MEDIC

ROLE OF MSCT FOR ACUTE CHEST PAIN: UPDATE 2023

BS CK II. Nguyễn Xuân Trình

Department of Cardiology- MEDIC Medical Center

MEDIC

CÔNG TY TNHH Y TẾ HÒA HẢO - PHÒNG KHÁM ĐA KHOA
(Tên cũ: TRUNG TÂM CHẨN ĐOÁN Y KHOA - MEDIC)
254 Hòa Hảo, P.4, Q.10, TP. Hồ Chí Minh
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Đăng ký khám trực tuyến:
http://medichh.nthsoft.vn
Hoặc app: Medic Hoa Hao

Qr code kết quả chứa bệnh án của quý khách. Medic không chịu trách nhiệm nếu quý khách cung cấp cho người khác.

QRCode kết quả

PHIẾU KHÁM BỆNH

KHOA TIM MẠCH - PHÒNG: 1

Họ tên:
Địa chỉ:
Nghề nghiệp: **Công nhân**

Năm sinh: **1972 - Nam**
ĐT:
Số thẻ BHYT:

Huyết áp - Mạch: **110/67 - 79 (08:10)** Cao: **152** cm; Nặng: **76** kg; Nhiệt độ: **37**°C

Tiền sử bệnh: THUỐC LÁ 1/2 GÓI/ NGÀY
THA ĐANG DÙNG KHÔNG RÕ LOẠI

Lý do đi khám: MỆT CẤP CỨU NHIỀU LẦN , TIM ĐẬP NHANH

CHỈ ĐỊNH:

1. SIÊU ÂM (1): SA Tim Màu

2. ĐIỆN CHẨN ĐOÁN (2): Holter ECG ; Điện tâm đồ (ECG)

3. MRI-CT SCAN (1): MSCT Mạch Vành - Tim

4. KHÁM BỆNH (1): Khám CK Tim mạch

XÉT NGHIỆM:

Giờ	Người lấy mẫu
____:____	

TỔNG SỐ XÉT NGHIỆM: 16

NFS (C.B.C)	HbA1C	GGT	TSH (Thế hệ 3)
AST (SGOT)	Triglycerides	eGFR (Độ Lọc Cầu Thận)	Free T4
ALT (SGPT)	LDL.C	Uric acid	Troponin - T hs
Tổng Phân Tích Nước Tiểu	Glucose (Random)	Ion đồ chung	D - Dimer

Bình thường

CHỈ ĐỊNH BỔ SUNG:

.....
.....
.....

Ngày 11 tháng 09 năm 2023 - 09:30

Bác sĩ

ĐD. NGUYỄN THỊ HỒNG NHUNG

BS. CKII. NGUYỄN XUÂN TRÌNH

Case 1

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Case 1

CÔNG TY TNHH Y TẾ HÒA HẢO - PHÒNG KHÁM ĐA KHOA
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QRCode kết quả

KẾT QUẢ SIÊU ÂM TIM MÀU

Máy: **ALOKA -ProSound α6**

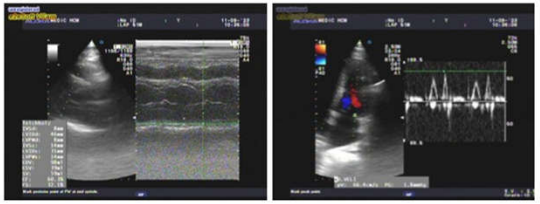
ID
Họ và tên **51** tuổi **Nam**
Địa chỉ : 436 Mã Lò - P. Bình Hưng Hòa A - Q. Bình Tân, Tp. Hcm -- 0989774455
Lâm sàng : MỆT CẤP CỨU NHIỀU LẦN , TIM ĐẬP NHANH

VÙNG KHẢO SÁT : SIÊU ÂM TIM MÀU

1- Nhĩ trái dãn nhẹ. Các buồng tim khác trong giới hạn bình thường LVDd = 46 mm
Loạn động vách liên thất và thành dưới. Chức năng thất trái bảo tồn EF= 60 % (Teichholz).
Chức năng tâm thu thất phải TAPSE =20 mm

2- Van 2 lá dầy ,hở 1/4-van ĐM chủ dầy ,hở 1/4
Không tăng áp động mạch phổi (PAPs= 28mmHg)

3- Không tràn dịch màng tim.



