

Il dolore toracico



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Perché parlare di dolore toracico?

Evaluating acute-onset chest pain (ACP) in the emergency department (ED) remains one of the most common and challenging clinical problems, accounting for 7 million visits annually in the USA and is the second most frequent cause of ED visits in adults, with related healthcare costs of \$13 to \$15 billion.^{1,2} Causes of ACP may include a wide

2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

of \$13 to \$15 billion.^{1,2} Causes of ACP may include a wide spectrum of pathologies ranging from ischaemic cardiac diseases, non-ischaemic pathologies or non-cardiac conditions. However, only a minority of these patients re-

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ditions. However, only a minority of these patients require urgent treatment for a potentially life-threatening condition such as acute coronary syndrome (ACS), pulmonary embolism (PE), aneurysm rupture or acute aortic dissection (AD).

Maffei E, Seitun S, Guaricci AI, Cademartiri F. *Chest pain: coronary CT in the ER.*
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Abstract

When a patient complains of chest pain, the first priority is to establish whether the situation is life threatening. Life-threatening differential diagnoses that clinicians must consider include acute coronary syndrome, cardiac tamponade, pulmonary embolus, aortic dissection, and tension pneumothorax. Nonthreatening causes of chest pain that should be considered include spontaneous pneumothorax, pleural effusion, pneumonia, valvular diseases, gastric reflux, and costochondritis. The challenge for clinicians is not to be limited by "satisfaction of search" and fail to consider important differential diagnoses. The challenge, however, can be met by developing a systematic method to assess chest pain that will lead to the appropriate diagnosis and appropriate treatment plan.

King JE, Magdic KS *Chest pain: a time for concern?* AACN Adc Crit Care 2014 Jul-Sep

Cosa fare?

■ 1. Anamnesi ed esame obiettivo

Anamnesi

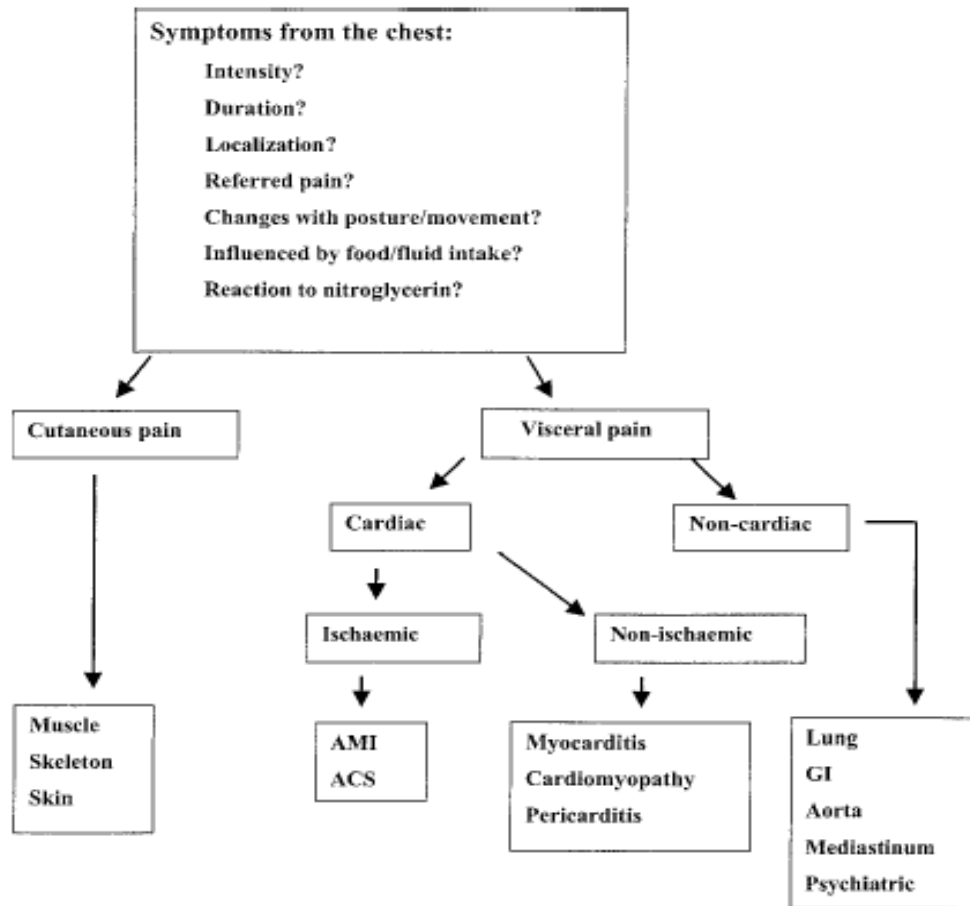


Figure 2 Algorithm for the diagnosis of acute chest pain.

