58° Congresso Nazionale
Società Italiana di Gerontologia e Geriatria

APPROCCIO CLINICO AL CARDIOPATICO ISCHEMICO ULTRAOTTANTENNE

Il Cardiologo Clinico

Alessandro Boccanelli

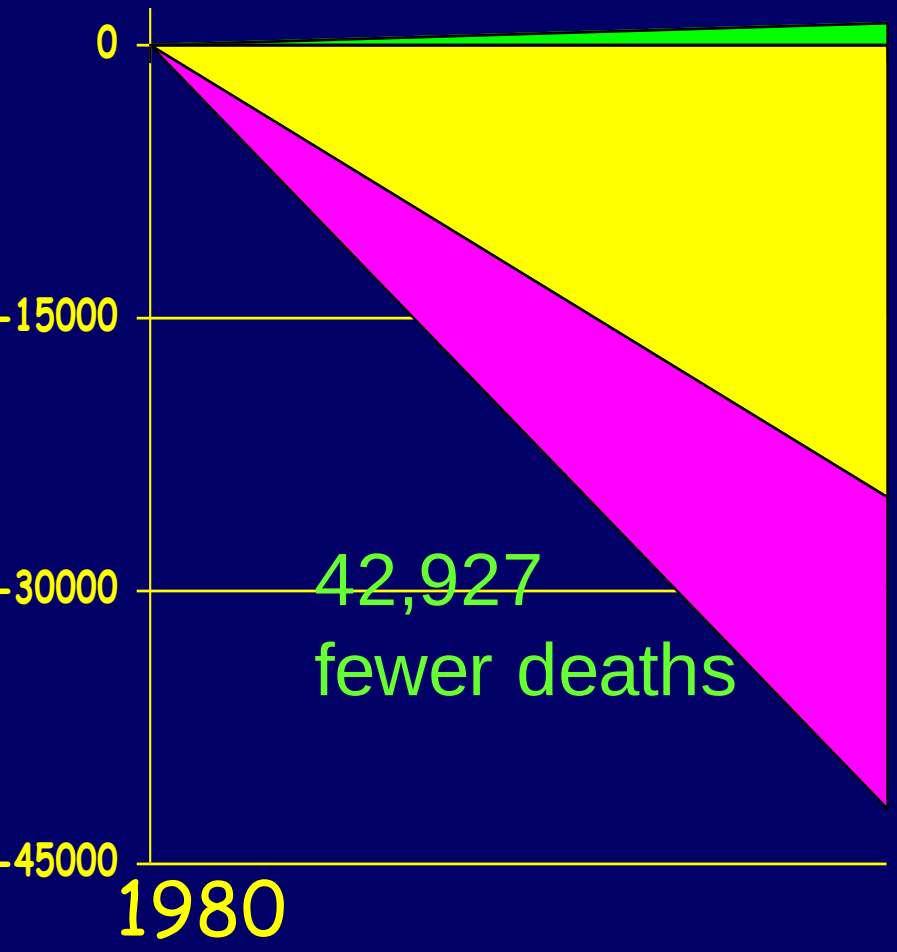
29 Novembre 2013

Congresso Nazionale
Società Italiana di Gerontologia e Geriatria

La Cardiologia :storia di un matrimonio tra uomo e macchina

- Il Cardiologo e l'elettrocardiografo
- Il cardiologo e il poligrafo
- Il Cardiologo e l'angiografo
- Il Cardiologo e l'ecocardiografo
- Il Cardiologo e il cicloergometro (e la gamma camera)
- Il Cardiologo e la TC
- Il Cardiologo e la RM
- ***Il Cardiologo e il fenotipo complesso***

Explaining the fall in coronary heart disease deaths in Italy 1980-2000



L. Palmieri, et al Am J Public Health 2009

Risk Factors worse +3 %

Obesity (increase) + 0.6 %
Diabetes (increase) + 2.2 %

Risk Factors better –58 %

Smoking - 3.7 %
Cholesterol -23.4 %
Population BP fall -25.0 %
Physical activity (incr.) - 5.8 %

Treatments -40 % AMI

treatments - 4.9 %
Secondary prevention - 6.1 %
Heart failure -13.7 %
Community Angina - 8.7 %
CABG & PTCA - 1.1 %
Unst.Angina: Aspirin etc- 1.0 %
Hypertension therapies - 1.5 %
Statins 1 prevention - 2.7 %

- Quell'onda che si generò in pochissimi anni ha prodotto una seconda impressionante rivoluzione epidemiologica: la riduzione progressiva degli STEMI a favore dei NSTEMI, con un balzo in avanti di oltre 10 anni nell'insorgenza delle malattie coronariche, la riduzione della encefalopatia ipertensiva multinfartuale e degli ictus, la immissione in circolazione di una grande quantità di persone scampate al pericolo della malattia cardio e cerebrovascolare, acuta o cronica.

- **LE RIVOLUZIONI EPIDEMIOLOGICHE DEL NOVECENTO**
- ***(i due tsunami che hanno cambiato il mondo)***
- **Alessandro Boccanelli**

- **G.Ital Cardiol Marzo 2013**

Gender	Men						Women					
Age	65-74 years		75+ years		All		65-74 years		75+ years		All	
(N. subjects)	(N=669)		(N=365)		(N=1034)		(N=619)		(N=348)		(N=967)	
	N	%	N	%	N	%	N	%	N	%	N	%
Dyslipidemia												
no	402	*61,0*	242	*68,0*	644	*63,4*	287	*47,5*	165	*48,8*	452	*48,0*
yes	257	*39,0*	114	*32,0*	371	***36,6***	317	*52,5*	173	*51,2*	490	***52,0***
Hypertension												
no	301	*45,2*	137	*37,6*	438	*42,5*	267	*43,7*	126	*36,3*	393	*41,0*
yes	365	*54,8*	227	*62,4*	592	***57,5***	344	*56,3*	221	*63,7*	565	***59,0***
Diabetes												
no	538	*81,0*	293	*80,7*	831	*80,9*	527	*86,0*	297	*85,6*	824	*85,8*
yes	126	*19,0*	70	*19,3*	196	***19,1***	86	*14,0*	50	*14,4*	136	***14,2***
Cardiovascular diseases												
no	494	*74,2*	221	*60,5*	715	*69,4*	468	*75,9*	241	*69,3*	709	*73,5*
yes	172	*25,8*	144	*39,5*	316	***30,6***	149	*24,1*	107	*30,7*	256	***26,5***
angina pectoris	43	*6,5*	34	*9,3*	77	***7,5***	28	*4,5*	19	*5,5*	47	***4,9***
atrial fibrillation	32	*4,8*	47	*12,9*	79	***7,7***	39	*6,3*	35	*10,1*	74	***7,7***
peripheral vascular disease	19	*2,9*	27	*7,4*	46	***4,5***	23	*3,7*	19	*5,5*	42	***4,4***
cerebrovascular disease	29	*4,4*	21	*5,8*	50	***4,8***	19	*3,1*	14	*4,0*	33	***3,4***
Previous myocardial infarction												
no	617	*92,8*	319	*88,1*	936	*91,1*	596	*97,4*	329	*95,6*	925	*96,8*
yes	48	*7,2*	43	*11,9*	91	***8,9***	16	*2,6*	15	*4,4*	31	***3,2***
Revascularization procedures												
no	602	*90,0*	305	*83,6*	907	*87,7*	596	*96,4*	331	*95,1*	927	*96,0*
yes	67	*10,0*	60	*16,4*	127	***12,3***	22	*3,6*	17	*4,9*	39	***4,0***
Comorbidities												
no	368	*55,3*	186	*51,0*	554	*53,7*	286	*46,2*	141	*40,5*	427	*44,2*
yes	298	*44,7*	179	*49,0*	477	***46,3***	333	*53,8*	207	*59,5*	540	***55,8***

Ottuagenari più compromessi

Co-morbidità	>80 anni %	< 80 anni %
Ipertensione	74	49
BPCO	33	14
Vasculopatia periferica	24	0.45
Diabete mellito	32	15
Insuf. cerebrovascolare	15	5
Insuf. Renale cronica	10	4

Frazione di eiezione	50.9 10	50.0 10

Chronic Coronary Artery Disease

Chronic coronary artery disease is prevalent in older adults and exists within the overall health context of the individual. Safe and effective management in this population requires consideration of risk/benefit and goals of care.

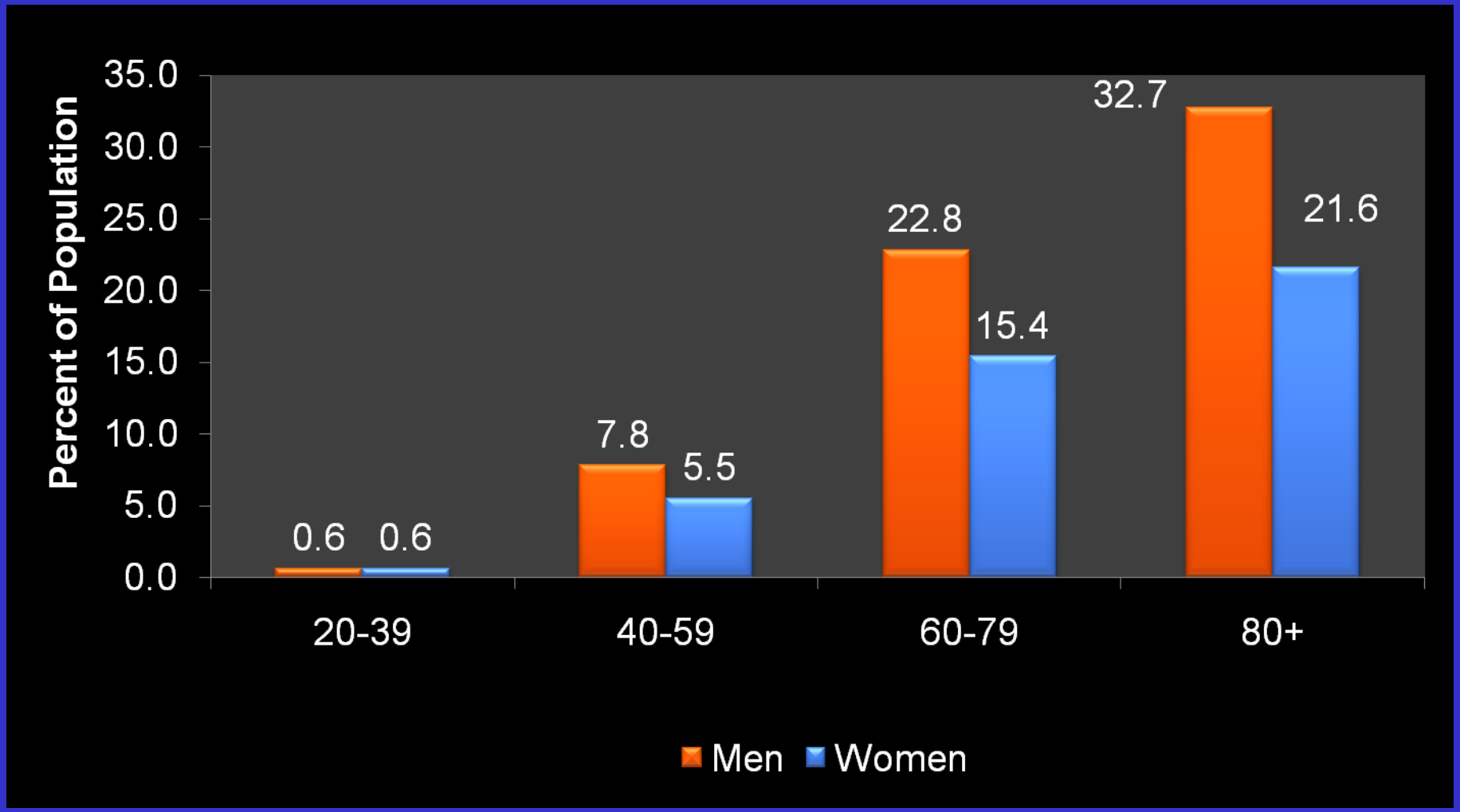
It is mandatory:

(1) To recognize differences in epidemiology and disease presentation of chronic coronary disease in older adults compared to younger adults

(2) To consider issues related to medical management and safe revascularization of chronic CAD in older adults.

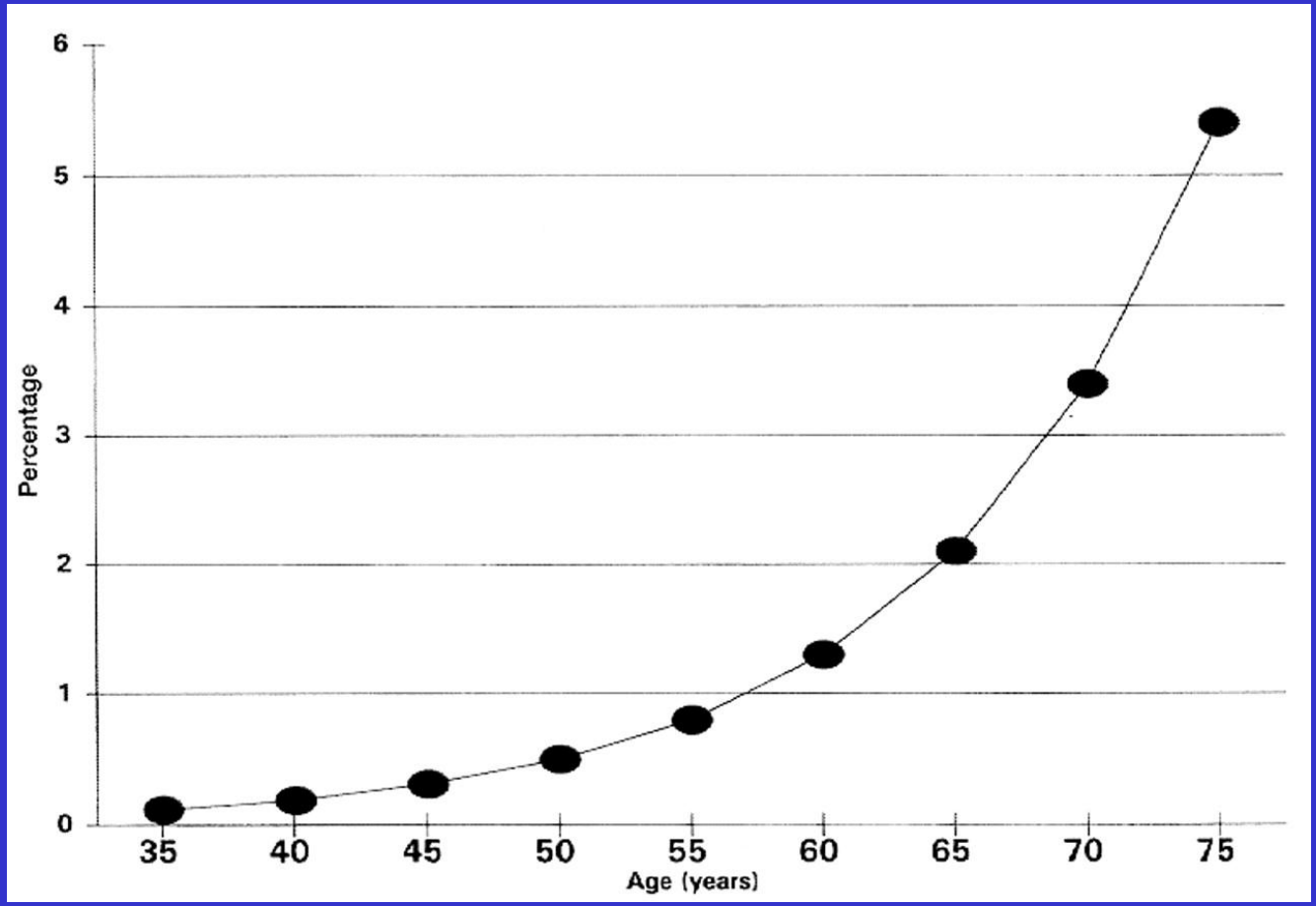
Content: Duane Pinto MD, MPH, Eric Peterson MD, MPH

