



***RISK STRATIFICATION IN
PATIENTS WITH NSTE -ACS.***

BY:

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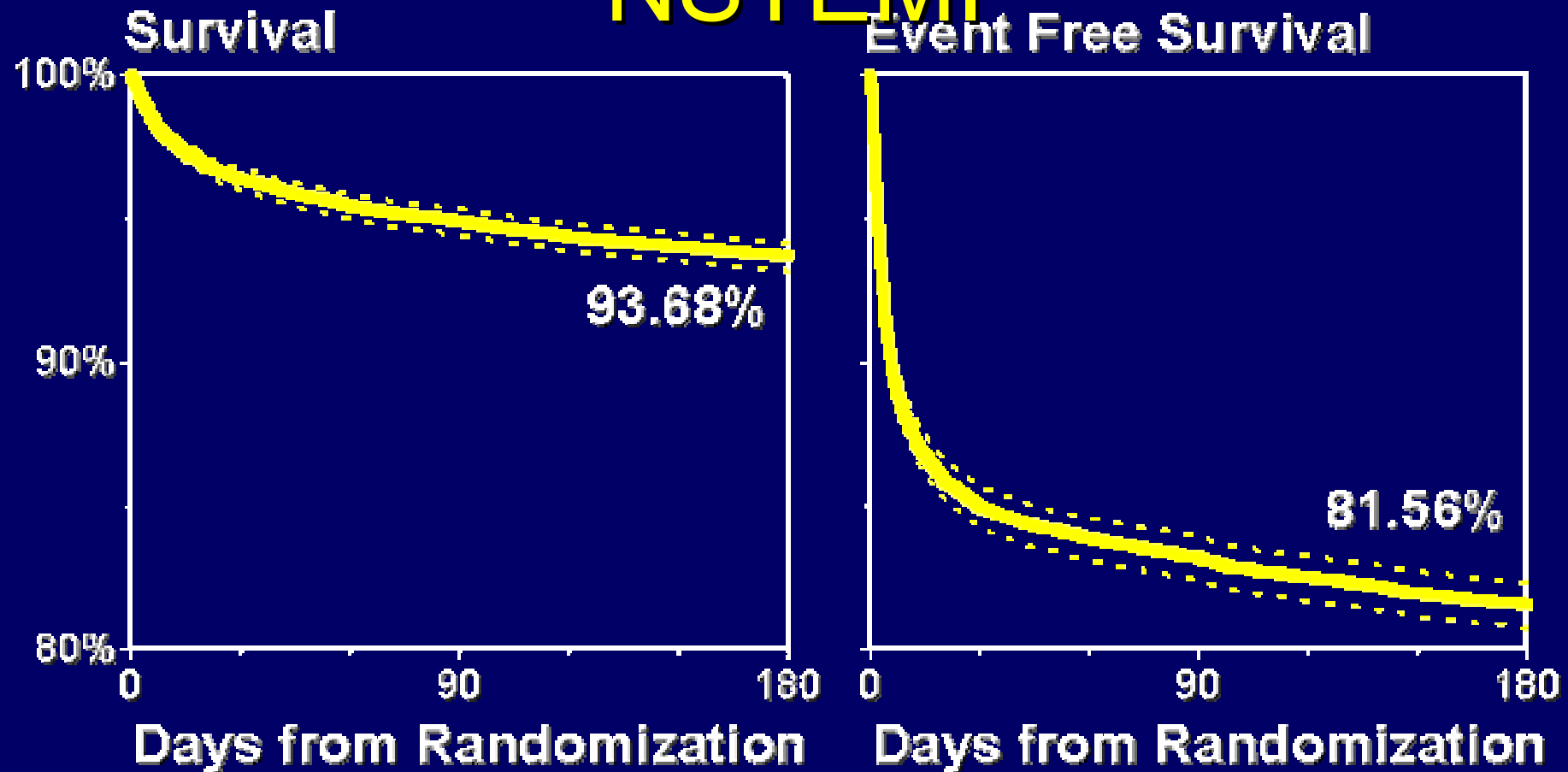
1. NATURAL HISTORY:

-The short-term mortality of patients with unstable angina has been shown to be lower(1.7% at 30 days) than that of patients with NSTEMI or STEMI.

-long term outcomes-for both mortality & nonfatal events- are actually worse for patients with either unstable angina or NSTEMI compared with STEMI.

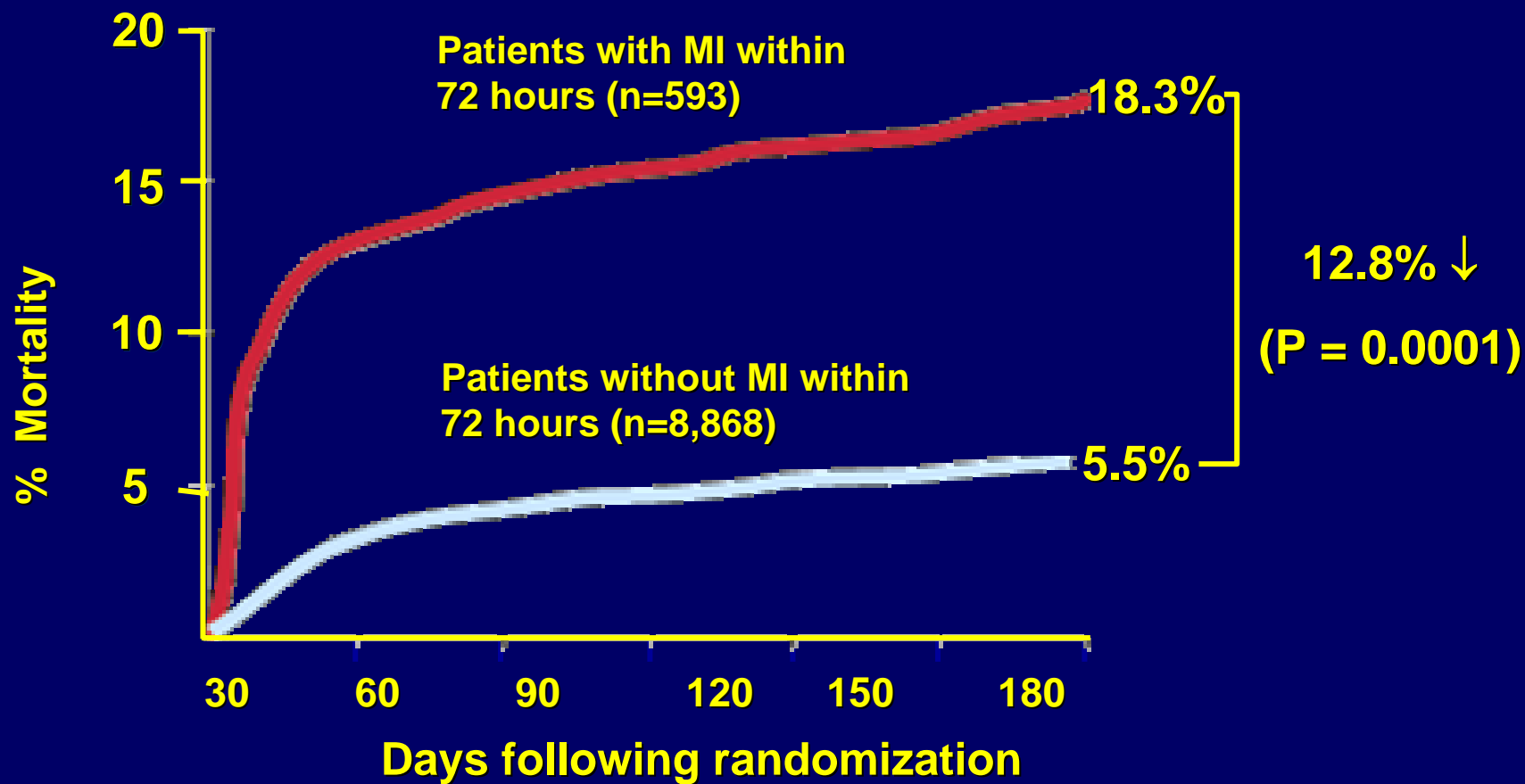
- **SHORT TERM OUTCOME** is dependent on the hemodynamic state
- **MEDIUM TERM OUTCOME** ; transient ST segment shift
- **LONG TERM OUTCOME** Tn T&I longer term above and beyond conventional risk factors