KẾT LUẬN : **THEO DÕI BỆNH TIM THIẾU MÁU CỤC BỘ**
HỞ VAN 2 LÁ 1/4,HỞ VAN ĐM CHỦ 1/4

Đề nghị :

Tp. Hồ Chí Minh, ngày 11/09/2023 10:39
(Bác sĩ đã ký)

Cao : 152 Nặng : 76 HA : 110/67 Tốc độ : 25mm/s Ngày : 11/ 9/2023 Giờ : 10: 8
Chỉ định : *-*

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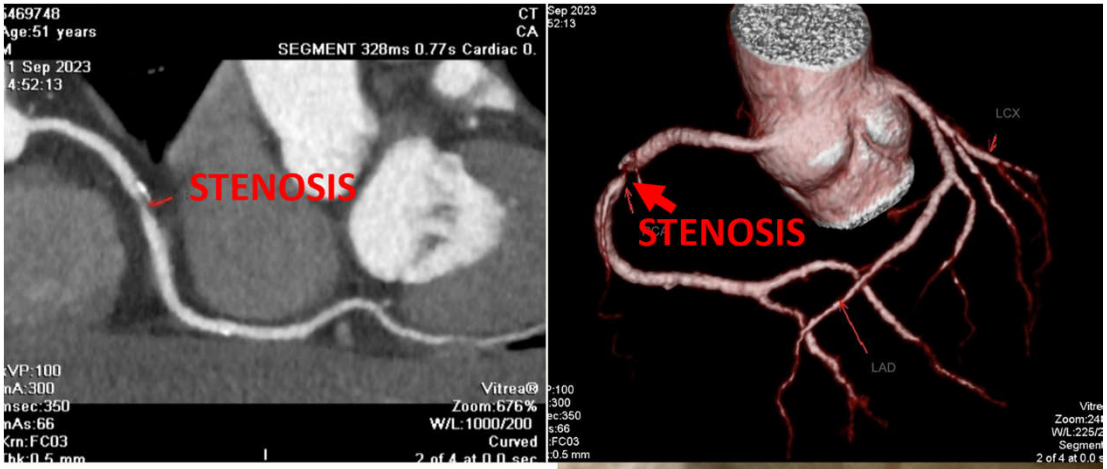
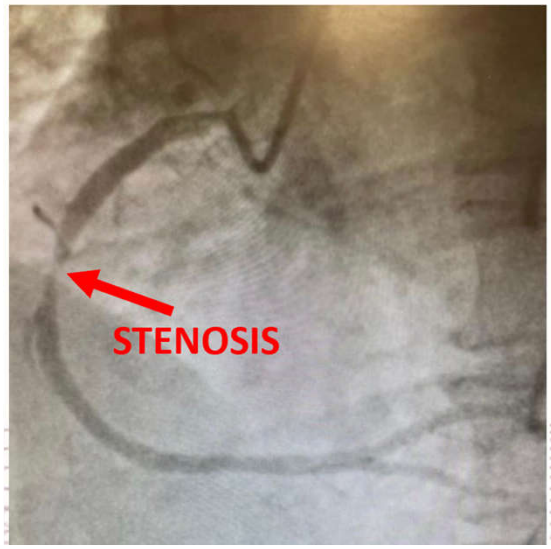
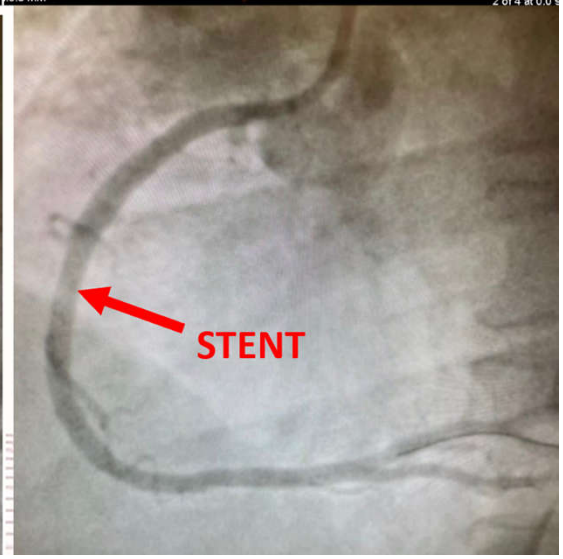
Case 1

