Congresso Nazionale
dei Medici di Bordo
della Marina Mercantile

1 Dicembre 2012
Genova, Hotel Holiday Inn

Programma preliminare

LA DIFFICILE GESTIONE DEL PAZIENTE CON IMA a BORDO

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Third universal definition of myocardial infarction

Kristian Thygesen, Joseph S. Alpert, Allan S. Jaffe, Maarten L. Simoons, Bernard R. Chaitman and Harvey D. White: the Writing Group on behalf of the Joint ESC/ACCF/AHA/WHF Task Force for the Universal Definition of Myocardial Infarction

Definition of myocardial infarction

Criteria for acute myocardial infarction

The term acute myocardial infarction (MI) should be used when there is evidence of myocardial necrosis in a clinical setting consistent with acute myocardial ischaemia. Under these conditions any one of the following criteria meets the diagnosis for MI:

- Detection of a rise and/or fall of cardiac biomarker values [preferably cardiac troponin (cTn)] with at least one value above the 99th percentile upper reference limit (URL) and with at least one of the following:
  - Symptoms of ischaemia.
  - New or presumed new significant ST-segment–T wave (ST–T) changes or new left bundle branch block (LBBB).
  - Development of pathological Q waves in the ECG.
  - Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality.
  - Identification of an intracoronary thrombus by angiography or autopsy.

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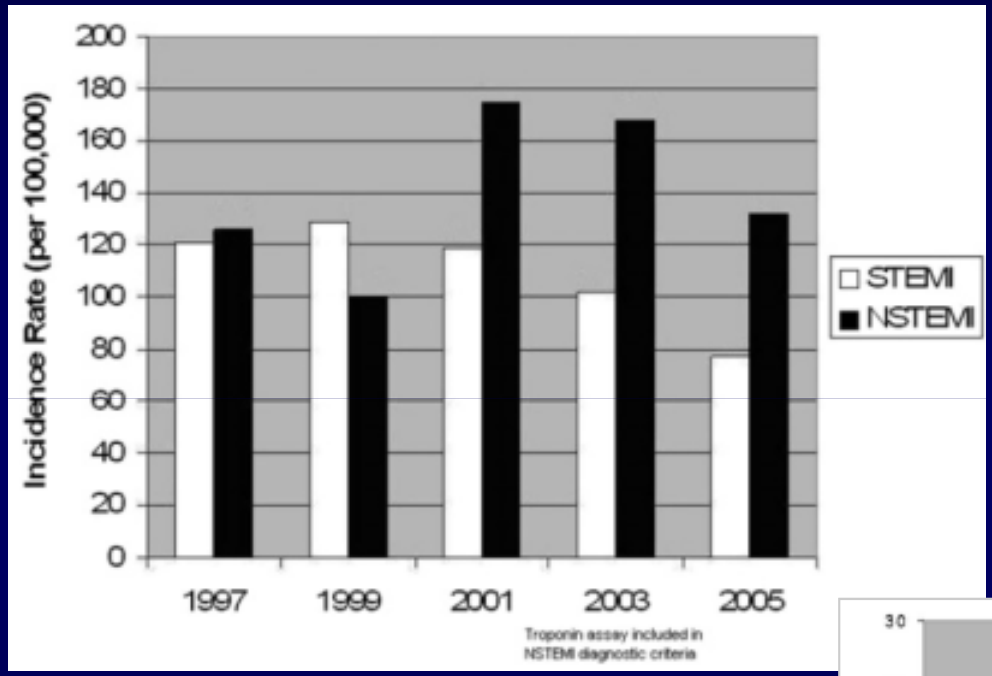
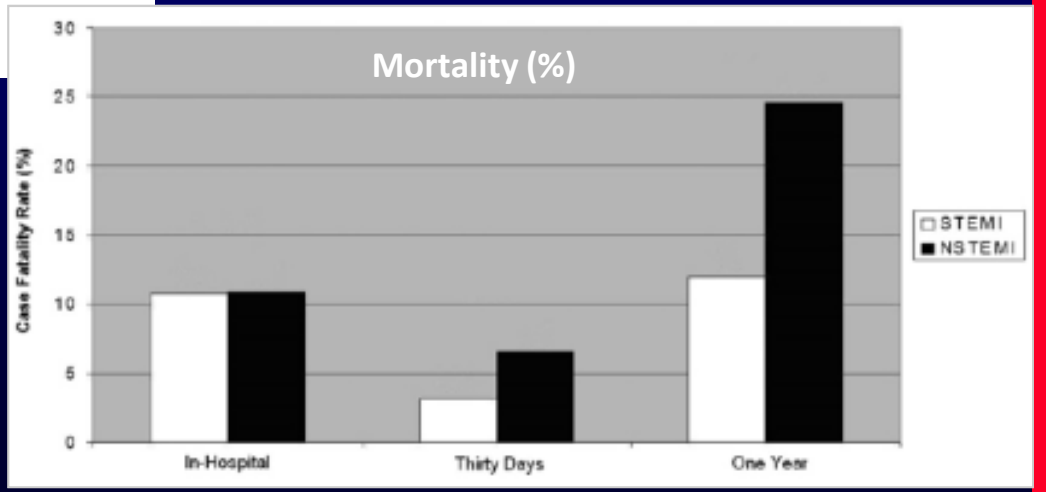
European Heart Journal (2012) **33**, 2551–2567
doi:10.1093/eurheartj/ehs184

Recent Trends in the Incidence, Treatment, and Outcomes of Patients with STEMI and NSTEMI



THE AMERICAN JOURNAL of MEDICINE®

Worcester Heart Attack Study
5383 patients



Mc Manus D et al., Am J Med 2011

Caratteristiche basali

	STEMI (5854)	NSTEMI (5852)	p
Sesso femminile	1600 (27,3%)	1957 (33,4%)	< 0,0001
Età media donne	73 ± 13	74 ± 11	0,0001
Età media uomini	63 ± 13	68 ± 12	<0,0001
Fumo	2273 (38,8)	1443 (24,7)	<0,0001
Ipertensione trattata	3121 (53,3)	3930 (67,2)	<0,0001
Iperdislipidemia trattata	1905 (32,5)	2329 (39,8)	<0,0001
Diabete trattato	1187 (20,3)	1790 (30,6)	<0,0001
Pregresso IMA	481 (8,2)	1012 (17,3)	<0,0001
IRC nota	276 (4,7)	694 (11,9)	<0,0001

CGF in emergenza + elettiva

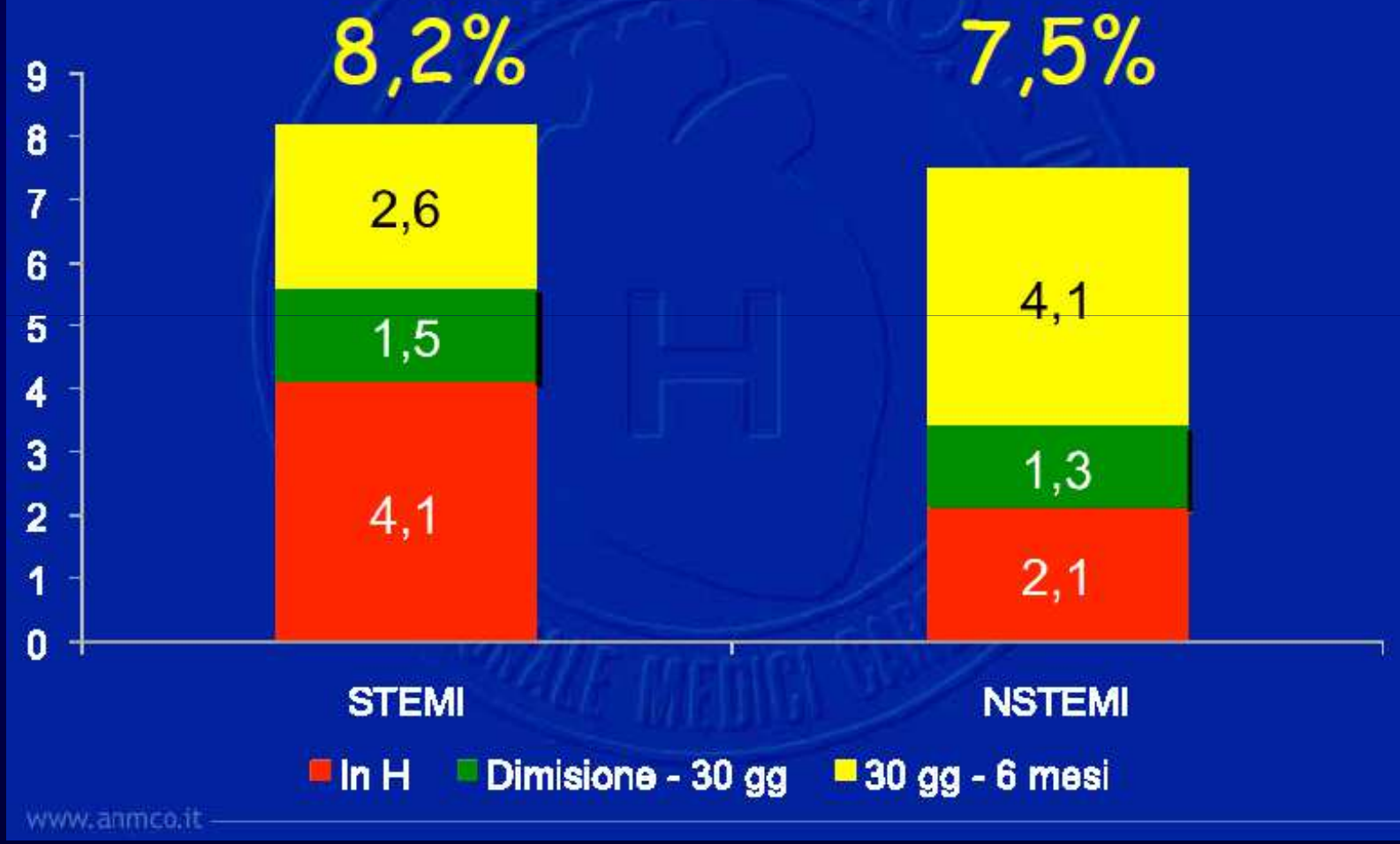
STEMI	NSTEMI
92,5%	85%

RIVASCOLARIZZAZIONE in pz con CGF

	STEMI	NSTEMI
PCI	94%	67%
CABG	4,9%	12,2%

Mortalità complessiva al fup a 6 mesi

InH su tutti i pz, a 30 gg e a 6 mesi su quelli con dato disponibile



Dolore toracico
Definizione

Per **dolore toracico acuto non traumatico** si intende qualsiasi dolore, regredito o in atto, potenzialmente di origine cardiovascolare dal mento all'ombelico.

