# *Diagnóstico y Tratamiento de la Cardiopatía Isquémica en el Diabético*

*XXVIII Congreso Nacional de la SEMI*

*SITGES. 23 de Noviembre 2007*

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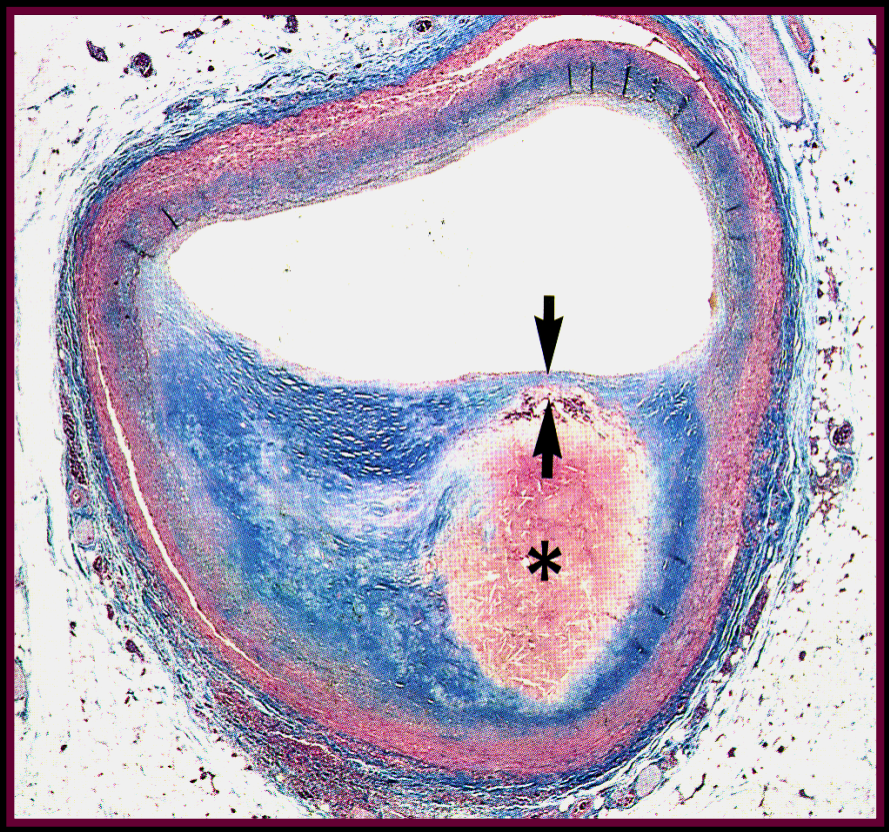
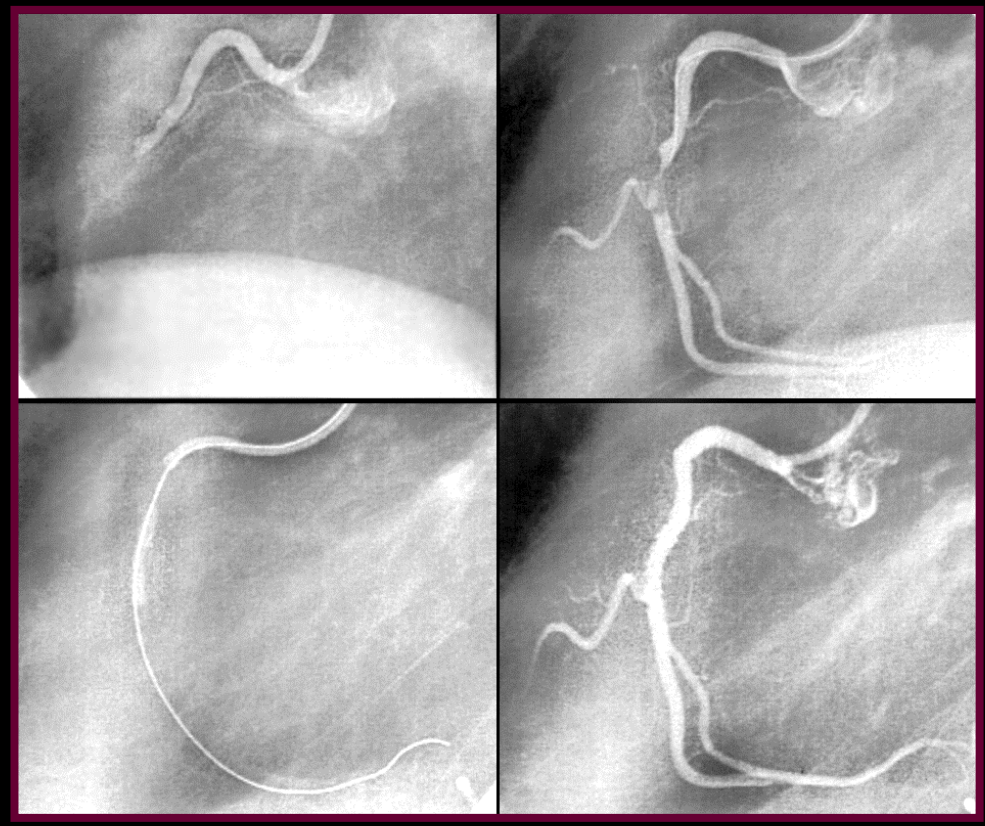
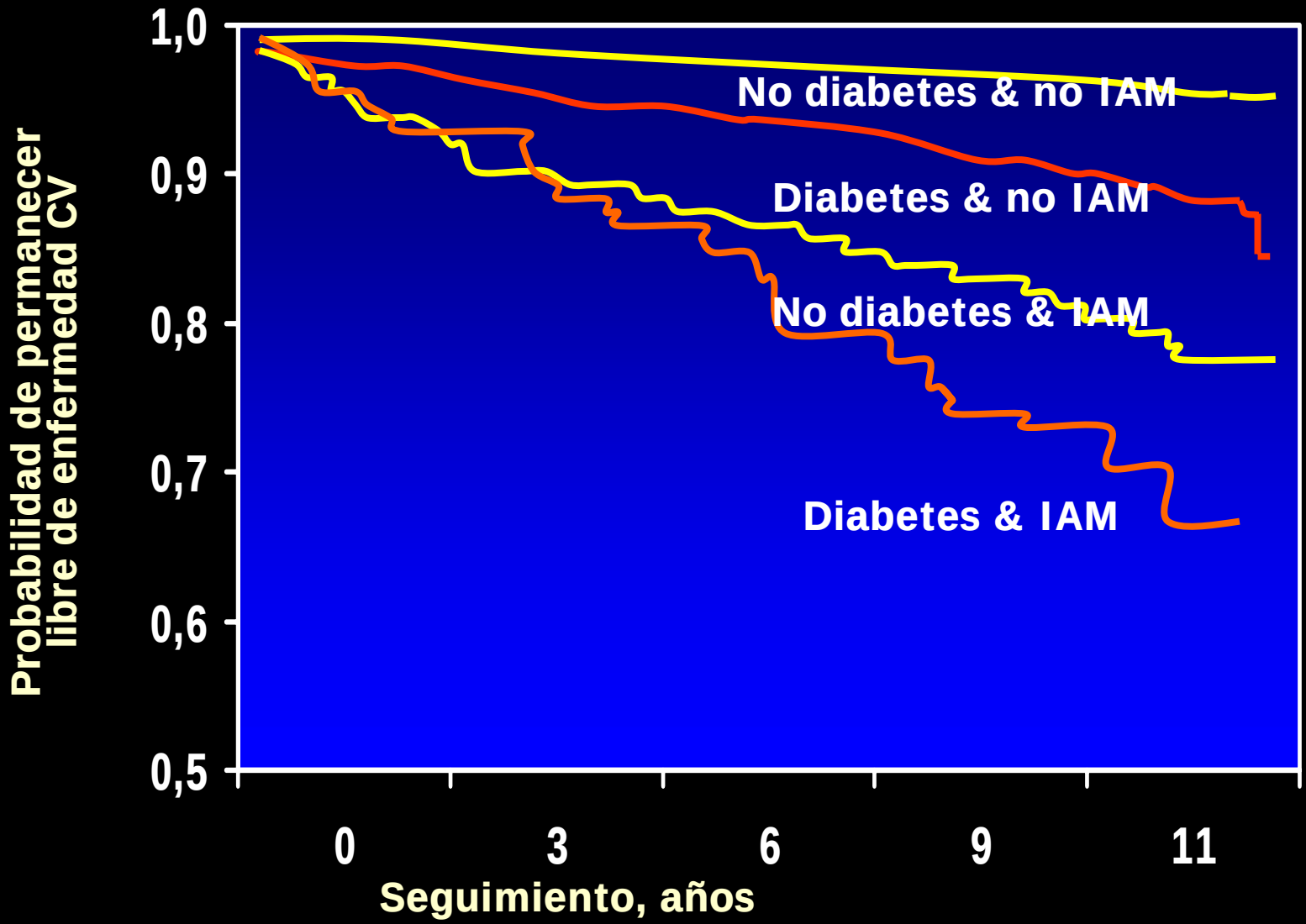
# Cardiopatía Isquémica y Alts. Metabolismo Hidrocarbonado