Prevalence of Coronary Heart Disease by Age and Sex in the U.S. from 1999-2004



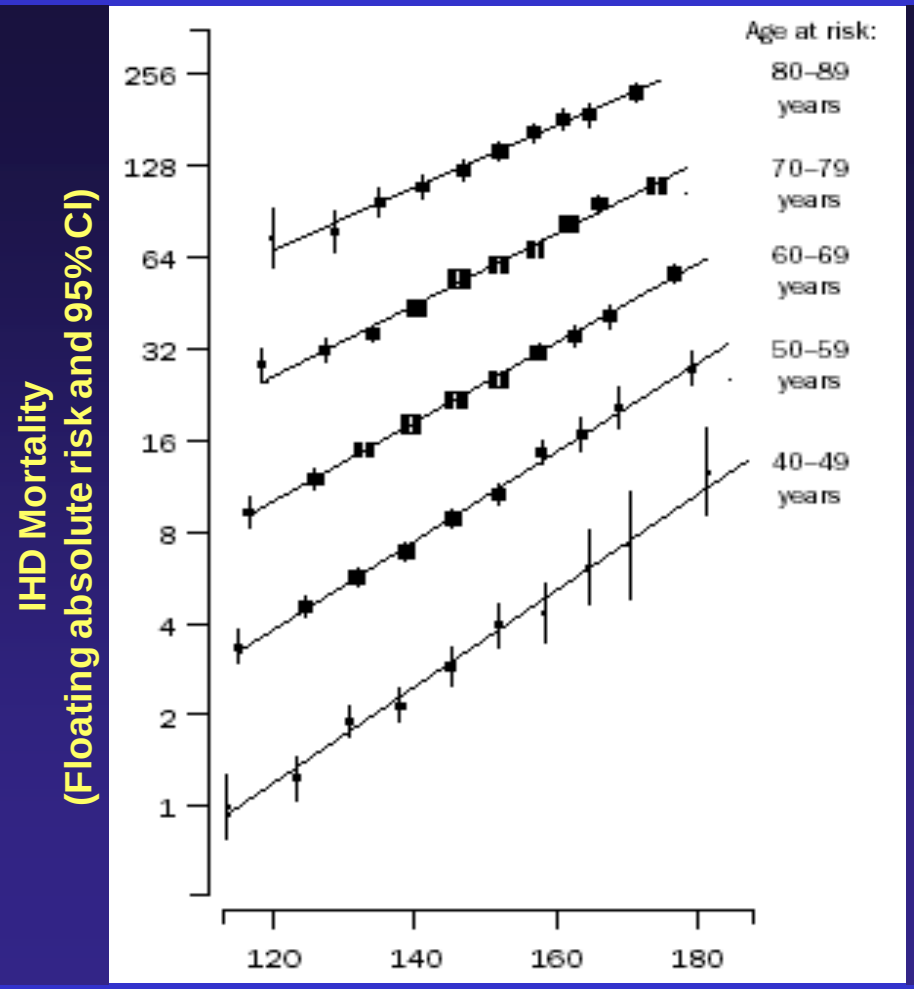
REF: Rosamond W, et al. *Circulation 2007;115:e69-171.*

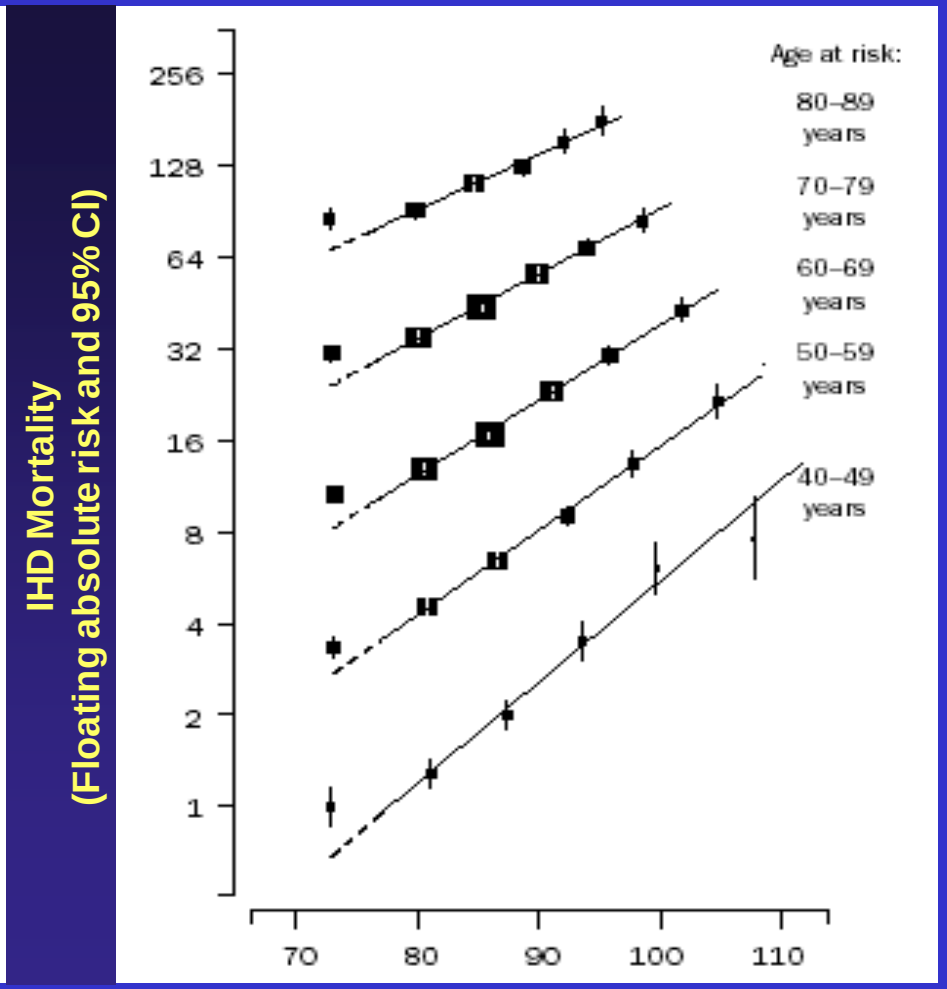
The prevalence of unrecognized myocardial infarction as a function of age



REF: Sigurdsson E, et al. The Reykjavik Study. Ann Intern Med 1995;122:96-102

Ischemic Heart Disease Mortality by Age and Blood Pressure





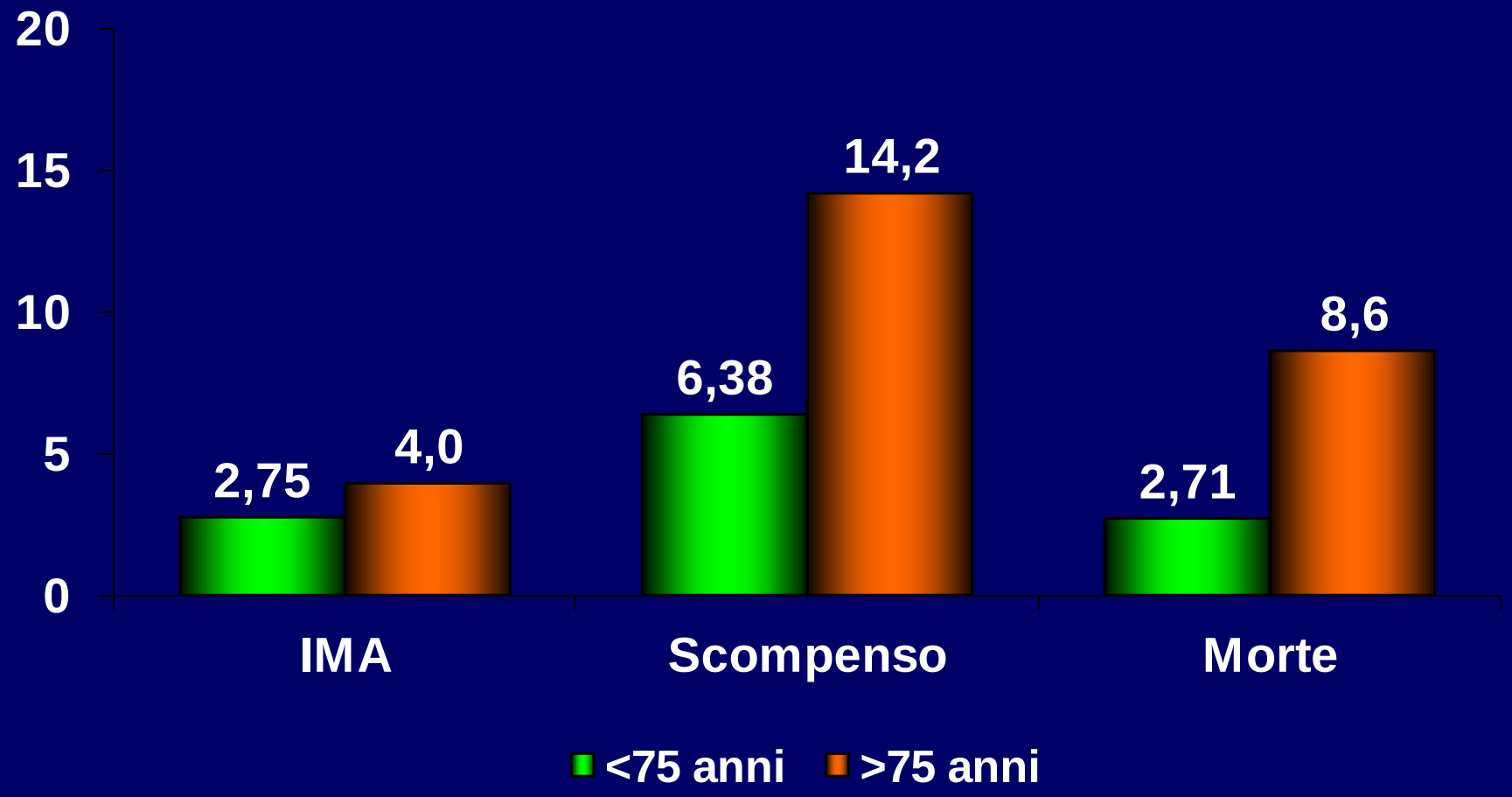
REF: Lewington S, et al. *Lancet 2002;360:1903-13*

