



IMATGE CARDIACA 2014

Dr. Carles Paré
Servei de Cardiologia
Hospital Clínic



ECOCARDIOGRAFIA



Deformation patterns in genotyped patients with hypertrophic cardiomyopathy

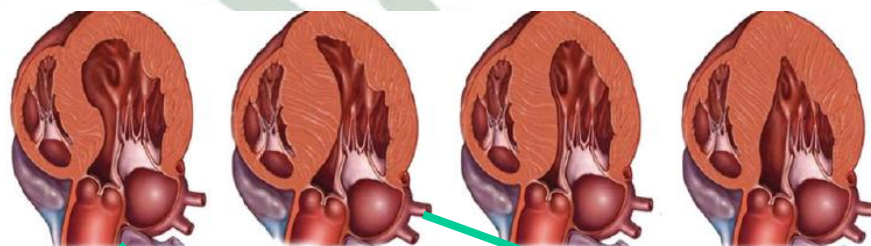


Jeffrey B. Geske, J. Martijn Bos, Bernard J. Gersh, Steve R. Ommen, Benjamin W. Eidem, and Michael J. Ackerman*
European Heart Journal – Cardiovascular Imaging (2014) 15, 456–465

Mayo Clinic, 200 1st St SW, Rochester, MN 55905, USA

80 genotip $\ominus$ 51 genotip +
49% 59%

131 pac MH



Sigmoidal

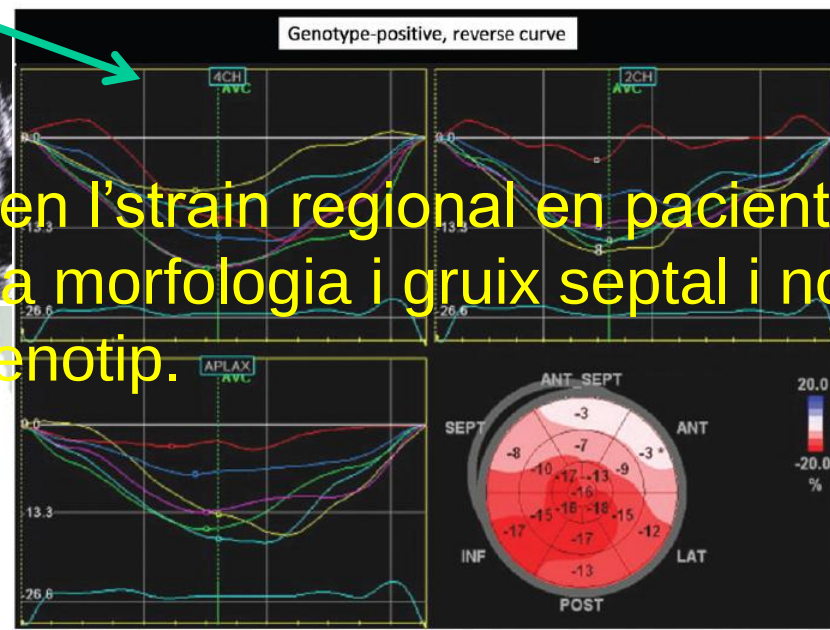
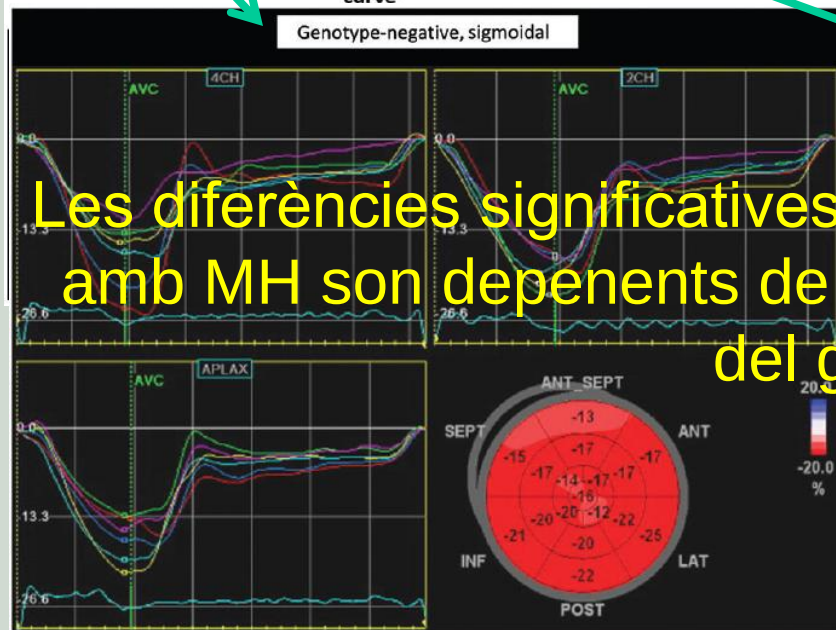
Reverse curve

Neutral

Apical

No diferències en deform.global entre genotip + i –

Sí diferències en strain regional: es inferior en genotip + a nivell infero-septal mig i basal i antero septal basal



Impaired Systolic Function by Strain Imaging in Heart Failure With Preserved Ejection Fraction

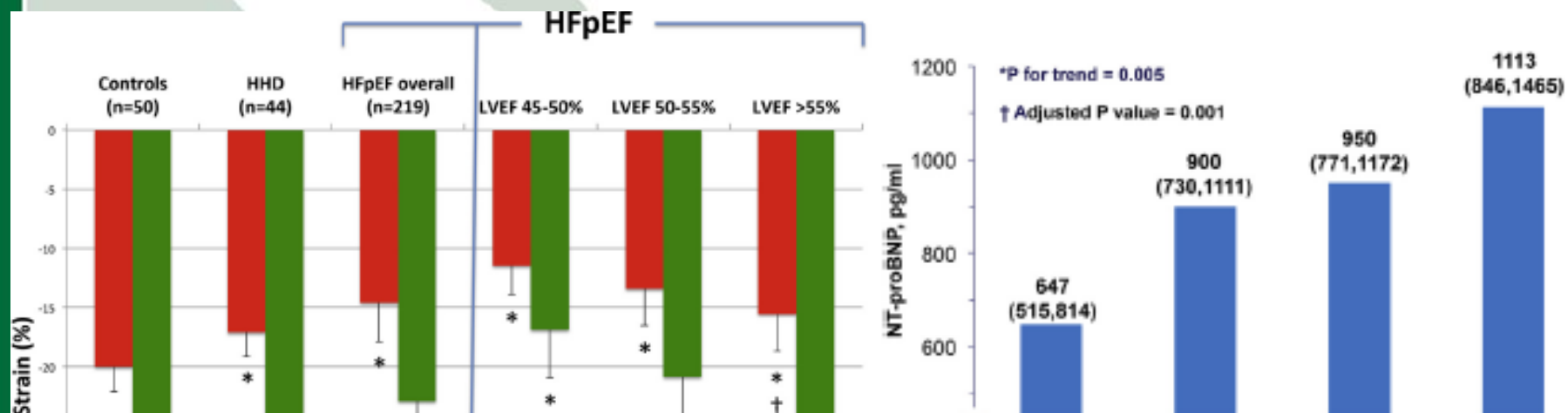


Elisabeth Kraigher-Krainer, MD,* Amil M. Shah, MD, MPH,* Deepak K. Gupta, MD,*
Angela Santos, MD,* Brian Claggett, PhD,* Burkert Pieske, MD,† Michael R. Zile, MD,‡
Adriaan A. Voors, MD,§ Marty P. Lefkowitz, MD,|| Milton Packer, MD,¶ John J. V. McMurray, MD,#
Scott D. Solomon, MD,* for the PARAMOUNT Investigators

Boston, Massachusetts; Graz, Austria; Charleston, South Carolina; Groningen, the Netherlands;

East Hanover, New Jersey; Dallas, Texas; and Glasgow, United Kingdom | *Am Coll Cardiol* 2014;63:447-56

218 pac. IC.FE.N. vs 50 controls N vs 44 HTA Disf.Diast. No IC



Strain Long i Circ significat. reduits en ICpFE vs controls normals i HTA
La prevalència de LS i CS reduits en ICpFE es alta
LS està independentment i significat. associat al nivell de NT-proBNP



Circ Cardiovasc Imaging. 2014;7:74-81





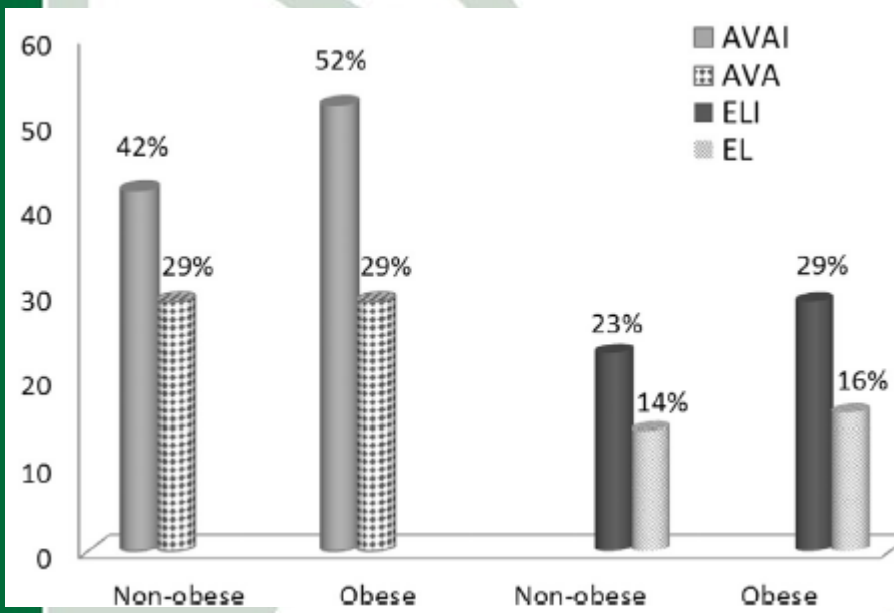
Impact of Obesity and Nonobesity on Grading the Severity of Aortic Valve Stenosis

Barbara P. Rogge, et al.