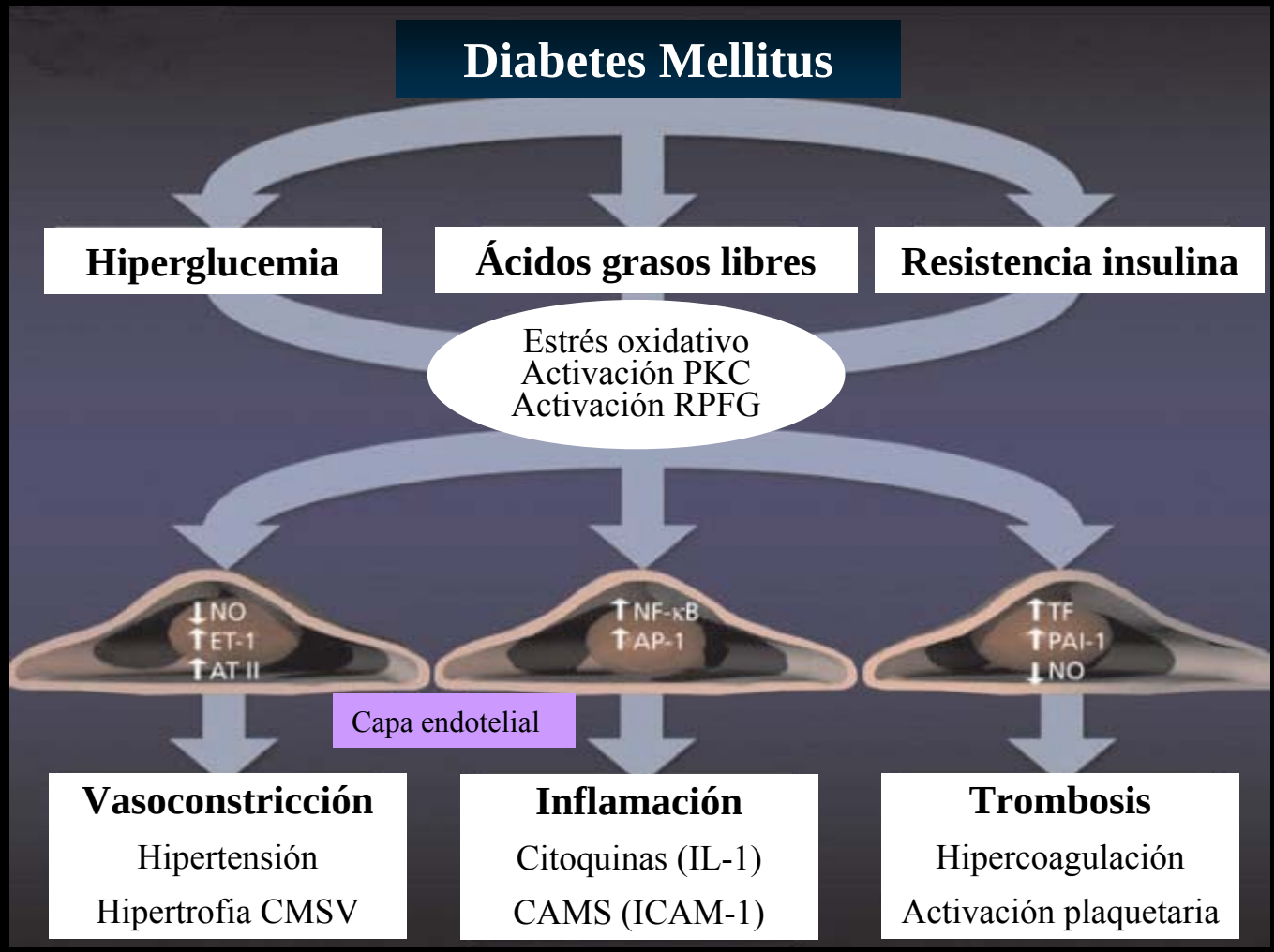


# Diabetes e Infarto de Miocardio




*Lee et al, Circulation 2004;109:855-860*

# DIABETES Y ENFERMEDAD CARDIOVASCULAR




*Circulation 2003;108:1527-1532.*

European Heart Journal
doi:10.1093/eurheartj/ehl261



# †Guidelines on diabetes, pre-diabetes, and cardiovascular diseases: full text‡

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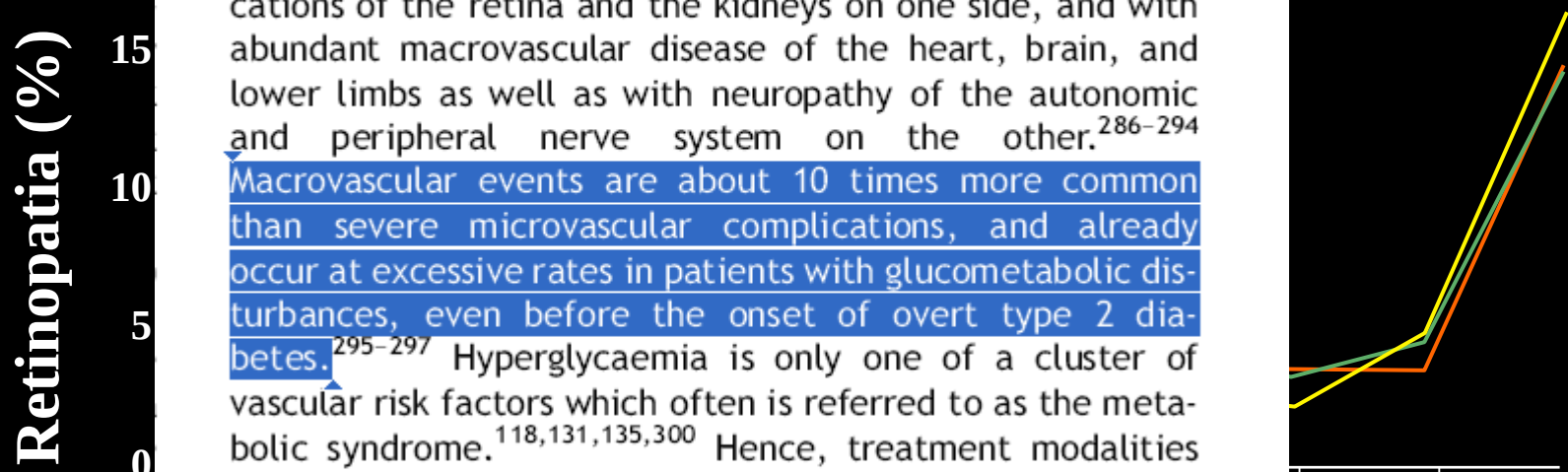
# DIAGNÓSTICO DE DIABETES

## Life style and comprehensive management

Long-term hyperglycaemia, i.e. DM–both type 1 and type 2–is strongly associated with specific microvascular complications of the retina and the kidneys on one side, and with abundant macrovascular disease of the heart, brain, and lower limbs as well as with neuropathy of the autonomic and peripheral nerve system on the other.[286–294] Macrovascular events are about 10 times more common than severe microvascular complications, and already occur at excessive rates in patients with glucometabolic disturbances, even before the onset of overt type 2 diabetes.[295–297] Hyperglycaemia is only one of a cluster of vascular risk factors which often is referred to as the metabolic syndrome.[118,131,135,300] Hence, treatment modalities have to be rather complex and strongly based on non-pharmacological therapy including life style changes and self-monitoring and it requires structured patient education.[301–305] This has to include a heavy emphasis on



# DIAGNÓSTICO DE DIABETES

Normoglucemia

GB < 110 mg/dl + TSOG < 140 mg/dl

Glucemia basal alterada

GB 110-125 mg/dl

Intolerancia a glucosa

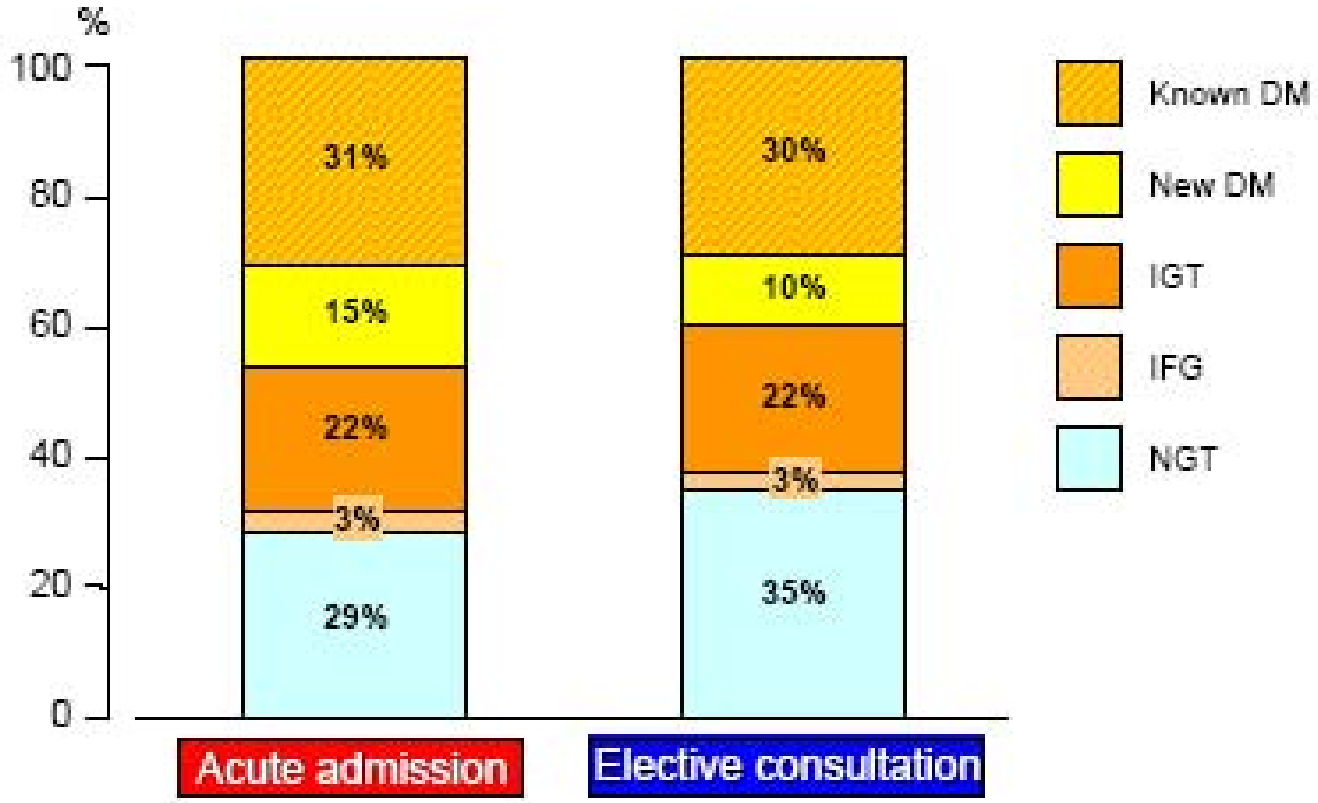
TSOG ≥ 140 mg/dl

} HOMEOSTASIS de la GLUCOSA ALTERADA (HGA)