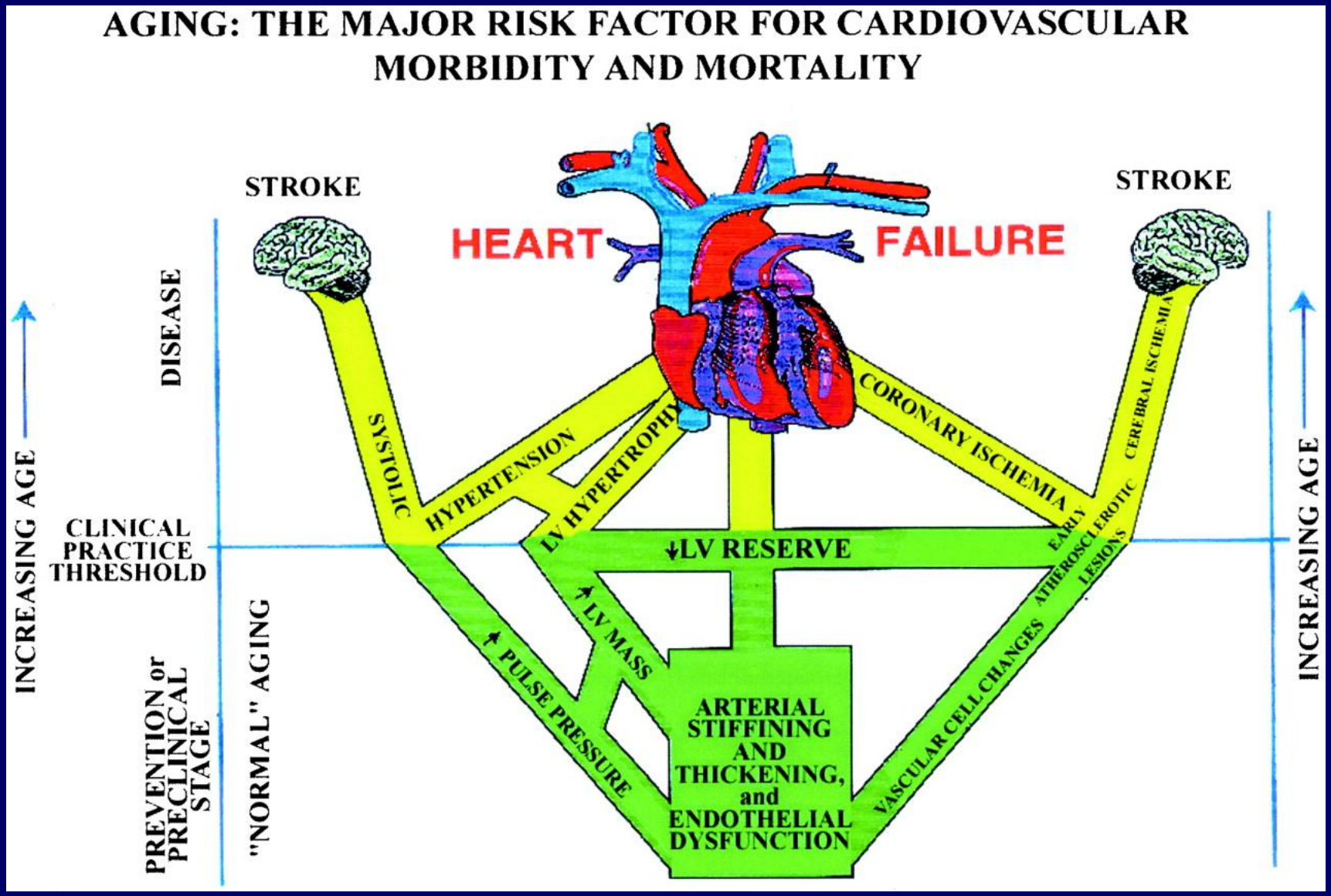
Eventi ospedalieri nel NSTEMI

Ruolo dell'età

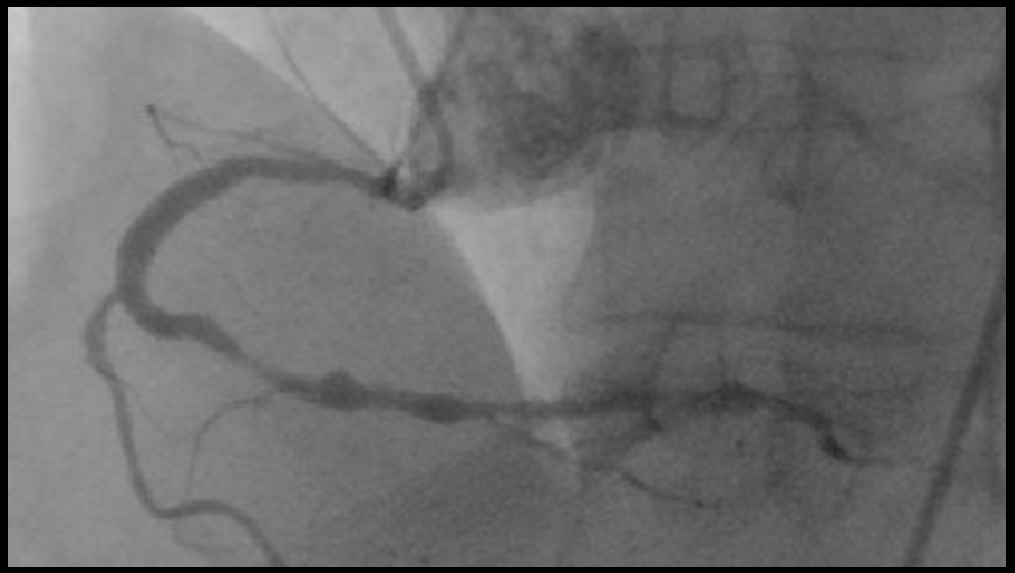
% Eventi

Alexander KP, et al. J Am Coll Cardiol 2005; 46: 1479-1487



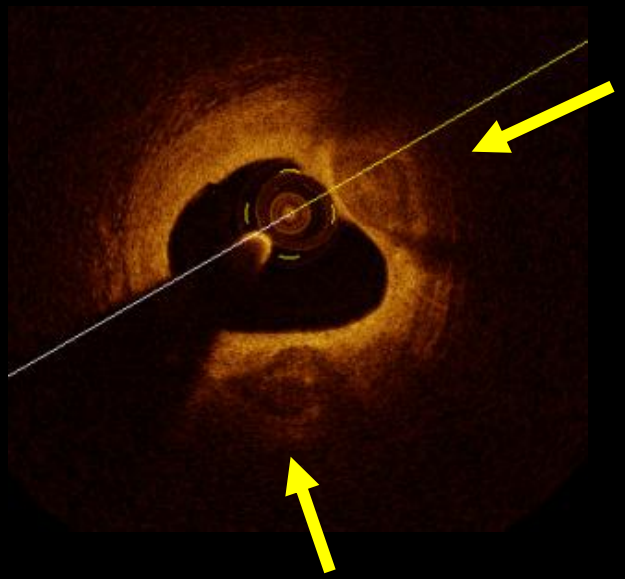


Lakatta and Levy. *Circulation* 2003;107:346-54

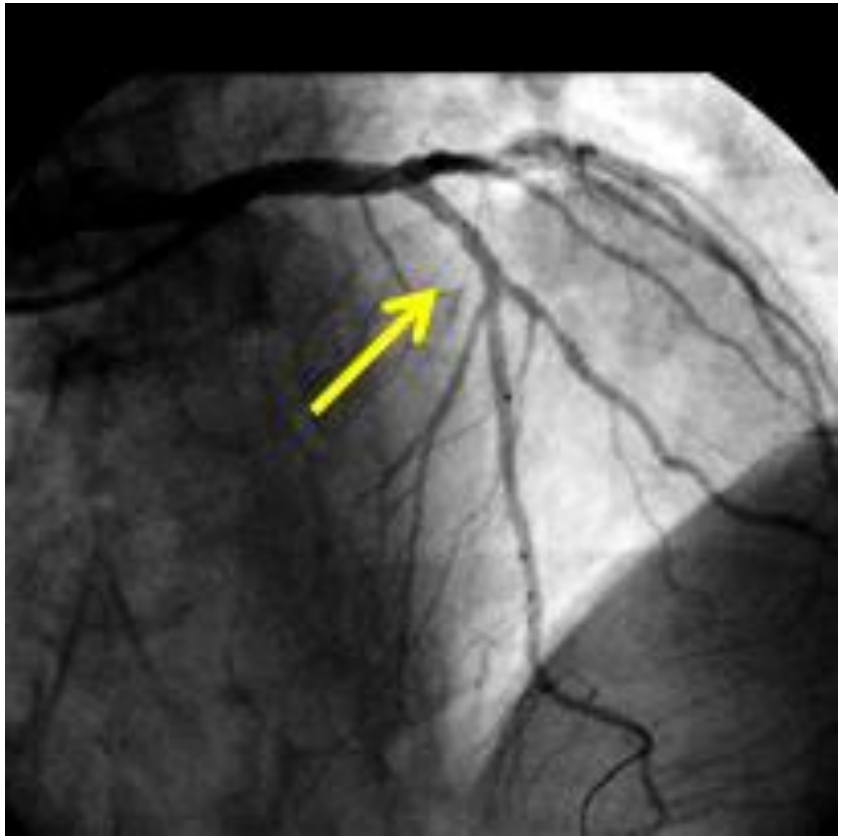


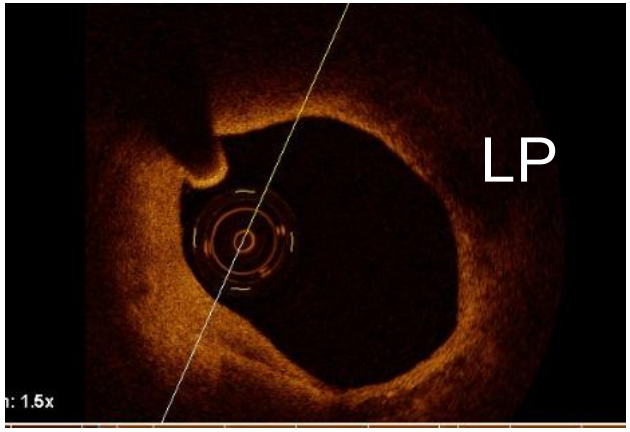
Uomo, 75 Anni
Angina stabile

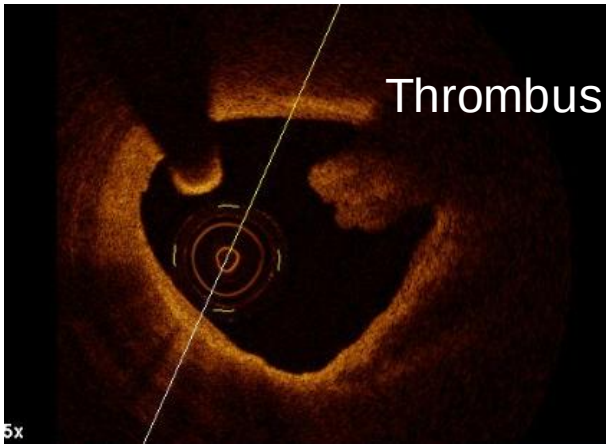
CGF: Malattia diffusa e calcifica dei 3 rami principali



Uomo, 51 Anni
Angina instabile





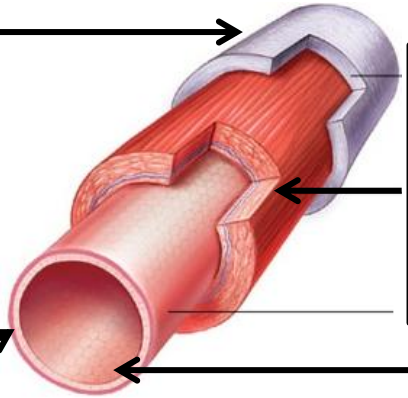


CGF: Semplici irregolarità nella DA Prox. Cdx e Cx Indenni

OCT: Rottura di placca su pool lipidico

Vascular Ageing

Adventitia:
> collagen, fibroblasts



Media:
> collagen, VSMCs, MMPs, AGEs, calcification, < Elastin

Endothelium:
Endothelial dysfunction

Intima:
> collagen, MΦ, MMPs, AGEs, calcification, I-CAM, VSMCs

Modificata da: Kovacic JC et al. *Circulation* 2011;123:1900-10

- Il trattamento con statine, modificando la biologia di placca, ne ha impedito l'evoluzione verso la rottura, ma non verso l'evoluzione sclerotica. Questa modifica della struttura di placca si è tradotta in una riduzione degli STEMI ed in un aumento degli infarti con meccanismo non trombotico, ma emodinamico, più tipico della fragilità e comorbilità delle fasce più avanzate della popolazione.

IN-ACS Outcome

Dati demografici e di popolazione:

- La SCA si verifica mediamente a 66 (ST) e a 69 (NST) anni, 3 anni più tardi della media europea.
- Le donne rappresentano circa il 30% della popolazione.
- I pazienti con NSTSCA hanno più fattori di rischio (diabete, ipertensione, dislipidemia) e comorbidità (insufficienza renale, BPCO)

CAMBIAMENTI: dati Blitz-3 n = 6986

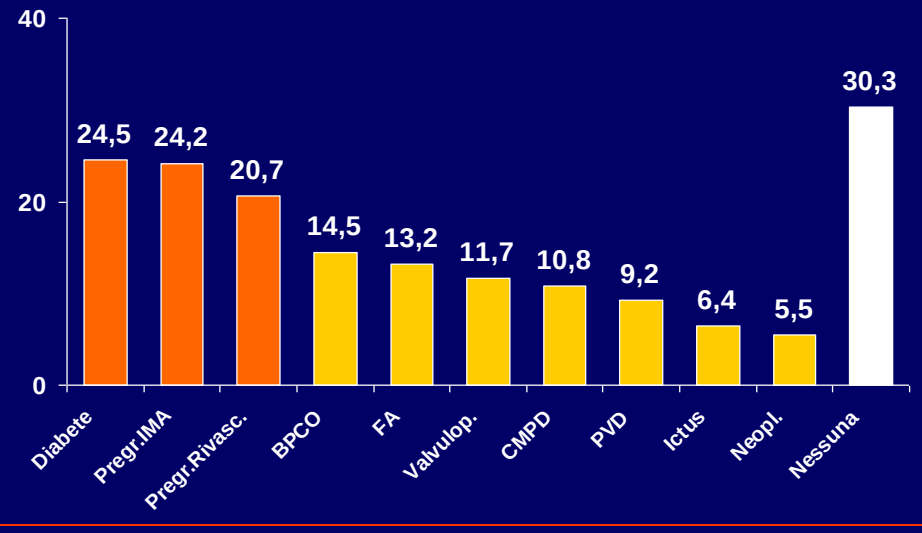
Epidemiologia

- > Età
- < STEMI
- > NSTEMI
- > Complessità clinica
- > Comorbilità
- > rivascolarizzati

Età media: 69.9±13.2 anni
Mediana: 72 anni
Età > 75 anni: 39%

Numero di comorbidità/ paziente

1	29,4%
2	21,2%
≥3	19,1%



Quando si parla oggi con i Colleghi che lavorano in UTIC, le frasi che vengono riferite più di frequente sono :

1) “a noi non mandano più i giovani, qualcun altro nella rete li sta drenando”
2) “abbiamo ridotto il numero delle angioplastiche primarie”
3) “ci mandano solo anziani, per lo più molto malandati e sempre più anziani”
4) “ci stiamo riempiendo di pazienti con scompenso cardiaco e fibrillazione atriale”