Valve Stenosis

Am J Cardiol 2014;113:1532–1535

heart failure. In conclusion, using AVAI and ELI for the grading of stenosis in patients with obesity may lead to overestimation of true AS severity. © 2014 Elsevier Inc. All rights reserved.



1524 pac. obesos:321

En obesos, AVA i Energy Loss indexats per SC tenen valors discordants amb AV i EL sense indexar. Son significat menors en els obesos.

EAO severa per AVAi $<0,6 \text{ cm}^2/\text{m}^2$
però no per AVA $>1 \text{ cm}^2$ en 15%
Igual en ELi/EL en 9% de pac.

AVAi/AVA associada a mayor RVAo: 28%
però no predictor de mort ni hosp. per IC

Indexing aortic valve area by body surface area increases the prevalence of severe aortic stenosis

Jander N, et al. Heart 2014;100:28–33

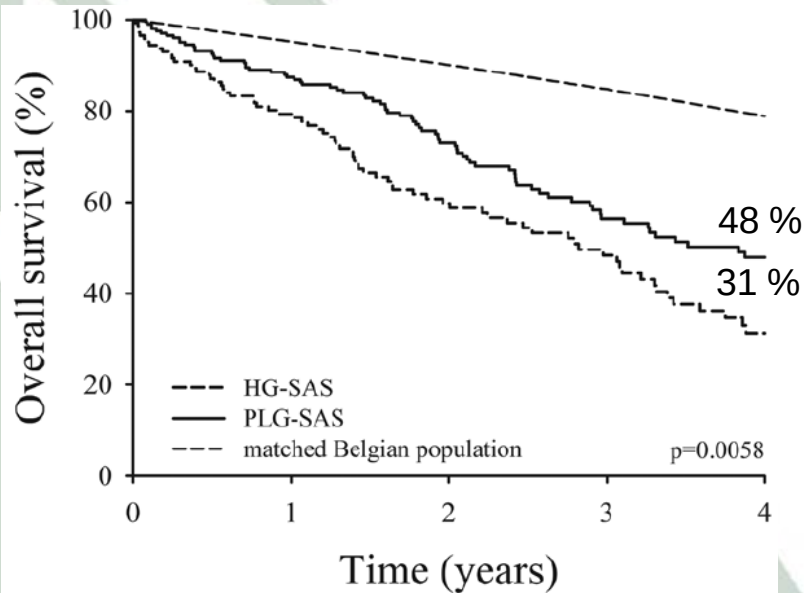
Conclusions Indexing AVA by BSA ($\text{AVA}_{\text{index}}$) significantly increases the prevalence of patients with criteria for severe stenosis by including patients with a milder degree of the disease without improving the predictive accuracy for aortic valve related events.

Natural History of Paradoxical Low-Gradient Severe Aortic Stenosis

Frédéric Maes, MD*; Jamila Boulif, MS*; Sophie Piérard, MD; Christophe de Meester, MS; et.al.

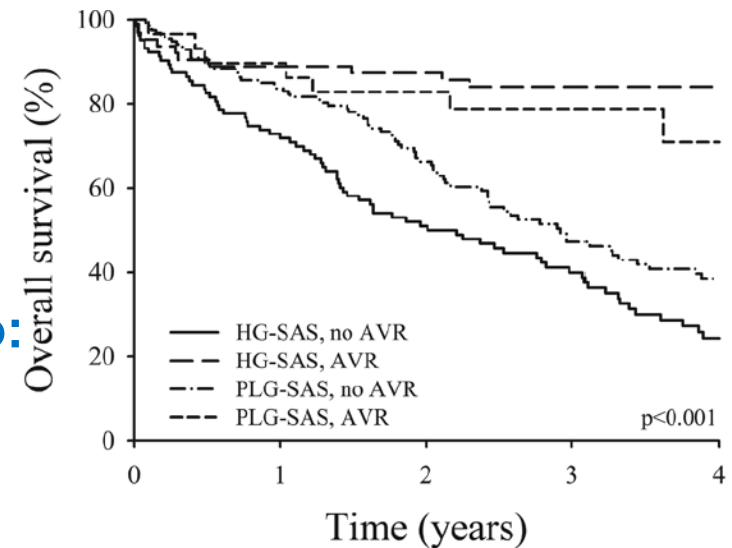
Circ Cardiovasc Imaging. 2014;7:714-722

349 patients prospect.
 Seguiment 28 m. (3-140)
 EAo severa FE normal
 Gradient > 40 mmHg 144 pac.
 ≤ 40 mmHg 205 pac.



HG-SAS	144	97	60	39	19
PLG-SAS	205	164	104	60	42

“PLG-SAS” forma menys severa d’EAo:
 - Millor evolució
 - Tendència a “HG-SAS” en pocs anys



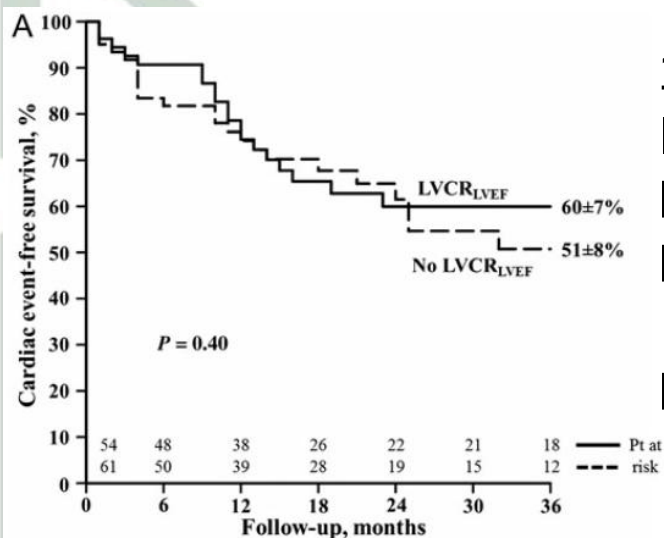
HG-SAS, no AVR	103	76	51	34	17
HG-SAS, AVR	63	57	56	43	33
PLG-SAS, no AVR	154	127	80	46	34
PLG-SAS, AVR	29	26	23	16	9



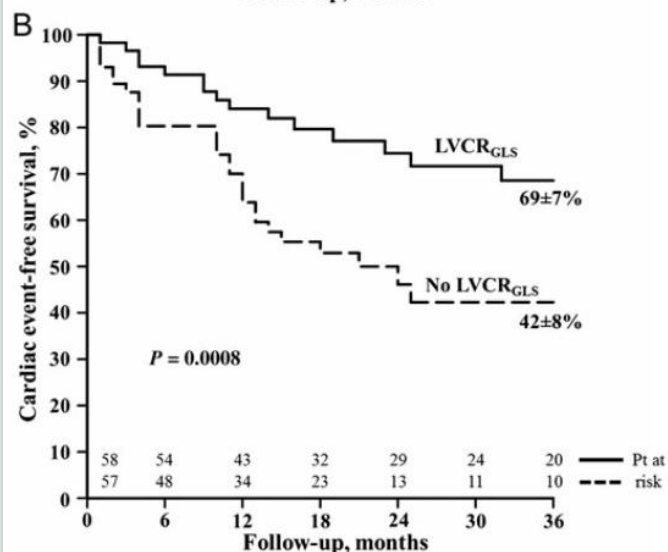
Left ventricular contractile reserve in asymptomatic primary mitral regurgitation

Julien Magne^{1†}, Haifa Mahjoub^{2†}, Raluca Dulgheru¹, Philippe Pibarot², Luc. A. Pierard^{1*},
and Patrizio Lancellotti^{1*}

European Heart Journal (2014) 35, 1608–1616



115 pac. asimptomàtics
IM primaria moderada (37%) i severa (63%).
FE preservada
Reserva contr.VE definida com milloria GLS >2%
superior en predir millors resultats que
Reserva contr.VE definida com milloria FE >4%



Després d'ajustar per paràmetres clínics i
eco per indicar reparació Mi, la RC basada
en GLS VE s'associa a millor pronòstic

Clinical experience shows that reliance on a single quantitative echocardiographic parameter for clinical decision-making often entails potential pitfalls and limitations. Hence, we caution that the measurement of LVCR_{GLS} requires good-quality tracings and requires a learning curve.