Diabetes mellitus

GB ≥ 126 mg/dl +/- TSOG ≥ 200 mg/dl

# Estimated glucose regulation for the entire cohort n= 4 961

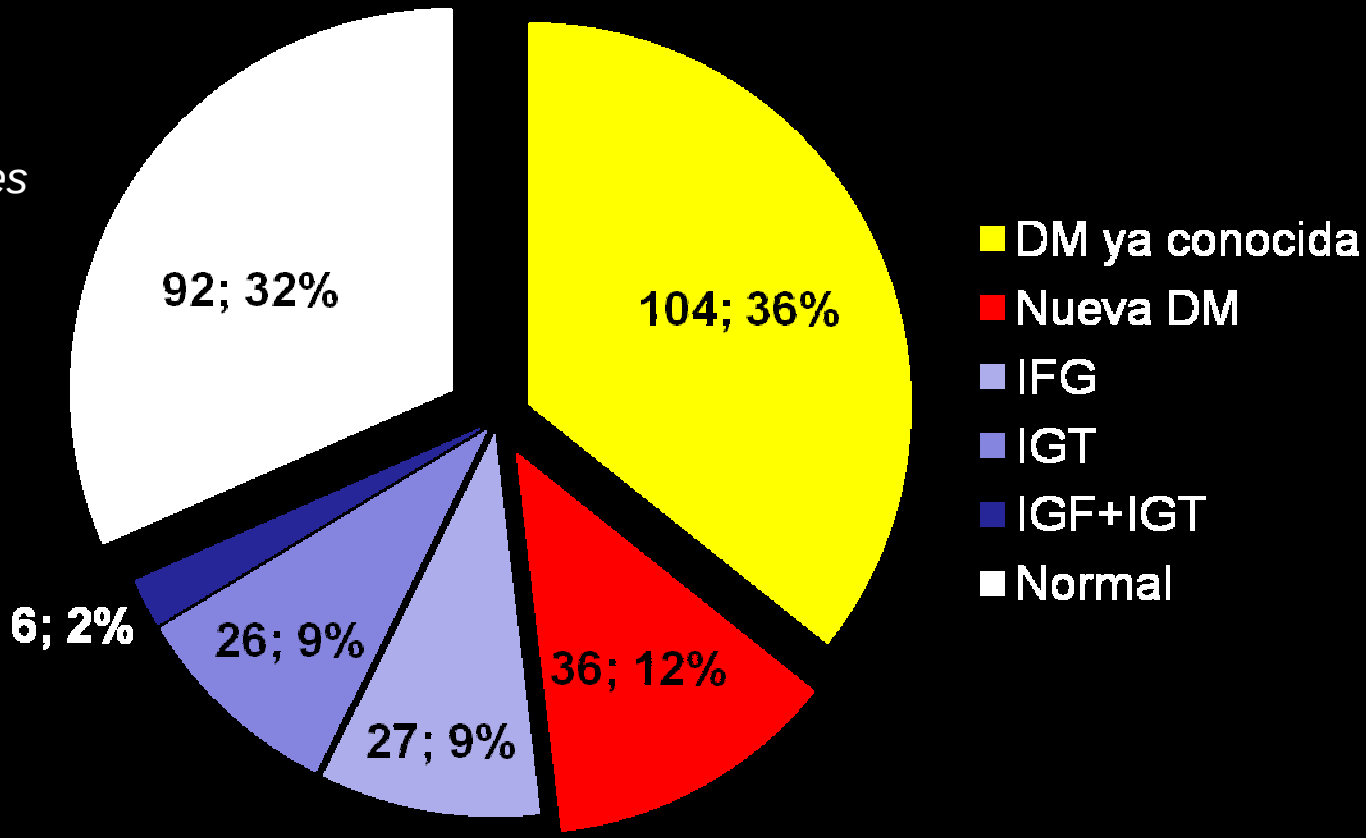





European Heart Journal (2004) 25, 1880–1890

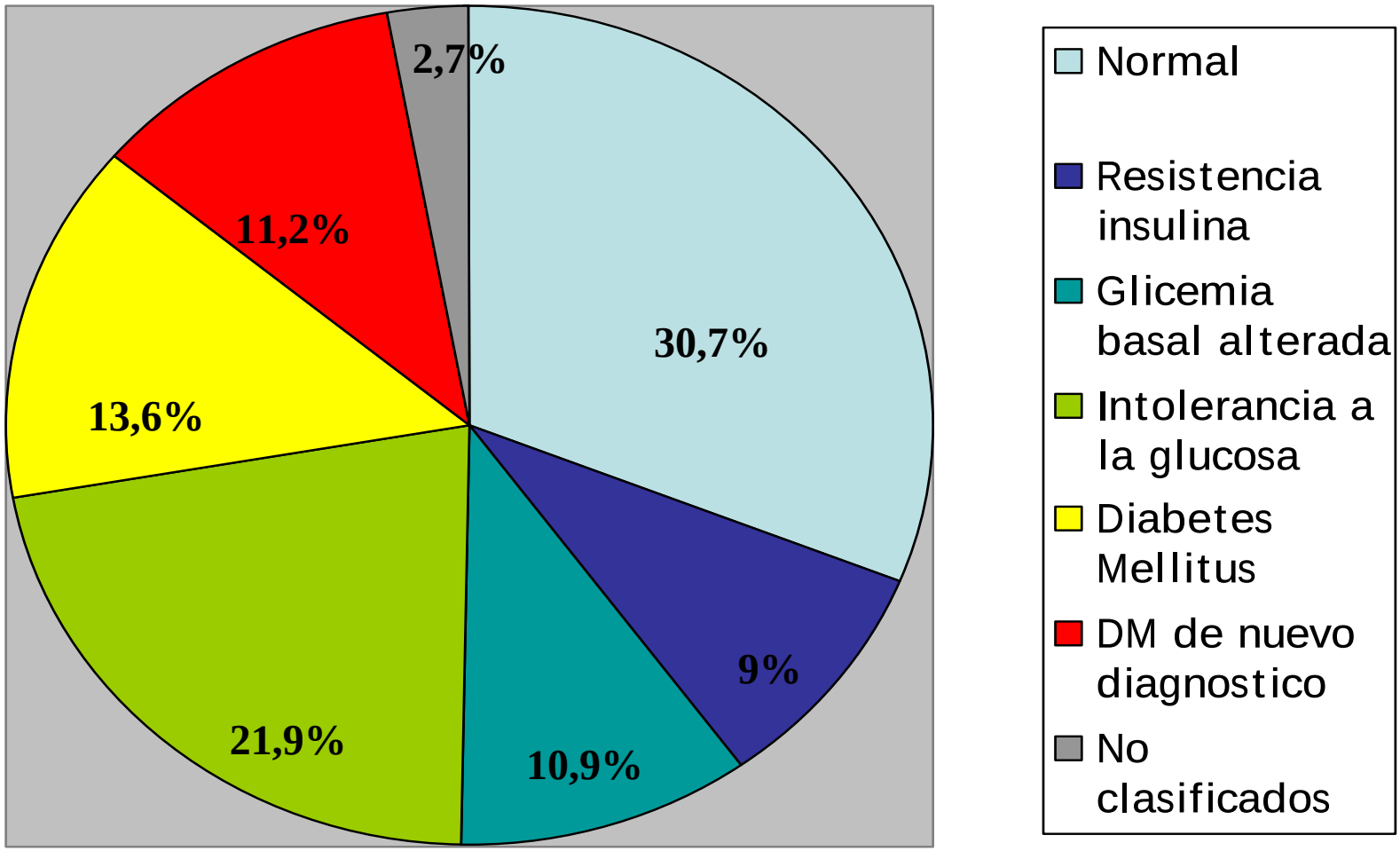
# RESULTADOS GLOBALES

*291 pacientes*




**5 (14%) en tto con ADO al alta**
**3 (8,3%) en tto con insulina al alta**

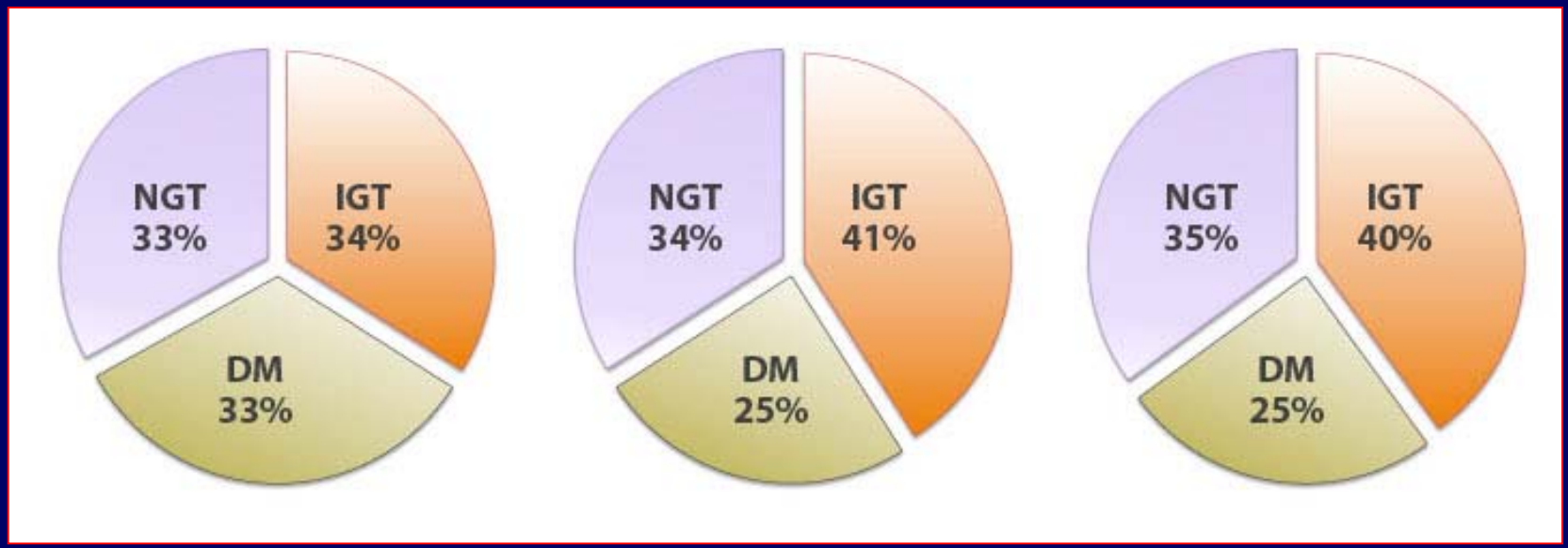
# Alteraciones del metabolismo hidrocarbonado en pacientes con hipertensión arterial