2002 ESC Task force on the management of chest pain

Esame obiettivo

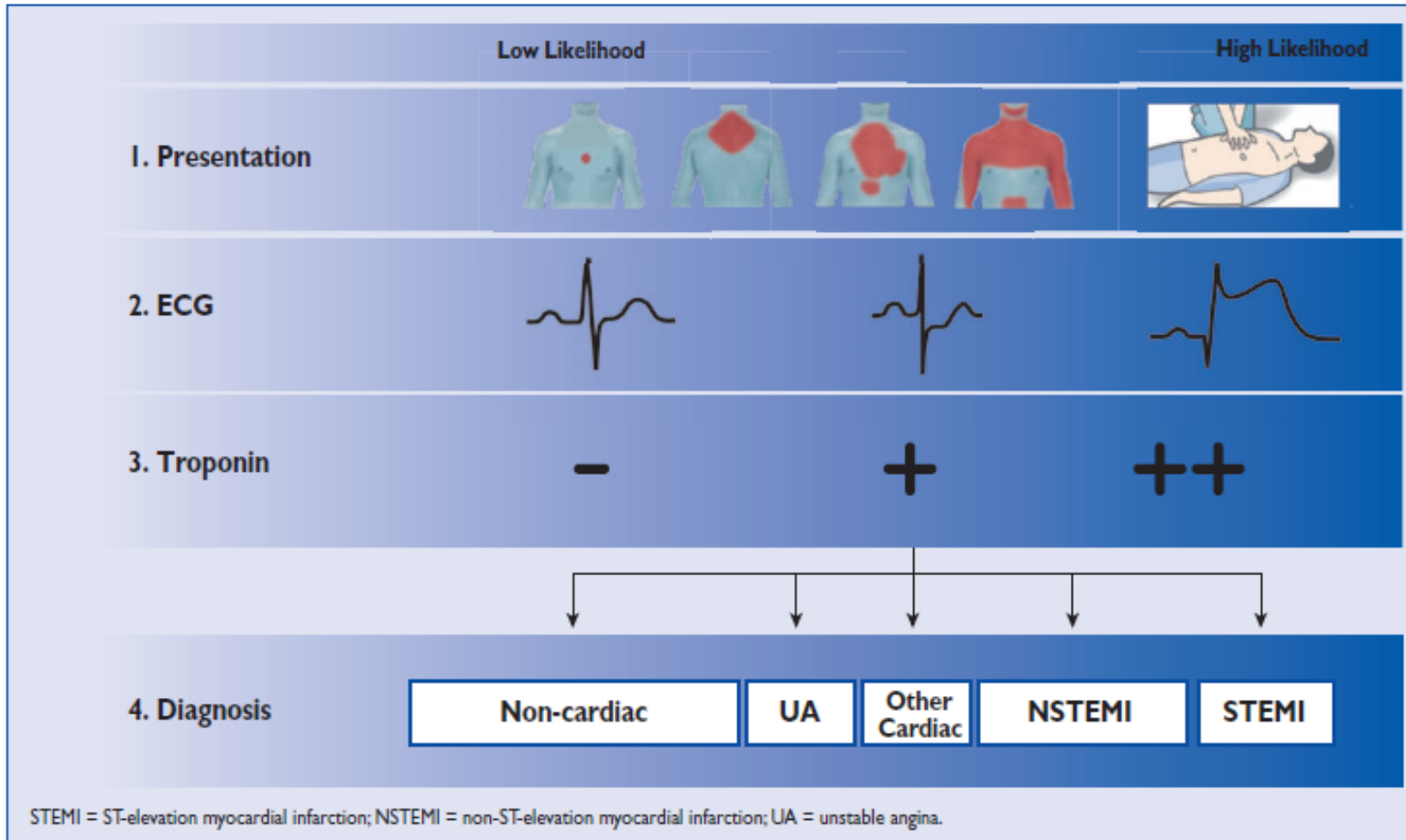
- Utile soprattutto per orientare verso cause non cardiache

Table 3 Summary of causes and types of chest pain

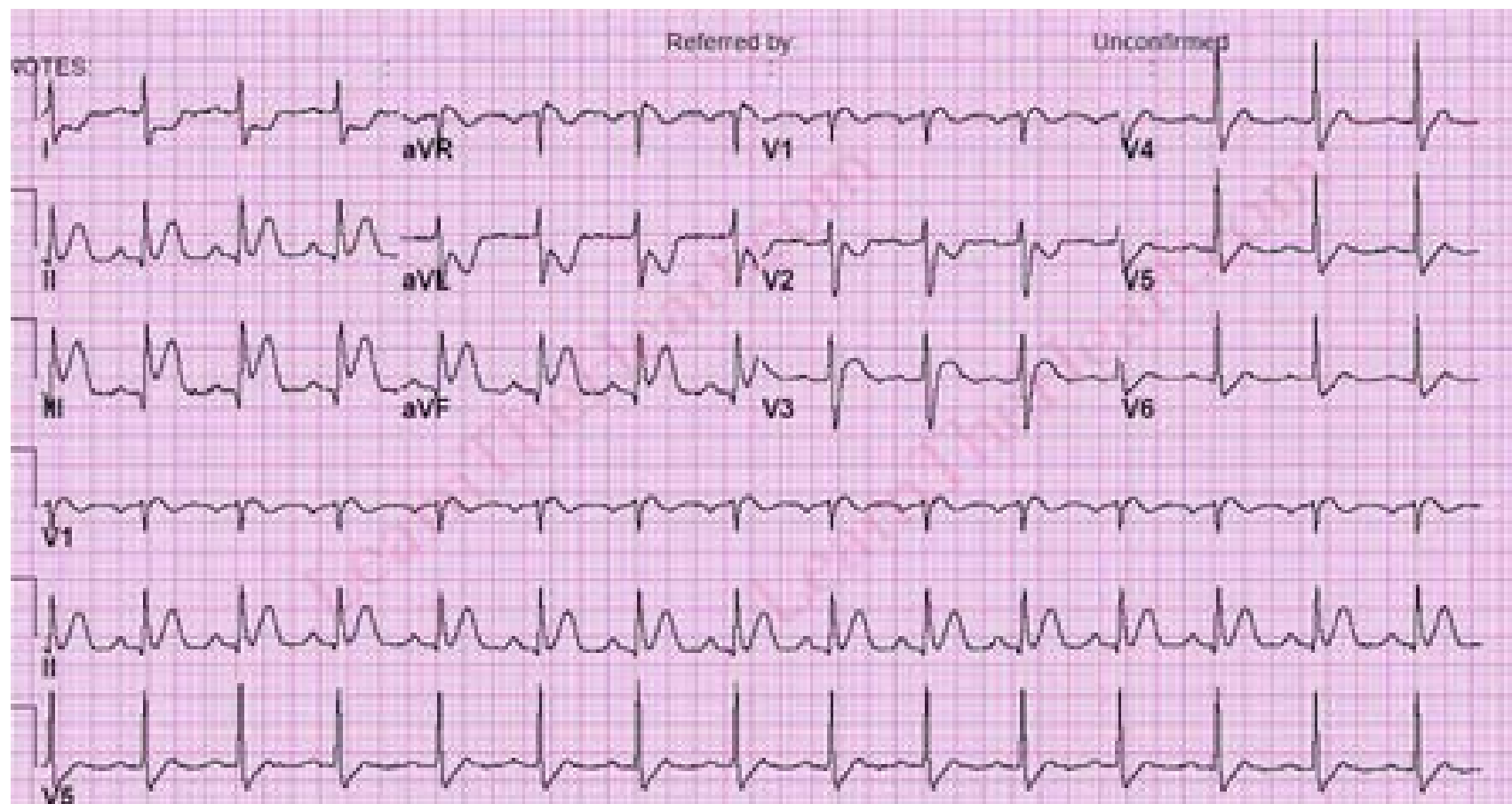
Aetiology	Type of pain	Sight of pain	Radiation	Duration of pain	Associated symptoms	Mode of onset	ECG findings	Risk factors
Angina	Visceral	Retrosternal	Neck, jaw, shoulder, and arm	>15 min	Nausea and dyspnoea	Variable	ST elevation or depression	
Pericarditis	Somatic	Midline	Neck, back, or shoulder	Hours to days	Pain worse on movement or breathing	Variable	ST elevation in all leads except aVR and V1	Viral infection, recent MI trauma, post-cardiac surgery
Dissecting aortic aneurysm	Visceral severe	Retrosternal	Interscapular	Variable	Nausea and breathlessness	Sudden	Non-specific	History of hypertension
Cervical nerve root pain	Sharp or aching, superficial	Upper chest—possibly one sided	Neck	Variable	May be exacerbated by neck movement	Variable	None	
Chest wall pain	Sharp or aching	Localised	None	Variable	None	Variable	None	
Pulmonary embolism	Pleuritic	Usually lateral aspect of chest wall	None	Variable	Breathlessness, unilateral swollen leg	Sudden	Non-specific S-T changes, tachycardia	Recent trauma or surgery, venous stasis or hypercoagulability
Infection	Pleuritic or somatic	Usually lateral aspect of chest wall	None	Variable	Breathlessness, bronchi, bronchial breathing	Variable	None	URTI, cough, sputum, fever
Pneumothorax	Pleuritic	Usually lateral aspect of chest wall	Neck and back	Variable	Breathlessness	Sudden	None	COPD, trauma, tall, thin, young people
Oesophageal pain	Aching or burning	Retrosternal	Interscapular	Minutes to hours	Difficulty or pain on swallowing	Variable	None	Gastro-oesophageal reflux disease