- La sede del dolore non sempre corrisponde alla sua origine.
- La correlazione tra intensità del dolore e gravità della patologia che lo provoca è scarsa.
- Il dolore può essere causato da patologie gravi ma curabili.

I walk into the room and what do I see?

vs.

"The Big Five"

Five life-threatening causes of Chest Pain

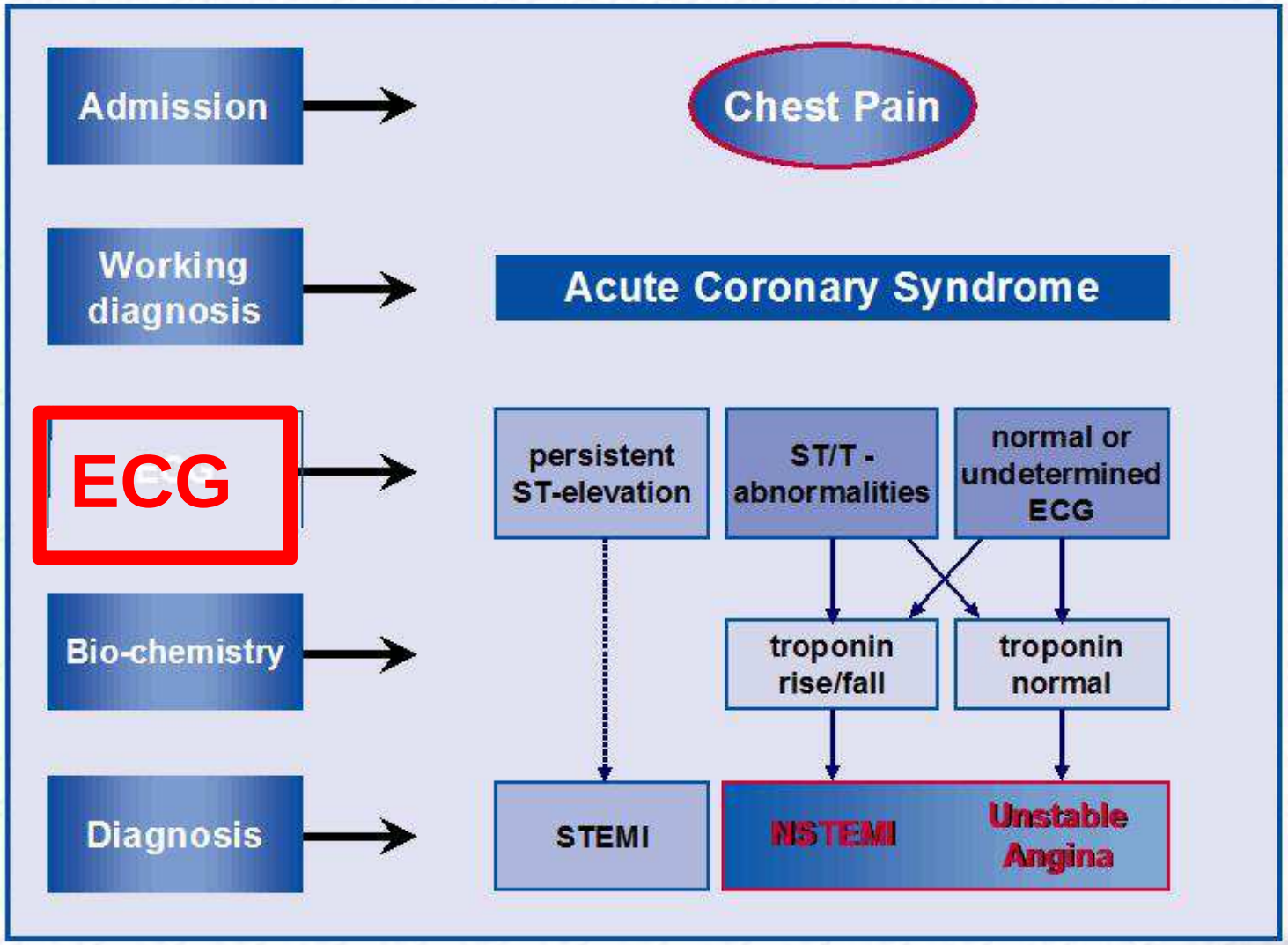
Acute coronary syndrome

Aortic dissection

Pulmonary Embolism

Tension Pneumothorax

Esophageal Rupture



European Heart Journal (2011) 32:2999–3054
doi:10.1093/eurheartj/ehr236

www.escardio.org/guidelines

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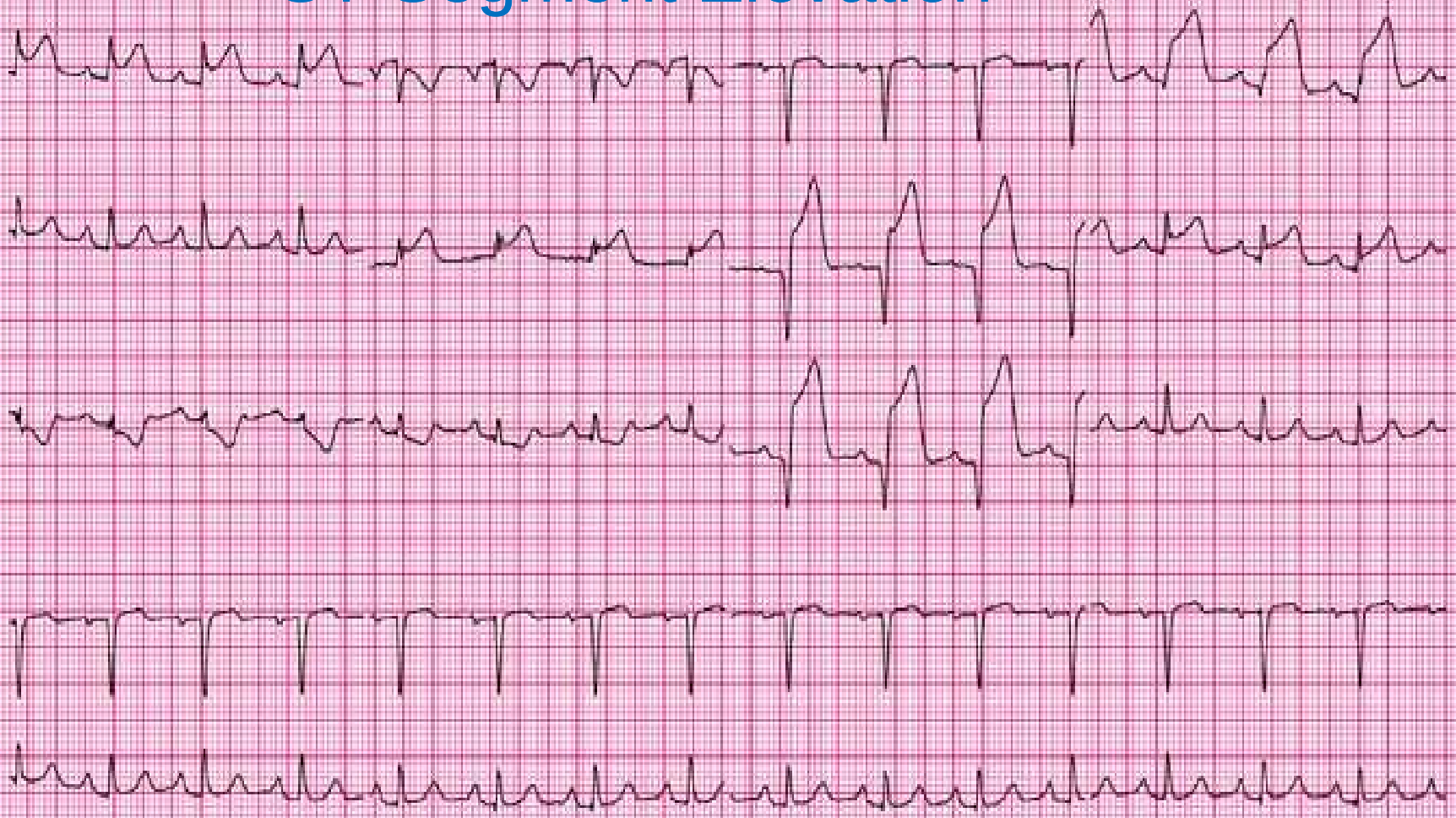
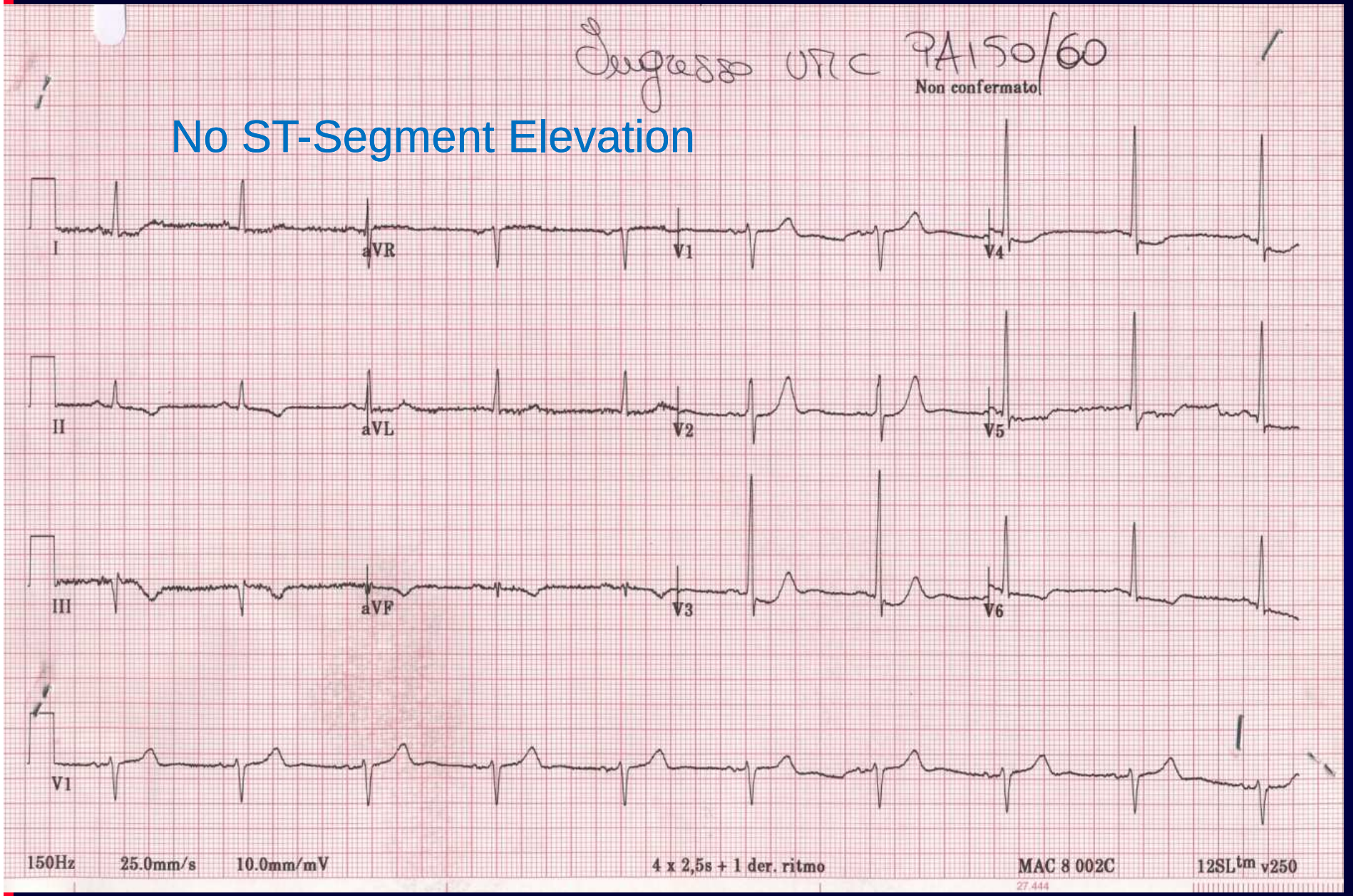
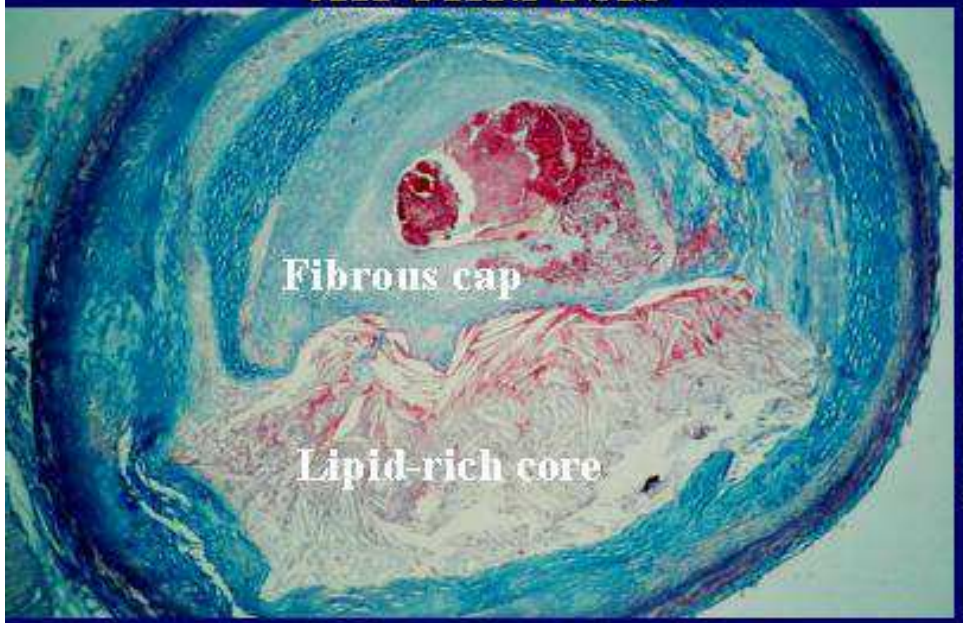
ST-Segment Elevation

