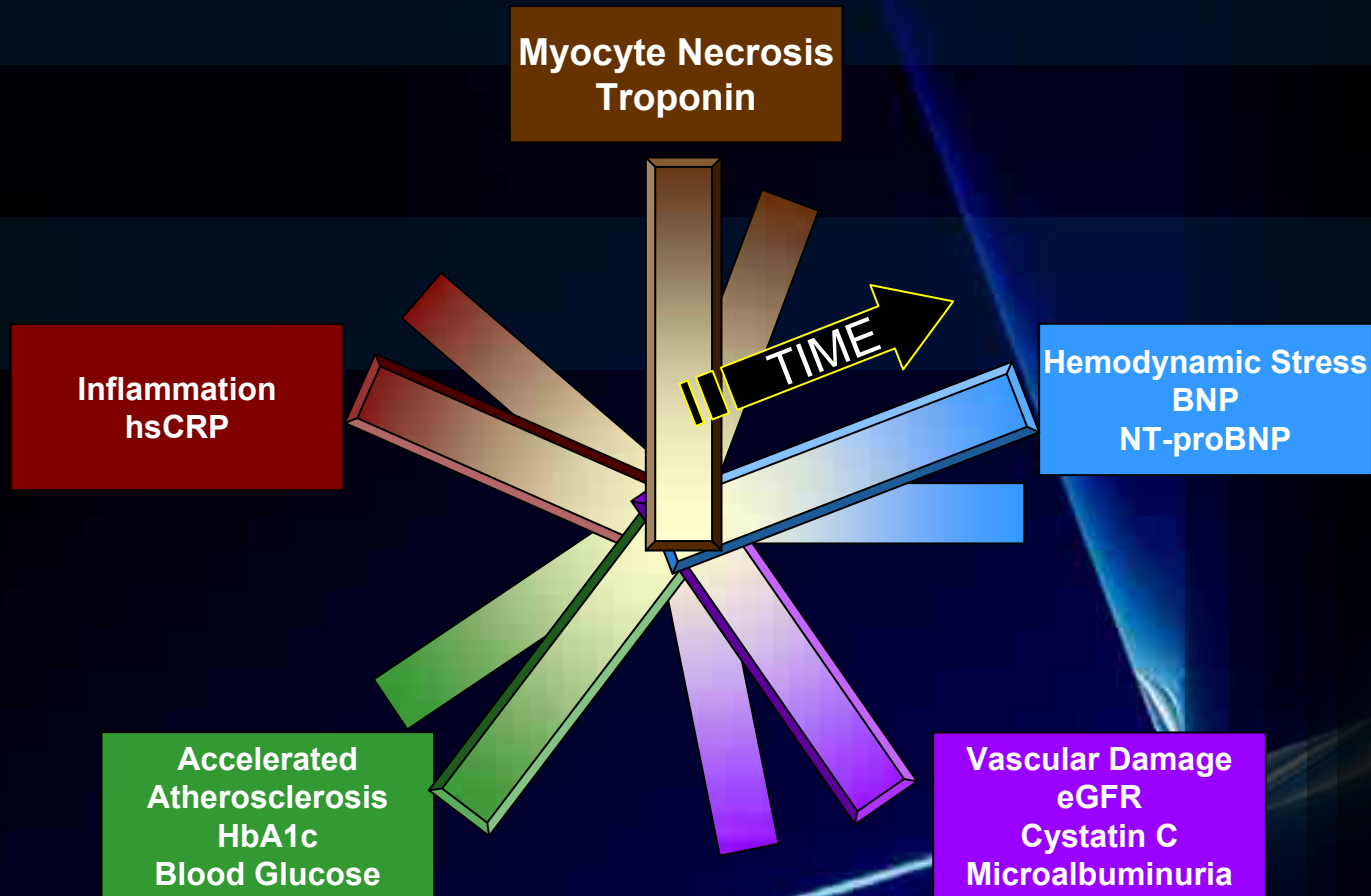


Definición universal de infarto, rol de las troponinas de última generación

*Dra Stella M Macin
Jefe UCIC
Instituto de Cardiología JF Cabral. Corrientes*

Proposed Updated Biomarker Prognostic Profile
in Acute Coronary Syndromes

Troponina positiva... es sinonimo de intervención ?

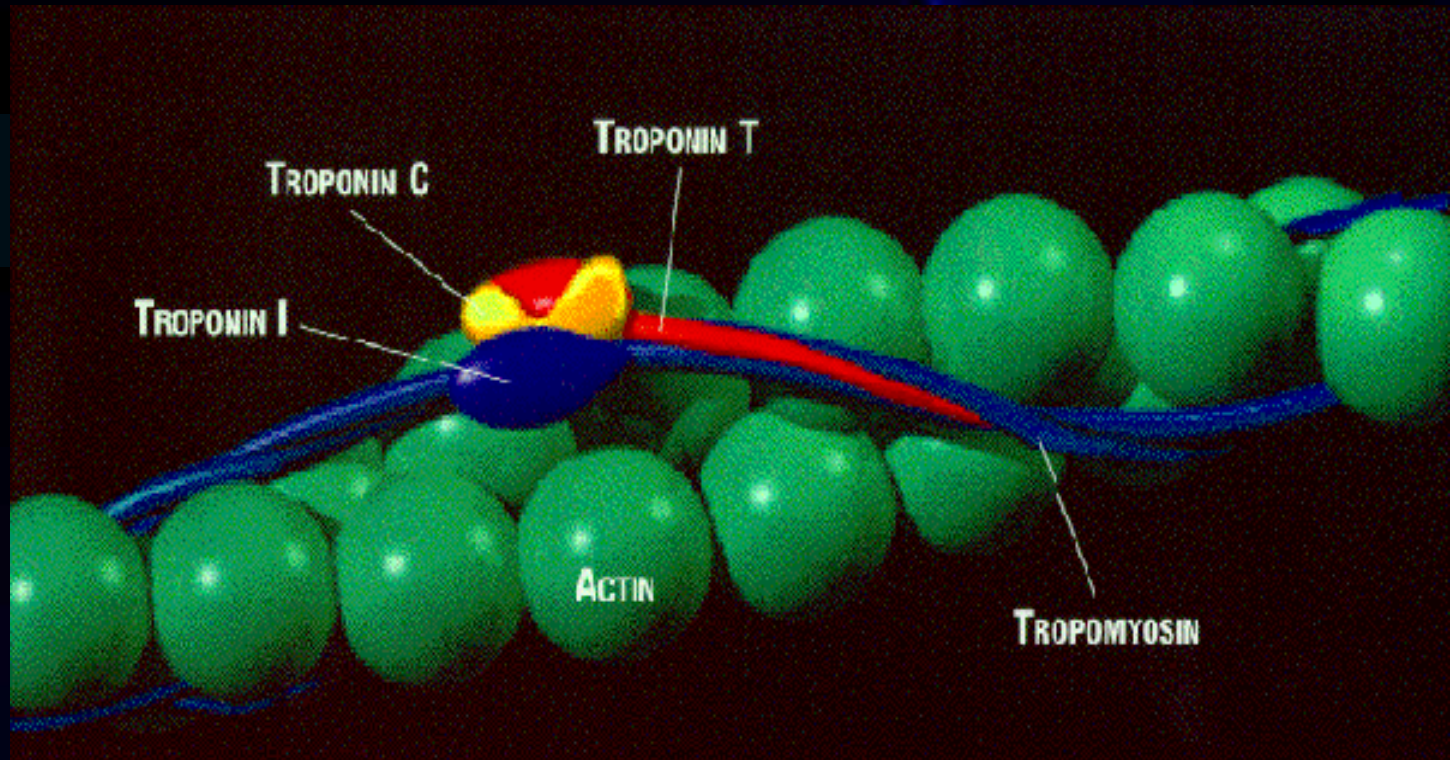


Darker shades of colors represent greater prognostic information, and **lighter shades** represent less or equivocal prognostic information at the time point tested. The **front star** represents measurements during the first days of hospital stay. The **back star** represents measurements 6 weeks to 6 months after initial presentation.

BNP B-type natriuretic peptide; eGFR estimated glomerular filtration rate; HbA1c hemoglobin A1c; hsCRP high-sensitivity C-reactive protein; NT-proBNP amino terminal pro-B-type natriuretic peptide. Modified from Morrow and Braunwald (1).

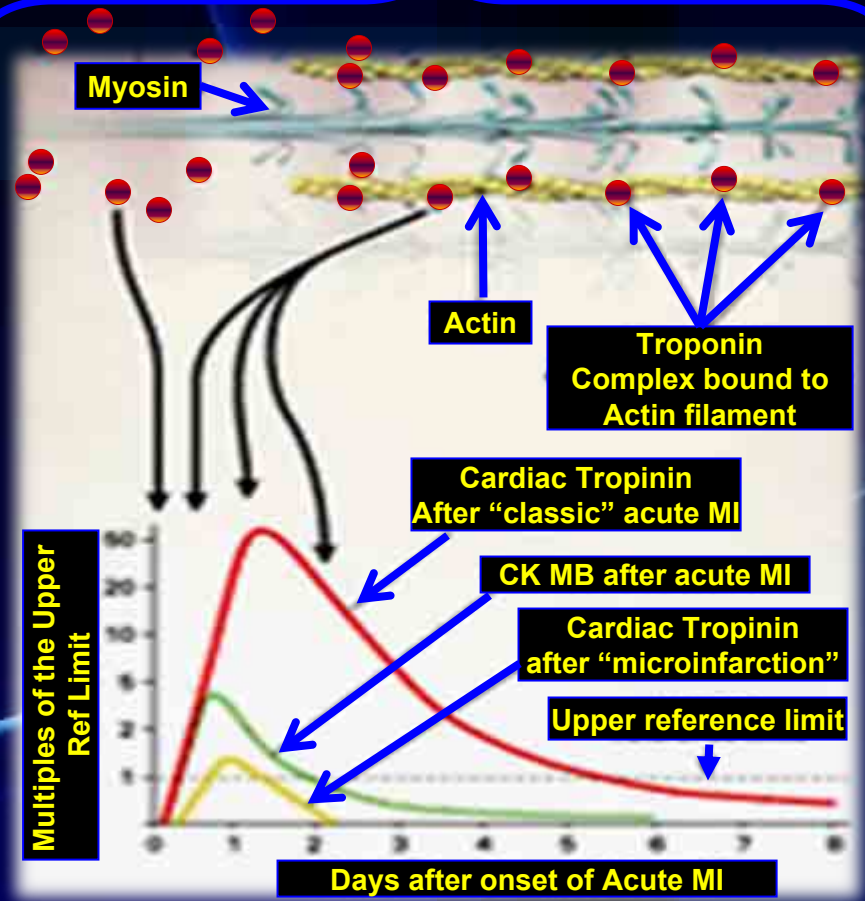
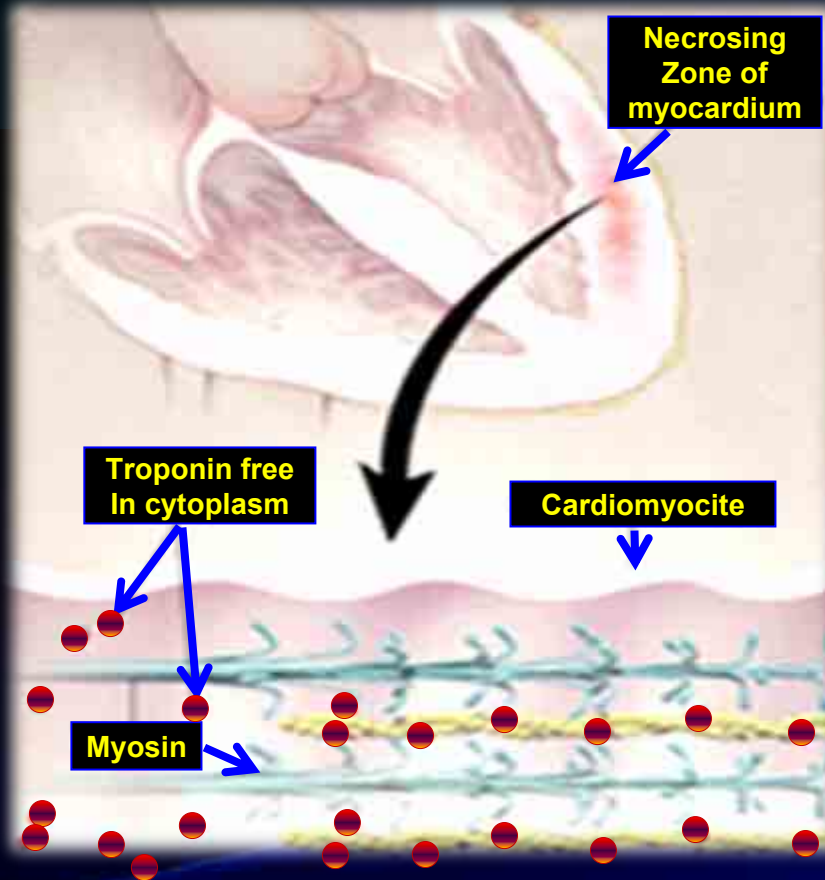
Troponina positiva... es sinónimo de intervención ?

Estructura de la Troponina



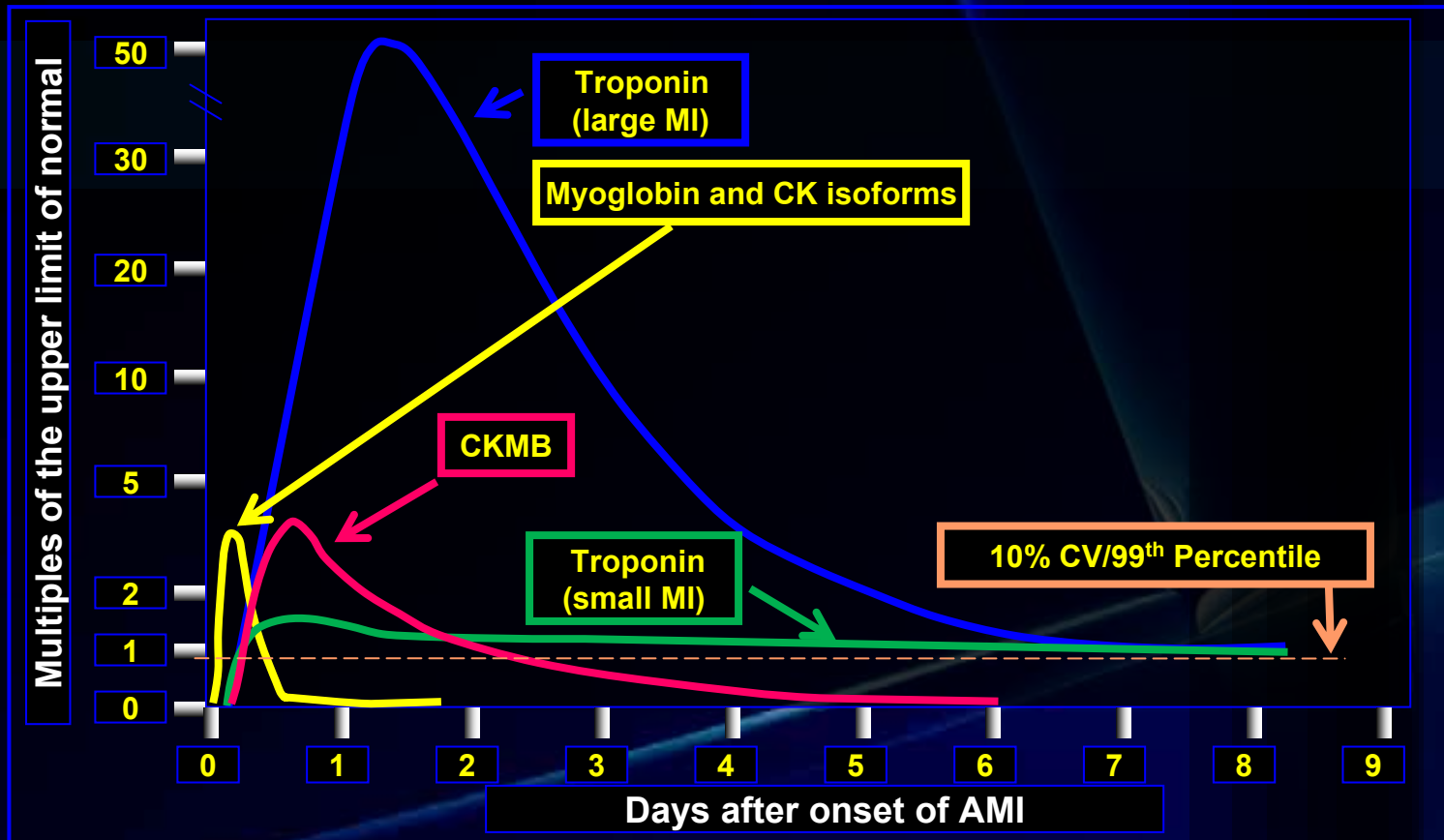
- Troponin T (39.7 kd) ligada al complejo tropomiosina
- Troponin C (18 kd) ligada al calcio, inicia la contracción
- Troponin I (22.5 kd) inhibe la contracción en estado de reposo

Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?

Tiempo a la liberación de biomarcadores luego del infarto agudo



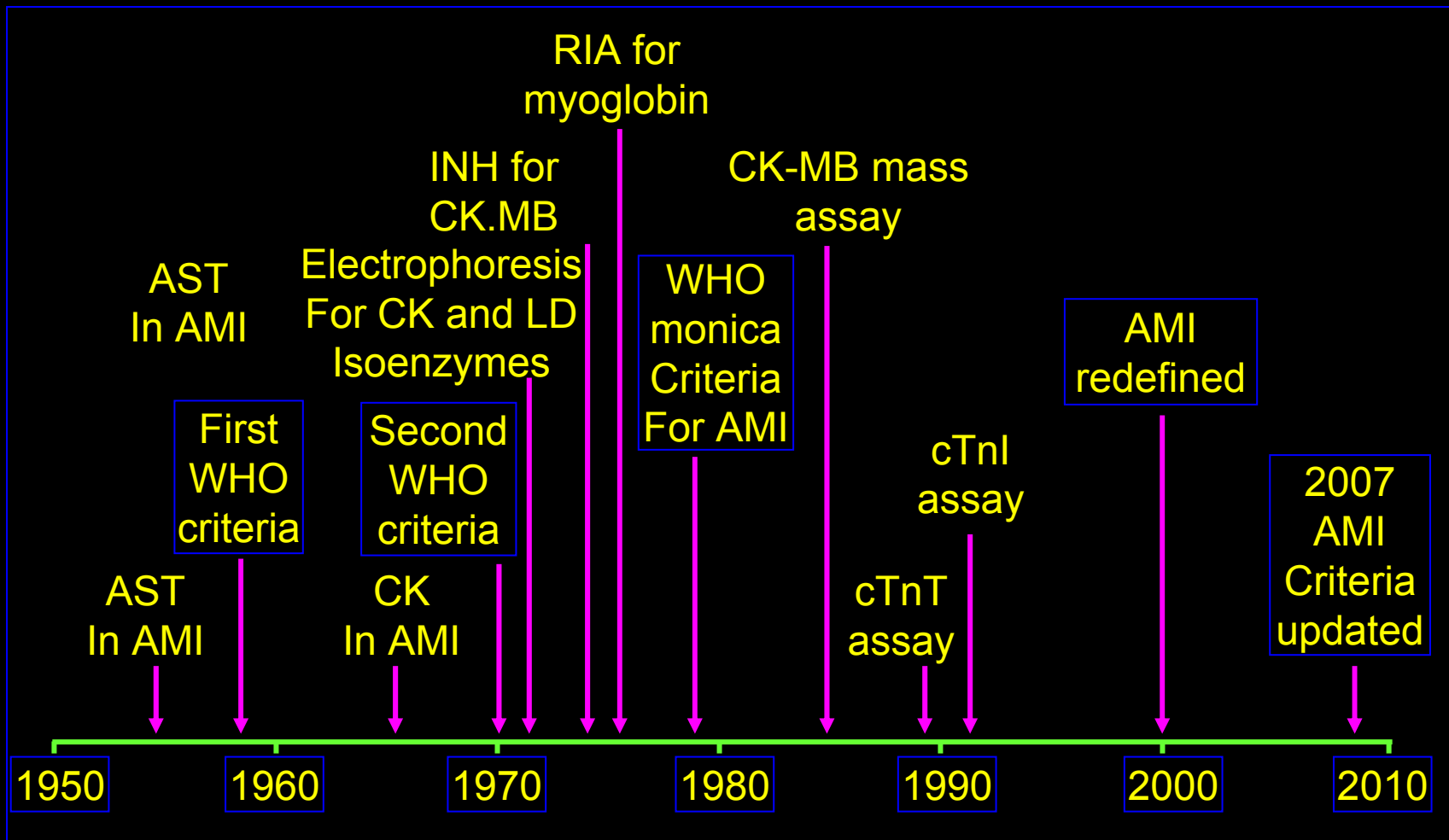
Anderson, J. L. et al. J Am Coll Cardiol 2007;50:e1-e157

Troponina positiva... es sinónimo de intervención ?

Criteria: Biochemical Markers for Detecting Myocardial Necrosis

- Increased cardiac troponin defined as measurement >99th percentile of reference group
- Max concentration of cTnT or cTnI exceeding the decision limit (99th percentile for reference control group) **at least once during initial 24h after index event.**
- Acceptable imprecision (%CV) at 99th percentile should be defined as $\leq 10\%$

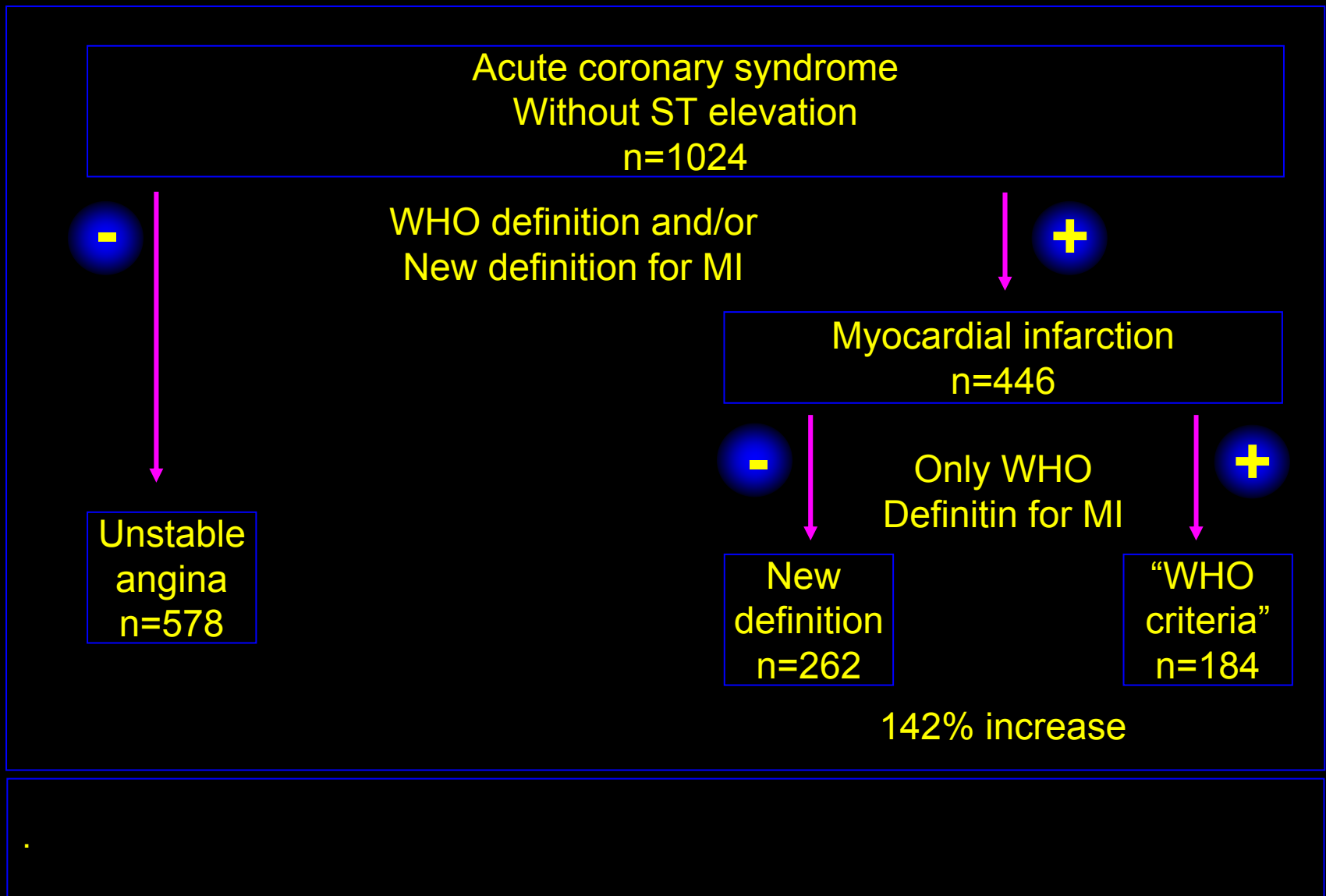
Troponina positiva... es sinónimo de intervención ?



AST, angiotensin sensitivity test; CK, creatine kinase; INH, immunoassay; LD, lactate dehydrogenase; RIA, radioimmunoassay; TnI, troponin I; TnT, troponin T; WHO, World Health Organization.

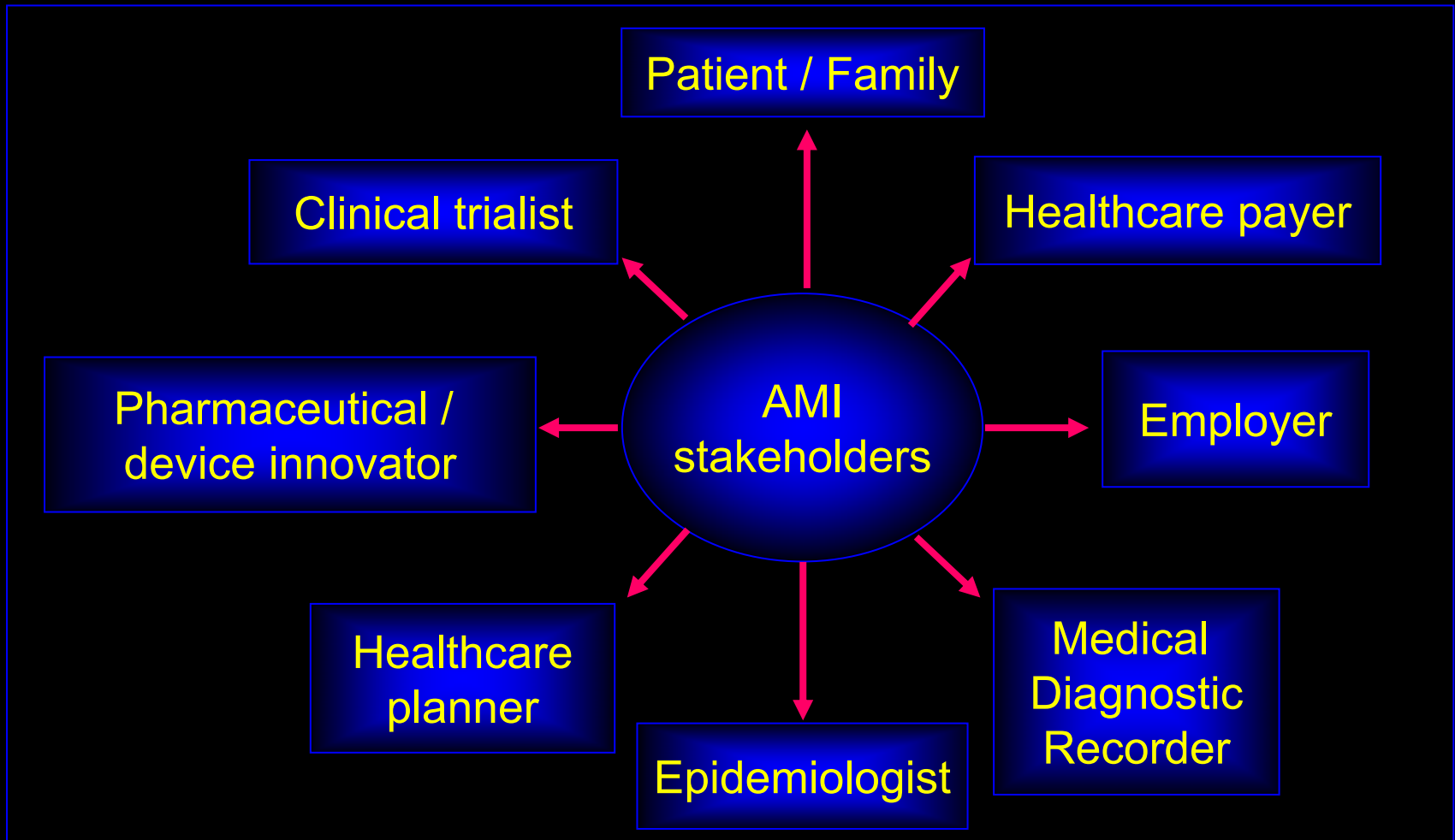
Increases in the frequency of acute myocardial infarction (MI) with troponin

Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?

Summary of key stakeholders interested in the definition of myocardial infarction.



Troponina positiva... es sinónimo de intervención ?

– Criteria for acute Myocardial Infarction

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

- Detection of rise and/or fall of cardiac biomarkers (preferably troponin) with at least one value above the 99th percentile of the upper reference limit (URL) together with evidence of myocardial ischaemia with one of the following:
 - » Symptoms of ischaemia;
 - » ECG changes indicative of new ischaemia [new 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 abnormality²
- Sudden, unexpected cardiac death, involving cardiac arrest, often with symptoms suggestive of myocardial ischaemia, and accompanied by presumably new ST elevation, or new LBBB, and/or evidence of fresh thrombus by coronary angiography and/or at autopsy, but death occurring before blood samples could be obtained, or at a time before the appearance of cardiac biomarkers in the blood.
- Cont...

Troponina positiva... es sinónimo de intervención ?

– Criteria for acute Myocardial Infarction Cont...

- For percutaneous coronary interventions (PCI) in patients with normal baseline troponin values, elevation of cardiac biomarkers above the 99th percentile URL are indicative of peri-procedural myocardial necrosis. By convention, increases of biomarkers greater than 3x99th percentile URL have been designated as defining PCI-related myocardial infarction. A subtype related to a documented stent thrombosis is recognized.
- For coronary artery bypass grafting (CABG) in patients with normal baseline troponin values, elevation of cardiac markers above the 99th percentile URL are indicative of peri-procedural myocardial necrosis. By convention, increases of biomarkers greater than 5x99th percentile URL plus either new pathological Q waves or new LBBB, or angiographically documented new graft or native coronary artery occlusion, or imaging evidence of new loss of viable myocardium have been designated as defining CABG-related myocardial infarction.
- Pathological finding of an acute myocardial infarction.

– Criteria for prior myocardial infarction

Any one of the following criteria meets the diagnosis for prior myocardial infarction:

- Development of new pathological Q waves without symptoms.
- Imaging evidence of a region of loss of viable myocardium that is thinned and fails to contact, in the absence of a non-ischaemic cause.
- Pathological finding of a healed or healing myocardial infarction.

Troponina positiva... es sinónimo de intervención ?

Definition of myocardial infarction

Criteria for acute myocardial infarction (2007)

Cardiac contusion, or other trauma The term “myocardial infarction” should be used when there is evidence of myocardial necrosis in a clinical setting consistent with myocardial ischaemia. Under these conditions any one of the following criteria meets the diagnosis for myocardial infarction:

1. Detection of rise and/or fall of cardiac biomarkers (preferably troponin) with at least one value above the 99th centile of the upper reference limit (URL) together with evidence of myocardial ischaemia with at least one of the following:

- (a) Symptoms of ischaemia
- (b) ECG changes indicative of new ischaemia (new ST–T changes or new left bundle branch block (LBBB))
- (c) Development of pathological Q waves in the ECG
- (d) Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality

2. Sudden, unexpected cardiac death, involving cardiac arrest, often with symptoms suggestive of myocardial ischaemia, and accompanied by presumably new ST elevation, or new LBBB, and/or evidence of fresh thrombus by coronary angiography and/or at autopsy, but death occurring before blood samples could be obtained, or at a time before the appearance of cardiac biomarkers in the blood

Definition of myocardial infarction (2000)

Criteria for acute, evolving or recent myocardial infarction Either one of the following criteria satisfies the diagnosis for an acute, evolving or recent myocardial infarction:

1. Typical rise and gradual fall (troponin) or more rapid rise and fall (CK-MB) of biochemical markers of myocardial necrosis with at least one of the following:

- (a) Ischaemic symptoms
- (b) Development of pathologic Q waves on the ECG
- (c) ECG changes indicative of ischaemia (ST segment elevation or depression) or
- (d) Coronary artery intervention (for example, coronary angioplasty)

2. Pathologic findings of an acute myocardial infarction

Reproduced from: (1) Myocardial infarction redefined – a consensus document of the Joint European Society of Cardiology/American College of Cardiology Committee for the Redefinition of Myocardial Infarction. *Eur Heart J* 2000; 21:1502–13 with permission of Oxford University Press; (2) Thygesen K, Alpert JS, White HD on behalf of the Joint ESC/ACCF/AHA/WHF Task Force for the Redefinition of Myocardial Infarction. Clinical Investigation Group: Armstrong PW, Antman EM, Fox KA, Hamm CW, Ohman EM, Simoons ML. Universal definition of myocardial infarction. *Eur Heart J* 2007;28:2525–38 with permission of Oxford University Press.