■ 2. ECG 12 derivazioni

ECG

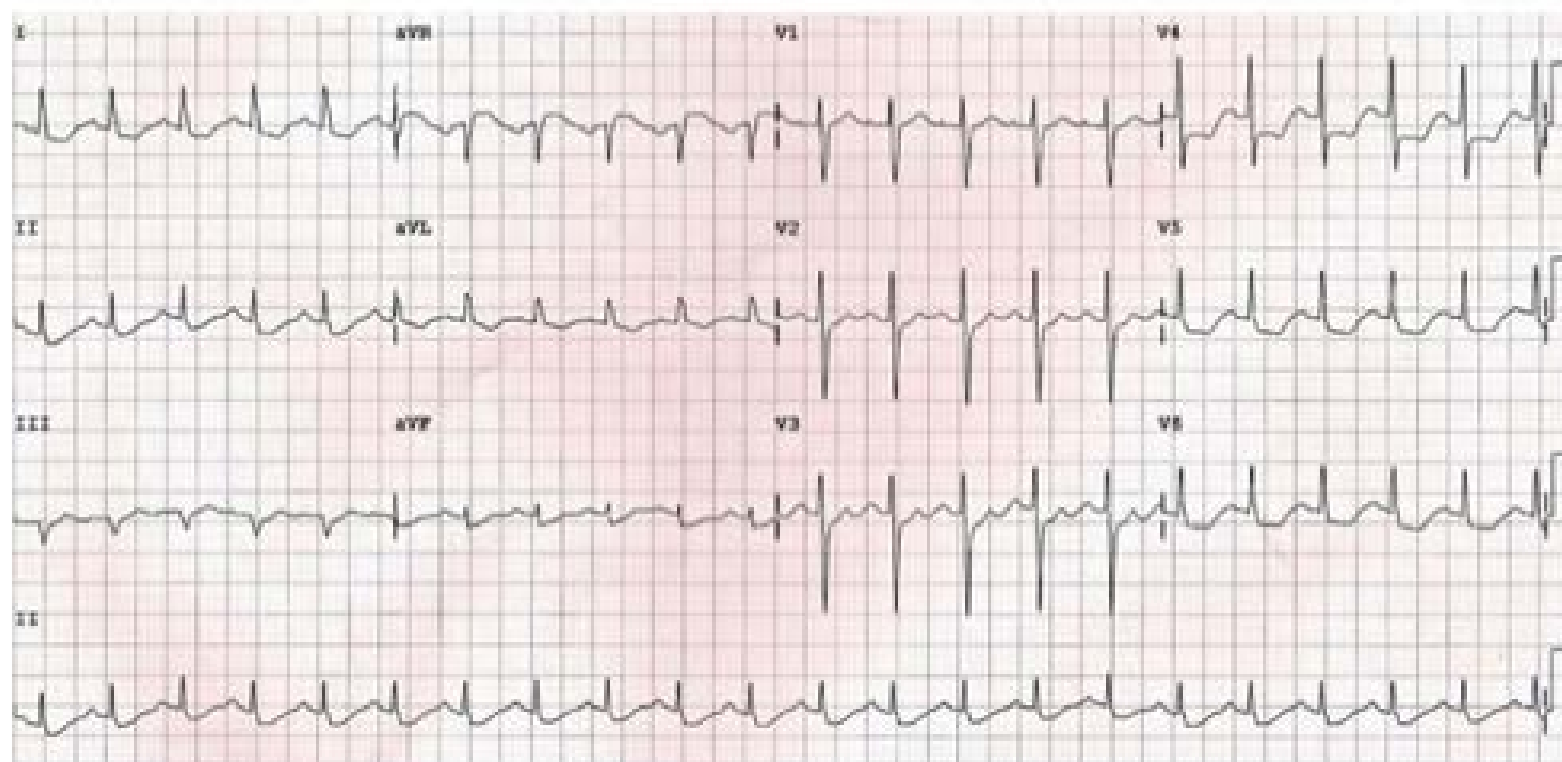


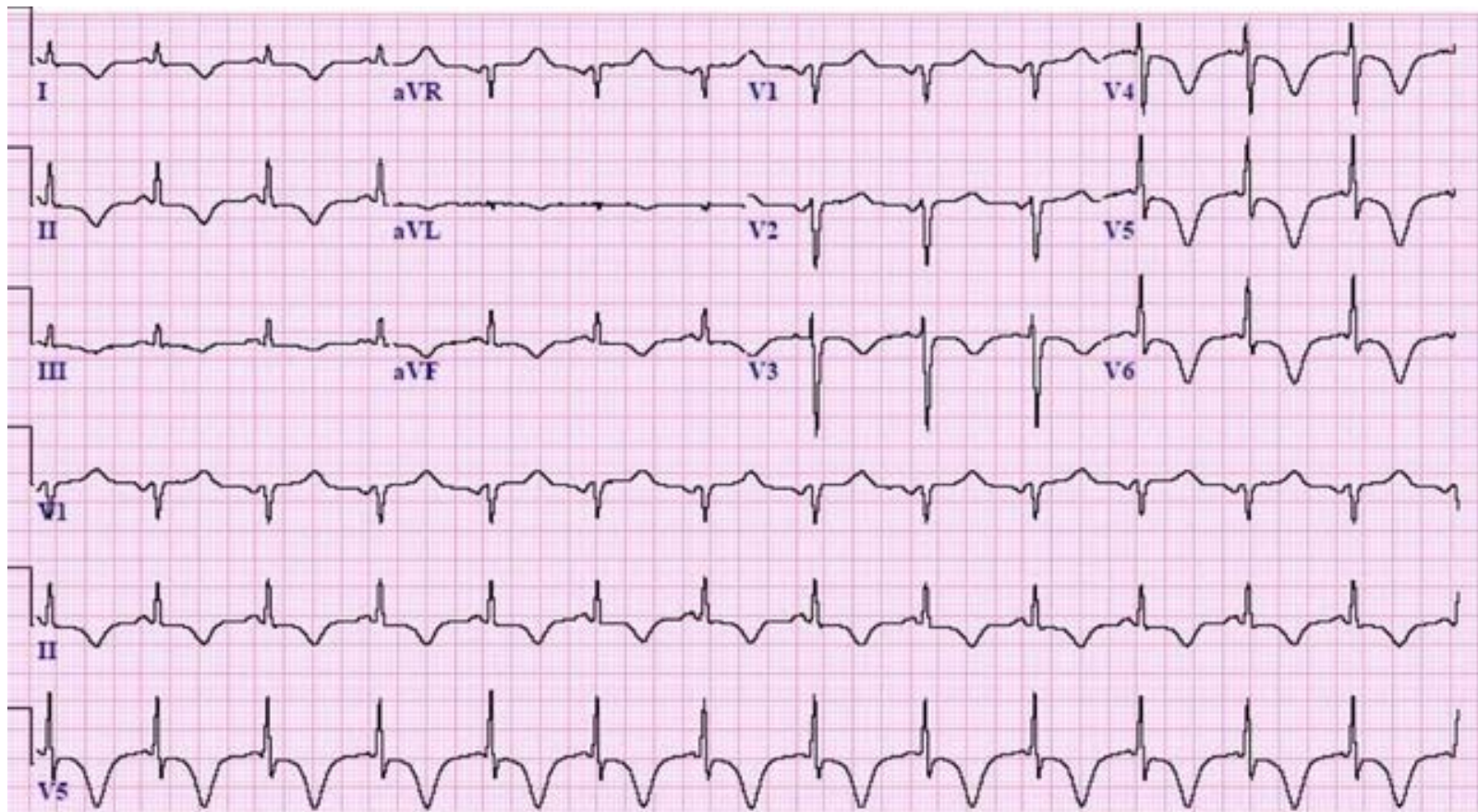