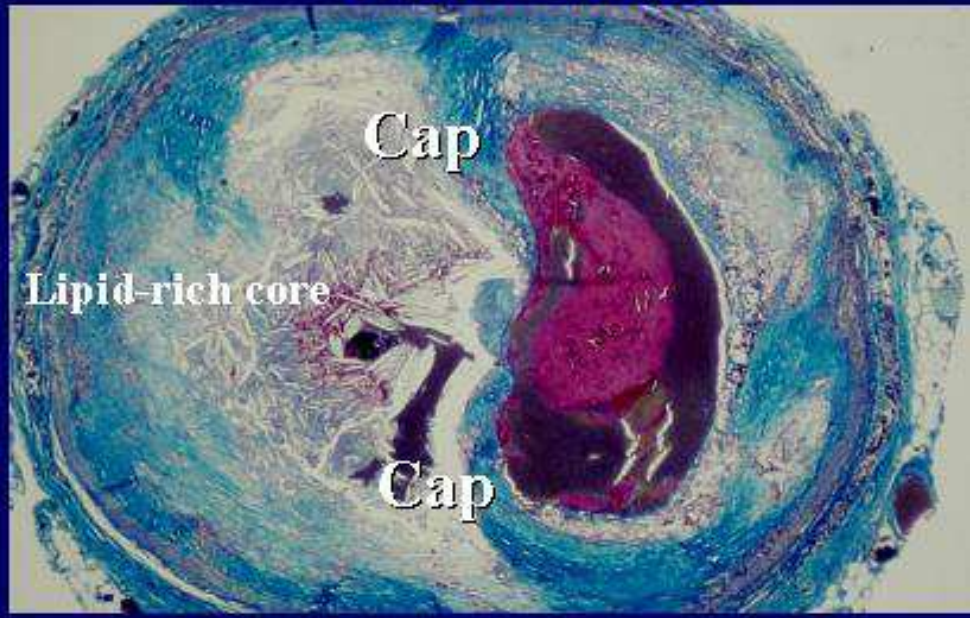


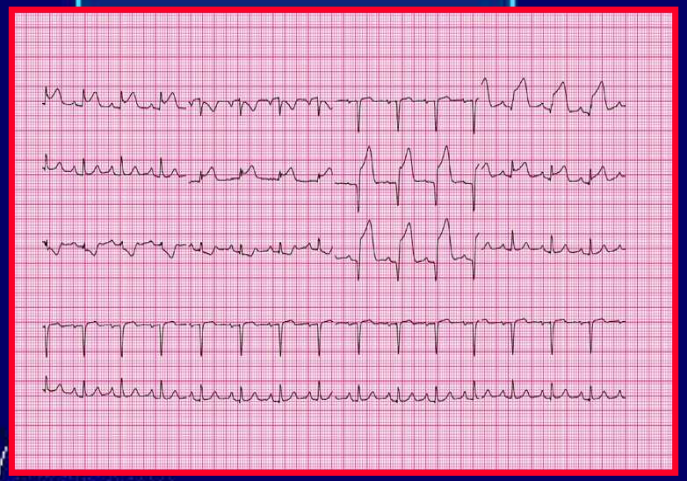

Ingresso UTIC PA 150/60
Non confermato
No ST-Segment Elevation
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
V1
150Hz
25.0mm/s
10.0mm/mV
4 x 2,5s + 1 der. ritmo
MAC 8 002C
12SL tm v250

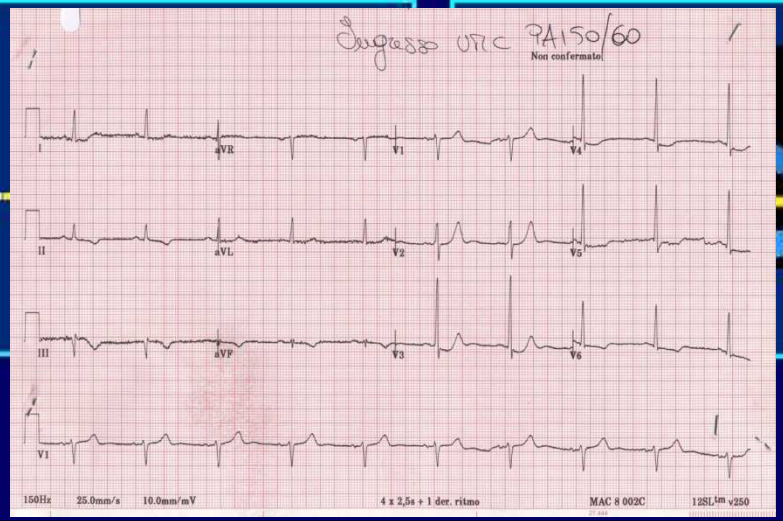
Occlusive thrombosis



Non-occl. thrombosis







Courtesy

Table 5 Common ECG pitfalls in diagnosing myocardial infarction

False positives
• Early repolarization
• LBBB
• Pre-excitation
• J point elevation syndromes, e.g. Brugada syndrome
• Peri-/myocarditis
• Pulmonary embolism
• Subarachnoid haemorrhage
• Metabolic disturbances such as hyperkalaemia
• Cardiomyopathy
• Lead transposition
• Cholecystitis
• Persistent juvenile pattern
• Malposition of precordial ECG electrodes
• Tricyclic antidepressants or phenothiazines
False negatives
• Prior MI with Q-waves and/or persistent ST elevation
• Right ventricular pacing
• LBBB

Sindrome coronarica acuta / Infarto miocardico acuto a bordo:

1. Riconoscimento precoce ……..
2. Stabilizzazione / monitoraggio / I° terapia
3. Gestione delle complicanze improvvise
4. Trasferimento in struttura idonea

Recommendations for diagnosis and risk stratification (1)

Recommendations	Class	Level
In patients with a suspected NSTE-ACS, diagnosis and short-term ischaemic/bleeding risk stratification should be based on a combination of clinical history, symptoms, physical findings, ECG (repeated or continuous ST monitoring), and biomarkers.	I	A
ACS patients should be admitted preferably to dedicated **chest pain units or coronary care units.**	I	C
It is recommended to use established risk scores **for prognosis and bleeding (e.g. GRACE, CRUSADE).**	I	B
A 12-lead ECG should be obtained within 10 min after first medical contact and immediately read by an experienced physician. This should be repeated in the case of recurrence of symptoms, and after 6–9 and 24 h, and before hospital discharge.	I	B
Additional ECG leads (V_3R, V_4R, V_7–V_9) are recommended when routine leads are inconclusive.	I	C