Impact of exercise pulmonary hypertension on postoperative outcome in primary mitral regurgitation

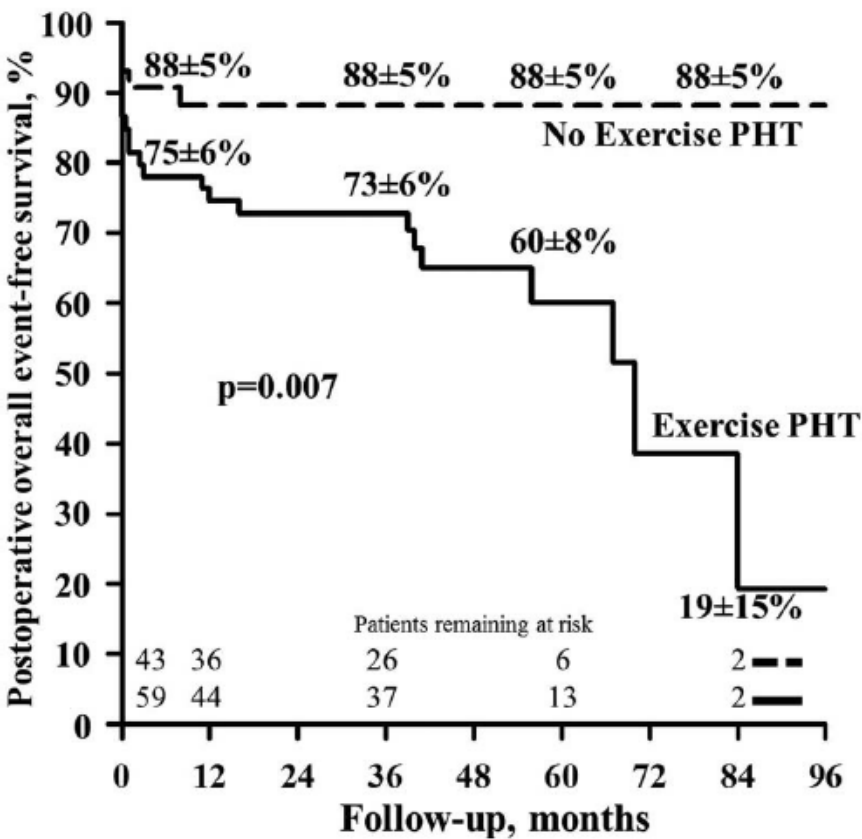
Julien Magne,¹ Erwan Donal,^{2,3} Haifa Mahjoub,⁴ Beatrice Miltner,¹ Raluca Dulgheru,¹ Christophe Thebault,^{2,3} Luc A Pierard,¹ Philippe Pibarot,⁴ Patrizio Lancellotti¹

Heart 2015;**101**:391–396.

102 pac. NYHA ≤2 No disf VE.

Ex HAP= P.AP.sist > 60 mmHg. (58%)

Seuiment 50±23 m.



What might this study add?

This study shows that exercise pulmonary hypertension in chronic primary mitral regurgitation is associated with reduced postoperative cardiac event-free survival and multiplies by 2 the risk of postoperative event, even after adjustment for parameters considered as trigger for surgery in current guidelines.

How might this impact on clinical practice?

These data emphasise the usefulness of exercise stress echocardiography in patients with primary mitral regurgitation. It also demonstrates that exercise stress echocardiography and the assessment of exercise pulmonary hypertension may identify a group of patients at high risk of postoperative cardiac event.



Noninvasive Imaging of Cardiovascular Injury Related to the Treatment of Cancer



Suwat Kongbundansuk, MD,* W. Gregory Hundley, MD*†

J Am Coll Cardiol Img 2014;7:824-38)



A Pre-chemotherapy

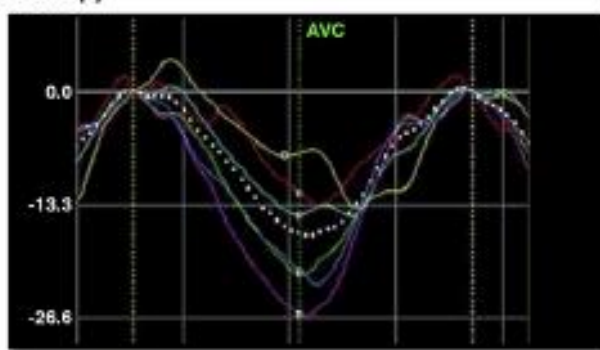
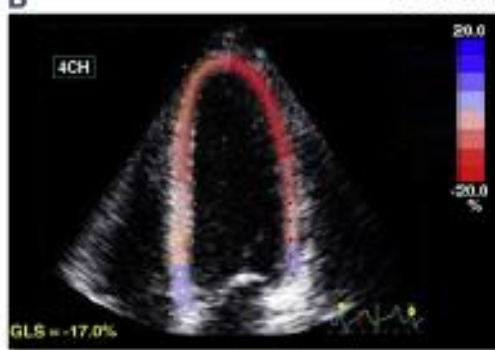
basal trastuzumab→

Recomanacions d'avaluació pre-quimioteràpia

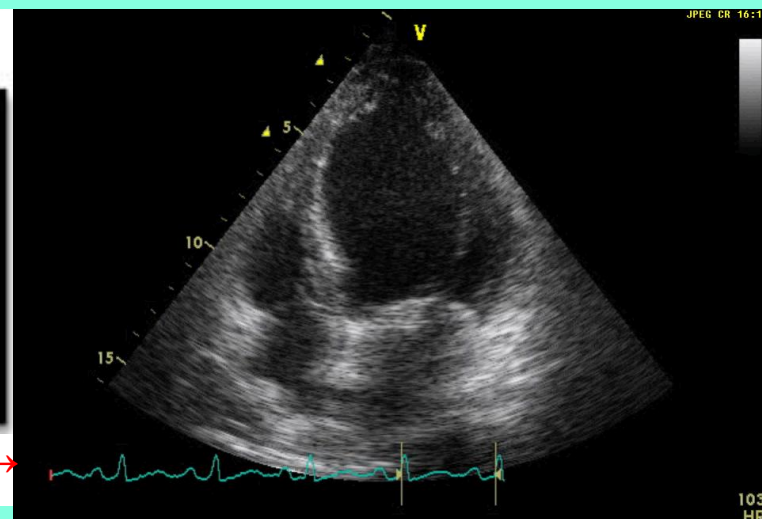
- antraciclítics: basades en valoració de FE VE.
- trastuzumab: incorporen determinació de biomarcadors (troponines, BNP)

En general recomanacions dirigides a prevenir caigudes importants de FE

B Post-chemotherapy



1 any trastuzumab→



La reducció del GLS un 10%-15% durant el tractament es el paràmetre més útil per detectar cardiotoxicitat definida com reducció de la FE ó instauració de IC (Marwick TH)



How to monitor cardiac toxicity of chemotherapy: time is muscle!

D Kerkhove,¹ C Fontaine,² S Droogmans,¹ J De Greve,² K Tanaka,³
Nico Van De Veire,^{1,4} Guy Van Camp¹ *Heart* 2014;**100**:1208–1217.

Monitoring cardiac toxicity of chemotherapy: key points 1

- ▶ There is no actual consensus among cardio-oncologists on how cardiotoxicity should be exactly defined.
- ▶ Even though minimal detectable change in
- ▶ In the case of good echogenicity, 3D LVEF approaches the best MRI performance.
- ▶ In the case of poor echogenicity,
- ▶ Combination of early TnI rise and GLS reduction might redefine cardiotoxicity criteria in the near future.
- ▶ Excludes almost completely the time window for cardio-oncological prevention.
- ▶ MRI is the gold standard for serial LVEF monitoring, but its high cost and limited availability preclude its use as the first line method.
- ▶ Echocardiography remains the first line method because it offers a complete and integrated evaluation of cardiac function: systolic and diastolic ventricular function as well as valvular and pericardial morphology and function.
- ▶ Global longitudinal strain (GLS) with speckle tracking has proven to be a better prognosticator for global cardiac death and morbidity compared to LVEF.
- ▶ A relative 10% reduction in GLS has repeatedly proven to predict later significant LVEF decrease.



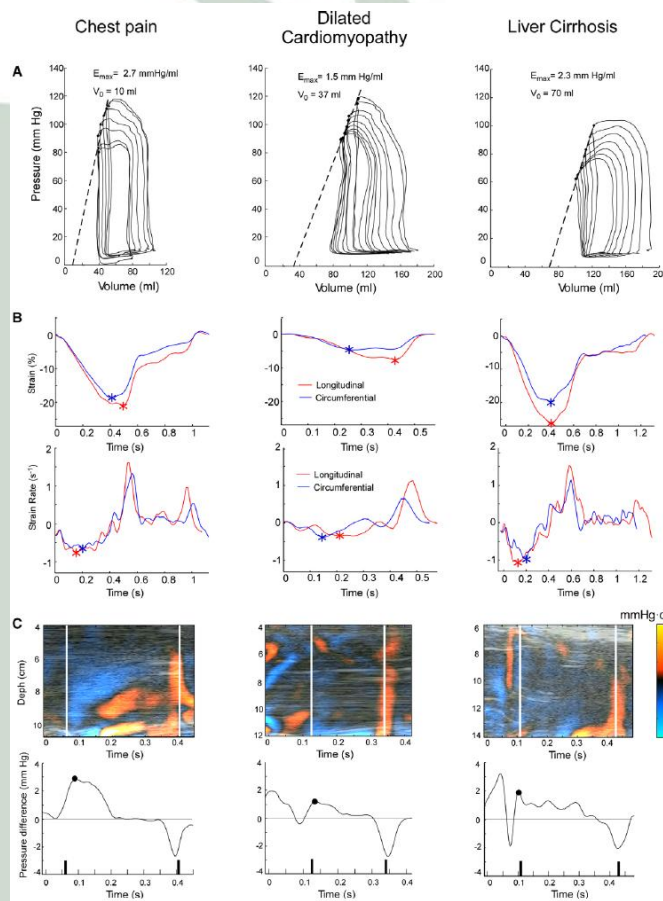
Validation of Noninvasive Indices of Global Systolic Function in Patients With Normal and Abnormal Loading Conditions

SOCIETAT CATÀ

A Simultaneous Echocardiography Pressure–Volume Catheterization Study

Raquel Yotti, MD, PhD; Javier Bermejo, MD, PhD; Yolanda Benito, DCS, DVM;
Ricardo Sanz-Ruiz, MD; Cristina Ripoll, MD, PhD; Pablo Martínez-Legazpi, PhD;
Candelas Pérez del Villar, MD; Jaime Elízaga, MD, PhD; Ana González-Mansilla, MD, PhD;
Alicia Barrio, DCS, Mbiol; Rafael Bañares, MD, PhD; Francisco Fernández-Avilés, MD, PhD

Circ Cardiovasc Imaging. 2014;7:164-172



27 pac.: MCD 8, EF normal: 10, CH : 9

Per validar clínicament mètodes basats en US de valoració de funció sistòlica global en condicions diverses de carga anòmala i avaluar la seva sensibilitat.