Troponina positiva... es sinónimo de intervención ?

Definition of myocardial infarction CONT...

Criteria for acute myocardial infarction (2007)

3. For percutaneous coronary interventions (PCI) in patients with normal baseline troponin values, elevations of cardiac biomarkers above the 99th centile URL are indicative of periprocedural myocardial necrosis. By convention, increases of biomarkers greater than 36 99th centile URL have been designated as defining PCI related myocardial infarction. A subtype related to a documented stent thrombosis is recognised

4. For coronary artery bypass grafting (CABG) in patients with normal baseline troponin of periprocedural myocardial necrosis. By convention, increases of biomarkers greater than 5699th centile URL plus either new pathological Q waves or new LBBB, or angiographically documented new graft or native coronary artery occlusion, or imaging evidence of new loss of viable myocardium, have been designated as defining CABG related myocardial infarction

5. Pathological findings of an acute myocardial infarction

Definition of myocardial infarction (2000)

Reproduced from: (1) Myocardial infarction redefined – a consensus document of the Joint European Society of Cardiology/American College of Cardiology Committee for the Redefinition of Myocardial Infarction. Eur Heart J 2000; 21:1502–13 with permission of Oxford University Press; (2) Thygesen K, Alpert JS, White HD on behalf of the Joint ESC/ACCF/AHA/WHF Task Force for the Redefinition of Myocardial Infarction. Clinical Investigation Group: Armstrong PW, Antman EM, Fox KA, Hamm CW, Ohman EM, Simoons ML. Universal definition of myocardial infarction. Eur Heart J 2007;28:2525–38 with permission of Oxford University Press.

Troponina positiva... es sinónimo de intervención ?

- **Type 1** Spontaneous myocardial infarction related to ischaemia due to a primary coronary event such as plaque erosion and/or rupture, fissuring, or dissection.
- **Type 2** Myocardial infarction secondary to ischaemia due to either increased oxygen demand or decreased supply, e.g. Coronary artery spasm, coronary embolism, anaemia, arrhythmias, hypertension, or hypotension.
- **Type 3** Sudden unexpected cardiac death, including cardiac arrest, often with symptoms suggestive of myocardial ischaemia, accompanied by presumably new ST elevation, or new LBBB, or evidence of fresh thrombus in a coronary artery by angiography and/or at autopsy, but death occurring before blood samples could be obtained, or at a time before the appearance of cardiac biomarkers in the blood.
- **Type 4a** Myocardial infarction associated with PCI.
- **Type 4b** Myocardial infarction associated with stent thrombosis as documented by angiography or at autopsy.
- **Type 5** Myocardial infarction associated with CABG.

Elevations of troponin in the absence of overt ischemic heart disease

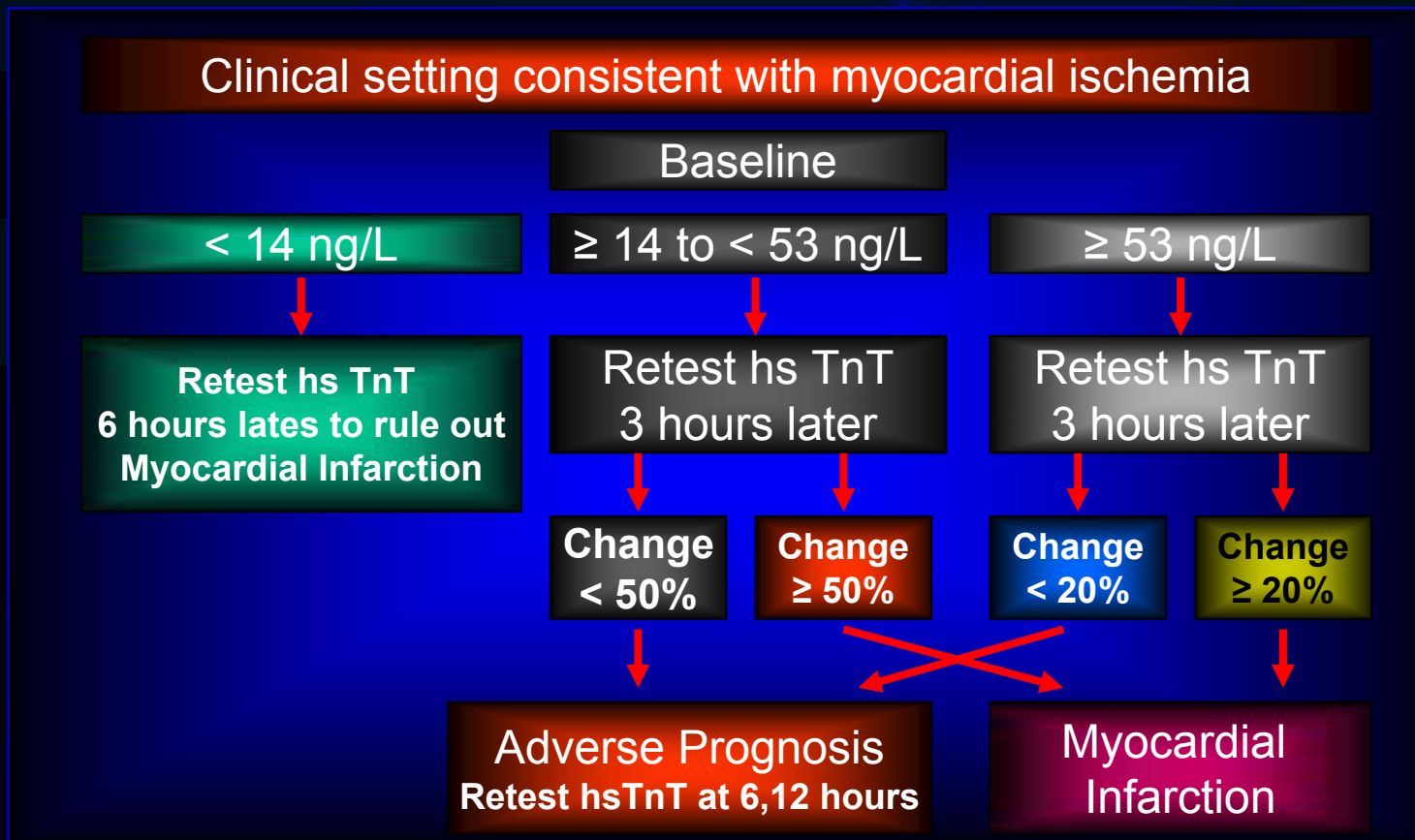
Troponina positiva... es sinónimo de intervención ?

- Cardiac contusion, or other trauma including surgery, ablation, pacing, etc.
- Congestive heart failure—acute and chronic
- Aortic dissection
- Aortic valve disease
- Hypertrophic cardiomyopathy
- Tachy- or bradyarrhythmias, or heart block
- Apical ballooning syndrome
- Rhabdomyolysis with cardiac injury
- Pulmonary embolism, severe pulmonary hypertension
- Renal failure
- Acute neurological disease, including stroke or subarachnoid haemorrhage
- Infiltrative diseases, e.g. amyloidosis, haemochromatosis, sarcoidosis, and scleroderma
- Inflammatory diseases, e.g. myocarditis or myocardial extension of endo-/pericarditis
- Drug toxicity or toxins
- Critically ill patients, especially with respiratory failure or sepsis
- Burns, especially if affecting >30% of body surface area
- Extreme exertion

ismm2010

Use of high sensitivity troponin T to diagnose myocardial infarction

Troponina positiva... es sinónimo de intervención ?



The figure illustrates the use of hsTroponin T (hsTnT) using the cutpoint of 14 ng/L, which fulfills the task force for the Universal definition for the diagnosis of MI requirements for an assay to have a 10% CV at the 99th percentile for an apparently healthy population.¹⁰ As the hsTroponin T measures 23 ng/L higher than the fourth-generation contemporary troponin T⁴ (with a cutpoint for the diagnosis of MI of 30 ng/L (0.03 ng/L) based on a 10% CV but not fulfilling the guideline recommendation for precision at the 99th percentile), the cutpoint for comparison is 53 ng/L. A biologic Δ of 50% is used to define the rise and or/fall as required by the Universal definition of MI taskforce. To make the diagnosis of MI, there must also be evidence of ischemia either manifesting as symptoms or evident on an electrocardiogram, imaging evidence of new loss of viable myocardium or new regional wall motion abnormality.

Troponina positiva... es sinónimo de intervención ?

Diagnostic Performance of Cardiac Troponin Assays at Presentation.

Troponin Assay	Sensitivity	Specificity	Negative Predictive Value	Positive Predictive Value
Sensitive Troponin Assays				
Abbot - Architect Troponin I	Percent (95% Confidence Interval)			
Limit of detection, 0.010 µg/L	94(88-97)	87(84-89)	98(97-99)	59(52-66)
99 th Percentile, 0.028 µg/L	86(79-92)	92(90-94)	97(95-98)	69(61-76)
10%Coef of Variation, 0.032µg/L	85(77-90)	93(90-95)	97(95-98)	70(62-78)
Roche High-Sensitive Troponin T				
Limit of detection, 0.002 µg/L	100(97-100)	14(12-18)	100(96-100)	19(16-23)
99 th Percentile, 0.014 µg/L*	95(90-98)	80(77-83)	99(97-100)	50(43-56)
RocheTroponin I				
Limit of detection, 0.100 µg/L	92(86-96)	88(86-91)	98(97-99)	62(55-69)
99 th Percentile, 0.160 µg/L	84(76-90)	94(91-95)	97(95-98)	73(65-80)
10%Coef of Variation, 0.300 µg/L	75(66-82)	97(95-98)	95(93-97)	83(75-89)

* The criterion of 10% coefficient of variation was fulfilled at the 99th Percentile.

Troponina positiva... es sinónimo de intervención ?

Diagnostic Performance of Cardiac Troponin Assays at Presentation.

Troponin Assay				Negative Predictive	Positive Predictive
Sensitive Troponin Assays		Sensitivity	Specificity	Value	Value
Siemens Troponin I Ultra		Percent (95% Confidence Interval)			
Limit of detection, 0.006 µg/L		97(91-99)	68(64-72)	99(97-100)	38(32-44)
99 th Percentile, 0.004 µg/L*		89(82-94)	92(89-94)	98(96-99)	68(60-76)
Standart Assays					
RocheTroponin T 4th Generation					
99 th Percentile, unknown					
Limit of detection, 0.010 µg/L		83(76-90)	93(91-95)	97(95-98)	72(64-79)
10%Coef of Variation, 0.300 µg/L		72(64-80)	97(96-98)	94(92-96)	85(76-91)

* The criterion of 10% coefficient of variation was fulfilled at the 99th Percentile.

Troponin positive

Tpn Precision at low Concentrations

(*clin chem* 327-332, 2004)

Criteria

99th percentile reference limit at 10% CV for the evaluated troponin I assays

SUNY Chemistry Lab

Lo control at 1.16 ug/L (CV = 17.1%)

Hi control at 2.89 ug/L (CV = 9.5%)

Table 1: Cut-off values of cardiac troponin assays

Assay	LLD	99th percentile	10% CV*	ROC curve
ARCH STAT Troponin-I, Abbott Diagnostics	0.009	0.012	0.032	0.3
AxSYM Troponin-I ADV, Abbott Diagnostics	0.02	0.04	0.16	0.4
i-STAT,† Abbott Laboratories	0.02	0.08 (WB)	0.1	ND
Centaur, Bayer Diagnostics	0.02	0.1	0.35	1.0
Access AccuTnl Troponin I, Beckman Coulter	0.01	0.04	0.06	0.5
Triage Cardiac Panel,† Biosite	0.19	< 0.19	0.5	0.4
Dimension RxL, Dade Behring	0.04	0.07	0.14	0.6-1.5
Stratus CS,† Dade Behring	0.03	0.07	0.06	0.6-1.5
Immulate, Diagnostic Products Corporation	0.1	0.2	0.6	1.0
Vitros, Ortho-Clinical Diagnostics	0.02	0.08	0.12	0.4
Response,† Ortho-Clinical Diagnostics	0.03	< 0.03 (WB)	0.21	ND
Elecsys, Roche Diagnostics	0.01	< 0.01	0.03	0.1
Reader,† Roche Diagnostics	0.05	< 0.05 (WB)	ND	0.1
Tosoh AIA, Global Medical Instrumentation Inc.	0.06	< 0.06	0.06	0.31-0.64

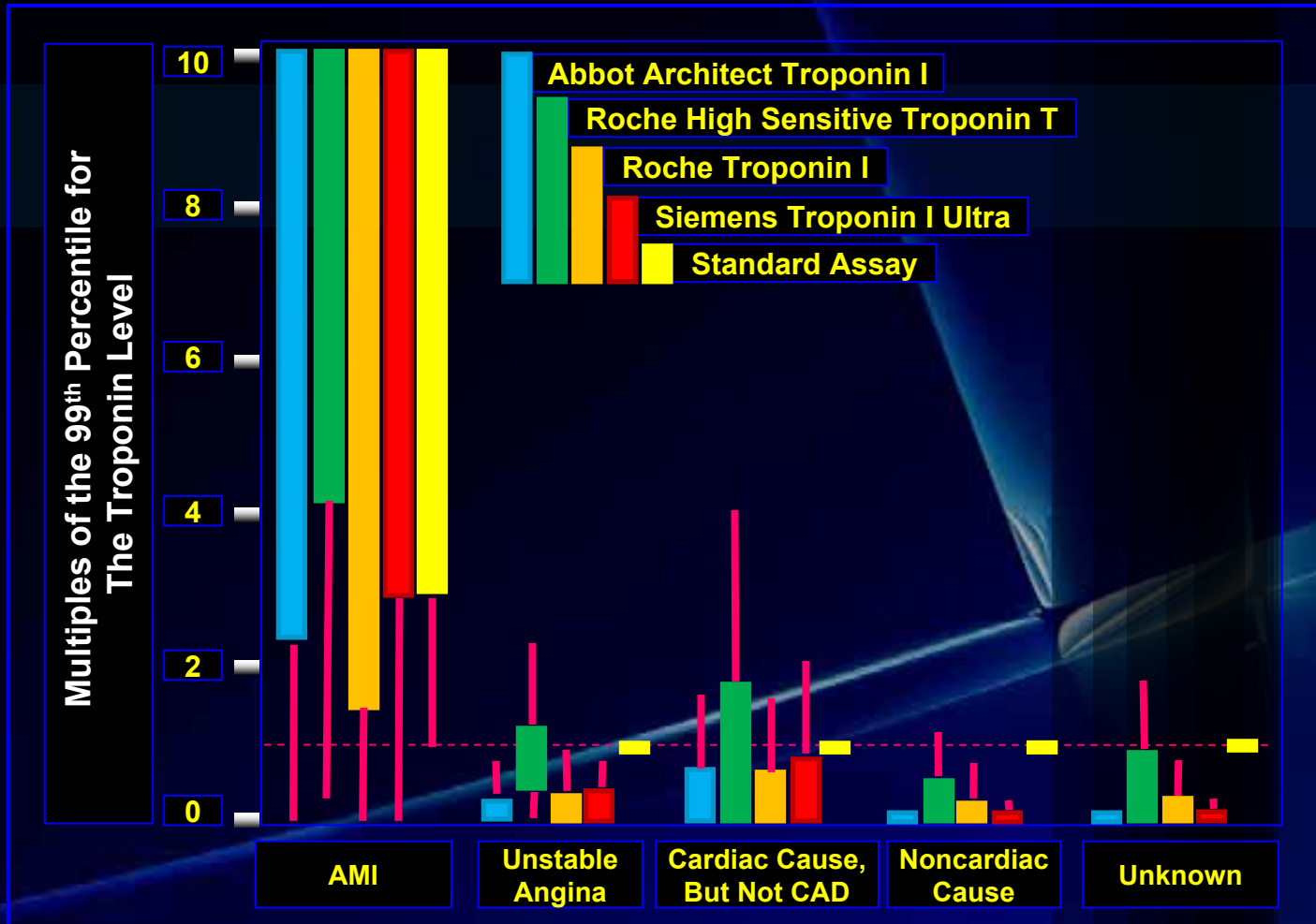
Note: LLD = lower limit of detection, CV = coefficient of variation, ROC = receiver operating characteristic, ND = not determined, WB = whole blood.

*Per manufacturer.

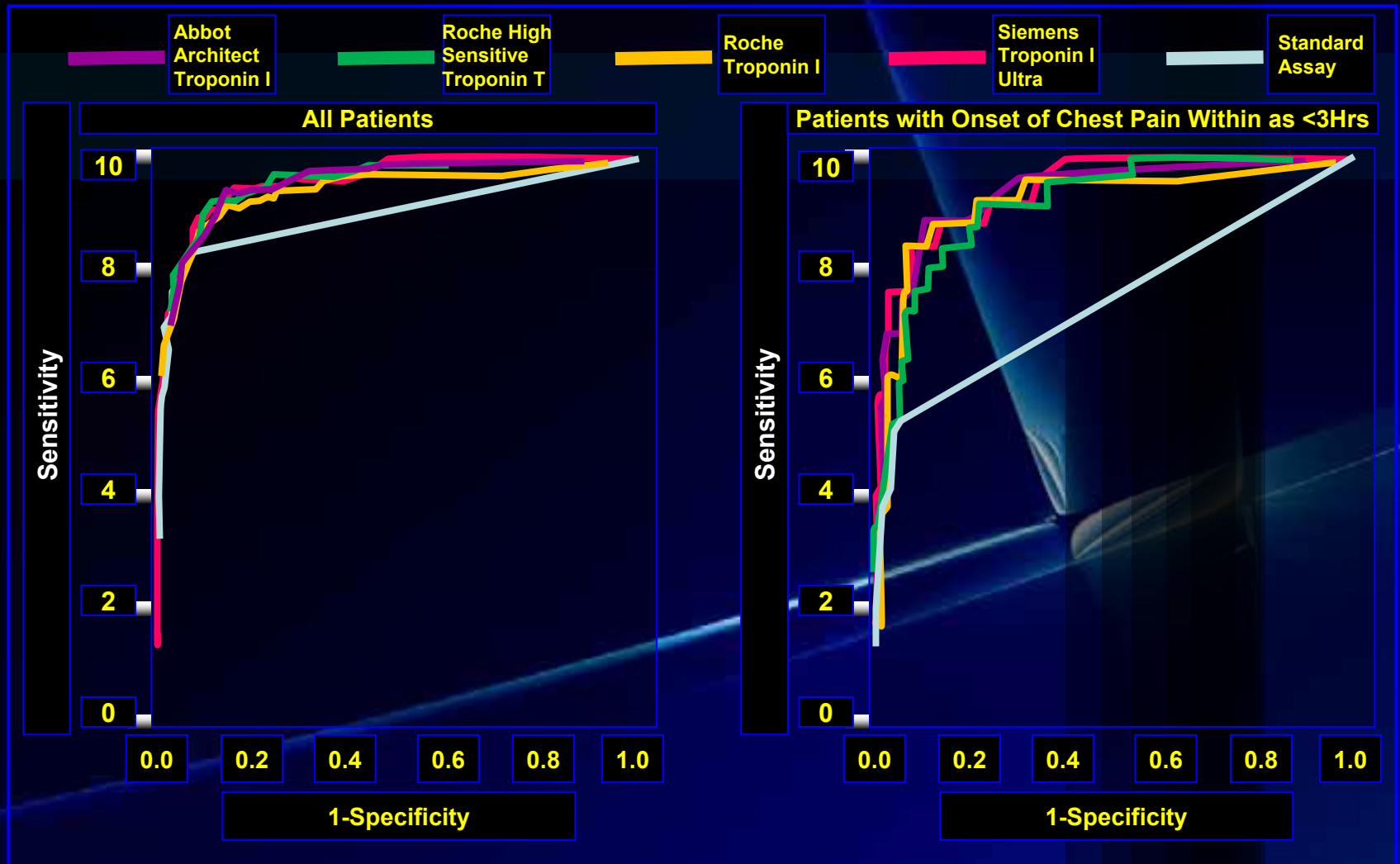
†Point-of-care assay FDA-cleared as high-sensitivity assay 2004 (CS).

Source: Apple et al.⁵⁷

Troponina positiva... es sinónimo de intervención ?

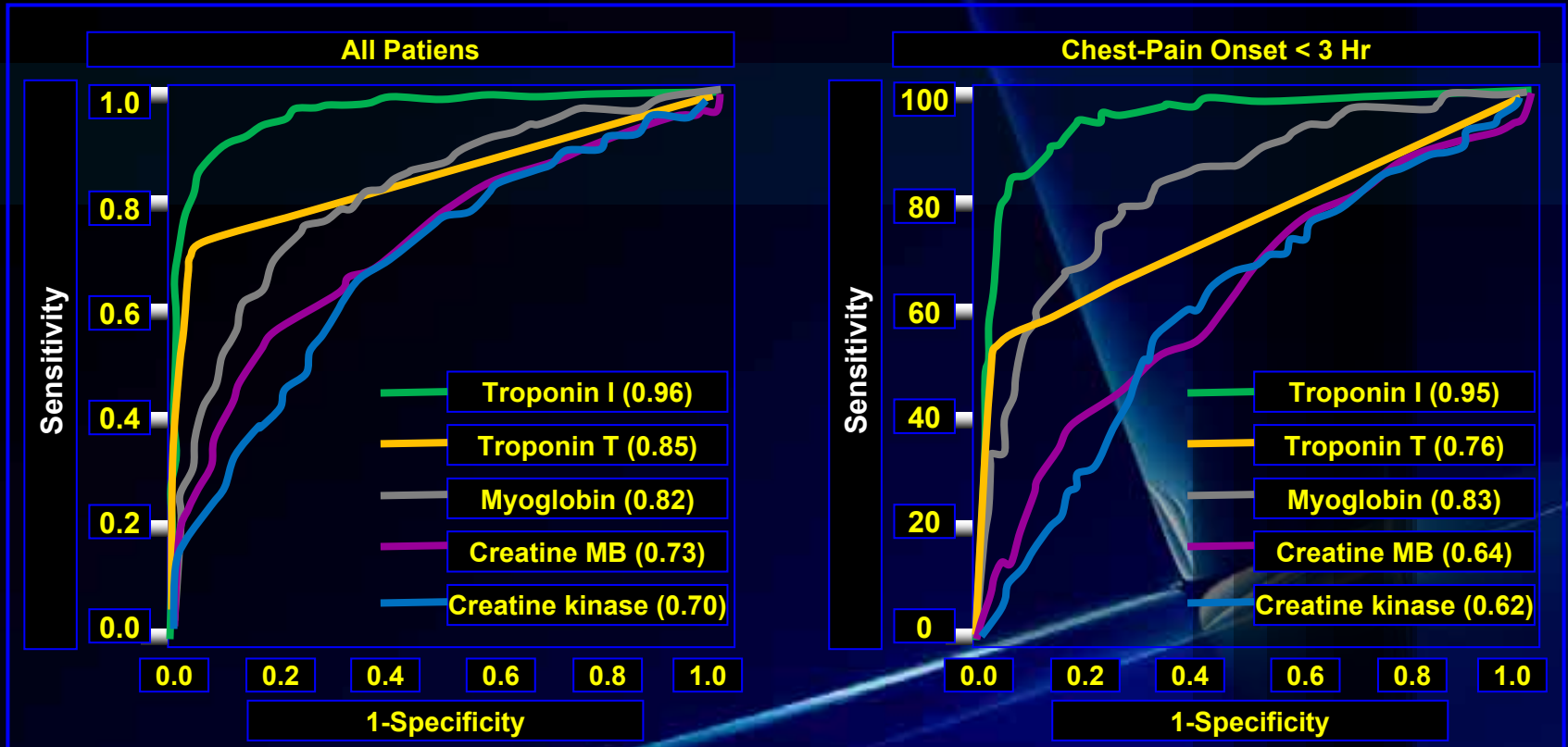


Troponina positiva... es sinónimo de intervención ?



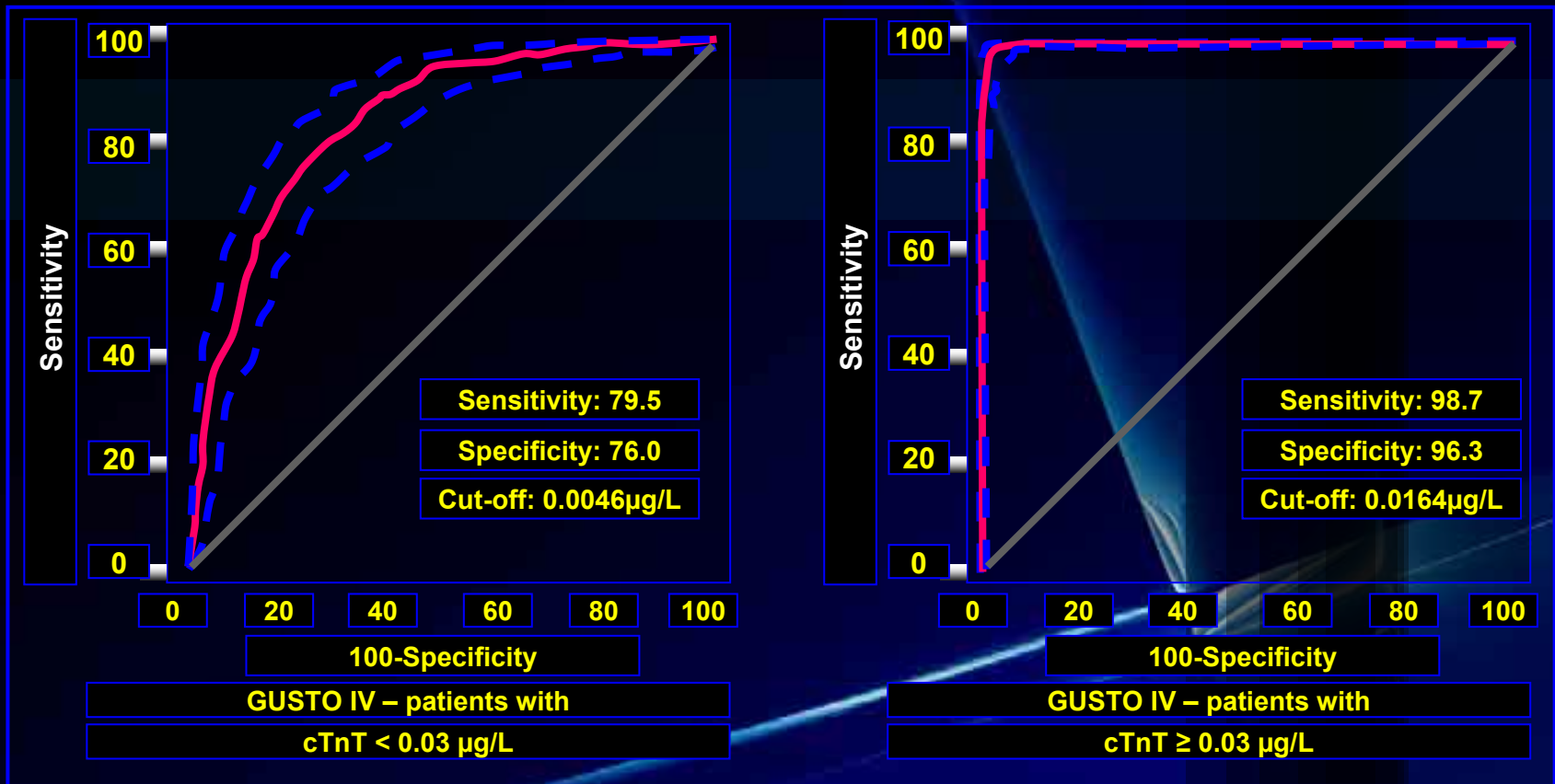
Troponina positiva... es sinónimo de intervención ?

Diagnostic Accuracy of Single Biomarker Testing for Acute Myocardial Infarction.



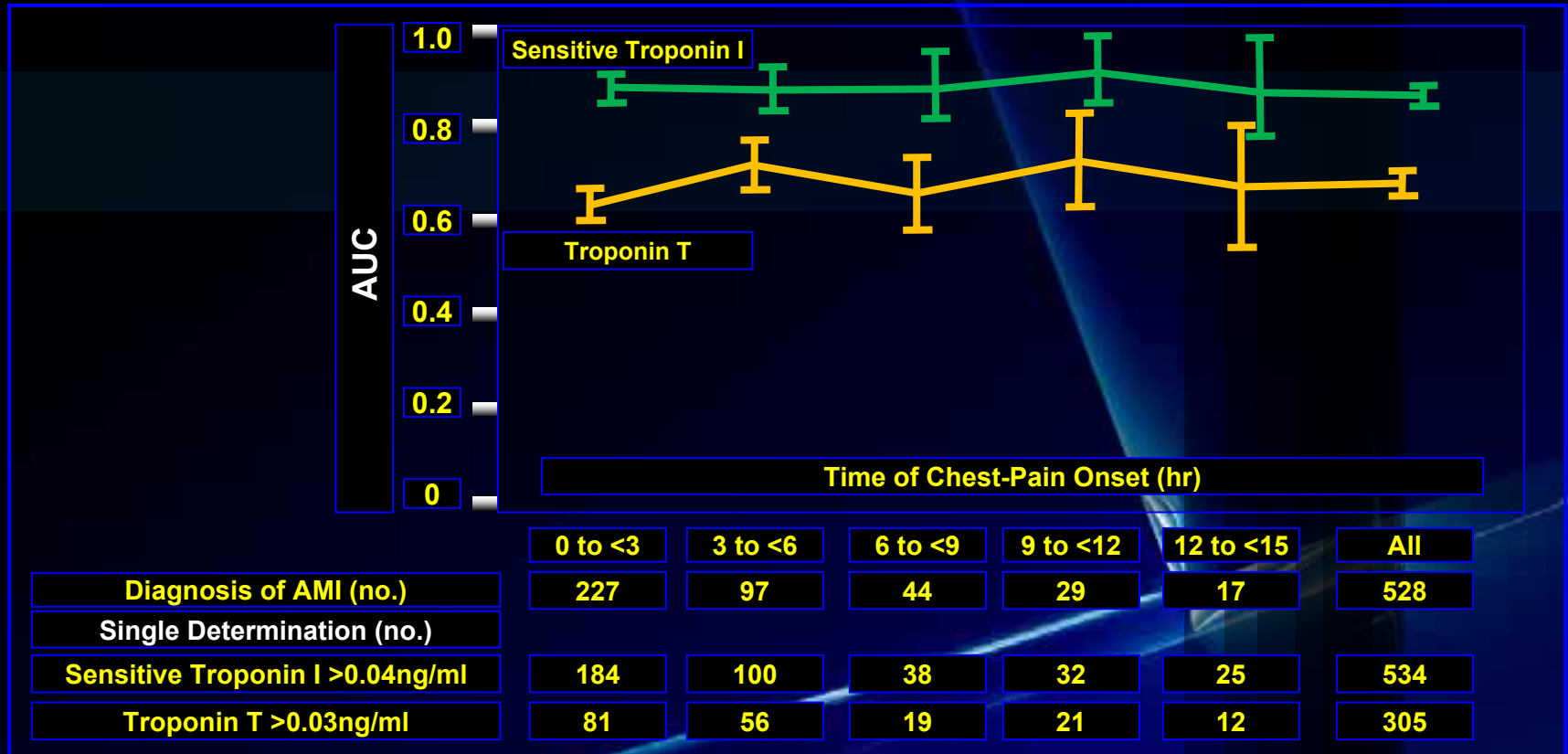
Troponina positiva... es sinónimo de intervención ?

Curve ROC de niveles de cTnI en sujetos sanos y en ptes con SCA con cTnT arriba y debajo de 0.03 µg/l



Troponina positiva... es sinónimo de intervención ?