*García-Puig J et. al Am J Med 2006: 119: 318-26*

# GAMI - oral glucose tolerance in "non-diabetic" AMI patients

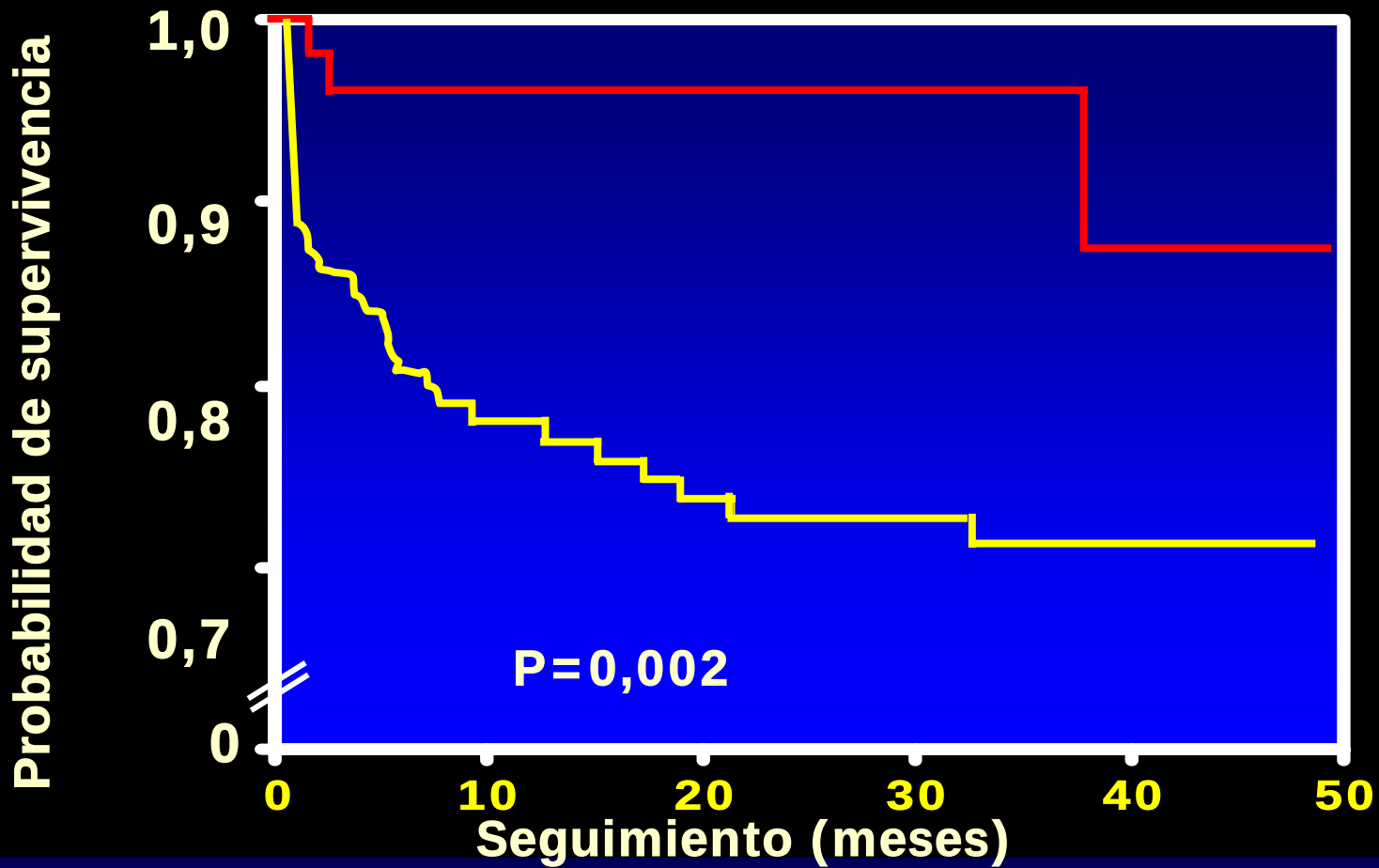
| OGTT at discharge n = 168 | OGTT at 3 month n = 145 | OGTT after 1 year n = 124 |
|---|---|---|




| Abnormal 67% | Abnormal 66% | Abnormal 65% |
|---|---|---|

*L.Ryden, Karolinska Institute*

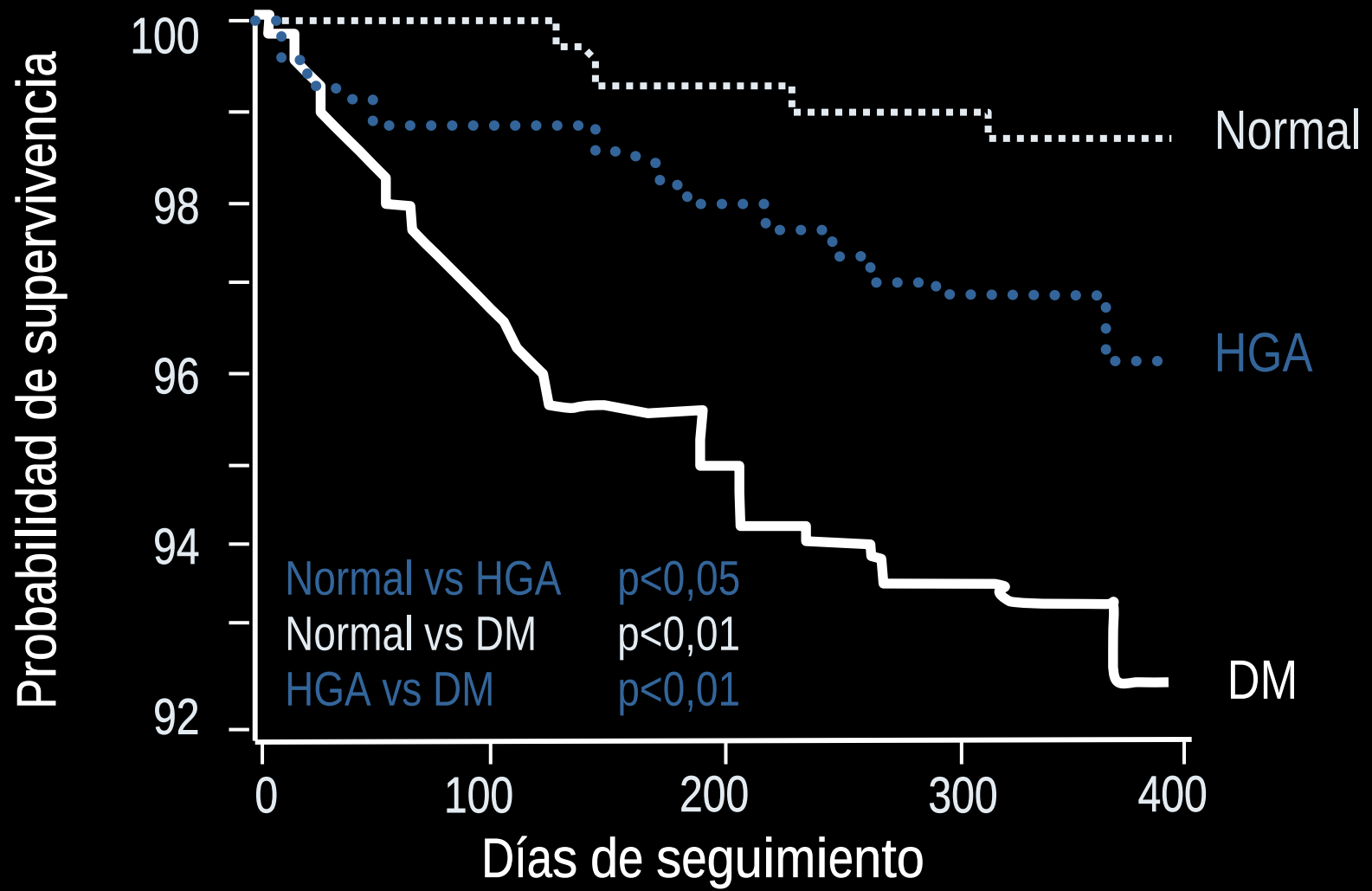
# Intolerancia a la Glucosa. Estudio GAMI
# Predictor del Pronóstico tras IM




| | | | | | | |
|---|---|---|---|---|---|---|
| Normal | 55 | 53 | 53 | 53 | 13 | 13 |
| Anormal | 113 | 91 | 85 | 85 | 57 | 57 |

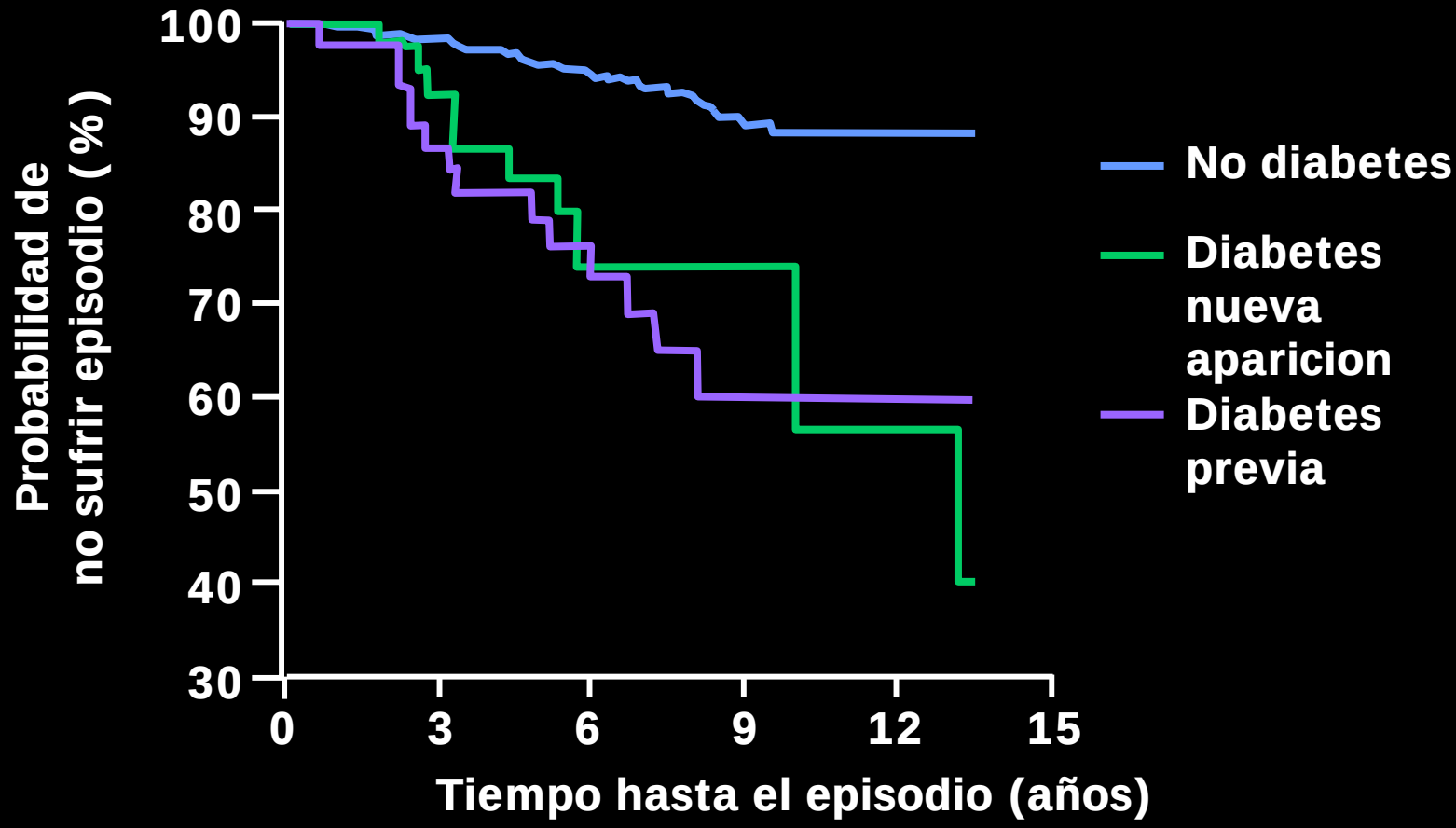
*Bartnik, M et al Eur Heart Journal 2004;25:1990-1997*

# MORTALIDAD POR CARDIOPATÍA ISQUÉMICA




*Euro Heart Survey Diabetes. Eur Heart J 2004*

# Episodios Cardiovasculares en Pacientes Hipertensos Diabéticos




**Los pacientes con diabetes tienen un riesgo 3 veces superior de sufrir un episodio cardiovascular respecto a los no diabéticos**