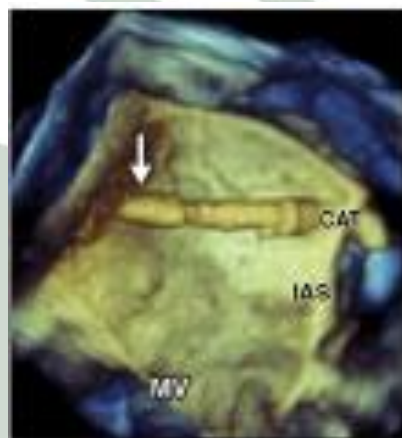
Conclusions

Noninvasive indices based on Doppler echocardiography have limited accuracy to characterize global LV systolic chamber function in the clinical setting. The Doppler-derived peak EIVPD best correlates with reference indices. This index should be preferred for assessing the state of global LV systolic chamber function, particularly in conditions associated with abnormal load.

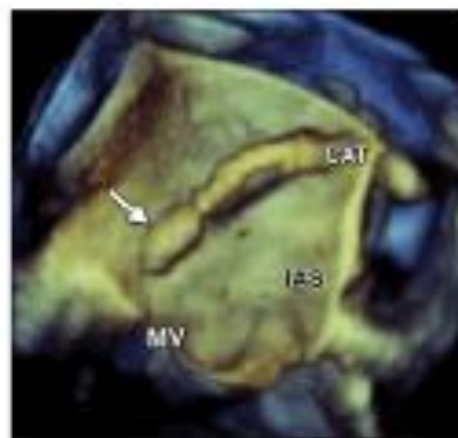
The peak ejection intraventricular pressure difference is depicted in each curve (●)

3D TEE During Catheter-Based Interventions

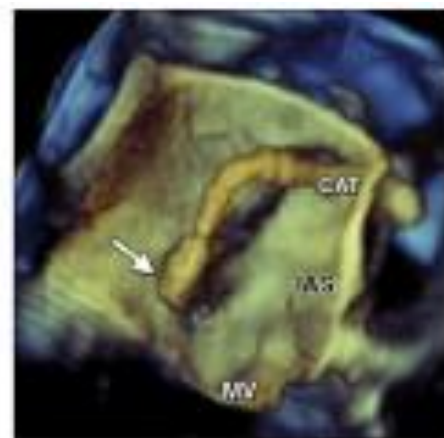
Francesco Fulvio Faletra, MD, Giovanni Pedrazzini, MD, Elena Pasotti, MD,
Stefano Muzzarelli, MD, Maria Cristina Dequarti, MD, Romina Murzilli, MD,
Susanne Anna Schlossbauer, MD, Iveta Petrova Slater, MD, Tiziano Moccetti, MD
Lugano, Switzerland [J Am Coll Cardiol Img 2014;7:292–308]



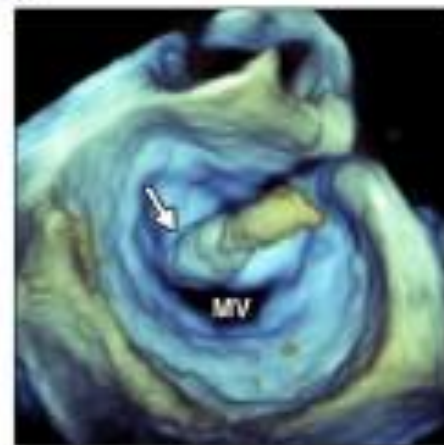
D



E



F





R.M.

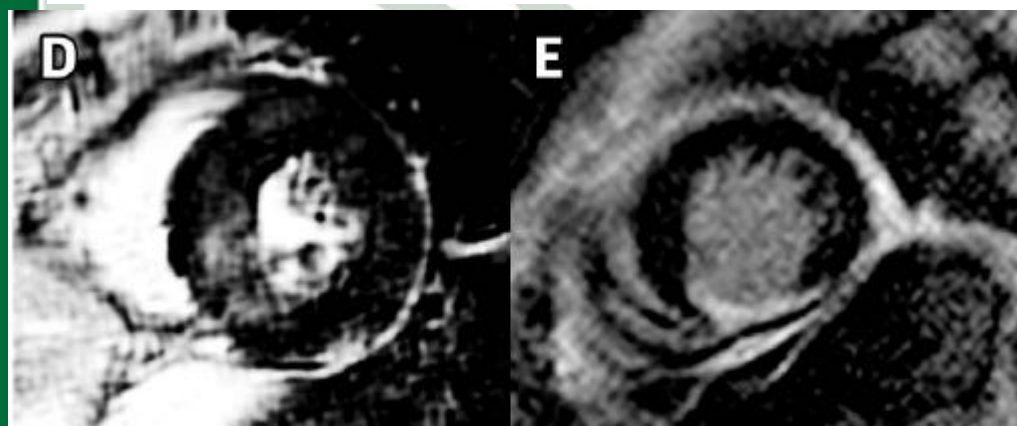


Prognostic Significance of LGE by CMR in Aortic Stenosis Patients Undergoing Valve Replacement



Gilles Barone-Rochette, MD, Sophie Piérard, MD, Christophe De Meester de Ravenstein, MS, Stéphanie Seldrum, MD, Julie Melchior, MD, Frédéric Maes, MD, Anne-Catherine Pouleur, MD, PhD, David Vancraeynest, MD, PhD, Agnes Pasquet, MD, PhD, Jean-Louis Vanoverschelde, MD, PhD, Bernhard L. Gerber, MD, PhD

J Am Coll Cardiol 2014;64:144-54



154 pac RVAo quirúrgic + 40 pac TAVI percut.
seguiment 2,9 a. Morts: 21 RVAo, 20 TAVI

La detecció de RT per RM pot predir totes les causes de mortalitat CV en pacients de baix risc amb EAo severa, sense antecedents de IAM i que s'intervenien de RVAo.

I també sembla pronosticar mortalitat relacionada amb malalties CV en pac. d'alt risc sotmesos a TAVI percutània

TABLE 4 Predictors of Overall Survival After Surgical AVR on Univariate and Multivariate Cox Analysis