Diagnosis of Acute Myocardial Infarction with the Use of Sensitive Troponin I Assay.



Troponina positiva... es sinónimo de intervención ?

Cardiac troponin is a preferred biomarker of acute myocardial infarction (MI). Unfortunately, elevation of troponin can be detected in a variety of conditions other than acute MI. This review focuses on the incidence and clinical significance of increased troponin in conditions commonly associated with troponin elevations, particularly in those that may resemble acute MI.

(CHEST 2004; 125:1877–1884)

Troponina positiva... es sinónimo de intervención ?

Condiciones comúnmente asociadas con elevaciones de troponinas
cardiacas en ausencia de infarto

Acute PE

Acute pericarditis

Acute or severe HF

Myocarditis

Sepsis and/or shock

Renal failure

False-positive troponin

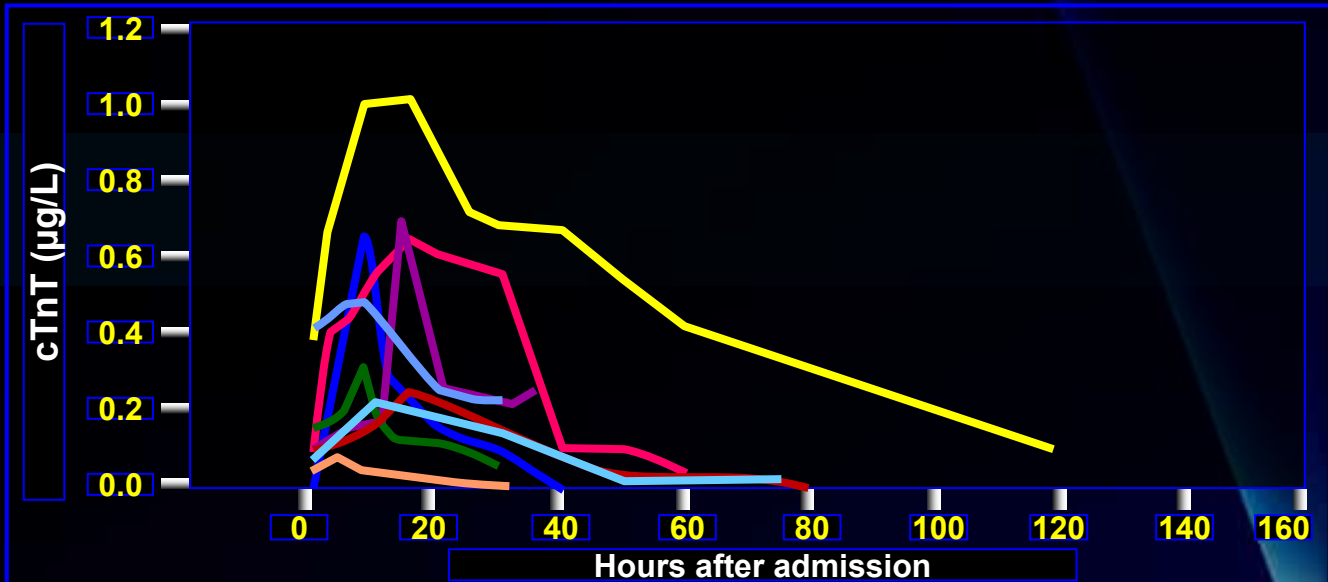
Troponina positiva... es sinónimo de intervención ?

Incidence and Clinical Significance of Troponin Elevations in Various Conditions*

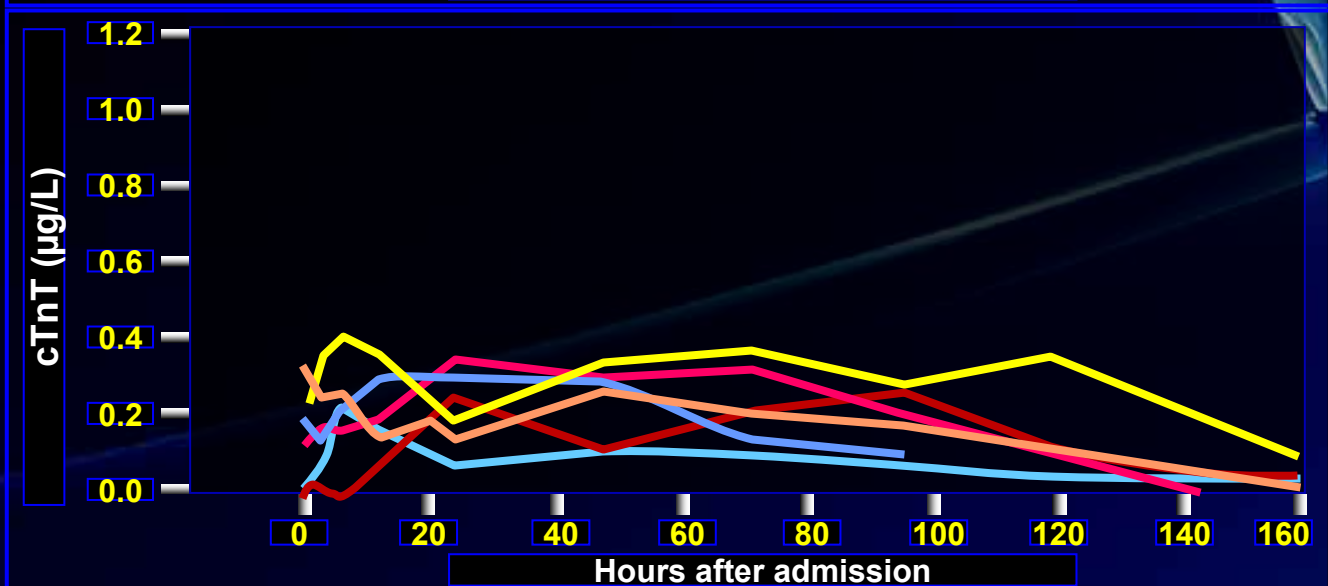
Conditions	Troponin Subunit	Cut-offs, ng/mL	Incidence, %	Clinical Significance of Troponin Elevation
Acute pericarditis	TnI	0.5	49	Correlates with recent infection
		1.5	22	
Acute PE				
Overall	TnT	0.1	32	Increased risk of in-hospital mortality, poor 30-d outcome, right ventricular dysfunction, shock/hypotension, and need for mechanical ventilation.
Massive			53	
Small			0	
Submassive	TnI	0.4	21	
		2.3	4	

Troponina positiva... es sinónimo de intervención ?

Curva Tiempo-liberación Troponin T en Embolia de pulmón



Time-release curve of cTnT (µg/L) in nine patients with confirmed PE who developed a cTnT ≥ 0.1 µg/L (A) and 6 patients with microinfarction (B)



Muller-Bardorff et al. Clin Chem 48 (4): 673

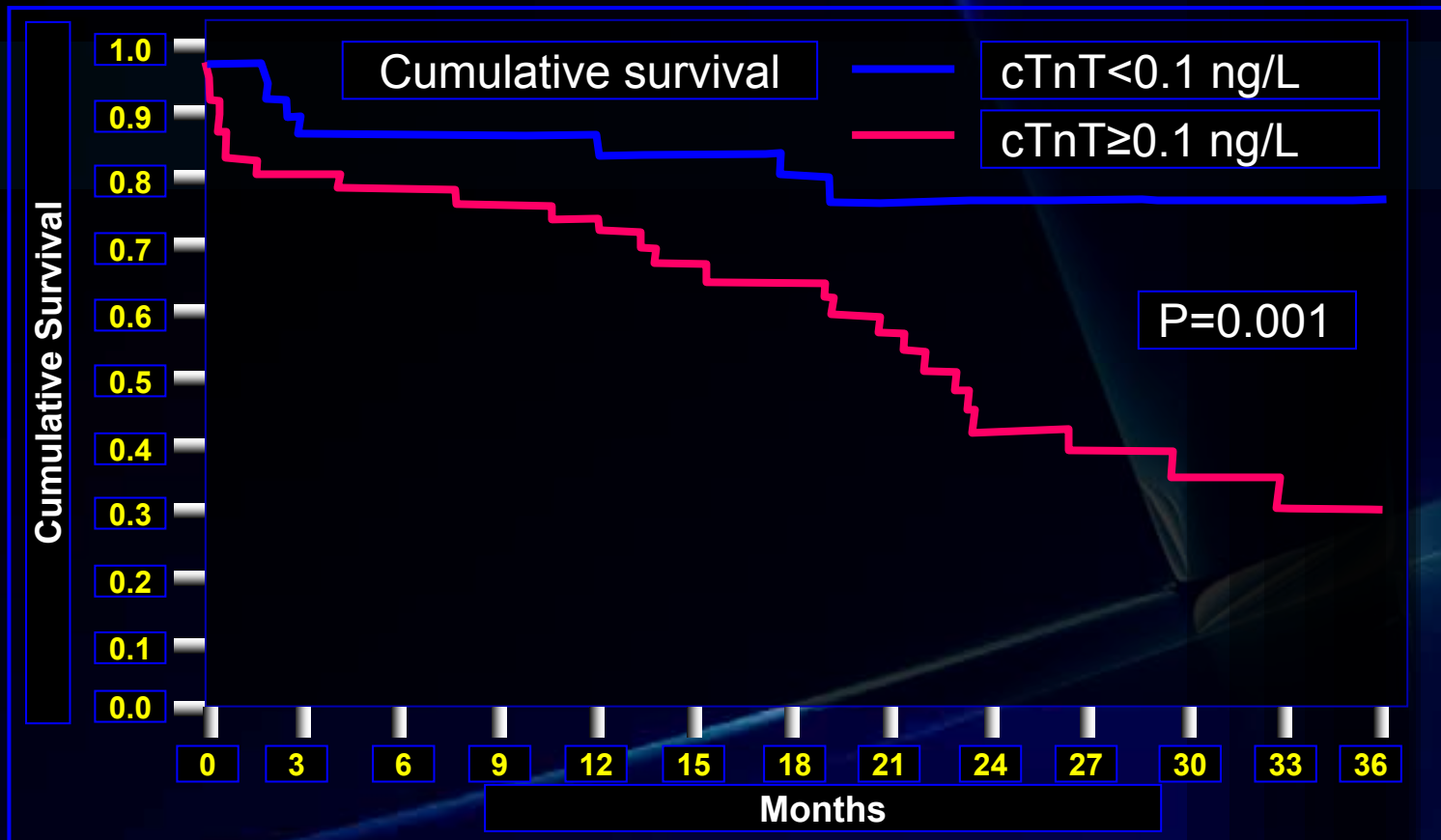
Troponina positiva... es sinónimo de intervención ?

Incidence and Clinical Significance of Troponin Elevations in Various Conditions*. CONT...

Conditions	Troponin Subunit	Cut-offs, ng/mL	Incidence, %	Clinical Significance of Troponin Elevation
HF				
Severe but stable	TnI	0.1	3	Independent predictor of long-term survival or readmission for HF; correlates with worse functional class, and lower ejection fraction
	TnT	0.1	15	
Hospitalized HF	TnT	1.0	3	
		0.1	7	
Stable or unstable	TnI	1.0	2	
		0.3	23	
Acute left HF	TnI	1.0	0	
		0.1	20	
		1.0	55	
Cor pulmonale	TnI	0.1	7	
		1.0	0	

Troponina positiva... es sinónimo de intervención ?

Curva de supervivencia en edema de pulmón



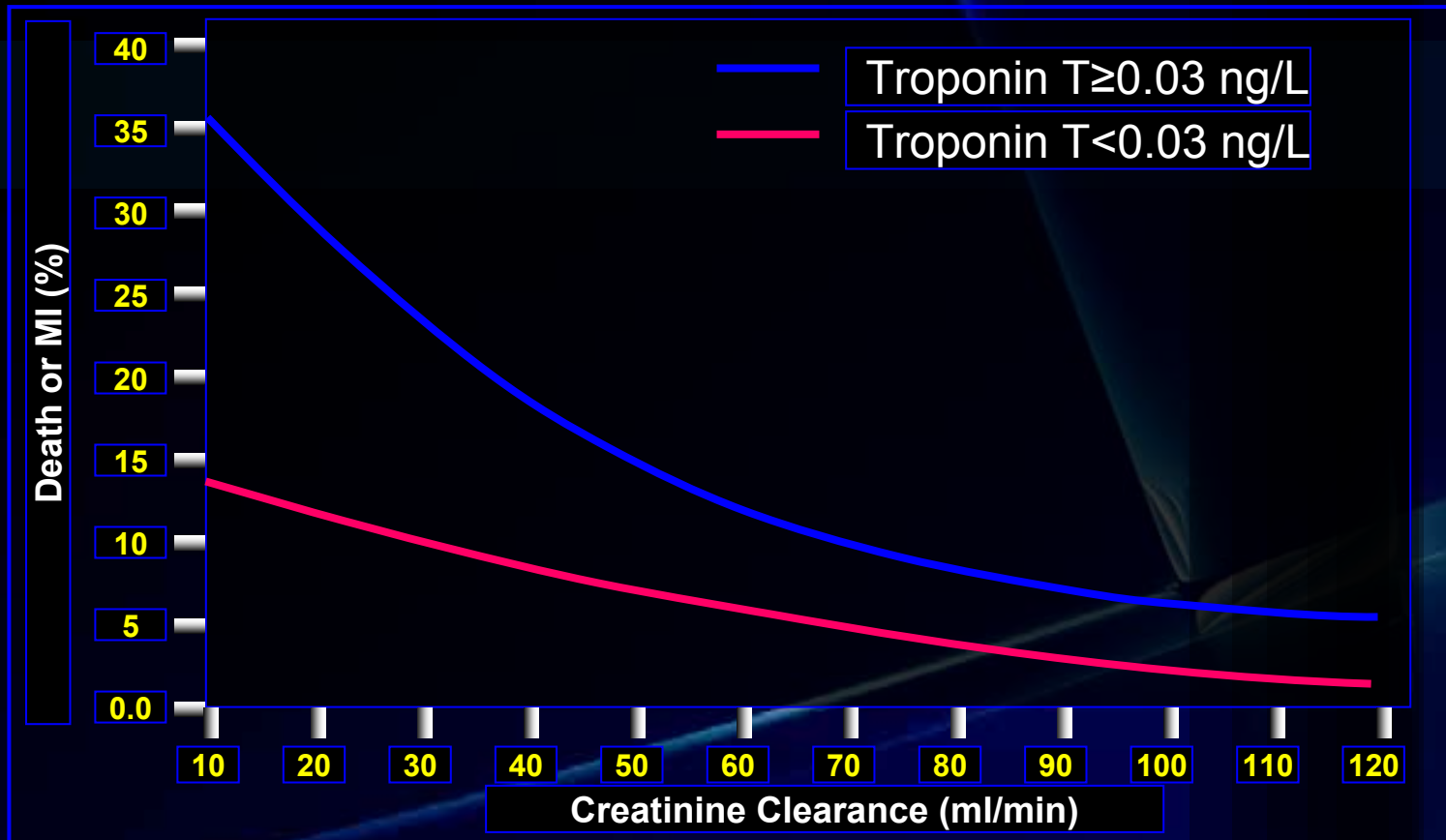
Troponina positiva... es sinónimo de intervención ?

Incidence and Clinical Significance of Troponin Elevations in Various Conditions*. CONT...

Conditions	Troponin Subunit	Cut-offs, ng/mL	Incidence, %	Clinical Significance of Troponin Elevation
Myocarditis	TnI	3.1	34	Correlates with recent onset of HF and more diffuse myocarditis
Severe sepsis/shock	TnI	0.1	58–85	Correlates with APACHE II score and degree of hypotension; increased in-hospital mortality; independent predictor of left ventricular dysfunction
		0.4	50	
	TnT	0.1	36 - 69	
Renal failure	TnI	0.1	6	Independent predictor of poor long-term outcome
		0.4	1	
	TnT	0.03	53	
		0.1	20	

Troponina positiva... es sinónimo de intervención ?

Incidencia de muerte/infarto de acuerdo a valores de Troponin T y clearance de Creatinina



Aviles et al. N Engl J Med 2002;346:2047-2052

Troponina positiva... es sinónimo de intervención ?

Common Causes of False-Positive Troponin

Heterophilic antibodies

Rheumatoid factor

Fibrin clots

Microparticles

Analyzer malfunction

Troponina positiva... es sinónimo de intervención ?

Troponin Predicts Response to Therapy

- Dalteparin
- FRISC

- Lindahl et al, JACC 29:43

- Tirofiban
- PRISM

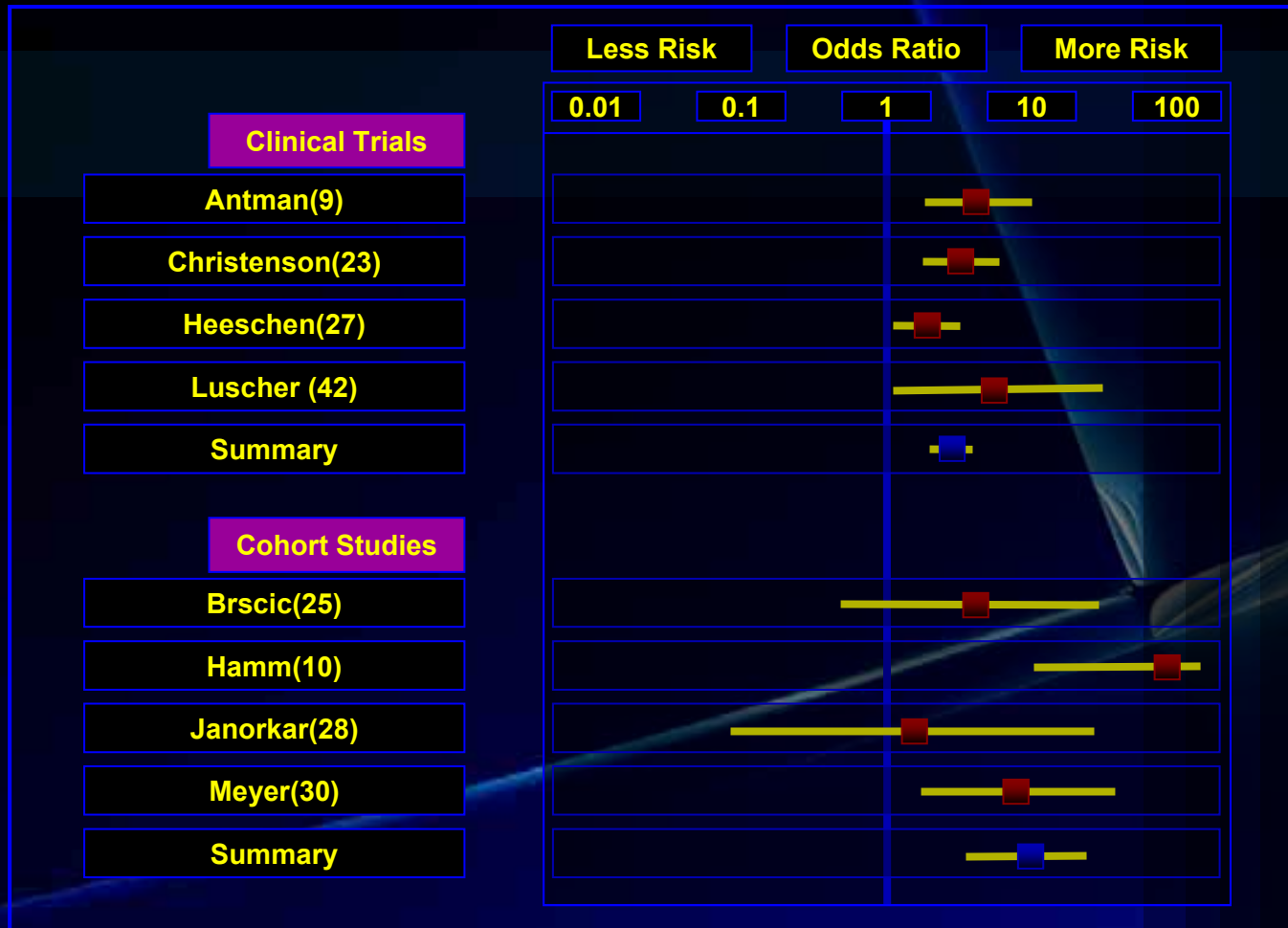
- Heeschen et al, Lancet 354:1757

- Abciximab
- CAPTURE

- (in patients undergoing PCI)
- Hamm et al, NEJM 340:1623

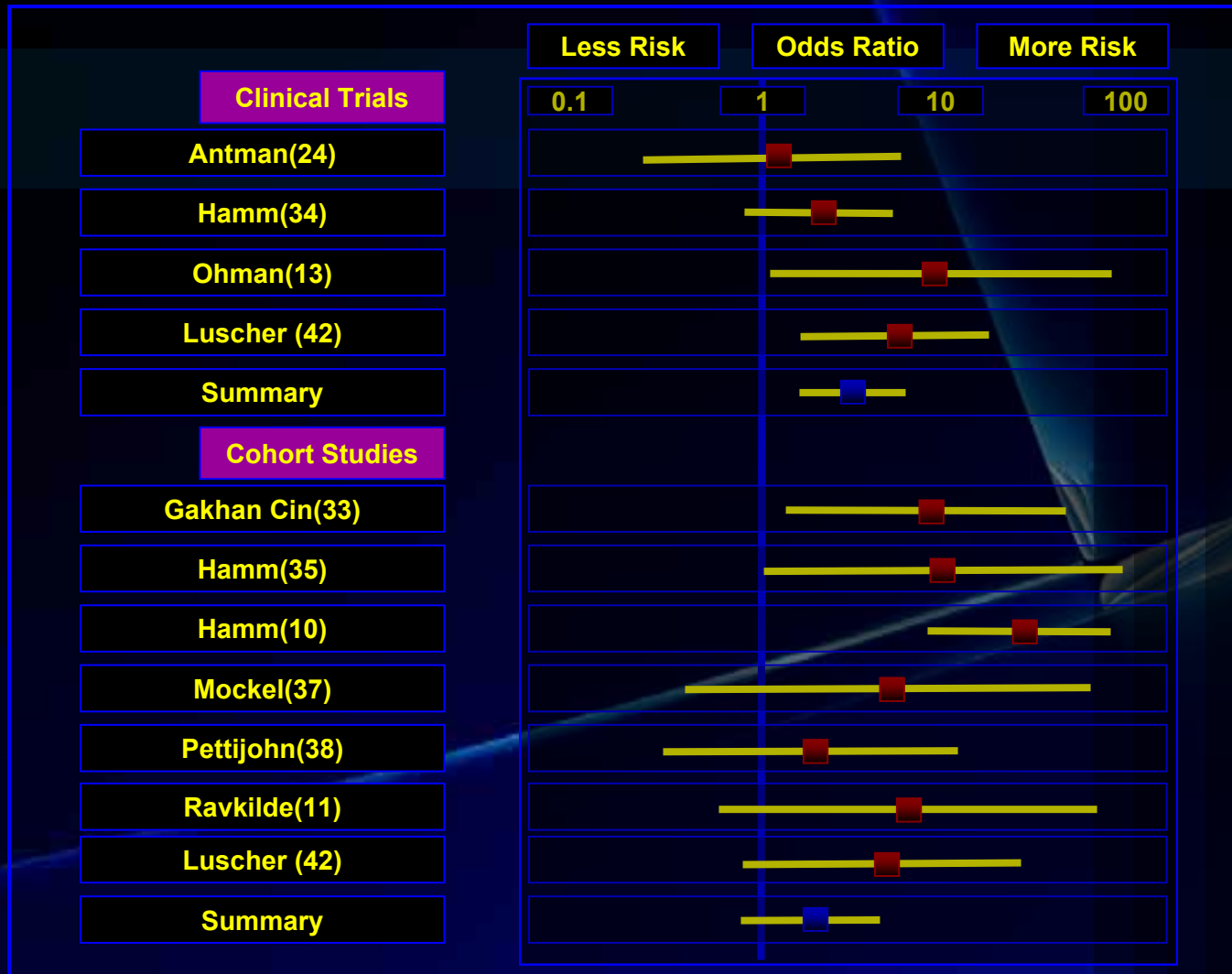
Troponina positiva... es sinónimo de intervención ?

Valor pronóstico de los valores de **TnIc** en SCA: Meta-análisis



Troponina positiva... es sinónimo de intervención ?

Valor pronóstico de los valores de TnTc en SCA: Meta-análisis



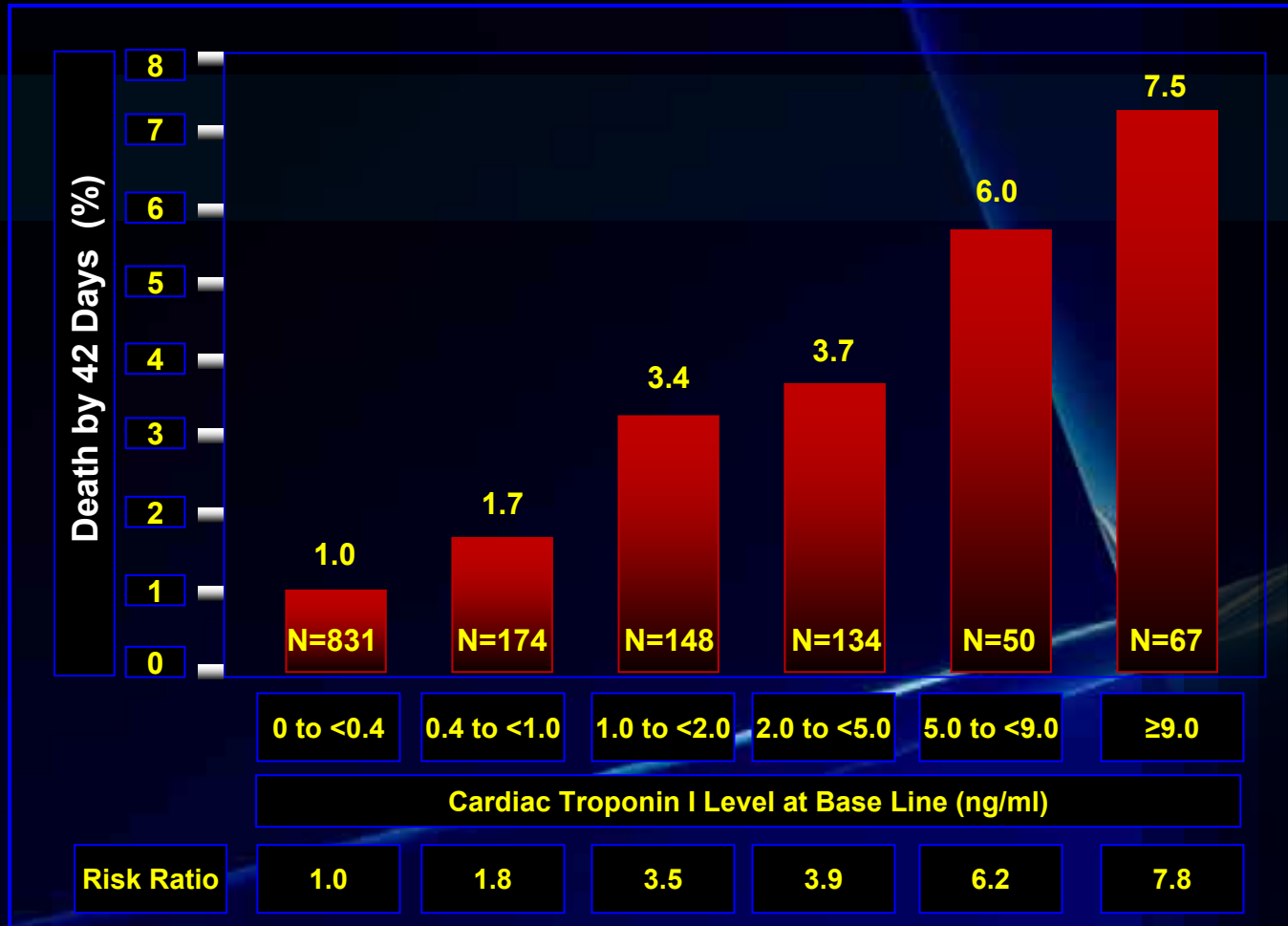
Troponina positiva... es sinónimo de intervención ?

Porcentaje de pacientes con TnTc y TnI positivas en ensayos clínicos y estudios de cohorte

	<i>Troponin T</i>		<i>Troponin I</i>	
	Clinical Trial	Cohort Studies	Clinical Trial	Cohort Studies
	(n=5)	(n=12)	(n=4)	(n=6)
Total patients	2,904	2,255	4,912	1,491
Mean age (years)	64	60	63	63
Male (%)	68	66	69	69
Troponin positive (%)	40	21	33	23
Death rate troponin positive (%)	3.8	11.6	4.8	8.4
Death rate troponin negative (%)	1.3	1.7	2.1	0.7
Median follow-up (weeks)	4	18	4	8
Summary OR (95% CI)	3.0 (1.6–5.5)	5.1 (3.2–8.4)	2.6 (1.8–3.6)*	8.5 (3.5–21.1)*
Study heterogeneity p value	0.28	0.11	0.28	0.16

Troponina positiva... es sinónimo de intervención ?

