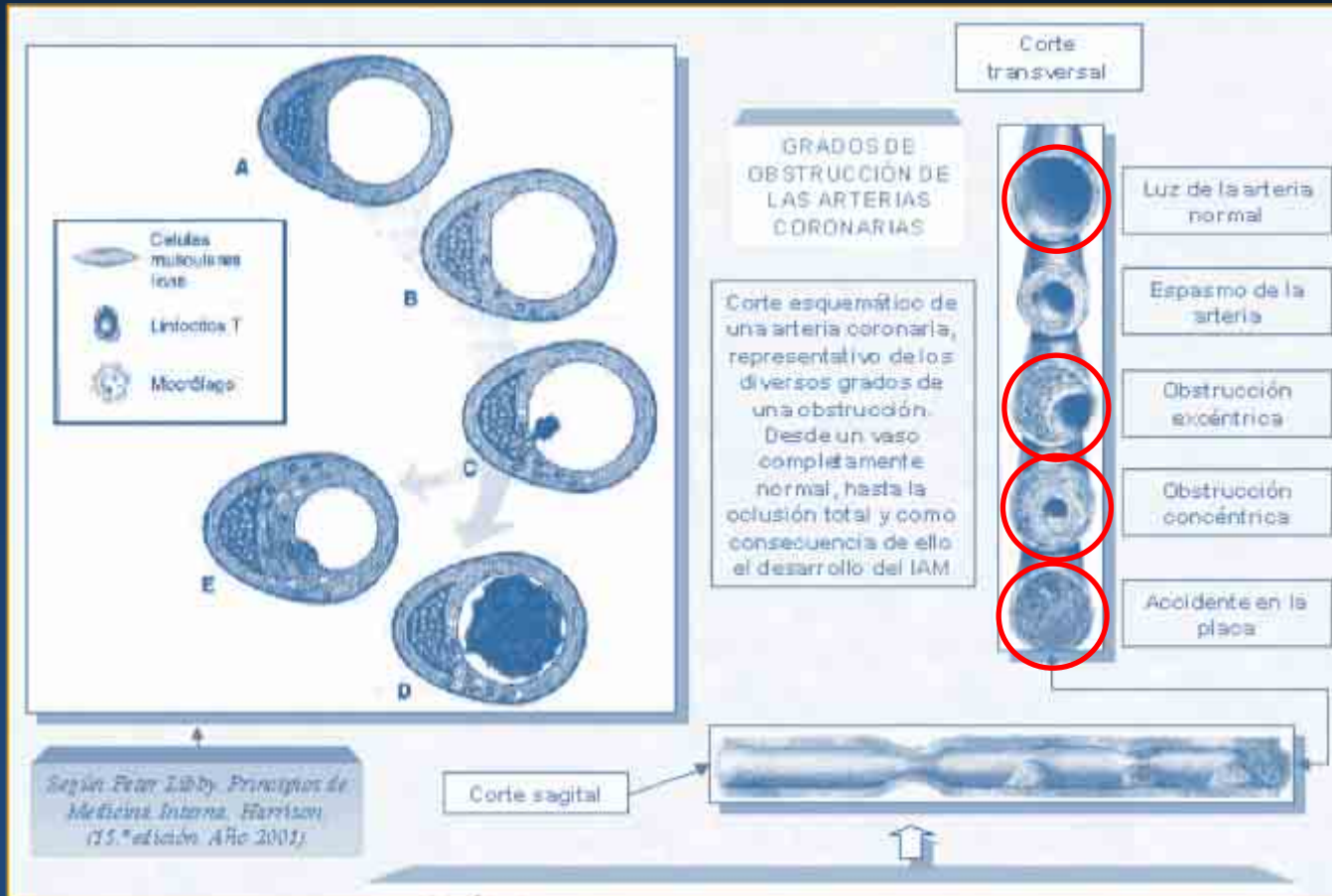


Utilidad de la Angiografía Coronaria No invasiva por Tomografía Multicorte en el Síndrome Coronario Agudo