*Verdecchia P et al. Hypertension. 2004;43:963–969.*

# TAG Y MORTALIDAD CV

## Estudios observacionales en población general

| | | |
|---|---|---|
| The Whitehall Study, | Lancet 1980, | n= 18.404, follow up 7.5 y. |
| Paris Prospective Study, | Diabetologia 1989, | n= 7038, follow up 10 y. |
| Helsinky Policeman Study, | Diabetes Care 1979, | n= 1.059, follow up 10 y. |
| Funagata Diabetes Study, | Diabetes Care 1999, | n= 2534, follow up 7 y. |
| Cardiovascular Health Study, | Lancet 1999, | n=4515, follow up 8 y. |
| Rancho Bernardo Study, | Diabetes Care 1989, | n= 1858, follow up 7 y. |
| Pacific Islands Study, | Diabetologia 1999, | n=9179, follow up 12 y |
| Hoorn Study, | Diabetologia 1999, | n= 2363, follow up 7 y. |

**Hazard ratio de TAG para mortalidad CV: 2,22**

# RECOMENDACIONES ADA 2007

## Standards of Medical Care in Diabetes—2007

AMERICAN DIABETES ASSOCIATION

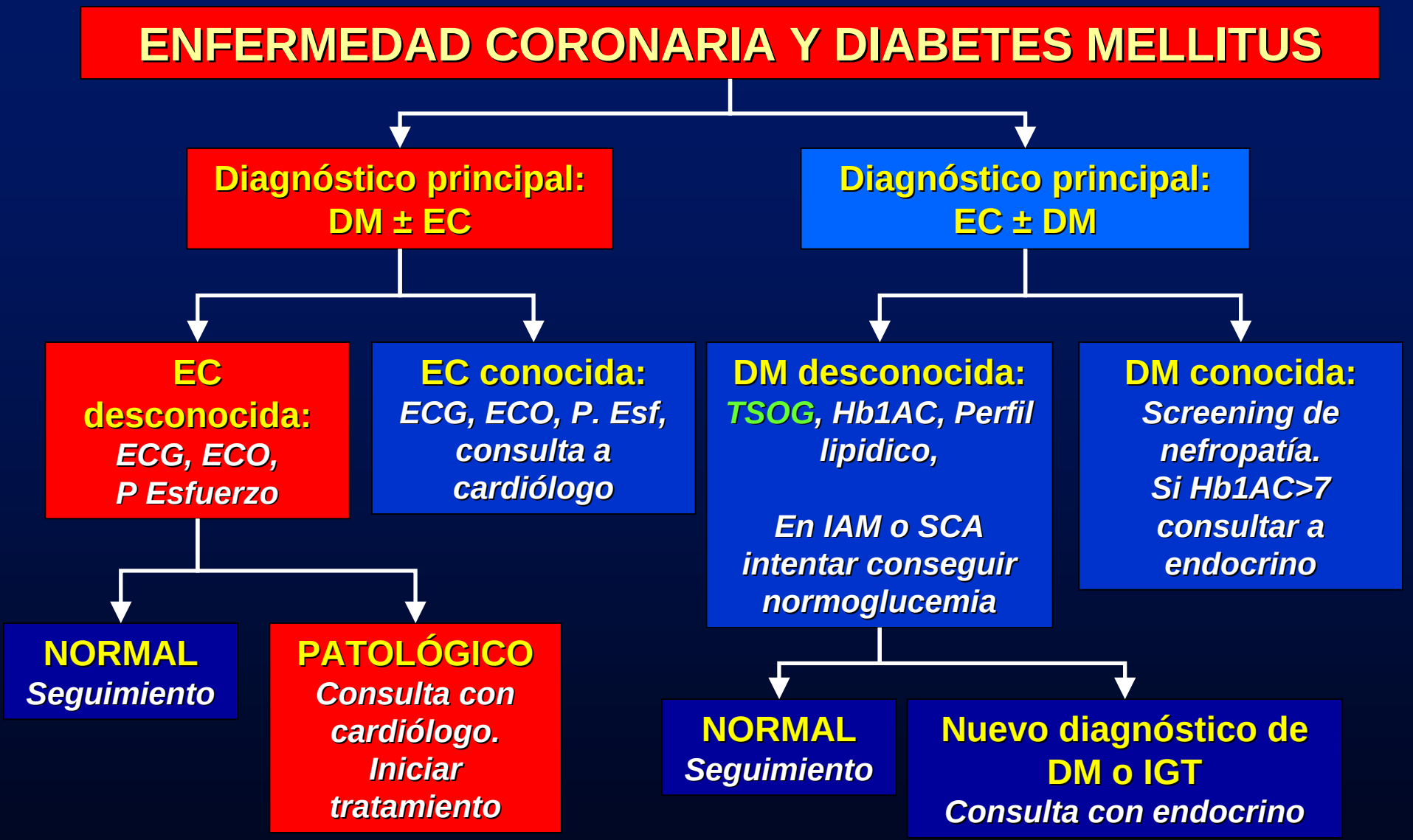
Diabetes is a chronic illness that requires continuing medical care and patient self-management education

Candidates for a diagnostic cardiac stress test include those with *1*) typical or atypical cardiac symptoms and 2) an abnormal resting ECG. The screening of asymptomatic patients remains controversial.

Candidates for a screening cardiac stress test include those with *1*) a history of peripheral or carotid occlusive disease and 2) sedentary lifestyle, age >35 years, and plans to begin a vigorous exercise program. There are no data to suggest that patients who start to increase their physical activity by walking or similar exercise increase their risk of a CVD event and therefore are unlikely to need a stress test.

ADA 2007

# ENFERMEDAD CORONARIA Y DIABETES MELLITUS




*Guidelines on diabetes, pre-diabetes, and cardiovascular diseases. Eur Heart J 2007; 28, 88–136*

# *Limitaciones Ergometría*

- Ancianos
- Alteraciones ECG basal: BCRI, WPW, marcapasos,...
- Mujeres
- Necesidad realizar esfuerzo para alcanzar FCME
- Valoraciones abiertas a interpretaciones: HVI, FA, digital, post revascularización...
- Rentabilidad diagnóstica dependiente de la probabilidad pretest (teorema Bayes)

# Probabilidad pre-test enfermedad coronaria

(a) Pretest likelihood of CAD in symptomatic patients according to age and sex

| Age (years) | Typical angina | | Atypical angina | | Non-anginal chest pain | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| 30–39 | 69.7 ± 3.2 | 25.8 ± 6.6 | 21.8 ± 2.4 | 4.2 ± 1.3 | 5.2 ± 0.8 | 0.8 ± 0.3 |
| 40–49 | 87.3 ± 1.0 | 55.2 ± 6.5 | 46.1 ± 1.8 | 13.3 ± 2.9 | 14.1 ± 1.3 | 2.8 ± 0.7 |
| 50–59 | 92.0 ± 0.6 | 79.4 ± 2.4 | 58.9 ± 1.5 | 32.4 ± 3.0 | 21.5 ± 1.7 | 8.4 ± 1.2 |
| 60–69 | 94.3 ± 0.4 | 90.1 ± 1.0 | 67.1 ± 1.3 | 54.4 ± 2.4 | 28.1 ± 1.9 | 18.6 ± 1.9 |

*Guidelines CSA. EHJ 2006;27:1341*

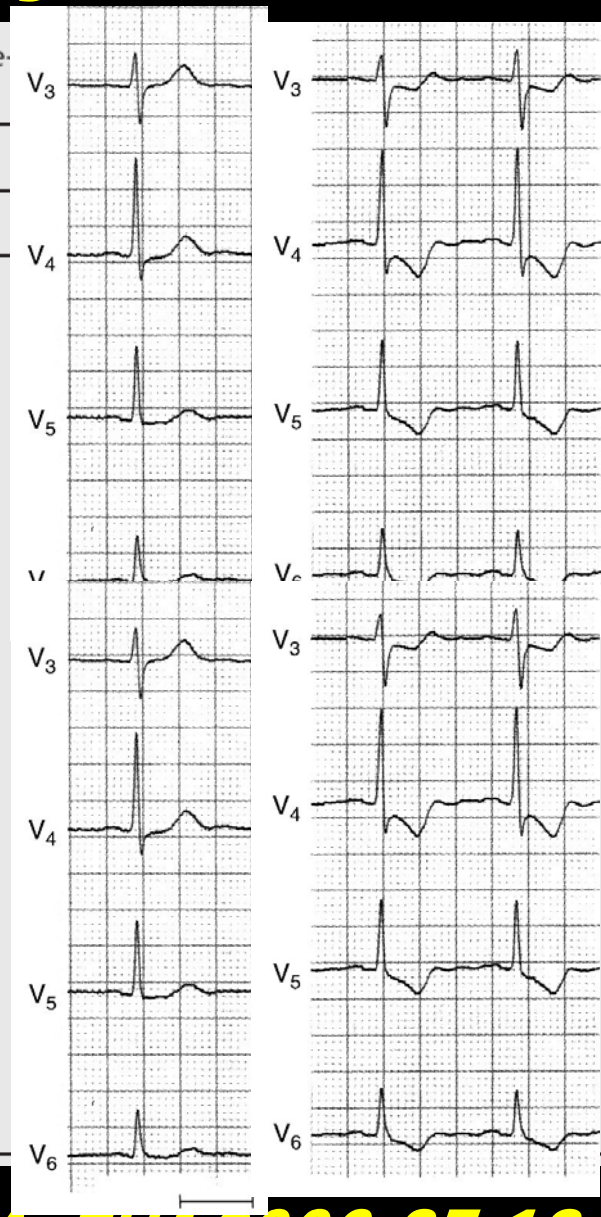
# Teorema Bayes

(b) CAD post-test likelihood (%) based on age, sex, symptom classification and exercise-induced ST-segment depression

| Age (y | | Typical angina | | Atypical angina | |
|---|---|---|---|---|---|
| | | | | le | Female |
| 30–39 | | | | | 1 |
| | | | | | 4 |
| | | | | | 9 |
| | | | | | 15 |
| | | 96 | 79 | 76 | 33 |
| | | 99 | 93 | 92 | 63 |
| 40–49 | | 61 | 22 | 16 | 3 |
| | 0.00–0.09 | 86 | 53 | 44 | 12 |
| | 0.00–0.14 | 94 | 72 | 64 | 25 |
| | 0.00–0.19 | 97 | 84 | 78 | 39 |
| | 0.00–0.24 | 99 | 93 | 91 | 63 |
| | >0.25 | >99 | 98 | 97 | 86 |
| 50–59 | 0.00–0.04 | 73 | 47 | 25 | 10 |
| | | 91 | 78 | 57 | 31 |
| | | | | | 50 |
| | | | | | 67 |
| | | | | | 84 |
| | | | | | 95 |
| 60–69 | | | | | 21 |
| | | | | | 52 |
| | | | | | 72 |
| | | | | | 83 |
| | 0.00–0.24 | 99 | 99 | 96 | 93 |
| | >0.25 | >99 | 99 | 99 | 98 |