Hẹp 90% RCA II







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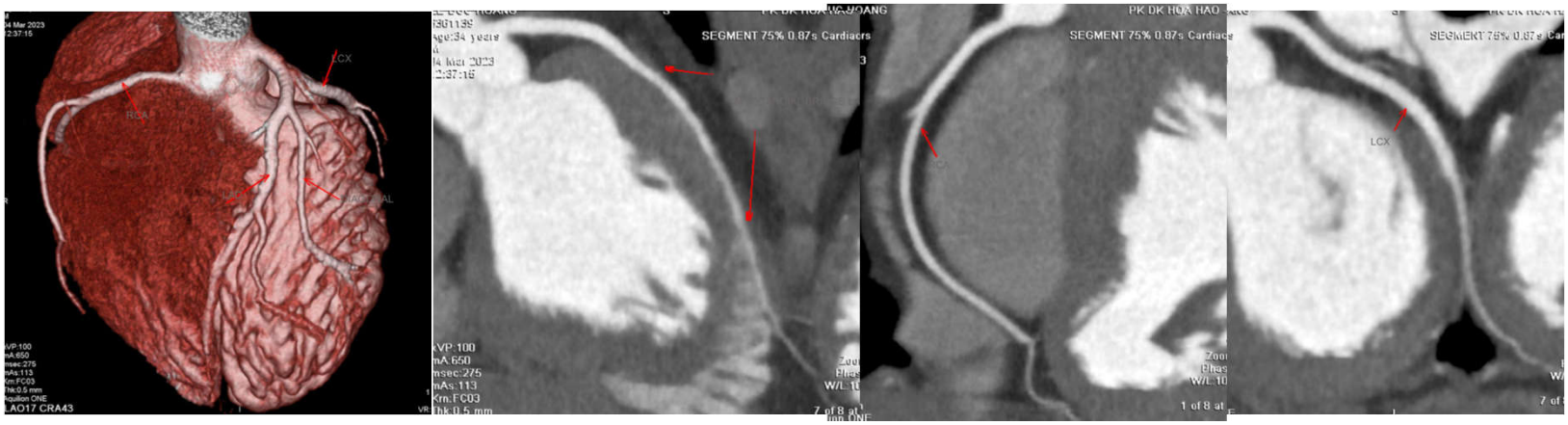
Case 2 : **Viêm cơ tim**, 34M, Mệt, Khó thở, EF giảm, tăng men tim - CT **Đánh giá động mạch vành**



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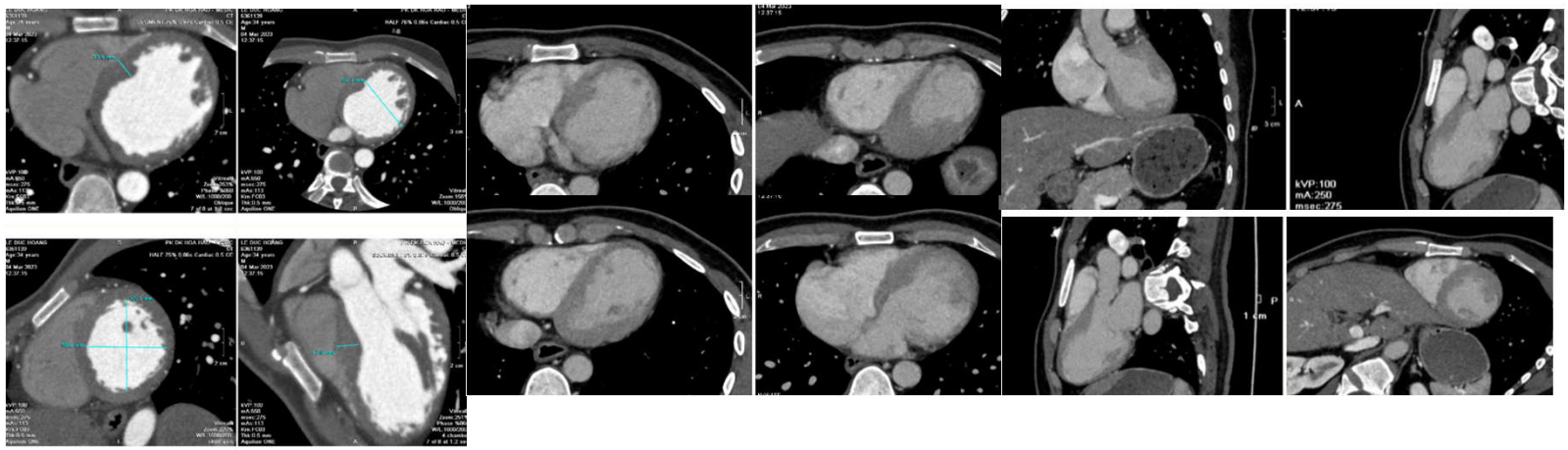
Case 2: **Viêm cơ tim**, 34M, Mệt, Khó thở, EF giảm, tăng men tim - CT **Đánh giá cơ tim**