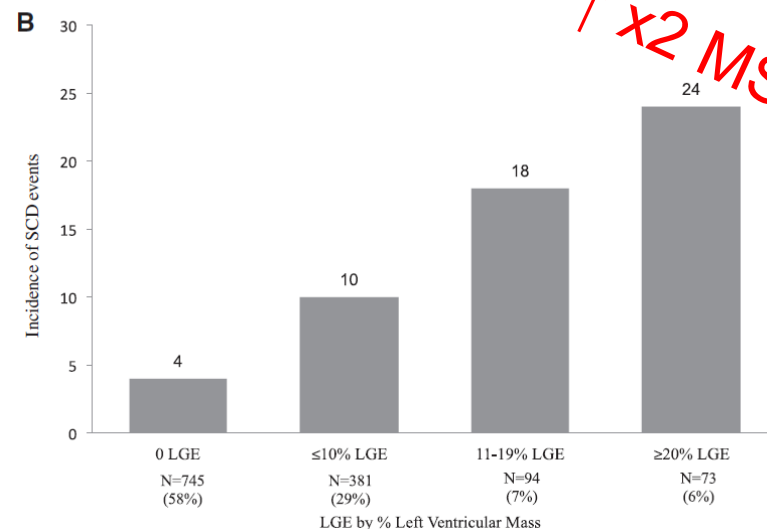
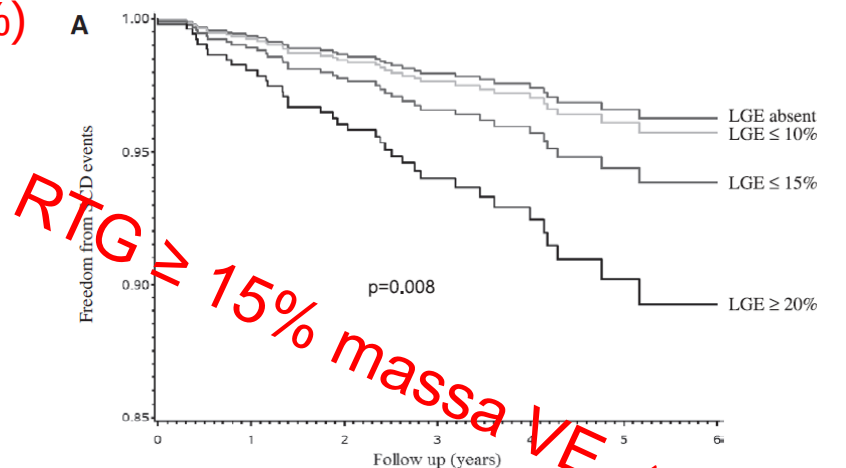
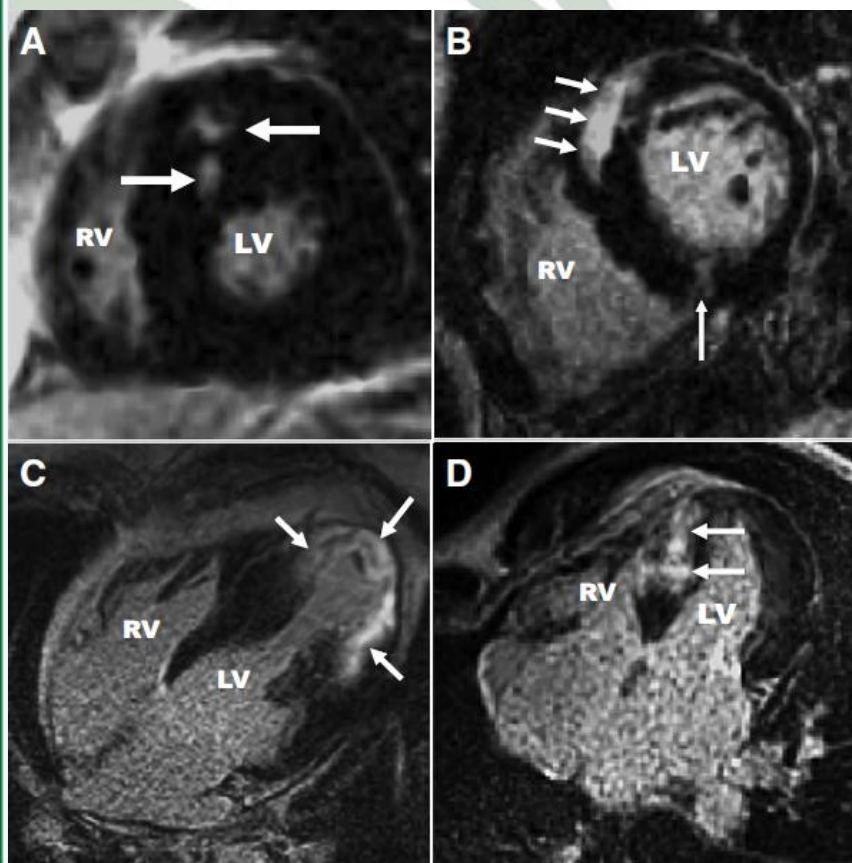
	Univariate		Multivariate	
	HR (95% CI)	p Value	HR (95% CI)	p Value
<u>Presence of LGE</u>	2.8 (1.1-6.7)	0.02	<u>2.8 (1.1-6.9)</u>	<u>0.025</u>
<u>NYHA functional class III/IV</u>	3.2 (1.3-8.0)	0.007	<u>3.2 (1.1-8.1)</u>	<u>0.01</u>
LBBS	2.8 (0.92-8.3)	0.06	-	-



Prognostic Value of Quantitative Contrast-Enhanced Cardiovascular Magnetic Resonance for the Evaluation of Sudden Death Risk in Patients With Hypertrophic Cardiomyopathy

Raymond H. Chan, MD, MPH; Barry J. Maron, MD et al. *Circulation*.2014;130:484-495.

1293 MH seguits 3,3 a. MS en 37 pac (3%)
Extensió RTG associada a risc de MS





Potential role of fibrosis imaging in severe valvular heart disease

Philippe Debonnaire,^{1,2} Victoria Delgado,¹ Jeroen J Bax¹

Heart 2015;**101**:397–407

Normal Control

Moderate Aortic Stenosis

Severe Aortic Stenosis

Non-invasive imaging techniques to assess direct LV fibrosis include:

- Contrast enhanced CMR:
 - focal (replacement) fibrosis
- T1 weighted cardiac magnetic resonance:
 - diffuse fibrosis: T1 mapping, extracellular volume
- Echocardiographic calibrated integrated backscatter
- Molecular imaging:
 - collagen targeted agents with CMR
 - radiolabelled ACE inhibitors and angiotensin receptor antagonists with SPECT or PET

Non-invasive imaging techniques to assess indirect LV fibrosis include:

- Strain and strain rate imaging:
 - tissue Doppler imaging
 - speckle tracking echocardiography
 - tagged CMR
- Perfusable tissue fraction and index with PET

La fibr
un futu
noved

esses s'han introduït per detectar fibrosi directament o per valorar canvis subtils en la funció sistòlica VE, secundaris a fibrosi VE

ur i pot ser
atge

canvis

CLÍNICA
BARCELONA
Hospital Universitari



Usefulness of contrast-enhanced cardiac magnetic resonance in identifying the ventricular arrhythmia substrate and the approach needed for ablation

David Andreu¹, Jose Tomás Ortiz-Pérez¹, Tim Boussy¹, Juan Fernández-Armenta¹, Teresa M. de Caralt², Rosario J. Perea², Susanna Prat-González¹, Lluís Mont¹, Josep Brugada¹, and Antonio Berrueto^{1*}

Observacional

80 pac. Amb arritmia ventr. no idiopàtica

Isquèmica: 63%

Ablació exitosa en 77 (96%)

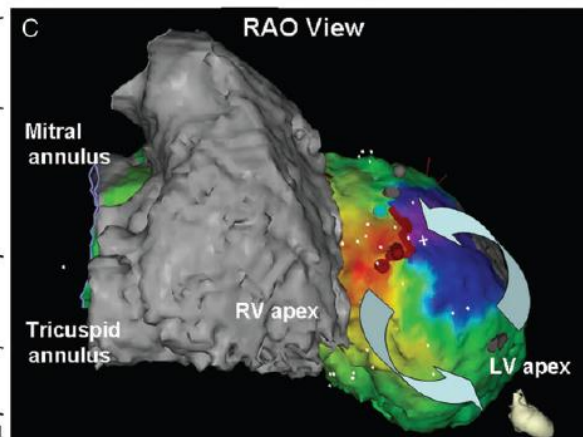
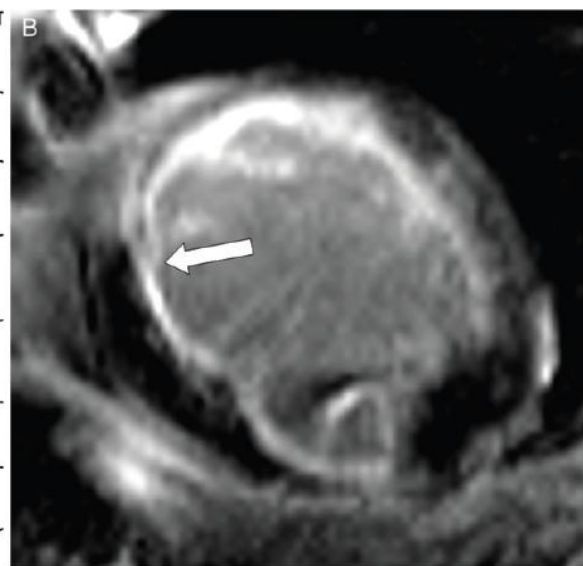
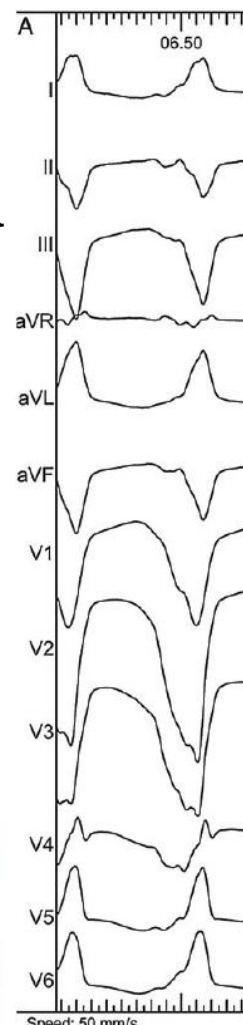
Tots amb RTG: subendoc. 19 (24,7%)

transm. 36 (46%)

mesoc. 8 (10,4%)

subepic. 11 (14,3%)

absent 3 (3,9%)





Cost-effectiveness of initial stress cardiovascular MR, stress SPECT or stress echocardiography as a gate-keeper test, compared with upfront invasive coronary angiography in the investigation and management of patients with stable chest pain: mid-term outcomes from the CECaT randomised controlled trial *BMJ Open* 2014

(Cost effectiveness of noninvasive cardiac testing)

898 pac. 869 vius a 2 anys

Dolor toràcic

Encara que SPECT-MIBI fou marginalment superior als altres tests, no va haver cap altre diferència significativa entre els grups en mortalitat, supervivència (ajustada per qualitat), ni cost.

superior en els grups randomitzats a RM-adenosina

(HR:1,1-6,2) i similar en els grups de SPECT-MIBI

(HR:1,0 95% CI 0,4-2,9) i de Eco-Dobutamina (HR:1,6 95% CI 0,6-4,0)



T.A.C.