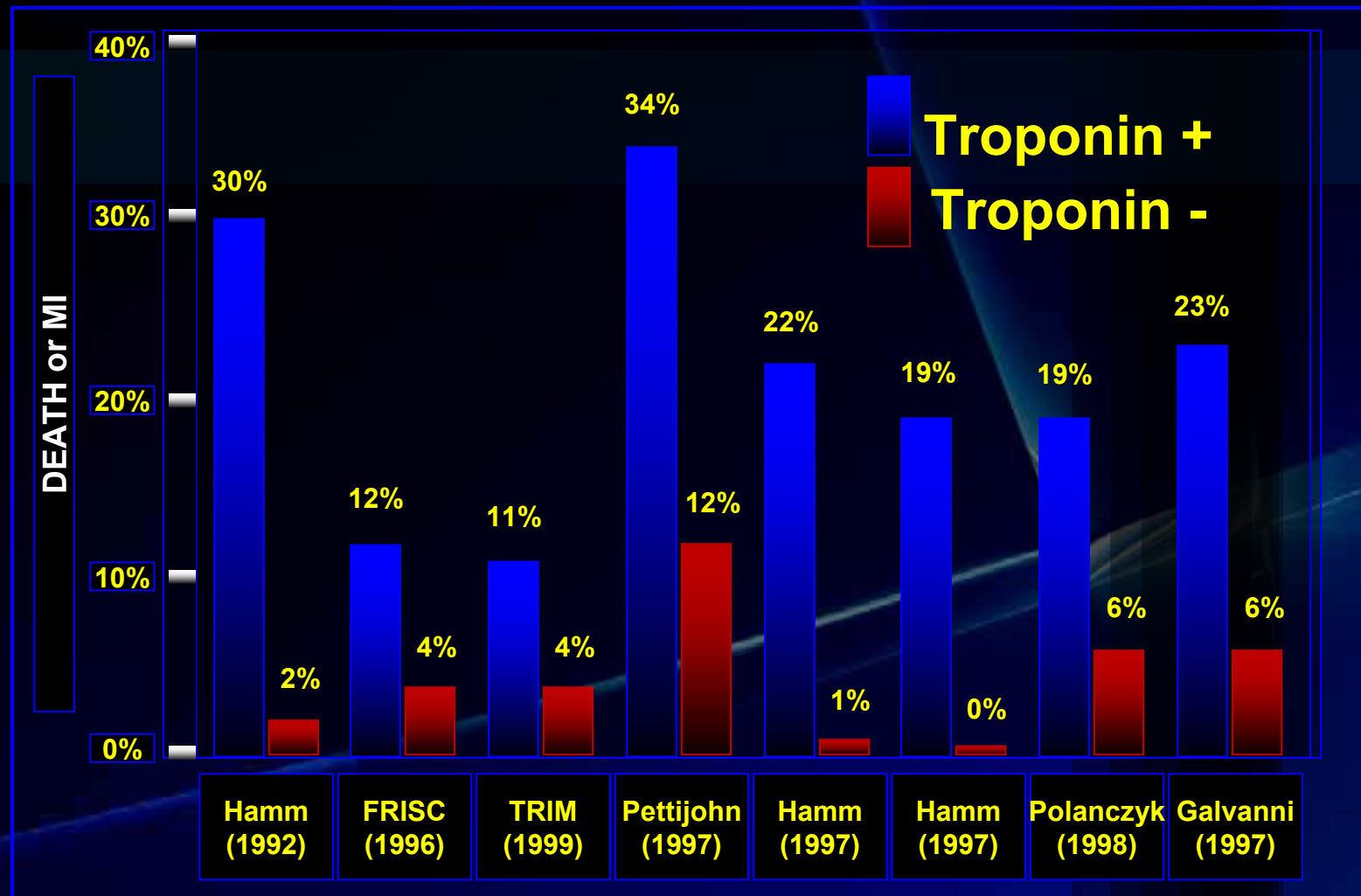
TIMI III B: Mortalidad a 42 días segun niveles de troponina



Antman NEJ Med 2002;346 (26): 2079(editorial)

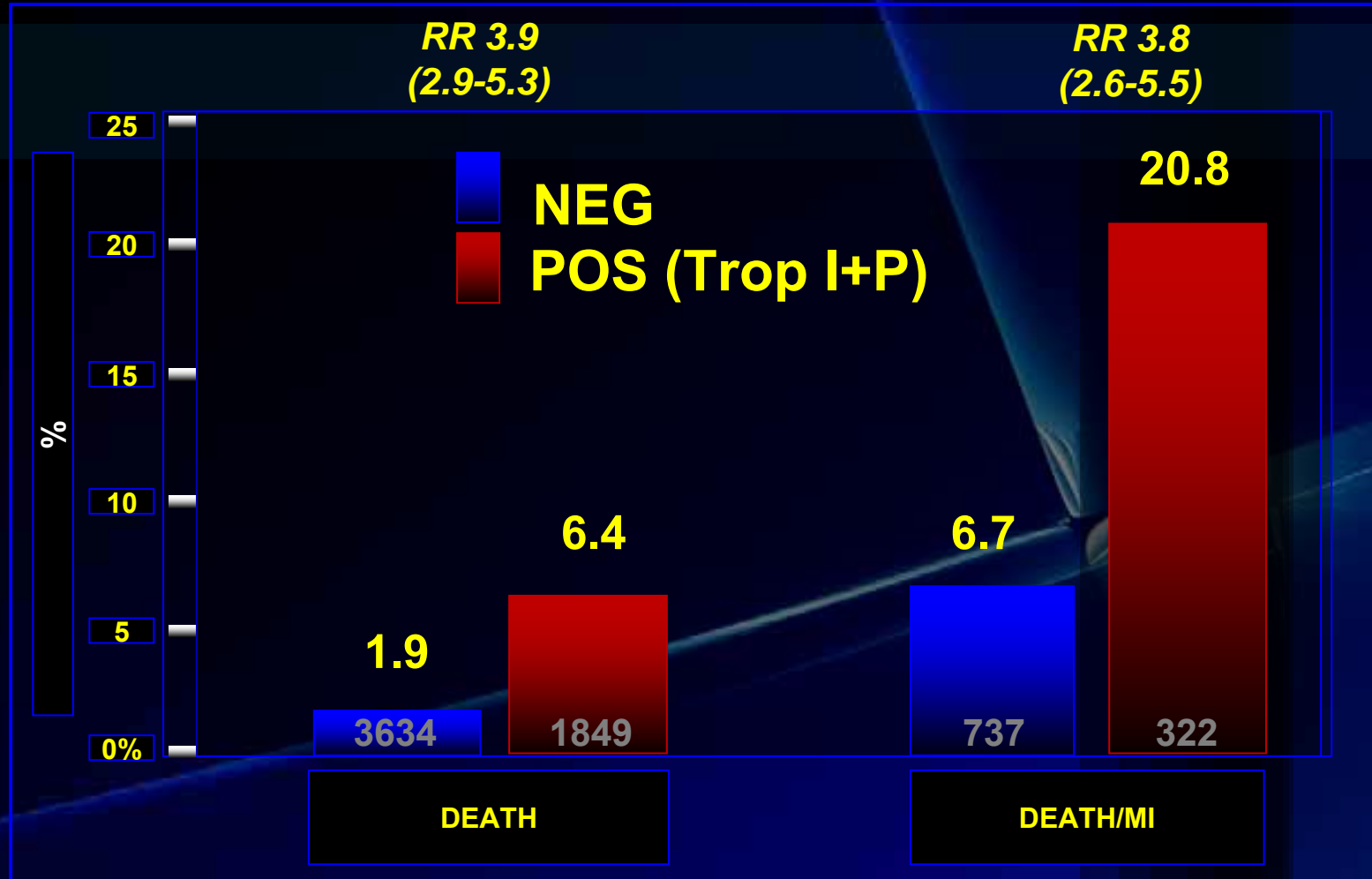
Troponina positiva... es sinónimo de intervención ?

Troponin as a Marker of Increased Risk in ACS



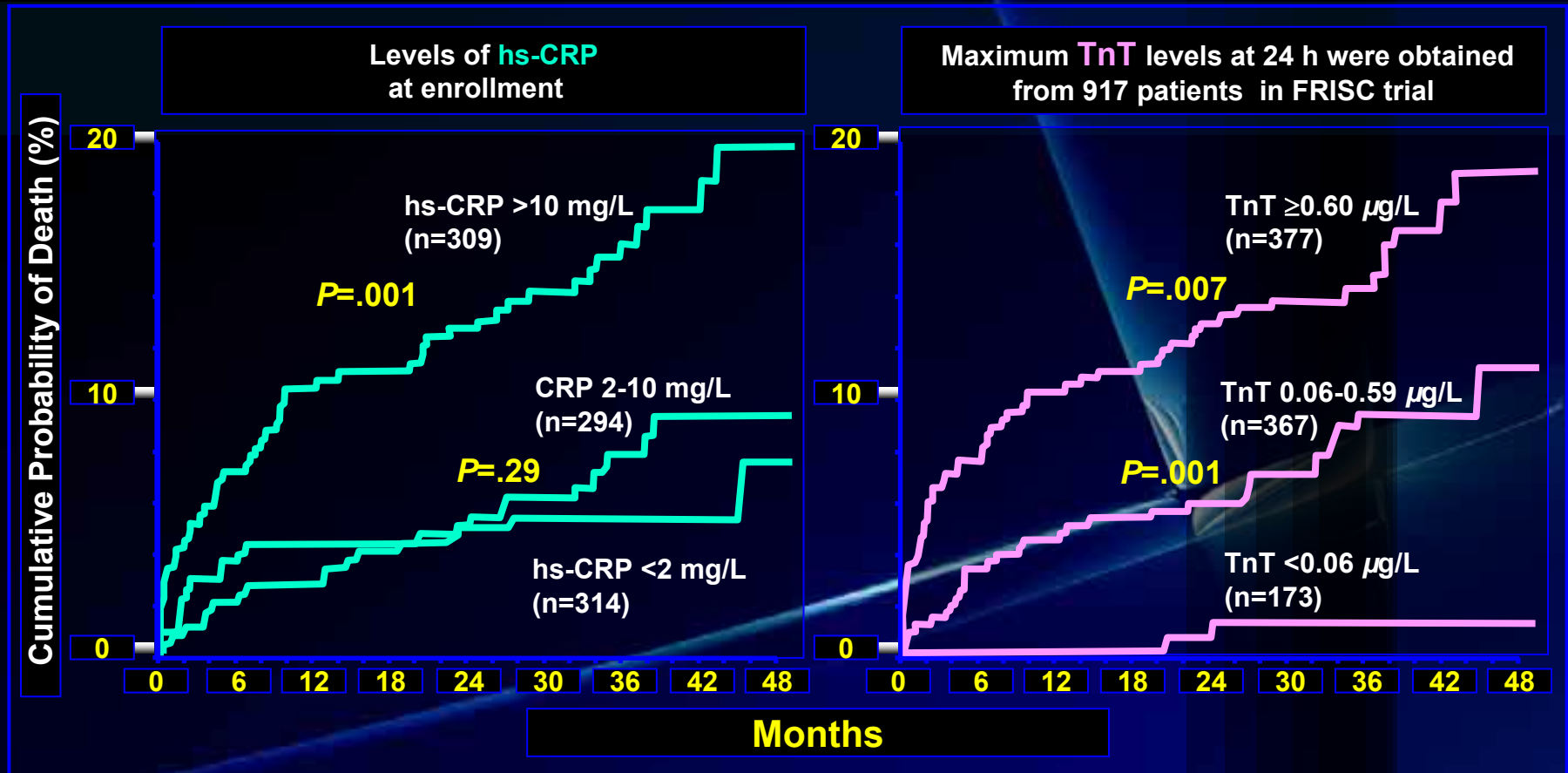
Troponina positiva... es sinónimo de intervención ?

Prognostic Value of Pos. Troponin Test in ACS



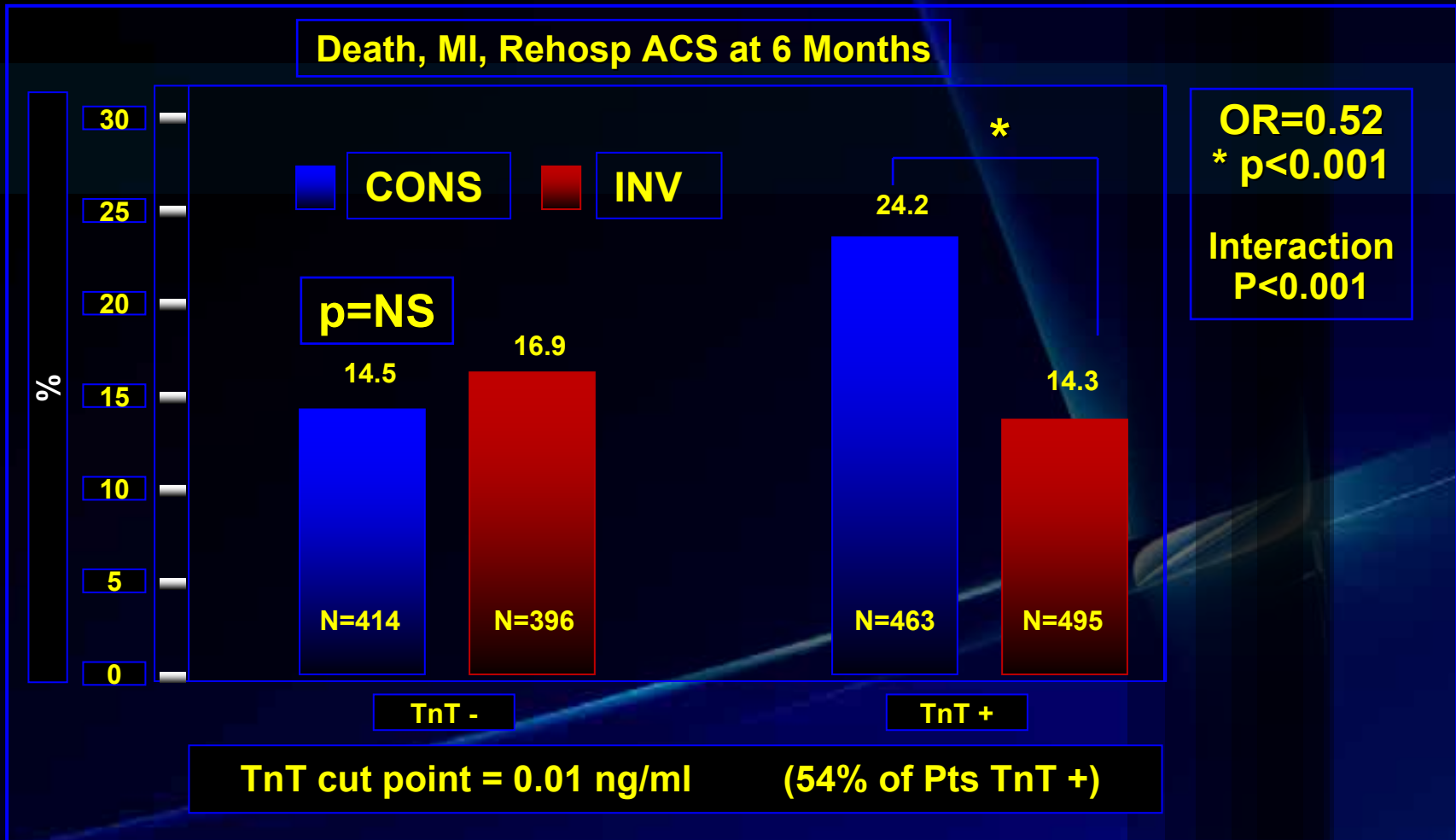
Troponina positiva... es sinónimo de intervención ?

Predictive Value of Troponin T (TnT) and hs-CRP for ACS Mortality: FRISC Substudy

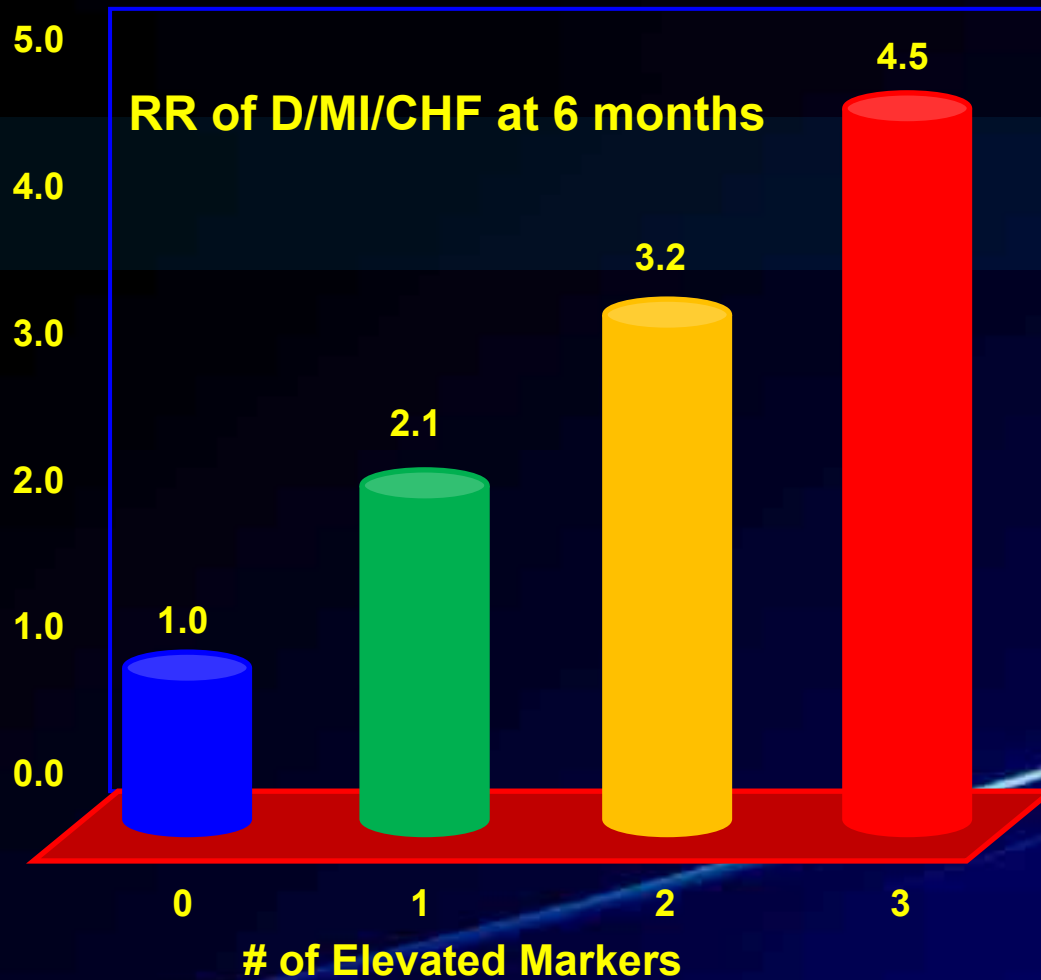


Troponina positiva... es sinónimo de intervención ?

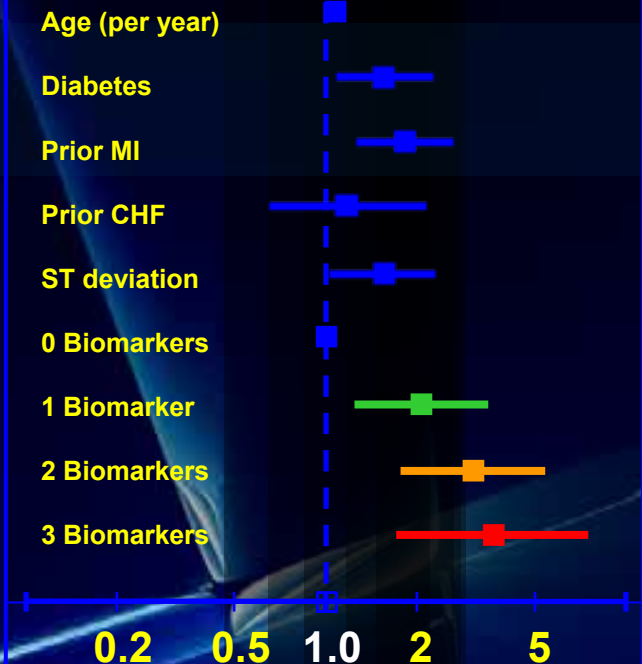
Troponin T: 1°EP at 6 months



Troponina positiva... es sinónimo de intervención ?



OR & 95% CI for D/MI/CHF by 6 months



Assign patients 1 point for the presence of each elevated biomarker (TnI > 0.1 ng/ml, CRP > 1.5 mg/dl, BNP > 80 pg/ml).

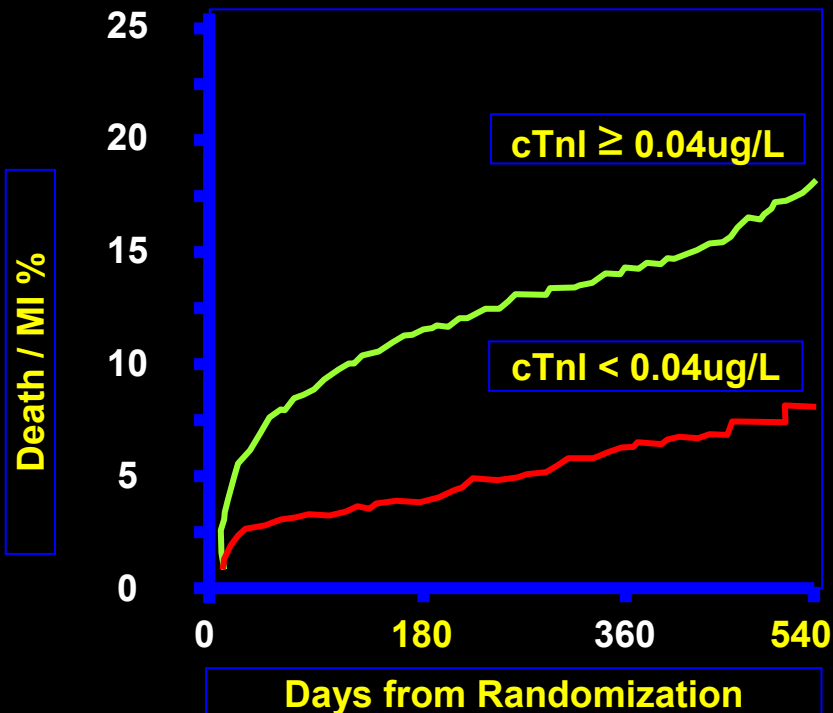
Sabatine MS, Circulation 2002;105:1760-3



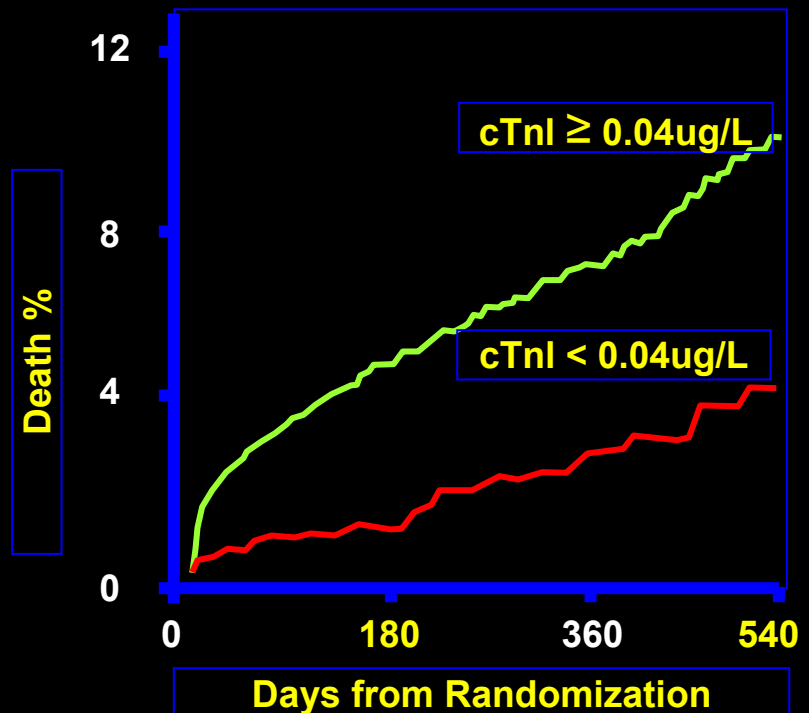
Troponina positiva... es sinónimo de intervención ?

Risk of Death or MI by Baseline cTnl Result

(A)



(B)



Kaplan-Meier estimated cumulative incidence of

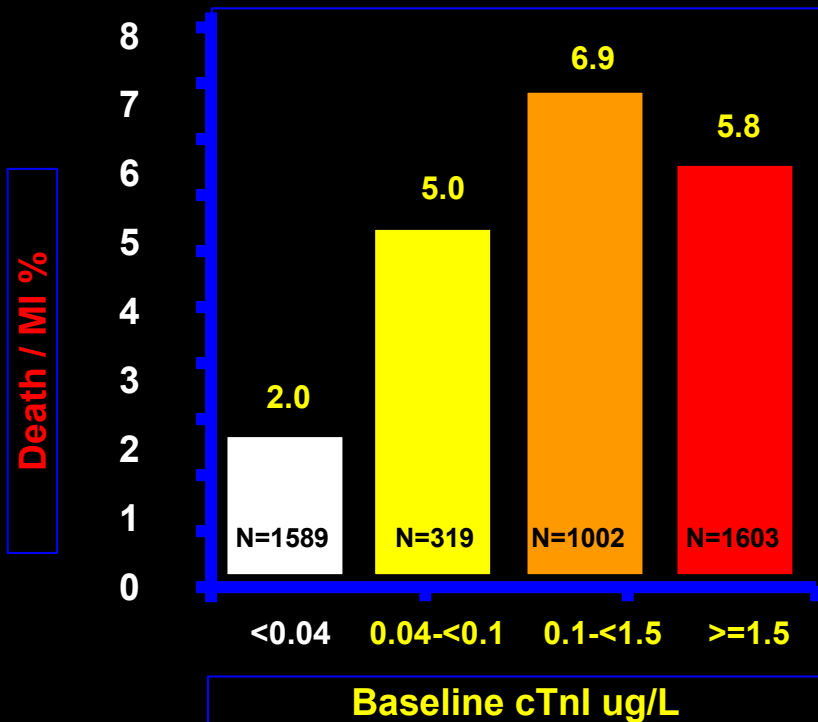
(A) death or myocardial infarction (MI) and

(B) death stratified by baseline cardiac troponin I (cTnl) concentration using the 99th percentile reference limit (0.04 ug/l [cTnl ≥ 0.04 ug/l, n=2,924; cTnl < 0.04 g/l, n= 1,589]).

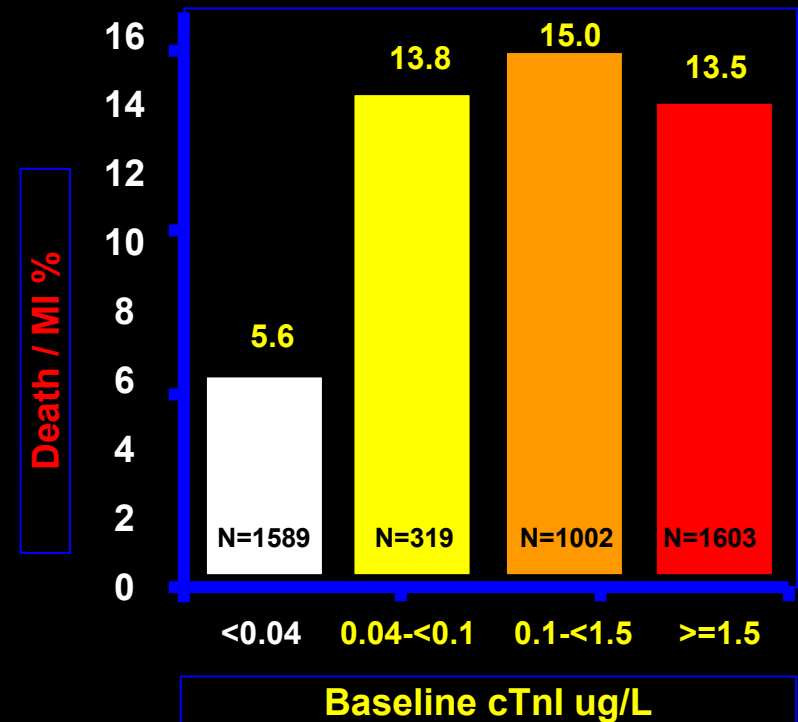
Troponina positiva... es sinónimo de intervención ?

Kaplan-Meier Estimated Event Rates for Death or MI

(A) 30 Days



(B) 12 Months



Kaplan-Meier estimated event rates for death or myocardial infarction (MI) at

(A) 30 days and

(B) 12 months by strata of baseline cardiac troponin I (cTnI).

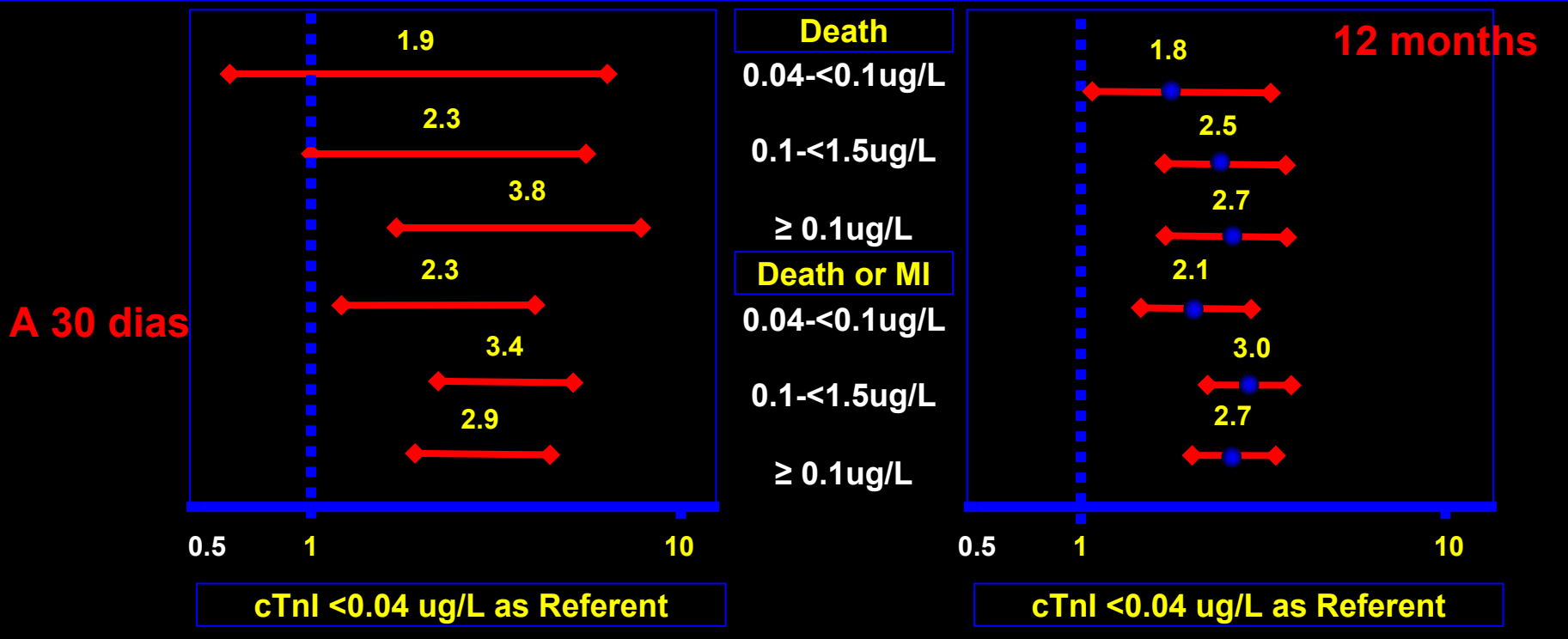
Patients who had low-level elevation of cTnI (0.04 ug/l to 0.1 ug/l) were at significantly increased risk of death or MI compared with patients who did not have elevated cTnI. $P < 0.001$.

Troponina positiva... es sinónimo de intervención ?

Adjusted HR for Death and Death or MI

A Adjusted HR* for Events at 30 Days by Stratum of cTnl

B Adjusted HR* for Events at 12 Months by Stratum of cTnl



Adjusted hazard ratio (HR) for death and death or myocardial infarction (MI) at

After adjusting for established clinical predictors of outcome, patients who had low-level elevation of cTnl were consistently at higher risk of recurrent cardiovascular events compared with patients who had cTnl < 0.04 ug/l.

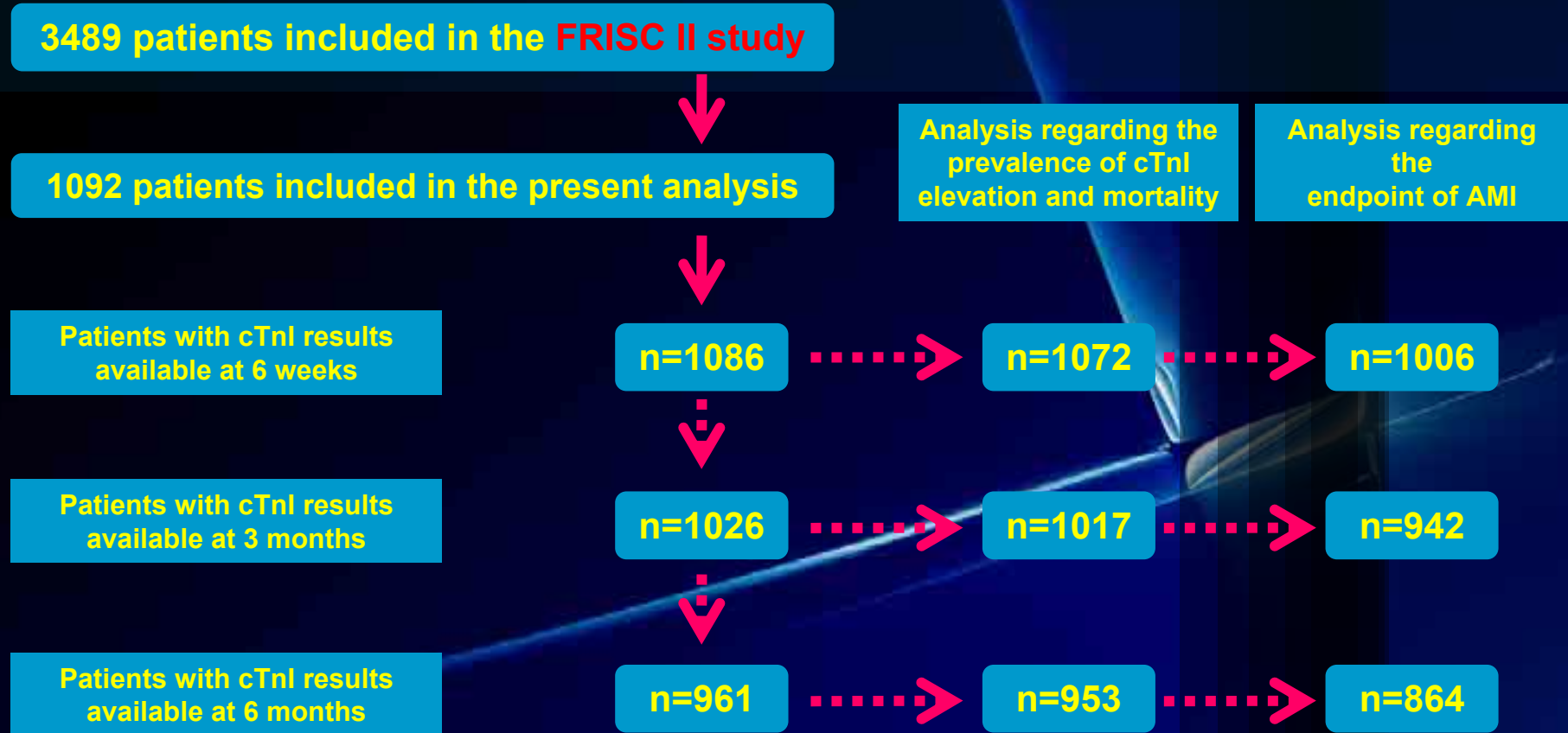
Troponina positiva... es sinónimo de intervención ?

