

Il cuore del paziente diabetico

Pasquale Caldarola

Cardiologia - UTIC

Osp. Santa Paola - ASL Bari

Diapositiva preparata da PASQUALE CALDAROLA e ceduta alla Società Italiana di Diabetologia.
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Bari 27 Settembre 2017

CUORE e GLP-1:
dalla teoria
alla pratica

BARI the nicolaus hotel
27 settembre 2017

Cardiovascular disease and diabetes

VBWG

~65% of deaths are
due to CV disease

Coronary heart
disease deaths
↑2- to 4-fold

Cardiovascular
complications
of T2DM

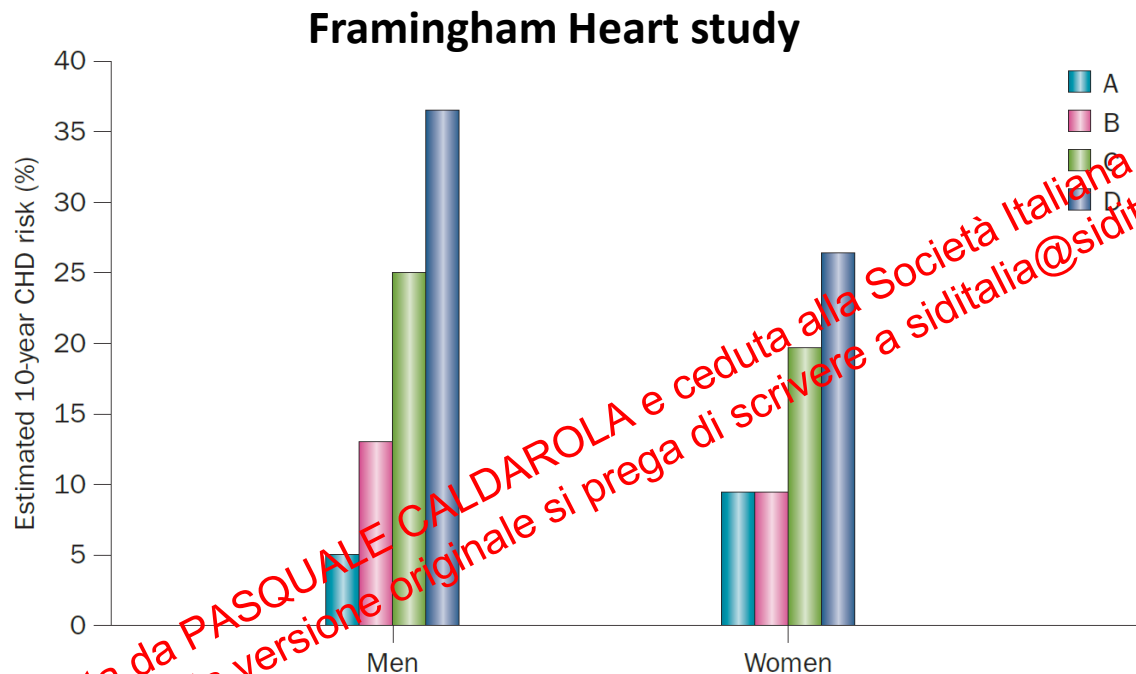
Stroke risk
↑2- to 4-fold

Heart failure
↑2- to 5-fold

T2DM = type 2 diabetes mellitus

Bell DSH. *Diabetes Care*. 2003;26:2433-41.
Centers for Disease Control (CDC). www.cdc.gov.

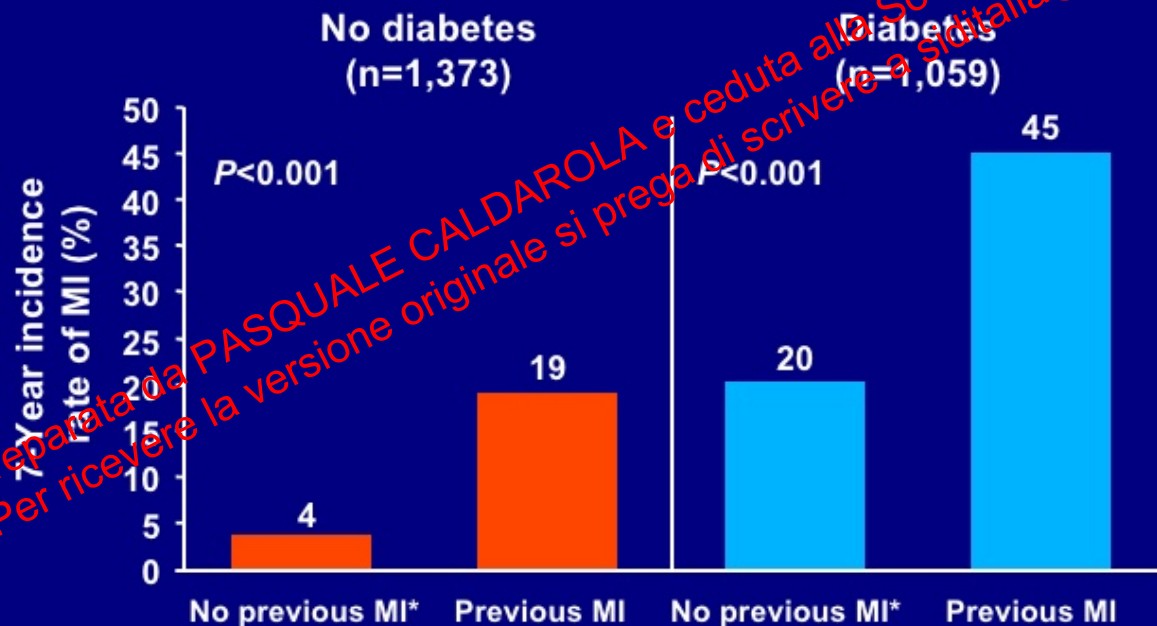
Diabete e coronaropatia



	A	B	C	D
Blood pressure (mmHg)	120/80	140/90	140/90	140/90
Total-cholesterol level (mg/dl)	200	240	240	240
HDL-cholesterol level (mg/dl)	50	50	40	40
Diabetes mellitus	No	No	Yes	Yes
Cigarette smoking	No	No	No	Yes



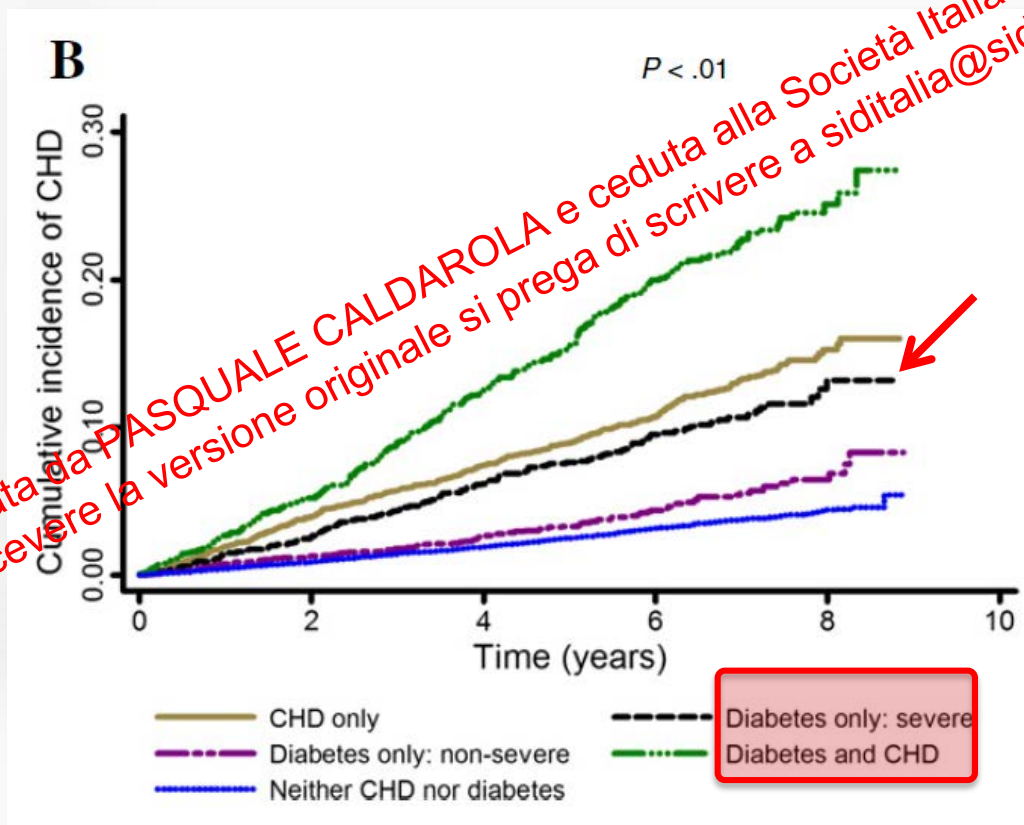
Seven-Year Incidence of Fatal/Nonfatal MI in Finland



*No previous myocardial infarction (MI) at baseline.

Haffner SM et al. *N Engl J Med.* 1998;339:229-234.

Diabetes, diabetes severity, and coronary heart disease risk equivalence: REasons for Geographic and Racial Differences in Stroke (REGARDS)



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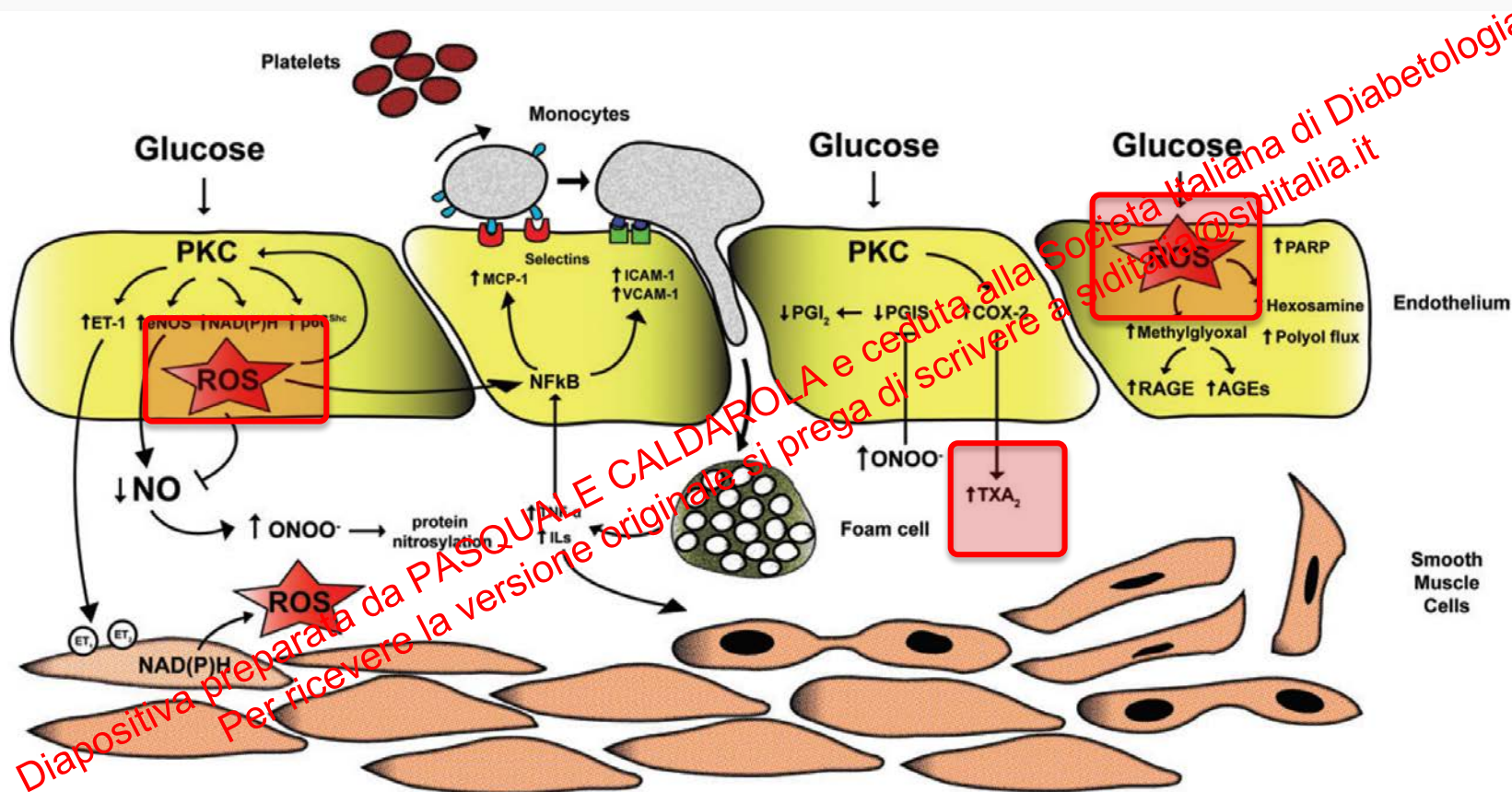
Published in final edited form as:

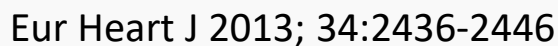
Am Heart J. 2014 October ; 168(4): 466–470.e1. doi:10.1016/j.ahj.2014.06.023.

Prevalence of Glucose Abnormalities Among Patients Presenting with an Acute Myocardial Infarction

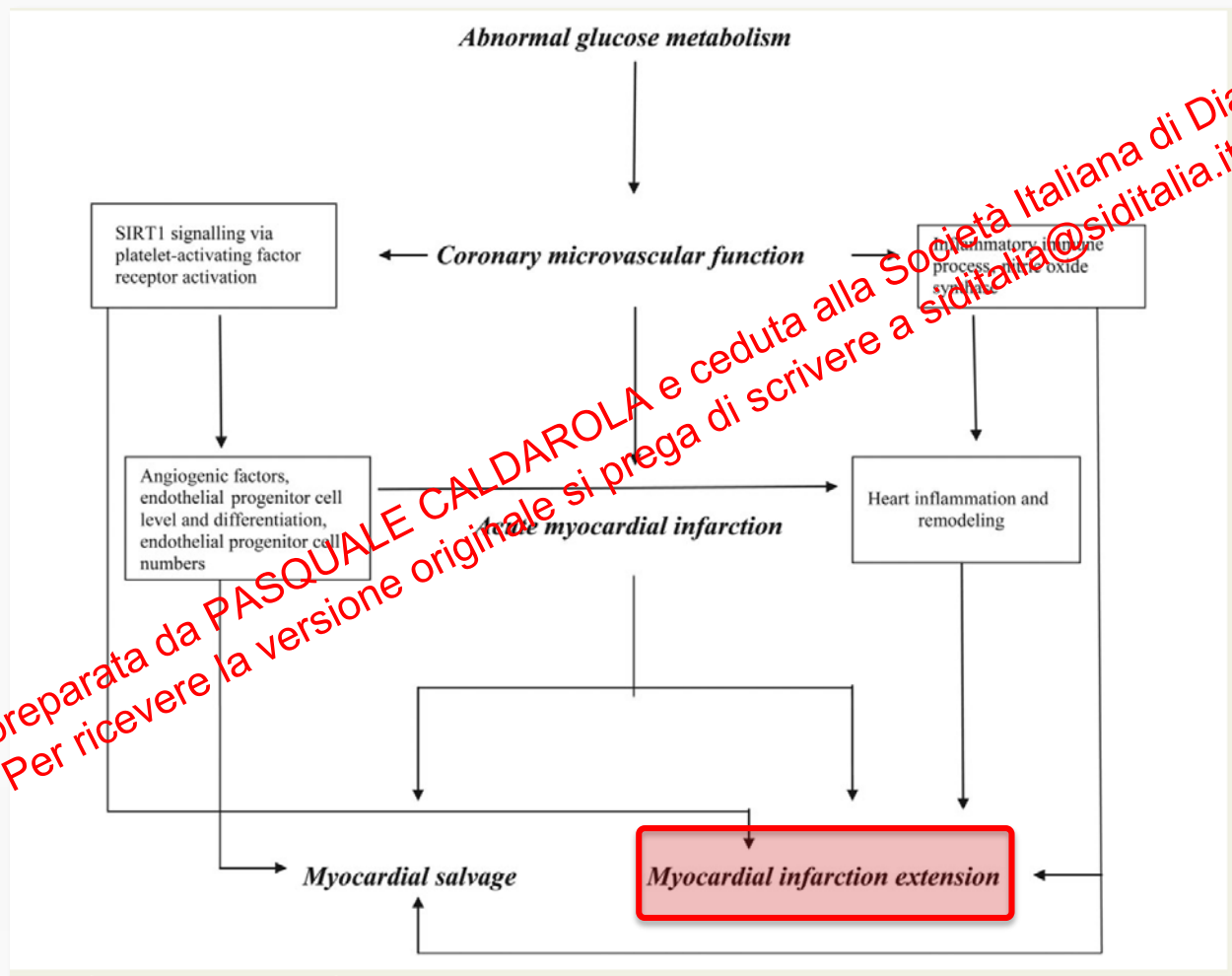
Suzanne V. Arnold, MD MHA^{*,†}, Kasia J. Lipska, MD[‡], Yan Li, PhD[§], Darren K. McGuire, MD MHSC[§], Abhinav Goyal, MD MHS[¶], John A. Spertus, MD MPH^{††}, and Mikhail Kosiborod, MD^{*,†}

Conclusions—In a large U.S. AMI registry, we found that nearly 7 in 10 patients had dysglycemia, with 38% having diabetes and an additional 31% with pre-diabetes based on HbA1c levels. Over half of the patients who did not have a known diagnosis of diabetes at the time of admission had either newly diagnosed diabetes or pre-diabetes. Progressively greater severity of dysglycemia was also associated with incremental increase in long-term mortality. These data highlight the AMI hospitalization as a key opportunity to screen for glucose abnormalities, so that appropriate interventions and patient education efforts can be implemented prior to discharge.



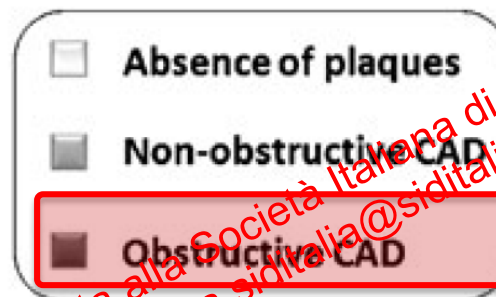
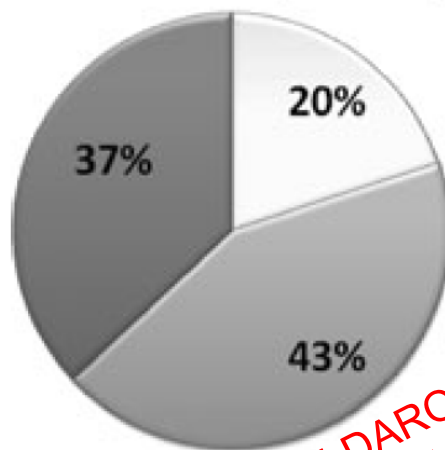


Maggior estensione di area infartuata

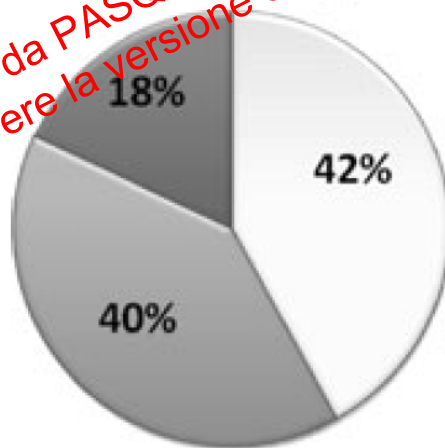


Peggior quadro coronarografico

Diabetics (n=147)

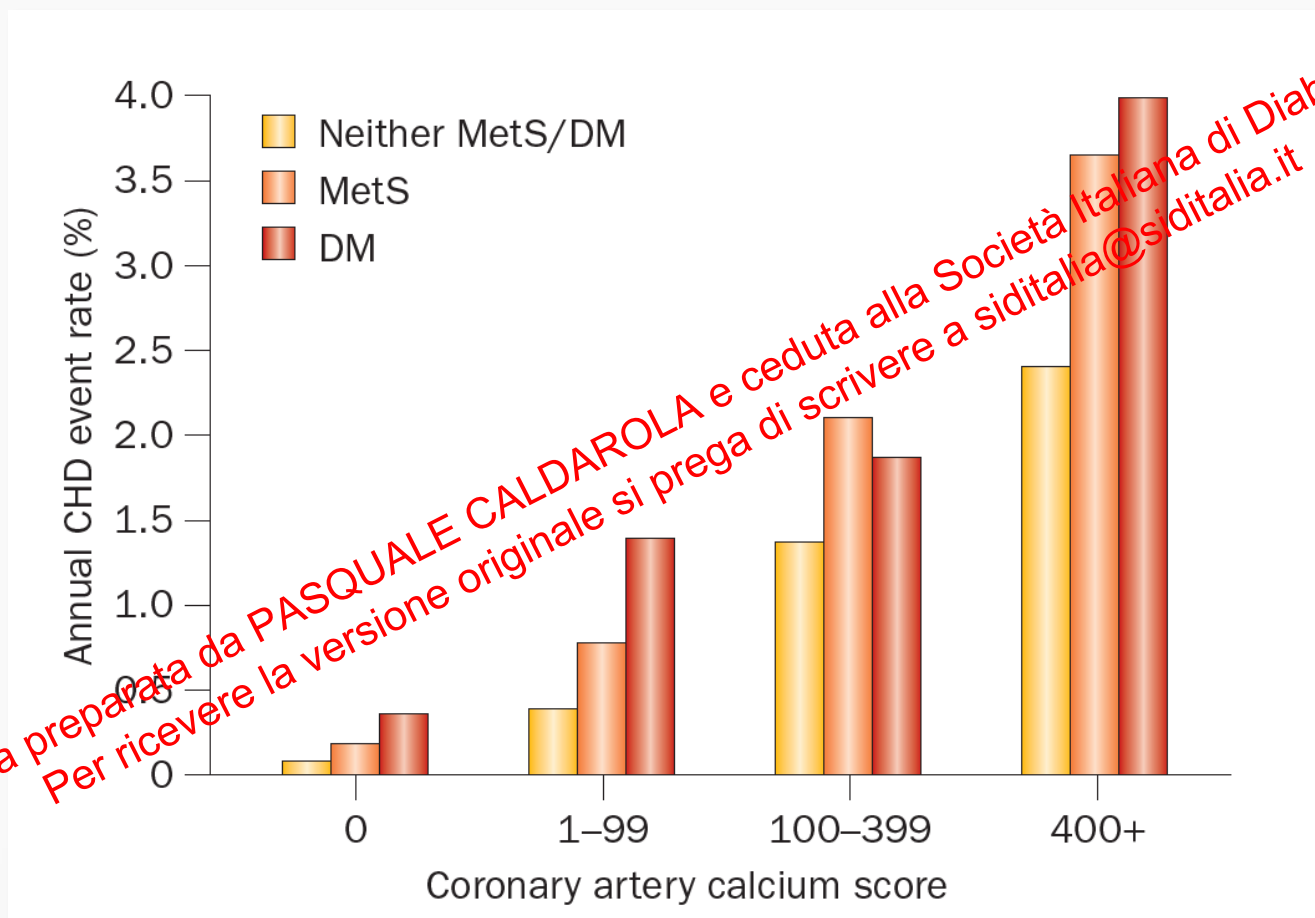


Nondiabetics (n=979)