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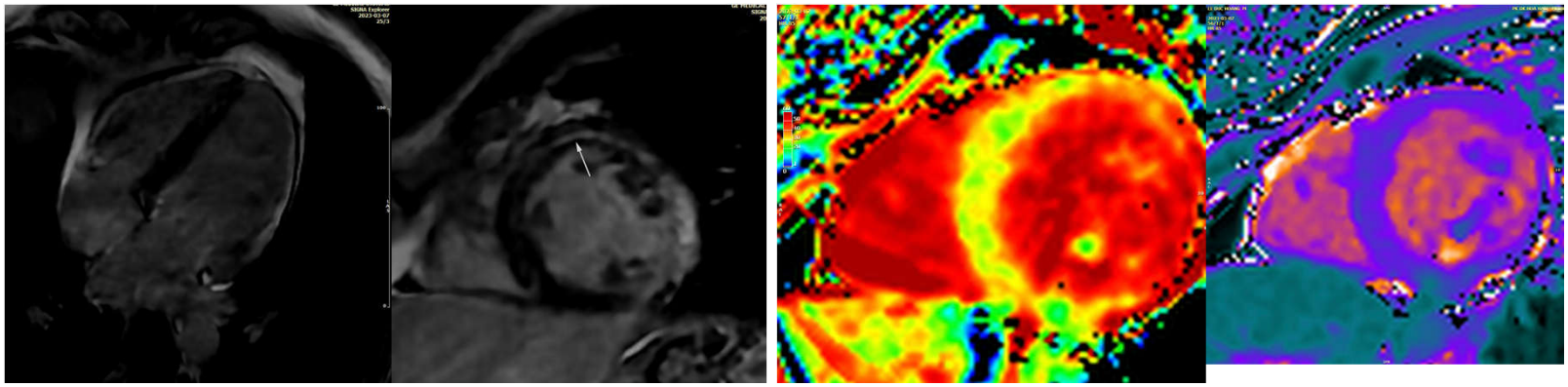
Case 2: Viêm cơ tim, 34M, Mệt, Khó thở, EF giảm, tăng men tim – MRI tim

*** KẾT LUẬN:
- HÌNH ẢNH TRÊN MRI: NGHĨ NHIỀU ĐẾN VIÊM CƠ TIM (THỎA TIÊU CHUẨN LAKE LOUISE 2018).
- VÙNG CƠ TIM VIÊM: THÀNH TRƯỚC PHẦN GIỮA, VÁCH LIÊN THẤT GIỮA VÀ VÁCH MỎM, THÀNH BÊN PHẦN GIỮA VÀ PHẦN GẦN MỎM THẤT TRÁI + THÀNH TỰ DO THẤT PHẢI.
- THẤT TRÁI DÃN NHẸ - GIẢM TRUNG BÌNH CHỨC NĂNG TÂM THU (LVEF=35%).
- LGE (+): SẸO XƠ HÓA XUYÊN THÀNH TOÀN BỘ THÀNH BÊN THẤT TRÁI, SẸO XƠ HÓA Ở GIỮA THÀNH VÙNG VÁCH LIÊN THẤT GIỮA, VÁCH MỎM VÀ THÀNH TRƯỚC PHẦN GIỮA THẤT TRÁI, KHỐI LƯỢNG SẸO 16 GRAM VÀ CHIẾM 18% KHỐI LƯỢNG CƠ TIM THẤT TRÁI.