LE RIVOLUZIONI EPIDEMIOLOGICHE DEL NOVECENTO
(i due tsunami che hanno cambiato il mondo)
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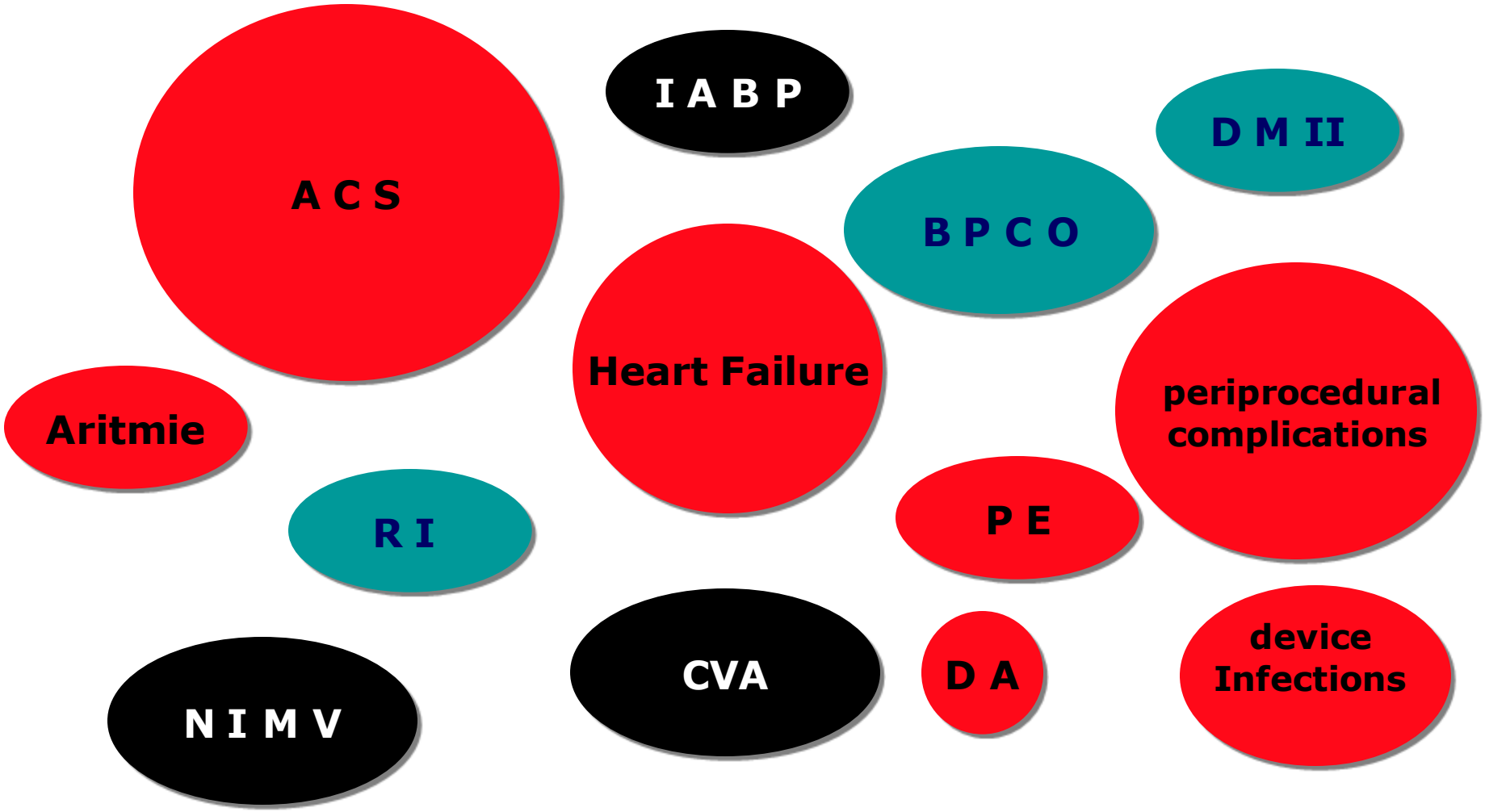
G.Ital Cardiol Marzo 2013

Il fenotipo clinico complesso



Interazioni tra Comorbilità e Cardiopatie Acute

Aggravamento ischemia-scompenso

- ↓ apporto O2
  - anemia
  - BPCO, insuff respiratoria
- ↑ consumo O2
  - febbre, tachiaritmie
  - ipertensione arteriosa
  - ipertiroidismo, fistola A-V
- processi infiammatori

Terapia inadeguata

- allergie
- controindicazioni
- TAO (warfarin)

Cardiopatia Acuta

Predisposizione alle complicanze

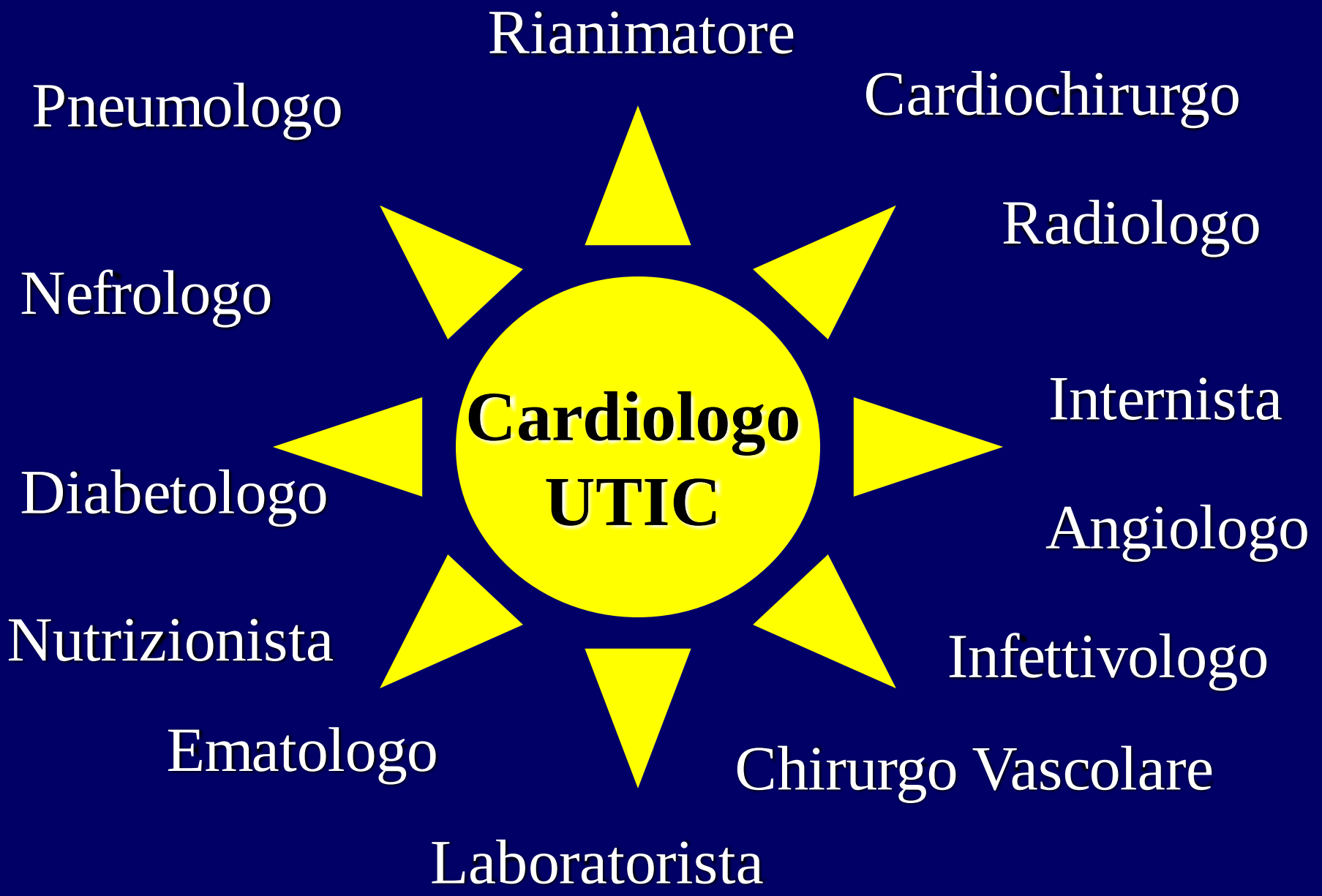
- diatesi emorragica
- m. gastrointestinali
- stroke
- insuff renale
- insuff epatica
- diabete mellito

Qualità e aspettativa di vita

- neoplasia in fase avanzata
- deficit cognitivo
- allettamento permanente

E il cardiologo?

- il cardiologo interventista,
- Il cardiologo clinico,
- l'elettrofisiologo,
- l'esperto di scompenso cardiaco,
- l'ecocardiografista,
- il riabilitatore,
- il cardiologo nucleare,
- il cardiologo per le nuove tecniche di imaging,
- il cardiologo ambulatoriale,
- il cardiologo ospedaliero
- un "cardiologo intensivista?"


Rianimatore
Pneumologo
Cardiochirurgo
Radiologo
Nefrologo
Cardiologo
UTIC
Internista
Diabetologo
Angiologo
Nutrizionista
Infettivologo
Ematologo
Chirurgo Vascolare
Laboratorista

Con il ridursi delle cause “vascolari” di cardiopatia, si fanno avanti quelle più propriamente “tissutali” o degenerative. Ecco pertanto l’incremento dello scompenso cardiaco, non a caso a sempre più prevalente fisiopatologia diastolica, non legata cioè a fenomeni di perdita di tessuto contrattile necrotica, ma piuttosto a sostituzione fibrotica progressiva e perdita di miociti.

LE RIVOLUZIONI EPIDEMIOLOGICHE DEL NOVECENTO
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AGEISM
in acute cardiac care settings

- Are older persons with acute cardiac conditions discriminated (i.e. not offered the best available treatment)?

1

- ✓ **older, comorbid cardiac patients frequently are denied the best available treatment**
- ✓ **discrimination occurs across all steps of emergency care**

AGEISM
in acute cardiac care settings

2

- Is the denial (if any) of best treatment to older persons justifiable because of therapeutic futility?

✓ **Therapeutic discrimination of older cardiac patients is not only questionable in terms of equity, but also clinically not justifiable, as benefits from best treatment are in fact greater in older, comorbid patients**

MEDICINA BASATA SULL'EVIDENZA

Non è un Paese per vecchi

Clinical trials: regulations

ICH Topic E7 Studies in Support of Special Populations: Geriatrics. (1994)

Patients entering clinical trials should be **reasonably representative** of the population that will be later treated by the drug.

-*Geriatric population defined as >65 yrs. Important to include patients 75 and above. No upper age limits, no unnecessary exclusion due to concomitant illness.*

-*Specific pharmacokinetic, pharmacodynamic and drug-drug interaction studies may be needed.*

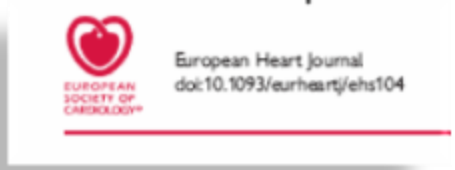
-*Phase III CTs: >100 patients would allow detection of clinically important differences in the elderly.*

Eligibility Criteria Of Randomized Controlled Trials Published In High-impact General Medical Journal

Data Synthesis:…common medical conditions formed the basis for exclusion in 81% of trials. Patients were excluded due to age in **72%** (**38,5%** in older age). Individuals receiving commonly prescribed medications were excluded in 54%… Of all exclusion criteria only 47% were justified...Industry sponsored trials and multicenter trials were more likely to exclude…

Conclusions:..women, children, the **elderly** and those with common medical conditions are frequently excluded from RCTs.

Van Spall HG, JAMA 2007



Search for: ELDERLY:

10 results in 61 pages

Diagnostic caveats

1. Symptoms and signs may be particularly difficult to identify… in… the elderly…
2. Confusion (especially in the elderly) [*Table 4: Symptoms and signs typical of HF*]
3. The Hypertension, Abnormal renal/liver function (1 point each), Stroke, Bleeding history or predisposition, Labile INR, Elderly (>65) [HAS-BLED]…
4. Anaemia … is common in HF, particularly in… the elderly…
5. A high index of suspicion is needed to make diagnosis [of depression], especially in the elderly

RCTs with [highly selected] older persons

1. … in Seniors With Heart Failure (SENIORS)] in 2128 elderly (≥70 years) patients…
2. Another trial [Evaluation of Losartan In The Elderly (ELITE) II] failed to show…
3. The 850-patient Perindopril for Elderly People with Chronic Heart failure trial (PEP-CHF)…

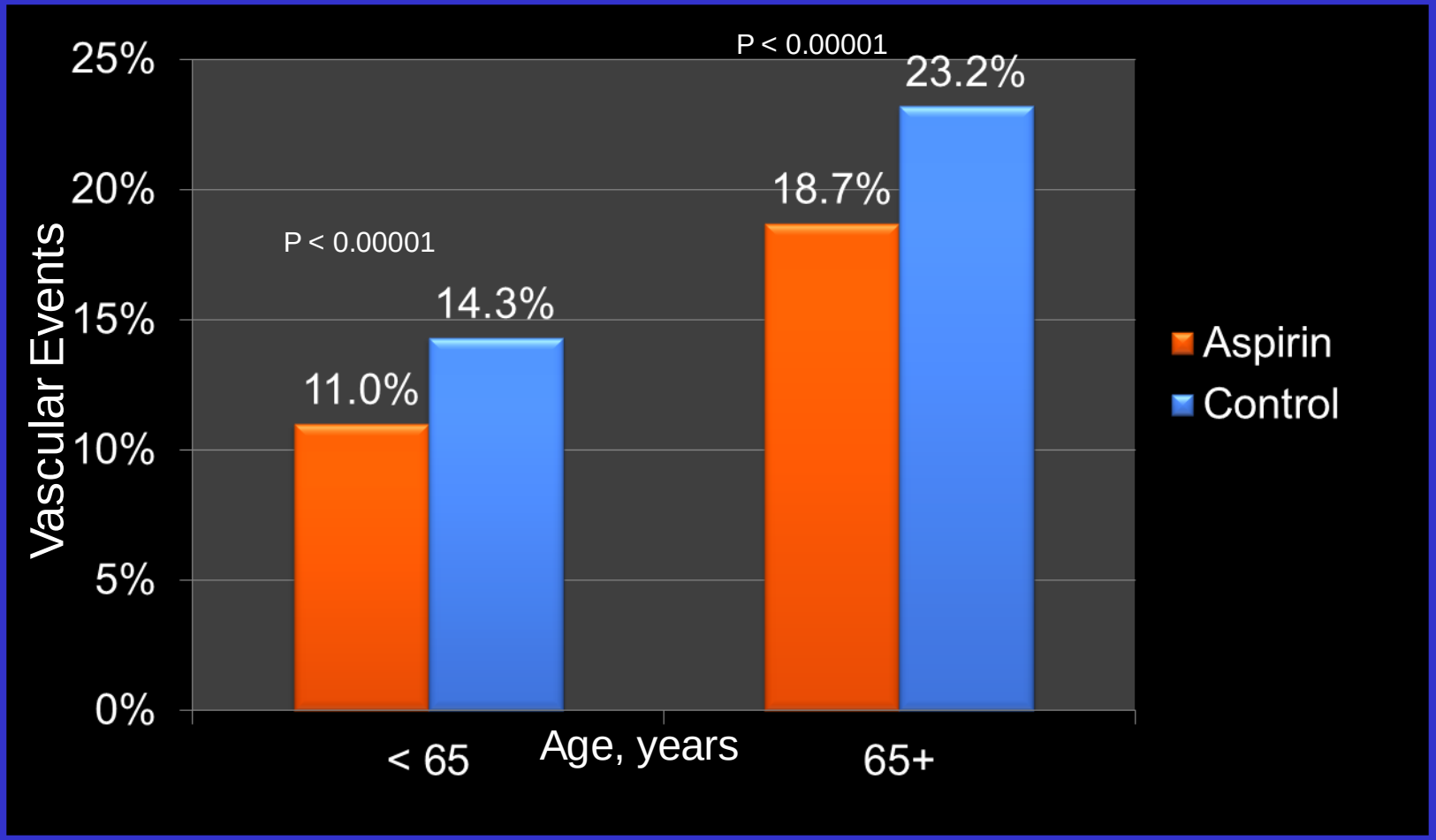
Adverse events with specific drug

1. Spironolactone…can cause hyperkalaemia… especially in the elderly…

Lack of evidence in RCTs

1. …physical training is beneficial in HF, although typical elderly patients were not enrolled in many studies…