Dyslipidemia, Coronary Artery Calcium, and Incident Atherosclerotic Cardiovascular Disease

Implications for Statin Therapy From the Multi-Ethnic Study of Atherosclerosis

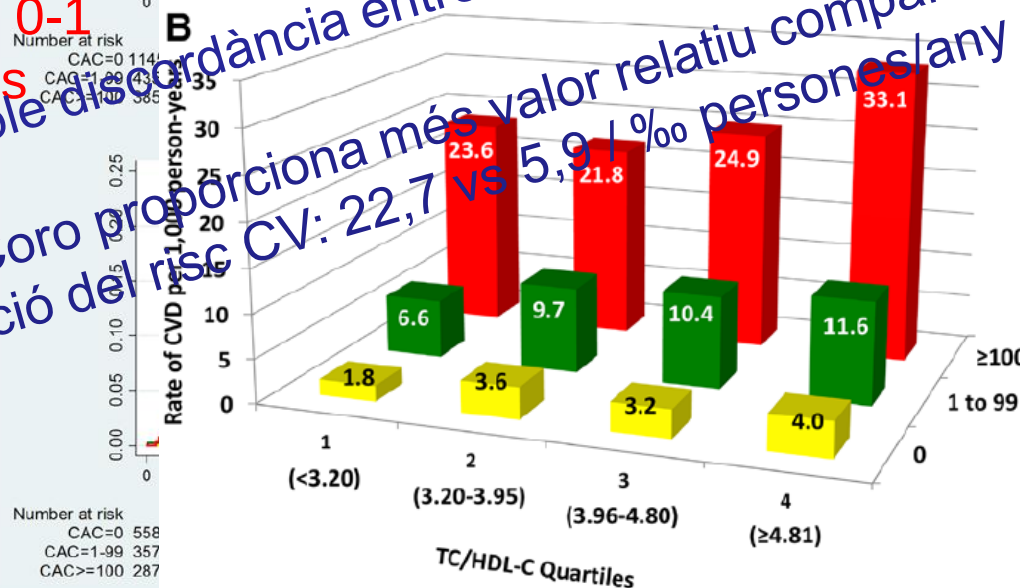
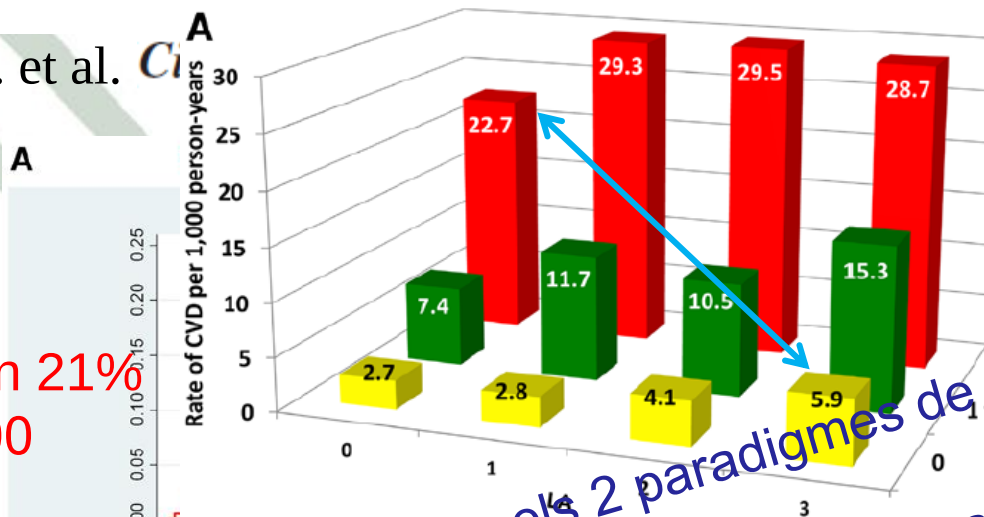
Martin SS. et al. *Circulation*

5534 pac
-Seg. 7,6 a.

55% events en 21%
amb CAC ≥ 100

65% events en 0-1
anomalies lipids

Considerable discordància entre els 2 paradigmes de valoració de risc
Ca++ Coro proporciona més valor relatiu comparat amb lipids en valoració del risc CV: 22,7 vs 5,9 / %o persones/any

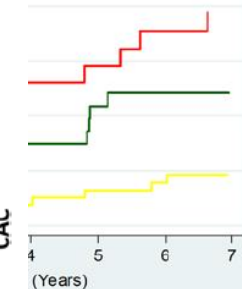


AC=0

normality



malities



Value of CACS Compared With ETT

and Myocardial Perfusion Imaging for

Predictin

Asympto

at Low R

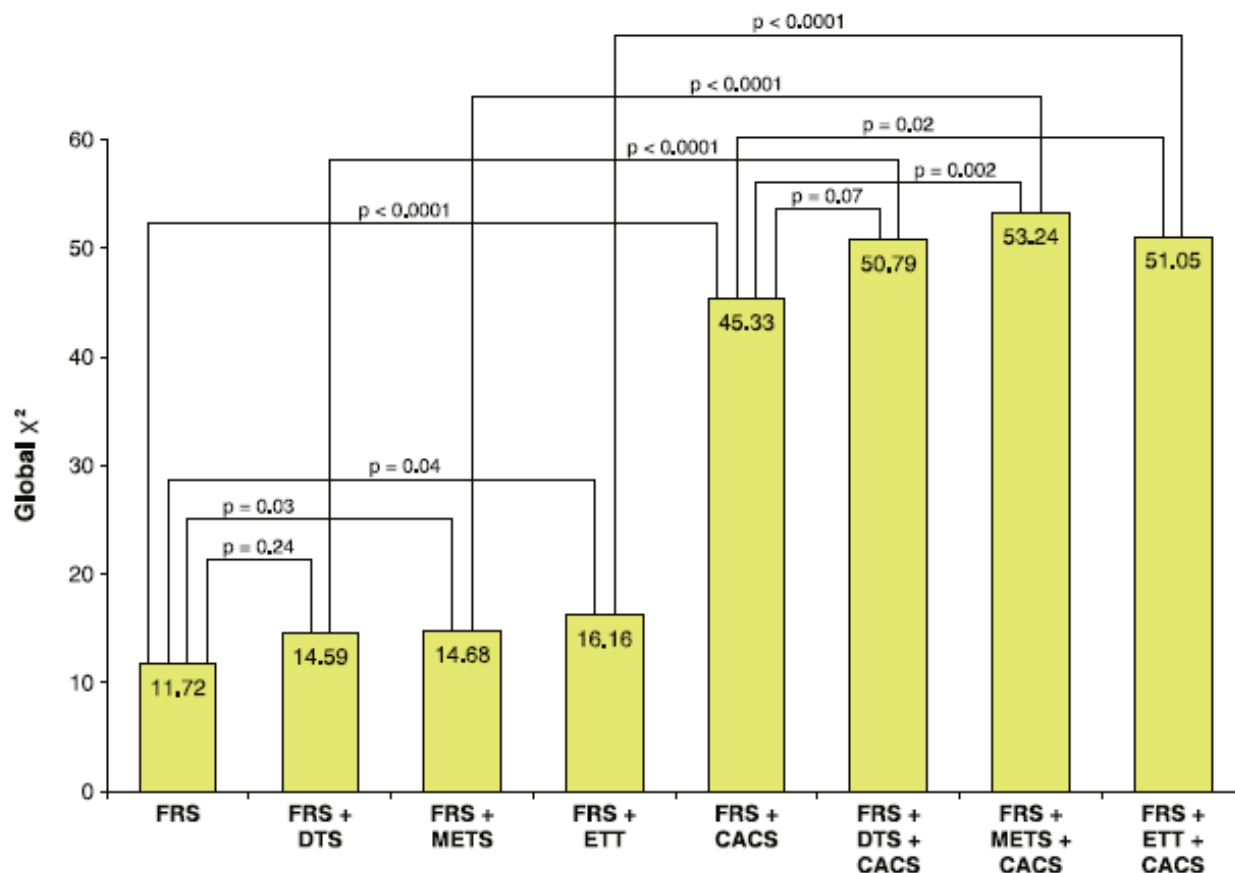
Clinical Implic

Su Min Chang, MD,* F
Maria E. Frias,* John J

Seguim. 6,9

All patients (n = 946)

- Increasing FRS
- Atypical chest pain
- Abnormal SPECT
- ETT ischemia
- Decreasing METs
- Decreasing DTS
- Log(CACS + 1)



inir valor relatiu
ro, PE i SPECT
: a llarg termini

In a multimodality world where there are many options for evaluating asymptomatic patients at risk for CAD, our results support the selection of CACS, over ETT and SPECT, as the practical initial test for accurately predicting long-term cardiovascular risk in both men and women when used in conjunction with a standard clinical assessment. The cost effectiveness

Does coronary CT angiography improve risk stratification over coronary calcium scoring in symptomatic patients with suspected coronary artery disease? Results from the prospective multicenter international CONFIRM registry