Tp. Hồ Chí Minh, ngày 07/03/2023 16:42
(Bác sĩ đã ký)



2021 AHA/ACC/ASE/CHEST/SAEM/SCCT/SCMR Guideline for the Evaluation and Diagnosis of Chest Pain: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

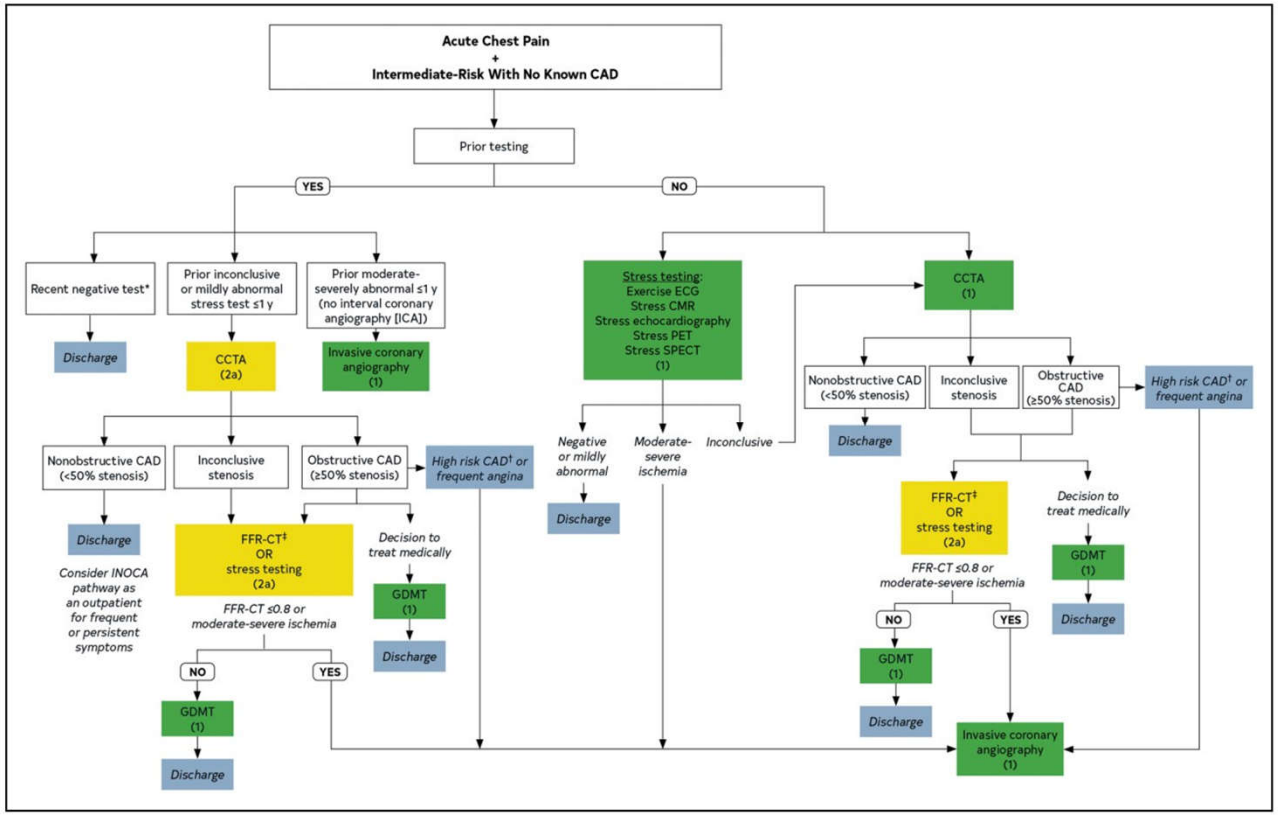


Figure 9. Evaluation Algorithm for Patients With Suspected ACS at Intermediate Risk With No Known CAD

Gulati et al. 2021 AHA/ACC Guideline for the Evaluation and Diagnosis of Chest Pain. Circulation.2021;144:e368–e454