Long-term Benefits of Aspirin



REF: Antiplatelet Trialists' Collaboration . *BMJ 1994;308:81-106*

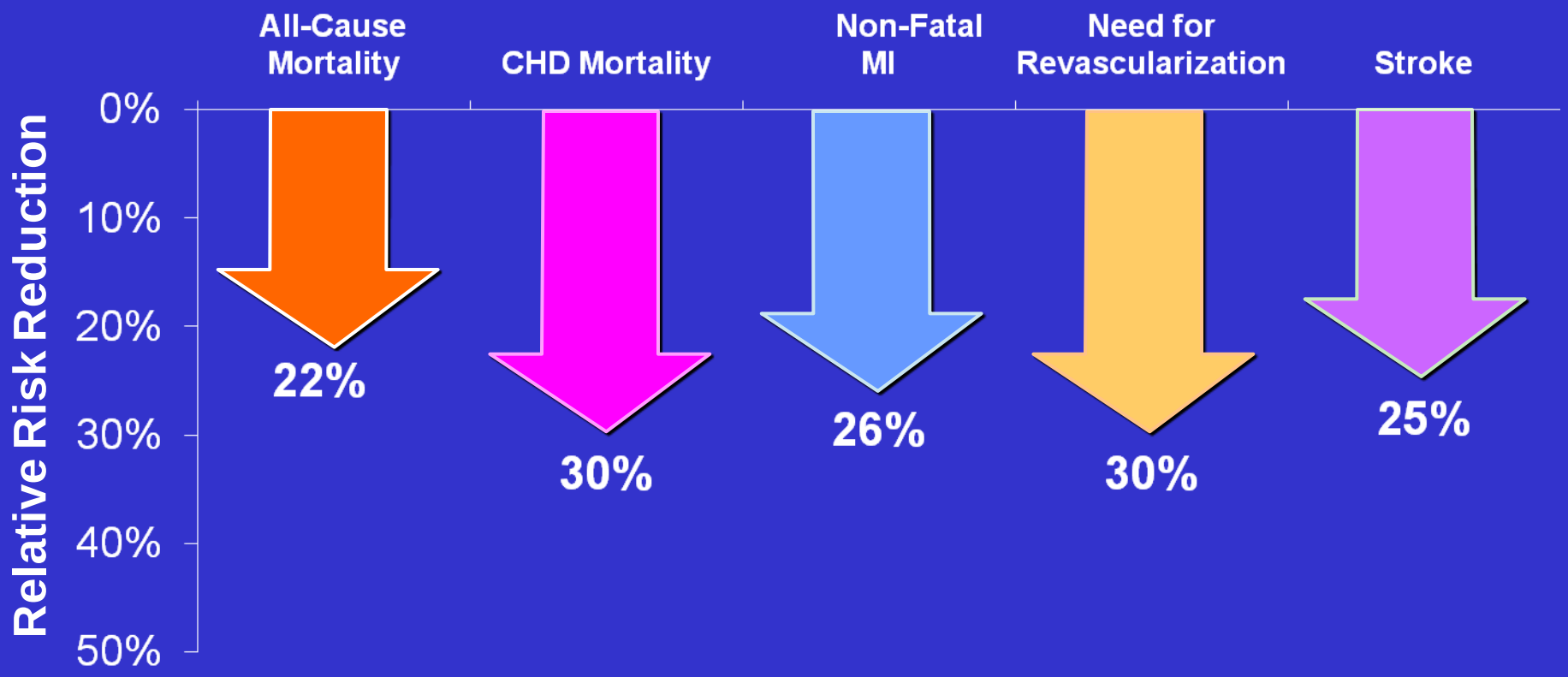
Benefits of β-Blockade Among Elderly Patients: Survival at 1 Year After Myocardial Infarction

Age over 75 years	Two or more comorbidities	Number of patients	Relative risk (95% CI)	p
Yes	Yes	1700	0·42 (0·32–0·54)	0·0001
Yes	No	5206	0·41 (0·35–0·48)	0·0001
No	Yes	1469	0·49 (0·37–0·65)	0·0001
No	No	5248	0·30 (0·24–0·37)	0·0001

REF: Rochon PA, et al. Lancet. 2000 Aug 19;356:639-44.

Statin Therapy Meta-Analysis

Relative Risk Reduction in Outcomes in Patients ≥ 65 Years
n = 19,569 after mean follow-up of 4.9 years



Afilalo J, et al. J Am Coll Cardiol. 2008 Jan 1;51(1):37-45.

CARDIOPATIA ISCHEMICA NELL'ANZIANO:

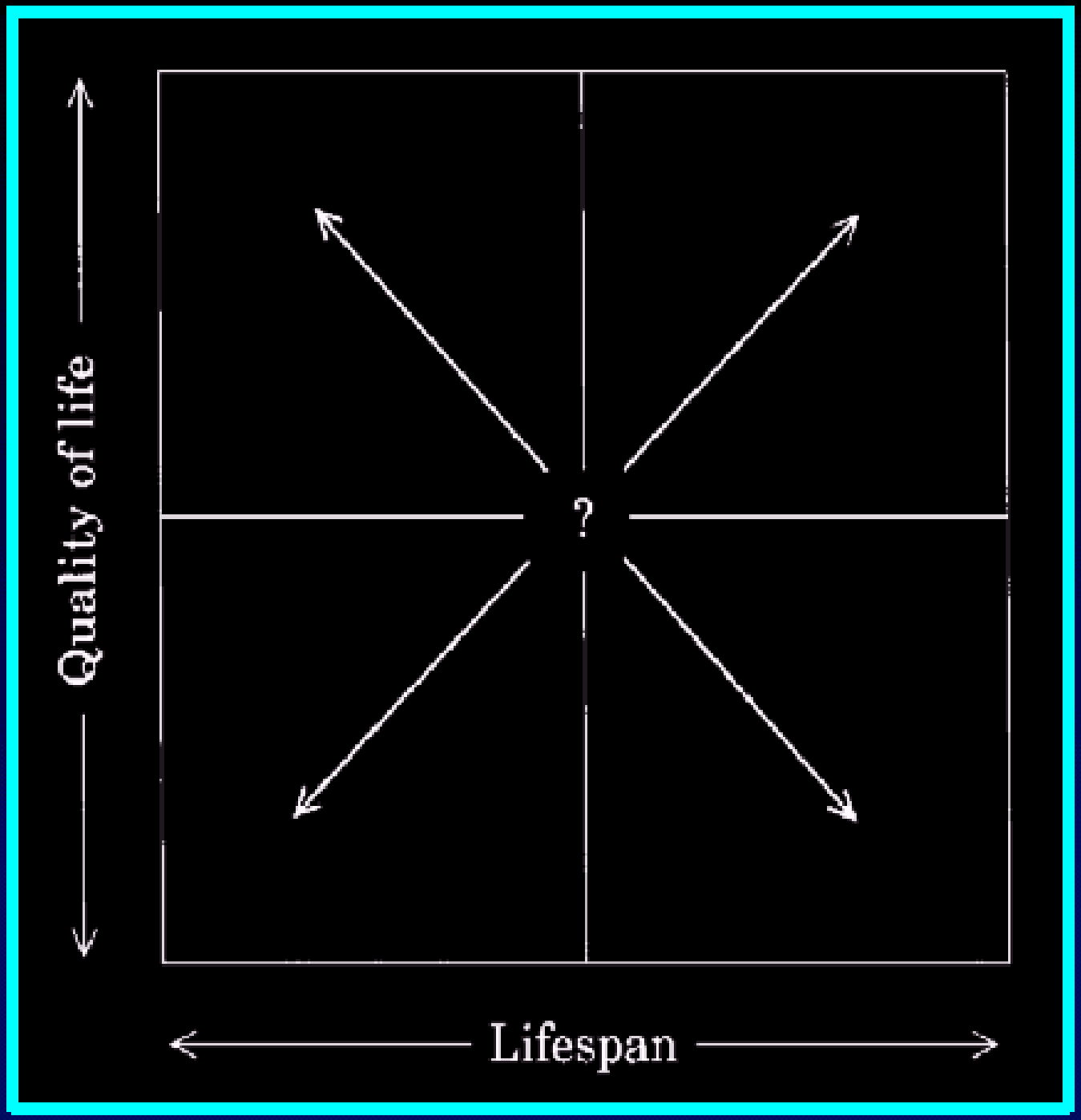
Terapia medica,stent o bypass?

- Quale è il beneficio in termini di sopravvivenza attuariale, considerando l'aspettativa di vita di un ottuagenario?

- Si verifica una regressione significativa della sintomatologia a distanza?

- Aumenta la durata della vita?
- Di quanto?
- Aumenta la qualità della vita?
- A quale costo ottengo i miei risultati?

Possibili Effetti della Terapia



Attesa di Vita per fasce di età (dati ISTISAN 2004)		
Età	Femmine	Maschi
0	82,513	76,541
55	29,377	24,578
65	20,503	16,504
75	12,531	9,913
80	9,153	7,296
85	6,457	5,243

Noninvasive Risk Stratification

High-Risk (> 3% annual mortality)

1. Severe resting left ventricular dysfunction (LVEF < 35%)
2. High-risk treadmill score (score ≤ –11)
3. Severe exercise left ventricular dysfunction (exercise LVEF < 35%)
4. Stress-induced large perfusion defect (particularly if anterior)
5. Stress-induced multiple perfusion defects of moderate size
6. Large, fixed perfusion defect with LV dilation or increased lung uptake (thallium-201)
7. Stress-induced moderate perfusion defect with LV dilation or increased lung uptake (thallium-201)
8. Echocardiographic wall motion abnormality at low stress rate
9. Stress echocardiographic evidence of extensive ischemia

Intermediate-Risk (1%-3% annual mortality)

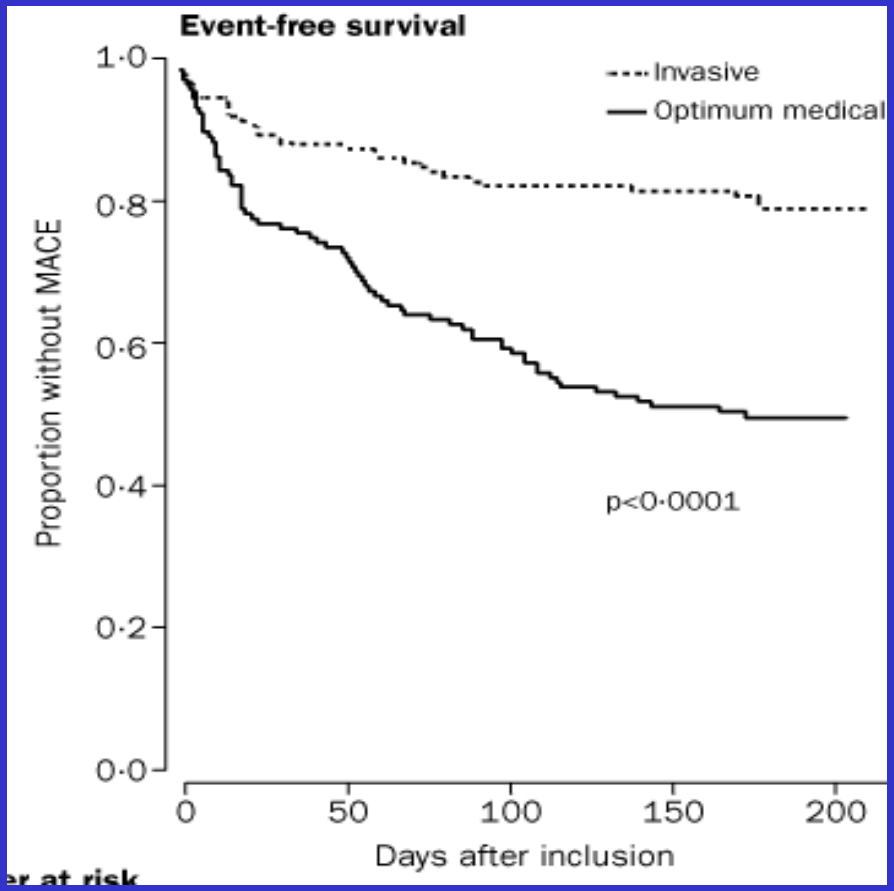
1. Mild/moderate resting left ventricular dysfunction (LVEF = 35% to 49%)
2. Intermediate-risk treadmill score (–11 < score < 5)
3. Stress-induced moderate perfusion defect without LV dilation or increased lung intake (thallium-201)
4. Limited stress echocardiographic ischemia with a wall motion abnormality only at higher doses of dobutamine involving less than or equal to two segments

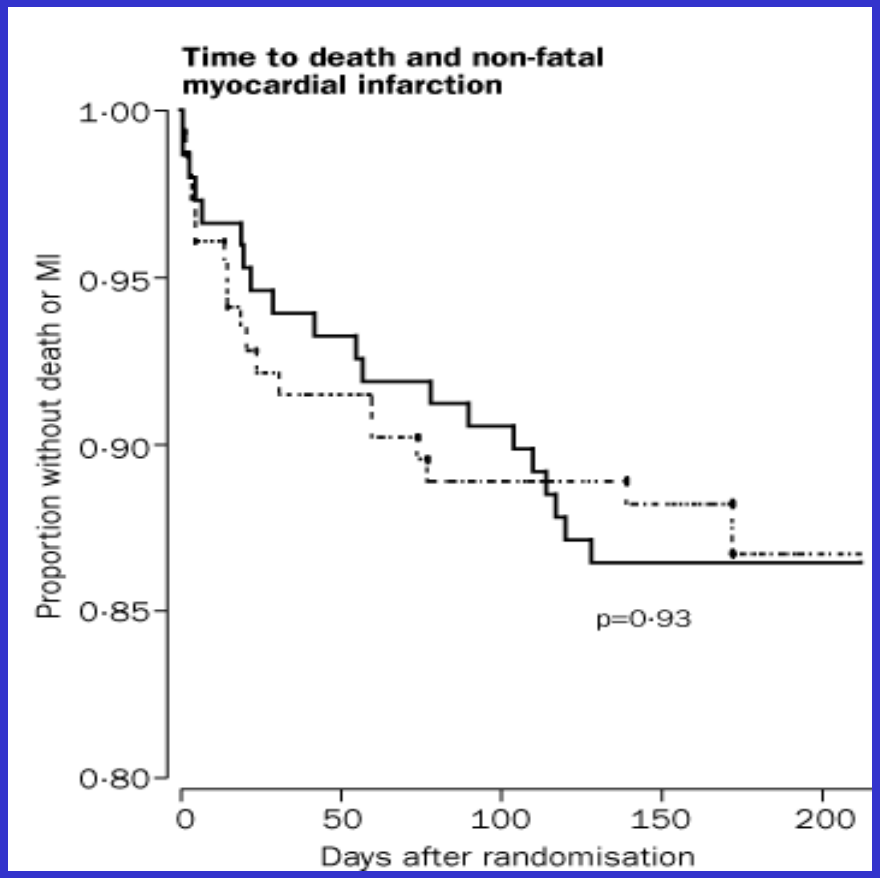
Low-Risk (<% annual mortality)