Hazard Ratio para muerte por todas las causas y causas cardiovasculares, según el nivel de biomarcadores

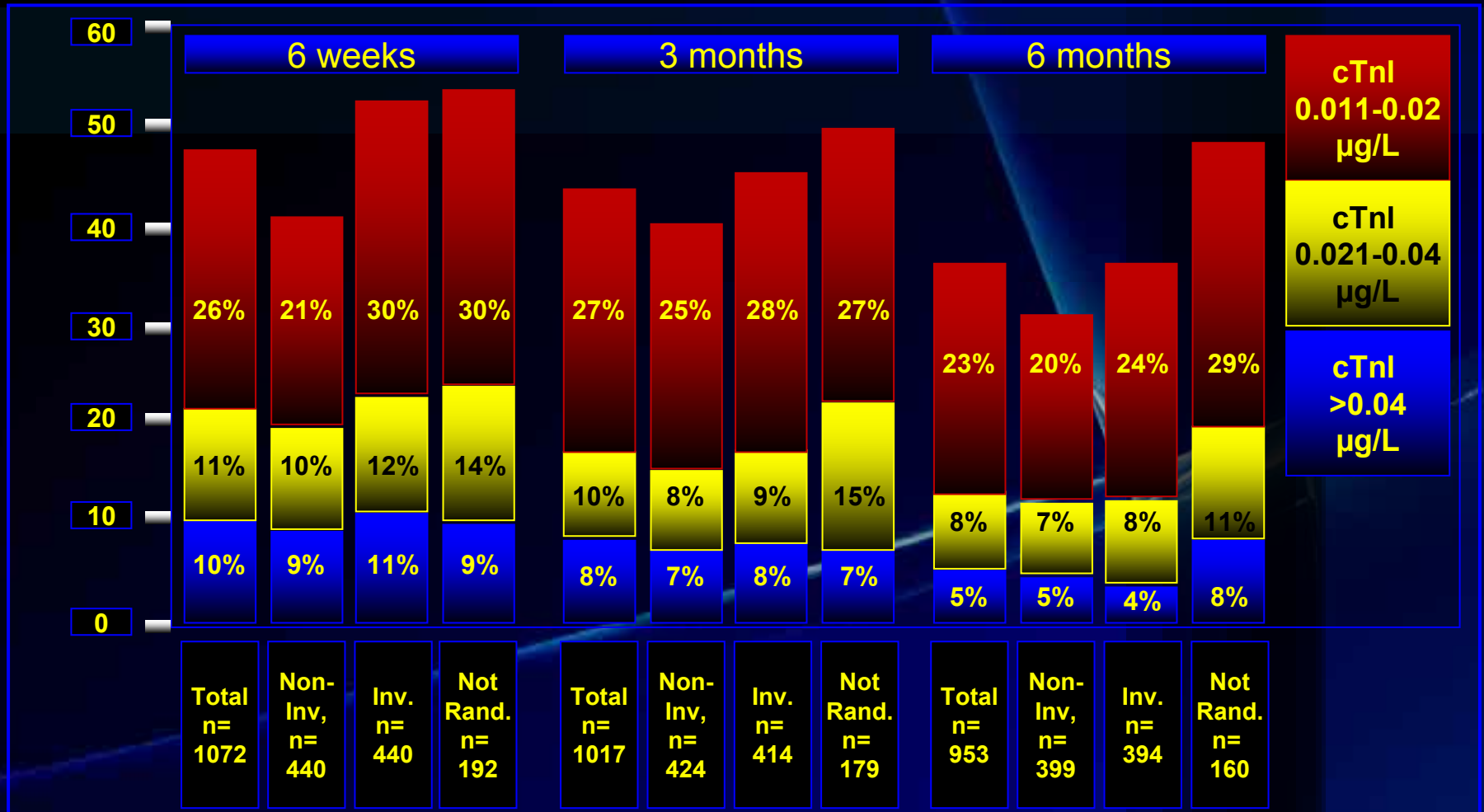
Biomarcador	Muerte Cardiovascular		Muerte por todas las causas	
	Hazard Ratio (95% CI)	P Value	Hazard Ratio (95% CI)	P Value
Muestras				
Troponin I				
1-SD increase	1.60 (1.41–1.82)	<0.001	1.36 (1.24–1.50)	<0.001
>0.021 µg/liter†	3.40 (2.31–5.00)	<0.001	2.28 (1.71–3.03)	<0.001
>0.035 µg/liter‡	4.08 (2.55–6.55)	<0.001	2.78 (1.92–4.02)	<0.001
NT-pro-BNP				
1-SD increase	2.03 (1.72–2.39)	<0.001	1.58 (1.41–1.76)	<0.001
≥386 ng/liter†	3.77 (2.60–5.46)	<0.001	2.53 (1.94–3.29)	<0.001
>309 ng/liter‡	4.10 (2.86–5.88)	<0.001	2.55 (1.98–3.28)	<0.001

Troponina positiva... es sinónimo de intervención ?

Patient population



Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?

Mortalidad Total e IAM a 5 años en relación a los niveles de Tntc a 6 sem, 3 Meses y 6 Meses

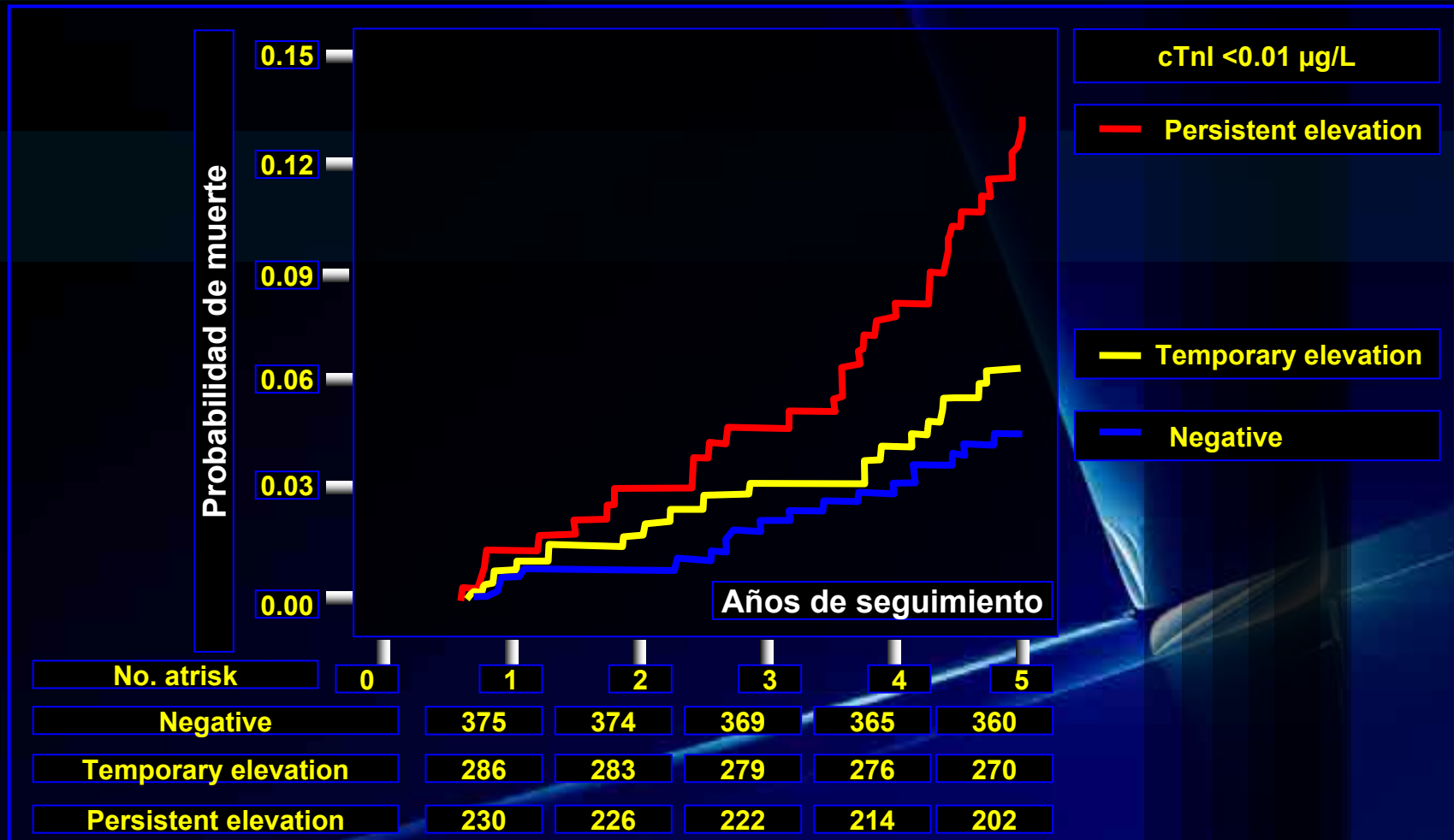
Muerte	n	6 sem	P	n	3 meses	P	n	6 meses	P
cTnl ≤ 0.01 µg/L	560	35 (6.3)	<0.001	573	31 (5.4)	<0.001	611	29 (4.7)	<0.001
cTnl >0.01 µg/L	512	68 (13.3)		444	58 (13.1)		342	43 (12.6)	
cTnl ≤ 0.02 µg/L	842	66 (7.8)	<0.001	843	60 (7.1)	<0.001	829	57 (6.9)	0.05
cTnl >0.02 µg/L	230	37 (16.1)		174	29 (16.7)		124	15 (12.1)	
cTnl ≤ 0.04 µg/L	965	90 (9.3)	0.39	946	77 (8.2)	0.04	907	69 (7.6)	1.00
cTnl >0.04 µg/L	107	13 (12.1)		77	12 (15.6)		46	3 (6.5)	
Infarto									
cTnl ≤ 0.01 µg/L	542	85 (15.7)	0.03	543	69 (12.7)	<0.001	575	62 (10.8)	0.003
cTnl >0.01 µg/L	464	98 (21.1)		399	86 (21.6)		289	53 (18.3)	
cTnl ≤ 0.02 µg/L	802	130 (16.2)	0.002	790	117 (14.8)	0.003	760	97 (12.8)	0.22
cTnl >0.02 µg/L	204	53 (26.0)		152	38 (25.0)		104	18 (17.3)	
cTnl ≤ 0.04 µg/L	914	164 (17.9)	0.57	874	139 (15.9)	0.12	827	109 (13.2)	0.62
cTnl >0.04 µg/L	92	19 (20.7)		68	16 (23.5)		37	6 (16.2)	

Troponina positiva... es sinónimo de intervención ?

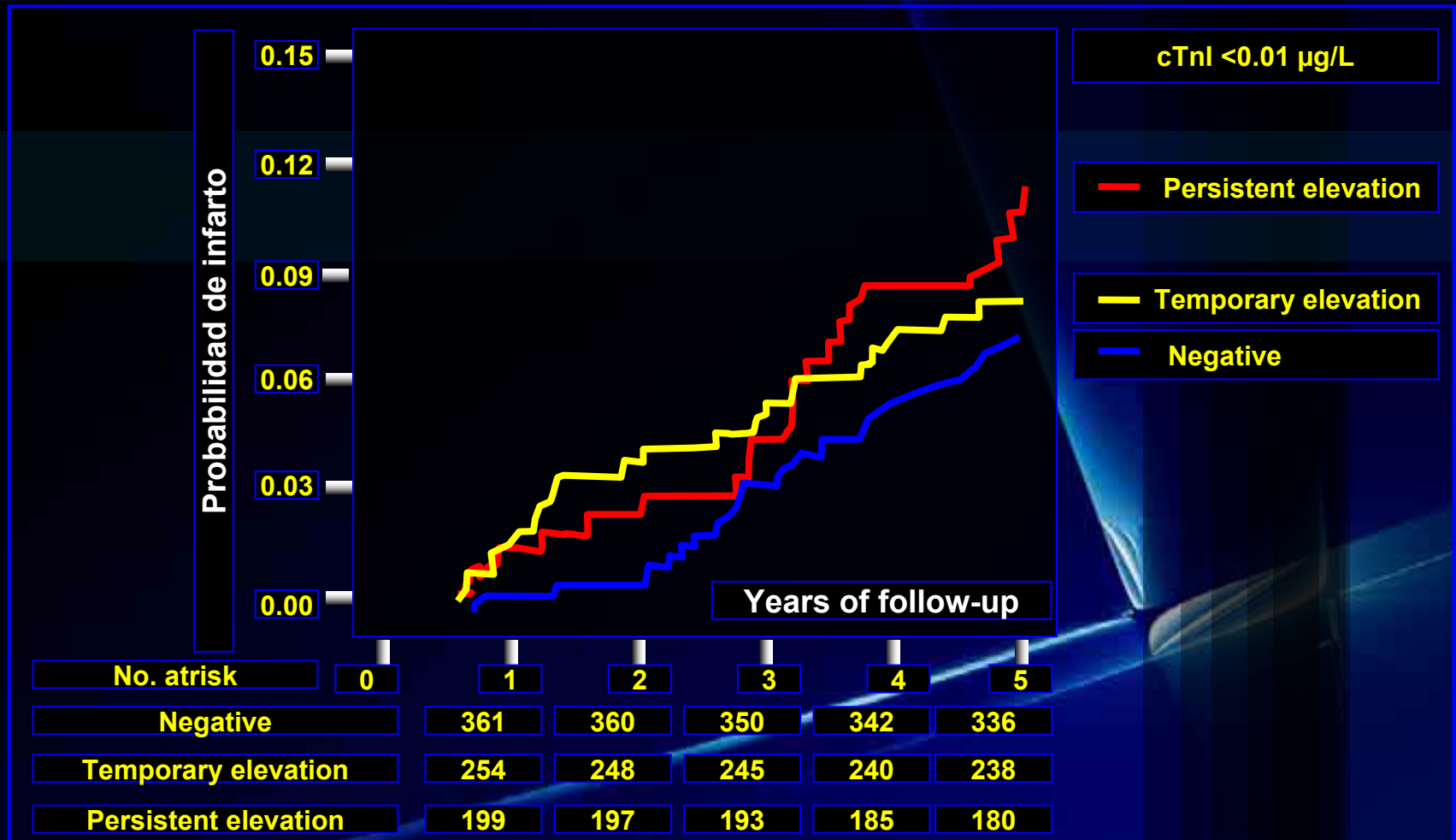
Eventos Adversos a 5 años en relación de los niveles de cTnl

	cTnl Negativa	Temporaria Elevación de cTnl	Persistente elevación de cTnl	P
cTnl >0.01 µg/L				
Muerte	17/377 (4.5)	18/288 (6.3)	31/233 (13.3)	< 0.001
IAM	39/362 (10.8)	32/259 (12.4)	39/202 (19.3)	0.01
cTnl >0.02 µg/L				
Muerte	38/632 (6.0)	20/207 (9.7)	8/59 (13.6)	0.04
IAM	71/596 (11.9)	28/174 (16.1)	11/53 (20.8)	0.10
cTnl >0.04 µg/L				
Muerte	56/774 (7.2)	9/108 (8.3)	1/16 (6.3)	0.91
IAM	93/718 (13.0)	14/91 (15.4)	3/14 (21.4)	0.55

Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?

Prognostic Value of Biochemical Markers Measured at Different Time Points

Randomization	Model 1 (n=877)		Model 2 (n=877)	
	HR (95% CI)	P Value	HR (95% CI)	P Value
Death				
cTnl >0.04 µg/l	1.8 (1.0–3.3)	0.05	0.9 (0.5–1.8)	0.82
NT-proBNP (ln)	1.7 (1.3–2.0)	<0.001	1.7 (1.3–2.1)	<0.001
eGFR<75 ml/min/1.73 m ²	1.0 (0.6–1.5)	0.83	0.9 (0.6–1.4)	0.58
AMI				
cTnl >0.04 µg/l	2.5 (1.5–3.9)	<0.001	2.5 (1.5–4.2)	0.001
NT-proBNP (ln)	1.2 (1.0–1.3)	0.05	1.0 (0.8–1.2)	0.76
eGFR<75 ml/min/1.73 m ²	1.7 (1.2–2.4)	0.004	1.6 (1.2–2.3)	0.007
Death or AMI				
cTnl >0.04 µg/l	2.2 (1.5–3.2)	<0.001	1.9 (1.2–3.0)	0.003
NT-proBNP (ln)	1.2 (1.1–1.4)	0.002	1.1 (0.9–1.2)	0.31
eGFR<75 ml/min/1.73 m ²	1.3 (1.0–1.8)	0.05	1.3 (1.0–1.7)	0.10

Troponina positiva... es sinónimo de intervención ?

Prognostic Value of Biochemical Markers Measured at Different Time Points CONT...

6 Weeks	Model 1 (n=869)		Model 2 (n=869)		Model 3 (n=869)	
	HR (95% CI)	P Value	HR (95% CI)	P Value	HR (95% CI)	P Value
Death						
cTnl >0.01 µg/l	1.7 (1.1–2.8)	0.03	1.2 (0.7–1.9)	0.60	1.3 (0.8–2.2)	0.38
NT-proBNP (ln)	1.8 (1.5–2.2)	<0.001	1.7 (1.4–2.2)	<0.001	1.7 (1.3–2.2)	<0.001
CRP (ln)	1.4 (1.1–1.7)	0.003	1.2 (1.0–1.5)	0.04	1.3 (1.0–1.5)	0.02
eGFR<75 ml/min/1.73 m ²	1.0 (0.6–1.6)	0.98	0.9 (0.6–1.5)	0.68	0.9 (0.5–1.4)	0.60
Revascularization	—	—	—	—	0.6 (0.4–0.9)	0.02
AMI						
cTnl >0.01 µg/l	0.9 (0.6–1.4)	0.65	0.7 (0.5–1.0)	0.08	0.8 (0.6–1.2)	0.33
NT-proBNP (ln)	1.4 (1.2–1.7)	0.001	1.4 (1.2–1.8)	0.001	1.5 (1.2–1.7)	<0.001
CRP (ln)	1.2 (1.0–1.4)	0.07	1.1 (0.9–1.3)	0.20	1.2 (1.0–1.4)	0.02
eGFR<75 ml/min/1.73 m ²	1.6 (1.1–2.5)	0.02	1.5 (1.0–2.4)	0.05	1.2 (0.8–1.7)	0.34
Revascularization	—	—	—	—	0.6 (0.4–0.8)	0.003

Troponina positiva... es sinónimo de intervención ?

Table 2 Prognostic Value of Biochemical Markers Measured at Different Time Points CONT...

6 Weeks	Model 1 (n=869)		Model 2 (n=869)		Model 3 (n=869)	
	HR (95% CI)	P Value	HR (95% CI)	P Value	HR (95% CI)	P Value
Death or AMI						
cTnl >0.01 µg/l	1.1 (0.8–1.5)	0.73	0.8 (0.5–1.1)	0.15	0.8 (0.6–1.2)	0.33
NT-proBNP (ln)	1.5 (1.3–1.7)	<0.001	1.5 (1.3–1.8)	<0.001	1.5 (1.2–1.7)	<0.001
CRP (ln)	1.2 (1.1–1.4)	0.004	1.2 (1.0–1.4)	0.04	1.2 (1.0–1.4)	0.02
eGFR<75 ml/min/1.73 m ²	1.3 (0.9–1.8)	0.15	1.2 (0.8–1.7)	0.34	1.1 (1.0–1.2)	0.19
Revascularization	—	—	—	—	0.6 (0.4–0.8)	0.003

Troponina positiva... es sinónimo de intervención ?

Prognostic Value of Biochemical Markers Measured at Different Time Points CONT...

6 Months	Model 1 (n=856)		Model 2 (n=856)		Model 3 (n=856)	
	HR (95% CI)	P Value	HR (95% CI)	P Value	HR (95% CI)	P Value
Death						
cTnl >0.01 µg/l	2.4 (1.4–4.0)	0.001	1.6 (0.9–2.8)	0.13	1.6 (0.9–2.9)	0.10
NT-proBNP (ln)	2.1 (1.6–2.7)	<0.001	1.8 (1.3–2.3)	<0.001	1.8 (1.3–2.3)	<0.001
CRP (ln)	1.5 (1.2–1.9)	<0.001	1.3 (1.1–1.6)	0.02	1.3 (1.1–1.6)	0.02
eGFR<75 ml/min/1.73 m ²	0.9 (0.5–1.6)	0.73	0.8 (0.5–1.4)	0.49	0.9 (0.5–1.5)	0.54
Revascularization	—	—	—	—	0.7 (0.4–1.1)	0.11
AMI						
cTnl >0.01 µg/l	1.5 (1.0–2.4)	0.07	1.3 (0.8–2.0)	0.37	1.3 (0.8–2.1)	0.28
NT-proBNP (ln)	1.4 (1.1–1.8)	0.006	1.3 (1.0–1.6)	0.06	1.3 (1.0–1.6)	0.06
CRP (ln)	1.3 (1.1–1.6)	0.006	1.3 (1.0–1.5)	0.02	1.3 (1.0–1.5)	0.02
eGFR<75 ml/min/1.73 m ²	1.0 (0.6–1.5)	0.83	0.9 (0.6–1.5)	0.76	0.9 (0.6–1.5)	0.80
Revascularization	—	—	—	—	0.6 (0.4–1.0)	0.05

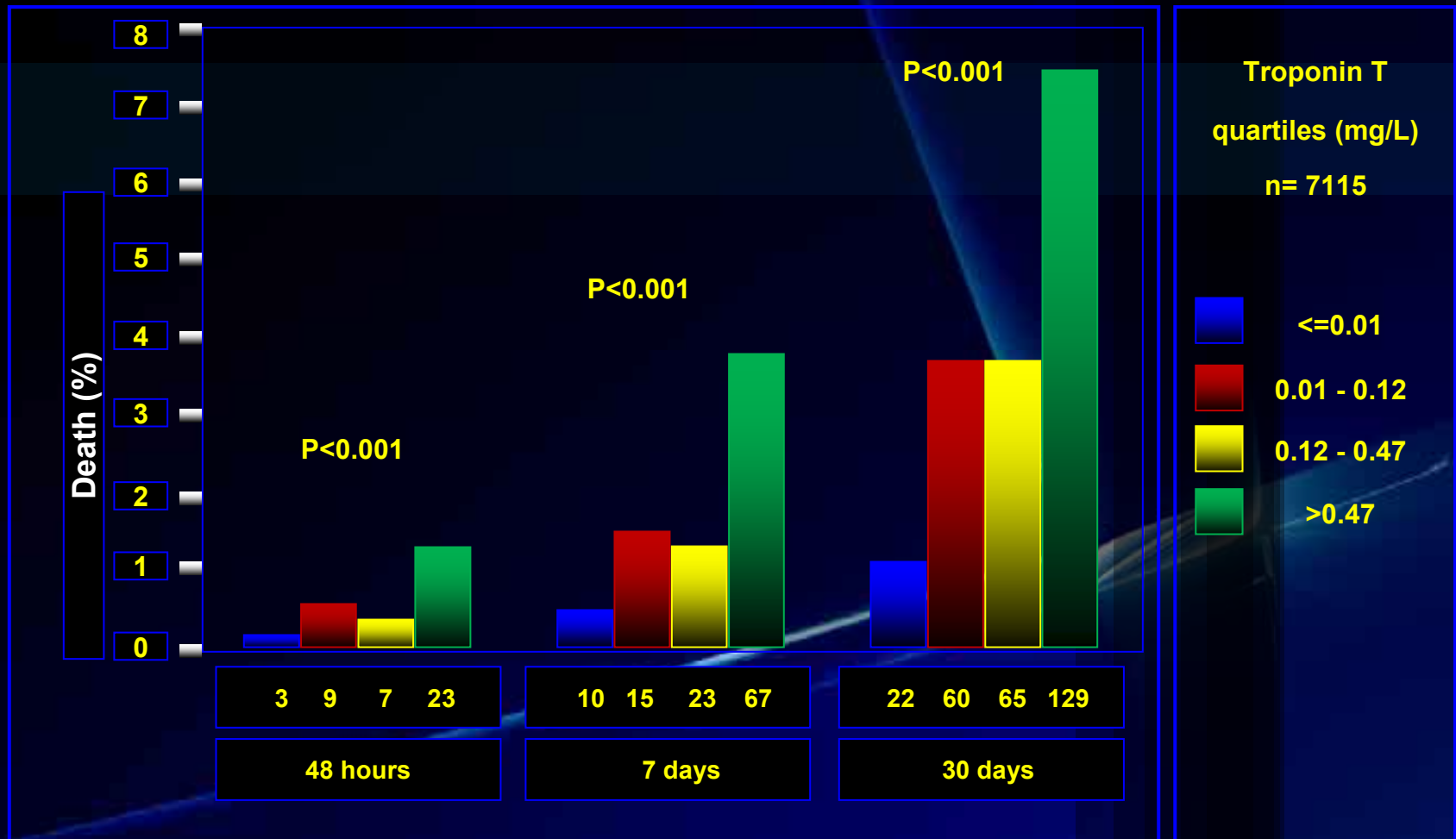
Troponina positiva... es sinónimo de intervención ?

Prognostic Value of Biochemical Markers Measured at Different Time Points CONT...

6 Months	Model 1 (n=856)		Model 2 (n=856)		Model 3 (n=856)	
	HR (95% CI)	P Value	HR (95% CI)	P Value	HR (95% CI)	P Value
Death or AMI						
cTnl >0.01 µg/l	1.6 (1.1–2.4)	0.009	1.2 (0.8–1.8)	0.32	1.3 (0.9–1.9)	0.22
NT-proBNP (ln)	1.6 (1.3–1.9)	<0.001	1.4 (1.2–1.8)	0.001	1.4 (1.2–1.7)	0.001
CRP (ln)	1.4 (1.2–1.6)	<0.001	1.3 (1.1–1.5)	0.003	1.3 (1.1–1.5)	0.003
eGFR<75 ml/min/1.73 m ²	1.0 (0.6–1.4)	0.77	0.9 (0.6–1.3)	0.61	0.9 (0.6–1.4)	0.69
Revascularization	—	—	—	—	0.7 (0.5–0.9)	0.02

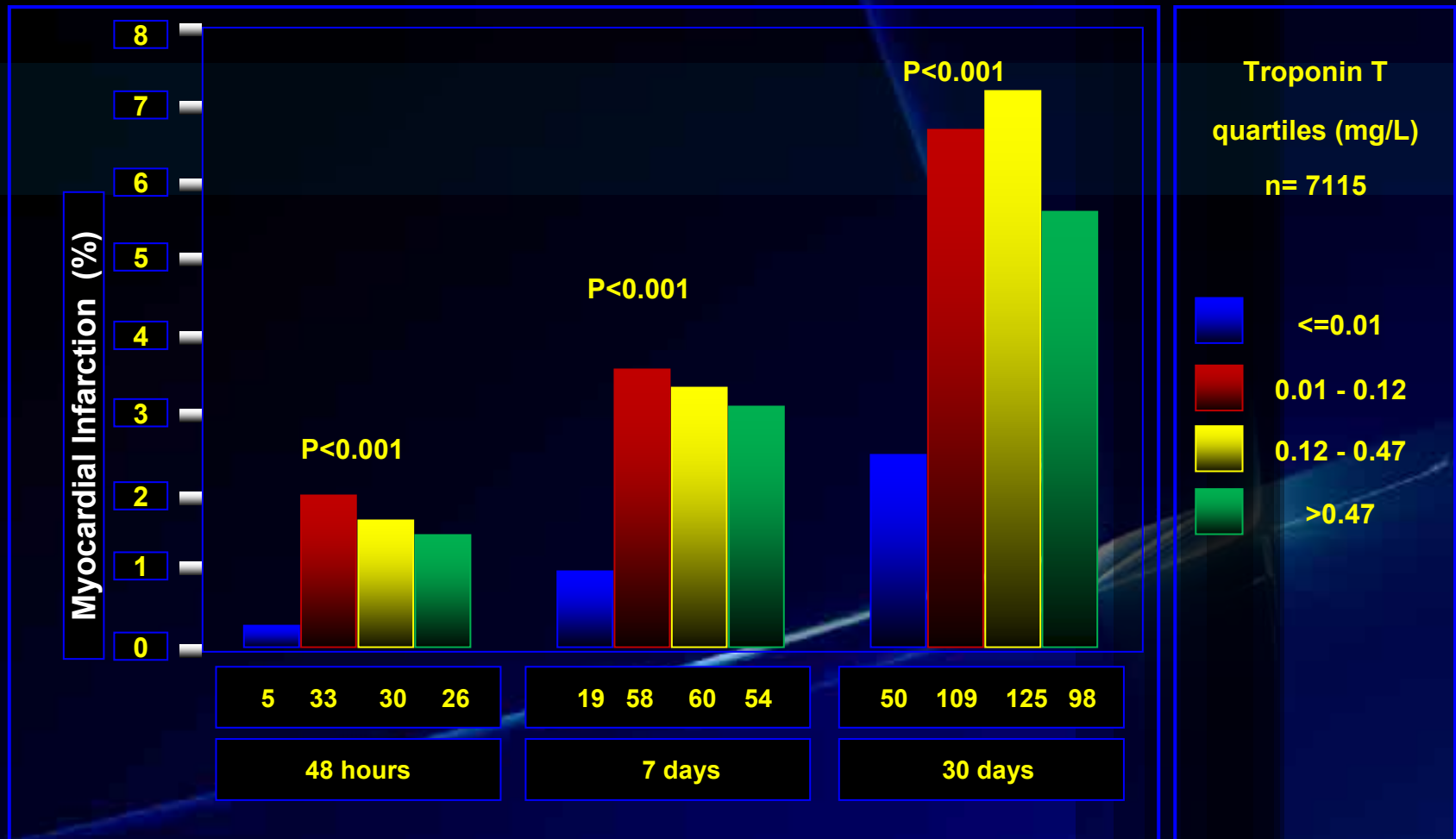
Troponina positiva... es sinónimo de intervención ?

Rate of (a) death/myocardial infarction (MI), (b) death, and (c) MI at 48 h, 7 days, and 30 days, respectively, in relation to quartiles of troponin T.



Troponina positiva... es sinónimo de intervención ?

Rate of (a) death/myocardial infarction (MI), (b) death, and (c) MI at 48 h, 7 days, and 30 days, respectively, in relation to quartiles of troponin T.



Troponina positiva... es sinónimo de intervención ?