48 a

48 a

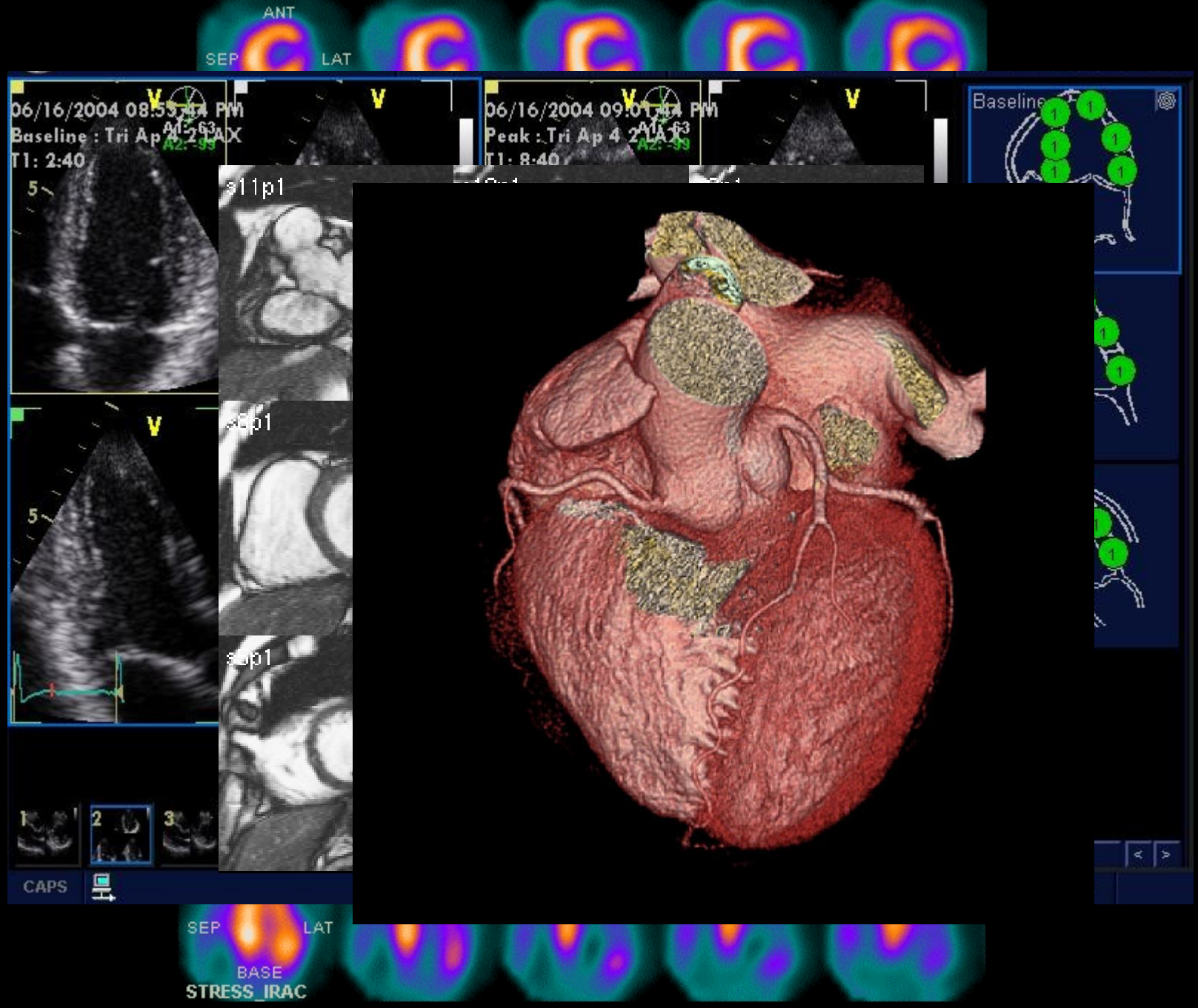



Guidelines CSA. EHJ 2006;27:1341

# *Indicaciones Ergometría*

| | |
|---|---|
| Síntomas de angina y probabilidad pretest intermedia de enfermedad coronaria para diagnóstico | I |
| Diagnóstico con probabilidad pretest baja | IIb |
| Diagnóstico con ↓ ST basal ≥ 1 mm | IIb |
| Control en pacientes estables | IIb |

*CSA guidelines. EHJ 2006;27:1341*


ANT
SEP
LAT
06/16/2004 08:53:44 PM
Baseline : Tri Ap 4 2 AX
T1: 2:40
06/16/2004 09:01:47 PM
Peak :.Tri Ap 4 2 AX
Baseline
CAPS
SEP
LAT
BASE
STRESS_IRAC
<------ Inferior
Horizontal Axis
Anterior ------>

# Diagnóstico de angina estable. Oportunidades.Técnicas de imagen

| | S % | E % |
|---|---|---|
| ECG esfuerzo | 68 | 77 |
| Eco esfuerzo | 80-85 | 84-86 |
| SPECT esfuerzo | 85-90 | 70-75 |
| Eco dobutamina | 40-100 | 62-100 |
| Eco dipiridamol/adenosina | 56-92 | 87-100 |
| SPECT dipiridamol/adenosina | 83-94 | 64-90 |

*Guidelines CSA. EHJ 2006;27:1341*

# *Consideraciones especiales en diabéticos*

- Mortalidad x3 en ♂ y x 5 en ♀
- > frecuencia isquemia silente
- Asocia disfunción ventricular suclínica
- Diagnóstico enfermedad coronaria similar al de no diabéticos ?
- Indicaciones de tratamiento farmacológico y de revascularización similar a no diabéticos ?

*Guidelines CSA. EHJ 2006;27:1341*

# *Por qué No Estudiar a Todos los Diabéticos Asintomáticos*

1. **La Prevalencia de la Enfermedad debe ser de la Suficiente Magnitud para Justificar el Estudio Rutinario de una Gran Población de Pacientes.**

   *Prevalencia variable*

   *Prevalencia de enfermedad "tratable" es completamente desconocida*

2. **Las Pruebas Complementarias deben Identificar de Forma Adecuada a Pacientes de Alto y Bajo Riesgo**

   *¿Cuales son los Diabéticos de Bajo Riesgo?*

3. **La Identificación de los Pacientes Afectados debe Permitir realizar Tratamiento que Mejore el Pronóstico**

   *No existen estudios randomizados que comparen diferentes estrategias terapéuticas en diabéticos asintomáticos*

# ESTUDIO COURAGE

## ¿REVASCULARIZACIÓN O TRATAMIENTO MÉDICO?

POBLACIÓN:

- Estenosis de ≥ 70% proximal en ≥ 1 CE + evidencia objetiva de isquemia
- Estenosis ≥ 80% + angina típica sin isquemia objetivada

| PCI + tratamiento médico óptimo | Tratamiento médico óptimo |
|---|---|

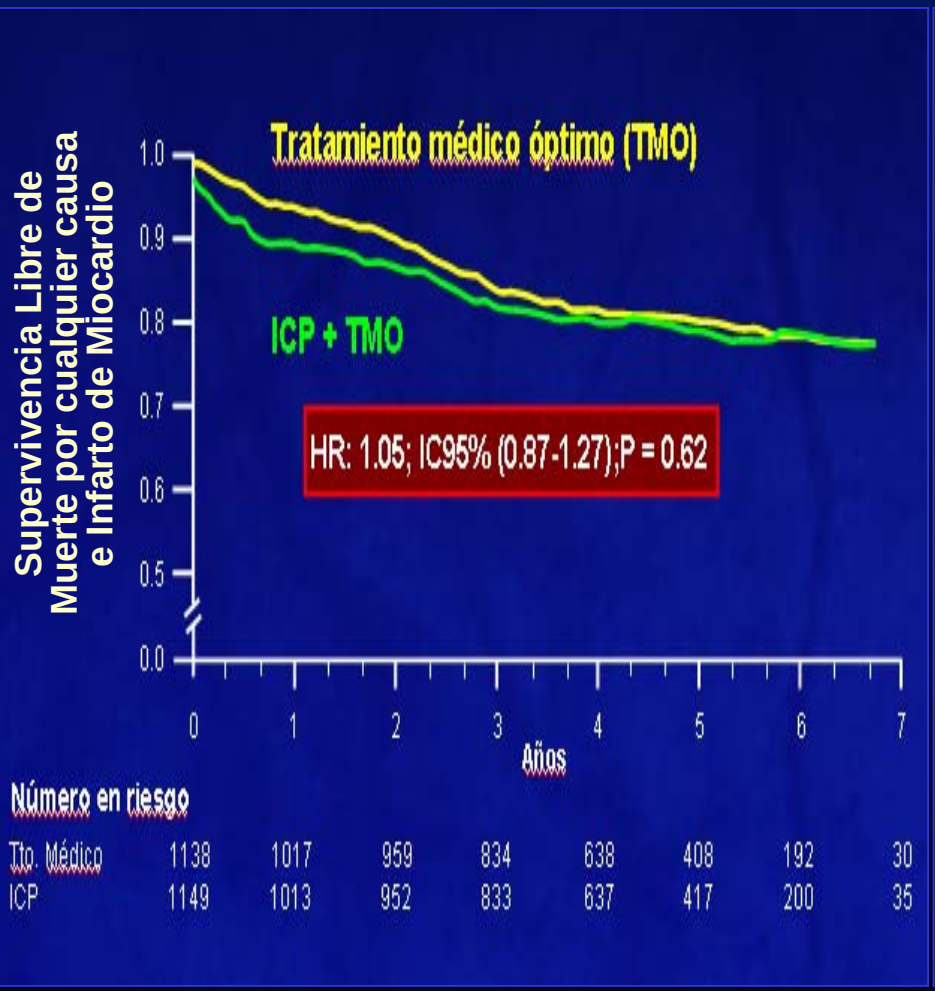
End-point primario → Muerte de cualquier causa + IM no fatal