Prognosis in Unstable Angina / NSTEMI



PURSUIT trial data

Mortality in Non-ST ↑ ACS Patients With Myocardial Infarction During Hospitalization



2-METHODS OF RISK STATIFICATIN.

patients with UA/NSTEMI are a heterogeneous group, with a prognosis that ranges from

- An excellent outcome with modest adjustments in therapeutic regimen,
- high risk of death or MI : in which intensive treatment is needed.

- High risk subgroups of patients, identified by:
 - clinical features.
 - electrocardiographic findings, or
 - cardiac(or vascular) markers.
- This group appear to derive greater benefit from more aggressive -antithrombotic or
 - interventional therapy or
 - both.

3-CLINICAL VARIABLES:

-classification of unstable angina has been shown in several studies to be useful clinically in identifying high risk patients.

-**High risk** groups of patients with unstable angina are those with :

-Acute **rest** pain.

-Post-MI unstable angina.

-Secondary unstable angina.

4-RISK ASSESSMENT BY ECG :

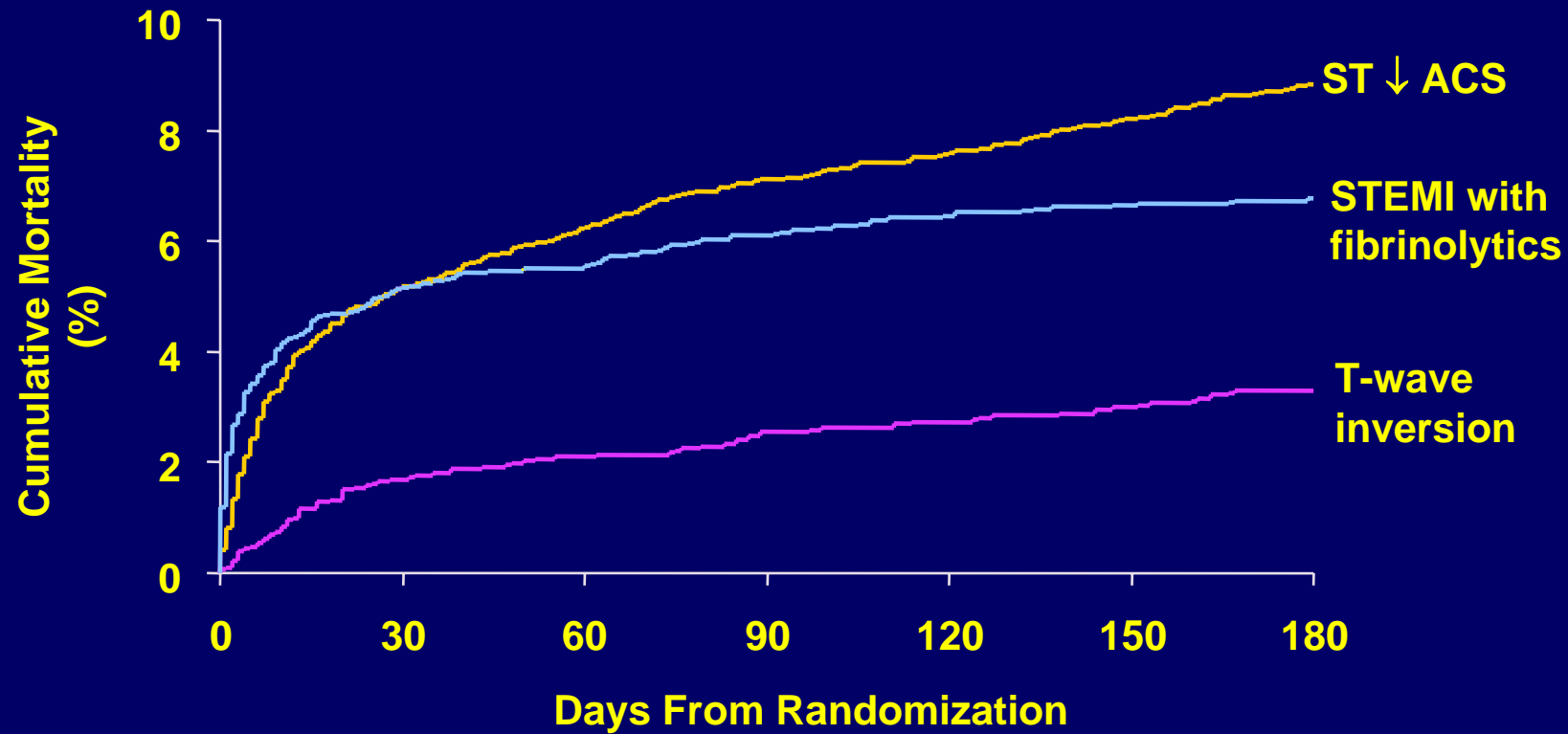
-The admission ECG is very useful in predicting long-term adverse outcomes.