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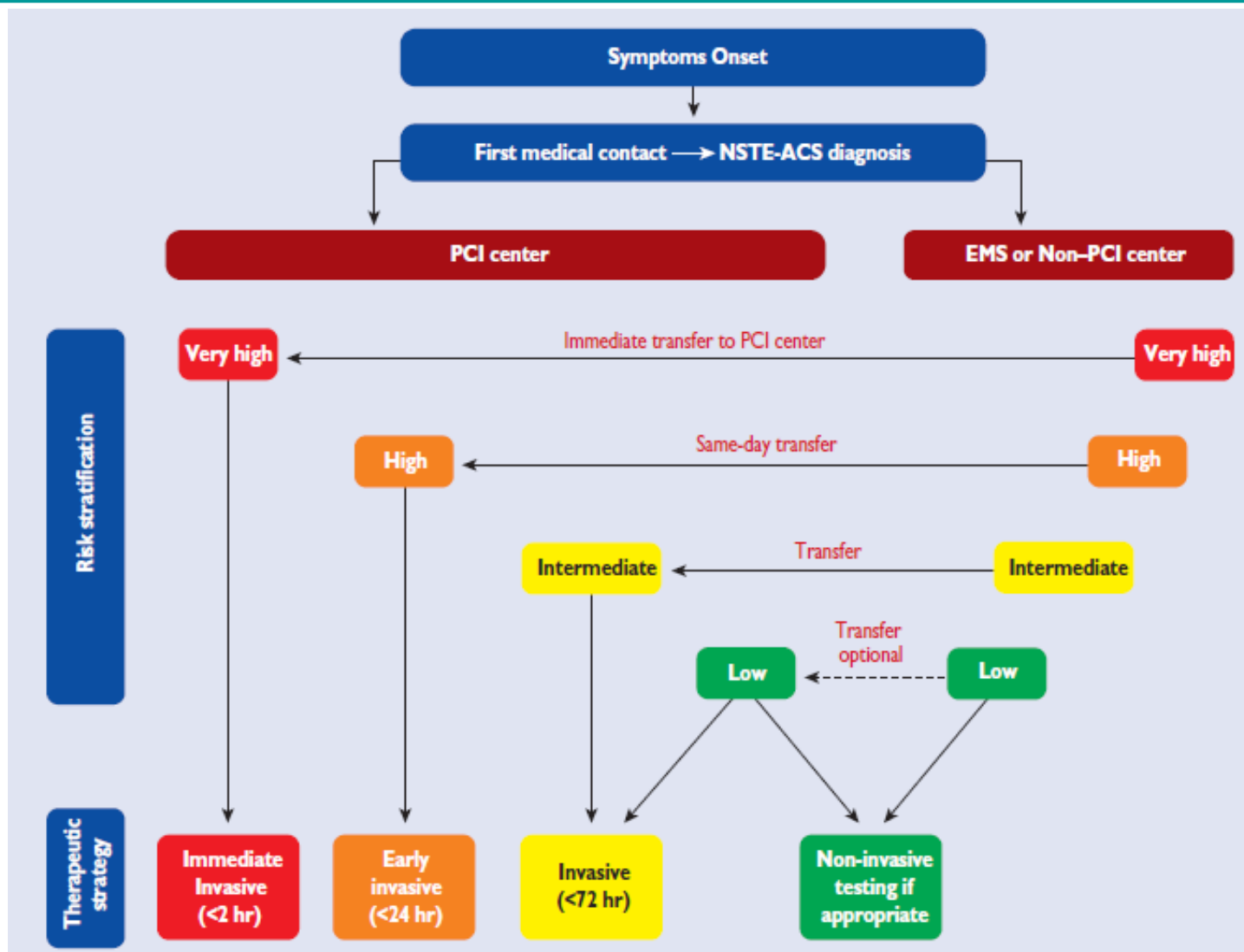