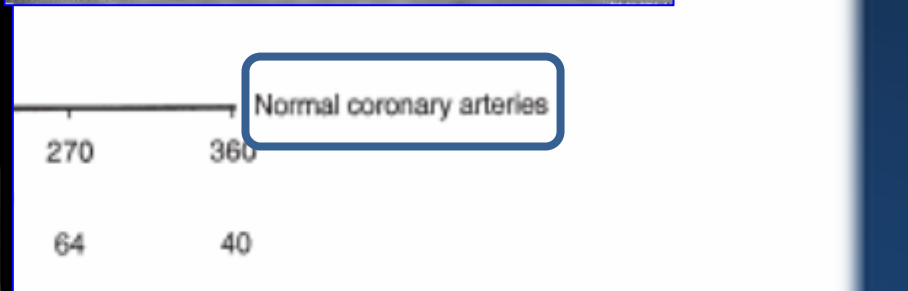
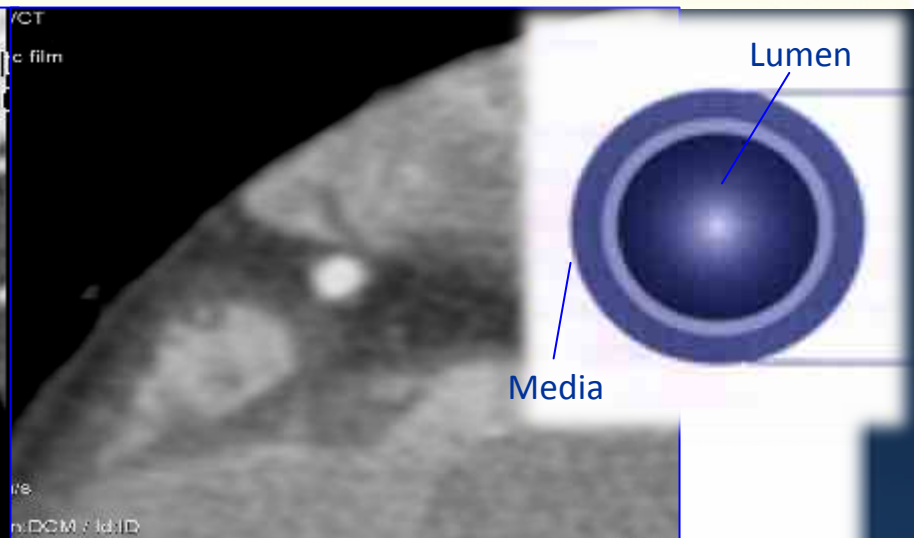
Curso de Formación Continua en Cardiología 2010
Sociedad Correntina de Cardiología (SOCACORR)

Pablo Bayol
Cardiólogo
Dpto de Diagnóstico por Imágenes
Instituto de Cardiología "J.F.Cabral"
Corrientes - Argentina

Síndromes clínicos ateroscleróticos



Prognostic Value of Multislice Computed Tomography Coronary Angiography in Patients With Known or Suspected Coronary Artery Disease



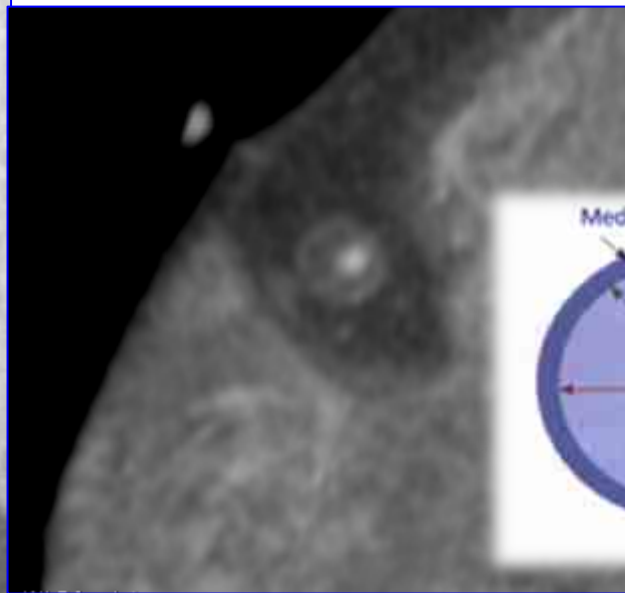
Normal and Abnormal Coronary Arteries on MSCT

...tion, and revascularization. MSCT = multislice computed tomography.

Prognostic Value of Multislice Computed Tomography Coronary Angiography in Patients With Known or Suspected Coronary Artery Disease