-Independent predictors of 1-year death or MI included:

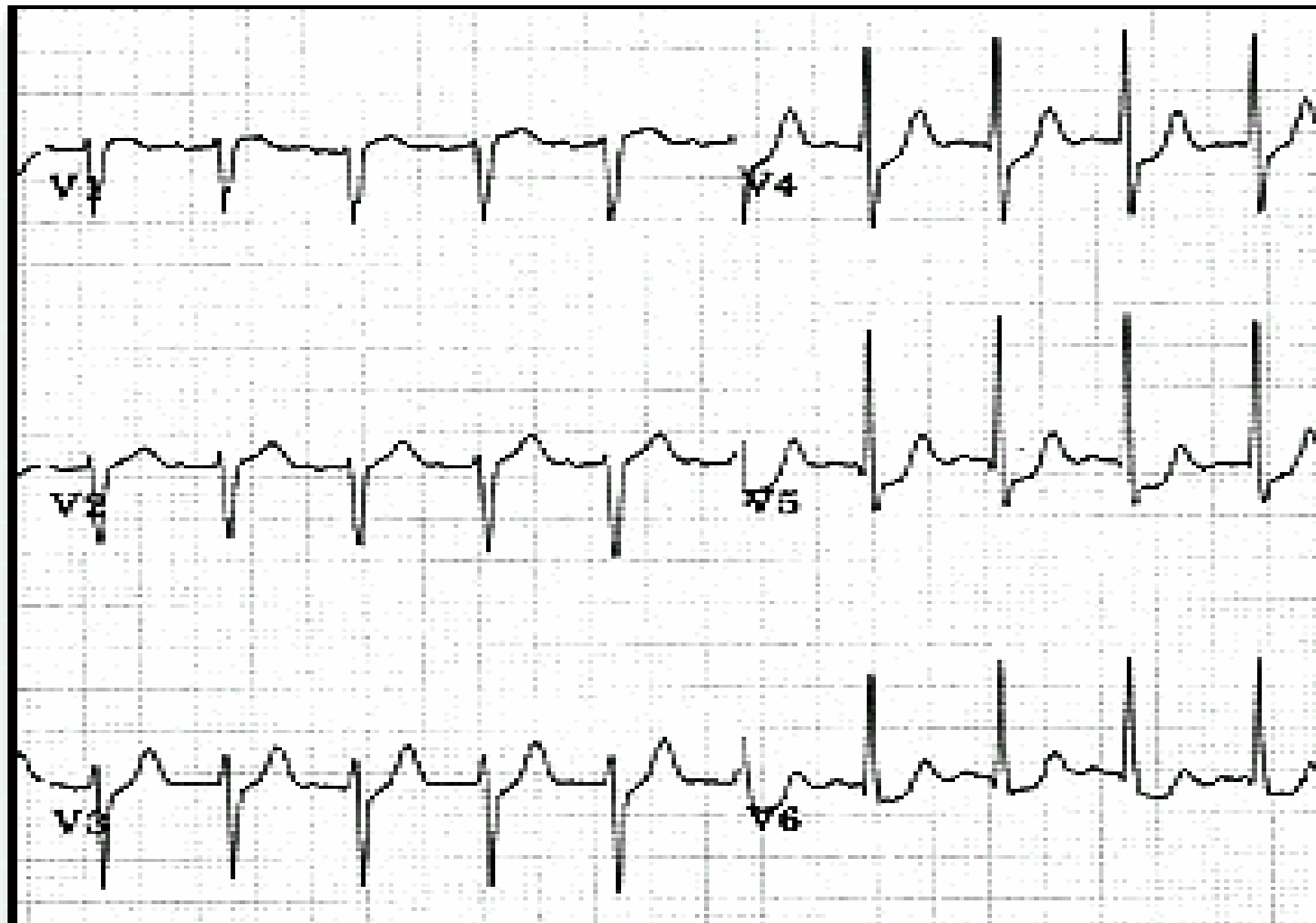
- LBBB
- ST segment deviation $> 0.05\text{mv}$.

-The presence of T wave changes $> 0.1\text{mV}$,
was associated with a modest or no increase in subsequent death or MI.

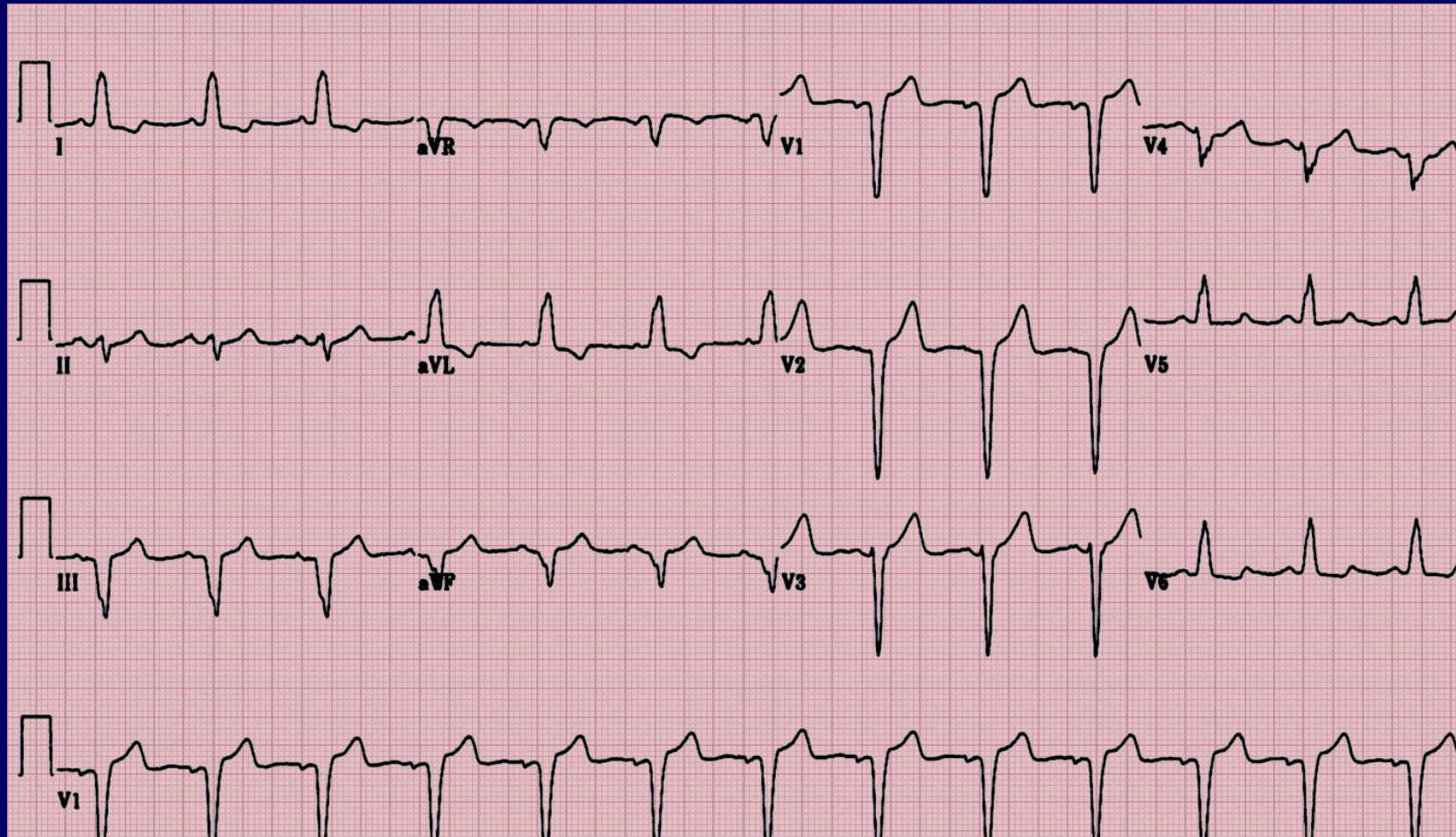
GUSTO IIb: Correlation of 6-Month Mortality With Baseline ECG Findings in Patients With ACS