Se non c'è sopralivellamento ST?









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ischaemia is suspected when standard leads are inconclusive.	I	C	
It is recommended to measure cardiac troponins with sensitive or high-sensitivity assays and obtain the results within 60 min.	I	A	6,30–36,39,51–59,108
A rapid rule-out protocol at 0 h and 3 h is recommended if high-sensitivity cardiac troponin tests are available.	I	B	6,30–36,39,51–59,108
A rapid rule-out and rule-in protocol at 0 h and 1 h is recommended if a high-sensitivity cardiac troponin test with a validated 0 h/1 h algorithm is available. Additional testing after 3–6 h is indicated if the first two troponin measurements are not conclusive and the clinical condition is still suggestive of ACS.	I	B	30–34,36,39,51–55
It is recommended to use established risk scores for prognosis estimation.	I	B	84,94,106

2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

inducible ischaemia is recommended before deciding on an invasive strategy.			
Echocardiography is recommended to evaluate regional and global LV function and to rule in or rule out differential diagnoses. ^d	I	C	
MDCT coronary angiography should be considered as an alternative to invasive angiography to exclude ACS when there is a low to intermediate likelihood of CAD and when cardiac troponin and/or ECG are inconclusive.	IIa	A	80
Monitoring			
Continuous rhythm monitoring is recommended until the diagnosis of NSTEMI is established or ruled out.	I	C	101
It is recommended to admit NSTEMI patients to a monitored unit.	I	C	99,100
Rhythm monitoring up to 24 h or PCI (whichever comes first) should be considered in NSTEMI patients at low risk for cardiac arrhythmias. ^e	IIa	C	

2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

In patients who are stable and free of chest pain for several hours, with no ischaemic signs at 12-lead ECG and with serial negative cardiac troponin, a functional stress testing (preferably with imaging) may be performed during the period of observation or shortly after discharge. That is a Class I indication (Level of Evidence: A) according to the European Society of Cardiology (ESC) guidelines for the management of ACSs in patients presenting without persistent ST-segment elevation.³

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Techniques	Advantages	Limits
Echo	• Safe	• Poor sensitivity
	• Relatively modest cost	• High degree of operator dependence
	• Availability, portability, ease of performance	• Poor acoustic window in at least 10% of cases
	• Provides structural and functional data	• Artefacts
	• Provides important prognostic information	
SPECT	• High SE and SP for detection of ischaemia	• High cost
	• Transmural infarct	• Radiation exposure
	• Allows assessment of LV function	• Time consuming
	• Provides important prognostic information	• Logistical issue
		• FP findings (photon attenuation artefacts)
		• FN results (possible balanced ischaemia not detectable by semi-quantitative analysis)
MRI	• Safe	• High cost
	• Highest SE and SP for detection of ischaemia	• Time consuming
	• Allows assessment of LV function	• Limited availability
	• Detects subendocardial infarct (transmurality)	• Important logistic requirements
	• Differentiates new from old infarct (T ₂ w imaging)	• Heart rate and respiratory motion artefacts
	• Detects UA without necrosis (T ₂ w imaging)	
	• Provides important prognostic information	

Imaging			
In patients with no recurrence of chest pain, normal ECG findings and normal levels of cardiac troponin (preferably high-sensitivity), but suspected ACS, a non-invasive stress test (preferably with imaging) for inducible ischaemia is recommended before deciding on an invasive strategy.	I	A	64,74, 113, 114
Echocardiography is recommended to evaluate regional and global LV function and to rule in or rule out differential diagnoses. ^d	I	C	
MDCT coronary angiography should be considered as an alternative to invasive angiography to exclude ACS when there is a low to intermediate likelihood of CAD and when cardiac troponin and/or ECG are inconclusive.	IIa	A	80

2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

Multidetector computed tomography (MDCT) allows for visualization of the coronary arteries and a normal scan excludes CAD. A

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Several hundreds of single-centre studies and three large prospective randomized trials with cohort sizes from 230 to 360 patients have evaluated the diagnostic accuracy of cardiac CT as compared with the gold standard of invasive coronary angiography (Figure 1).^{60–62} The strength of cardiac CT is its high sensitivity superior to other imaging techniques (98–100%).⁷ According to the Bayesian theorem and the high NPV (99–100%) of cardiac CT, the consensus is to consider the use of cardiac CT mainly in populations with low-to-intermediate probability or after an inconclusive functional test owing to its excellent ability to rule out CAD.^{7,63} Important