www.escardio.org/guidelines

European Heart Journal (2011) 32:2999–3054
doi:10.1093/eurheartj/ehr236

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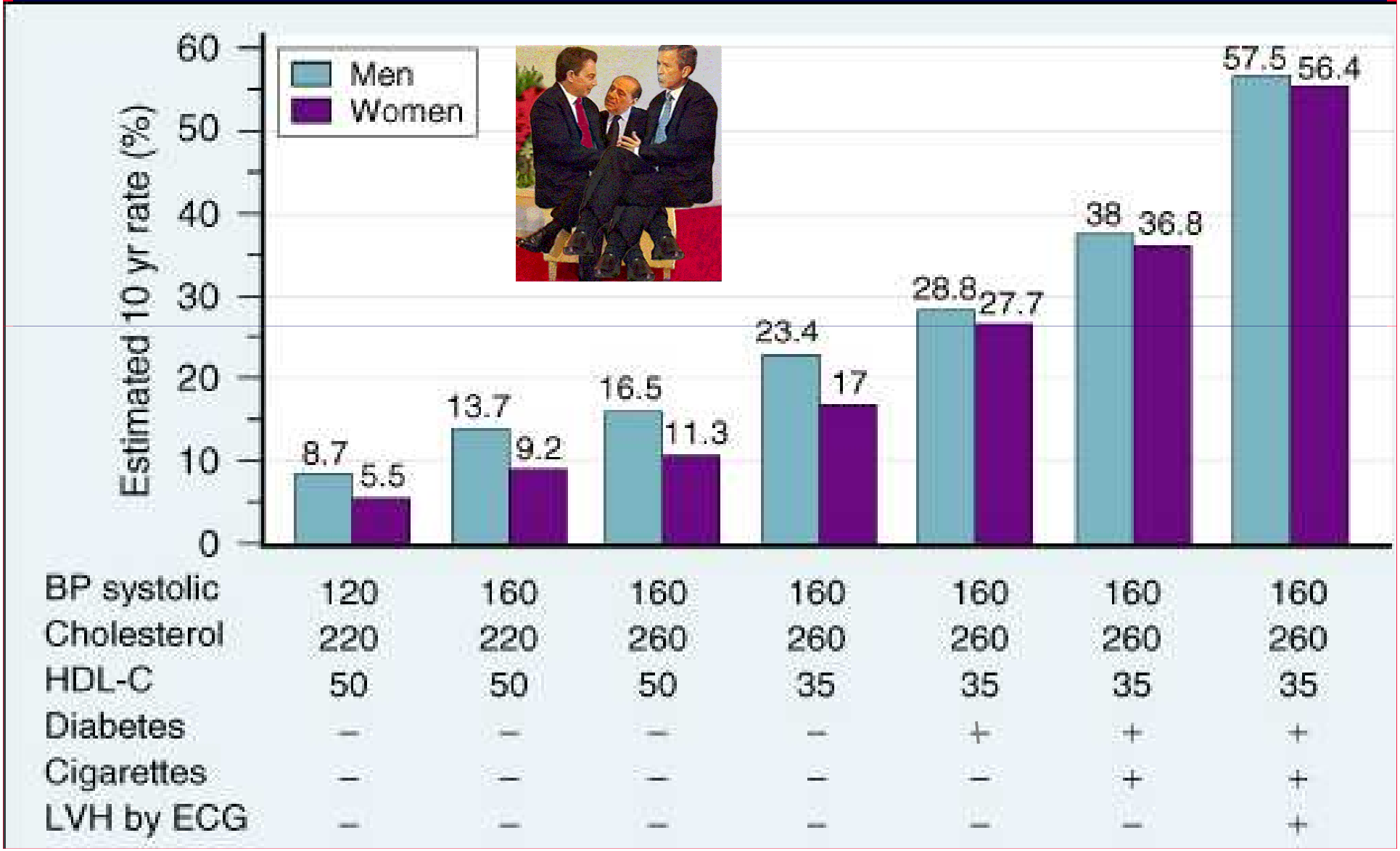
Diagnosi ……

In patients with a suspected NSTE-ACS, diagnosis and short-term ischaemic/ bleeding risk stratification should be based on a combination of clinical history, symptoms, physical findings, ECG (repeated or continuous ST monitoring), and biomarkers.

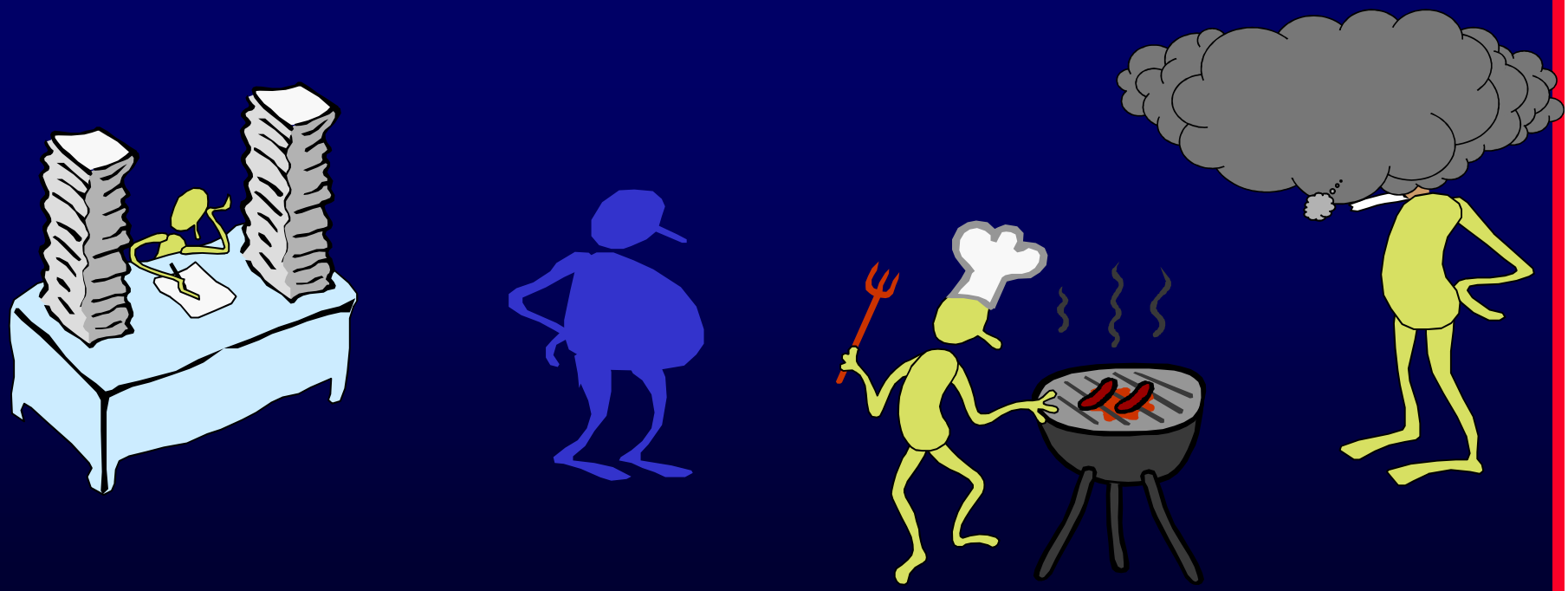
- ***Storia clinica (profilo di rischio, prevalenza di malattia)***
- ***Sintomi ---tipici ---atipici --sospetti***
- ***Eame obiettivo***
- ***ECG***
- ***Biomarkers (troponine normali, mosse)***

Incidenza non cumulativa ma moltiplicativa di rischio

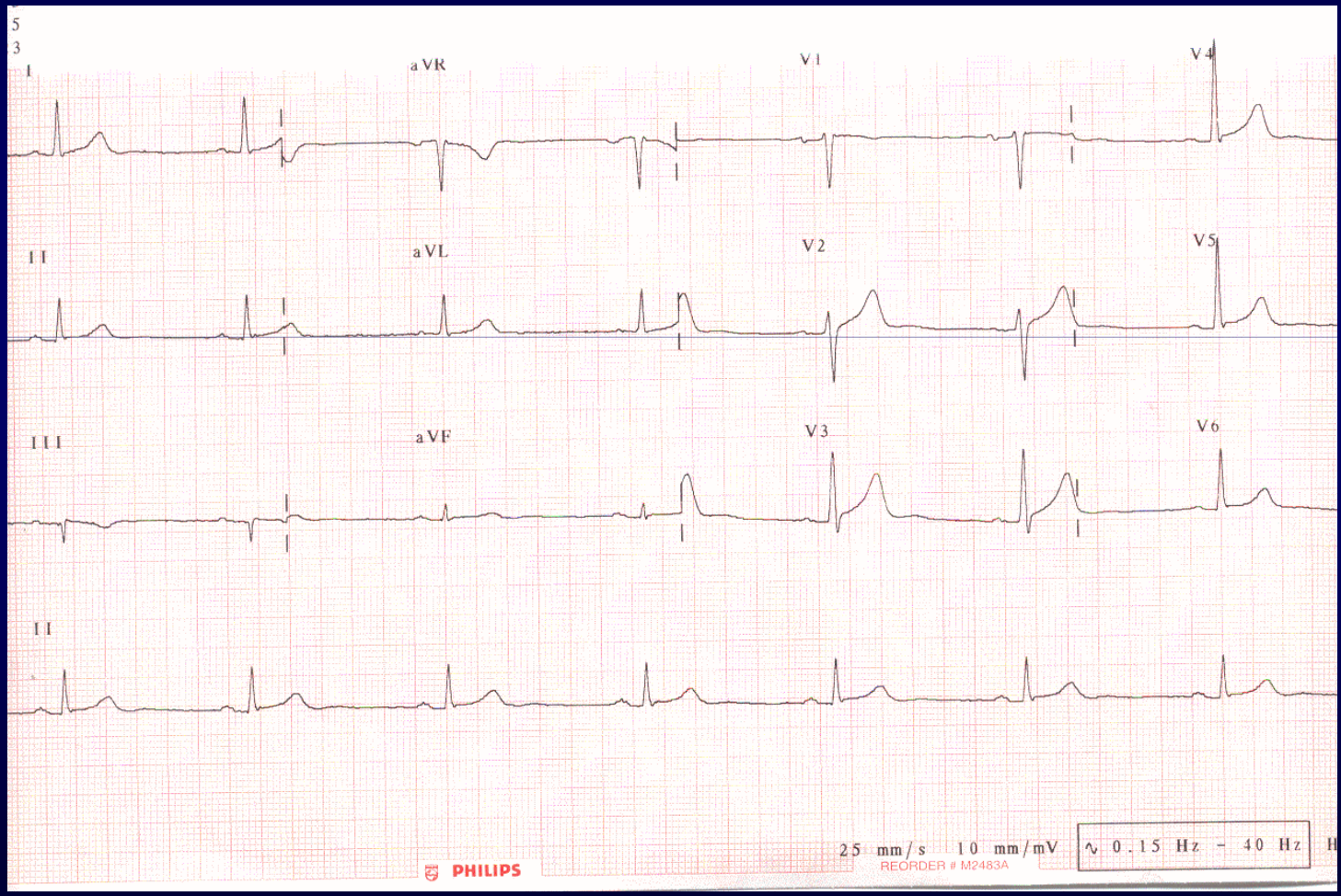


Il paziente ad alto rischio

La presenza di più fattori di rischio produce una incidenza di eventi cardiovascolari non cumulativa ma moltiplicativa.