1. Low-risk treadmill score (score ≥5)
2. Normal or small myocardial perfusion defect at rest or with stress*
3. Normal stress echocardiographic wall motion or no change of resting wall motion during stress

REF: Gibbons RJ, et al. *Circulation 2003;107:149-158.*

Trial of Invasive versus Medical therapy in Elderly patients with chronic symptomatic CAD: TIME (n=305)





TIME Investigators. Trial of invasive versus medical therapy in elderly patients with chronic symptomatic coronary-artery disease (TIME): a randomised trial. Lancet 2001; 358: 951

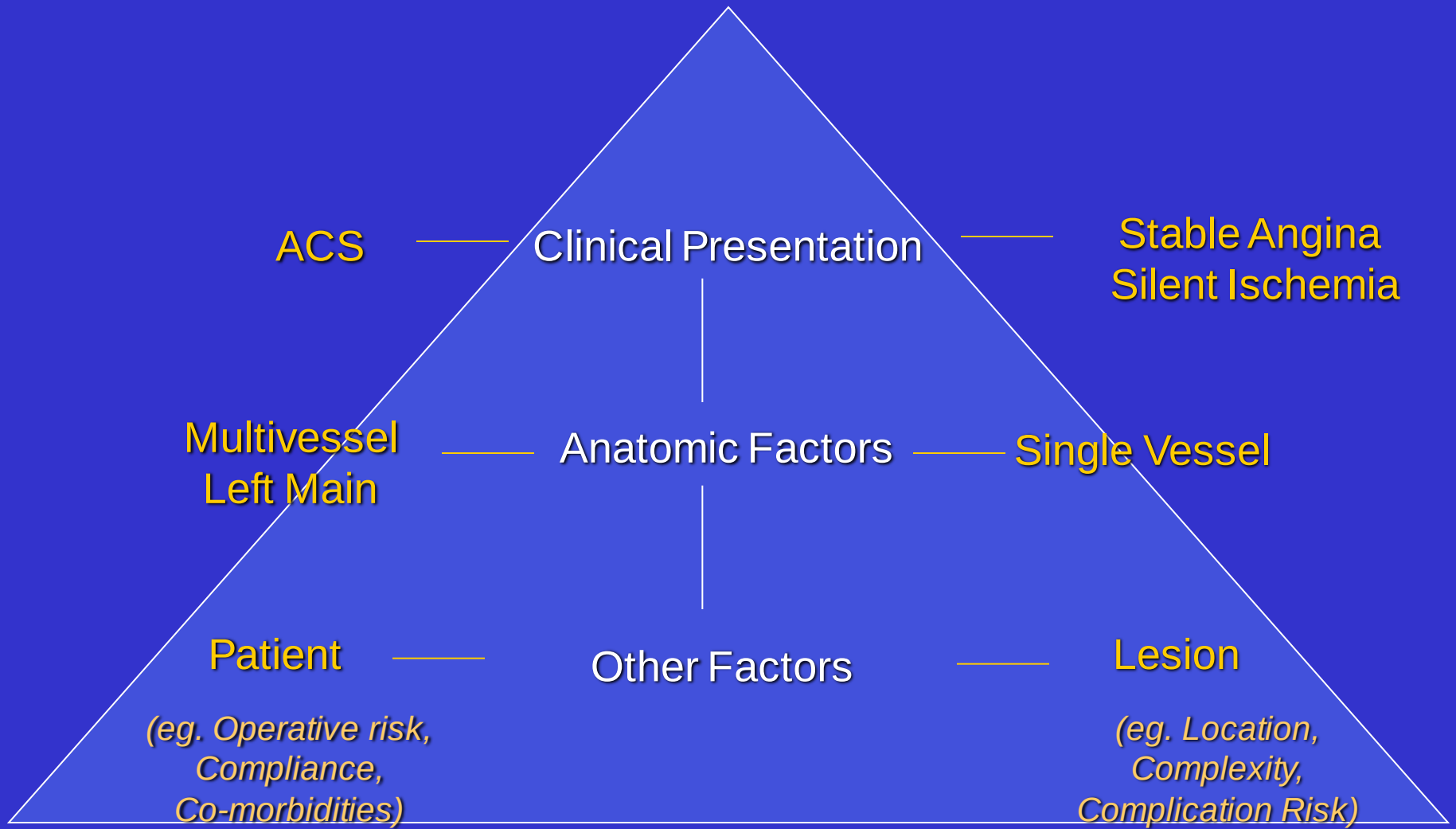
Survival with Medical Therapy vs. Revascularization

Adjusted 4-year Survival Rates (N=21,573)

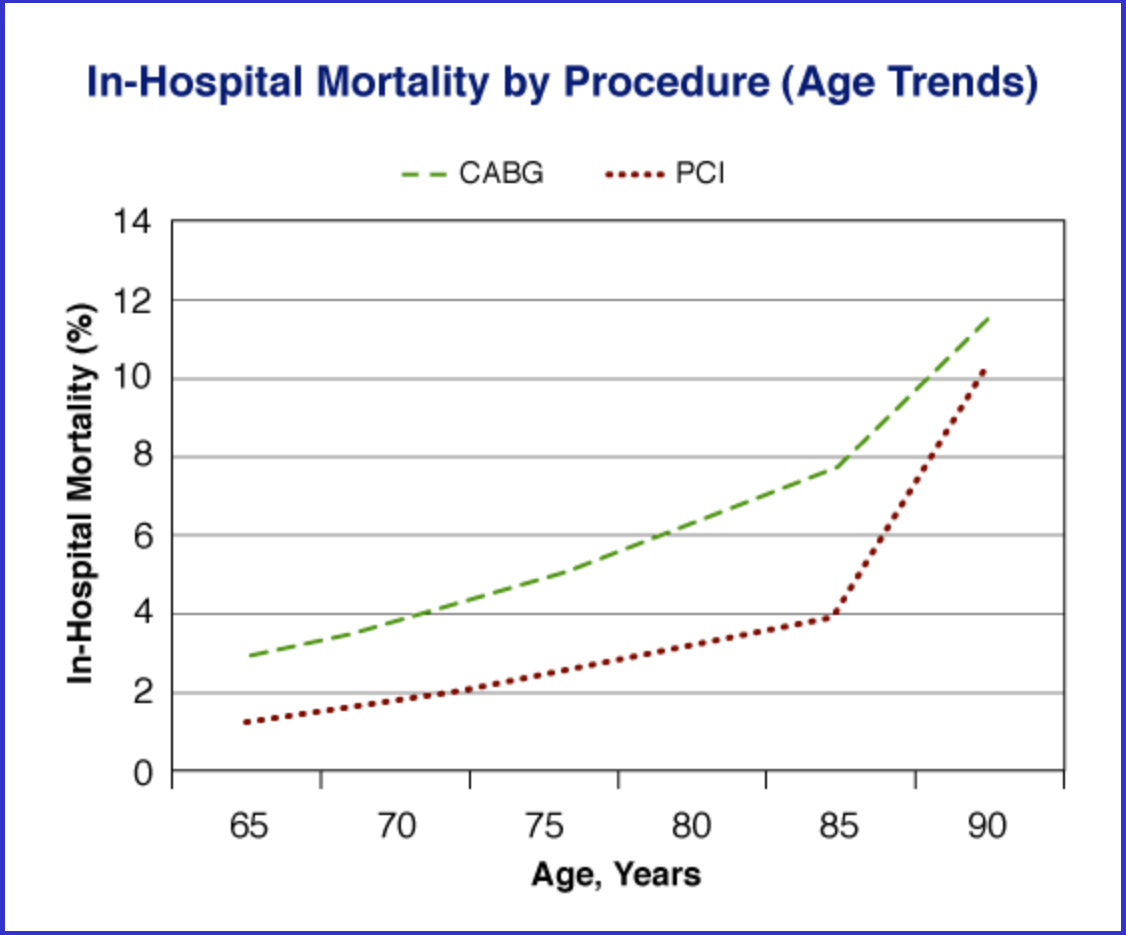
Age, years	Medical Therapy	PCI	CABG
< 70	90.8%	93.8%	95.0%
70-79	79.1%	83.9%	87.3%
≥ 80	60.3%	71.6%	77.4%

REF: Graham MM, et al. Circulation 2002;105:2378-84

Revascularization Decisions



Mortality Following PTCA and CABG



n = 109,708 for PTCA, n = 67,764 for CABG

REF: Batchelor WB, et al. J Am Coll Cardiol 2000;35:731-8 & 36:723-30. Alexander KP et al.. J Am Coll Cardiol 2000;35:731-738

ACCF/SCAI/STS/AATS/AHA/ASNC/HFSA/SCCT 2012 Appropriate Use Criteria for Coronary Revascularization Focused Update

Table A1. CAD Prognostic Index

Extent of CAD	Prognostic Weight (0–100)	5-Year Survival Rate (%)*
1-vessel disease, 75%	23	93
>1-vessel disease, 50% to 74%	23	93
1-vessel disease, ≥95%	32	91
2-vessel disease	37	88
2-vessel disease, both ≥95%	42	86
1-vessel disease, ≥95% proximal LAD	48	83
2-vessel disease, ≥95% LAD	48	83
2-vessel disease, ≥95% proximal LAD	56	79
3-vessel disease	56	79
3-vessel disease, ≥95% in at least 1	63	73
3-vessel disease, 75% proximal LAD	67	67
3-vessel disease, ≥95% proximal LAD	74	59

Indications for revascularization in stable angina or silent ischaemia

	Subset of CAD by anatomy	Class[a]	Level[b]
For prognosis	Left main >50%[c]	I	A
	Any proximal LAD >50%[c]	I	A
	2VD or 3VD with impaired LV function[d]	I	B
	Proven large area of ischaemia (>10% LV)	I	B
	Single remaining patent vessel >50% stenosis[d]	I	C
	1VD without proximal LAD and without >10% ischaemia	III	A
For symptoms	Any stenosis >50% with limiting angina or angina equivalent, unresponsive to OMT	I	A
	Dyspnoea/CHF and >10% LV ischaemia/viability supplied by >50% stenotic artery	IIa	B
	No limiting symptoms with OMT	III	C

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Angiographic Versus Functional Severity of Coronary Artery Stenoses in the FAME Study

Fractional Flow Reserve Versus Angiography in Multivessel Evaluation

Table 2 Lesion Characteristics per Category of Angiographic Stenosis Severity

	% Stenosis by Angiography*		
	50% to 70% (n = 620, 47%)	71% to 90% (n = 513, 39%)	91% to 99% (n = 96, 15%)
FFR >0.80	402 (65)	104 (20)	7 (4)
FFR ≤0.80	218 (35)	409 (80)	189 (96)
Mean FFR for all lesions	0.81 ± 0.12	0.67 ± 0.15	0.52 ± 0.15
Mean FFR >0.80	0.89 ± 0.05	0.87 ± 0.05	0.87 ± 0.04
Mean FFR ≤0.80	0.68 ± 0.10	0.62 ± 0.13	0.51 ± 0.13

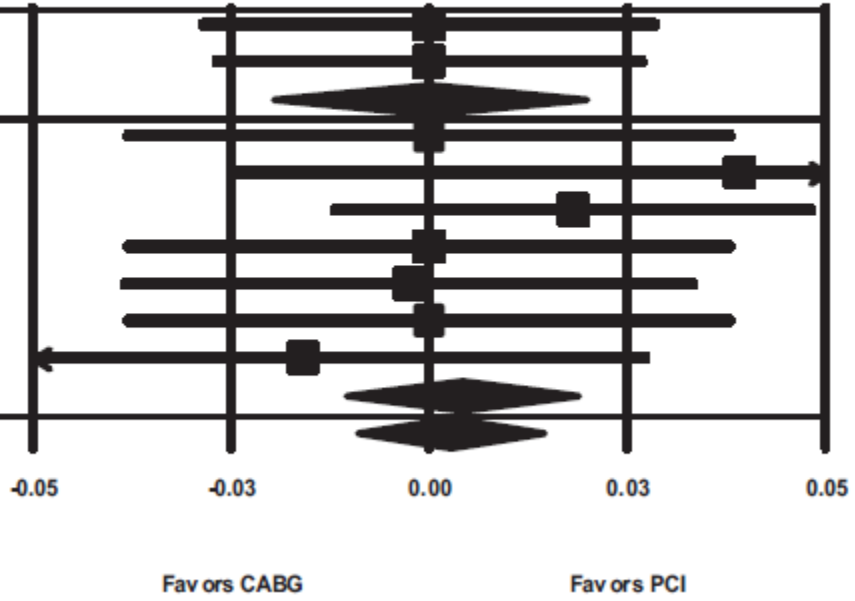
Pim A. *J. Am. Coll. Cardiol.* 2010;55;2816-2821

Lesione isolata della discendente anteriore

Isolated Disease of the Proximal Left Anterior Descending Artery

Comparing the Effectiveness of Percutaneous Coronary Interventions and Coronary Artery Bypass Surgery

Study name	Risk difference	Lower limit	Upper limit	p-Value	Survival / Total PCI	Survival / Total CABG
Lausanne	0.000	-0.029	0.029	1.000	68 / 68	66 / 66
MASS	0.000	-0.027	0.027	1.000	72 / 72	70 / 70
Summary for Balloon Trials	0.000	-0.020	0.020	1.000	140 / 140	136 / 136
AMIST	0.000	-0.038	0.038	1.000	50 / 50	50 / 50
Groningen	0.039	-0.025	0.103	0.229	51 / 51	49 / 51
Leipzig	0.018	-0.012	0.048	0.239	110 / 110	108 / 110
Poland	0.000	-0.038	0.038	1.000	50 / 50	50 / 50
Seoul-Hong	-0.003	-0.039	0.034	0.891	117 / 119	69 / 70
Seoul-Kim	0.000	-0.038	0.038	1.000	50 / 50	50 / 50
SIMA	-0.016	-0.059	0.028	0.474	62 / 63	60 / 60
Summary for Stent Trials	0.004	-0.011	0.019	0.585	490 / 493	436 / 441
Summary for All SVD Trials	0.003	-0.009	0.014	0.661	630 / 633	572 / 577



Heterogeneity Statistics:
Balloon trials: Q=0.0, p=1.0; I^2=0.0.
Stent trials: Q=3.1, p=0.8; I^2=0.0.
All SVD trials: Q=3.2, p=0.9; I^2=0.0.