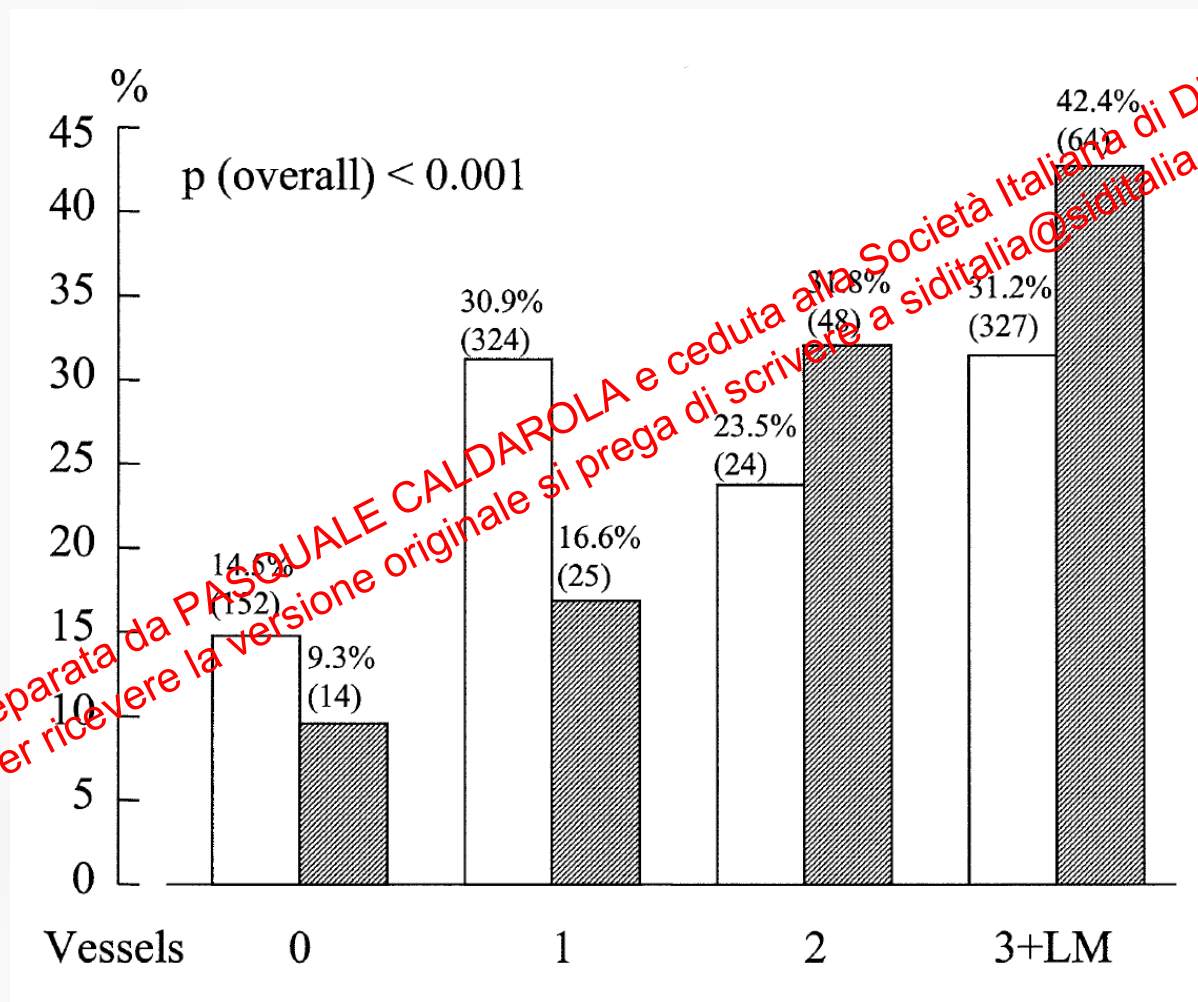


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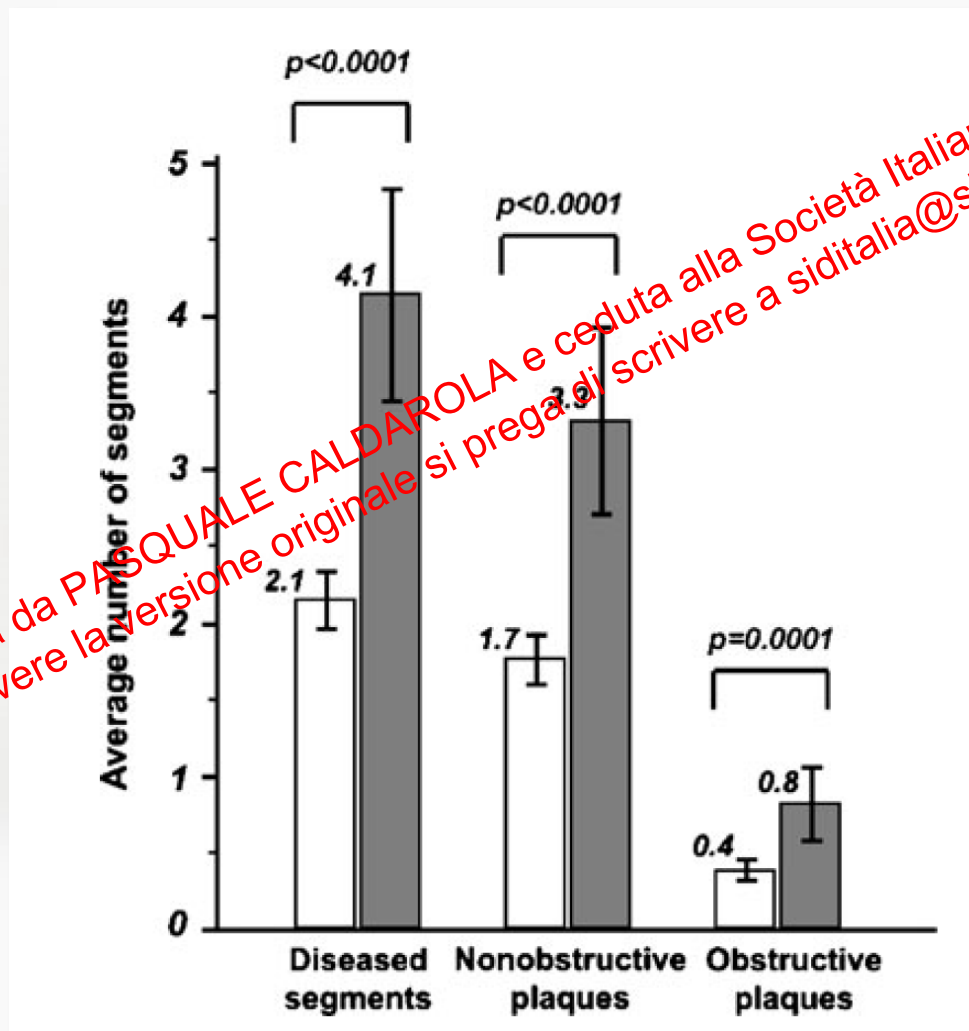
Peggior quadro coronarografico



Peggior quadro coronarografico



Peggior quadro coronarografico



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Diabete e coronaropatia

- **Coronaropatia accelerata e diffusa**
- **Stenosi coronariche più lunghe**
- **Diametro dei vasi più piccolo**
- **Calcificazioni**
- **Circoli collaterali ridotti**
- **Elevata trombogenicità**
- **Aumentata incidenza di restenosi dopo PCI**

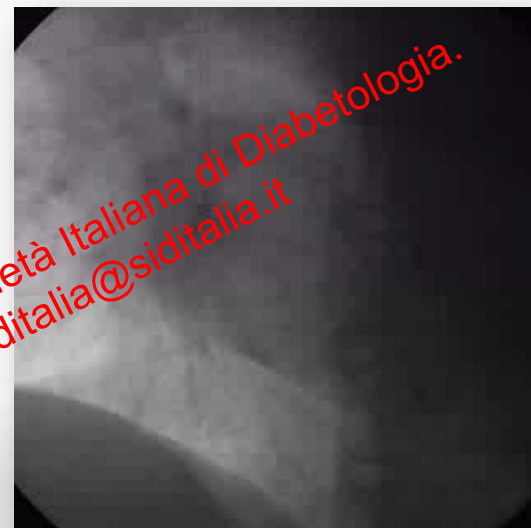
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Peggior quadro coronarografico



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Peggior quadro coronarografico