Maschio, 60 aa, razza bianca, iperteso con PA domiciliare intorno a 160 /90 , diabetico NID, fumatore. A visita per toracoalgia apparentemente tipica



Carta italiana del rischio cardiovascolare

Uomini diabetici (rischio cardiovascolare a 10 anni)

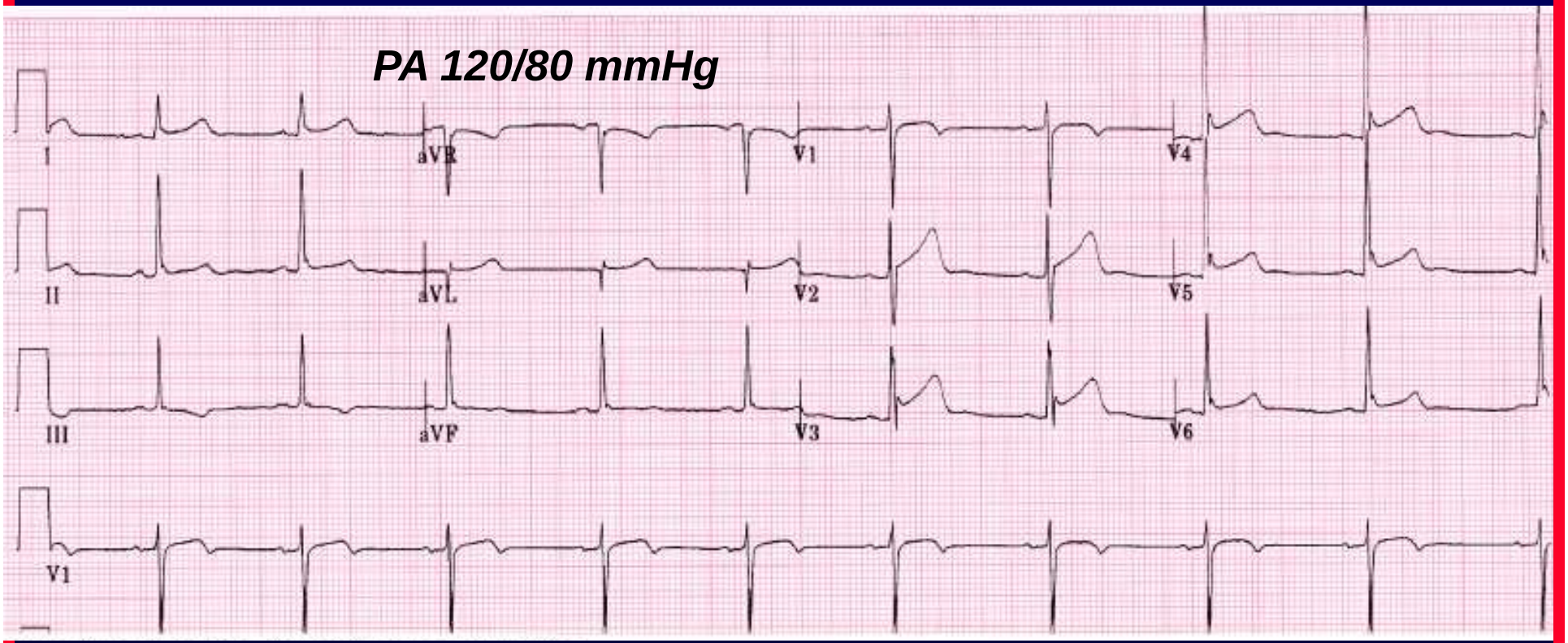
ALTO RISCHIO !!!

> 30% a 10 aa

ISS, 2004

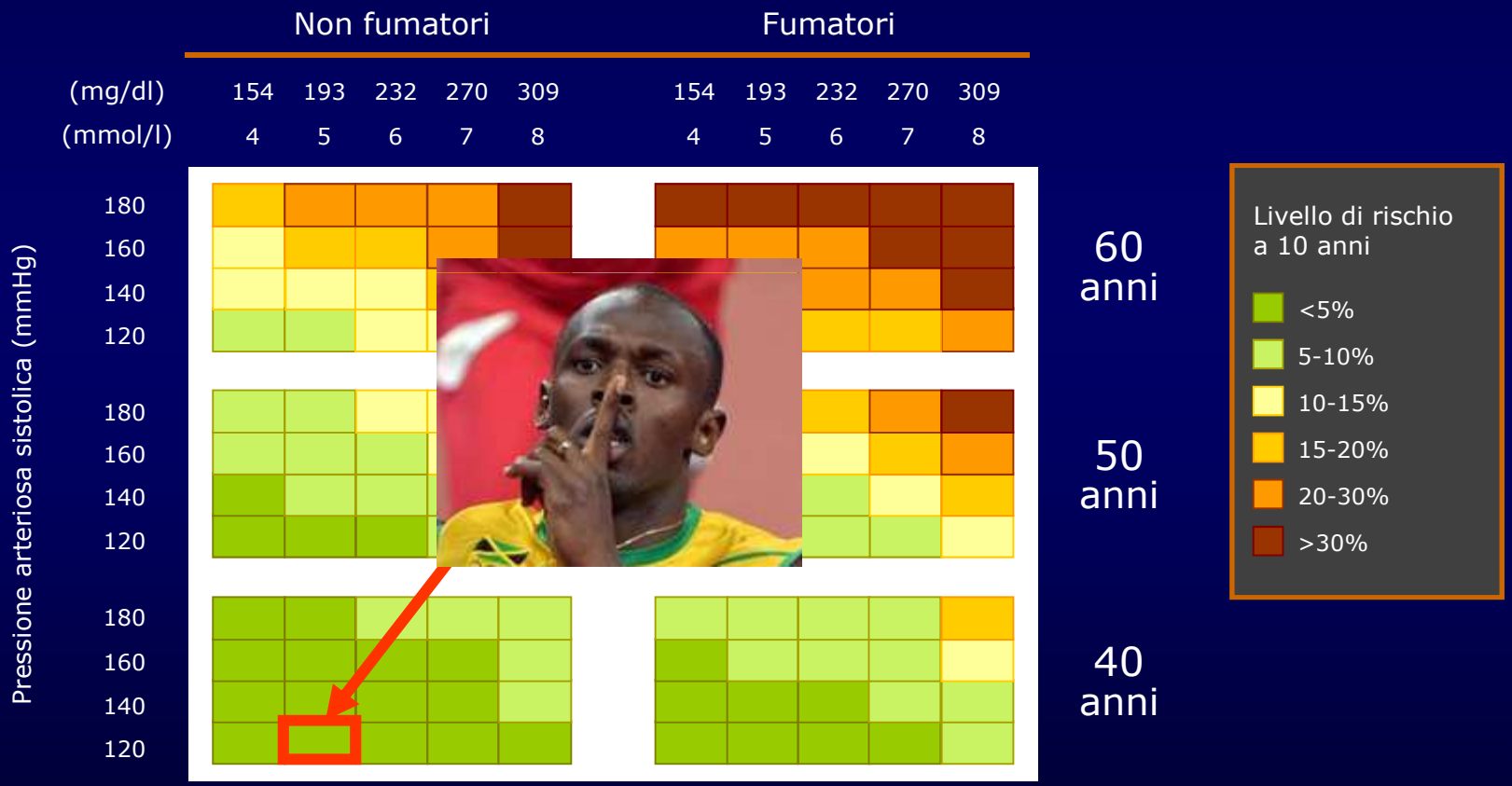
Maschio 30 aa razza nera, non familiarità nè fumo . Chol 170 mg/dl HDL 70 mg/dl Nessun altro fattore di rischio. A visita per dispnea sospirosa

PA 120/80 mmHg



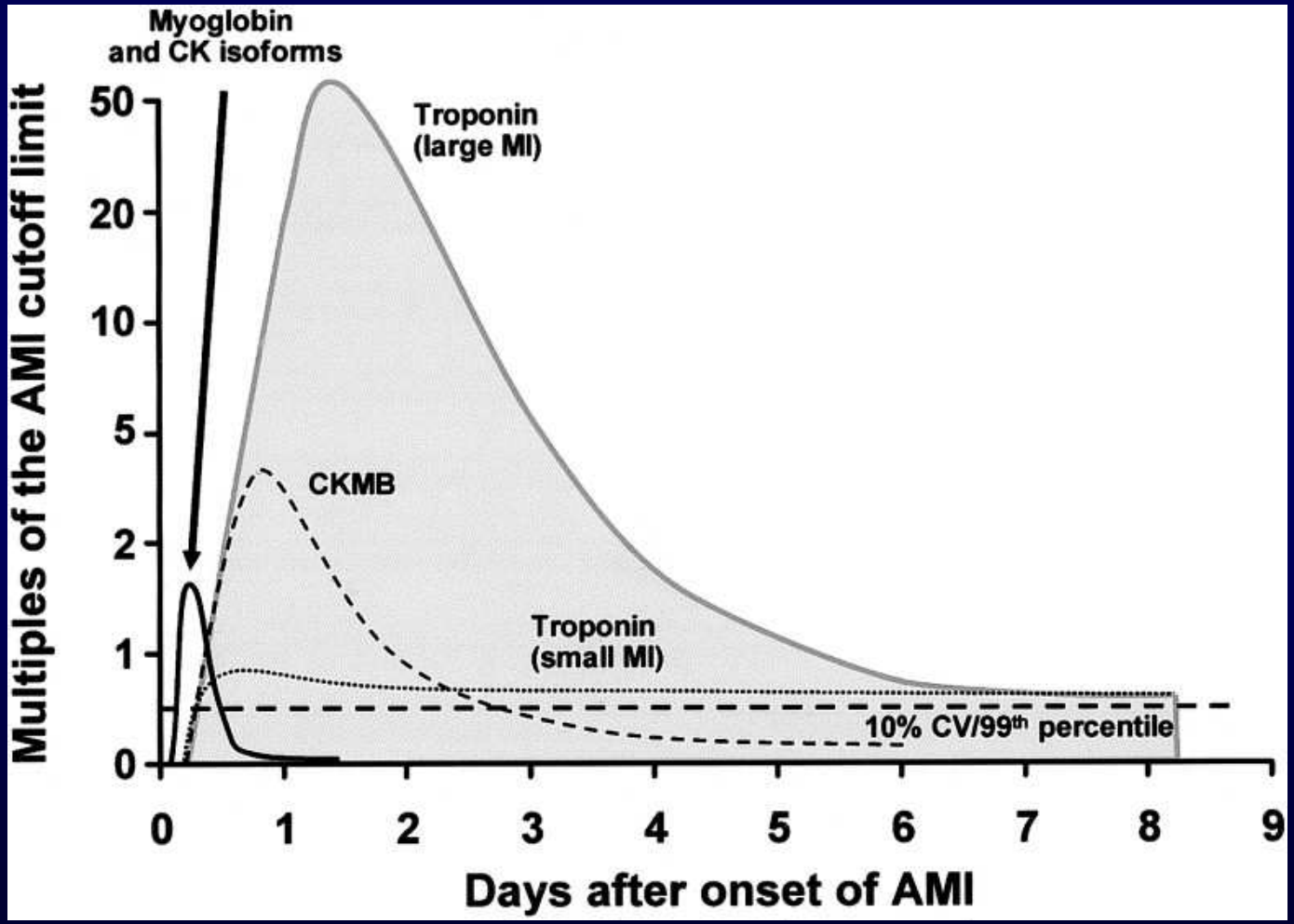
30 aa razza nera, non familiarità nè fumo . Chol Normal HDL 70 Nessun altro fattore di rischio A visita per dispnea sospirosa

Uomini non diabetici (rischio cardiovascolare a 10 anni)



ISS, 2004

L’innalzamento delle TNI inizia tra 2 e 4 ore dopo l’inizio dei sintomi.