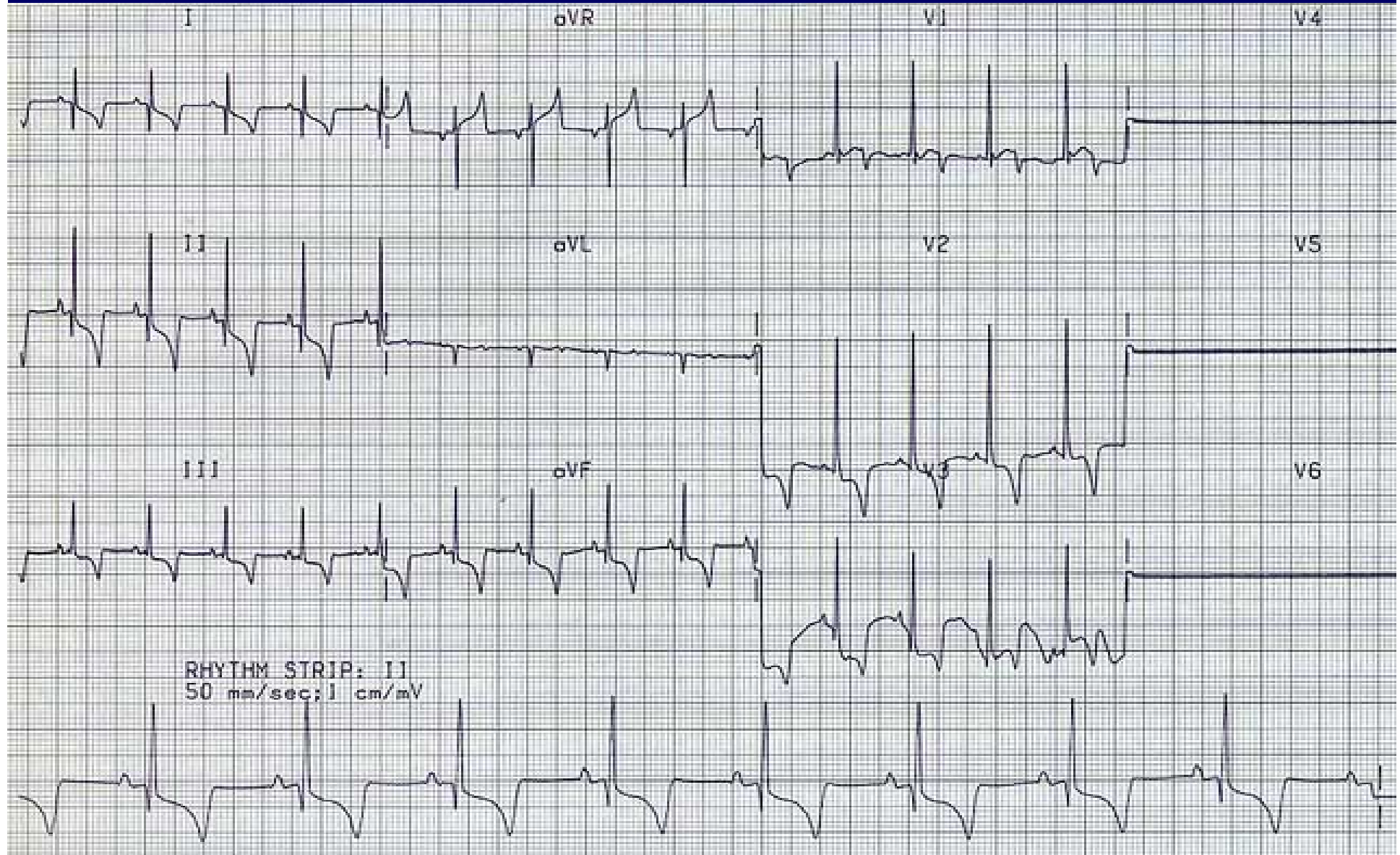
Typical ST Depression



New LBBB



Non-ST-Segment Elevation MI



5-RISK ASSESSMENT BY CARDIAC MARKERS.

1-Creatine kinase-MB

NSTMI= elevated biomarkers of myocardial necrosis

-NSTMI with elevated CK-MB or troponins,
have a worse long-term prognosis than those with unstable angina.

- .

CK/MB

- Rises 4-6 hours after injury and peaks at 24 hours
- Remains elevated 36-48 hours
- Positive if CK/MB $> 5\%$ of total CK and 2 times normal
- Elevation can be predictive of mortality
- False positives with exercise, trauma, muscle dz, DM, PE

2-Myoglobin

- Rises 2-4 hours after injury and peaks at 6-12 hours
- Remains elevated 24-36 hours
- Not cardiac specific
- Rise of 25-40% over 2 hours strongly predictive of MI

ROPONINS :

