloading LV, ↑ koronární perfuze

Impella u kardiogenního šoku: DanGerShock Trial (n=360)

Death from Any Cause at 180 Days

HR, 0.74 (95% CI, 0.55–0.99); P=0.04

- Microaxial Flow Pump: 45.8
- Standard Care: 58.5

Composite Safety End-Point Event

Relative risk, 4.74 (95% CI, 2.36–9.55)

- Microaxial Flow Pump: 24.0
- Standard Care: 6.2
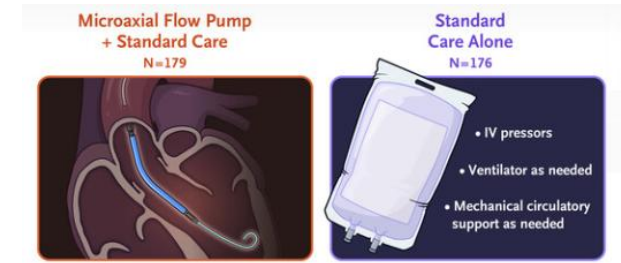
- **Nemocní s OHCA komatosní a infarkty pravé komory byli vyloučeni**
- 50% non-culprit vessel PCI
- Žádný efekt MSP: ženy, 1VD (analýza podskupin)