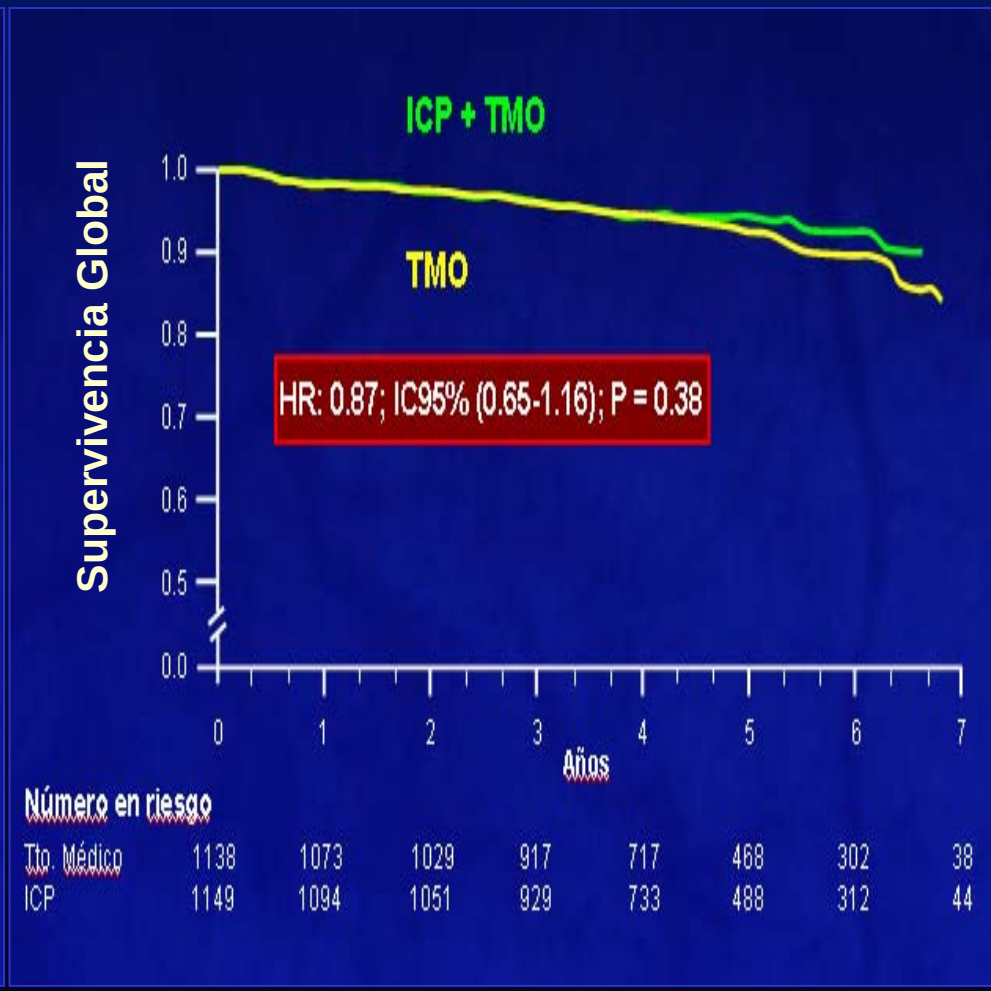
End-point secundario → Muerte, IM, stroke y hospitalización por angina inestable con marcadores negativos

EXCLUSIÓN → Angina clase IV, test de inducción de isquemia de alto riesgo, IC refractaria o shock cardiogénico, FEVI < 30%, revascularización en los últimos 6 meses.