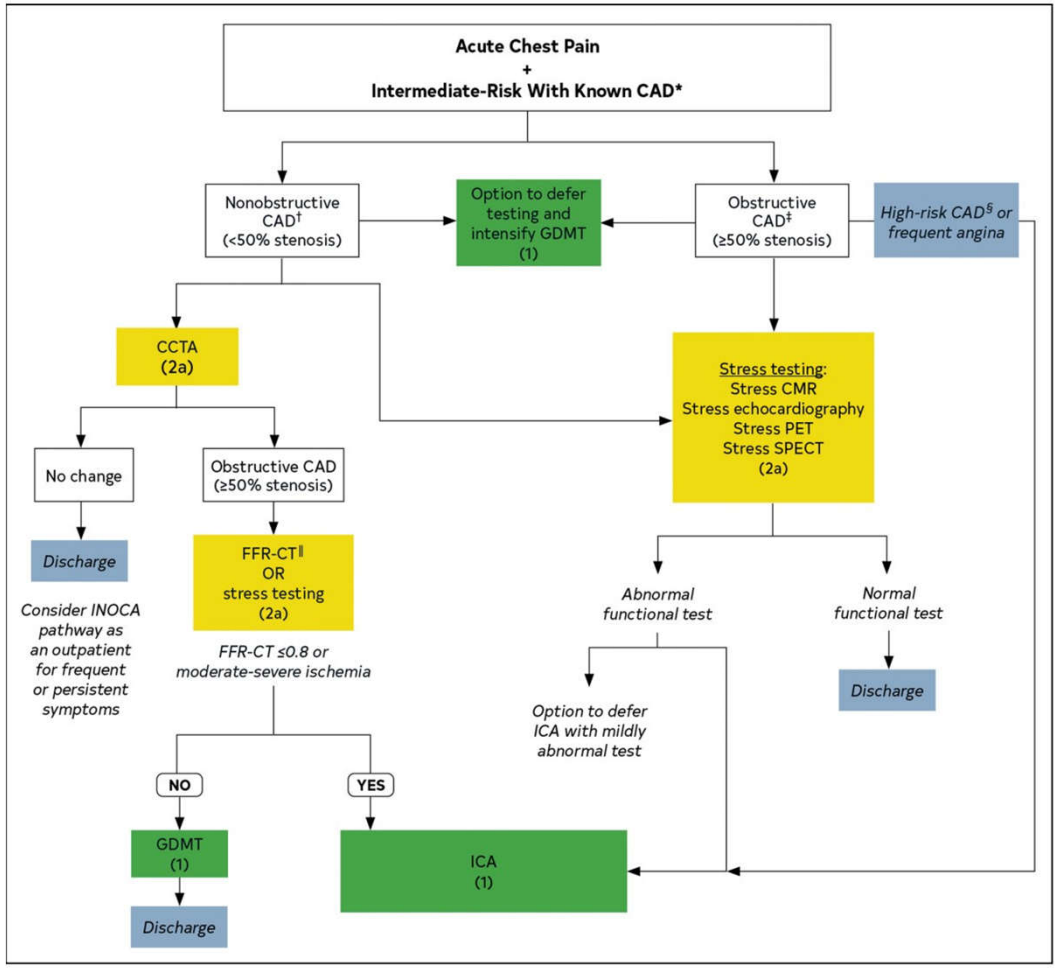


Figure 10. Evaluation Algorithm for Patients With Suspected ACS at Intermediate Risk With Known CAD

Gulati et al. 2021 AHA/ACC Guideline for the Evaluation and Diagnosis of Chest Pain. Circulation.2021;144:e368–e454

ESC European Society of Cardiology
European Heart Journal (2023) **00**, 1–107
https://doi.org/10.1093/eurheartj/ehad191

2023 ESC Guidelines for the management of acute coronary syndromes

Recommendation Table 2 — Recommendations for non-invasive imaging in the initial assessment of patients with suspected acute coronary syndrome

Recommendations	Class[a]	Level[b]
Emergency TTE is recommended in patients with suspected ACS presenting with cardiogenic shock or suspected mechanical complications.	I	C
In patients with suspected ACS, non-elevated (or uncertain) hs-cTn levels, no ECG changes and no recurrence of pain, incorporating CCTA or a non-invasive stress imaging test as part of the initial workup should be considered.[116,122–127]	IIa	A
Emergency TTE should be considered at triage in cases of diagnostic uncertainty but this should not result in delays in transfer to the cardiac catheterization laboratory if there is suspicion of an acute coronary artery occlusion.	IIa	C
Routine, early CCTA in patients with suspected ACS is not recommended.[117]	III	B

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Table 2a
Recommended chest pain pathways: Patients with No known CAD.