JACC cardiovascular Interventions

J R. Kapoor et Al 2008;1;483

JACC cardiovascular Interventions

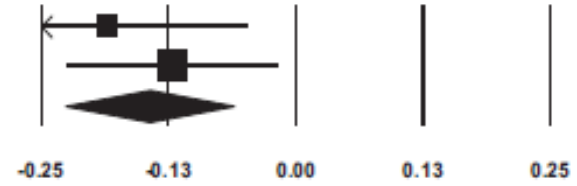
Isolated Disease of the Proximal Left Anterior Descending Artery

Comparing the Effectiveness of Percutaneous Coronary Interventions and Coronary Artery Bypass Surgery

J R. Kapoor et Al 2008;1;483

Freedom from repeat revascularization at 12 Months

Study name	Risk difference	Lower limit	Upper limit	p-Value	PCI	CABG
Poland	-0.185	-0.322	-0.048	0.008	37 / 49	47 / 50
Seoul-Kim	-0.120	-0.224	-0.016	0.023	43 / 50	49 / 50
	-0.144	-0.226	-0.061	0.001	80 / 99	96 / 100

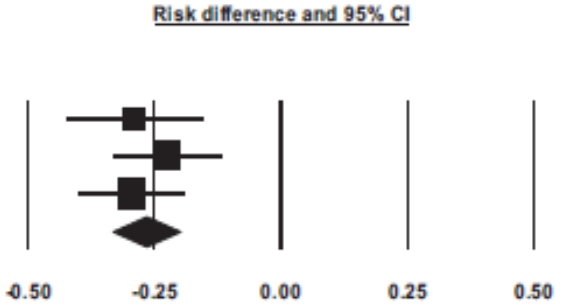


Heterogeneity Statistics: Q=0.56, p=0.5; I^2=0.0.

Favors CABG Favors PCI

Freedom from repeat revascularization at 60 Months

Study name	Risk difference	Lower limit	Upper limit	p-Value	PCI	CABG
Lausanne	-0.290	-0.427	-0.153	0.000	40 / 65	59 / 65
Leipzig	-0.224	-0.332	-0.117	0.000	71 / 106	93 / 104
MASS	-0.296	-0.403	-0.188	0.000	50 / 71	69 / 69
	-0.267	-0.333	-0.201	0.000	161 / 242	221 / 238



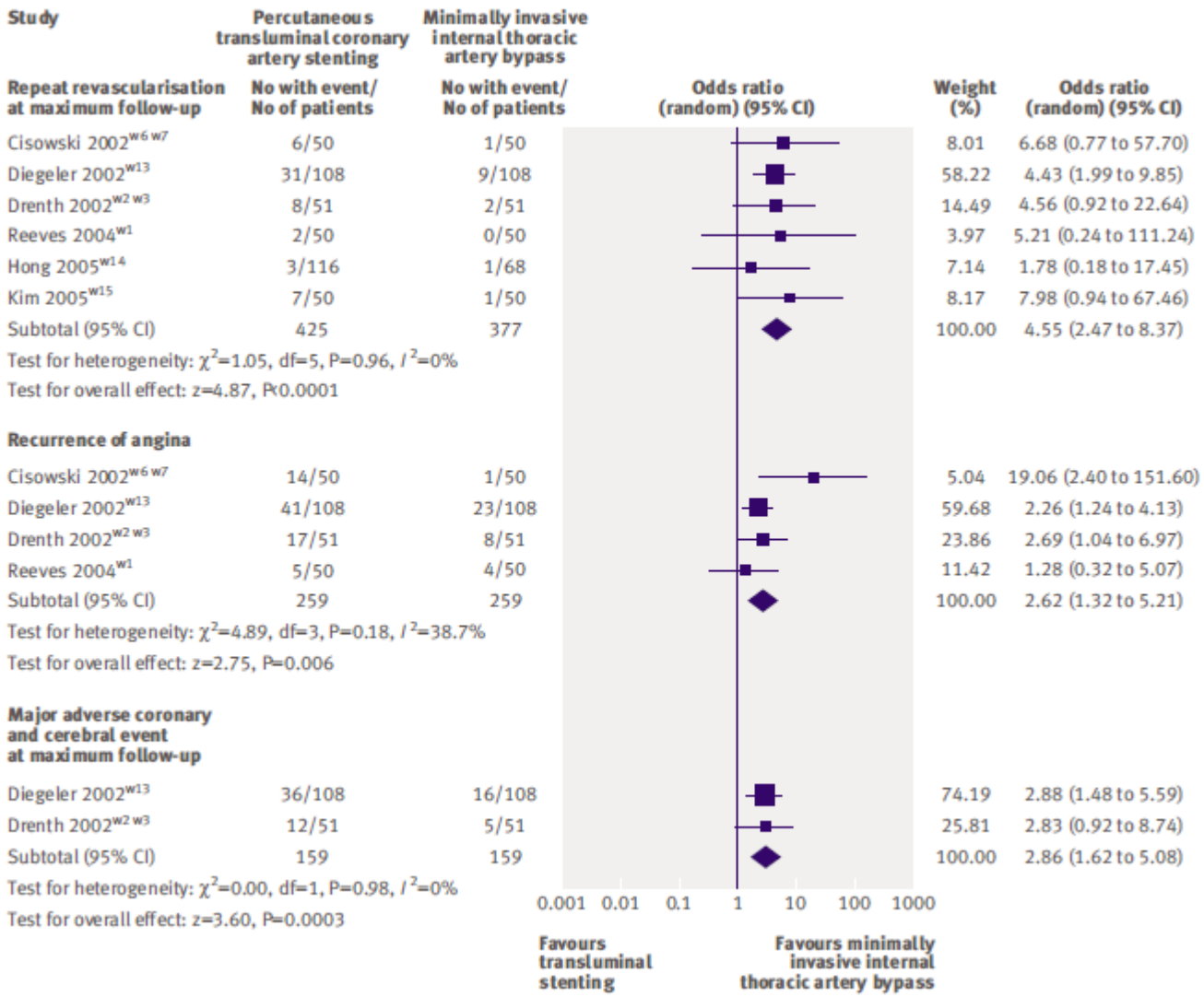
Heterogeneity Statistics: Q=0.99, p=0.6; I^2=0.0.

Favors CABG Favors PCI

BMJ

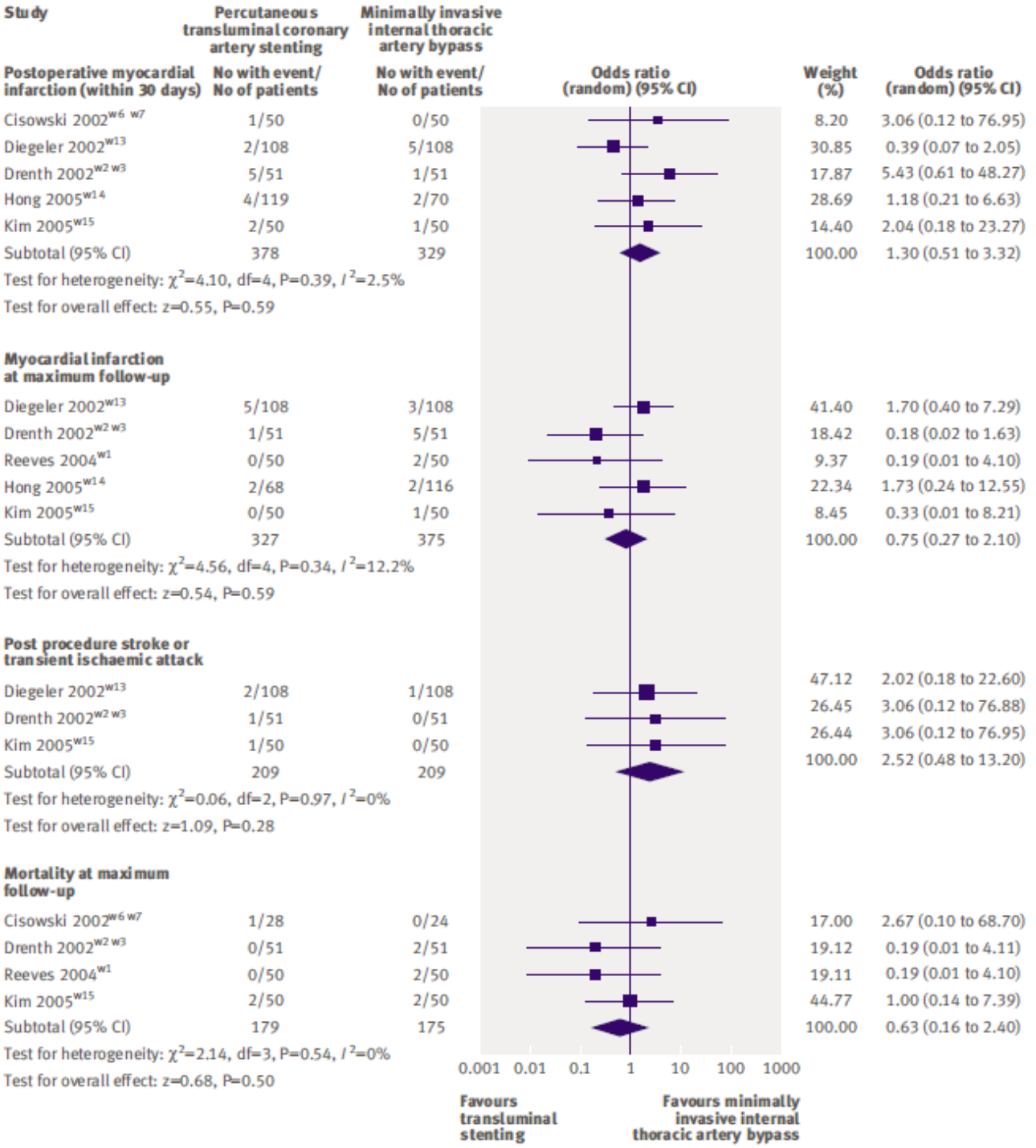
O Aziz et Al
2007;334:617.

Meta-analysis of minimally invasive internal thoracic artery bypass versus percutaneous revascularisation for isolated lesions of the left anterior descending artery



BMJ

O Aziz et Al 2007;334:617.



Treatment of Left Anterior Descending Coronary Artery Disease With Sirolimus-Eluting Stents

TABLE 3. Major Adverse Cardiac Events

Event	Sirolimus, % (n) (N=234)	Bare Metal, % (n) (N=225)	Relative risk (95% CI)	*P*
In-hospital MACE	3.4% (8/234)	1.3% (3/225)	2.56 (0.72, 9.09)	0.222
Total MACE to 360 days	9.8% (23/234)	24.9% (58/225)	0.39 (0.26, 0.61)	<0.001
All death	0.9% (2/234)	1.3% (3/225)	0.64 (0.11, 3.75)	0.680
Cardiac death	0.4% (1/234)	0.9% (2/225)	0.48 (0.05, 5.00)	0.617
Myocardial infarction	3.8% (9/234)	2.7% (6/225)	1.44 (0.52, 3.97)	0.602
TLR*	6.0% (14/234)	23.1% (52/225)	0.26 (0.16, 0.43)	<0.001
TVF†	12.0% (28/234)	27.5% (62/225)	0.43 (0.29, 0.84)	<0.001
Stent thrombosis to 30 days	0.0% (0/234)	0.4% (1/225)	0.00	0.490
Late thrombosis to 360 days	0.4% (1/234)	0.0% (0/225)		1.000
Subacute closure	0% (0/234)	0.0% (0/225)		N/A

Circulation. 2004;110:374-379

Indications for CABG vs. PCI in stable patients with lesions suitable for both procedures and **low predicted surgical mortality**

Subset of CAD by anatomy	Favours CABG	Favours PCI
1VD or 2VD - non-proximal LAD	IIb C	I C
1VD or 2VD - proximal LAD	I A	IIa B
3VD simple lesions, full functional revascularization achievable with PCI, SYNTAX score ≤22	I A	IIa B
3VD complex lesions, incomplete revascularization achievable with PCI, SYNTAX score >22	I A	III A
Left main (isolated or 1VD, ostium/shaft)	I A	IIa B
Left main (isolated or 1VD, distal bifurcation)	I A	IIb B
Left main + 2VD or 3VD, SYNTAX score ≤32	I A	IIb B
Left main + 2VD or 3VD, SYNTAX score ≥33	I A	III B