Abnormal coronary arteries



Estudio de Imágenes apropiado

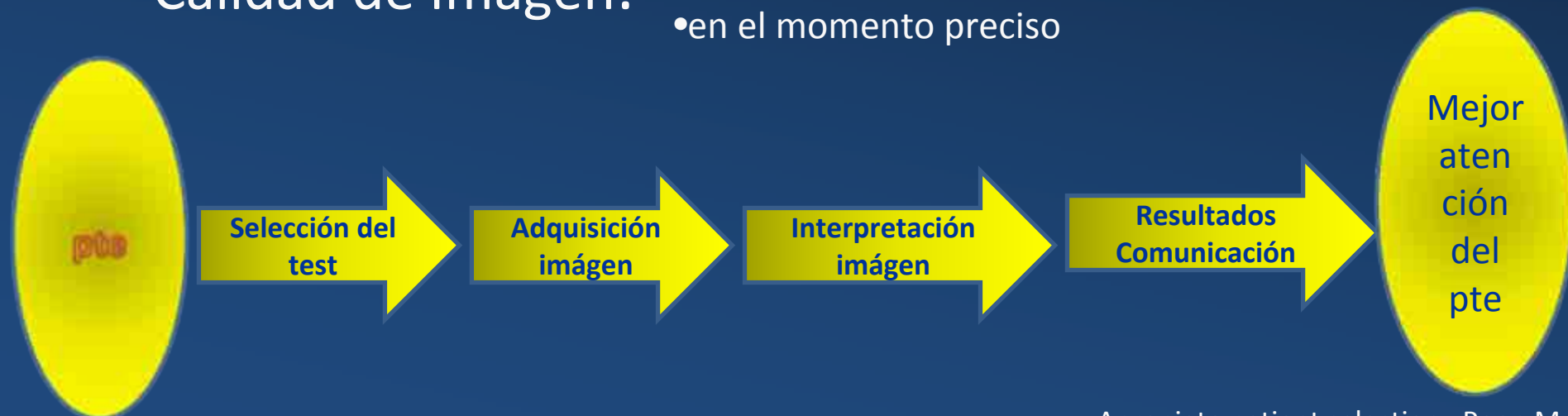
✓ Estudio en el cual la información esperada, combinada con el juicio clínico, excede las consecuencias negativas esperadas, por un margen amplio para una indicación específica para la cual el procedimiento es considerado aceptable.

Imágenes apropiadas

- ✓ Variaciones regionales en el uso
- ✓ Crecimiento de nuevas tecnologías
- ✓ Naturaleza de las utilidades
- ✓ Clínicos, pacientes, industria, evidencia

Calidad de Imagen:

- prueba correcta
- para el paciente adecuado
- en el momento preciso



Multislice Computed Tomographic Characteristics of Coronary Lesions in Acute Coronary Syndromes

Sadako Motoyama, MD, PhD,* Takeshi Kondo, MD, PhD,† Masayoshi Sarai, MD, PhD,* Atsushi Sugiura, MD, PhD,* Hiroto Harigaya, MD,* Takahisa Sato, MD, PhD,* Kaori Inoue, MD,* Masanori Okumura, MD,* Junichi Ishii, MD, PhD,* Hirofumi Anno, MD, PhD,‡ Renu Virmani, MD, FACC,§ Yukio Ozaki, MD, PhD,* Hitoshi Hishida, MD, PhD,* Jagat Narula, MD, PhD, FACC¶

Toyooka and Takasaki, Japan; Gaithersburg, Maryland; and Irvine, California

- Objectives** To evaluate the feasibility of noninvasive assessment of the characteristics of disrupted atherosclerotic plaques, the authors interrogated the culprit lesions in acute coronary syndromes (ACS) by multislice computed tomography (CT).
- Background** Disrupted atherosclerotic plaques responsible for ACS histopathologically demonstrate large lipid cores and positive vascular remodeling. It is expected that plaques vulnerable to rupture should bear similar imaging signatures by CT.
- Methods** Either 0.5-mm × 16-slice or 64-slice CT was performed in 38 patients with ACS and compared with 33 patients with stable angina pectoris (SAP) before percutaneous coronary intervention. The coronary plaques in ACS and SAP were evaluated for the CT plaque characteristics, including vessel remodeling, consistency of noncalcified plaque (NCP <30 HU or 30 HU <NCP <150 HU), and spotty or large calcification.
- Results** In the CT profile of culprit ACS and SAP lesions, the frequency of 30 HU <NCP <150 HU (100% vs. 100%, $p = \text{NS}$) was not different, and large calcification (22% vs. 55%, $p = 0.004$) was significantly more frequent in the stable lesions. Positive remodeling (87% vs. 12%, $p < 0.0001$), NCP <30 HU (79% vs. 9%, $p < 0.0001$), and spotty calcification (63% vs. 21%, $p = 0.0005$) were significantly more frequent in the ACS lesions. Presence of all 3 (i.e., positive remodeling, NCP <30 HU, and spotty calcification) showed a high positive predictive value, and absence of all 3 showed a high negative predictive value for the culprit plaques associated with ACS.
- Conclusions** The CT characteristics of plaques associated with ACS include positive vascular remodeling, low plaque density, and spotty calcification. It is logical to presume that plaques vulnerable to rupture harbor similar characteristics. (J Am Coll Cardiol 2007;50:319-26) © 2007 by the American College of Cardiology Foundation