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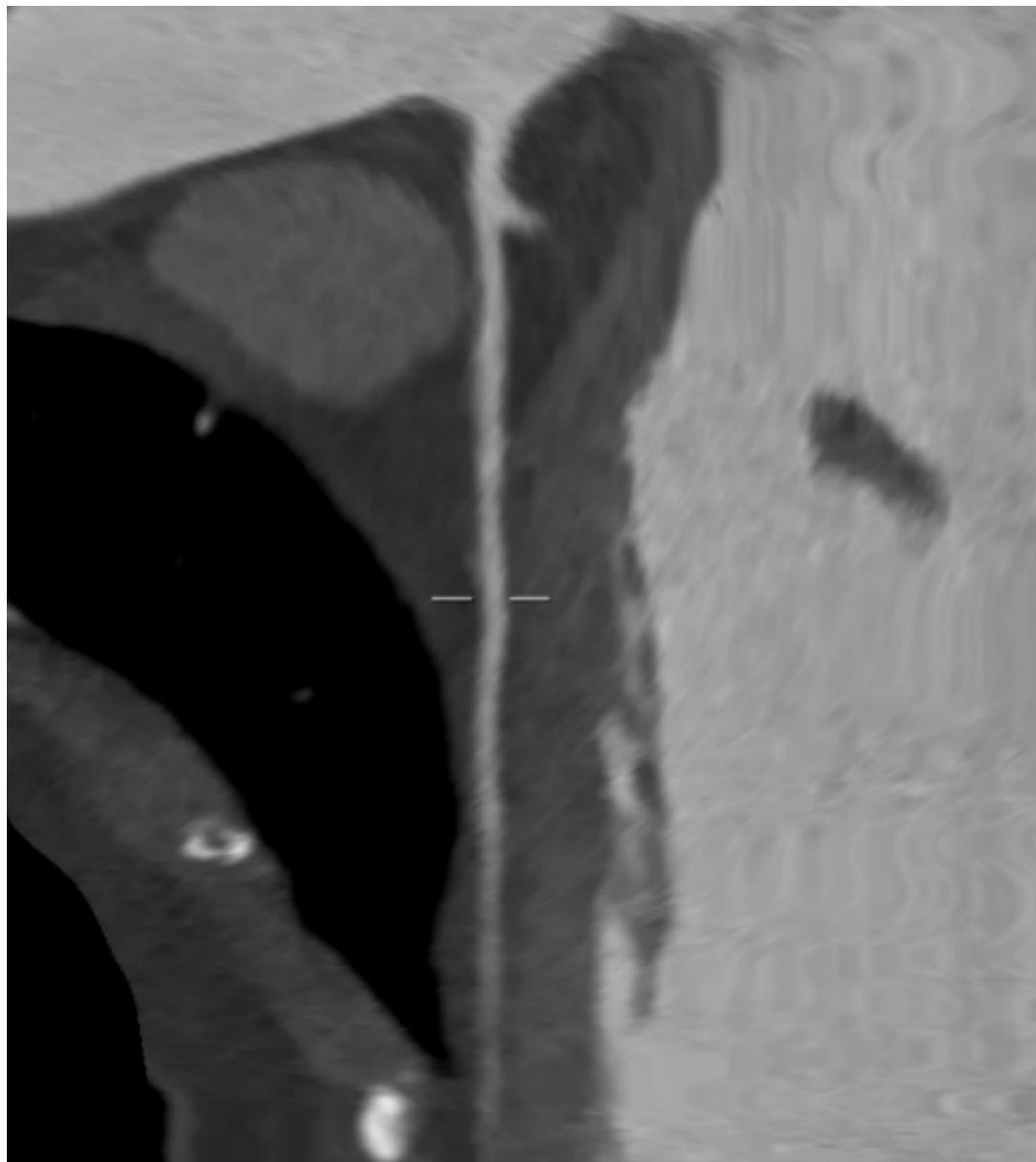
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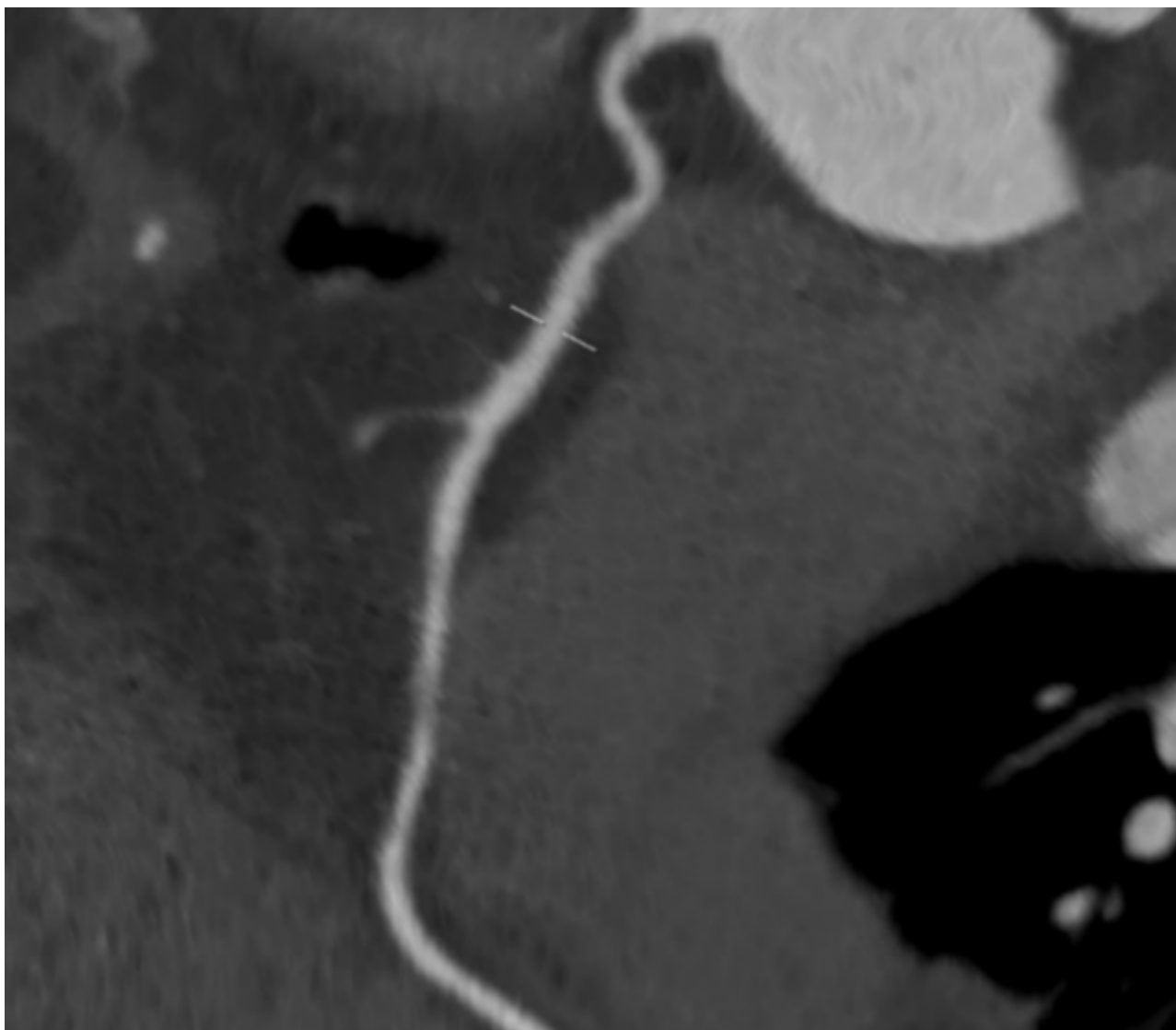
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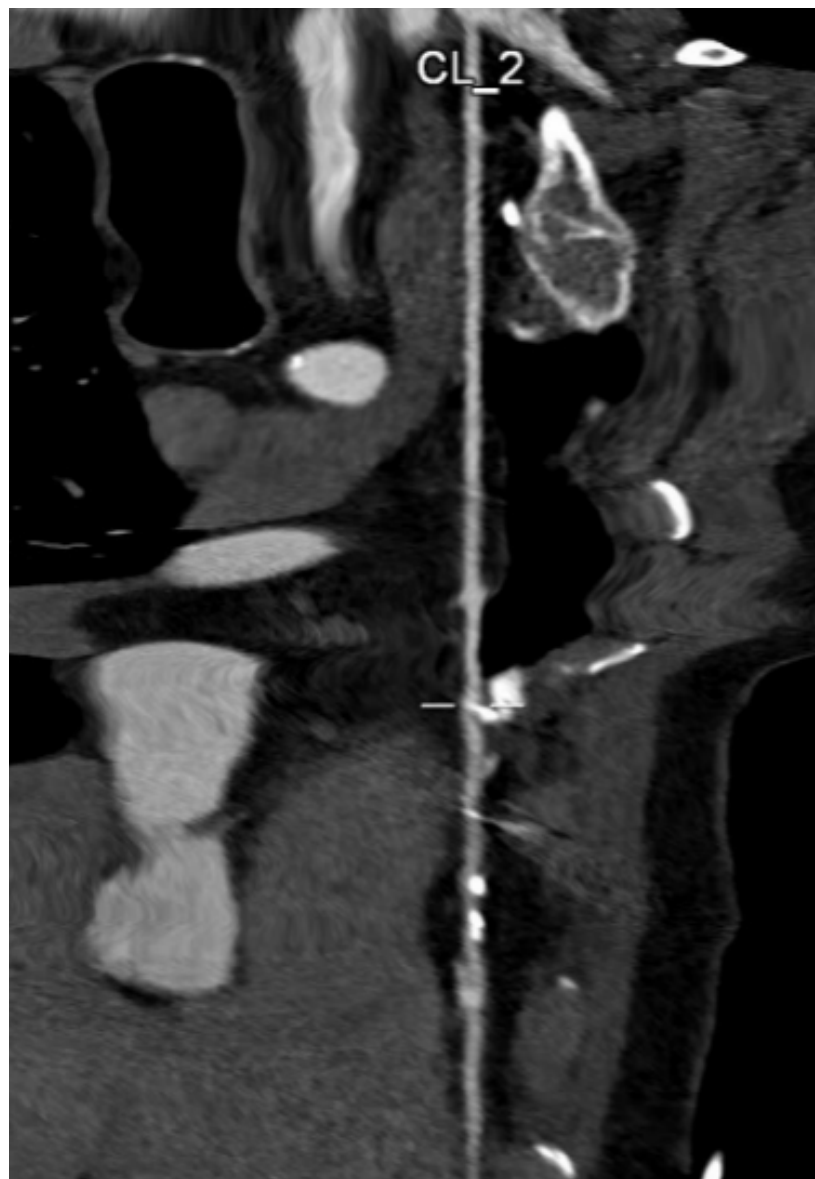
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independently from clinical variables.⁶⁴ Moreover, overwhelming evidence supports the excellent mid-term and long-term prognosis after a negative cardiac CT examination, with an average annualized rate of major cardiac events as low as 0.21%.^{65,66} This emphasizes a clinical value of cardiac CT for identification of patients with absence of coronary atherosclerotic plaques in whom no further additional testing and/or therapy is necessary or indicated.