Regresión Logística múltiple en relación a Troponin T y PCR como predictores de muerte, infarto y muerte o infarto a 30 días

	Muerte		IAM		Muerte o IAM	
	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value
Model 1						
TnT cuartiles [†]	1.63 (1.43–1.87)	<0.001	1.23 (1.11–1.37)	<0.001	1.39 (1.27–1.52)	<0.001
CRP cuartiles [‡]	1.19 (1.05–1.35)	0.006	0.94 (0.85–1.04)	0.26	1.00 (0.92–1.09)	0.91
Modelo 2						
TnT (µg/l) >0.01 vs. ≤0.01 [‡]	3.36 (2.10–5.34)	<0.001	2.48 (1.79–3.42)	<0.001	2.84 (2.14–3.76)	<0.001
CRP (mg/l) >1.84 vs. ≤ 1.84 [‡]	1.72 (1.17–2.55)	0.009	0.76 (0.59–0.98)	0.033	0.93 (0.75–1.16)	0.53
Modelo 3						
TnT (µg/l) >0.47 vs. ≤ 0.47 [‡]	2.47 (1.86–3.28)	<0.001	1.22 (0.79–1.32)	0.89	1.51 (1.23–1.86)	<0.001
CRP (mg/l) >9.62 vs. ≤ 9.62 [‡]	1.31 (0.98–1.74)	0.07	0.98 (0.76–1.25)	0.85	1.07 (0.87–1.31)	0.55

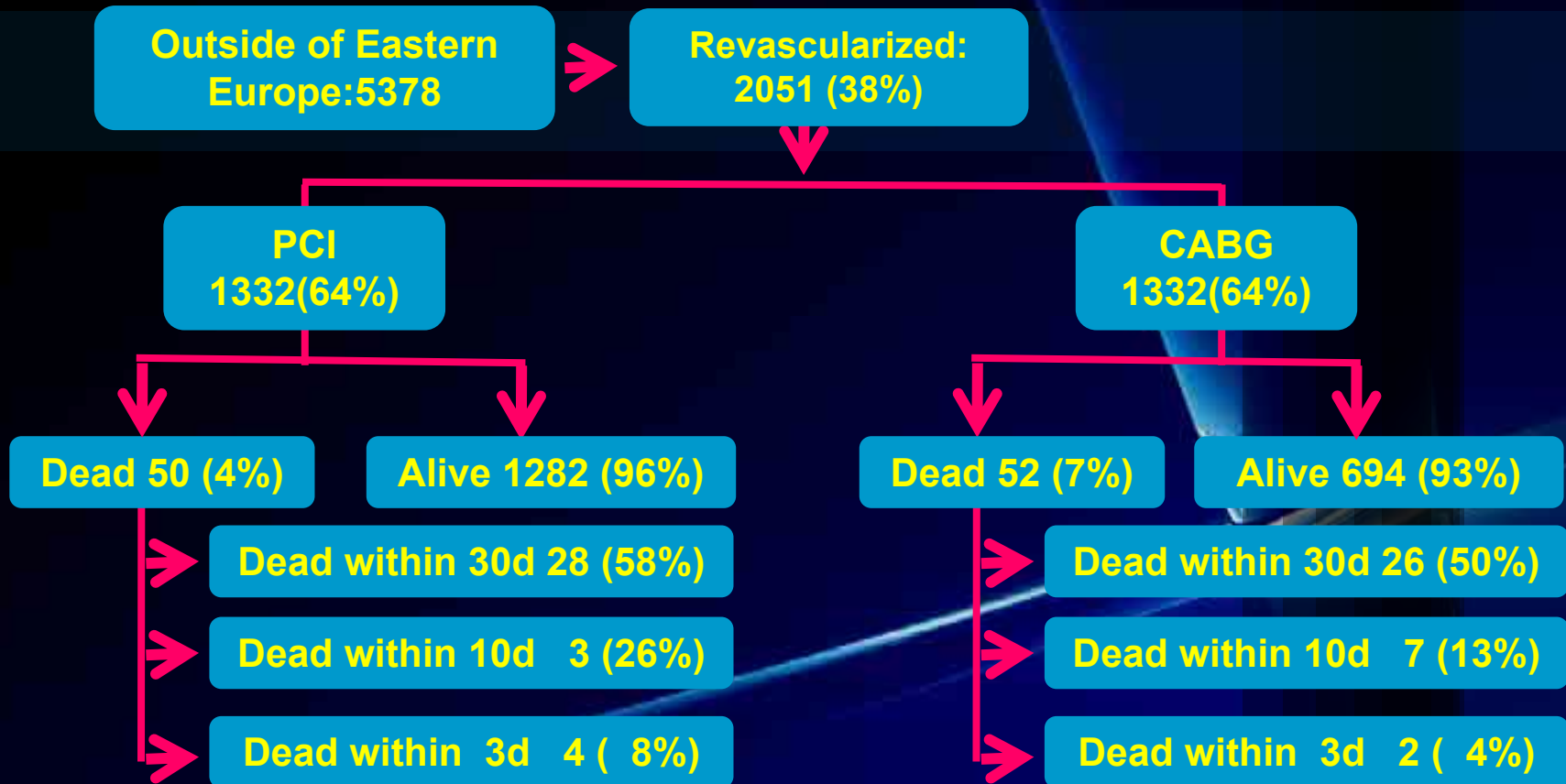
Troponina positiva... es sinónimo de intervención ?

Mortalidad a 30 Dias en relación a cuartiles de Troponin T y PCR

PCR (mg/l)	Troponina T (µg/l)				p Value*
	≤0.01	0.01 - 0.12	0.12 - 0.47	>0.47	
≤1.84	0.3 (2)	2.5 (12)	3.4 (13)	3.6 (9)	<0.001
1.84–3.96	1.7 (9)	3.2 (14)	2.7 (12)	6.8 (24)	<0.001
3.96–9.62	1.4 (6)	3.6 (14)	3.3 (16)	7.0 (33)	<0.001
>9.62	1.4 (5)	6.4 (20)	5.6 (24)	9.1 (62)	<0.001
p value*	0.01	0.007	0.07	0.005	

Troponina positiva... es sinónimo de intervención ?

Mortalidad en subgrupo de of pacientes estraticados por tipo de intervención (ATC o CABG)



Troponina positiva... es sinónimo de intervención ?

Características basales segun niveles de Troponina-T y NT-proBNP

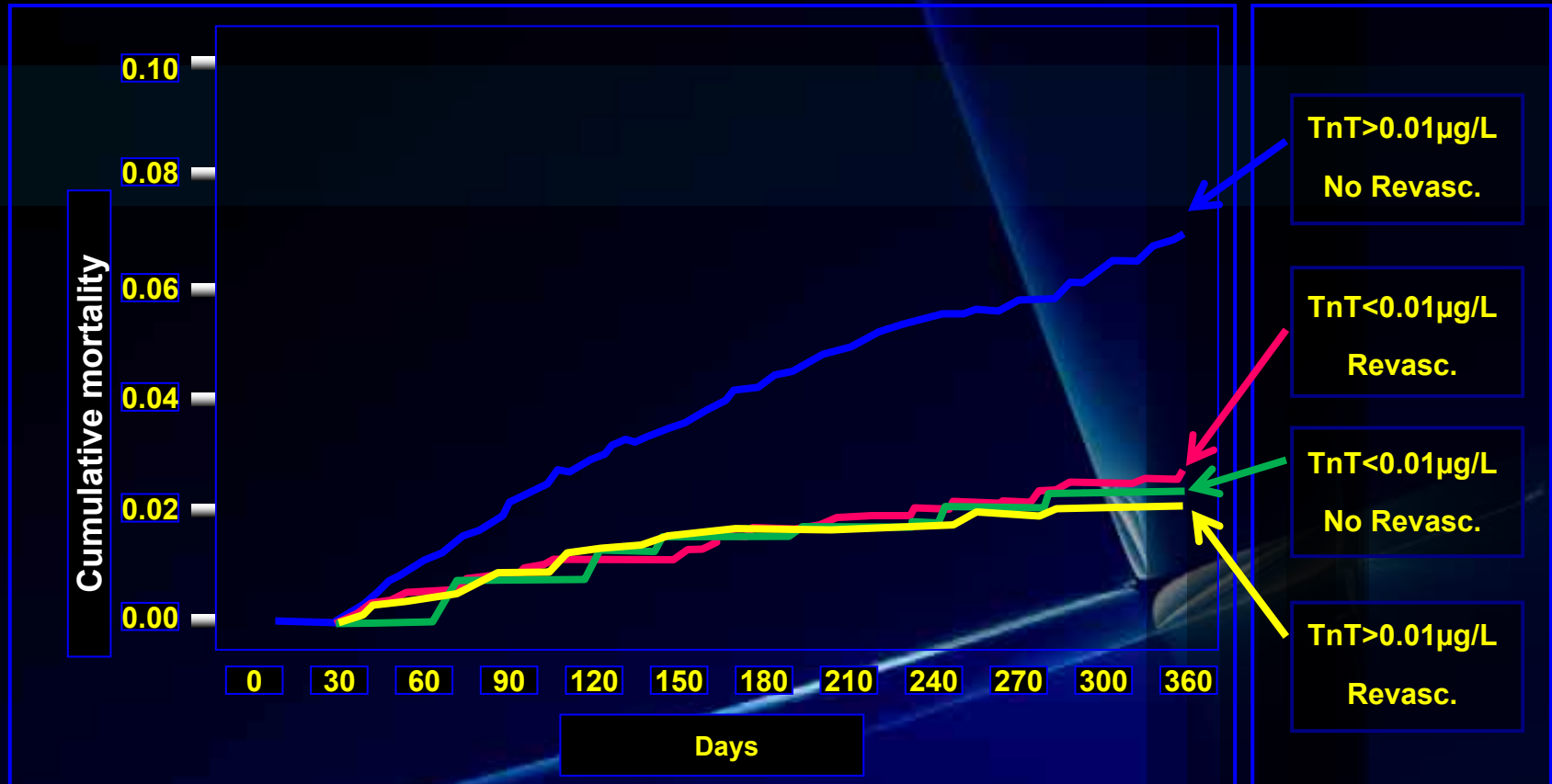
	TnT (µg/l)		p	NT-proBNP (ng/l)		p
	≤ 0.01	>0.01		≤ 237	>237	
Age (yrs), mean ± SD	64 ± 11	66 ± 11	<0.001	59 ± 10	67 ± 11	<0.001
Weight (kg), mean ± SD	76 ± 13	78 ± 14	<0.001	80 ± 13	76 ± 13	<0.001
Male gender, %	48.3	67.5	<0.001	65.9	60.5	<0.001
Current smoking, %	16.6	24.8	<0.001	28.6	20.7	<0.001
History of stroke, %	1.5	2.5	0.02	1.0	2.7	<0.001
Heart failure, %	7.7	7.3	0.6	2.8	9.0	<0.001
Hypercholesterolemia, %*	35.0	29.7	<0.001	31.9	30.7	0.3
Angina pectoris, %	60.6	42.2	<0.001	42.0	48.8	<0.001
Hypertension, %	57.4	49.8	<0.001	44.5	54.2	<0.001
Diabetes mellitus, %	18.4	22.1	0.01	13.7	23.3	<0.001
Previous MI, %	28.2	32.0	0.02	17.9	34.8	<0.001
Previous revascularization, %	16.4	15.0	0.13	11.3	16.5	<0.001
ST-segment depression	93.2	76.2	<0.001	84.8	79.6	<0.001

Troponina positiva... es sinónimo de intervención ?

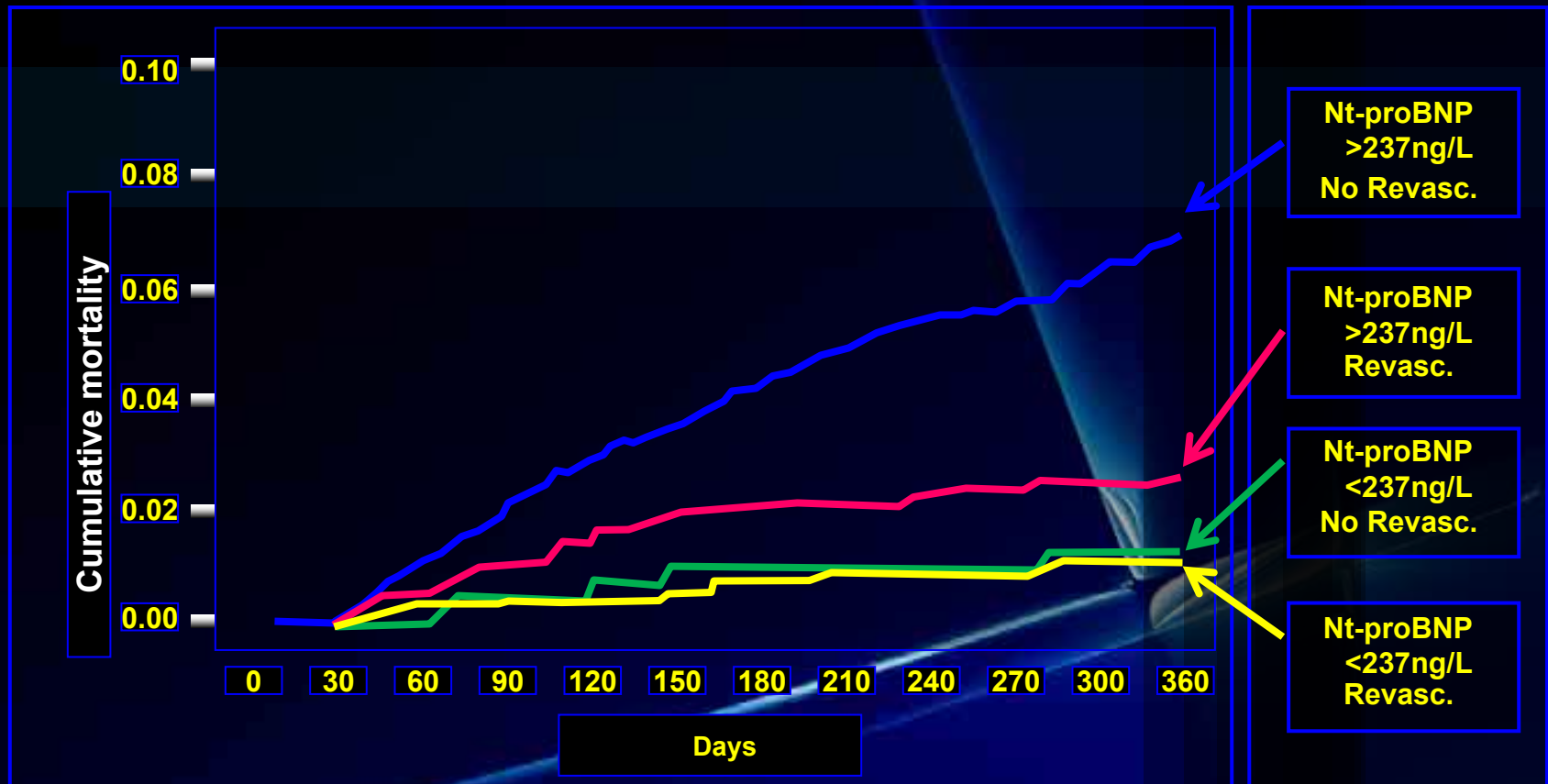
Mortalidad a 1 año en Relación a la Revascularización a 30 Días y niveles de marcadores

Marcador	Pacientes	Univariado			Multivariado Survival Model †		
		Mortalidad*, %(n)		P Value	RR	95%CI	P Value ‡
		No Revas	Revas				
TnT ≤0.01 µg/l	1,779	2.6 (42)	3.0 (11)	0.7	1.79	(0.96, 3.8)	0.004
TnT >0.01 µg/l	5,336	6.9 (222)	2.2 (37)	<0.001	0.56	(0.4, 0.7)	
NT-proBNP ≤237 ng/l	1,702	1.2 (15)	1.2 (5)	1.0	1.91	(0.7, 5.3)	0.04
NT-proBNP >237 ng/l	5,107	7.0 (235)	2.7 (40)	<0.001	0.63	(0.5, 0.8)	
Il-6 ≤10 ng/l	5,143	4.5 (158)	2.0 (30)	<0.001	0.77	(0.6, 1.1)	0.39
Il-6 >10 ng/l	1,714	8.4 (95)	3.6 (17)	0.001	0.61	(0.4, 0.9)	
CRP ≤ 10 mg/l	5,331	4.2 (155)	1.5 (24)	<0.001	0.54	(0.4, 0.8)	0.03
CRP >10 mg/l	1,777	9.3 (107)	5.5 (25)	0.01	0.94	(0.7, 1.4)	
Creacl >51 ml/min	5,777	3.5 (134)	1.9 (35)	0.01	0.76	(0.5, 1.0)	0.30
Creacl ≤ 51 ml/min	1,926	11.6 (157)	4.3 (18)	<0.001	0.60	(0.4, 1.8)	

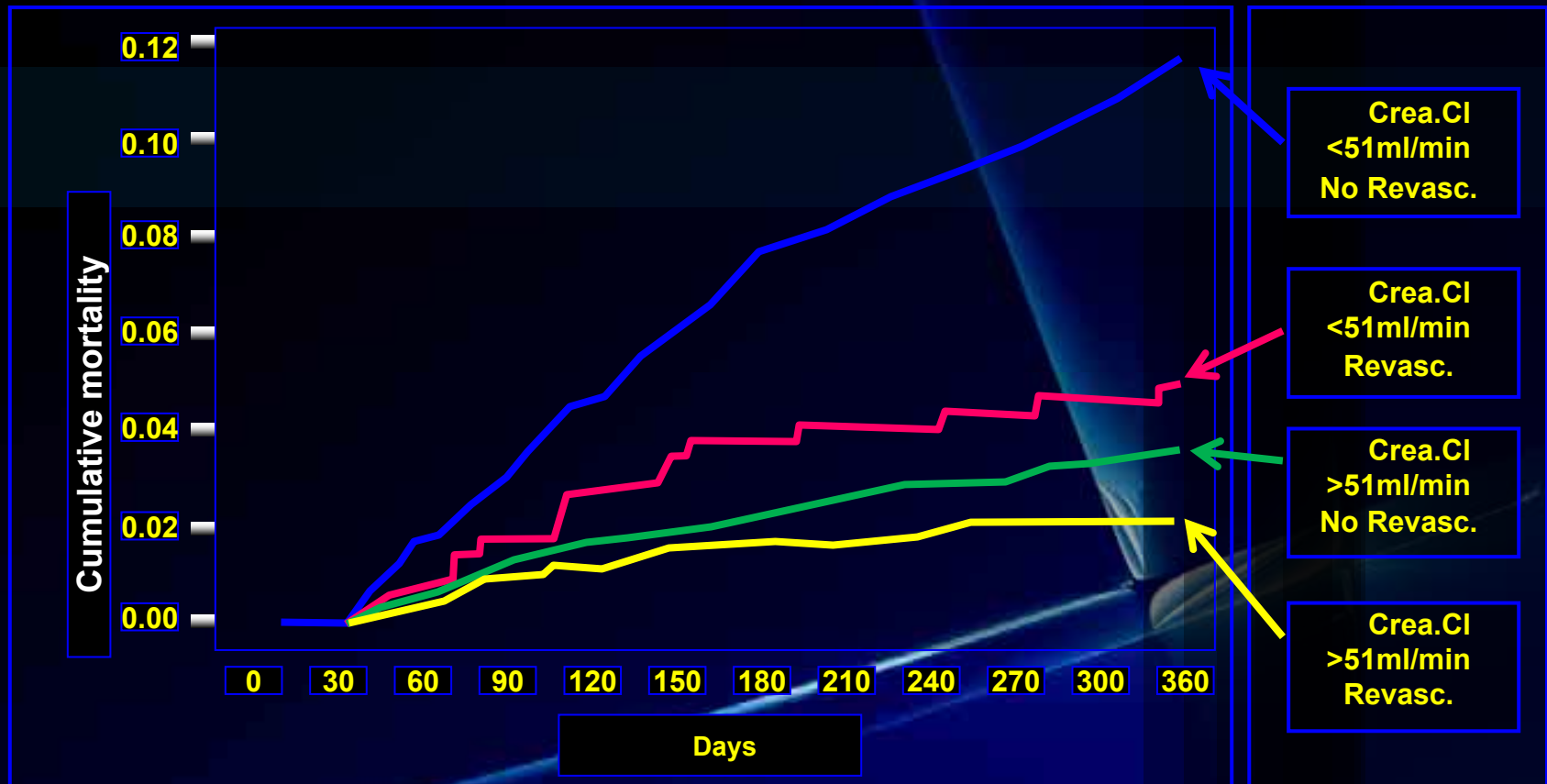
Troponina positiva... es sinónimo de intervención ?



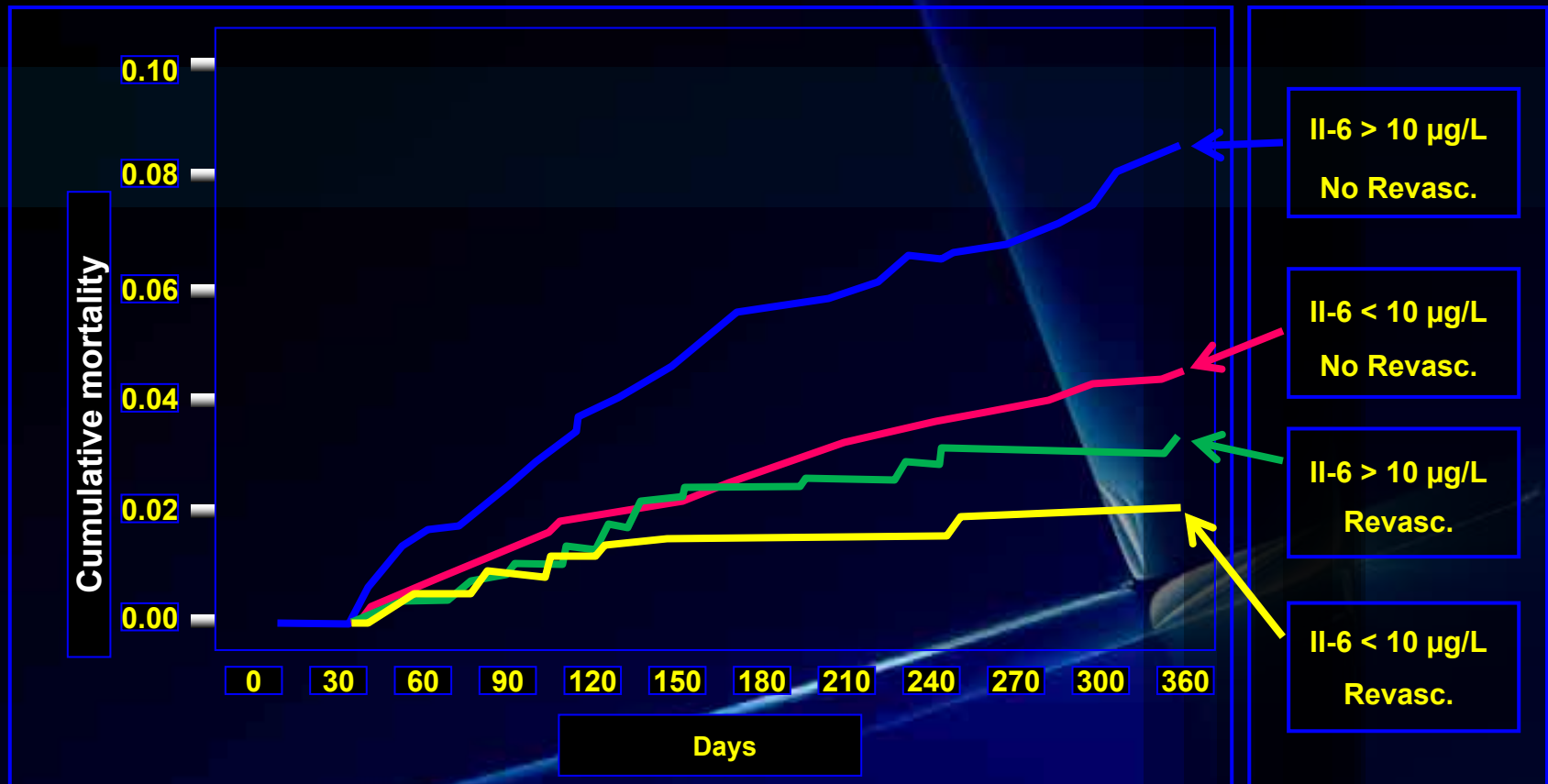
Troponina positiva... es sinónimo de intervención ?



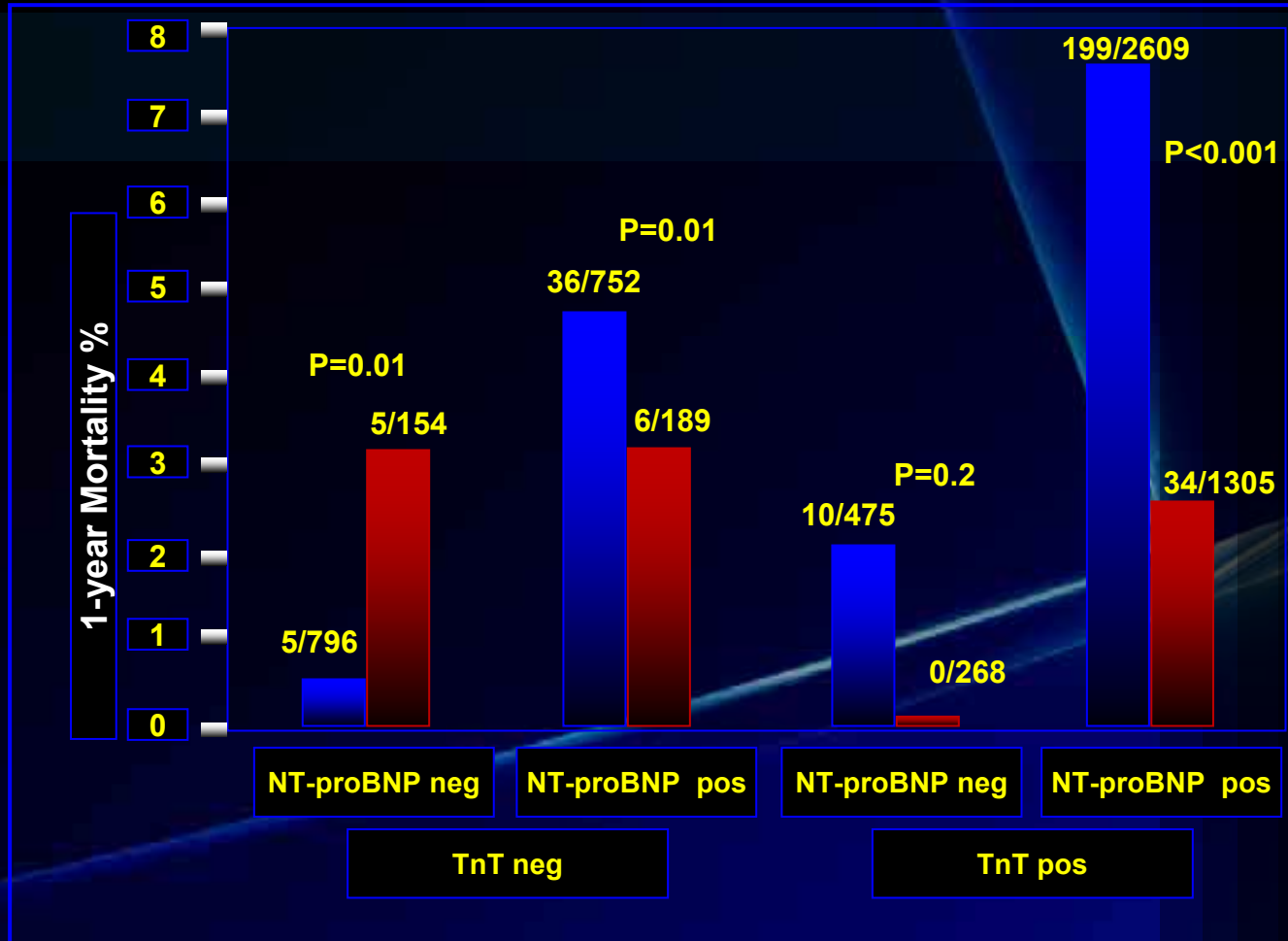
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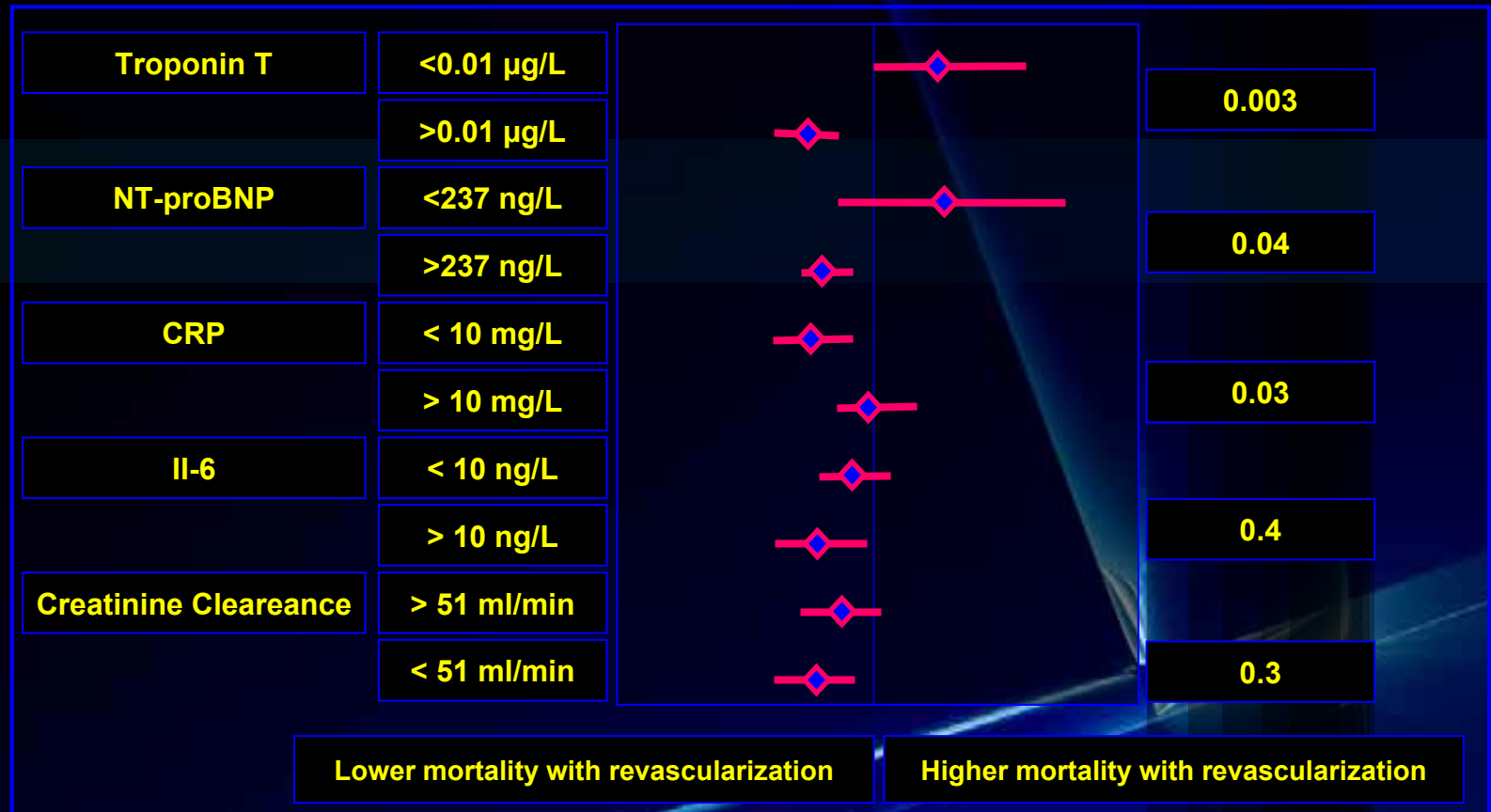
Troponina positiva... es sinónimo de intervención ?



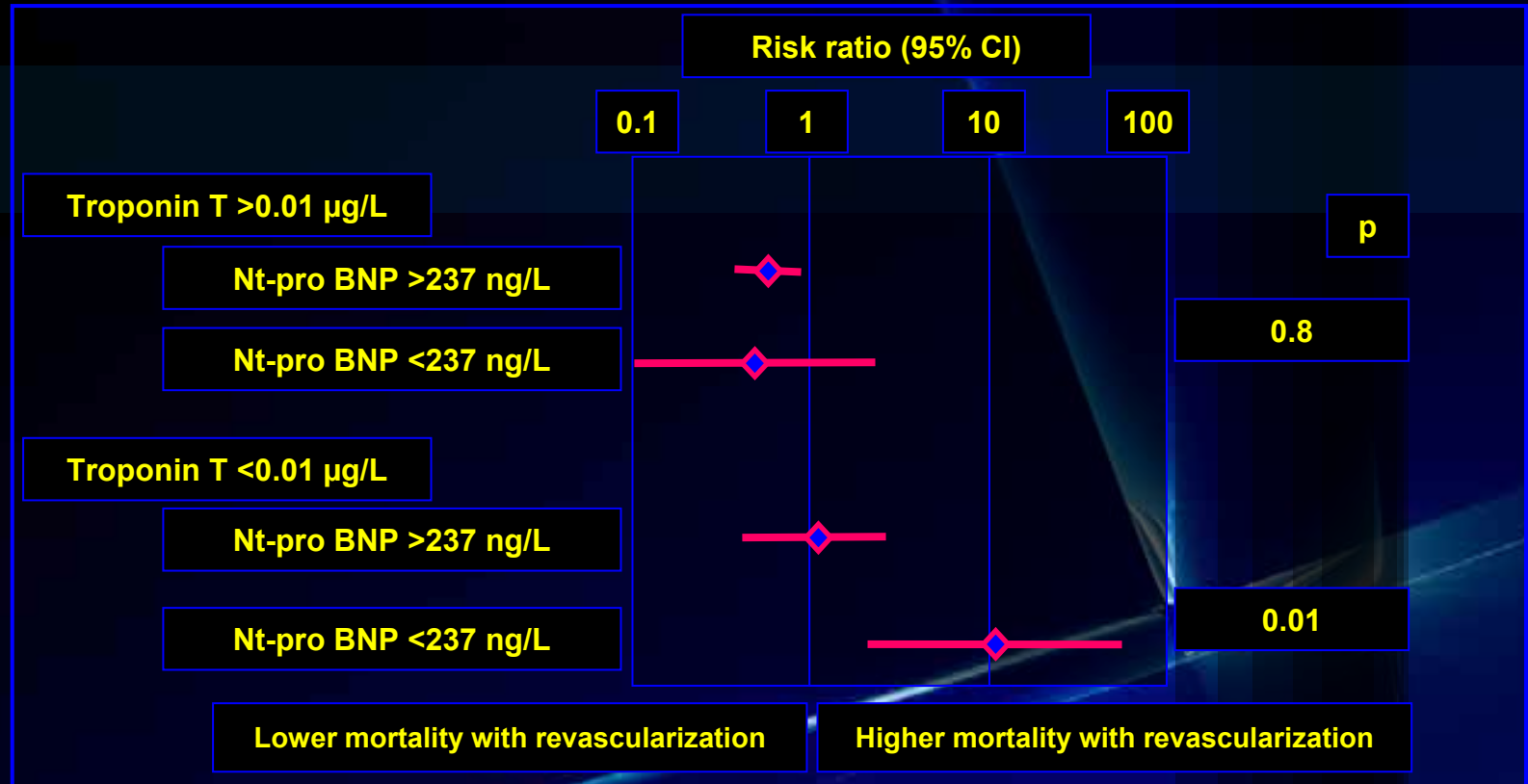
Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?