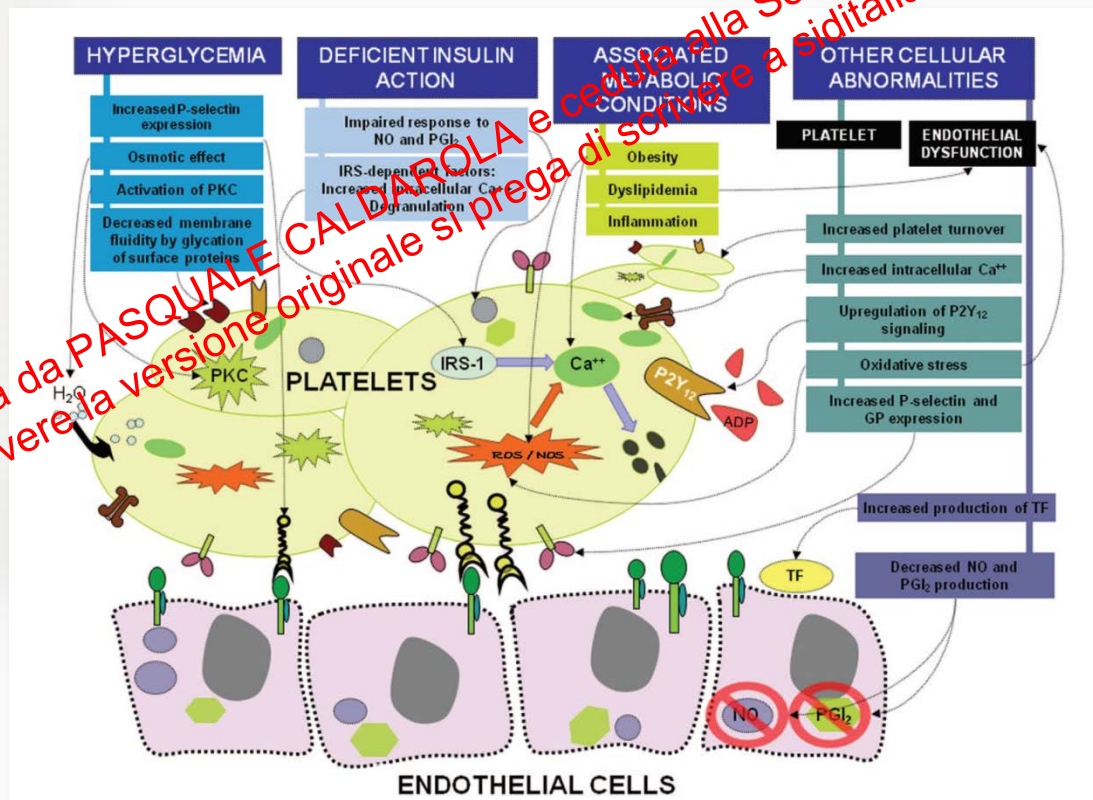


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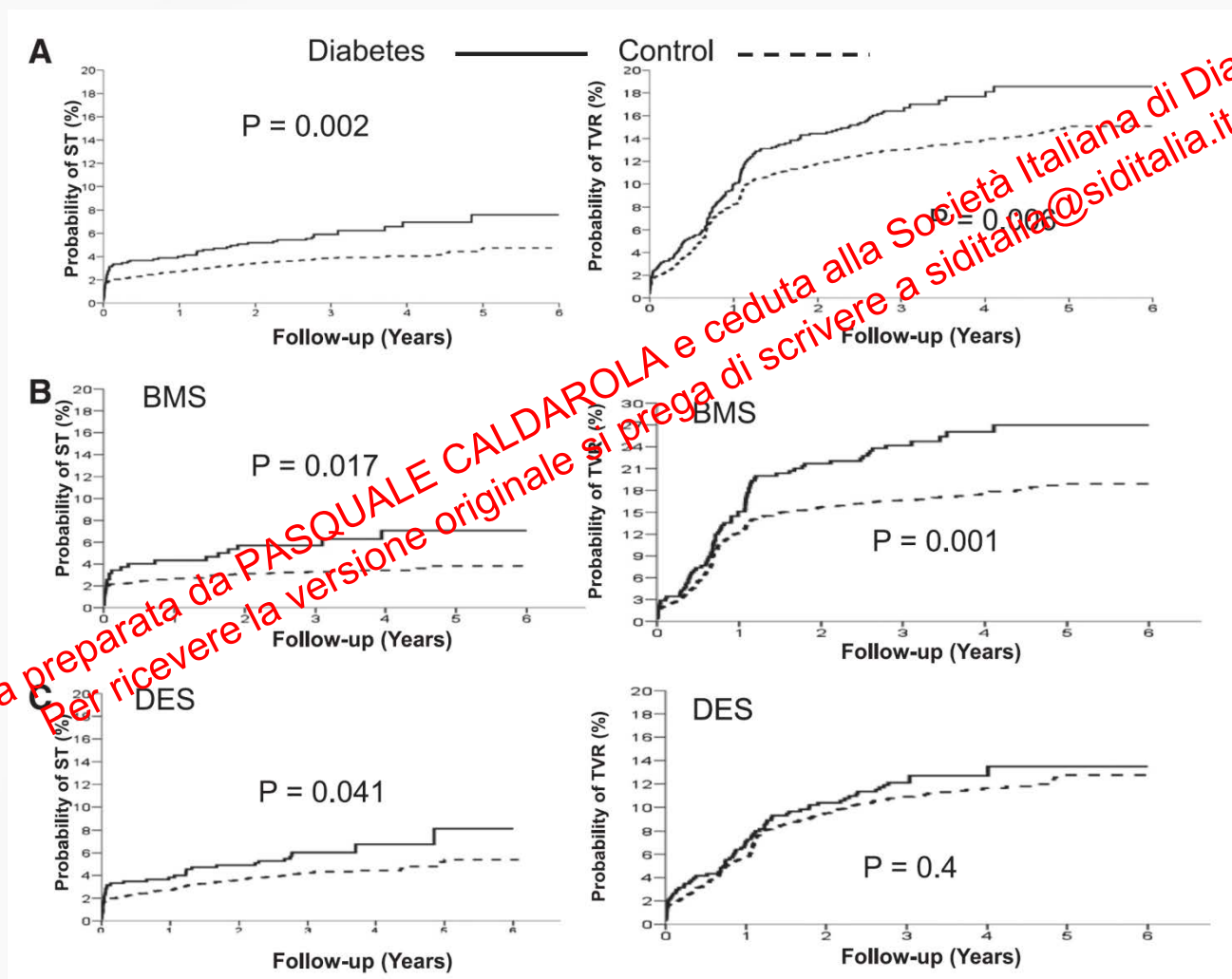
Diabetes and Cardiovascular Disease

Diabetes and Antiplatelet Therapy in Acute Coronary Syndrome

José Luis Ferreiro, MD; Dominick J. Angiolillo, MD, PhD

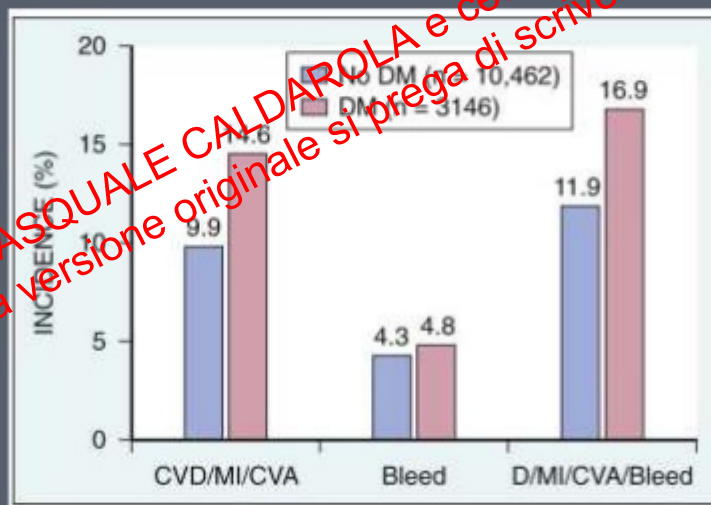


Più elevata frequenza di stent trombosi



Diabete aumentato rischio di sanguinamenti

- Diabetes is associated with an increased risk for MI; and across the spectrum of acute coronary syndrome (ACS) events, in which diabetes may affect more than one in three patients, patients with diabetes have worse CVD outcomes after ACS events



TRITON-TIMI 38 randomized trial.

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CRUSADE score of in-Hospital major bleeding

Predictor	Score
Baseline haematocrit, %	
< 31	9
31-33.9	7
34-36.9	3
37-39.9	2
≥ 40	0
Creatinine clearance, mL/min	
≤ 15	39
> 15-30	35
> 30-60	28
> 60-90	17
> 90-120	10
> 120	0

Predictor	Score
Heart rate (b.p.m.)	
≤ 70	0
71-80	1
81-90	3
91-100	5
101-110	8
111-120	10
≥ 121	11
Sex	
Male	0
Female	8
Signs of CHF at presentation	
No	0
Yes	7

Predictor	Score
Prior vascular disease	
No	0
Yes	6
Diabetes mellitus	
No	0
Yes	6
Systolic blood pressure, mmHg	
≤ 90	10
91-100	8
101-120	5
121-180	1
181-200	3
≥ 201	5