Third universal definition of myocardial infarction

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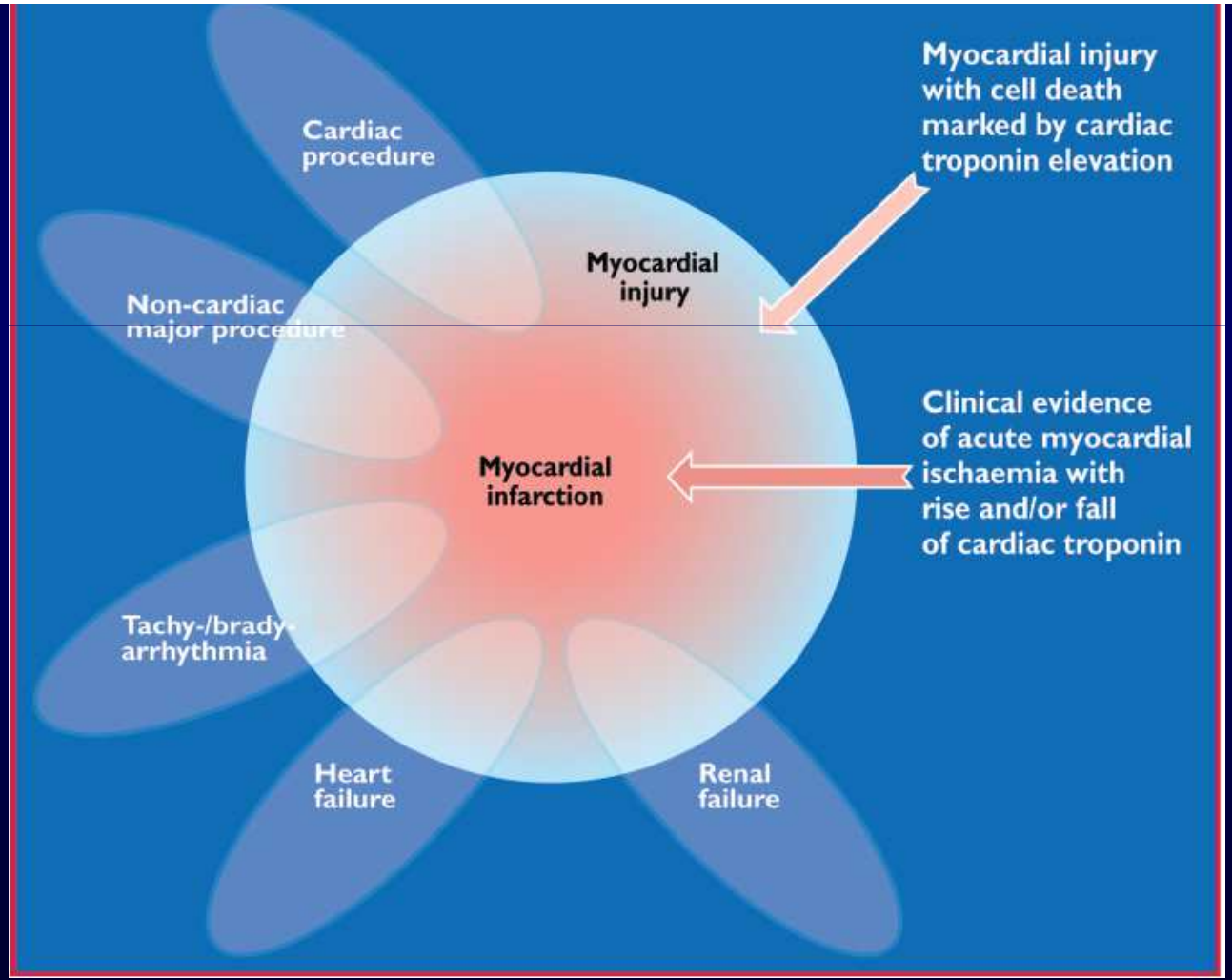

Table I Elevations of cardiac troponin values because of myocardial injury

Injury related to primary myocardial ischaemia
Plaque rupture Intraluminal coronary artery thrombus formation
Injury related to supply/demand imbalance of myocardial ischaemia
Tachy-/brady-arrhythmias Aortic dissection or severe aortic valve disease Hypertrophic cardiomyopathy Cardiogenic, hypovolaemic, or septic shock Severe respiratory failure Severe anaemia Hypertension with or without LVH Coronary spasm Coronary embolism or vasculitis Coronary endothelial dysfunction without significant CAD
Injury not related to myocardial ischaemia
Cardiac contusion, surgery, ablation, pacing, or defibrillator shocks Rhabdomyolysis with cardiac involvement Myocarditis Cardiotoxic agents, e.g. anthracyclines, herceptin
Multifactorial or indeterminate myocardial injury
Heart failure Stress (Takotsubo) cardiomyopathy Severe pulmonary embolism or pulmonary hypertension Sepsis and critically ill patients Renal failure Severe acute neurological diseases, e.g. stroke, subarachnoid haemorrhage Infiltrative diseases, e.g. amyloidosis, sarcoidosis Strenuous exercise

Recommendations for diagnosis and risk stratification (1)

It is recommended to use established risk scores **for prognosis and bleeding (e.g. GRACE, CRUSADE).**

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European Heart Journal (2012) **33**, 2551–2567
doi:10.1093/eurheartj/ehs184

RISK Score

➔ Strumento (statisticamente derivato) per stimare il rischio clinico al fine di scegliere la miglior strategia

GRACE™
GLOBAL REGISTRY OF ACUTE CORONARY EVENTS

Countries	30
Hospitals	247
Patients	102,341

TIMI STUDY GROUP
An Academic Research Organization of Brigham and Women's Hospital and Harvard Medical School

- Derivato da TIMI 11B ed ESSENCE; validato in TIMI 3B, TACTICS-TIMI 18, MERLIN-TIMI 36,CURE.

CRUSADE
Bleeding Score Calculator

- 89,000 Pts da "real-world"

TIMI STUDY GROUP

An Academic Research Organization of Brigham and Women's Hospital and Harvard Medical School

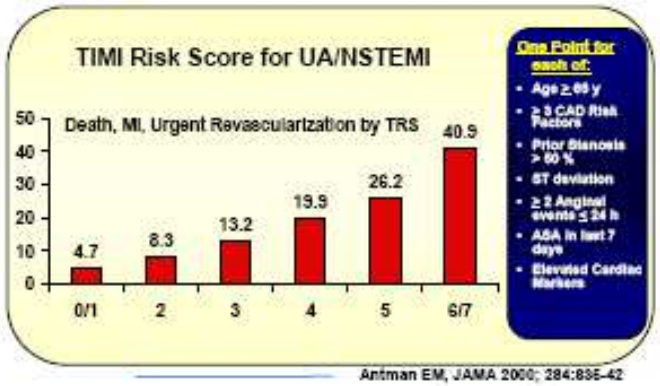
GRACE™ GLOBAL REGISTRY OF ACUTE CORONARY EVENTS

TIMI Risk Score Calculator

Age ≥ 65 years?	☐ Yes (+1)
≥ 3 Risk Factors for CAD?	☐ Yes (+1)
Known CAD (stenosis ≥ 50%)?	☐ Yes (+1)
ASA Use in Past 7d?	☐ Yes (+1)
Severe angina (≥ 2 episodes w/in 24 hrs)?	☐ Yes (+1)
ST changes ≥ 0.5mm?	☐ Yes (+1)
+ Cardiac Marker?	☐ Yes (+1)

Score: 0 points

TIMI 11B



Antman EM, JAMA 2000; 284:835-42

In Hospital

- Età
- FC
- Pressione Sistolica
- Creatinina
- Killip Class
- Arresto Cardiaco
- Deviazione ST
- Enzimi

6 Mesi

- Età
- FC
- Pressione Sistolica
- Creatinina
- Scompenso
- IMA
- Deviazione ST
- Enzimi
- PCI in ricovero

Risk category (tertile)	GRACE risk score	In-hospital death (%)
Low	≤108	<1
Intermediate	109–140	1–3
High	>140	>3
Risk category (tertile)	**GRACE risk score**	**Post-discharge to 6-month death (%)**
Low	≤88	<3
Intermediate	89–118	3-8
High	>118	>8

Medical History

① Age in Years	Points
≤29	0
30-39	0
40-49	18
50-59	36
60-69	55
70-79	73
80-89	91
≥90	100

② History of Congestive Heart Failure	24
③ History of Myocardial Infarction	12

Findings at Initial Hospital Presentation

④ Resting Heart Rate, beats/min	Points
≤49.9	0
50-69.9	3
70-89.9	9
90-109.9	14
110-149.9	23
150-199.9	35
≥200	43

⑤ Systolic Blood Pressure, mm HG	
≤79.9	24
80-99.9	22
100-119.9	18
120-139.9	14
140-159.9	10
160-199.9	4
≥200	0

⑥ ST-Segment Depression	11

Findings During Hospitalization

⑦ Initial Serum Creatinine, mg/dL	Points
0-0.39	1
0.4-0.79	3
0.8-1.19	5
1.2-1.59	7
1.6-1.99	9
2-3.99	15
≥4	20

⑧ Elevated Cardiac Enzymes	15
⑨ No In-Hospital Percutaneous Coronary Intervention	14

Σ=112

GRACE™
GLOBAL REGISTRY OF ACUTE CORONARY EVENTS

In pratica ……..