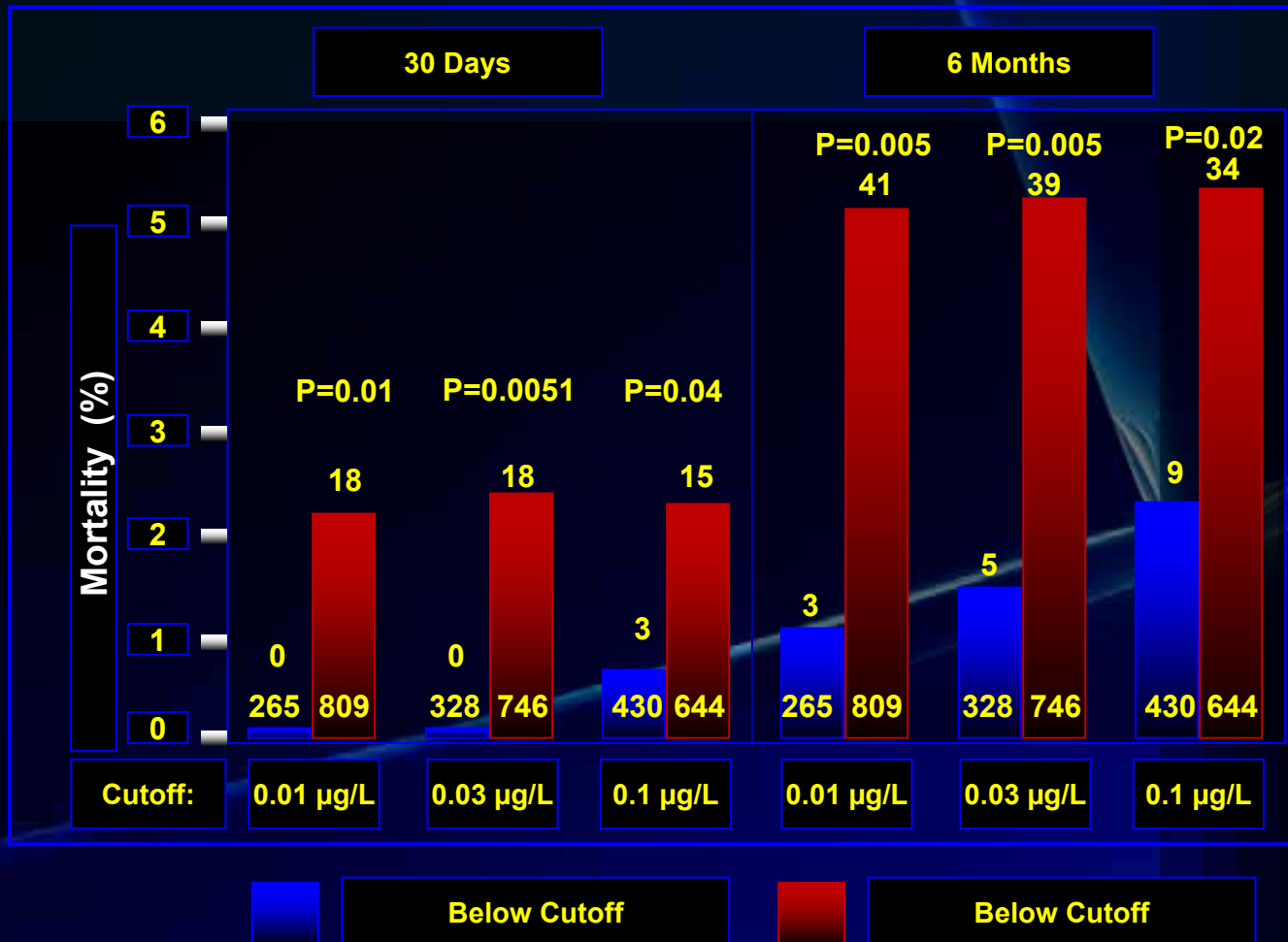


Troponina positiva... es sinónimo de intervención ?



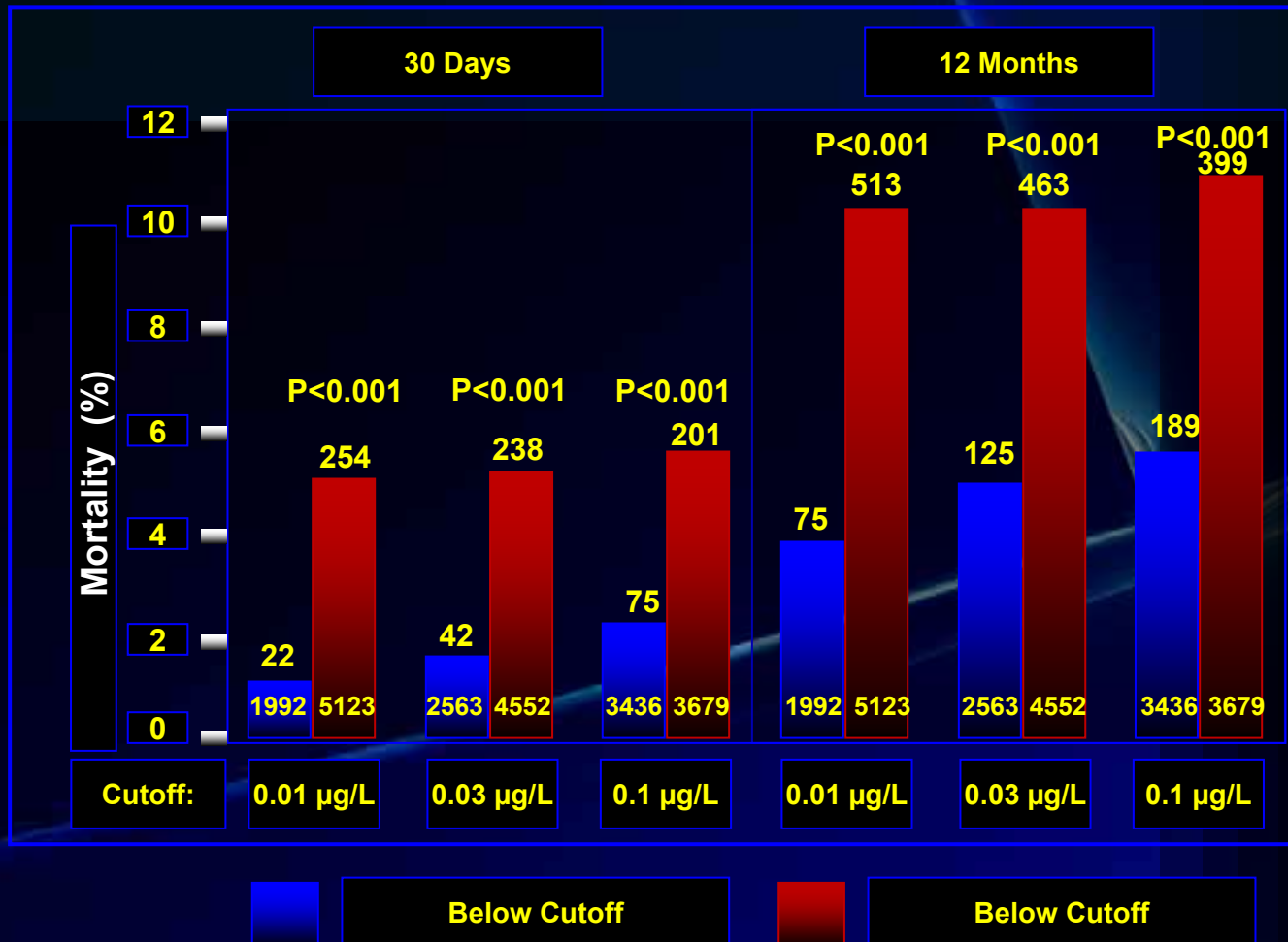
Troponina positiva... es sinónimo de intervención ?

FRISC II

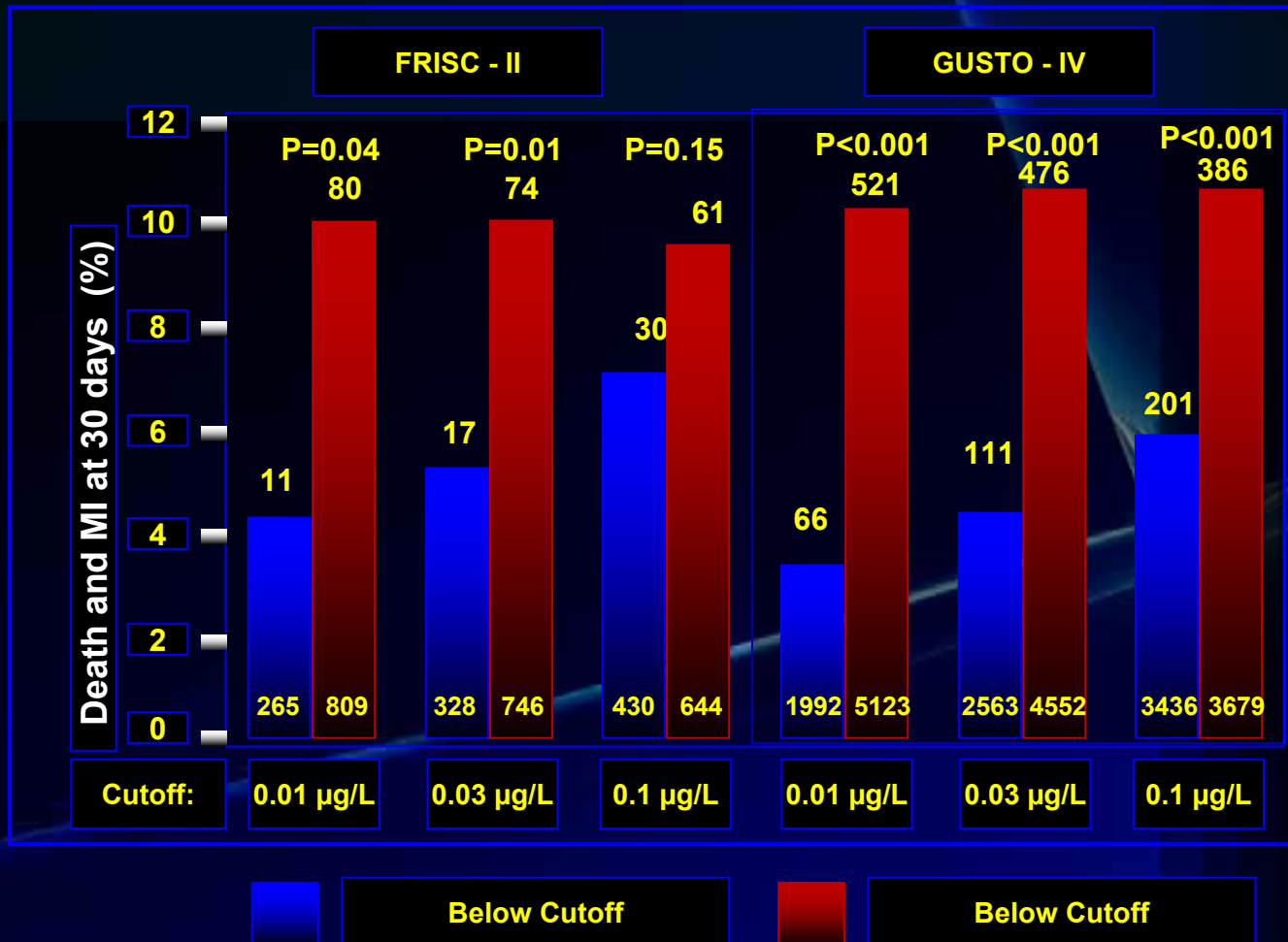


Troponina positiva... es sinónimo de intervención ?

GUSTO IV

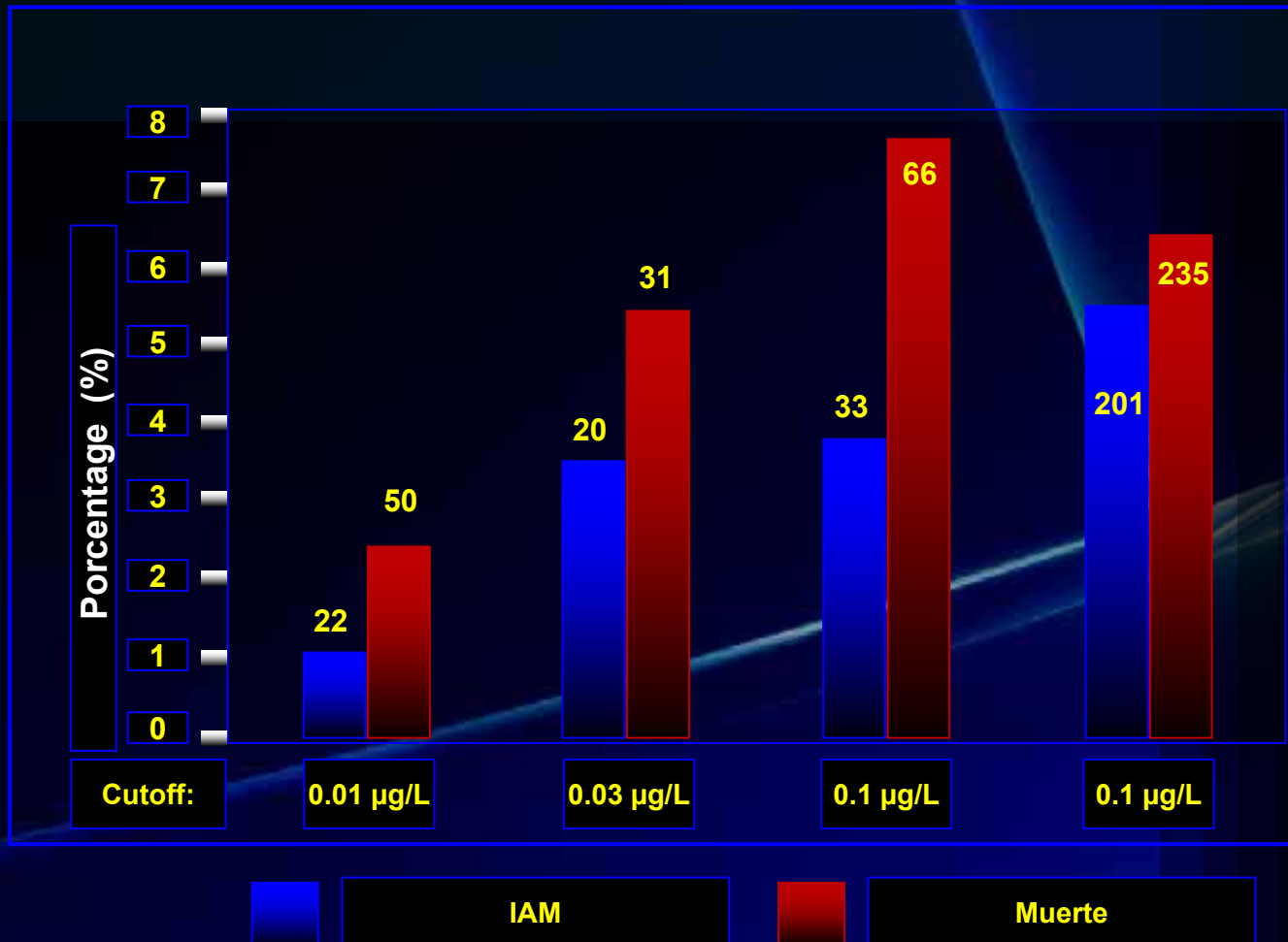


Troponina positiva... es sinónimo de intervención ?

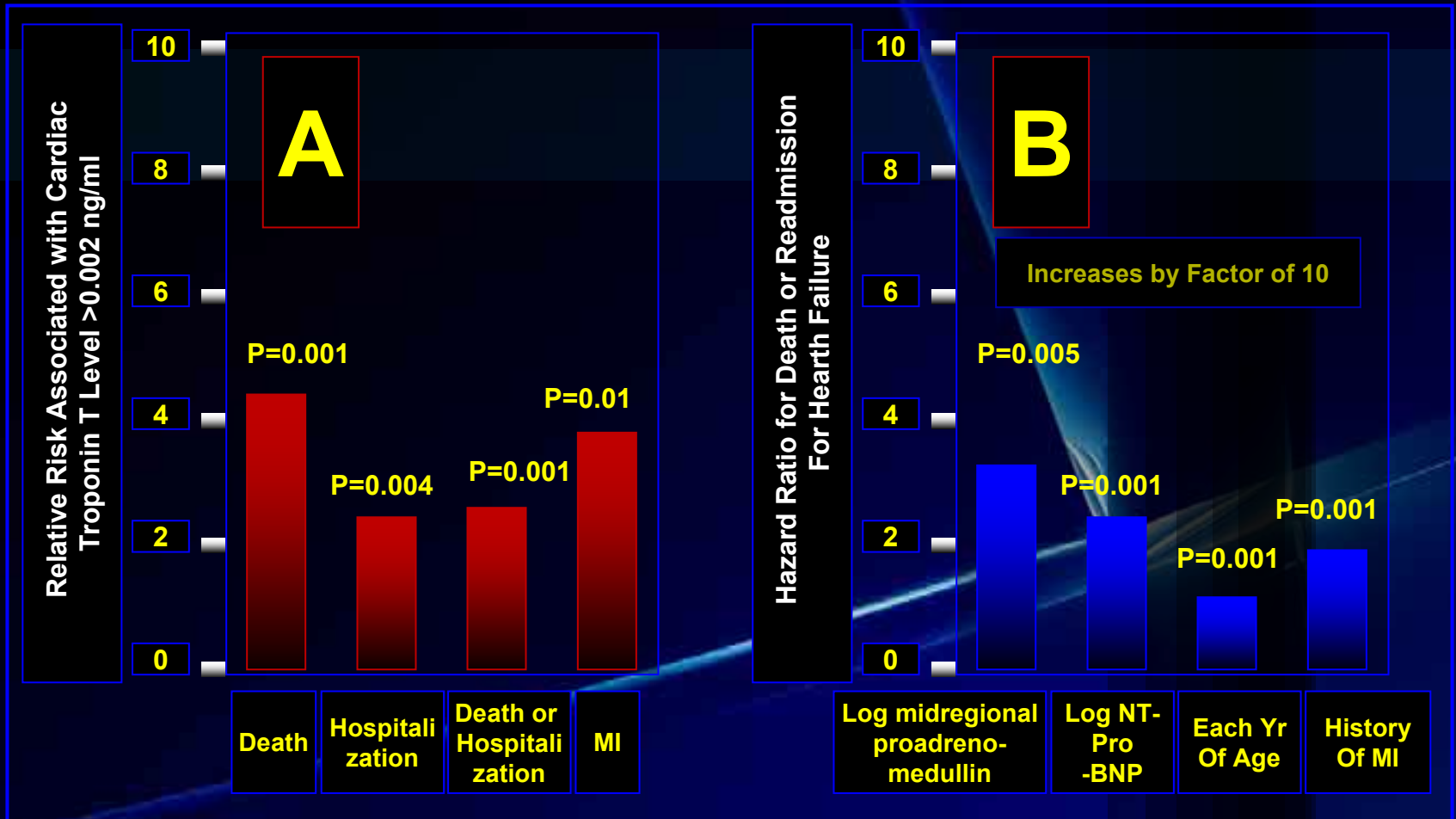


Troponina positiva... es sinónimo de intervención ?

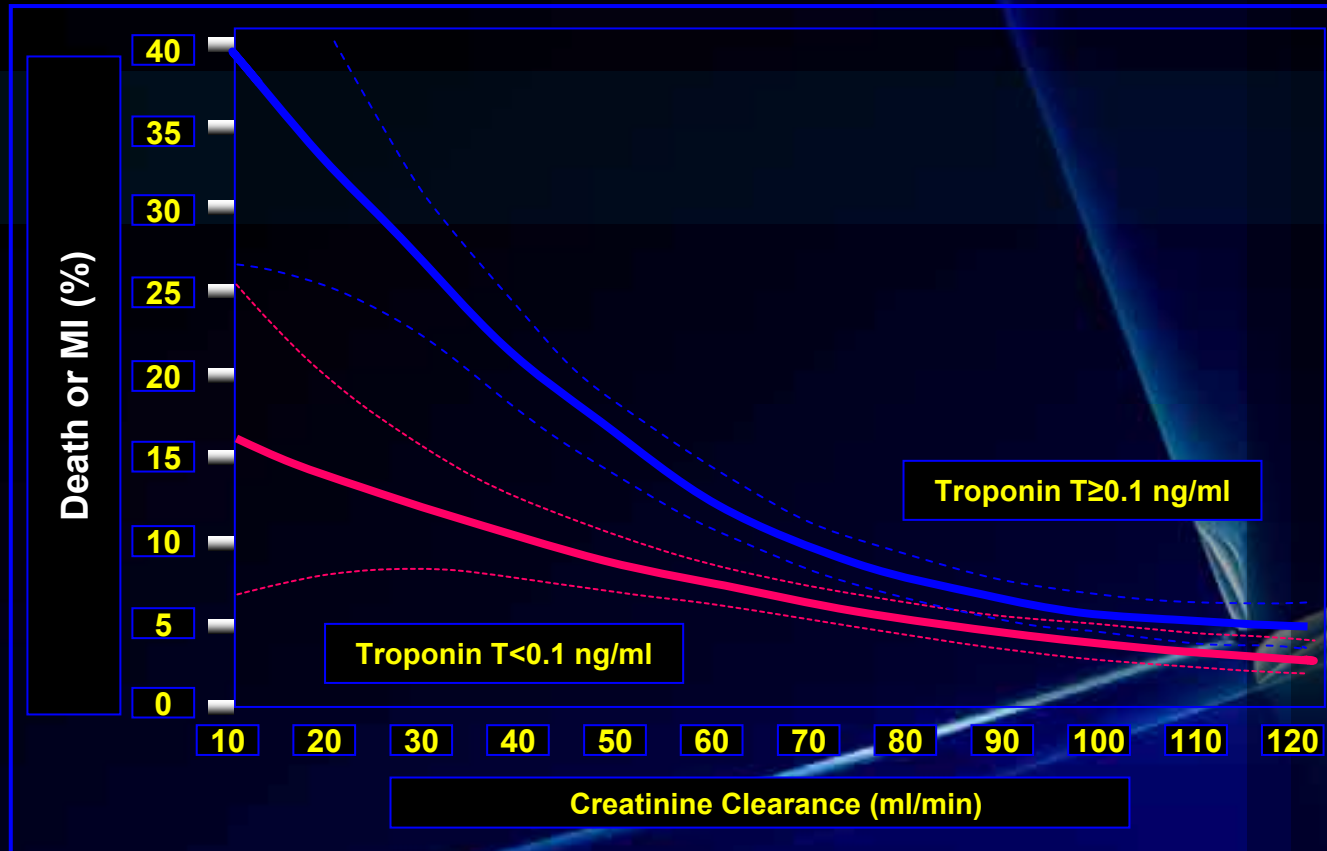
GUSTO IV



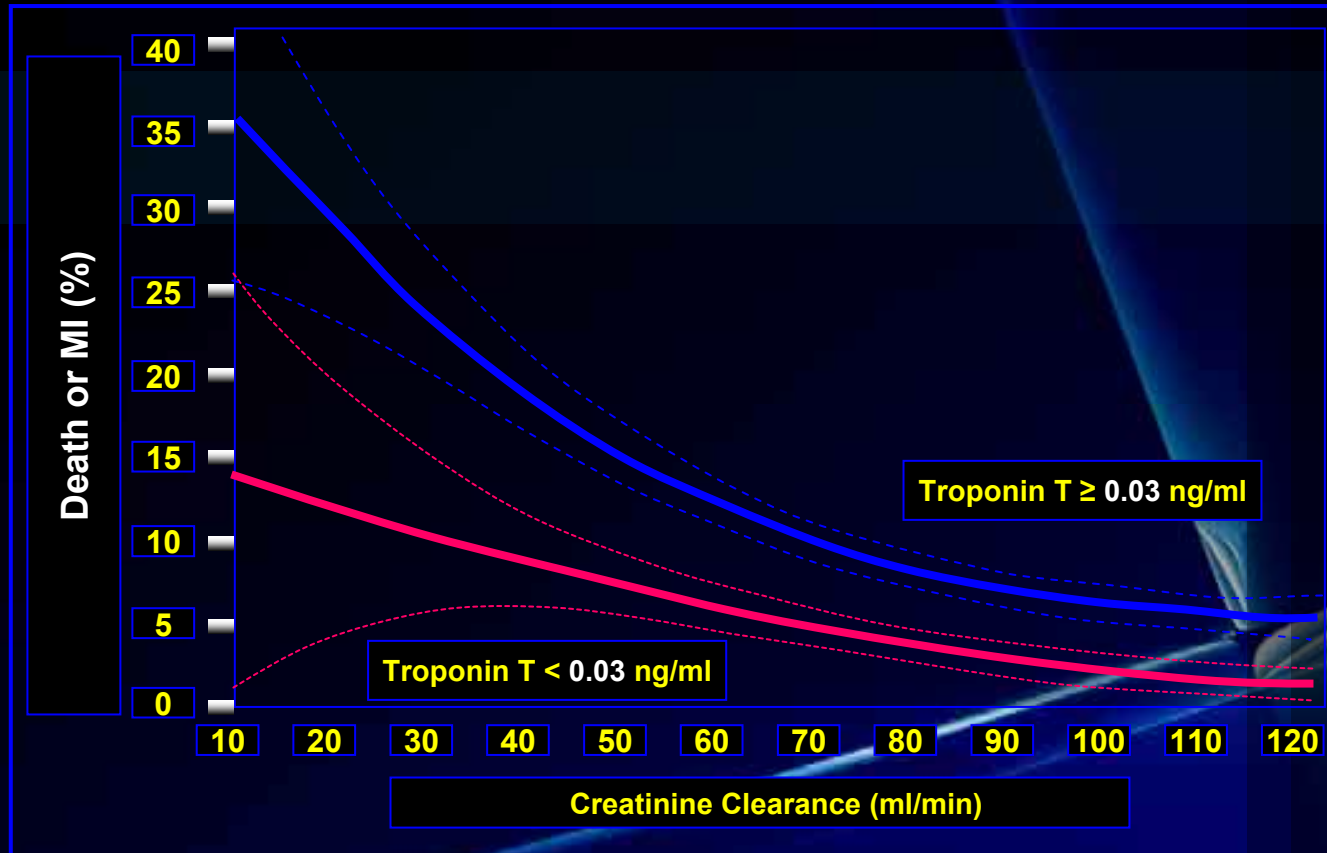
Troponina positiva... es sinónimo de intervención ?



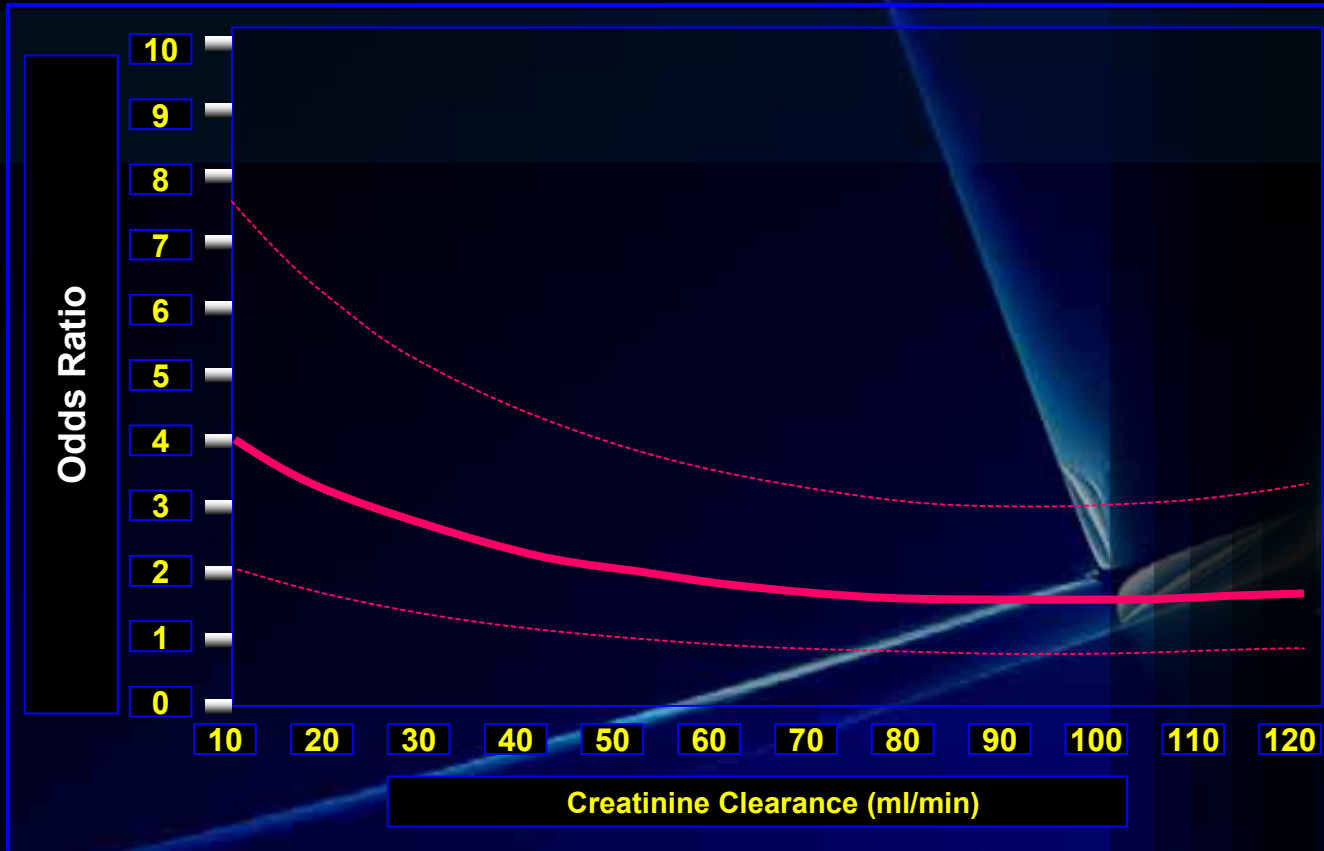
Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?



Troponina positiva... es sinónimo de intervención ?

BASE-LINE CHARACTERISTICS ACCORDING TO GROUPS DEFINED BY CREATININE CLEARANCE AND TROPONIN T STATUS.*

Characteristic	CREATININE CLEARANCE AND TROPONIN T LEVEL				N° (%)	P Value †
	BOTH NORMAL (N =2605)	ABNORMAL TROPONIN T LEVEL ONLY (N=2695)	ABNORMAL CREATININE CLEARANCE ONLY (N=783)	BOTH ABNORMAL (N =950)		
Age >65 yr	1037 (40)	1104 (41)	689 (88)	877 (92)	<0.001	
Female sex	1073 (41)	669 (25)	463 (59)	468 (49)	<0.001	
Weight >90 kg	447 (17)	587 (22)	23 (3)	36 (4)	<0.001	
Smoker	657 (25)	970 (36)	89 (11)	134 (14)	<0.001	
Medical condition						
Hypercholesterolemia	883 (34)	730 (27)	217 (28)	237 (25)	<0.001	
Hypertension	1394 (54)	1154 (43)	524 (67)	573 (60)	<0.001	
Diabetes mellitus	500 (19)	521 (19)	198 (25)	260 (27)	<0.001	
ST-segment depression	2364 (91)	1829 (68)	735 (94)	765 (81)	<0.001	

Abnormal creatinine clearance was defined as a measurement in the lowest quartile (<58.4 ml per minute), and an abnormal troponin T level was defined as a level of 0.1 ng per milliliter or higher.