Multislice Computed Tomographic Characteristics of Coronary Lesions in Acute Coronary Syndromes

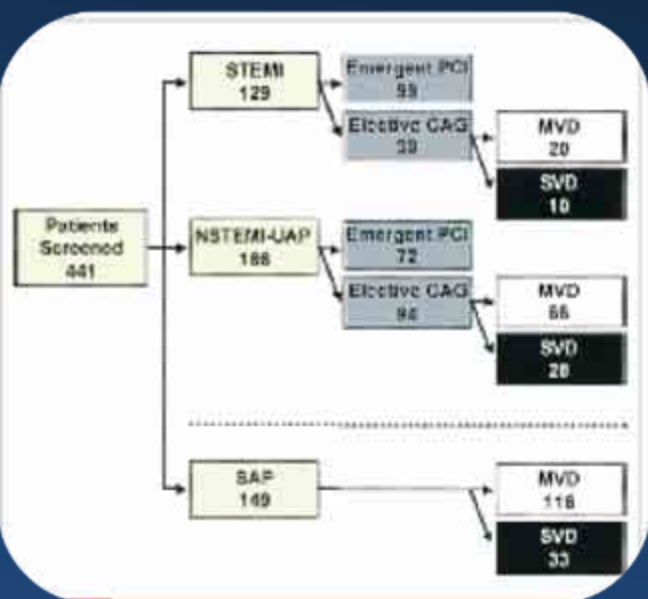
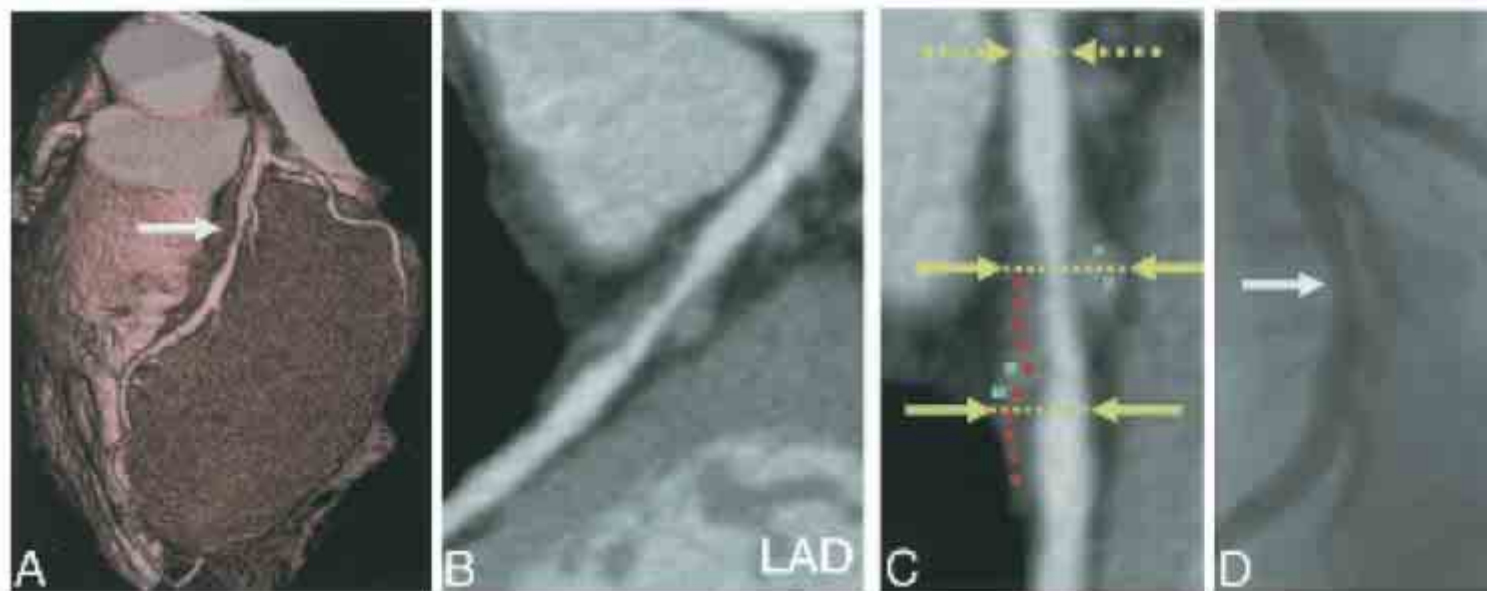