Very specific and more sensitive than CK

Rises 4-8 hours after injury

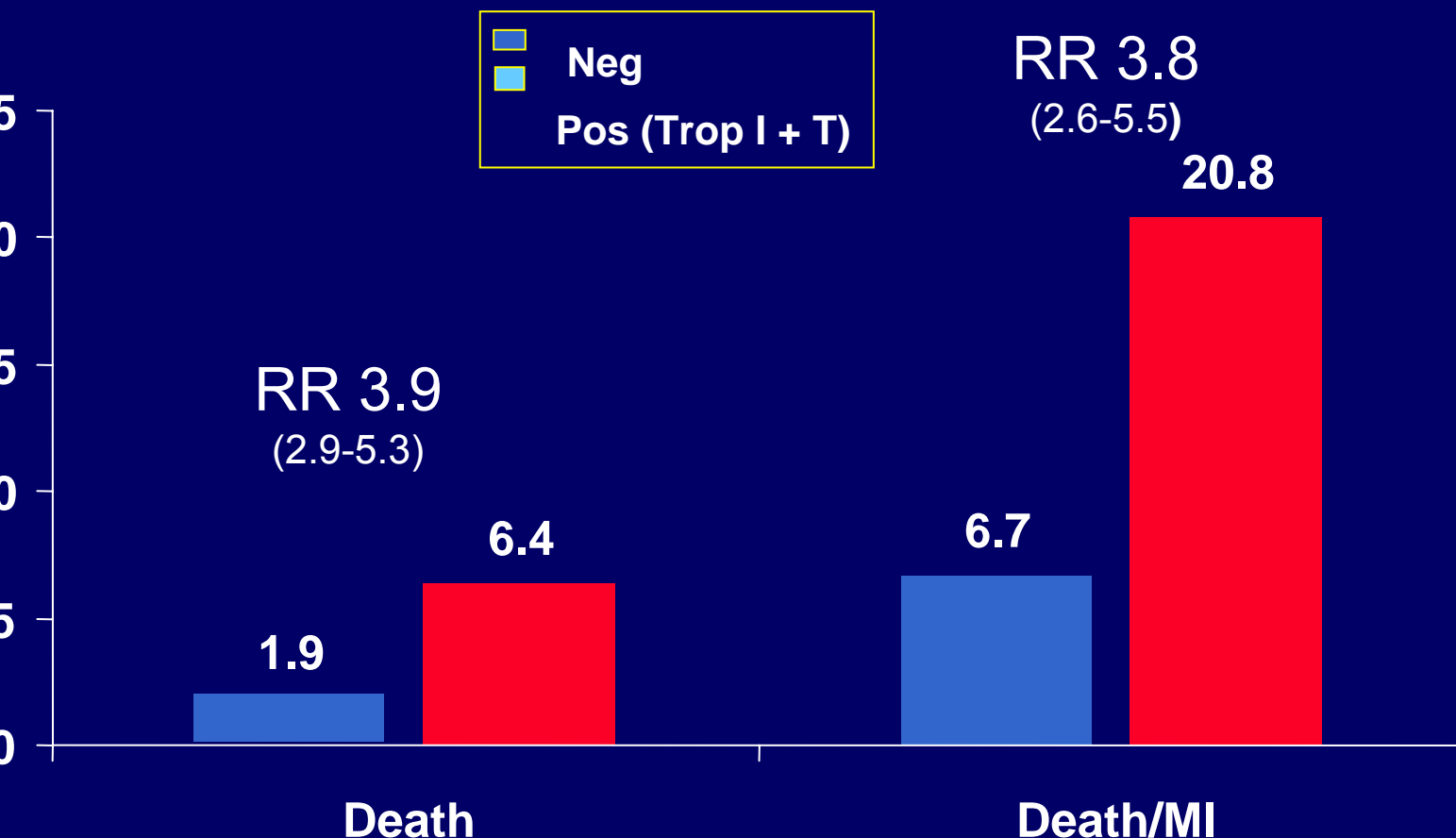
Remains elevated for 7-10 days

Provide very useful prognostic information

Linear relationship between the level
of troponin T or I & subsequent risk
of death

The higher the troponin, the higher
the mortality risk

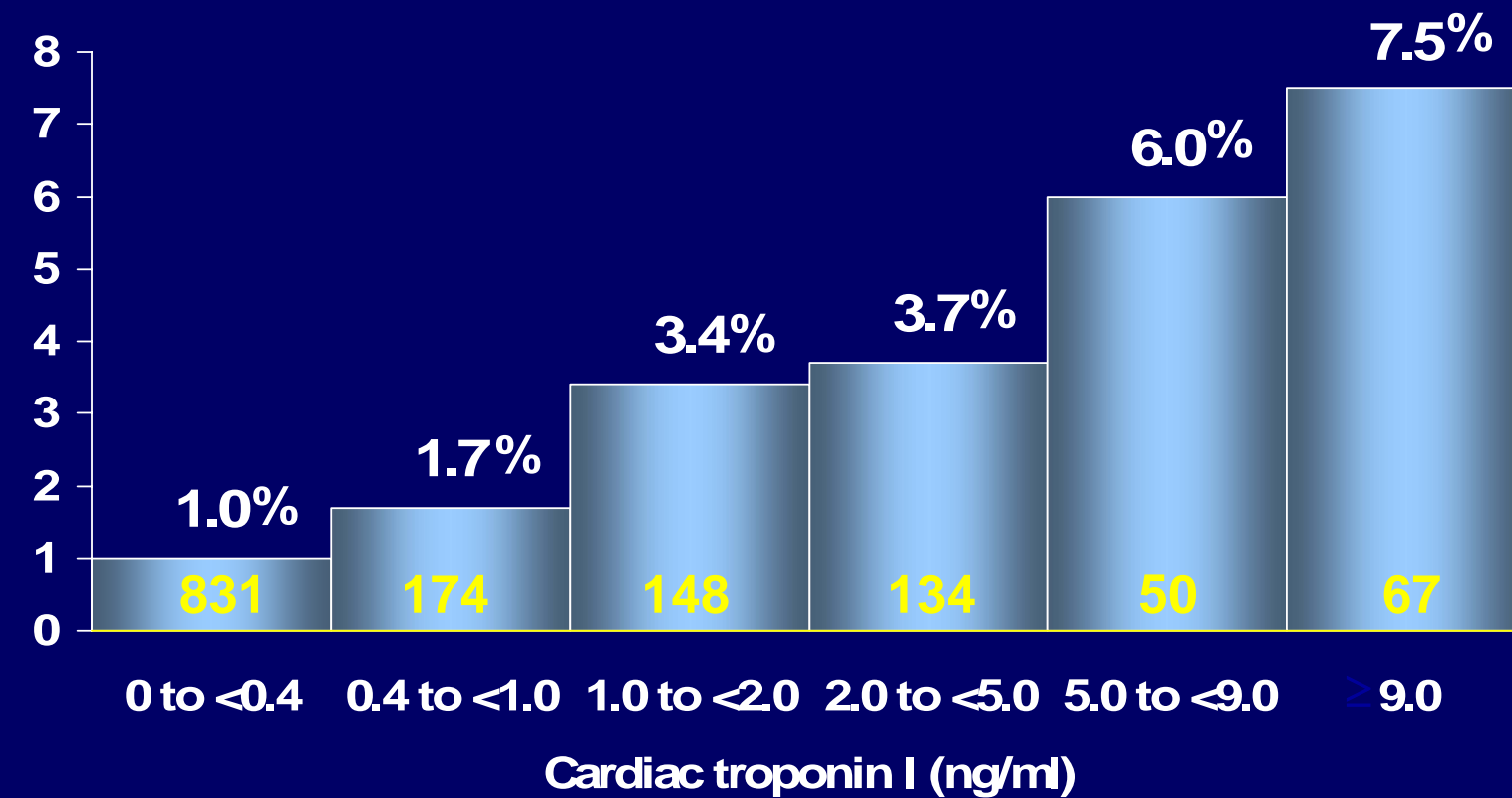
Prognostic Value of Troponin T or I in ACS: A Meta-Analysis



-A higher risk of MI was observed with lower levels of troponin in several studies, & thus the overall rate of death or MI is equally high among patients with low or higher troponin values.