www.crusadebleedingscore.org

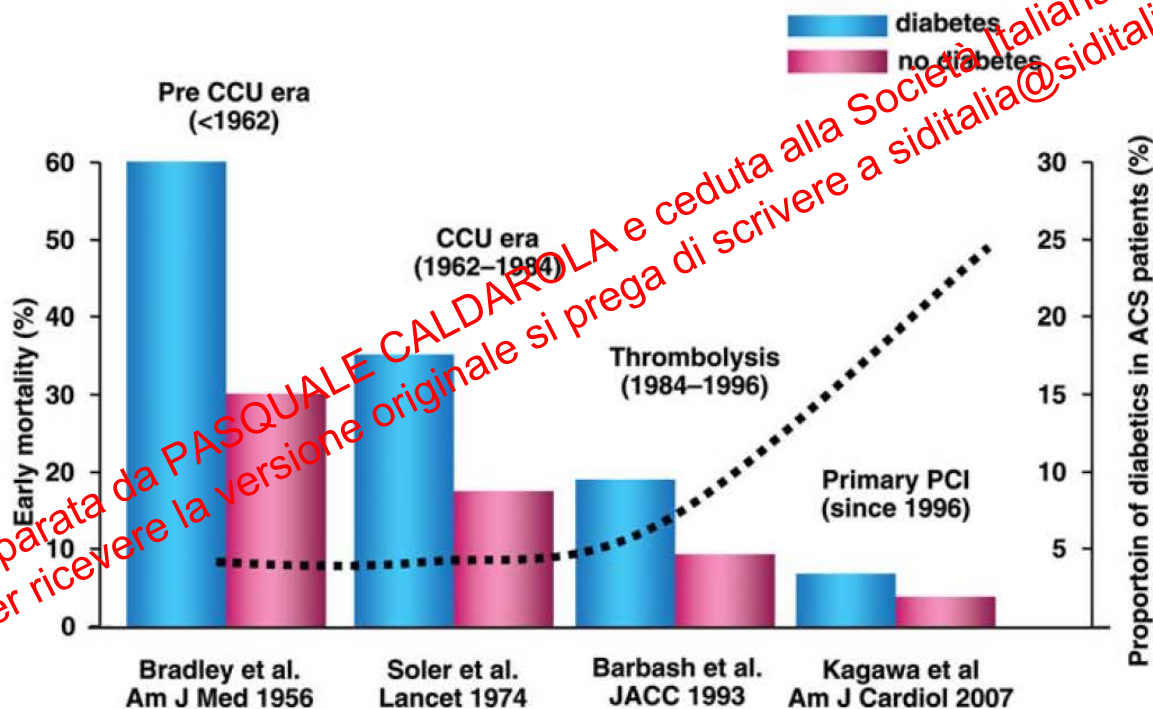
www.escardio.org/guidelines

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

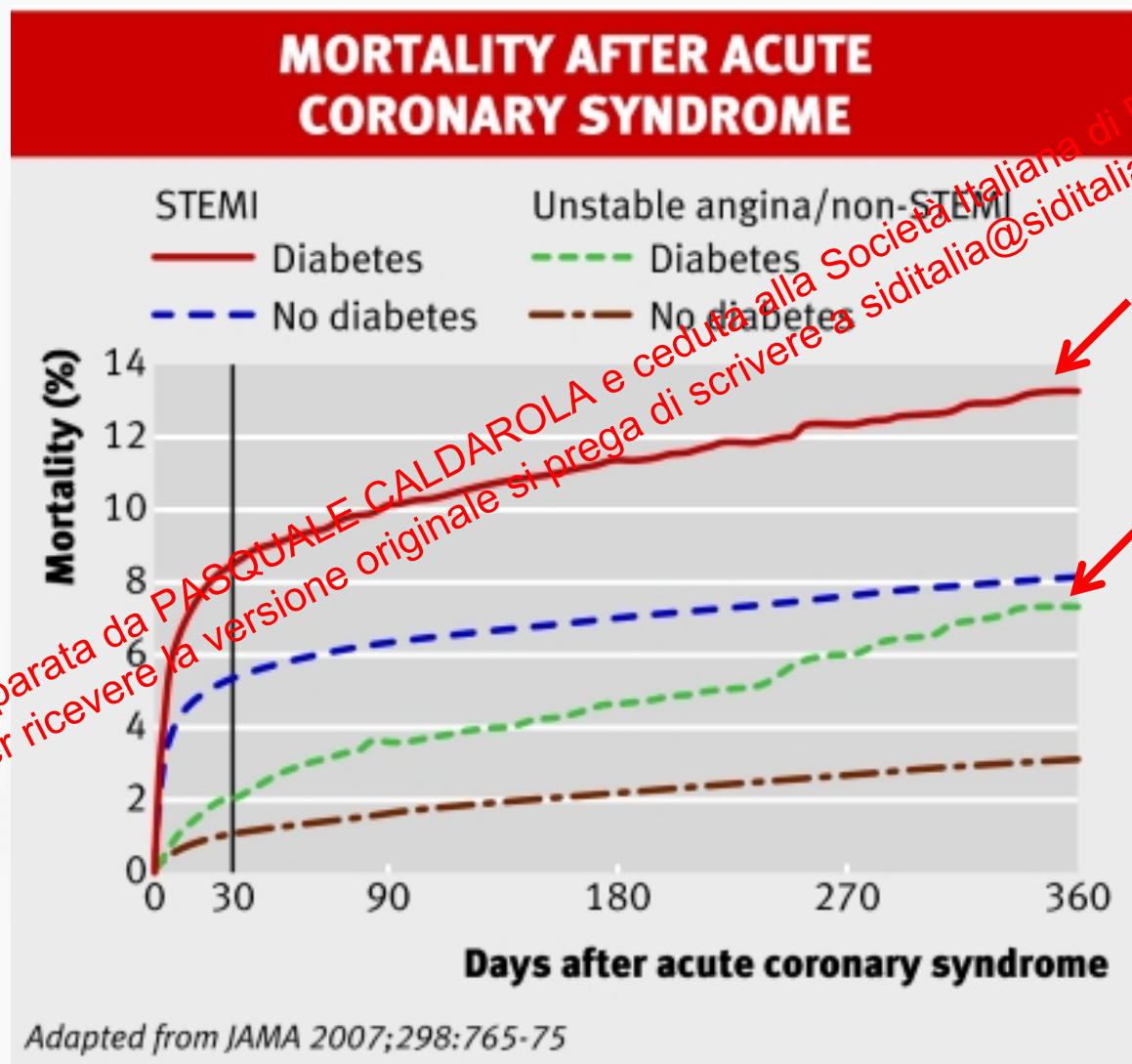


Diabete aumentata mortalità a breve termine

Early mortality of diabetic and non-diabetic patients with acute myocardial infarction: Historical perspective

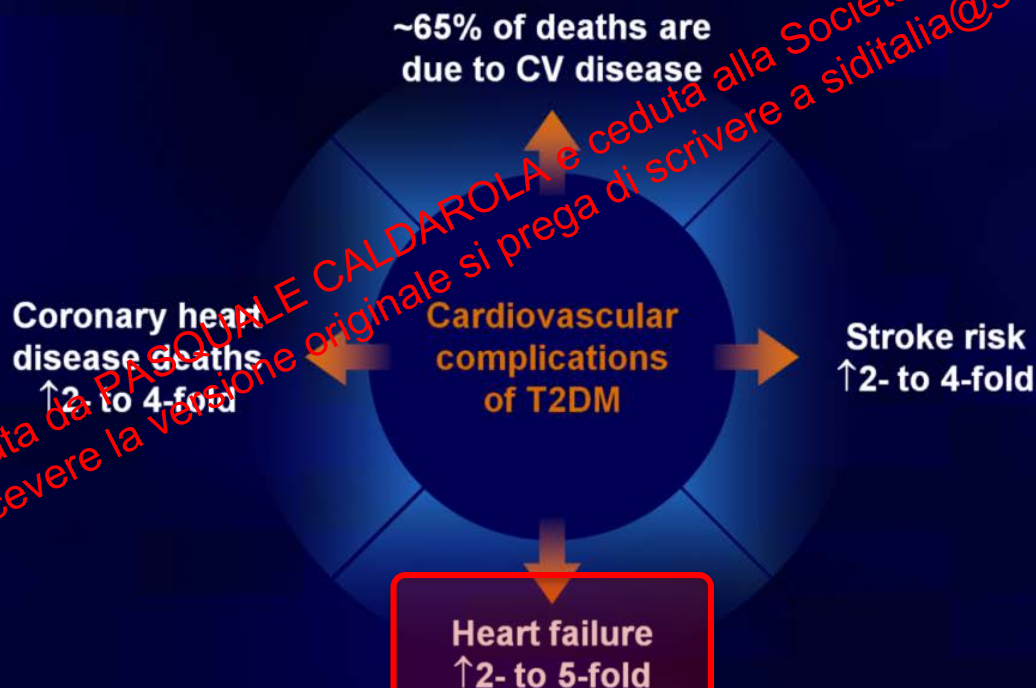


Diabete aumentato rischio di mortalità a lungo termine



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Cardiovascular disease and diabetes

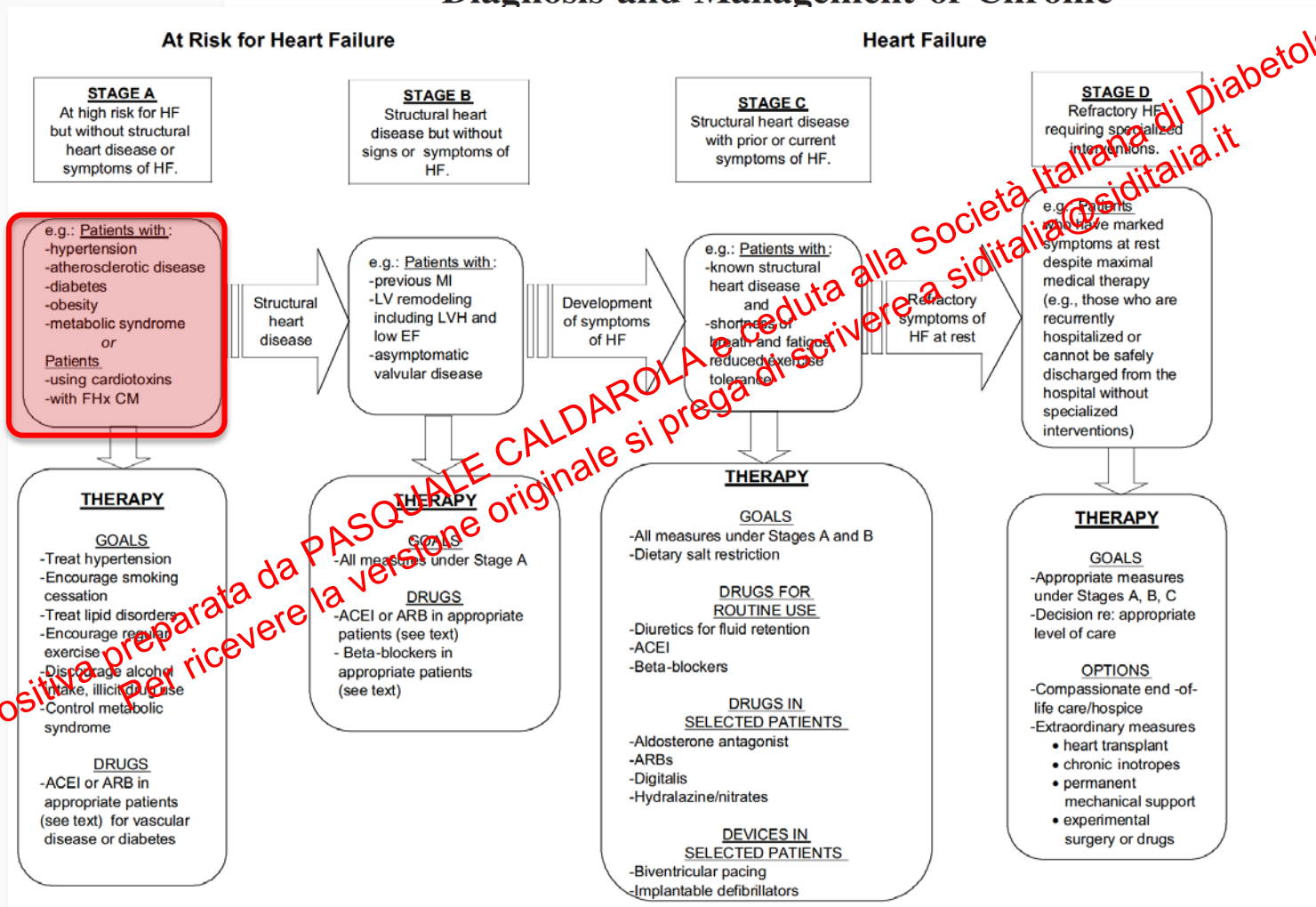


T2DM = type 2 diabetes mellitus

Bell DSH. *Diabetes Care*. 2003;26:2433-41.
Centers for Disease Control (CDC). www.cdc.gov.

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ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic



EuroHeart Failure Survey II (EHFS II): a survey on hospitalized acute heart failure patients: description of population

Table 2 Baseline characteristics and precipitating factors by clinical classification of EHFS II patients

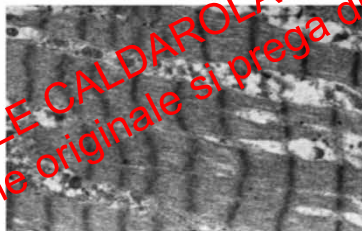
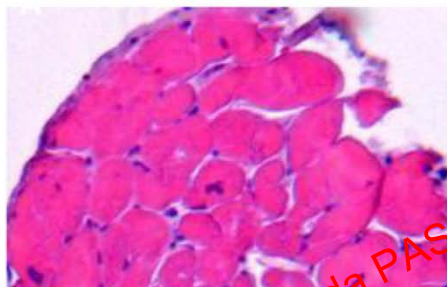
Characteristics	Total	Decomp. HF	Pulmonary oedema	Cardiogenic shock	Hypert. HF	Right HF
No. of patients (% of total)	3580	2340 (65.0)	581 (16.2)	139 (3.9)	407 (11.4)	113 (3.2)
Age (years), mean (SD)	69.9 (12.9)	69.7 (12.8)	71.2 (11.5)	67.3 (12.7)	69.8 (11.2)	69.6 (13.4)
Age, IQR	62.6–78.7	62.3–78.7	64.6–79.7	59.5–77.2	61.9–78.4	63.0–79.5
Male (%)	61.3	62.1	59.4	67.6	60.4	50.4
Body mass index (kg/m ²)	26.6	26.5	26.9	26.4	28.0	26.6
New-onset AHF (%)	37.1	29.7	59.6	64.7	37.3	39.8
Hospitalization for HF within last 12 months (%)	44.5	48.0	33.7	29.3	45.1	46.4
Underlying diseases (%)						
CHD	53.6	54.0	54.9	52.5	53.8	38.1
Hypertension	62.5	56.0	70.1	54.0	94.6	52.2
Diabetes mellitus	32.8	30.9	39.4	34.3	34.5	29.2
Atrial fibrillation/flutter	38.7	41.3	28.1	24.6	37.7	38.4
Previous stroke or TIA	13.3	12.4	15.7	11.8	16.0	13.3
Valvular disease	34.4	37.5	26.2	18.0	31.7	43.8
Renal failure	16.8	16.6	15.8	18.1	18.7	17.7
Anaemia	14.7	15.0	15.7	14.4	11.3	16.8
Chronic obstructive pulmonary disease	19.3	19.2	19.3	18.1	18.0	27.4
Pacemaker implanted	9.1	10.6	5.9	10.8	4.9	8.8
Dilated cardiomyopathy	19.3	21.8	11.4	10.2	20.2	15.9