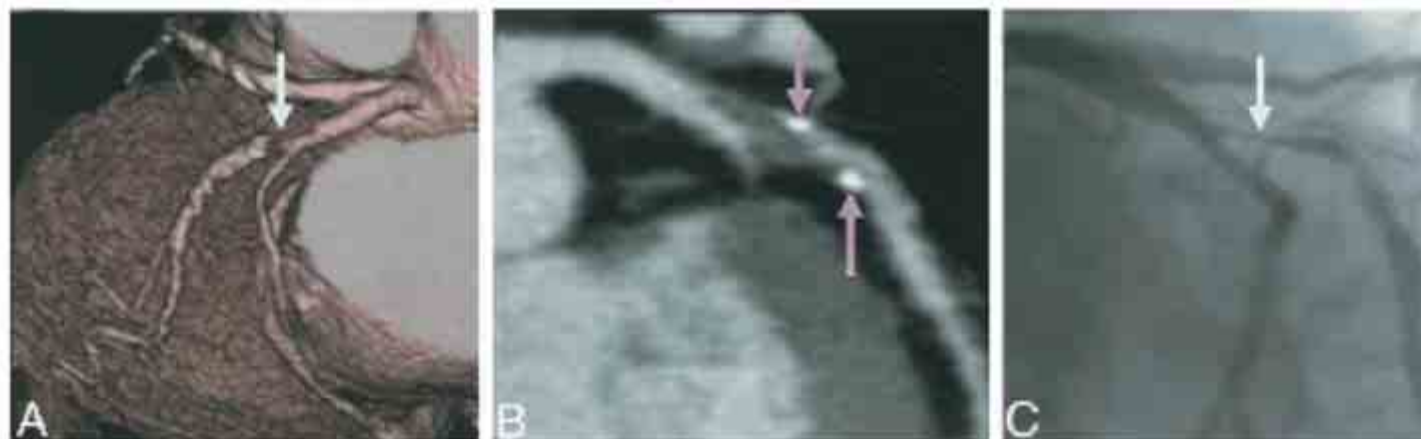
Table 1 Clinical and Angiographic Characteristics of the Patients

	ACS (n = 38) (STEMI 10, NSTEMI 9, UAP 19)	SAP (n = 33)	p Value
Age, yrs	62 ± 11	67 ± 9	0.053
Male/female	31/7	23/10	0.242
Diabetes	8 (21%)	7 (22%)	0.987
Hypertension	16 (42%)	19 (58%)	0.295
Hyperlipidemia	23 (61%)	22 (67%)	0.692
Smoking	19 (51%)	18 (55%)	0.702
Obesity	11 (29%)	11 (33%)	0.690
Lesion location			0.650
LAD	19 (50%)	14 (42%)	
LCX	8 (22%)	6 (18%)	
RCA	11 (29%)	12 (36%)	

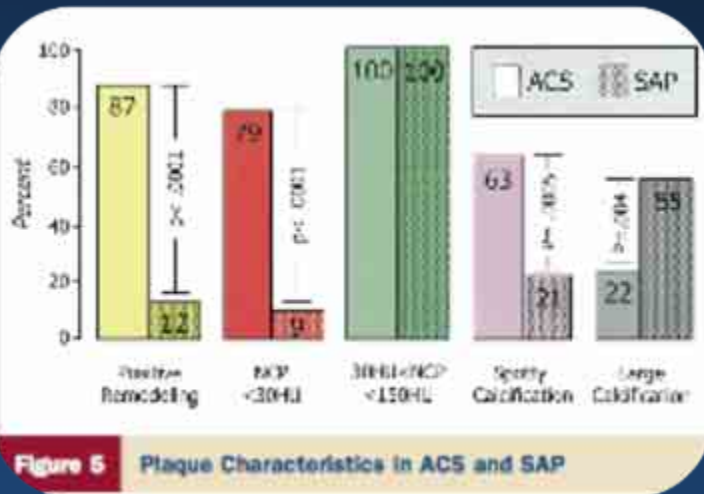
Multislice Computed Tomographic Characteristics of Coronary Lesions in Acute Coronary Syndromes



Multislice Computed Tomographic Characteristics of Coronary Lesions in Acute Coronary Syndromes



Multislice Computed Tomographic Characteristics of Coronary Lesions in Acute Coronary Syndromes



Positive remodeling

NCP < 30 HU

NCP >30 HU <150 HU

Spotty Calcification

Large Calcification >220 HU

Figure 5 Plaque Characteristics in ACS and SAP

Table 2 CT Characteristics of Culprit Lesions in ACS and Target Lesions in SAP

	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)	Accuracy (%)
Positive remodeling	87	88	89	65	88
NCP <30 HU	79	91	91	79	85
Spotty calcification	63	79	77	65	72
Positive remodeling + NCP <30 HU	74	93	93	76	83
Positive remodeling + NCP <30 HU + spotty calcification	47	97	95	60	70
Positive remodeling or NCP <30 HU	92	85	89	90	89
Positive remodeling or NCP <30 HU or spotty calcification	100	67	78	100	85

Multislice Computed Tomographic Characteristics of Coronary Lesions in Acute Coronary Syndromes

Conclusions

CT characteristics of culprit lesions associated with ACS seem to be distinct from those of stable plaques.