-Troponin T & I are useful not only in diagnosing MI but also in risk assessment & in targeting therapies to high risk patients.

Troponin I Levels and Mortality in Patients with NSTEMI-ACS



REACTIVE PROTEIN:

-CRP is very promising. Elevated CRP has related to

- increased risk of death

- MI

- need for urgent revascularization.

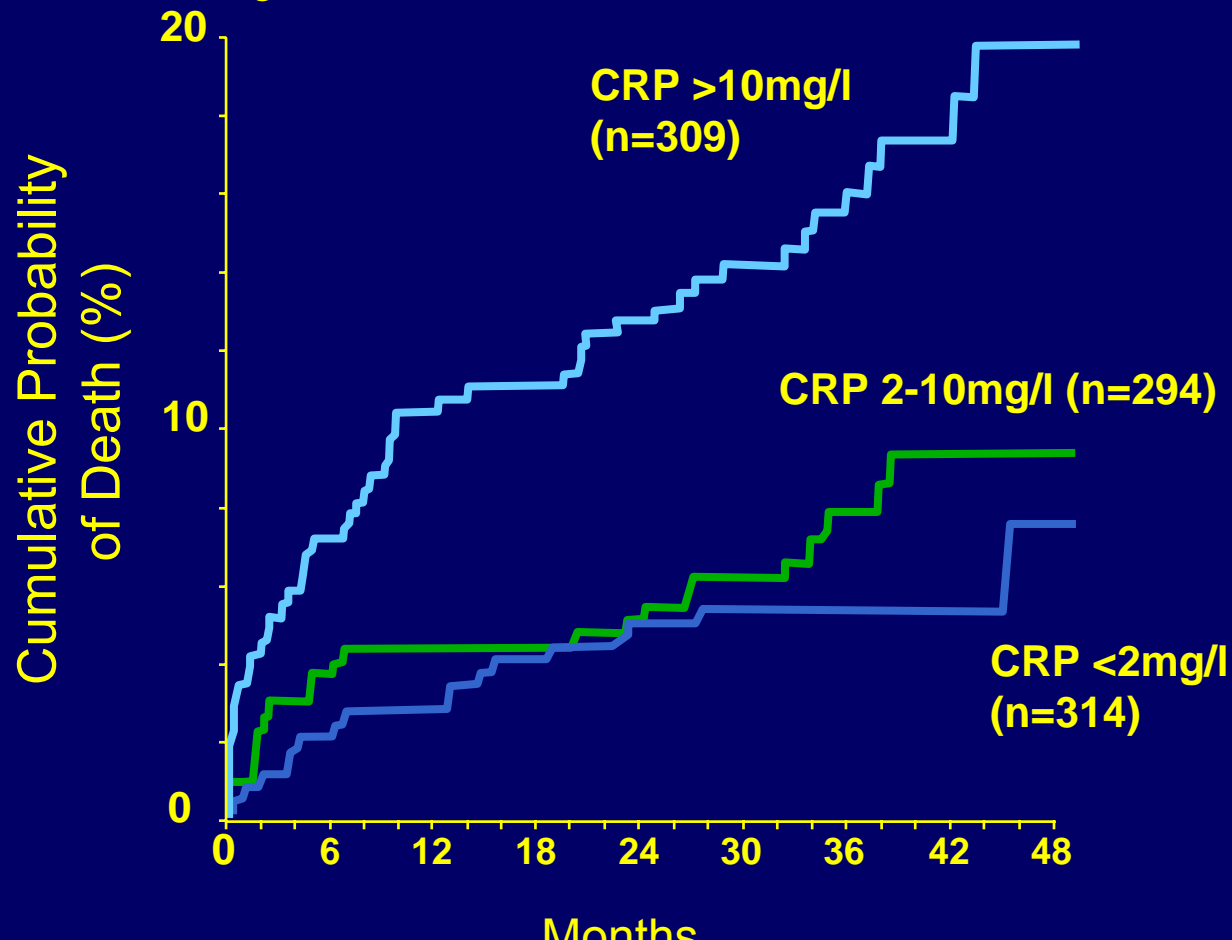
-levels of CRP in patients with ACS are approximately five times higher than those of stable patients.

-CRP was able to discriminate a high- & a low-risk group: mortality for patients with an elevated CRP was 5.8% versus 0.4% for patients without elevated CRP.

-Mortality can be stratified from
0.4% for patients with both markers negative
1.7% if either CRP or troponin was positive
0.1% if both were positive.

Predictive Value of hs-CRP

Mortality from ACS in FRISC Substudy



-CRP measured at the time of hospital
charge has been found to be a strong predictor
of outcome over 3 to 12 month.

Other inflammatory markers

have offered consistent evidence of an association between systemic inflammation & recurrent adverse events , including

serum amyloid A

monocyte chemoattractant protein-1 (MCP-1).

WHITE BLOOD CELL COUNT:

Simple marker of inflammation

Elevated WBC counts were ass. with
higher risk of mortality & recurrent acute

II

This association was independent of CRP.

CD40 LIGAND :

CD40L is a member of tumor necrosis factor- α family of proteins.

Expressed on the platelet surface when platelets are activated

Subsequently cleaved, generating a soluble proteolytic fragment termed sCD40L.