†P values are for the four-way comparison among groups.

Troponina positiva... es sinónimo de intervención ?

BASE-LINE CHARACTERISTICS ACCORDING TO GROUPS DEFINED BY CREATININE CLEARANCE AND TROPONIN T STATUS.*

Characteristic	CREATININE CLEARANCE AND TROPONIN T LEVEL				N° (%)	P Value †
	BOTH NORMAL (N =2605)	ABNORMAL TROPONIN T LEVEL ONLY (N=2695)	ABNORMAL CREATININE CLEARANCE ONLY (N=783)	BOTH ABNORMAL (N =950)		
<i>Medical condition</i>						
Myocardial infarction	740 (28)	713 (26)	304 (39)	399 (42)	<0.001	
Chronic stable angina	1422 (55)	872 (32)	532 (68)	487 (51)	<0.001	
Bypass surgery	217 (8)	219 (8)	90 (11)	90 (9)	0.02	
Angioplasty	256 (10)	233 (9)	93 (12)	75 (8)	0.02	
Heart failure	170 (7)	99 (4)	110 (14)	144 (15)	<0.001	
Stroke	44 (2)	55 (2)	24 (3)	45 (5)	<0.001	
Abciximab treatment	1734 (67)	1826 (68)	526 (67)	616 (65)	0.41	

Abnormal creatinine clearance was defined as a measurement in the lowest quartile (<58.4 ml per minute), and an abnormal troponin T level was defined as a level of 0.1 ng per milliliter or higher.

†P values are for the four-way comparison among groups.

Troponina positiva... es sinónimo de intervención ?

UNADJUSTED AND ADJUSTED ODDS RATIOS FOR DEATH OR MYOCARDIAL INFARCTION WITHIN 30 DAYS ACCORDING TO TROPONIN T STATUS AND QUARTILE OF CREATININE CLEARANCE.*

QUARTILE OF CREATININE CLEARANCE	MYOCARDIAL INFARCTION OR DEATH		UNADJUSTED ODDS RATIO (95% CI)	P Value	ADJUSTED ODDS RATIO (95% CI) †	P Value
	TROPONIN T ≥0.1 ng/ml	TROPONIN T <0.1 ng/ml				
<i>no./total no. in quartile (%)</i>						
First	186/950 (20)	70/783 (9)	2.5 (1.9–3.3)	<0.001	2.5 (1.8–3.3)	<0.001
Second	91/886 (10)	60/917 (7)	1.6 (1.2–2.3)	0.004	1.8 (1.3–2.6)	<0.001
Third	61/879 (7)	47/883 (5)	1.3 (0.9–2.0)	0.16	1.4 (0.9–2.1)	0.16
Fourth	46/930 (5)	20/805 (2)	2.0 (1.2–3.5)	0.008	2.3 (1.3–4.1)	0.003
	TROPONIN T ≥0.03 ng/ml	TROPONIN T <0.03 ng/ml				
<i>no./total no. in quartile (%)</i>						
First	214/1180 (18)	42/553 (8)	2.7 (1.9–3.8)	<0.001	2.7 (1.9–3.8)	<0.001
Second	115/1113 (10)	36/690 (5)	2.1 (1.4–3.1)	<0.001	2.4 (1.6–3.6)	<0.001
Third	86/1102 (8)	22/660 (3)	2.5 (1.5–4.0)	<0.001	2.6 (1.6–4.4)	<0.001
Fourth	58/1117 (5)	8/618 (1)	4.2 (2.0–8.8)	<0.001	4.8 (2.3–10.4)	<0.001

* The first quartile of creatinine clearance included values below 58.4 ml per minute; the second quartile included values between 58.4 and 76.9 ml per minute; the third quartile included values between 77.0 and 98.6 ml per minute; and the fourth quartile included values greater than 98.6 ml per minute. CI denotes confidence interval.

†The odds ratios were adjusted for the presence or absence of an age greater than 65 years, ST-segment depression, and a history of angina, myocardial infarction, bypass surgery, angioplasty, diabetes mellitus, stroke, and heart failure.

Troponina positiva... es sinónimo de intervención ?

Baseline troponin and angiographic outcomes

Parameter	Troponin undetectable	Troponin ≤ median (0.01-0.12 ng/ml)	Troponin > median (0.12-11.08 ng/ml)	P value for trend
TFG 0/1	13.5%	12.7%	17.4%	.18
TFG 0/1 or death before angiography	13.9%	14.1%	21.9%	.0038
TMPG 0/1	48.4%	43.4%	45.7%	.35
Thrombus	47.7%	45.2%	51.9%	.25
Stenosis (mean±SD)	69.6 ± 19.6	69.3 ± 18.9	69.0 ± 21.4	.68
Multivessel CAD or LM ≥50%	30.7%	34.3%	36.3%	.22

TFG, TIMI Flow Grade; TMPG, TIMI Myocardial Perfusion Grade; CAD, coronary artery disease; LM, left main.

Troponina positiva... es sinónimo de intervención ?

Baseline troponin and clinical outcomes

Outcome	Troponin undetectable	Troponin \leq median (0.01-0.12 ng/ml)	Troponin $>$ median (0.12-11.08 ng/ml)	P value for trend
30-d CV death	1.5%	4.5%	9.5%	<.0001
CHF	1.9%	3.0%	5.8%	.005
CV death or CHF	3.2%	7.3%	14.4%	<.0001
Recurrent MI	8.6%	5.5%	3.7%	.01

TFG, TIMI Flow Grade; TMPG, TIMI Myocardial Perfusion Grade; CAD, coronary artery disease; LM, left main.

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Troponina positiva... es sinónimo de intervención ?

90-Minute ST resolution and angiographic outcomes

Parameter	ST - segment resolution			P value for trend
	Complete	Partial	None	
Median time to angiography, h (interquartile range)	81.6 (52.7-125.5)	76.1 (50.9-123.7)	70.8 (4.6-125.5)	.02
TFG 0/1	8.9%	13.6%	24.2%	<.0001
TFG 0/1 or death before angiography	9.2%	14.9%	27.2%	<.0001
TMPG 0/1	43.6%	46.0%	52.1%	.059
Thrombus	42.1%	48.7%	61.2%	<.0001
Stenosis (mean \pm SD)	67.9 \pm 18.6	69.8 \pm 18.3	72.7 \pm 21.6	.0048
PCI	66.1%	59.1%	65.1%	.16

TFG, TIMI Flow Grade; TMPG, TIMI Myocardial Perfusion Grade; CAD, coronary artery disease; LM, left main.

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Troponina positiva... es sinónimo de intervención ?

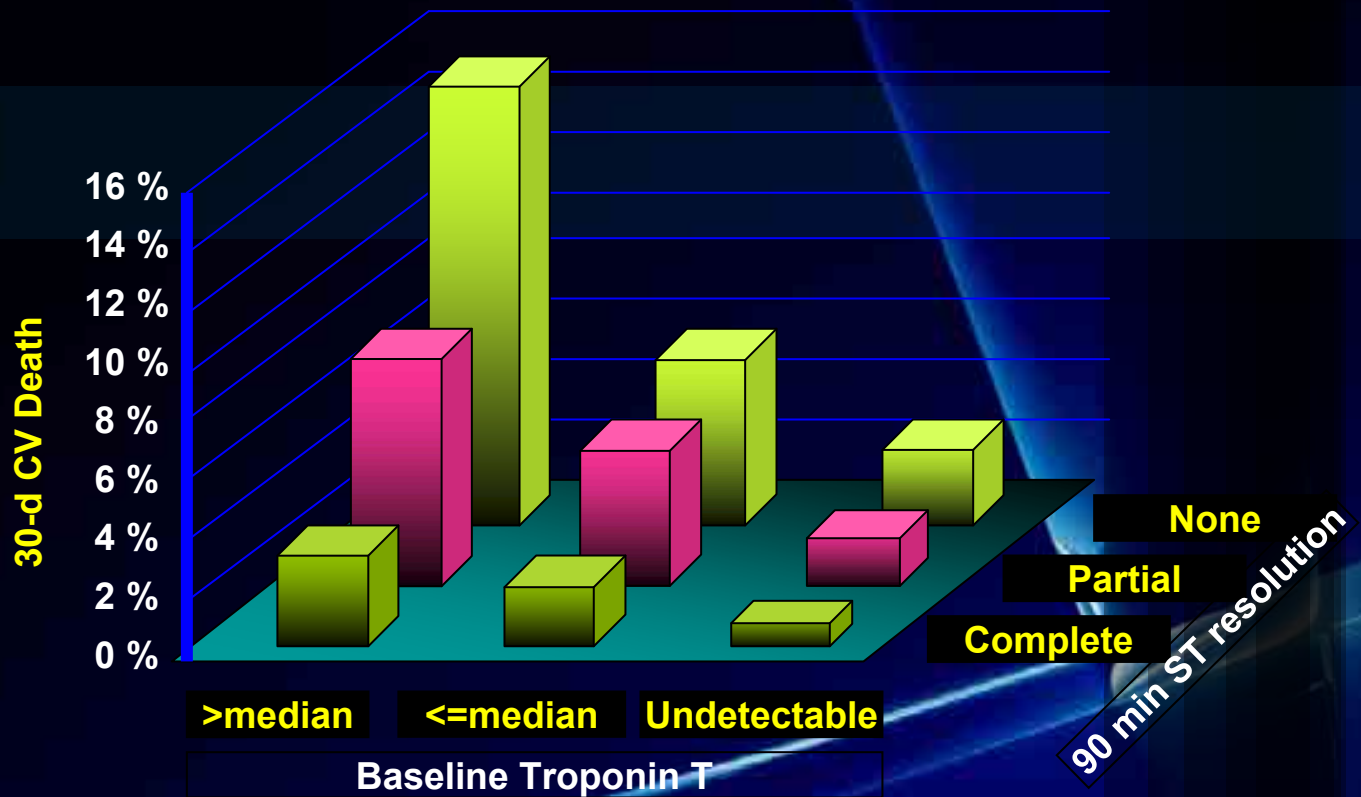
90-Minute ST resolution and clinical outcomes

Outcome	ST - segment resolution			P value for trend
	Complete	Partial	None	
30-d CV Death	1.4%	4.3%	7.1%	.0003
CHF	1.9%	2.2%	6.7%	.003
CV death or CHF	3.3%	6.5%	12.6%	<.0001
Recurrent MI	9.0%	3.3%	9.7%	.78

TFG, TIMI Flow Grade; TMPG, TIMI Myocardial Perfusion Grade; CAD, coronary artery disease; LM, left main.

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Troponina positiva... es sinónimo de intervención ?

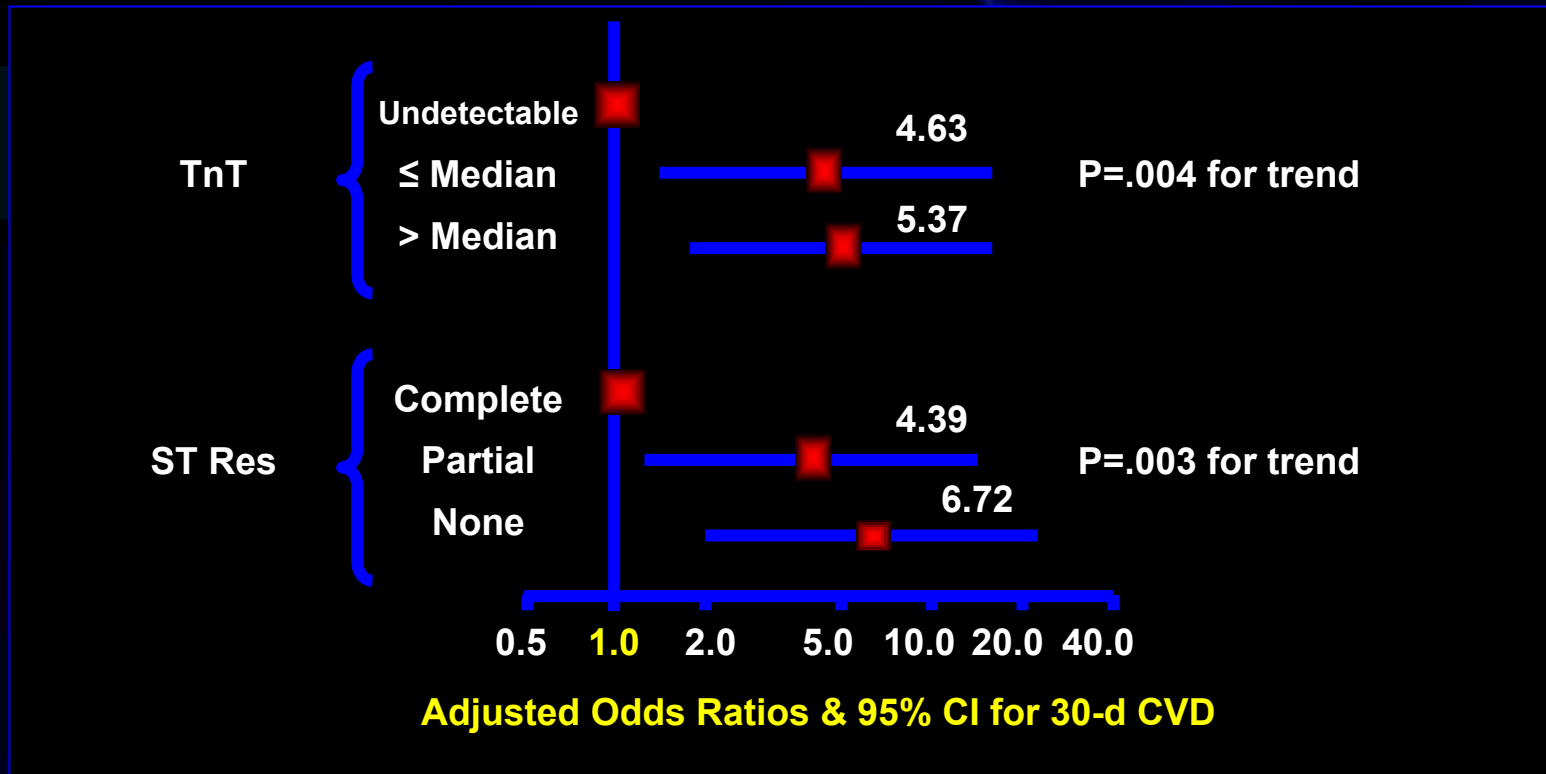


Rates of 30-day CV death stratified by troponin and ST resolution.

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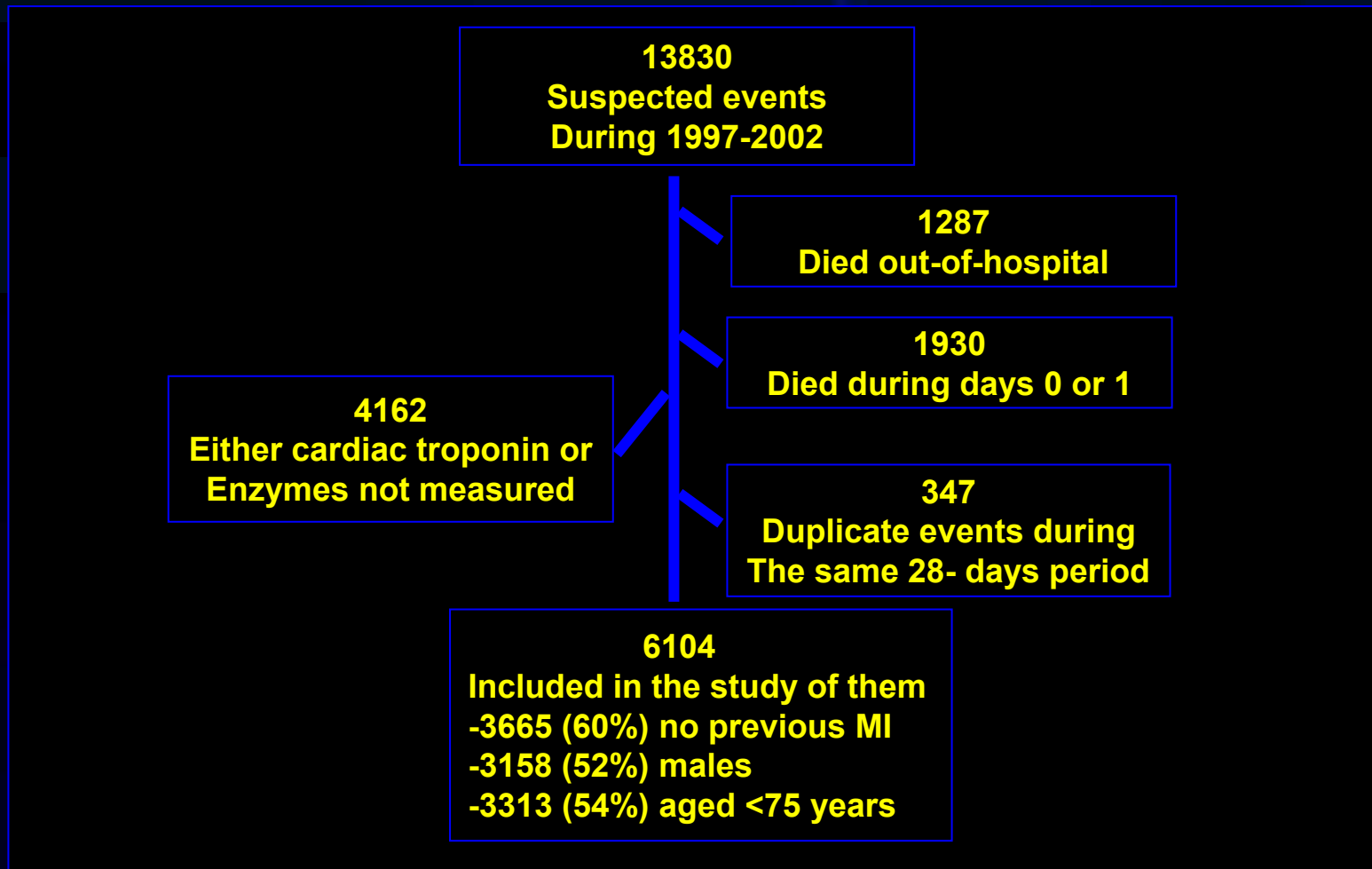
Troponina positiva... es sinónimo de intervención ?

Odds ratios for 30-day CV death.



Odds ratios (squares) and 95% CIs (horizontal lines) for the risk of CV death through 30 days for the magnitude of troponin elevation (undetectable is reference) and the degree of ST-segment resolution

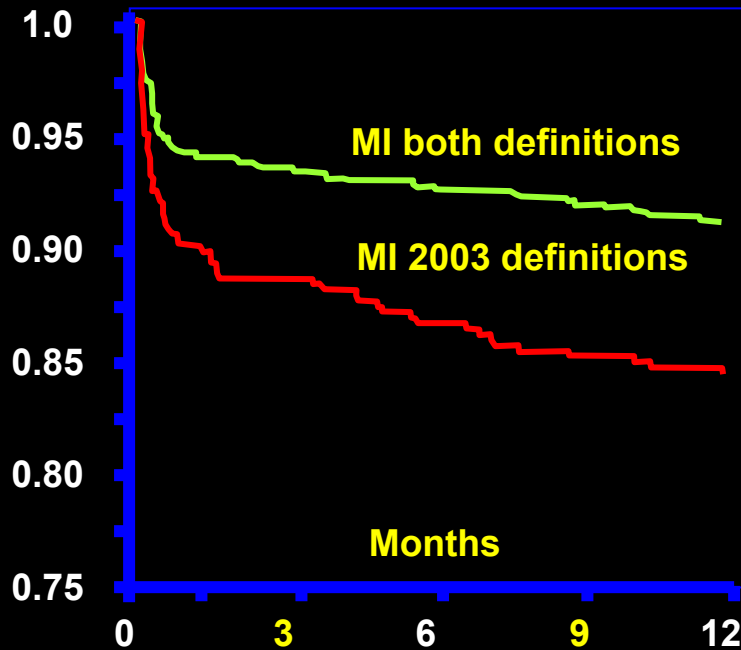
Troponina positiva... es sinónimo de intervención ?



Flow-chart of suspected MI events in the **FINAMI study** areas during 1997–2002, exclusions and events included in the study.

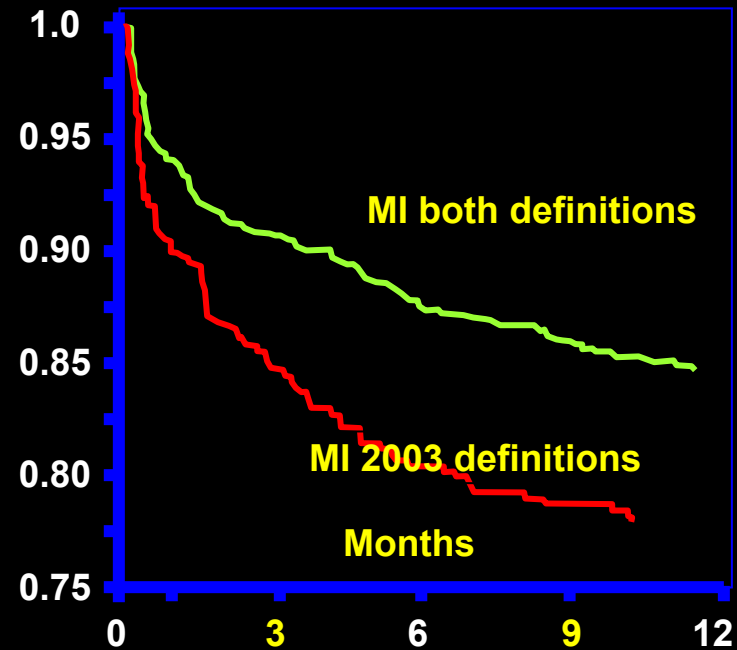
Troponina positiva... es sinónimo de intervención ?

(A) Survival



Months	0	3	6	9	12
MI both def.	739	684	677	669	660
MI 2003 def.	407	305	339	329	321

(B) Event free



Months	0	3	6	9	12
MI both def.	739	664	643	627	615
MI 2003 def.	407	335	314	304	296

Figure 2 (A) Kaplan–Meier survival curves (the endpoint is cardiovascular death) for persons aged 25–74 years with their first MI which fulfils both the WHO MONICA definition using enzymatic markers of myocardial injury and the 2003 definition using troponins, and in persons with their first MI which fulfils the 2003 definition only. In total, there are 1018 person-years of follow-up, log-rank test χ^2 11.8, $P < 0.0006$. The numbers of patients at follow-up are shown in the abscissa at 3 month intervals.

Figure 2(B) Kaplan–Meier curves for event-free survival (i.e. the endpoint is either cardiovascular death or non-fatal MI) in the same groups as described earlier. In total, there are 969 person-years of follow-up, log-rank test χ^2 8.8, $P < 0.003$.

Troponina positiva... es sinónimo de intervención ?

Table 2

Cross-tabulation of hospitalized suspected MI events ^a according to routine clinical diagnosis and the 2003 definition of MI

2003 definition ^b	Clinical diagnosis				Total
	MI	Unstable angina	Angina	Other	
Definite, n (%)	2595 (85)	126 (4)	91 (3)	254 (8)	3064 (100.0)
No, n (%)	239 (8)	531 (17)	805 (26)	1465 (48)	3040 (100.0)
Total, n (%)	2834 (46)	657 (11)	896 (15)	1717 (28)	6104 (100.0)

Kappa coefficient = 0.77 for the agreement between the clinical diagnosis of MI and the definite MI according to the 2003 definition vs. other categories (dichotomized data).

^a Includes events where the patient has been hospitalized alive and survived at least 1 day.

^b Luepker et al.¹⁰.

Troponina positiva... es sinónimo de intervención ?

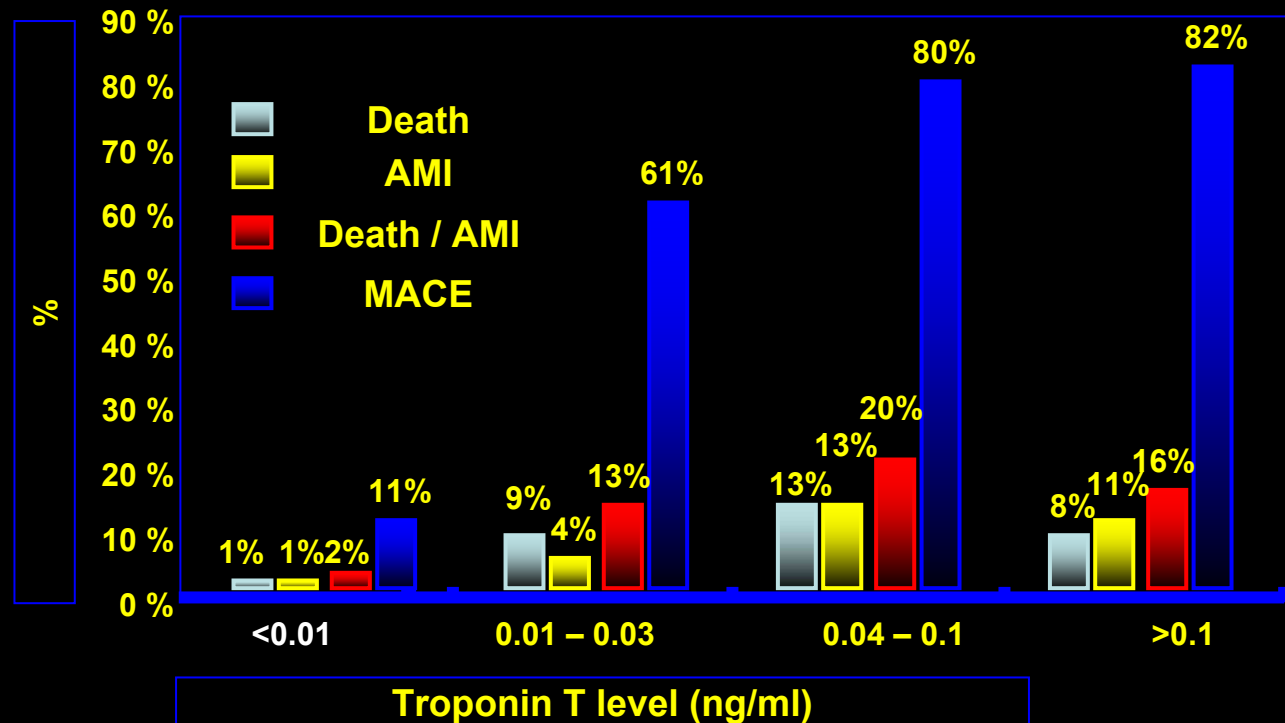


Figure 1 Troponin T and 6-month outcome. AMI, acute myocardial infarction; MACE, major adverse cardiac event.

Troponina positiva... es sinónimo de intervención ?

Figure 2

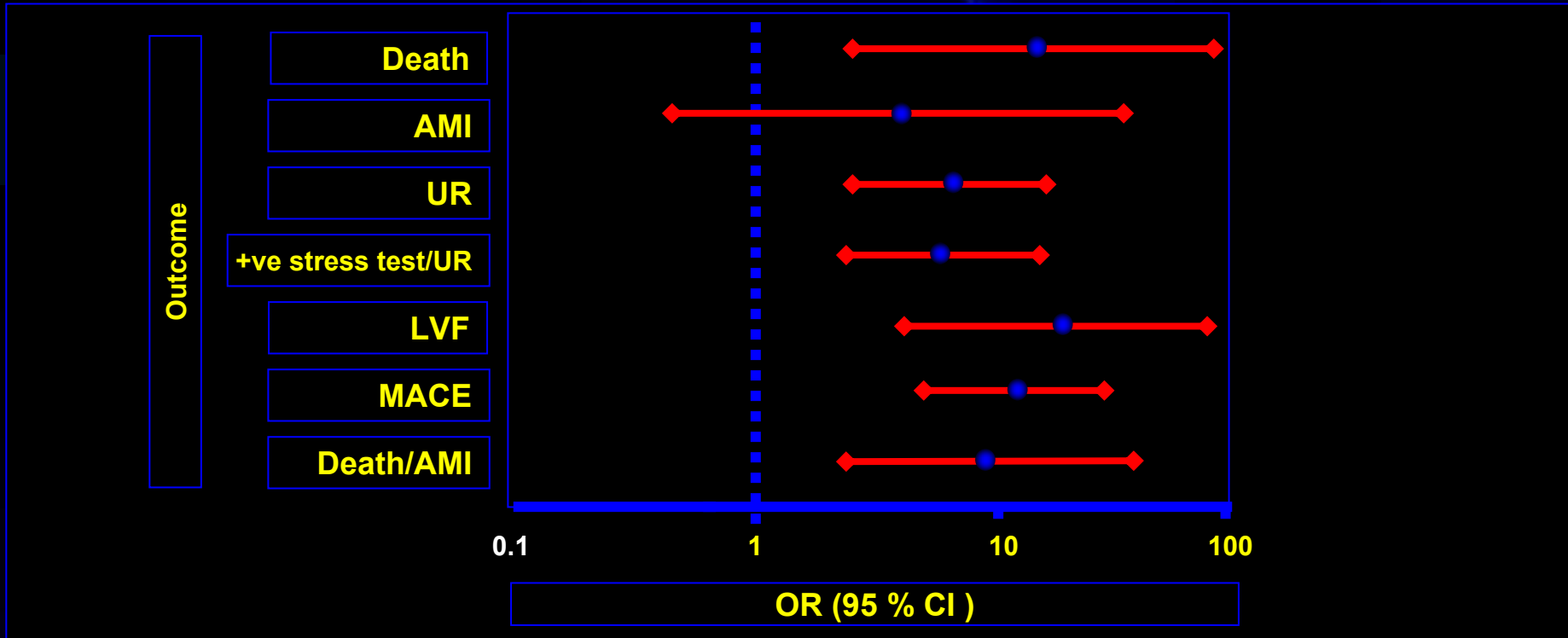


Figure 2 Univariate logistic regression analyses demonstrating the odds that patients with troponin T levels 0.01e0.03 ng/ml will develop individual outcomes within 6 months (relative to patients with troponin T <0.01 ng/ml). AMI, acute myocardial infarction; LVF, left ventricular failure; MACE, major adverse cardiac event; UR, urgent coronary revascularisation.

Troponina positiva... es sinónimo de intervención ?

Table 2

Multivariate logistic regression analysis showing the prognostic value of troponin T after adjustment for potential confounding factors

Troponin T (ng/ml)	Death / acute myocardial infarction (OR (95% CI))	Major adverse cardiac event (OR (95% CI))
<0.01	-	-
0.01-0.03	4.60 (1.08 to 19.68, p=0.039)	11.10 (4.44 to 27.76, p<0.0001)
0.04-0.1	16.43 (3.86 to 69.87, p=0.0002)	34.22 (9.31 to 125.71, p<0.0001)
>0.1	9.06 (4.09 to 20.06, p 6×10^{-8})	34.16 (20.46 to 57.06, p<0.0001)

Other variables entered into the model: Thrombolysis in Myocardial Infarction risk score (minus cardiac enzymes); serum creatinine.

Troponina positiva... es sinónimo de intervención ?

Table 3

Sensitivity and specificity of troponin T at different cut-offs for identifying patients who would develop adverse events

Outcome	Troponin Cut-off (ng/ml)	Percentage Sensitivity (95% CI)	Percentage Sensitivity (95% CI)
Death/acute myocardial	≥ 0.01 70.0	(54.6 to 81.9)	81.1 (78.1 to 83.7)
Infarction	≥ 0.04	60.0 (44.6 to 73.7)	83.6 (80.8 to 86.1)
Major adverse	≥ 0.01	66.2 (59.2 to 72.6)	93.9 (91.7 to 95.7)
cardiac event	≥ 0.04	59.3 (52.2 to 66.1)	95.4 (93.4 to 97.0)

Troponina positiva... es sinónimo de intervención ?

- Conclusiones

- Ptes con SCA es importante el interrogatorio para descartar otras causas, si existen síntomas diferentes al dolor precordial
- Tnt son marcadores de pronóstico y herramientas diagnósticas
- El punto de corte depende de la generación de TnTc utilizada
- El riesgo no siempre es evaluable solo con TnTc, observar el contexto de riesgo
- A mayores valores de TnTc mayor es el riesgo
- Si los valores de TnTc son <0.04 ng/dl sin otros elementos de alto riesgo parecerían no ser suficientes para indicar una CCG

Troponina positiva... es sinónimo de intervención ?

Muchas gracias