Chest Pain Level	Scenario	CAC (without cCTA)	cCTA*	cCTA + FFR-CT	cCTA + CTP	Notes
1	**STEMI** • ECG diagnostic for STEMI					Door-to-balloon time <90 minutes
2	**Leading Diagnosis NSTE-ACS** • ST-changes suggestive of ischemia (no ST-elevation), leading diagnosis NSTE-ACS • Elevated cTn or hs-cTn (>99th percentile)					Invasive coronary angiography; Coronary CTA is rarely indicated to determine if invasive evaluation is appropriate
3	**High Risk for ACS** • Normal or nonischemic ECG, high pretest risk for ACS**, and: ○ Normal or equivocal baseline cTn, *or* ○ hs-cTn <99th percentile					Coronary CTA is an alternative to functional testing or invasive angiography
4	**Low-to-Intermediate Risk for ACS** • Normal or nonischemic ECG, low-to-intermediate risk for ACS**, and: ○ Normal or equivocal baseline cTn, *or* ○ hs-cTn <99th percentile ○ Inadequate or mildly abnormal functional testing during the index ED visit or within the previous 1 year					Coronary CTA is most effective to rule-out ACS
5	**Very Low Risk for ACS** • Normal or nonischemic ECG, low risk for ACS**, and: ○ Normal hs-cTn, or ○ Normal cTn, and leading diagnosis is non-cardiac chest pain					Very low risk patients may not benefit from additional testing; Coronary CTA may be appropriate in some patients to confidently exclude CAD and provide risk stratification

Table 2b
Patients with documented CAD, post-revascularization.

Scenario	CAC (without cCTA)	cCTA*	cCTA + FFR-CT	cCTA + CTP
Prior PCI • Stent within a proximal coronary segment and stent diameter ≥ 3-mm • Normal or nonischemic ECG • Normal or equivocal cTn or hs-cTn				
Prior CABG • Normal or nonischemic ECG • Normal or equivocal cTn or hs-cTn				

C.D. Maroules et al. Journal of Cardiovascular Computed Tomography 17 (2023) 146–163

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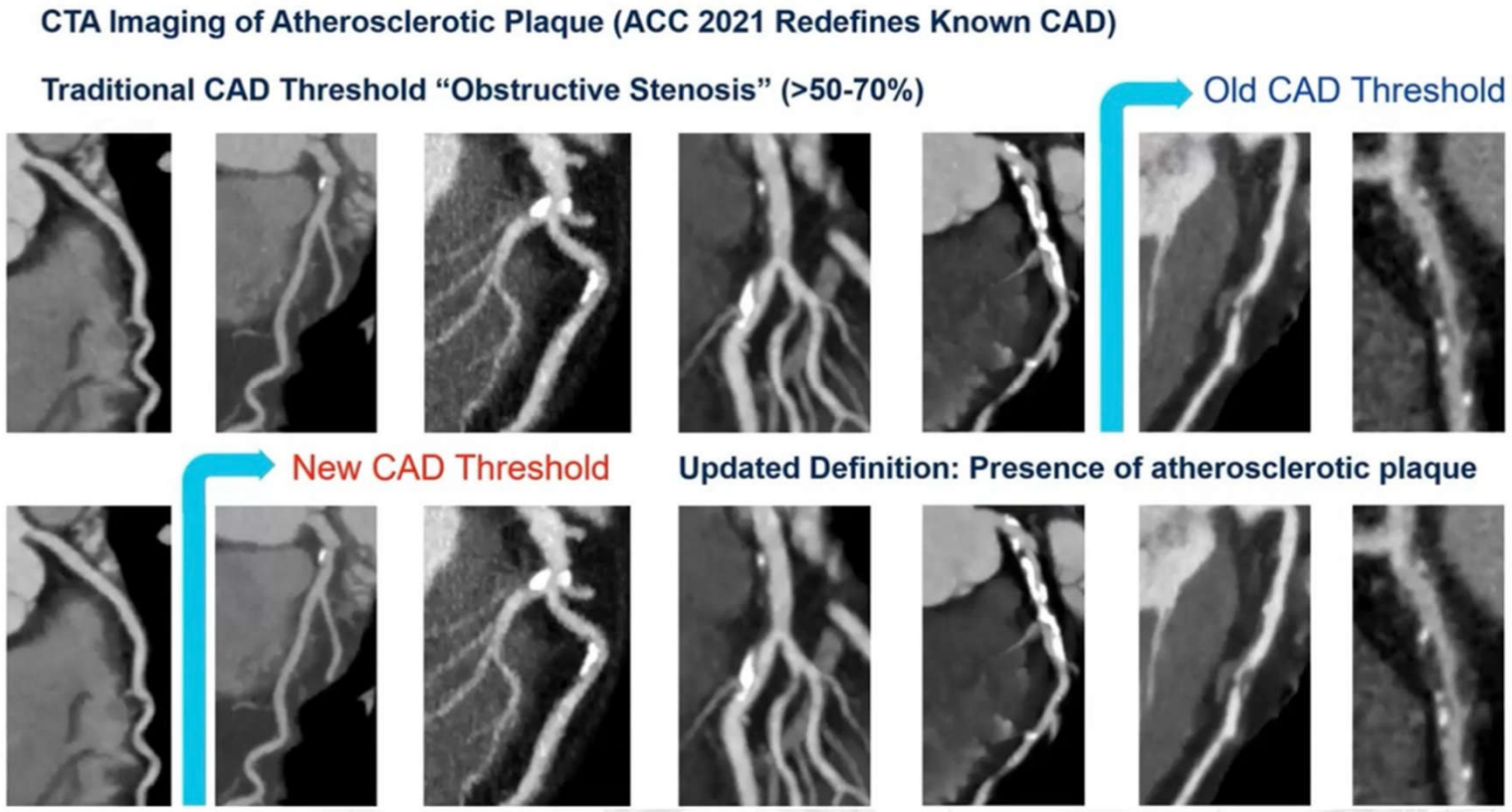