Clinical update

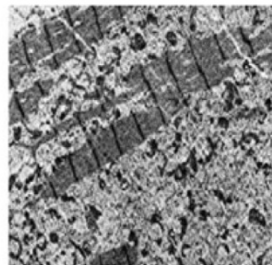
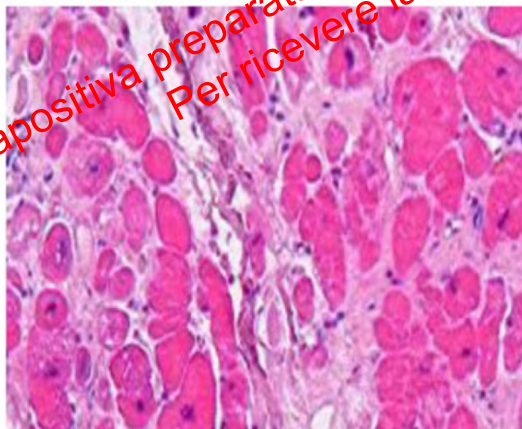
Clinical diabetic cardiomyopathy: a two-faced disease with restrictive and dilated phenotypes

Petar M. Seferović¹ and Walter J. Paulus^{2*}

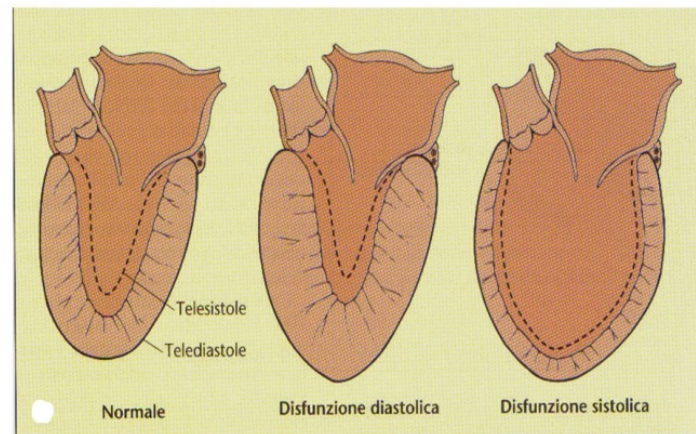
Restrictive/HFPEF phenotype



Dilated/HFREF phenotype



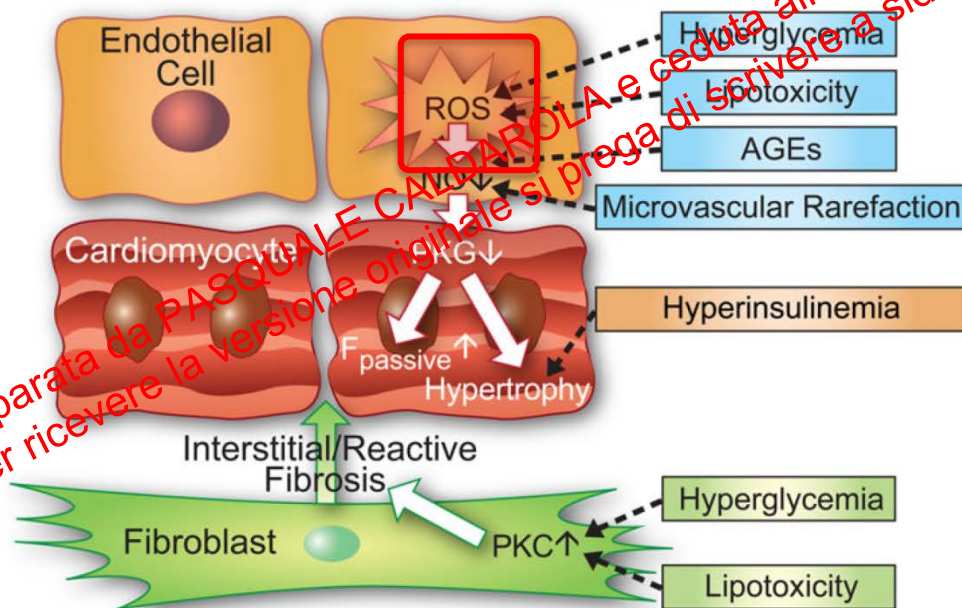
Disfunzione sistolica: cardiopatia ischemica, C. ipertensiva, cardiomiopatia dilatativa, alcuni tipi di cardiopatia valvolare.
Disfunzione diastolica: cardiopatia ipertensiva, cardiomiopatie restrittive.



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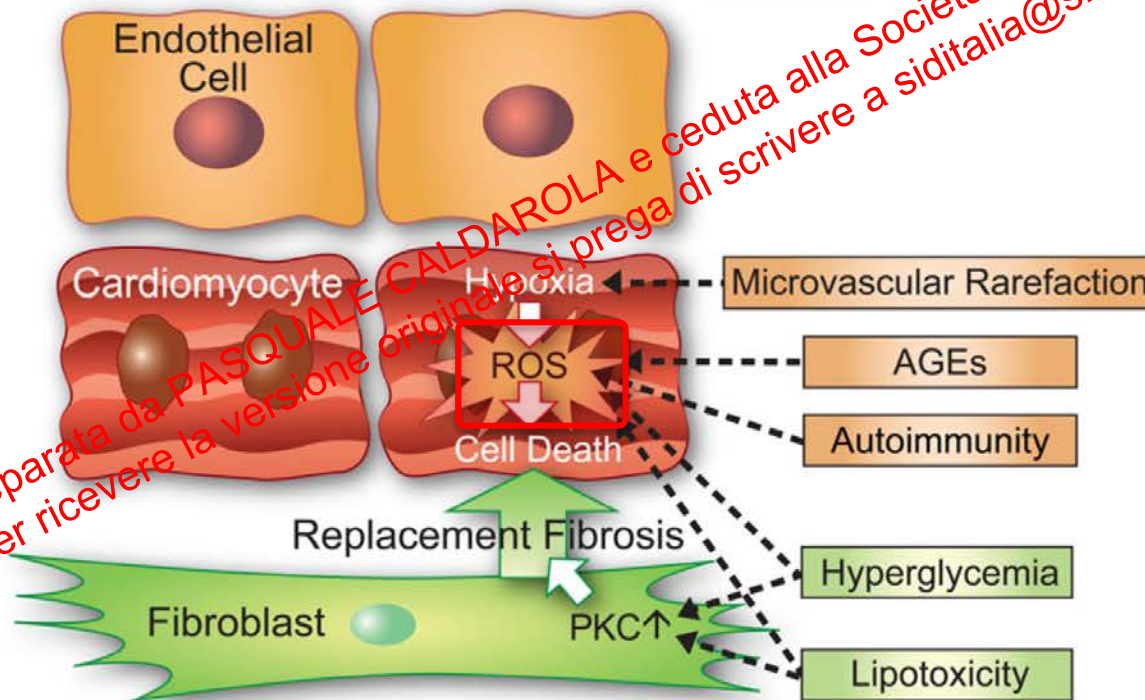
Patogenesi della cardiomiopatia diabetica

Clinical DMCMP with Restrictive/HFPEF Phenotype



Patogenesi della cardiomiopatia diabetica

Clinical DMCMP with Dilated/HFREF Phenotype



Fontes-Carvalho et al. *Cardiovascular Diabetology* (2015) 14:4
DOI 10.1186/s12933-014-0168-x



ORIGINAL INVESTIGATION

Open Access

Diastolic dysfunction in the diabetic *continuum*: association with insulin resistance, metabolic

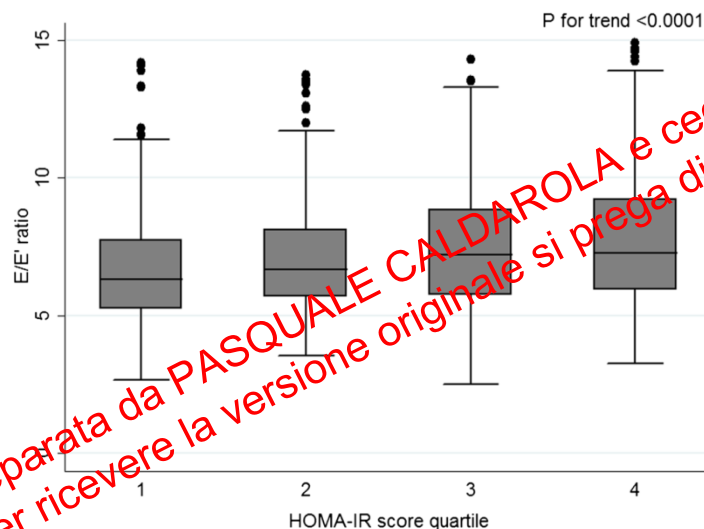


Figure 1 E/E' ratio according to insulin resistance quartiles.

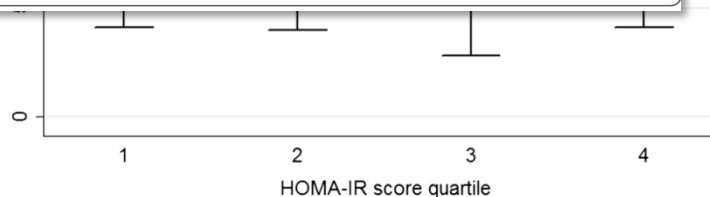
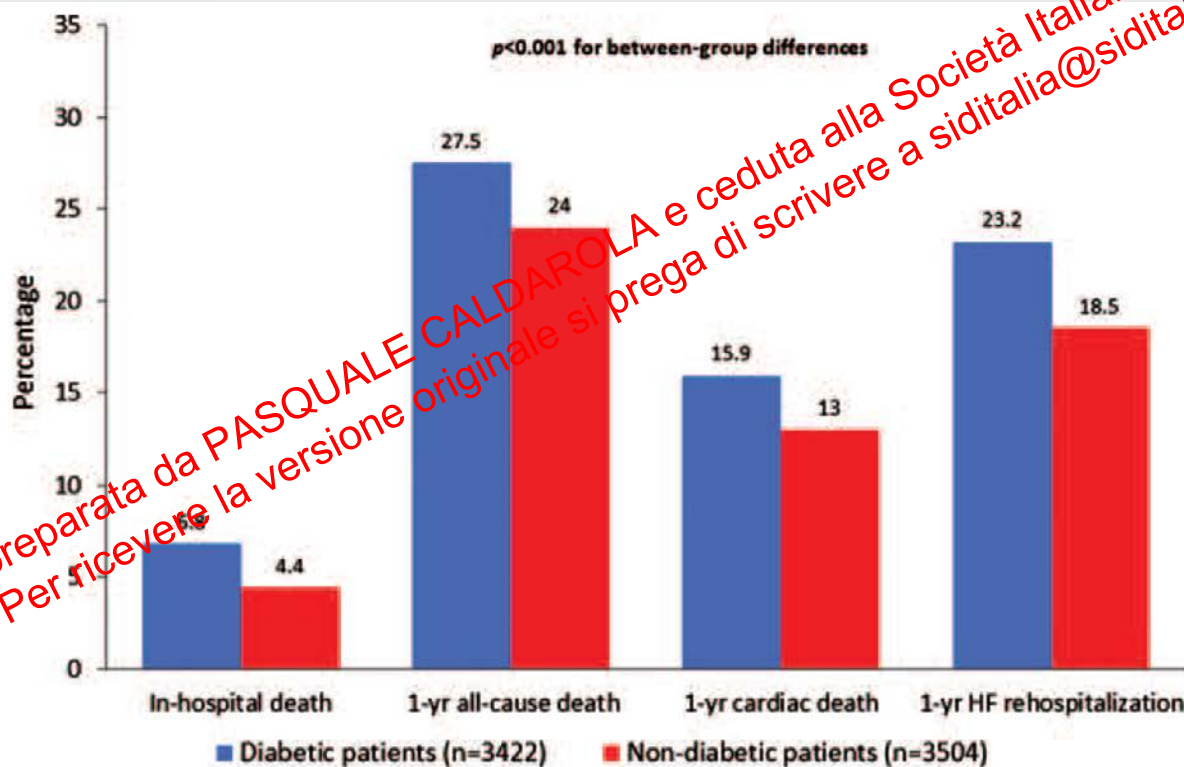


Figure 1 E' velocity according to insulin resistance quartiles.