These characteristics include positive vascular remodeling, presence of low-attenuation NCP, and spotty calcification.

It is logical to propose that plaques vulnerable to rupture should harbor similar characters and be amenable to noninvasive CT imaging.



Usefulness of Coronary Computed Tomography Angiography For Early Triage of Patients with Acute Chest Pain - The Rule Out Myocardial Infarction Using Computer Assisted Tomography (ROMICAT) Trial

Udo Hoffmann, Fabian Bamberg, Claudia U. Chae, John H. Nichols, Ian S. Rogers, Sujith K. Seneviratne, Quynh A. Truong, Ricardo C. Cury, Suhny Abbara, Michael D. Shapiro, Jamaluddin Moloo, Javed Butler, Maros Ferencik, Hang Lee, Ik-Kyung Jang, Blair A. Parry,

Department of Radiology, Emergency Medicine, and Cardiology Division, Massachusetts General Hospital and Harvard Medical School, Boston MA

Early Risk Stratification and Triage in the ED



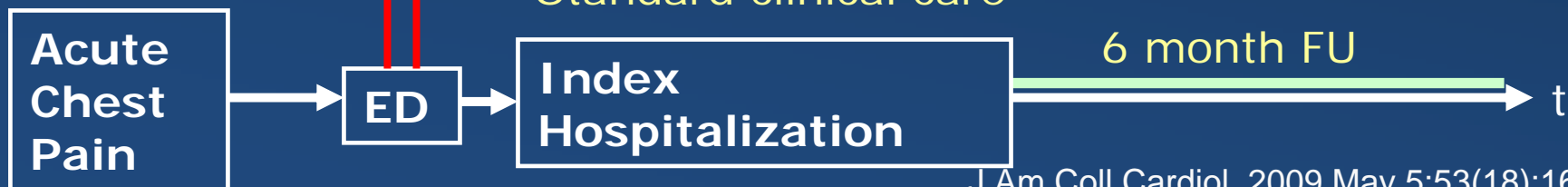
- 6 Million present with chest pain to ED annually
-
- ECG, initial biomarkers, and clinical presentation and traditional risk factors – no safe triage possible (Nagurney, JAMA 2006)
- low threshold to admit, >80% have no ACS, \$8Billion annually healthcare cost
- 1-5% of missed ACS cause 20% of ED malpractice costs

Improvement of the initial ED evaluation needed!

Observational, double-blinded Cohort Study

Cardiac CT Analysis - blinded to caregiver and subjects

1. Presence of atherosclerotic plaque per coronary segment
 - a. Calcified plaque
 - b. Non-calcified plaque
2. Presence of significant coronary artery stenosis (>50%)



Summary



- *confirmation - Absence of any CAD in 50% of patients - 100% NPV for ACS – may enable early safe and early discharge from the ED*
- triage criterion of 50% stenosis is not perfect because of non-stenotic ACS and limited spatial resolution of coronary CTA
- significant stenosis is detected in 10% of patients by coronary CTA – about 40% of these were discharged with a diagnosis of non-cardiac chest pain
- incremental value of non- calcified plaque for early triage is limited

Caso Clínico

- Pte 63 años sexo masculino
- Hipertenso, Dislipidémico
- Sintomático por Dolor Precordial
- PEG: infradesnivel ST cara inferior Insuficiente por cansancio de piernas