***Boden et al, N Engl J Med 2007; 356:1503***

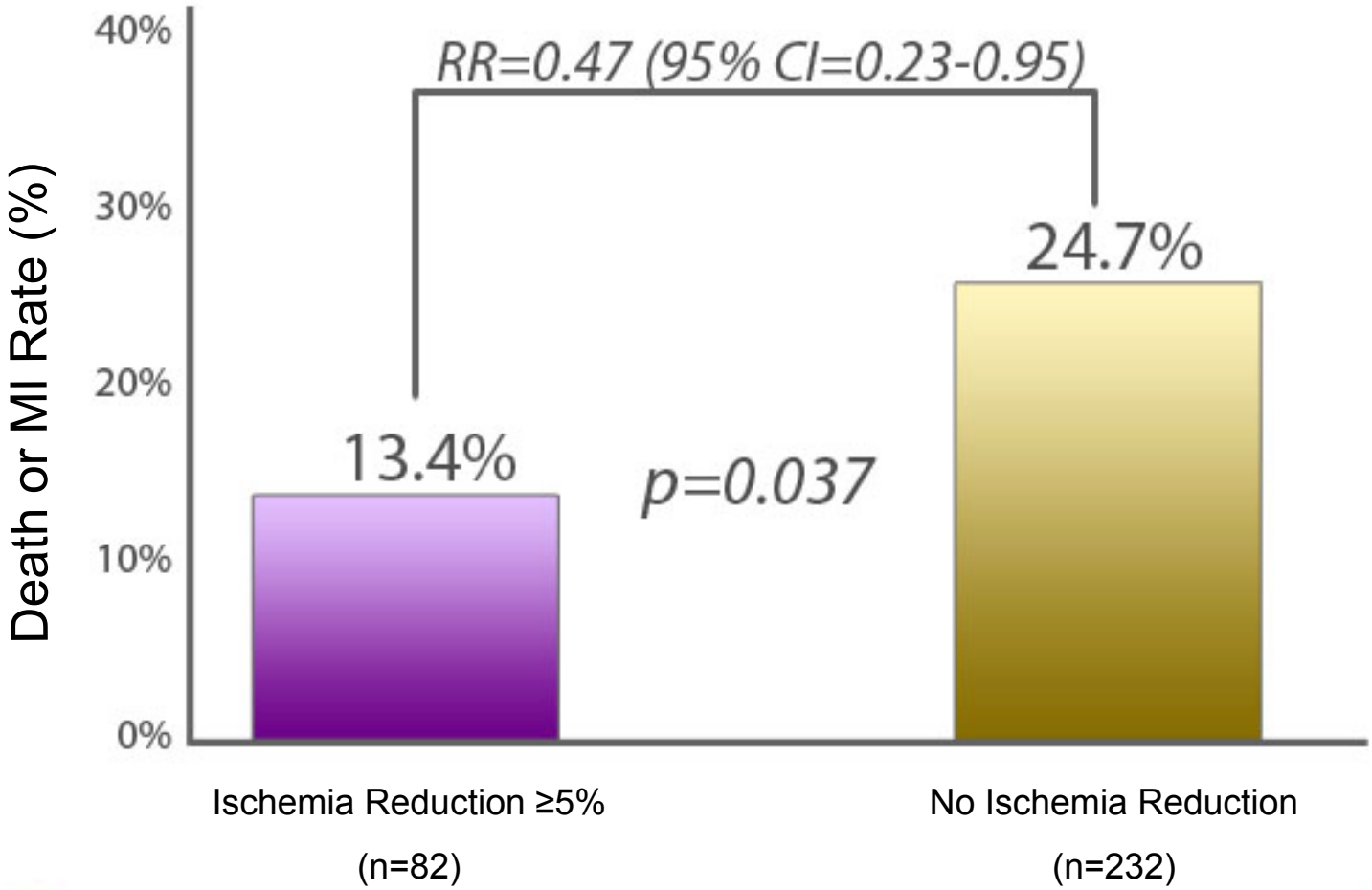
# Estudio COURAGE. Resultados



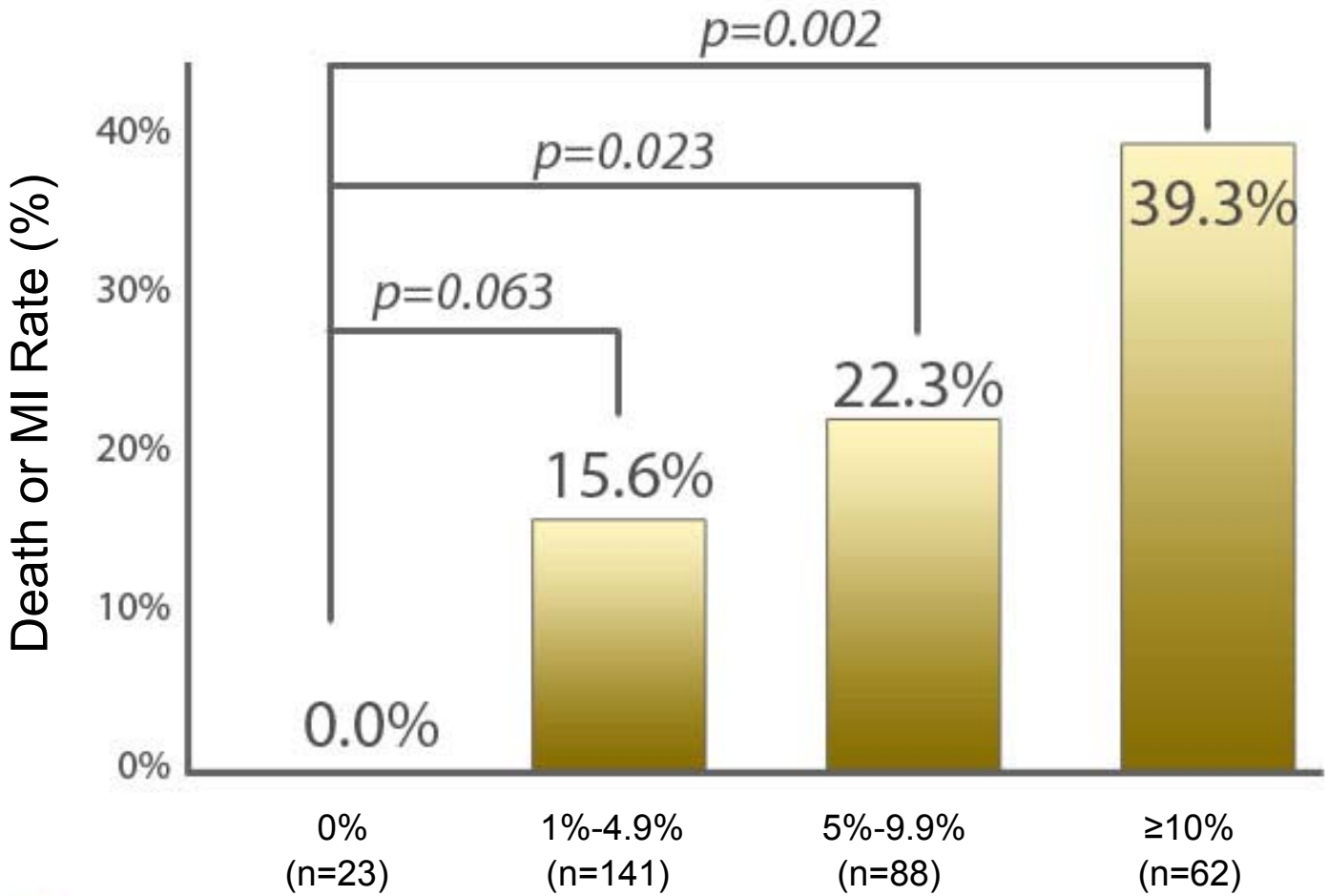

*Boden WE, et al N Engl J Med 2007;356*

# S. Courage. Rates of Death or MI by Ischemia Reduction



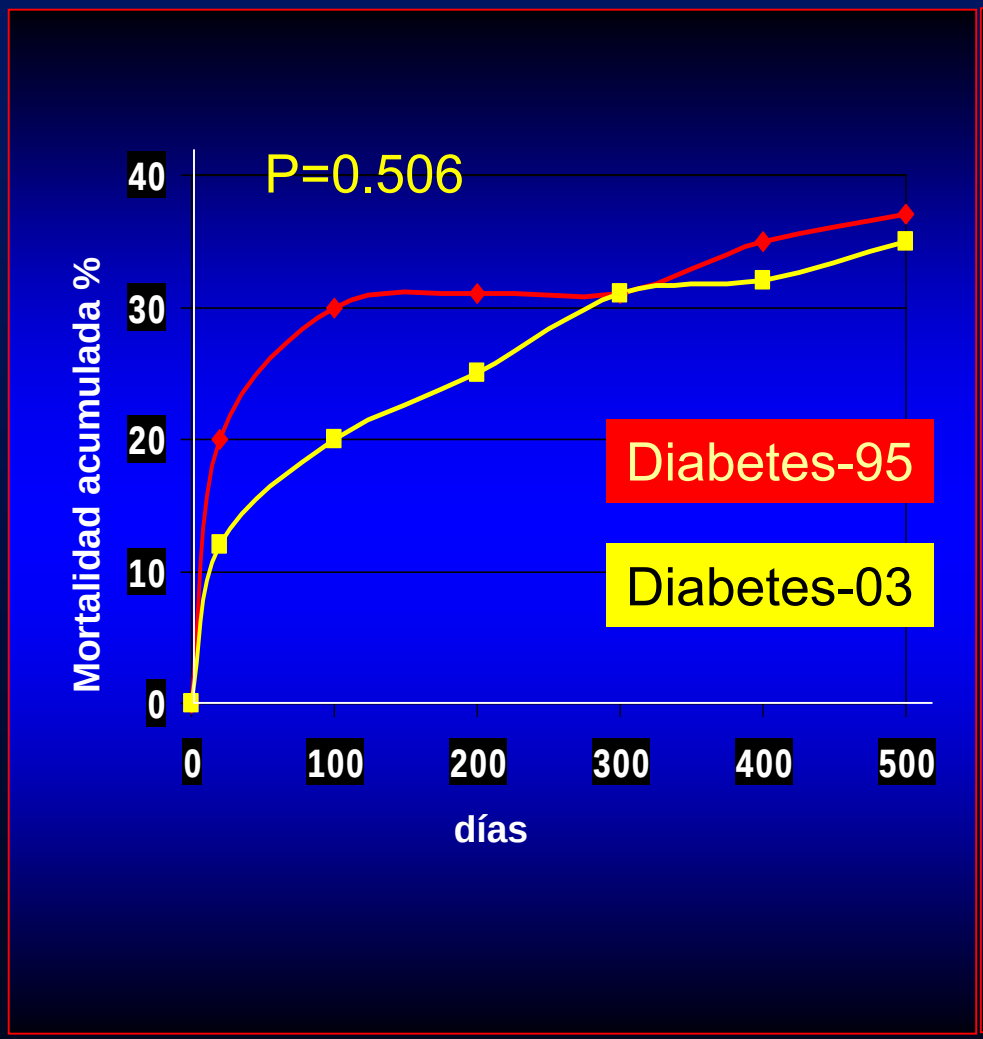

Late Trials. AHA 2007

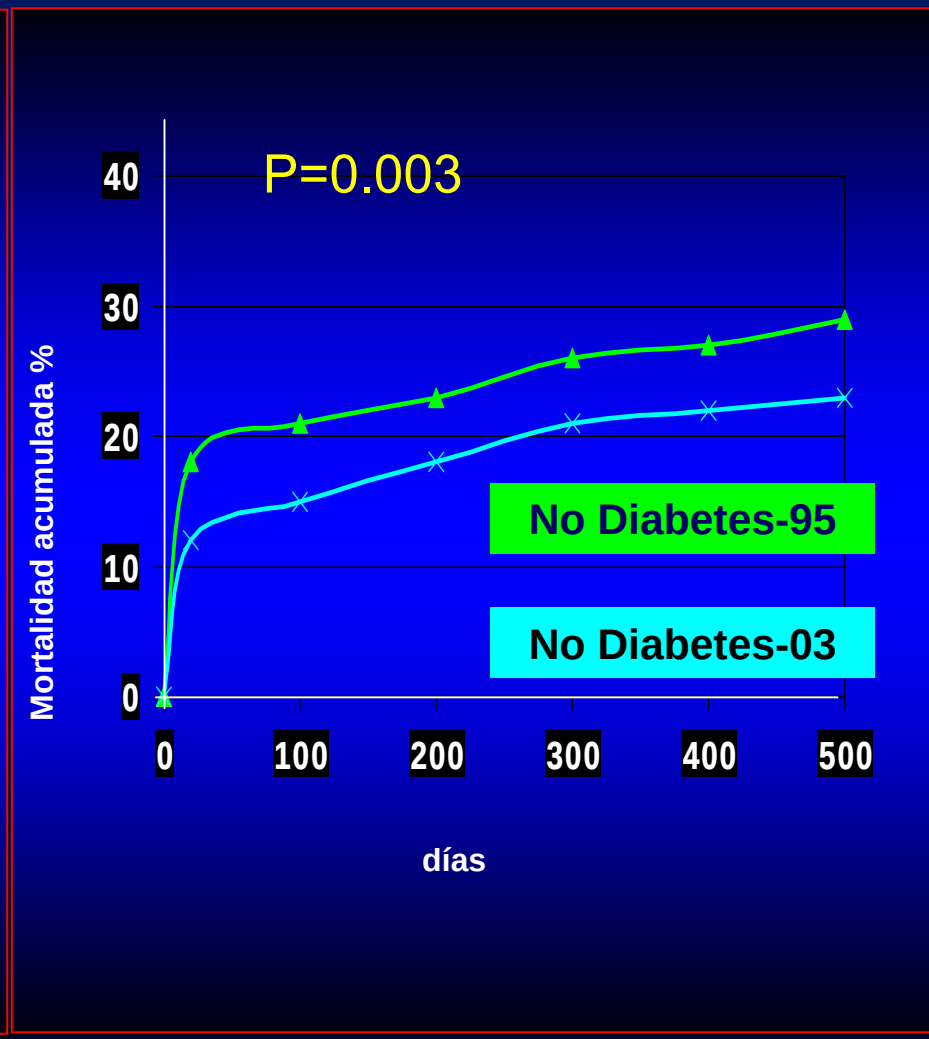
# S. Courage. Rates of Death or MI by Residual Ischemia on 6-18 MPS




Late Trials. AHA 2007

# *Mejoría supervivencia 1995-2003 IAM Diabéticos-No diabéticos*




Cubbon et al. Eur Heat J 2007;28:540-5

# ESTUDIO COURAGE

## ¿REVASCULARIZACIÓN O TRATAMIENTO MÉDICO?

| Variable | PCI Group (N=1149) | | | | Medical-Therapy Group (N=1138) | | | |
|---|---|---|---|---|---|---|---|---|
| | Baseline | 1 Yr | 3 Yr | 5 Yr | Baseline | 1 Yr | 3 Yr | 5 Yr |
| | *median ±SE* | | | | | | | |
| **Clinical status** | | | | | | | | |
| No. evaluated | 1148 | 1031 | 820 | 423 | 1137 | 1010 | 824 | 406 |
| Blood pressure — mm Hg | | | | | | | | |
| Systolic | 131±0.77 | 126±0.64 | 125±0.68 | 124±0.81 | 130±0.66 | 124±0.73 | 123±0.78 | 122±0.92 |
| | | | | | | | | 70±0.65 |
| C | | | | | | | | |
| | | | | | | | | 140±1.64 |
| HDL | 39±0.39 | 42±0.39 | 43±0.47 | 41±0.67 | 39±0.37 | 41±0.42 | 42±0.49 | 41±0.75 |
| LDL | 100±1.17 | 84±0.97 | 76±0.85 | 71±1.33 | 102±1.22 | 81±0.86 | 74±0.92 | 72±1.21 |
| Triglycerides — mg/dl | 143±2.96 | 129±2.74 | 124±2.79 | 123±4.13 | 149±3.03 | 133±2.90 | 126±2.84 | 131±4.70 |
| Body-mass index | 28.7±0.18 | 28.5±0.19 | 29.0±0.21 | 29.0±0.34 | 28.9±0.17 | 29.0±0.19 | 29.3±0.21 | 29.5±0.31 |
| Angina-free — no. (%)† | 135 (12) | 680 (66) | 602 (72) | 316 (74) | 148 (13) | 595 (58) | 558 (67) | 296 (72) |

Diferencias significativas a 1 año (0.001) y a 3 años (0.02), pero no a los 5 años

*Boden et al, N Engl J Med 2007; 356:1503*

# Objetivos de Tratamiento en Pacientes con Diabetes Tipo 2. Prevención-07

| | Unidad | Objetivo |
|---|---|---|
| HbA1C (DCCT) | **$HbA_{1C}$ (%)** | ≤ 6,5 si es posible |
| Glucosa en plasma | **ayunas/preprandial mmol/L (mg/dL)** | <6,0 (110) si es posible |
| | **postprandial mmol/L (mg/dL)** | < 7,5 (135) si es posible |
| Presión arterial | **mmHg** | ≤ 130/80 |
| Colesterol total | **mmol/L (mg/dL) mmol/L (mg/dL)** | < 4,5 (175)<br>< 4,0 (155) si es posible |
| Colesterol LDL | **mmol/L (mg/dL) mmol/L (mg/dL)** | < 2,5 (100)<br>< 2,0 (80) si es posible |

# *Objetivos Glicémicos para el Cuidado de Pacientes con Diabetes Recomendados por Varias Organizaciones*

| Organización | $HbA_{1c}$ (%) | FPG (mmol/L) | PG post-prandial (mmol/L) |
|---|---|---|---|
| ADA | < 7 | ≤ 6,7 (120) | Nada |
| IDF-Europa | ≤ 6,5 | ≤ 6,0 (108) | ≤ 7,5 (135) |
| AACE | ≤ 6,5 | ≤6,0 (108) | ≤ 7,8 (140) |

*ESC/EASD Eur Heart J 2007;28:88-136*

# Indicaciones ICP en angina estable

| Indication | For prognosis[a] | | For symptoms[b] | | Studies |
|---|---|---|---|---|---|
| | Class of recommendation | Level of evidence | Class of recommendation | Level of evidence | |
| PCI (assuming suitable anatomy for PCI, appropriate risk stratification, and discussion with the patient) | | | | | |
| Angina CCS classes I–IV despite medical therapy with one-vessel disease | | | I | A | ACME and MASS |
| Angina CCS classes I–IV despite medical therapy with multi-vessel disease (non-diabetic) | | | I | A | RITA 2 and VA-ACME |
| Stable angina with minimal (CCS class I) symptoms on medication and one-, two-, or three-vessel disease but objective evidence of large ischaemia | IIb | C | | | ACIP |

No angina → ?

Guidelines CSA. EHJ 2006;27:1341

# *Conclusiones*

- **Necesidad de una categorización o tabla de Riesgo del Diabético.**
- Factores:
  - Diagnóstico de DM más de 10 años
  - Tratamiento con Insulina
  - Enf. Vascular o Microvascular
  - Alteración de la F. Renal ( MA o FG< 60)

  - HTA
  - Dislipemia
  - Tabaquismo

# *Conclusiones*

- Necesidad de una categorización o tabla de Riesgo del diabético.
- Identificar y caracterizar las alteraciones del metabolismo de la glucosa.
- Estrategia diagnóstica de la C. Isquémica “similar” a los no diabéticos.
- Indicaciones de tratamiento farmacológico y de revascularización similares a los no diabéticos, aunque con recomendaciones específicas (BSRA, Estatinas, Stents-DES)
- **Control estricto de los objetivos terapéuticos**