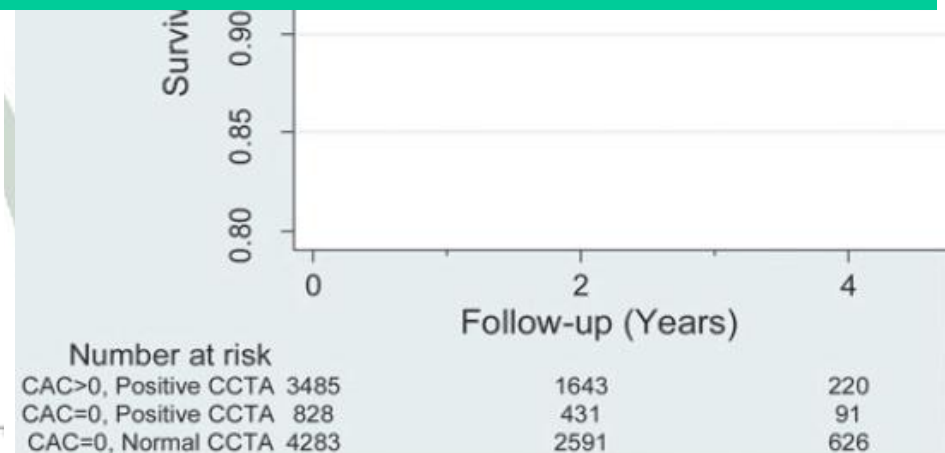
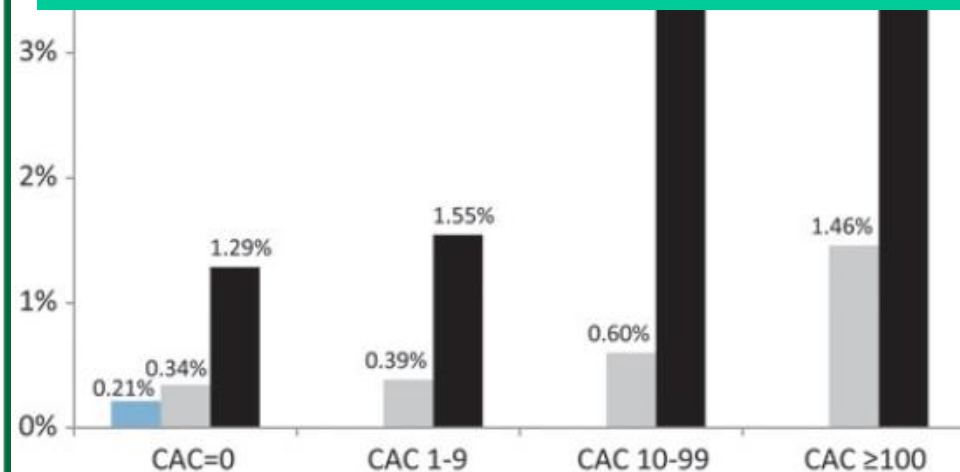
Mouaz H. Al-Mallah^{1,2*}, Waqas Qureshi¹, Fay Y. Lin³, Stephan Achenbach⁴, et al.

European Heart Journal – Cardiovascular Imaging (2014) **15**, 267–274

Internacional multicèntric. Prospectiu i observacional.

8627 pac. 50% ♂ 56 ± 12 a. Majoria dolor toràcic atípic. Seguiment 25m

CONCLUSIO: En pacients simptomàtics amb sospita de malaltia coronària l'angio TAC coronari afegeix increment del poder discriminatiu sobre el Ca++ coronari per discriminar els individus en risc de mort o IAM

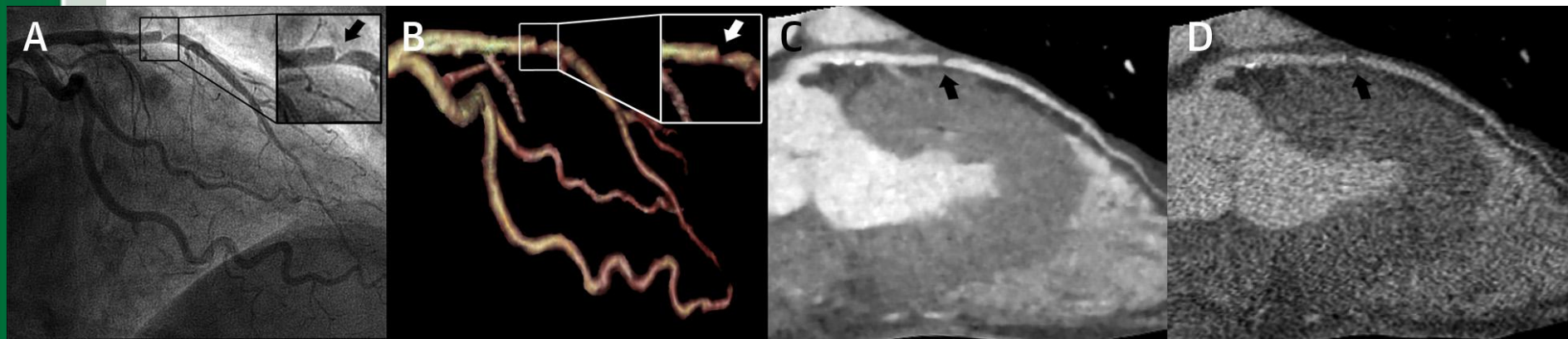


Annual event rates across the spectrum of calcium score

Interaction between calcium score, obstructive CAD on CCTA and events in the study population



Accuracy of Coronary CT Angiography Using a Submillisievert Fraction of



Volume rendered

Model based iterative reconstruction

No MBIR

METHODS In 36 patients (body mass index range 17 to 39 kg/m²) undergoing ICA for CAD evaluation, a CTA was acquired using very low tube voltage (80 to 100 kV) and current (150 to 210 mA) and was reconstructed with MBIR. CAD (defined as $\geq 50\%$ luminal narrowing) was assessed on CTA and on ICA.

CONCLUSIONS The use of MBIR reconstruction allows accurate noninvasive diagnosis of CAD with CTA at a submillisievert fraction of effective radiation dose comparable with a chest x-ray in 2 views.



Utilidad de la tomografía computarizada de 64 detectores en el diagnóstico y el manejo de los pacientes con cardiopatías congénitas

Montserrat Bret-Zurita^{a,*}, Emilio Cuesta^a, Antonio Cartón^b, Jesús Díez^c, Ángel Aroca^d, José M. Oliver^e y Federico Gutiérrez-Larraya^b *Hospital Universitario La Paz, Madrid,*

Rev Esp Cardiol. 2014;**67**(11):898-905

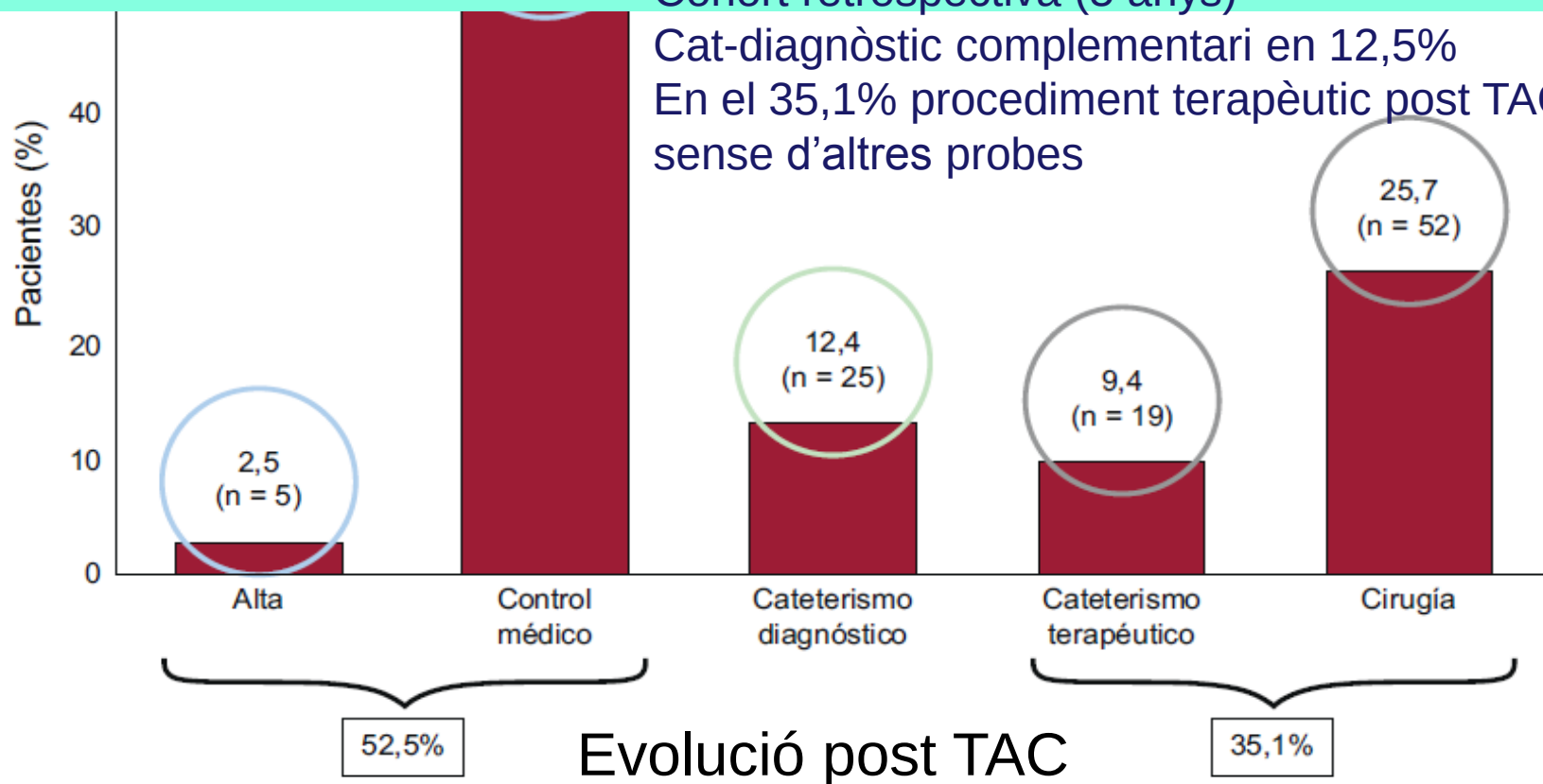
El TAC de 64 detectores te bona capacitat diagnòstica en CC
Fa noves troballes en 77% de casos
Canvia el maneig en > 1/3 de pacients

Estudi observacional.