Sr: 534 +c
MIP No cut Inverse

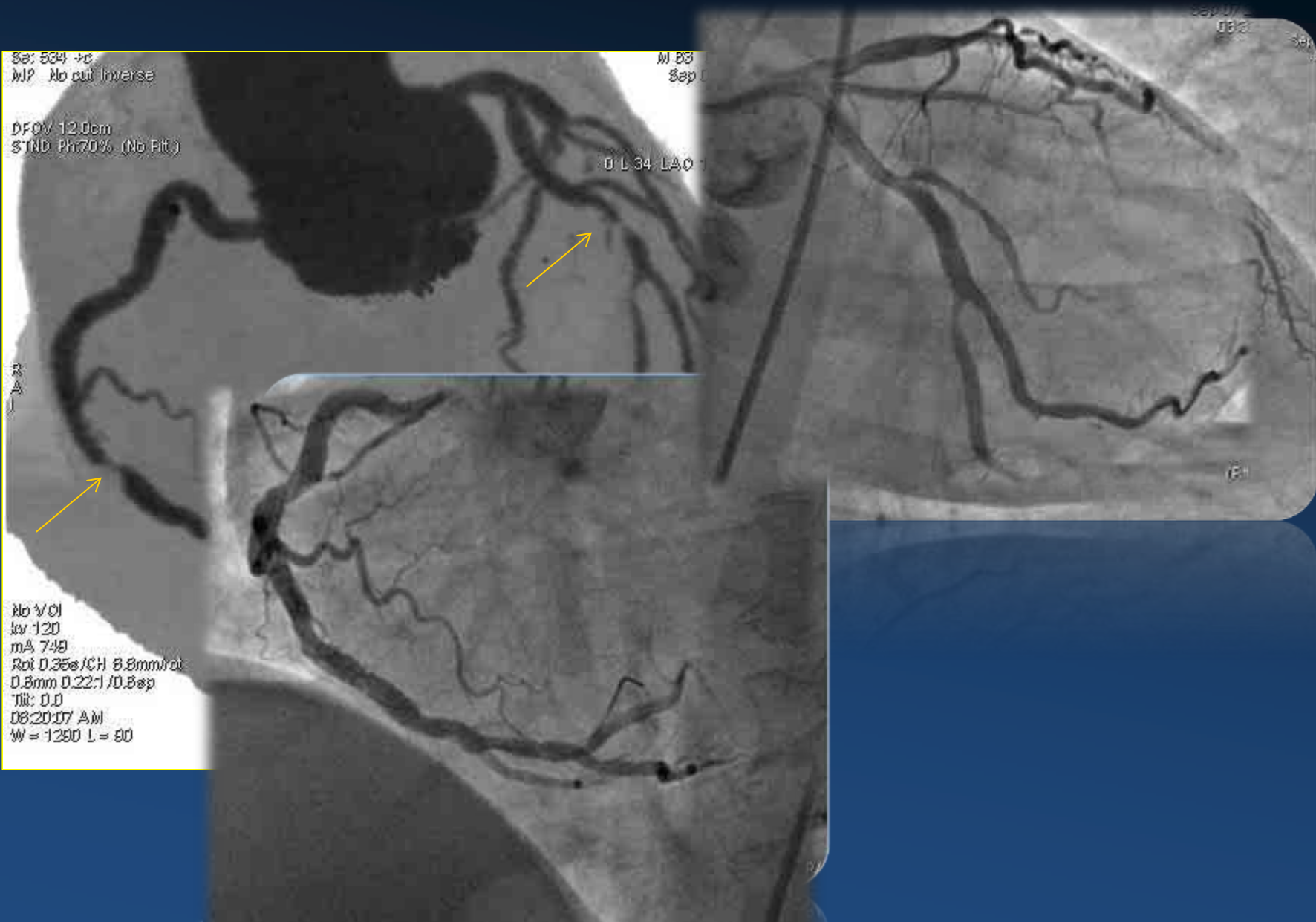
DFOV 12.0cm
STND Ph70% (No Fit)

R
A
I

No VCI
kv 120
mA 748
Rot 0.36s / CH 8.8mm / cu
0.8mm D.22:1 / D.8ap
Tilt: 0.0
08:20:07 AM
W = 1280 L = 80

M 53
Sep 0

0 L 34 LAO



EXPERT CONSENSUS DOCUMENT

ACCF/ACR/AHA/NASCI/SAIP/SCAI/SCCT 2010 Expert Consensus Document on Coronary Computed Tomographic Angiography

A Report of the American College of Cardiology Foundation Task Force on
Expert Consensus Documents

**Writing
Committee
Members**

Daniel B. Mark, MD, MPH, FACC, FAHA,
*Chair**

Daniel S. Berman, MD, FACC†‡
Matthew J. Budoff, MD, FACC, FAHA§
J. Jeffrey Carr, MD, FACC, FAHA||
Thomas C. Gerber, MD, FACC, FAHA¶#
Harvey S. Hecht, MD, FACC§
Mark A. Hlatky, MD, FACC, FAHA
John McB. Hodgson, MD, FSCAI, FACC**
Michael S. Lauer, MD, FACC, FAHA*
Julie M. Miller, MD, FACC*