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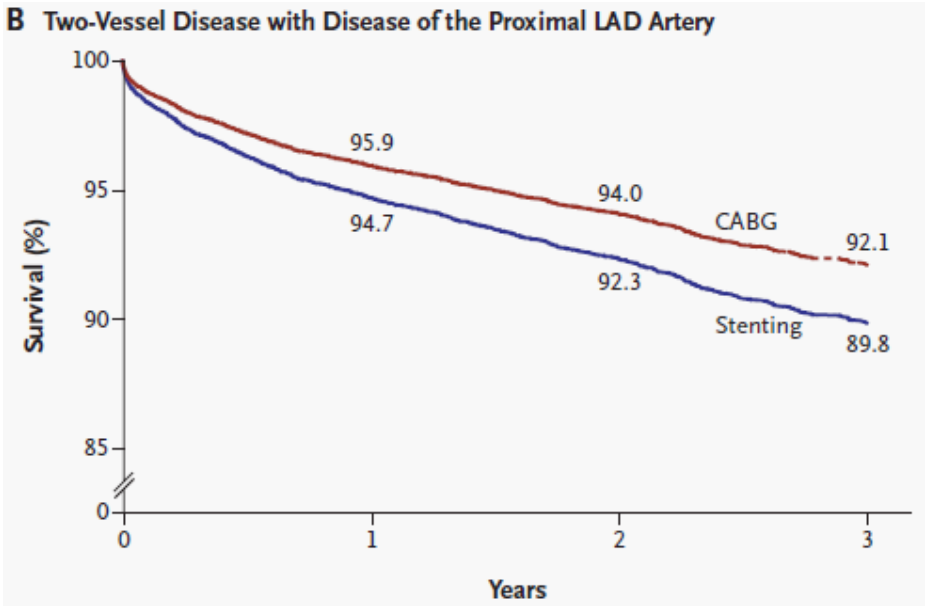
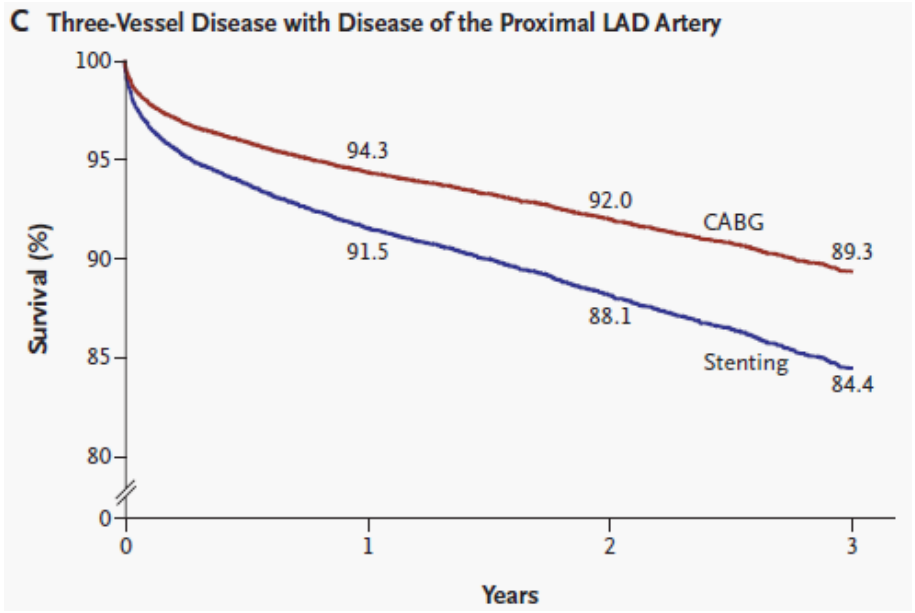
Multivaso

Long-Term Outcomes of Coronary-Artery Bypass Grafting versus Stent Implantation

New York's two cardiac registries 37,212 CABG and 22,102 patients BMS



adjusted hazard ratio for the long-term risk of death 0.76



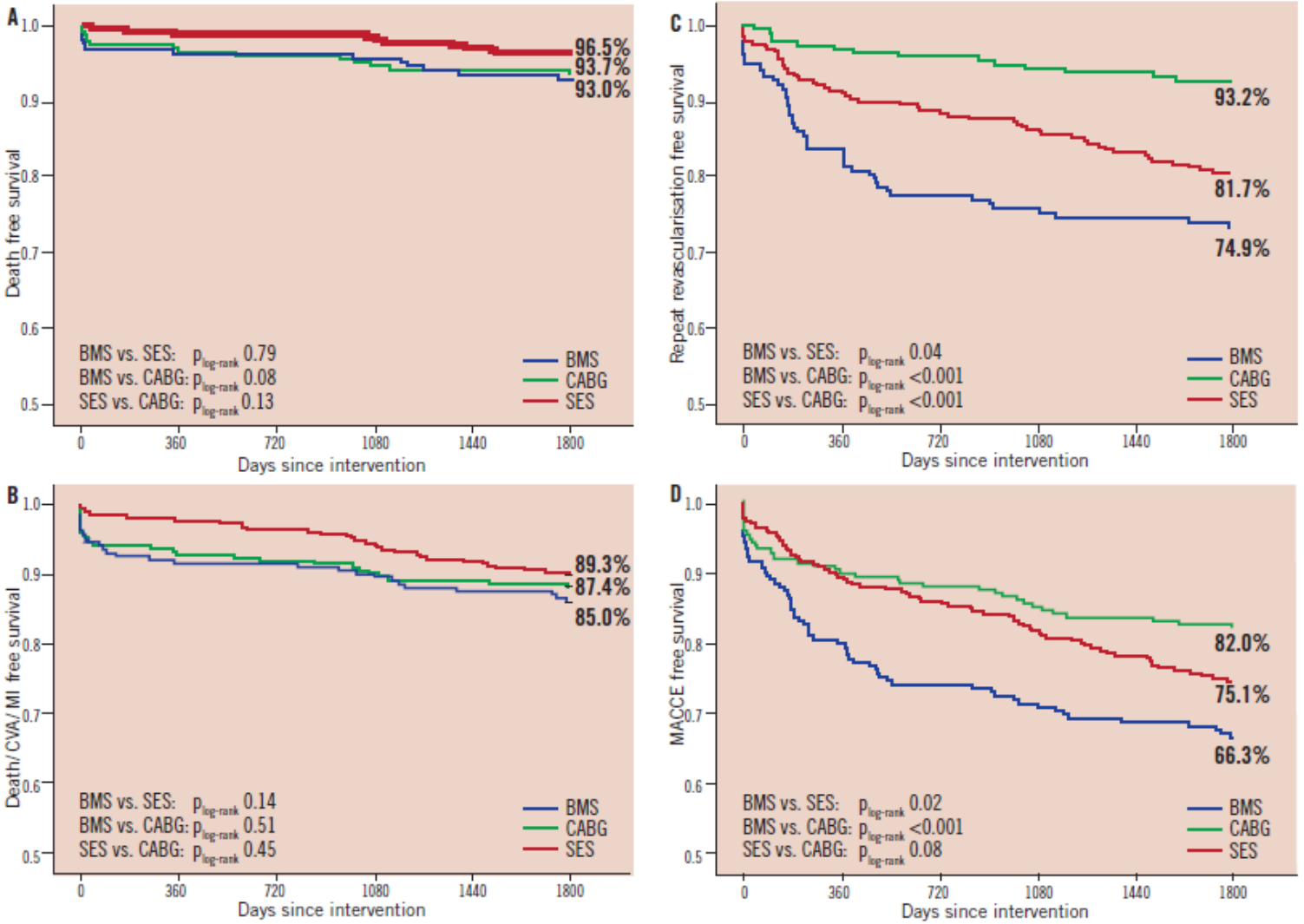
adjusted hazard ratio for the long-term risk of death 0.64

Revascularization were considerably higher in the stenting group than in the CABG group (7.8 percent vs. 0.3 percent for subsequent CABG and 27.3 percent vs. 4.6 percent for subsequent PCI)

The NEW ENGLAND JOURNAL of MEDICINE

EL. Hannan et Al 2005;352:2174-83

Five-year outcomes of percutaneous coronary intervention compared to bypass surgery in patients with multivessel disease involving the proximal left anterior descending artery: an ARTS-II sub-study



S Garg et Al EuroIntervention 2011;6:**1060-1067**

Process for decision making and patient information

Potential indications for ad hoc percutaneous coronary intervention vs. revascularization at an interval

***Ad hoc* PCI**
Haemodynamically unstable patients (including cardiogenic shock).
Culprit lesion in STEMI and NSTE-ACS.
Stable low-risk patients with single or double vessel disease (proximal LAD excluded) and favourable morphology (RCA, non-ostial LCx, mid- or distal LAD).
Non-recurrent restenotic lesions.
Revascularization at an interval
Lesions with high-risk morphology.
Chronic heart failure.
Renal failure (creatinine clearance <60 mL/min), if total contrast volume required >4 mL/kg.
Stable patients with MVD including LAD involvement.
Stable patients with ostial or complex proximal LAD lesion.
Any clinical or angiographic evidence of higher periprocedural risk with *ad hoc* PCI.

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Multidisciplinary decision pathways, patient informed consent, and timing of intervention

		ACS			Stable MVD	Stable with indication for *ad hoc* PCI[a]
	Shock	**STEMI**	**NSTE - ACS[b]**	**Other ACS[c]**		
Multidisciplinary decision making	Not mandatory.	Not mandatory.	Not required for culprit lesion but required for non-culprit vessel(s).	Required.	Required.	According to predefined protocols.
Informed consent	Oral witnessed informed consent or family consent if possible without delay.	Oral witnessed informed consent may be sufficient unless written consent is legally required.	Written informed consent[e] (if time permits).	Written informed consent[e]	Written informed consent[e]	Written informed consent[e]
Time to revascularization	Emergency: no delay.	Emergency: no delay.	Urgency: within 24 h if possible and no later than 72 h.	Urgency: time constraints apply.	Elective: no time constraints.	Elective: no time constraints.
Procedure	Proceed with intervention based on best evidence/ availability.	Proceed with intervention based on best evidence/ availability.	Proceed with intervention based on best evidence/ availability. Non-culprit lesions treated according to institutional protocol.	Proceed with intervention based on best evidence/ availability. Non-culprit lesions treated according to institutional protocol.	Plan most appropriate intervention allowing enough time from diagnostic catheterization to intervention.	Proceed with intervention according to institutional protocol defined by local Heart Team.

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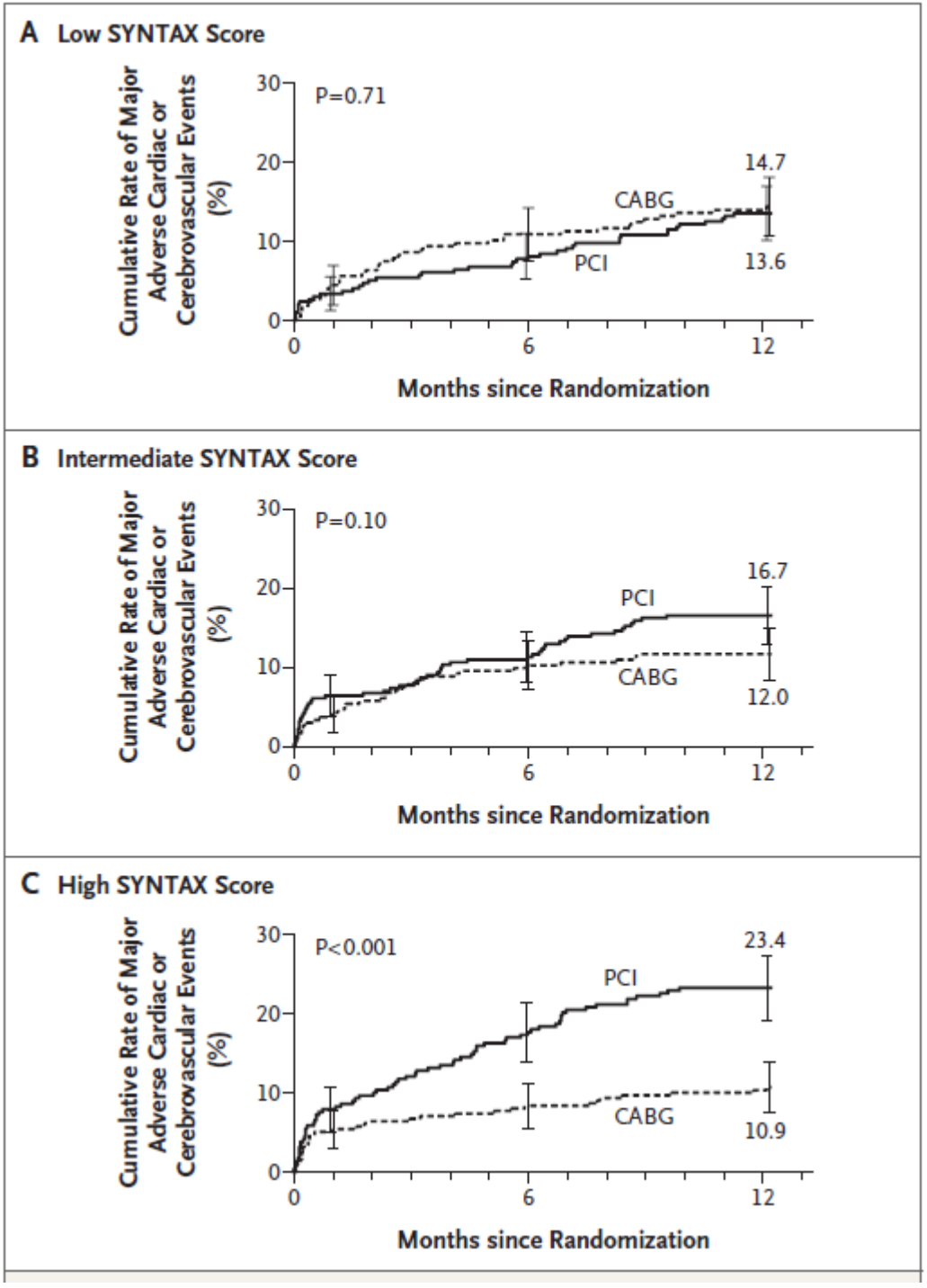
The NEW ENGLAND JOURNAL of MEDICINE

Percutaneous Coronary Intervention versus Coronary-Artery Bypass Grafting for Severe Coronary Artery Disease

Serruys PW et Al. 2009; 360: 961-972.

classifications aiming to grade the coronary anatomy with respect to the number of lesions and their functional impact, location, and complexity

www. SYNTAX score.com



Monovasali

- L’ angioplastica coronarica con impianto di DES di seconda generazione (ristenosi molto bassa) è la prima carta da giocare in pz con malattia dell’IVA prossimale non complessa e non ostiale.
- Nei pazienti a basso rischio operatorio Il BPAC con AMI e minitoracotomia rappresenta la soluzione ottimale in caso di malattia ostiale o lesioni prossimali complesse.

Multivasali

- La rivascolarizzazione della discendente anteriore va personalizzata in caso di malattia multivasale.
- Il rapporto rischio-beneficio di CABG/PCI si calcola con parametri clinici(Euroscore, ACEF), anatomici (Sintax score) o combinati(GRC,CSS) e

dopo adeguata informazione del paziente

- Bisogna tener conto della sua volontà.

Key Points

- Chronic CAD often coexists with other disease states due to its prevalence, and its presentation and diagnosis may further be confounded by comorbid conditions and aging physiology (e.g, lung disease, reduced mobility, abnormal ECGs, and mental status changes).
- While we have less trial evidence on the efficacy of therapies in the very elderly, data that do exist support the same guideline-based secondary prevention for CHD in high-risk older adults as in younger adults.
- Revascularization for chronic CAD should be considered for those at high risk based on non-invasive testing or with continued anginal symptoms despite medication
- While procedural risks rise with age, both percutaneous and surgical revascularization can be pursued in older adults with consideration of the individual benefit and risk.

Conclusioni

Uomini liberi, colti e pensanti sono la migliore garanzia per il paziente