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which allows evaluating even small vascular structures.¹⁰⁸ Several observational studies have evaluated the utility of a “double rule-out” or “triple rule-out” protocol for assessing aortic, pulmonary or cardiac sources of chest pain in the same examination

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Table 12 Characteristics of tests commonly used to diagnose the presence of coronary artery disease

	Diagnosis of CAD	
	Sensitivity (%)	Specificity (%)
Exercise ECG ^{a, %}	45–50	85–90
Exercise stress echocardiography ^a	80–85	80–88
Exercise stress SPECT ^{a, %}	73–92	63–87
Dobutamine stress echocardiography ^a	79–83	82–86
Dobutamine stress MRI ^{b, 100}	79–88	81–91
Vasodilator stress echocardiography ^a	72–79	92–95
Vasodilator stress SPECT ^{a, %}	90–91	75–84
Vasodilator stress MRI ^{b, %, 100–102}	67–94	61–85
Coronary CTA ^{c, 103–105}	95–99	64–83
Vasodilator stress PET ^{a, %, 106}	81–97	74–91

CAD – coronary artery disease; CTA – computed tomography angiography; ECG – electrocardiogram; MRI – magnetic resonance imaging; PET – positron emission tomography; SPECT – single photon emission computed tomography.

^a Results without/minimal referral bias.

^b Results obtained in populations with medium-to-high prevalence of disease without compensation for referral bias.

^c Results obtained in populations with low-to-medium prevalence of disease.