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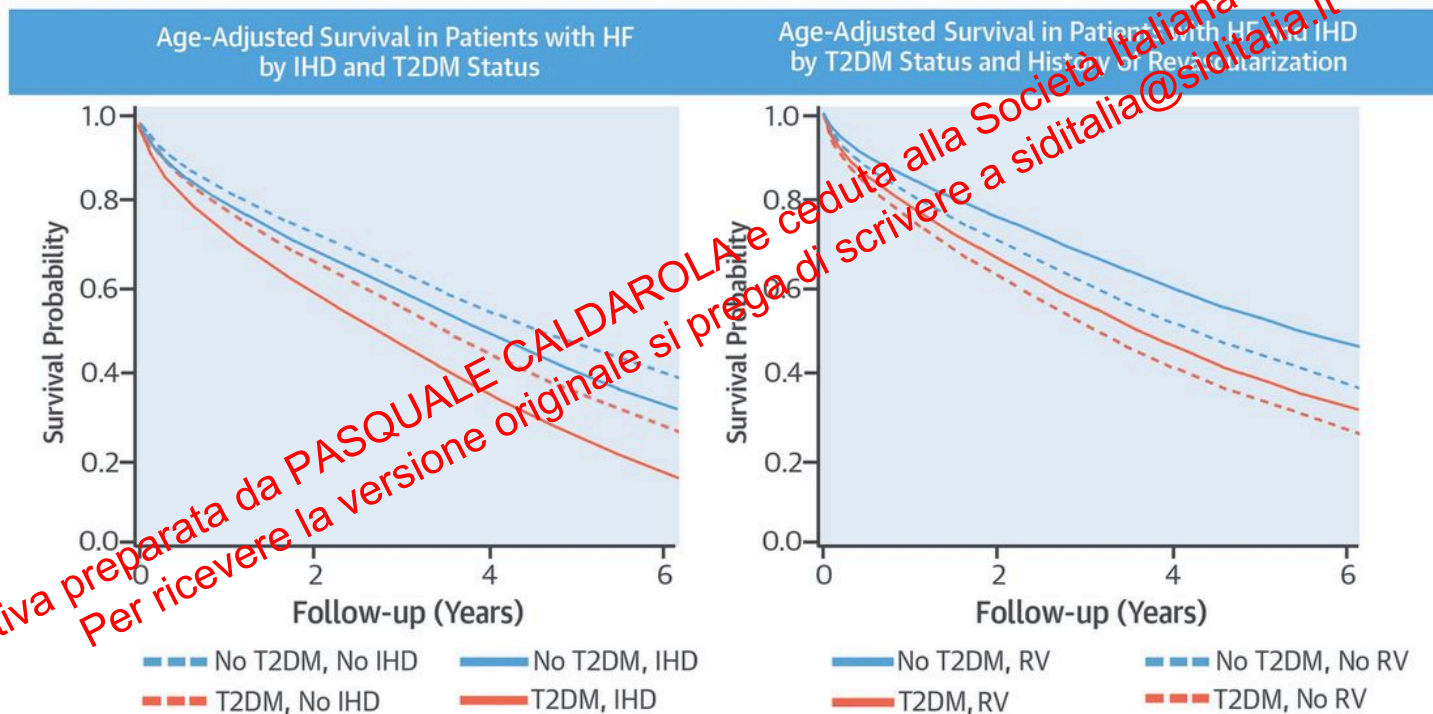
Peggior prognosi nei pz con AHF e diabete

ESC Heart Failure long term Registry



Peggior prognosi nei pz con HF e diabete

CENTRAL ILLUSTRATION: Prognostic Implications of T2DM in IHD and Nonischemic HF and the Role of Previous Revascularization



Johansson, I. et al. J Am Coll Cardiol. 2016;68(13):1404-16.

2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC)

To do and not to do messages from the Guidelines (continued)

Not-recommended treatments or co-morbidities in patients with heart failure	Class ^a	Level ^b
Adaptive servo-ventilation is not recommended in patients with HFrEF and a predominant central sleep apnoea because of an increased all-cause and cardiovascular mortality.	III	B
Thiazolidinediones (glitazones) are not recommended in patients with HF, as they increase the risk of HF worsening and HF hospitalization.	III	A
NSAIDs or COX-2 inhibitors are not recommended in patients with HF, as they increase the risk of HF worsening and HF hospitalization.	III	B

Diabetes treatments and risk of heart failure, cardiovascular disease, and all cause mortality: cohort study in primary care

Julia Hippisley-Cox, Carol Coupland

BMJ 2016; 354:i3477

DESIGN

Open cohort study.

SETTING

1243 general practices contributing data to the QResearch database in England.

PARTICIPANTS

469 688 people with type 2 diabetes aged 25-84 years between 1 April 2007 and 31 January 2015.

CONCLUSIONS

There are clinically important differences in risk of cardiovascular disease, heart failure, and all cause mortality between different diabetes drugs alone and

in combination. Overall, use of gliptins or glitazones was associated with decreased risks of heart failure, cardiovascular disease, and all cause mortality compared with non-use of these drugs. These results,

which do not account for levels of adherence or dosage information and which are subject to confounding by indication, might have implications for prescribing of diabetes drugs.

Cardiovascular disease and diabetes

VBWG

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Coronary heart
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↑2- to 4-fold

Cardiovascular
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Stroke risk
↑2- to 4-fold

Heart failure
↑2- to 5-fold

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Fibrillazione atriale diabete

Tabella 1. Tabella degli studi che hanno riportato una correlazione tra diabete mellito e fibrillazione atriale.

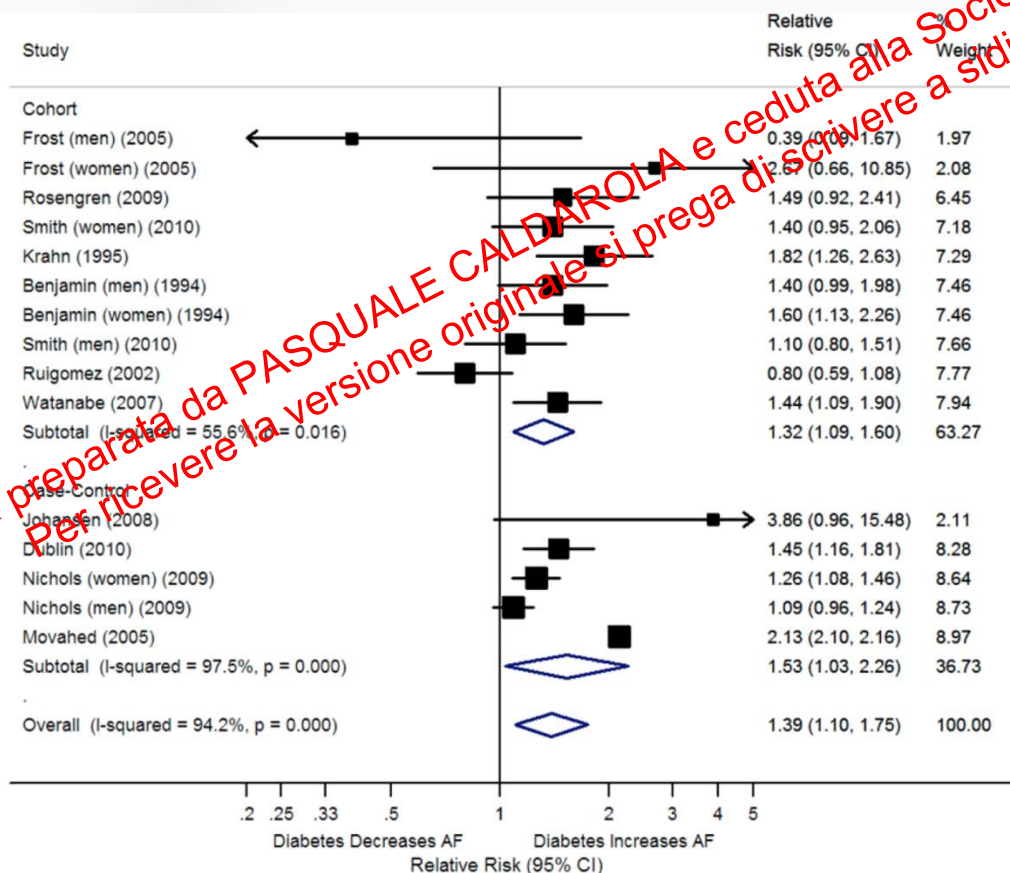
Autore	Anno	Acronimo	Nazione	Tipo di studio	Follow-up (anni)	Popolazione	Risultati
Benjamin et al. ⁷	1994	Framingham Heart Study	USA	Coorte	38	4731	Uomini OR 1.4 (1.0-2.0) Donne OR 1.6 (1.1-2.2)
Krahn et al. ⁸	1994	MFUS	Canada	Coorte	44	3983	RR 1.8 (1.26-2.64)
Psaty et al. ⁹	1997		USA	Coorte	3.2	5201	NS
Barriales Alvarez et al. ¹⁰	1999		Spagna	Caso-controllo	1		OR 1.9
Wilhelmsen et al. ¹¹	2001		Svezia	Coorte	25.2	7495	NS
Agmon et al. ¹²	2001	SPARC Study	USA	Caso-controllo		581	NS
Ruigomez et al. ¹³	2002	GPRED-UK	UK	Caso-controllo		6035	NS
Stewart et al. ¹⁴	2002	Renfrew/Paisley Study	UK	Coorte	20	15 046	Uomini p=0.78 Donne p=0.001
Östgren et al. ¹⁵	2004		Svezia	Cross-sectional			OR 2 (0.9-4.7)
Movahed et al. ¹⁶	2005		USA	Caso-controllo		293 124	OR 2.13 (2.10-2.16)
Frostet et al. ¹⁷	2005	Danish Diet, Case-control Study	Danimarca	Coorte	8	47 589	Uomini OR 0.39 (0.09-1.65) Donne OR 2.67 (0.66-10.9)
Kerr et al. ^{18a}	2005	CARAF	Canada	Coorte	5	757	NS
Johansen et al. ^{18b}	2008		Norvegia	Caso-controllo		154	OR 3.86 (1.01-16.25)
Iguchi et al. ¹⁹	2008	KAMS	Giappone	Coorte		41 436	OR 1.46 (1.20-1.78)
Liou et al. ²¹	2008		Cina	Cross-sectional		29 079	NS
McKee et al. ²²	2008	VALUE	USA	Prospettico	4.2	15 245	HR 1.49 (1.14-1.94)
Watanabe et al. ²³	2008	NPMS	Giappone	Coorte	4.5	28 449	HR 1.44 (1.09-1.90) HR 1.35 (1.06-1.73)
Tsang et al. ²⁴	2008		USA	Coorte	5.1	3248	HR 1.172 (0.936-1.468)
Dublin et al. ²⁵	2010		USA	Caso-controllo		1410	OR 1.4 (1.15-1.71)
Nichols et al. ²⁶	2009		USA	Coorte	8	10 213	Donne HR 1.26 (1.08-1.46) Uomini HR 1.09 (0.96-1.24)
Rosengren et al. ²⁷	2009		Svezia	Coorte	34	6903	HR 1.49 (0.92-2.41)
Haywood et al. ²⁸	2009	ALLHAT	Internazionale	RCT	4.9	42 418	OR 1.03 (0.84-1.2)
Smith et al. ²⁹	2010	MDCS	Svezia	Coorte	11	30447	Uomini HR 1.1 (0.84-1.59) Donne HR 1.4 (0.95-2.05)
Huxley et al. ³⁰	2012	ARIC	USA	Coorte	14.5	13 025	HR 1.35 (1.14-1.60)
Schoen et al. ^{31b}	2012	WHS	USA	RCT	16.4	34 720	HR 1.95 (1.49-2.56) HR corretto 1.14 (0.93-1.40)
Thacker et al. ³²	2012		USA	Coorte	5	1385	NS
Fontes et al. ^{33b}	2012	FHS	USA	Coorte	10	3023	NS
Latini et al. ^{34c}	2013	NAVIGATOR	Internazionale	RCT	7	8943	HR 1.08 (0.88-1.31)
Fatemi et al. ³⁵	2014	ACCORD	Nord America	RCT	4.6	10 251	Stretto controllo glicemico vs controllo usuale p=0.52