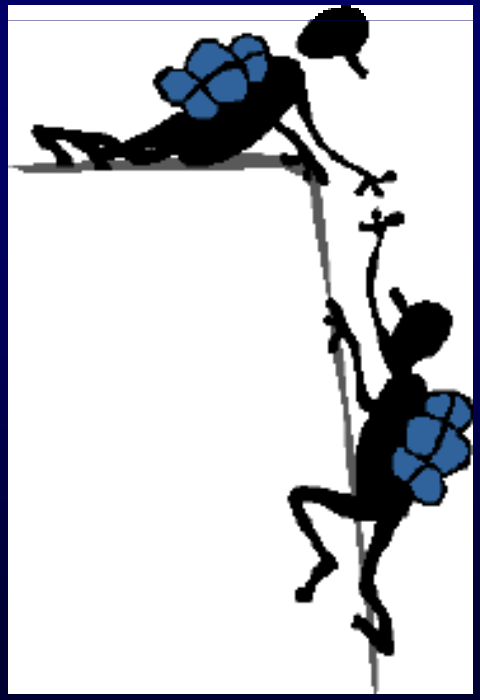
Il pz deve essere:

- *Portato in infermeria e messo in barella / letto*
- *Accurata anamnesi*
- *Effettuati ECG visita e Controllo parametri vitali*
- *Monitorizzato (in vicinanza defibrillatore) e assistito /accesso venoso*
- *Stima del rischio*
- *Inizio dei farmaci utili nella sindrome coronarica acuta*

FARMACI NELL'EMERGENZA CARDIOLOGICA

Nel dolore toracico di tipo ischemico, diamo al paziente una

M. A. N. O.



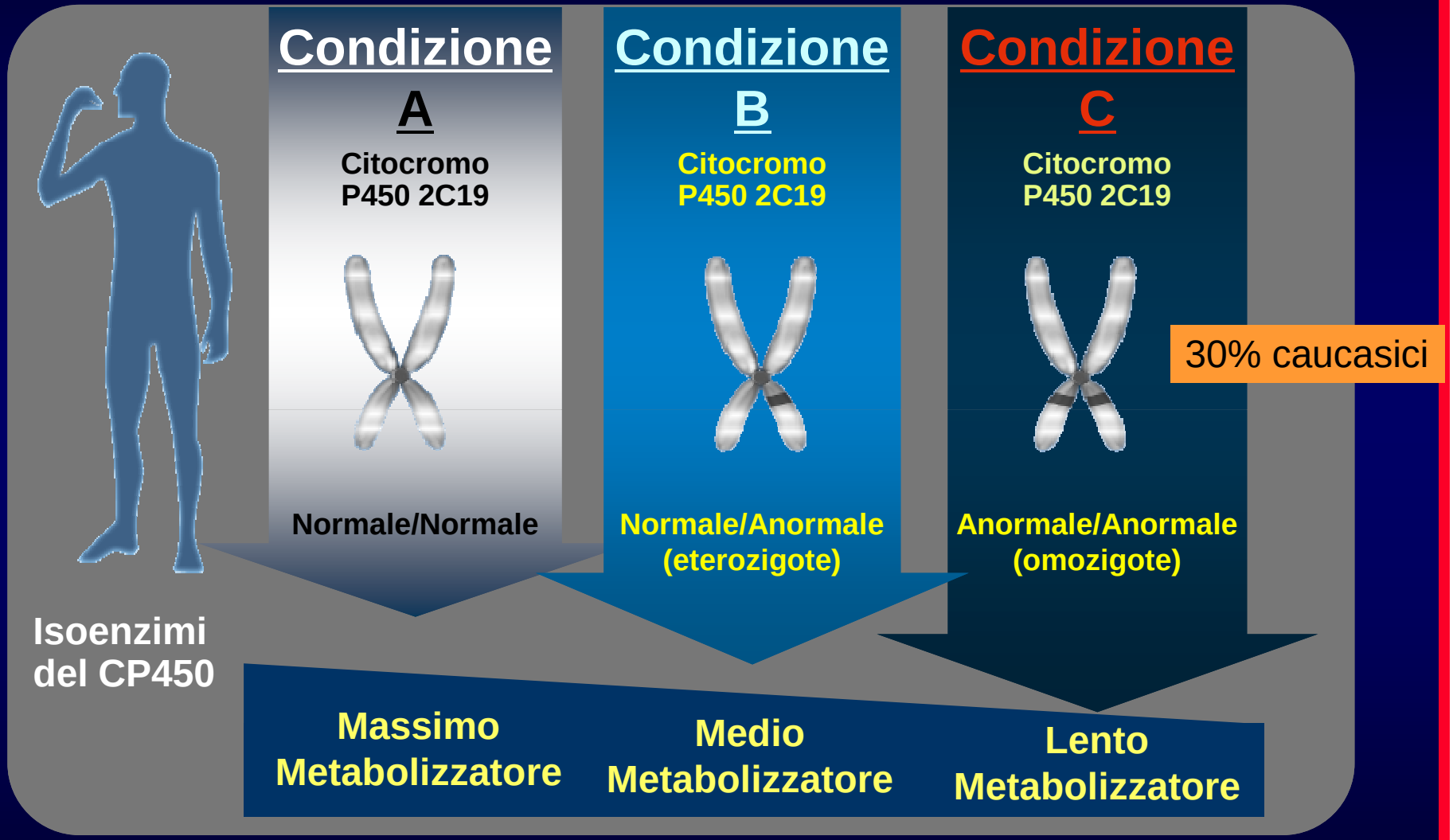
Antiaggreganti

Recommendations for oral antiplatelet agents

Recommendations	Class[a]	Level[b]	Ref[c]
Aspirin should be given to all patients without contraindications at an initial loading dose of 150–300 mg, and at a maintenance dose of 75–100 mg daily long-term regardless of treatment strategy.	I	A	107, 108
A $P2Y_{12}$ inhibitor should be added to aspirin as soon as possible and maintained over 12 months, unless there are contraindications such as excessive risk of bleeding.	I	A	110, 130, 132
A proton pump inhibitor (preferably not omeprazole) in combination with DAPT is recommended in patients with a history of gastrointestinal haemorrhage or peptic ulcer, and appropriate for patients with multiple other risk factors (*H. elicobacter pylori* infection, age ≥65 years, concurrent use of anticoagulants or steroids).	I	A	125–127
Prolonged or permanent withdrawal of $P2Y_{12}$ inhibitors within 12 months after the index event is discouraged unless clinically indicated.	I	C	-
Ticagrelor (180-mg loading dose, 90 mg twice daily) is recommended for all patients at moderate-to-high risk of ischaemic events (e.g. elevated troponins) , regardless of initial treatment strategy and including those pre-treated with clopidogrel (which should be discontinued when ticagrelor is commenced).	I	B	132
Prasugrel (60-mg loading dose, 10-mg daily dose) is recommended for $P2Y_{12}$-inhibitor-naïve patients (especially diabetics) in whom coronary anatomy is known and who are proceeding to PCI unless there is a high risk of life-threatening bleeding or other contraindications.[d]	I	B	130
Clopidogrel (300-mg loading dose, 75-mg daily dose) is recommended for patients who cannot receive ticagrelor or prasugrel.	I	A	110, 146, 147
A 600-mg loading dose of clopidogrel (or a supplementary 300-mg dose at PCI following an initial 300-mg loading dose) is recommended for patients scheduled for an invasive strategy when ticagrelor or prasugrel is not an option.	I	B	108, 114, 115


28 compresse rivestite con film
Efient 10 mg
compresse rivestite con film
prasugrel
ASPIRINETTA 100 mg - compresse
N02BA01 acido acetilsalicilico
56 film-coated tablets
Oral use
BRILIQUE 90 mg film-coated tablets
ticagrelor
AstraZeneca
Plavix
75 mg film-coated tablet Clopidogrel
28 film-coated tablets
Ticlopidina bluepharma
250 mg
250 mg Comprimidos
60
bluepharma

Polimorfismo del Citocromo P450



Kim KA, Park PW, Hong SJ, Park J-Y. *Nature.* 2008;84:236-242.

Farmacogenomica le varianti alleliche

Table 6 Recommendations for relief of pain, breathlessness and anxiety

Recommendations	Class [a]	Level [b]
Titrated i.v. opioids are indicated to relieve pain.	I	C
Oxygen is indicated in patients with hypoxia (SaO_2 <95%), breathlessness, or acute heart failure.	I	C
Tranquillizer may be considered in very anxious patients.	IIa	C

i.v. = intravenous; SaO_2 = saturated oxygen.

[a]Class of recommendation.

[b]Level of evidence.

Farmaci antiischemici

Recommendations for anti-ischaemic drugs

Recommendations	Class [a]	Level [b]	Ref [c]
Oral or intravenous nitrate treatment is indicated to relieve angina; intravenous nitrate treatment is recommended in patients with recurrent angina and/or signs of heart failure.	I	C	-
Patients on chronic β-blocker therapy admitted with ACS should be continued on β-blocker therapy if not in Killip class ≥III.	I	B	91
Oral β-blocker treatment is indicated in all patients with LV dysfunction (see Section 5.5.5) without contraindications.	I	B	86, 90, 91
Calcium channel blockers are recommended for symptom relief in patients already receiving nitrates and β-blockers (dihydropyridines type), and in patients with contraindications to β-blockade (benzothiazepine or phenylethylamine type).	I	B	88
Calcium channel blockers are recommended in patients with vasospastic angina.	I	C	-
Intravenous β-blocker treatment at the time of admission should be considered for patients in a stable haemodynamic condition (Killip class <III) with hypertension and/or tachycardia.	IIa	C	93
Nifedipine, or other dihydropyridines, are not recommended unless combined with β-blockers.	III	B	88

Complicanze dell'IMA: Scompenso Cardiaco

Table II – Clinical and hemodynamic subgroups in acute myocardial infarction

Killip Subgroup	Clinical characteristics	Hospital mortality
I	No congestion signs	<6%
II	S3, basal rales	<17%
III	Acute pulmonary edema	38%
IV	Cardiogenic shock	81%
Forrester subgroup	**Hemodynamic characteristics**	**Hospital mortality**
I	PCP <18, IC >2.2	3%
II	PCP >18, IC >2.2	9%
III	PCP <18, IC <2.2	23%
IV	PCP >18, IC <2.2	51%

PCP- pulmonary capillary pressure; CI- cardiac index.