■ Limiti tecnici:

- ❑ FC (ed extrasistoli)
- ❑ Artefatti da presenza di calcio o metalli (effetto blooming)

-
- Somministrazione di mdc
 - Dose radiante
-

- Probabilità pre-test lieve-moderata (15-85%) di coronaropatia
- FC non elevata e regolare (attenzione alle extrasistoli!)
- Paziente collaborante
- GFR > 30 ml/min
- Attenzione alle allergie

DIAMOND AND FORRESTER SCORE

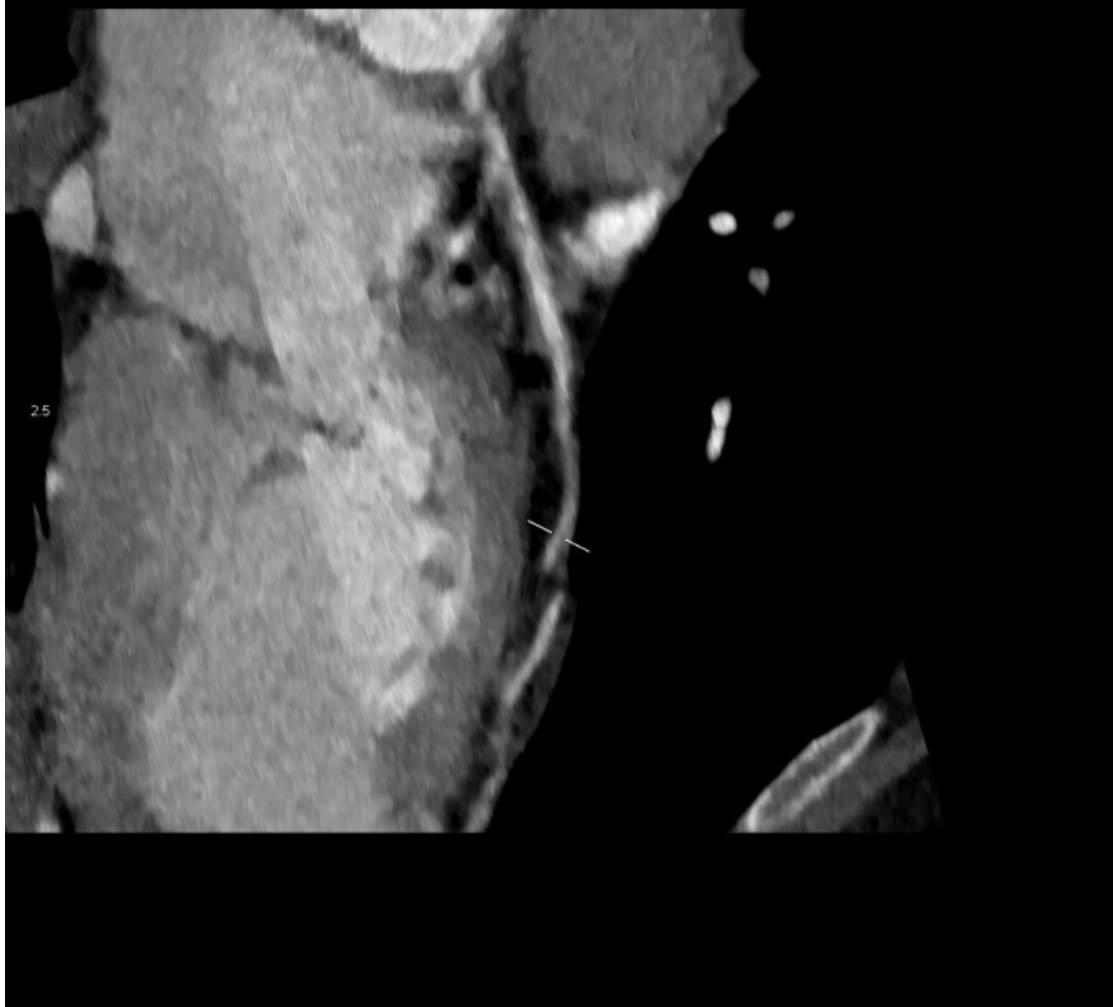
- Typical Angina:
 - Age 30-39: 76% likelihood (intermediate) in men and 26% in women (intermediate)
 - Age 40-49: 87% likelihood (high) in men and 55% in women (intermediate)
 - Age 50-59: 93% likelihood (high) in men and 73% in women (intermediate)
 - Age 60-69: 94% likelihood (high) in men and 86% in women (high)
- Atypical Angina:
 - Age 30-39: 34% likelihood (intermediate) in men and 12% in women (low)
 - Age 40-49: 51% likelihood (intermediate) in men and 22% in women (low)
 - Age 50-59: 65% likelihood (intermediate) in men and 31% in women (intermediate)
 - Age 60-69: 72% likelihood (intermediate) in men and 51% in women (intermediate)
- Non-Anginal Chest Pain:
 - Age 30-39: 4% likelihood (low) in men and 2% in women (low)
 - Age 40-49: 13% likelihood (intermediate) in men and 3% in women (low)
 - Age 50-59: 20% likelihood (intermediate) in men and 7% in women (low)
 - Age 60-69: 27% likelihood (intermediate) in men and 14% in women (intermediate)
- No criteria present
 - Risk is low to very low for both men and women







LAD



■ FC ideale < 65 bpm

calcium score (e.g. Agatston score <400) and distribution, in sinus rhythm and with a heart rate of 65 beats per minute (b.p.m.) or less (preferably 60 b.p.m. or less), should be considered for coronary CTA.¹¹¹ If necessary, the use of short-acting β -blockers or other heart rate-lowering medication is recommended.

2013 ESC guidelines on the management of stable coronary artery disease

3.4 ± 1.3 mSv, while a lower dose (2.4 ± 0.9 mSv) was measured for padding of 80 ms. In a segment-based analysis, coronary assessability was significantly higher ($P < 0.0001$) with MC (97%) when compared with standard (STD) reconstruction (81%) due to a significant reduction ($P < 0.0001$) in severe artefacts (54 vs. 356 cases, respectively). An artefact sub-analysis showed significantly lower number of motion artefacts and artefacts related to chest movement with MC (16 and 4 cases) than with STD reconstruction (286 and 24 cases, $P < 0.0001$ and $P < 0.05$, respectively). The number of coronary segments ranked among those of excellent image quality was significantly higher with MC ($P < 0.001$).

Andreini et al, *Low-dose CT coronary angiography with a novel IntraCycle motion-correction algorithm in patients with high heart rate or heart rate variability*. Eur Heart J Cardiovasc Imaging 2015

- Esame rapido e non invasivo
- Poche controindicazioni
- Alta sensibilità
- Alto VPN (-> prognosi)

- Fondamentali la selezione e la preparazione del paziente
 - Riduzione degli artefatti
 - Aumento della specificità dell'esame
 - Abbattimento della dose radiante

GRAZIE!