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Meta-analysis of Cohort and Case-Control Studies of Type-2 Diabetes Mellitus and Risk of Atrial Fibrillation

Rachel R. Huxley, DPhil, Kristian B. Filion, PhD, Suma Konety, MD, PhD, and Alvaro Alonso, MD, PhD

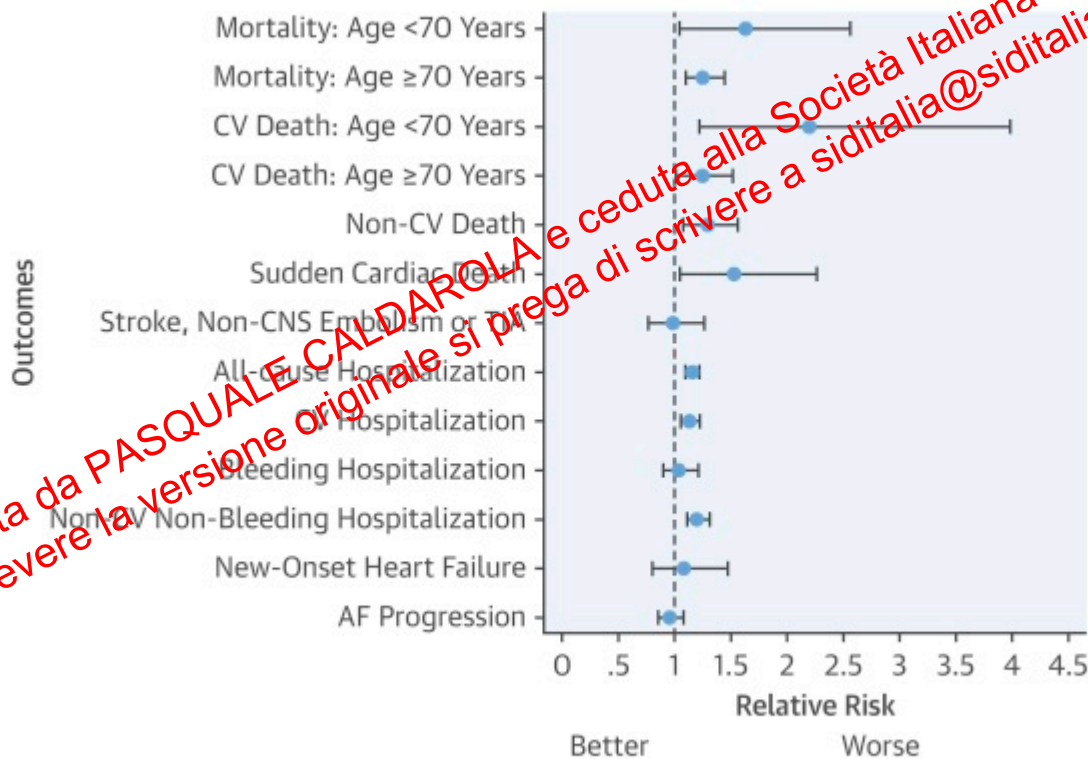
The Division of Epidemiology and Community Health, University of Minnesota, Minneapolis, Minnesota, USA



Il diabete peggiora prognosi dei pazienti con FA

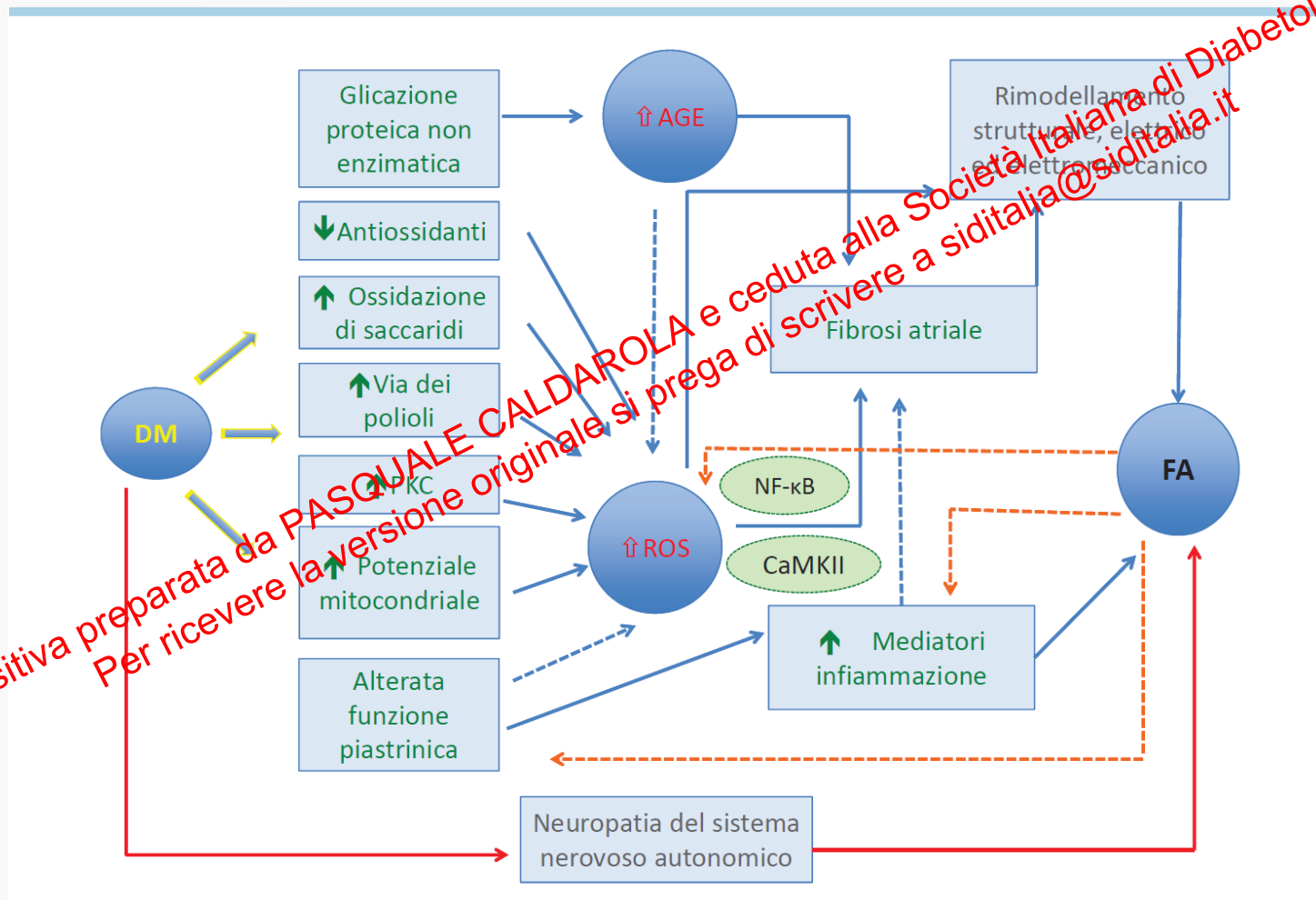
Outcomes Registry for Better Informed Treatment of Atrial Fibrillation -ORBIT-AF

CENTRAL ILLUSTRATION: Comparative Outcomes of AF Between Patients With and Without Diabetes



Echouffo-Tcheugui, J.B. et al. J Am Coll Cardiol. 2017;70(11):1325-35.

Fibrillazione atriale diabete: patogenesi



CHA₂DS₂-VASc score

Table 17 Assessment of stroke risk in patients with atrial fibrillation

CHA ₂ DS ₂ -VASc	
Congestive HF or LVEF ≤40%	1
Hypertension	1
Age ≥75 years	2
Diabetes mellitus	1
Stroke, transient ischaemic attack, or thrombo-embolism	2
Vascular disease (previous myocardial infarction, peripheral artery disease, or aortic plaque)	1
Age 65–74 years	1
Sex category (i.e. female sex)	1
Maximum score	9
CHA ₂ DS ₂ -VASc score = 0: recommend no antithrombotic therapy.	
CHA ₂ DS ₂ -VASc score = 1: recommend antithrombotic therapy with oral anticoagulation or antiplatelet therapy, but preferably oral anticoagulation.	
CHA ₂ DS ₂ -VASc score = 2: recommend oral anticoagulation.	

CHA₂DS₂-VASc = Cardiac failure, Hypertension, Age ≥75 (Doubled), Diabetes, Stroke (Doubled), Vascular disease, Age 65–74, and Sex category (Female); HF = heart failure; LVEF = left ventricular ejection fraction.

Diapositiva preparata da PASQUALE CALDAROLA e ceduta alla Società Italiana di Diabetologia.
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I diabetici hanno aumentato rischio di eventi coronarici, di scompenso cardiaco e stroke

Il «cuore diabetico» è gravato da un quadro clinico e da una prognosi peggiore

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