Cohort retrospectiva (5 anys)

Cat-diagnòstic complementari en 12,5%

En el 35,1% procediment terapèutic post TAC, sense d'altres probes



Evaluación del dolor torácico agudo mediante ecocardiografía de ejercicio y tomografía computarizada multidetectores



Aleksandra Mas-Stachurska^a, Oscar Miró^{b,c}, Marta Sitges^a, Teresa M. de Caralt^d, Rosario J. Perea^d, Beatriz López^b, Miquel Sánchez^{b,c}, Carles Paré^a, Xavier Bosch^a y José T. Ortiz-Pérez^{a,*}

Rev Esp Cardiol. 2015;68(1):17-24

69 pac. SCA confirmat en 17 (24,6%) sospitat per TAC: 42% , per ECO-EX : 29%

Valor diagnóstico del ecocardiograma de ejercicio y la tomografía computarizada multidetectores

	Sensibilidad, % (IC95%)	Especificidad, % (IC95%)	VPN, % (IC95%)	VPP, % (IC95%)	Precisión, % (IC95%)
<i>Ecocardiograma de ejercicio</i>					
Resultado general	82,3 (56,5-96,0)	88,4 (76,5-95,6)	93,9 (83,1-98,6)	70,0 (45,7-88,0)	86,9 (78,9-94,9)
Clínica positiva	41,2 (18,5-67,0)	92,3 (81,4-97,8)	82,8 (70,5-91,4)	63,6 (30,9-88,8)	79,7 (70,2-89,2)
ECG positivo	82,3 (56,5-96,0)	80,8 (67,5-90,4)	93,3 (81,7-98,5)	58,3 (36,7-77,9)	81,1 (71,9-90,3)
Motilidad positiva	47,1 (23,0-72,1)	94,2 (84,0-98,7)	84,5 (72,6-92,6)	72,7 (39,0-93,6)	82,6 (73,6-91,5)
TCMD $\geq$ 50%	100,0 (80,3-100,0)	76,9 (63,2-87,5)	100,0 (91,1-100,0)	58,6 (38,9-76,5)	82,6 (73,6-91,5)
TCMD $\geq$ 70%	100,0 (80,3-100,0)	88,4 (76,5-95,6)	100,0 (92,2-100,0)	73,9 (51,6-89,7)	91,3 (84,6-97,9)

ECG: electrocardiograma; IC95%: intervalo de confianza 95%; TCMD: tomografía computarizada multidetectores; VPN: valor predictivo negativo; VPP: valor predictivo positivo.

P>0.05 per a totes les comparacions entre els resultats generals de la ecocardiografia d'exercici i la TCMD tant per valor de tall al 50 % com al 70 %

Conclusions: En pacients a UCIES amb dolor toràctic, ECG normal, tropos negatives i probab. intermitja-baixa de MC, el TCMD ofereix sensibilitat >eco-exercici, però especificitat inferior. Encara que les dif no son significatives. Per tant el TCMD pot ser una alternativa vàlida al eco-exercici en el diagnòstic de SCA en aquesta població.



SPECT PET / TAC



Added value of hybrid myocardial perfusion SPECT and CT coronary angiography in the diagnosis of coronary artery disease

CEAT CA

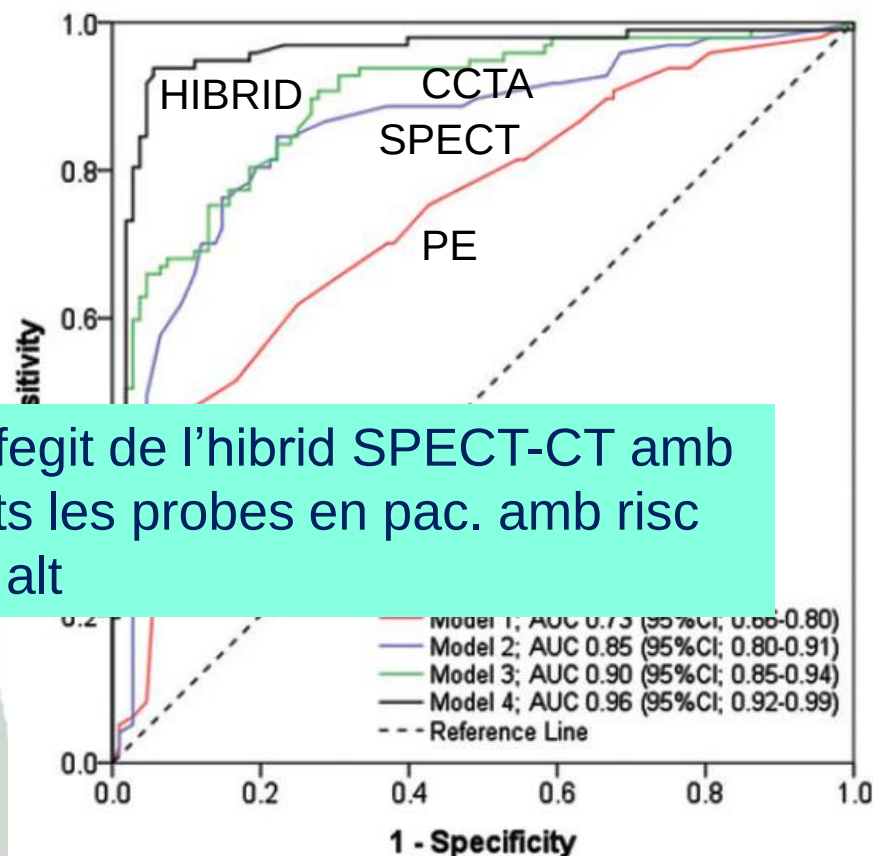
Jeroen Schaap^{1,2*}, Joris A.H. de Groot³, Koen Nieman^{4,5}, W. Bob Meijboom^{4,5}

European Heart Journal – Cardiovascular Imaging (2014) **15**, 1281–1288

- ✓ Prospectiu, 205 pac. de risc intermig-alt amb angina estable
- ✓ PE convencional, SPECT estrès-repós, score Ca++ i TAC coronari a tots
- ✓ Referència standard per malaltia

1er estudi que demostra valor diagn. afegit de l'hibrid SPECT-CT amb exactitud diagnòstica més enllà de tots les probes en pac. amb risc intermig - alt

el model bàsic

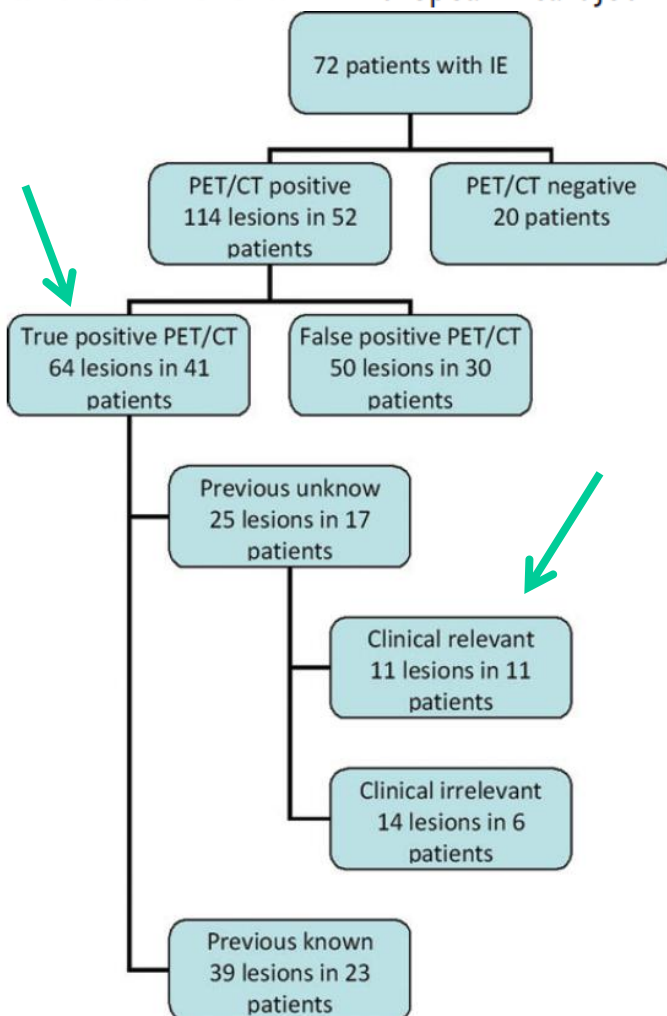




Clinical impact of ^{18}F -FDG-PET/CT in the extra cardiac work-up of patients with infective endocarditis



Ali Asmar^{1*}, Cengiz Özcan¹, Axel C.P. Diederichsen¹, Anders Thomassen², and Sabine Gill¹ European Heart Journal – Cardiovascular Imaging (2014) **15**, 1013–1019



Retrospectiu 72 pac. Lesions de importància clínica en 11

- osteomielitis 7
- abscess psoas 1
- gastrointestinal 2
- pròtesi vascular 1 (E.I. valv.aòrtica)