Complicanze dell'IMA: Scompenso Cardiaco (KILLIP II)

e 23 Treatment of heart failure and left ventricular dysfunction

Recommendations	Class [a]	Level [b]
Treatment of mild heart failure (Killip class II)		
Oxygen is indicated to maintain a saturation >95%.	I	C
Loop diuretics, e.g. furosemide: 20–40 mg i.v., is recommended and should be repeated at 1–4 h intervals if necessary.	I	C
I.v. nitrates or sodium nitroprusside should be considered in patients with elevated systolic blood pressure.	IIa	C
An ACE inhibitor is indicated in all patients with signs or symptoms of heart failure and/or evidence of LV dysfunction in the absence of hypotension, hypovolaemia, or renal failure.	I	A
An ARB (valsartan) is an alternative to ACE inhibitors particularly if ACE inhibitors are not tolerated.	I	B
An aldosterone antagonist (eplerenone) is recommended in all patients with signs or symptoms of heart failure and/or evidence of LV dysfunction provided no renal failure or hyperkalaemia.	I	B

Complicanze: scompenso cardiaco (KILLIP III-EPA)

Treatment of moderate heart failure (Killip class III)		
Oxygen is indicated.	I	C
Ventilatory support should be instituted according to blood gasses.	I	C
Loop diuretics, e.g. furosemide: 20–40 mg i.v., are recommended and should be repeated at 1–4 h intervals if necessary.	I	C
Morphine is recommended. Respiration should be monitored. Nausea is common and an antiemetic may be required. Frequent low-dose therapy is advisable.	I	C
Nitrates are recommended if there is no hypotension.	I	C
Inotropic agents: • Dopamine	IIa	C
• Dobutamine (inotropic)	IIa	C
• Levosimendan (inotropic/vasodilator).	IIb	C
An aldosterone antagonist such as spironolactone or eplerenone must be used if LVEF ≤40%.	I	B
Ultrafiltration should be considered.	IIa	B
Early revascularization must be considered if the patient has not been previously revascularized.	I	C

Complicanze: scompenso cardiaco (KILLIP IV - SHOCK)

Treatment of cardiogenic shock (Killip class IV)		
Oxygen/mechanical respiratory support is indicated according to blood gasses.	I	C
Urgent echocardiography/Doppler must be performed to detect mechanical complications, assess systolic function and loading conditions.	I	C
High-risk patients must be transferred early to tertiary centres.	I	C
Emergency revascularization with either PCI or CABG in suitable patients must be considered.	I	B
Fibrinolysis should be considered if revascularization is unavailable.	IIa	C
Intra-aortic balloon pumping may be considered.	IIb	B
LV assist devices may be considered for circulatory support in patients in refractory shock.	IIb	C
Haemodynamic assessment with balloon floating catheter may be considered.	IIb	B
Inotropic/vasopressor agents should be considered: • Dopamine	IIa	C
• Dobutamine	IIa	C
• Norepinephrine (preferred over dopamine when blood pressure is low).	IIb	B

Complicanze: Fibrillazione atriale

Table 24 Management of atrial fibrillation

Recommendations	Class [a]	Level [b]
Rhythm control should be considered in patients with atrial fibrillation secondary to a trigger or substrate that has been corrected (e.g. ischaemia).	IIa	C
Acute rate control of atrial fibrillation		
Intravenous beta-blockers or non-dihydropyridine CCB (e.g. diltiazem, verapamil)[d] are indicated if there are no clinical signs of acute heart failure.	I	A
Amiodarone or i.v. digitalis is indicated in case of rapid ventricular response in the presence of concomitant acute heart failure or hypotension.	I	B
Cardioversion		
Immediate electrical cardioversion is indicated when adequate rate control cannot be achieved promptly with pharmacological agents in patients with atrial fibrillation and on-going ischaemia, severe haemodynamic compromise or heart failure.	I	C
Intravenous amiodarone is indicated for conversion to sinus rhythm in stable patients with recent onset atrial fibrillation and structural heart disease.	I	A
Digoxin (LoE A), verapamil, sotalol, metoprolol (LoE B) and other beta-blocking agents (LoE C) are ineffective in converting recent onset atrial fibrillation to sinus rhythm and should not be used for rhythm control (although beta blockers or digoxin may be used for rate control).	III	A B C

Complicanze: aritmie ipo-ipercinetiche

Table 25 Management of ventricular arrhythmias and conduction disturbances in the acute phase

Recommendations	Class[a]	Level[b]
Direct current cardioversion is indicated for sustained VT and VF.	I	C
Sustained monomorphic VT that is recurrent or refractory to direct current cardioversion: should be considered to be treated with i.v. amiodarone.[d]	IIa	C
may be treated with i.v. lidocaine or sotalol.[e]	IIb	C
Transvenous catheter pace termination should be considered if VT is refractory to cardioversion or frequently recurrent despite antiarrhythmic medication.	IIa	C
Repetitive symptomatic salvoes of non-sustained monomorphic VT should be considered for either conservative management (watchful waiting) or treated with i.v. beta-blocker,[c] or sotalol,[e] or amiodarone.[d]	IIa	C
Polymorphic VT		
• must be treated by i.v. beta-blocker[c]	I	B
• or i.v. amiodarone[d]	I	C
• urgent angiography must be performed when myocardial ischaemia cannot be excluded	I	C
• may be treated with i.v. lidocaine	IIb	C
• must prompt assessment and correction of electrolyte disturbances consider magnesium.	I	C
• should be treated with overdrive pacing using a temporary transvenous right ventricular lead or isoprotenerol infusion.	IIa	C
In cases of sinus bradycardia associated with hypotension, AV block II (Mobitz 2) or AV block III with bradycardia that causes hypotension or heart		
• intravenous atropine is indicated	I	C
• temporary pacing is indicated in cases of failure to respond to atropine.	I	C
• urgent angiography with a view to revascularization is indicated if the patient has not received prior reperfusion therapy.	I	C

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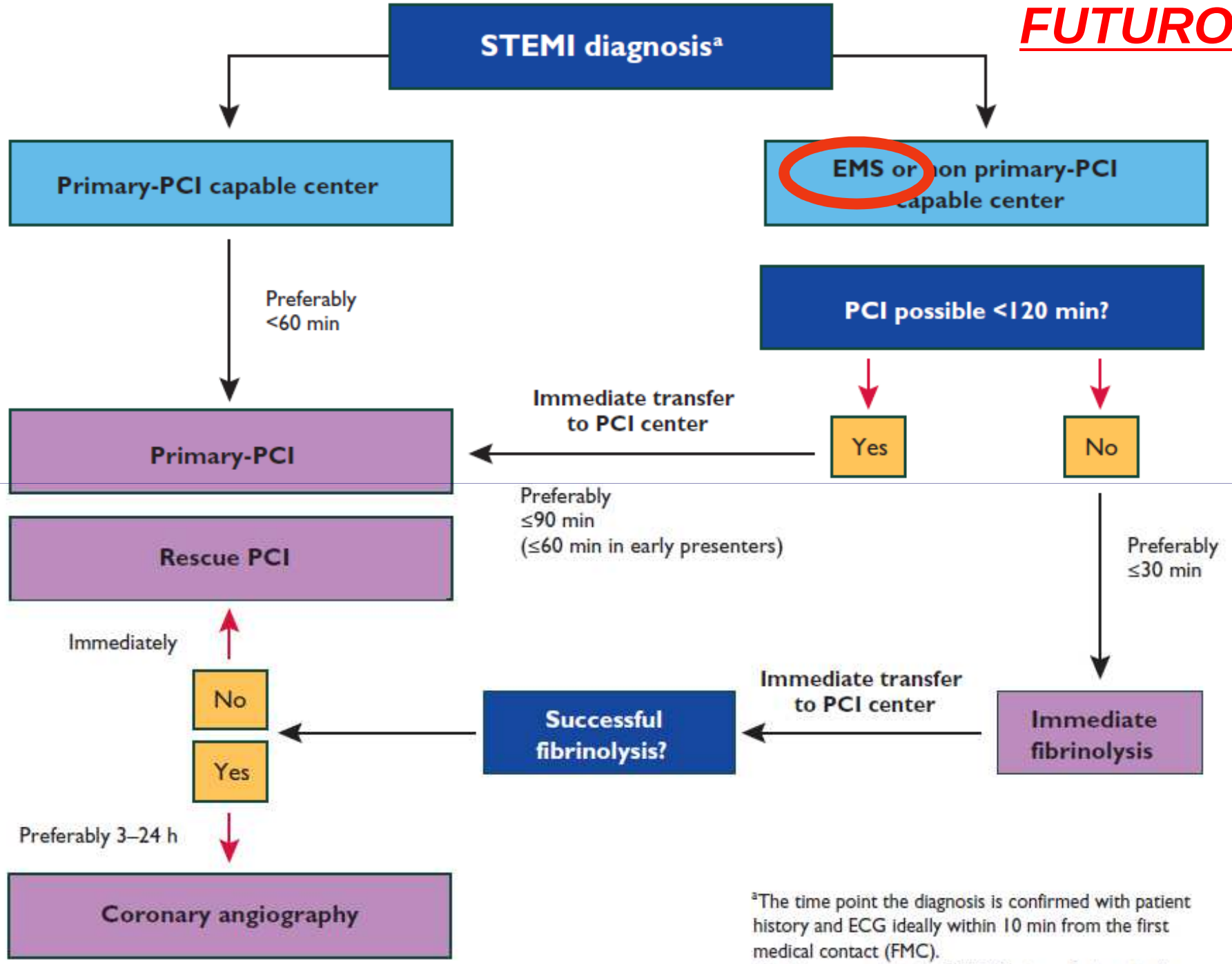
STEMI diagnosis[a]
Primary-PCI capable center
EMS or non primary-PCI capable center
Preferably <60 min
PCI possible <120 min?
Immediate transfer to PCI center
Yes
No
Primary-PCI
Preferably ≤90 min (≤60 min in early presenters)
Rescue PCI
Preferably ≤30 min
Immediately
No
Yes
Immediate transfer to PCI center
Successful fibrinolysis?
Immediate fibrinolysis
Preferably 3–24 h
Coronary angiography
[a]The time point the diagnosis is confirmed with patient history and ECG ideally within 10 min from the first medical contact (FMC).
All delays are related to FMC (first medical contact).

Grazie per l'attenzione !!!

Table 14 Fibrinolytic therapy

Recommendations	Class[a]	Level[b]	Ref[c]
Fibrinolytic therapy is recommended within 12 h of symptom onset in patients without contraindications if primary PCI cannot be performed by an experienced team within 120 min of FMC.	I	A	1, 41
In patients presenting early (<2 h after symptom onset) with a large infarct and low bleeding risk, fibrinolysis should be considered if time from FMC to balloon inflation is >90 min.	IIa	B	40, 41, 73
If possible, fibrinolysis should start in the prehospital setting.	IIa	A	72, 73, 155
A fibrin-specific agent (tenecteplase, alteplase, reteplase) is recommended (over non-fibrin specific agents).	I	B	150, 153
Oral or i.v. aspirin must be administered.	I	B	133
Clopidogrel is indicated in addition to aspirin.	I	A	156, 157
Antithrombin co-therapy with fibrinolysis			
Anticoagulation is recommended in STEMI patients treated with lytics until revascularization (if performed) or for the duration of hospital stay up to 8 days. The anticoagulant can be:	I	A	118, 153, 158–164
• Enoxaparin i.v followed by s.c. (using the regimen described below) (preferred over UFH).	I	A	158–163
• UFH given as a weight-adjusted i.v. bolus and infusion.	I	C	153