**-it has been found to be both prothrombotic
proinflammatory & to have a role in
atherosclerotic process.**

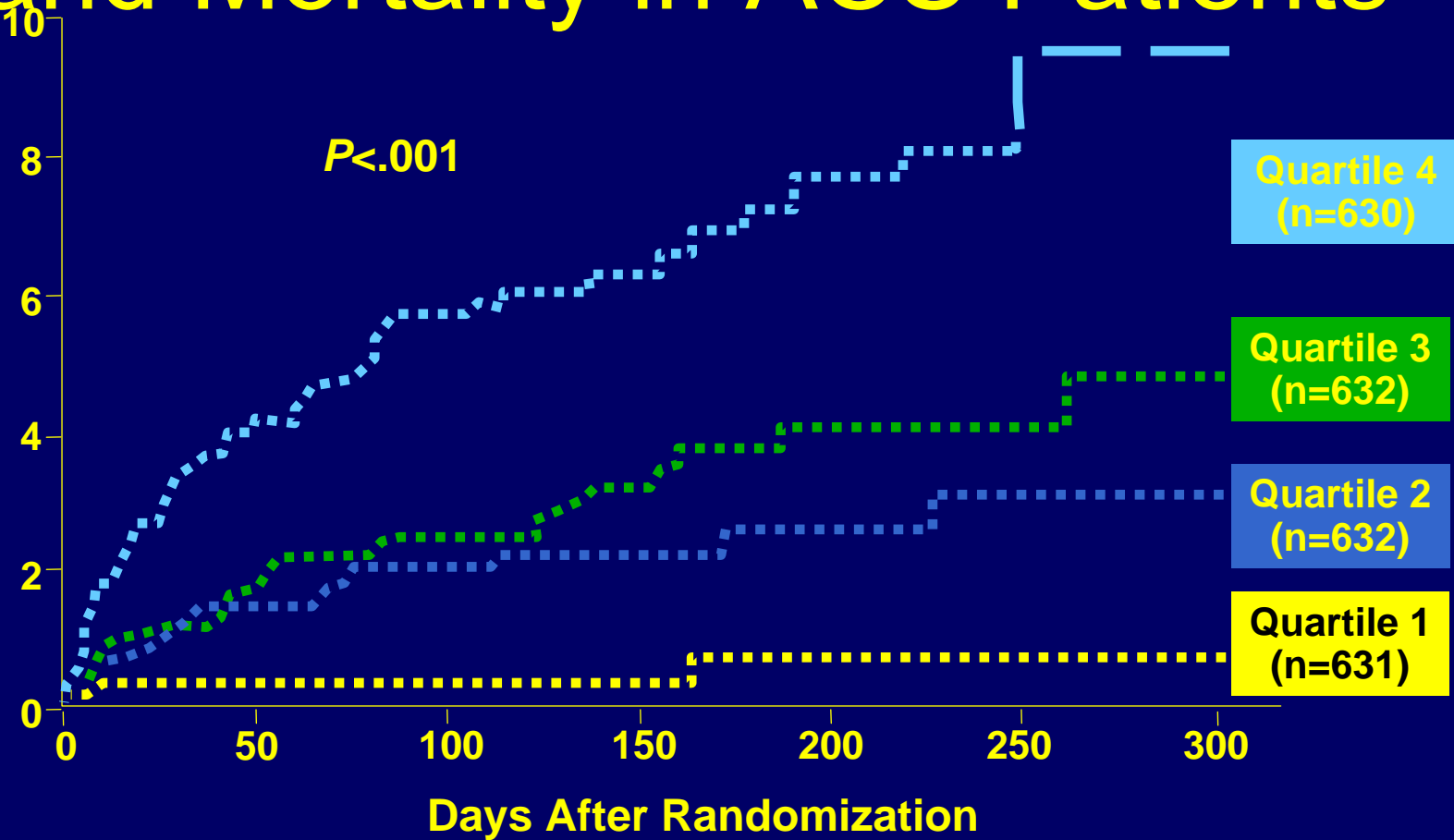
**-CD40L has been correlated with the
degree of platelet activation, as measured by
platelet monocyte aggregates, & thus is a novel
marker of platelet activation.**

B-TYPE NATRIURETIC PEPTIDE:

-BNP is a neurohormone that is synthesized in ventricular myocardium & released in response to increased wall stress.

-its actions include :natriuresis, vasodilation, inhibition of sympathetic nerve activity, & inhibition of the renin-angiotensin-aldosterone system.

B-type Natriuretic Peptide (BNP) and Mortality in ACS Patients



-BNP has prognostic value across the full spectrum of patients with ACS, including those with UA/NSTEMI.

-Measurement of BNP in patients with UA/NSTEMI is very important to our current tools for risk stratification.

MYELOPEROXIDASE (MPO):

MPO is a hemoprotein expressed by neutrophils that possesses potent inflammatory properties & that promotes oxidation of lipoproteins in vascular atheroma.

Marker of inflammation

role of neutrophil in vascular inflammation and ACS

- MPO serum levels in patients with STEMI-ACS were associated with increased risk

r

sequent death

. independent of other risk factors & other

diac markers.

-Elevations of MPO have been seen

throughout the coronary vasculature in patients

h UA/NSTEMI.

-Serum Creatinine :

levated creatinine was found to be associated with an adverse prognosis, independent of other standard risk factors.

GLUCOSE :

-Adverse outcomes have been seen among diabetic patients with acute MI with elevated admission glucose values compared with patients without hyperglycemia.

-This association was found even among patients without a prior diagnosis of diabetes.

-Adverse outcome also with poor glycemic control, as measured by hemoglobin A_{1c} has been seen in other studies.

Braunwald Classification of Risk for Patients with NSTEMI-ACS

CLINICAL INDICATORS OF INCREASED RISK IN PATIENTS WITH NSTE-ACS;

History ;

Age more than 70 y

DM

post MI angina

PVD

Cerebrovascular disease

CLINICAL PRESENTATION;

Braunwald class II or III (acute ,subacute
rest pain)

Braunwald class B (secondary UA)

HF

Hypotension

Ventricular arrhythmias

ECG ;

ST deviation 0.05 Mv

LBBB

T wave inversion 0.03 Mv

Cardiac markers

Tn T or Tn I

BNP

CK-MB

CD40 LIGAND

GLUCOSE

CREATININE

HBA1c

ANGIOGRAM ;

Thrombus

3 VD

REDUCED EF

COMBINED RISK ASSESSMENT SCORES.

- Comprehensive risk scores that use clinical variables, findings from ECG, & findings from serum cardiac markers.
- the most important baseline determinants of higher mortality were:
 - increasing age.
 - increasing heart rate.
 - lower systolic BP.
 - ST segment depression.
 - signs of heart failure.

TIMI Risk Score

predicts risk of death, new/recurrent MI, need for urgent revascularization within 14 days