Richard L. Morin, PhD||
Debabrata Mukherjee, MD, FACC
Michael Poon, MD, FACC‡
Geoffrey D. Rubin, MD, FAHA¶#
Robert S. Schwartz, MD, FACC**

*American College of Cardiology Foundation Representative; †American Society of Nuclear Cardiology Representative; ‡Society of Cardiovascular Computed Tomography Representative; §Society of Atherosclerosis Imaging and Prevention Representative; ||American College of Radiology Representative; ¶American Heart Association Representative; #North American Society for Cardiovascular Imaging Representative; **Society for Cardiovascular Angiography and Interventions Representative

**ACCF
Task Force
Members**

Robert A. Harrington, MD, FACC, FAHA,
Chair

Eric R. Bates, MD, FACC
Charles R. Bridges, MD, MPH, FACC,
FAHA
Mark J. Eisenberg, MD, MPH, FACC,
FAHA
Victor A. Ferrari, MD, FACC, FAHA

Alice K. Jacobs, MD, FACC, FAHA
Sanjay Kaul, MD, MBBS, FACC
David J. Moliterno, MD, FACC
Debabrata Mukherjee, MD, FACC
Robert S. Rosenson, MD, FACC, FAHA
James H. Stein, MD, FACC, FAHA††
Howard H. Weitz, MD, FACC
Deborah J. Wesley, RN, BSN, CCA

EXPERT CONSENSUS DOCUMENT

**ACCF/ACR/AHA/NASCI/SAIP/SCAI/SCCT
2010 Expert Consensus Document on
Coronary Computed Tomographic Angiography**

A Report of the American College of Cardiology Foundation Task Force on
Expert Consensus Documents

- **8.3. Use of Coronary CT Angiography in the Assessment of Patients With Acute Chest Pain**

Chang SA, Choi SI, Choi EK, et al.

Usefulness of 64-slice multi-detector computed tomography as an initial diagnostic approach in patients with acute chest pain. **Am Heart J. 2008;156:375–83.**

Hoffmann U, Nagurney JT, Moselewski F, et al.

Coronary multidetector computed tomography in the assessment of patients with acute chestpain. **Circulation.2006;114:2251– 60.**

Goldstein JA, Gallagher MJ, O'Neill WW, et al.

A randomized controlled trial of multi-slice coronary computed tomography for evaluation of acute chest pain. **J Am Coll Cardiol. 2007;49:863–71.**

Hollander JE, Chang AM, Shofer FS, et al.

Coronary CT angiography for rapid discharge of low-risk patients with potential acute coronary syndromes. **Ann Emerg Med. 2009; 53:295–304.**

THE CT-STAT Trial

BACKGROUND: In the U.S., approximately 6 million patients present to the emergency department (ED) annually with chest pain or equivalent complaints, incurring \$8-10 billion for hospital stays to rule out acute coronary syndromes. **PURPOSE:** CTAT is a randomized, multicenter study that sought to compare the safety and efficiency of coronary computed tomographic angiography (CCTA) to standard of care (SOC) evaluation of low-intermediate risk patients with acute chest pain.

DESIGN: At 16 trial sites, 749 acute chest pain patients with low-to-intermediate risk (negative initial cardiac enzymes and EKGs) were randomized to a diagnostic strategy including CCTA (n=376) or SOC with myocardial perfusion imaging (MPI) (n=373) for disposition to immediate discharge, additional noninvasive testing or invasive angiography.



Primary Endpoint: tomographic angiography (CCTA) and standard of care (SOC)

Secondary Endpoint: invasive angiography during index, visit final discharge diagnosis of acute coronary syndromes time to diagnosis and cost of care

Primary Outcomes: safety (freedom from 6-month major adverse cardiac events - MACE) and efficiency (time to disposition and ED cost of care).

Results: Time-to-diagnosis decreased by half, due to more rapid facilitation in testing. Cost-to-diagnosis decreased by one-third, primarily due to expedited time-to-diagnosis and reduced length of stay

Conclusion: Compared to SOC, CCTA is faster, cheaper, and safe

EXPERT CONSENSUS DOCUMENT

**ACCF/ACR/AHA/NASCI/SAIP/SCAI/SCCT
2010 Expert Consensus Document on
Coronary Computed Tomographic Angiography**

A Report of the American College of Cardiology Foundation Task Force on
Expert Consensus Documents

- 8.3. Use of Coronary CT Angiography in the Assessment of Patients With Acute Chest Pain

Overall,

these results reinforce the data from the stable angina studies showing that a negative coronary CTA study improves diagnostic certainty for ruling out significant coronary disease in a low-risk acute coronary population.

MUCHAS GRACIAS