≥ 65 years

CAD Risk Factors

Coronary Stenosis $>50\%$

ST-segment deviation

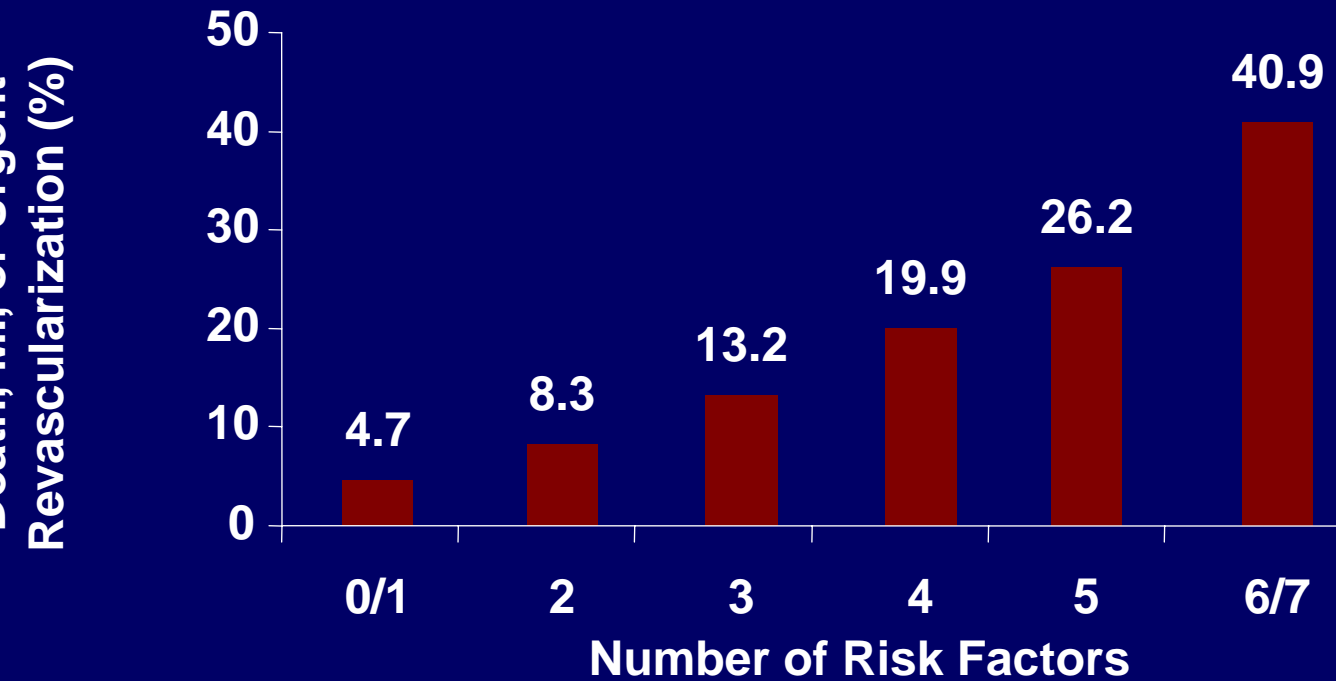
Anginal events ≤ 24 hours

MI in last 7 days

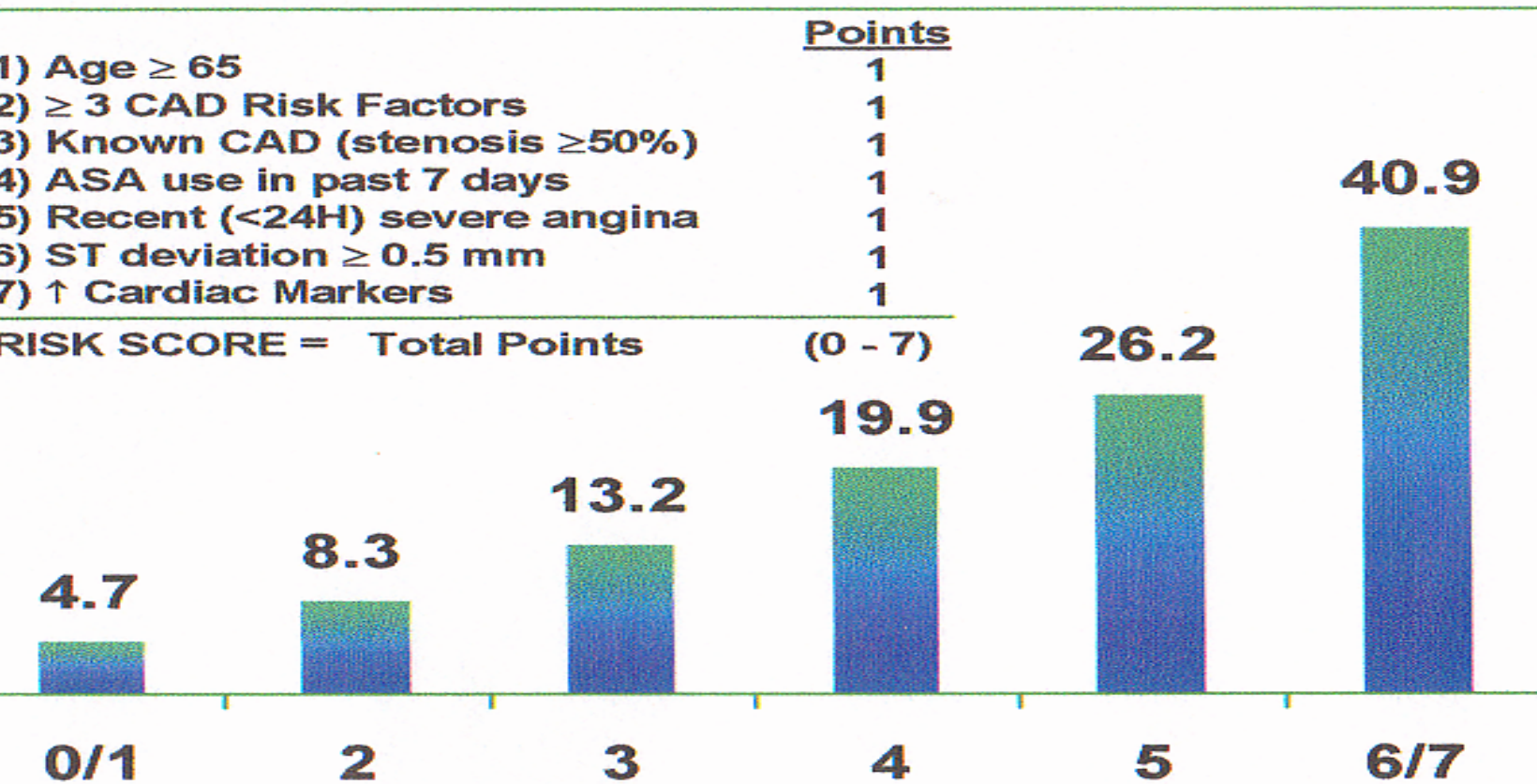
Positive Cardiac Markers (CK-MB or troponin)

**is scoring system was used to
atify the risk for patients across a 10
ds gradient of risk
om 4.7 % to 40.9 % (p<0.001)**

The TIMI Risk Score and Incidence of Adverse Ischemic Events in Patients with NSTEMI-ACS



Risk Stratification



the strongest prognostic markers

CRP; marker of inflammation initiator of atherosclerosis

BNP; reflect impaired LV function

Tn; the most sensitive and specific marker of myocyte necrosis

patients with higher TIMI risk scores ;

and significant reductions in events when
treated with ;

Enoxaparine compared with ufh (heparin)

with a GPII B/III A inhibitor compared with

placebo .

with an invasive vs conservative strategy.

Thank you