Michael J Gallagher (2023) . https://www.vumedi.com/term/ct/

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CORONARY ARTERY CALCIUM (CAC) TESTING

- Coronary artery calcium (CAC) testing with non-contrast CT is rarely appropriate as a stand-alone test for the evaluation of ACP in the ED.
- When CAC= 0, the rate of obstructive CAD is low (less than 1%) and long-term prognosis is favorable.
- However, CAC = 0 cannot exclude ACS, which can occur in 1–3% of patients who have noncalcified plaque.

C.D. Maroules et al. Journal of Cardiovascular Computed Tomography 17 (2023) 146–163

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Heart. 2023 Apr 12;109(9):695-701. doi: 10.1136/heartjnl-2022-321682.

Coronary calcium score in the initial evaluation of suspected coronary artery disease

Eva Ringdal Pedersen [1 2], Siren Hovland [2], Iman Karaji [3 2], Christ Berge [2], Abukar Mohamed Ali [2], Ole Christian Lekven [2], Kier Jan Kuiper [2], Svein Rotevatn [2], Terje Hjalmar Larsen [2 4]

- **Objective:** We evaluated coronary artery calcium (CAC) scoring as an initial diagnostic tool in outpatients and in patients presenting at the emergency department due to suspected coronary artery disease (CAD).
- **Methods:** 10 857 patients underwent CAC scoring and coronary CT angiography (CCTA)
- **Results:** the sensitivity, specificity, positive predictive value and negative predictive value (NPV) of CAC=0 for obstructive CAD were 95.3%, 53.4%, 30.0% and 98.2%, respectively. However, among patients <45 years of age, although the NPV was high at 98.9%, the sensitivity of CAC=0 for obstructive CAD was only 82.3%.
- **Conclusions:** In symptomatic patients, CAC=0 correctly ruled out obstructive CAD and high-risk CAD in 98.2% and 99.4% of cases. This large registry-based cross-sectional study supports the incorporation of CAC testing in the early triage of patients with chest pain and as a gatekeeper to further cardiac testing. However, a full CCTA may be needed for safely ruling out obstructive CAD in the youngest patients (<45 years of age).

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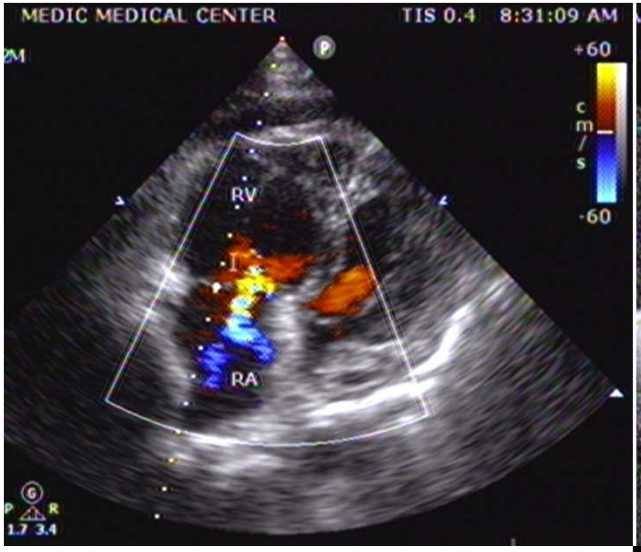
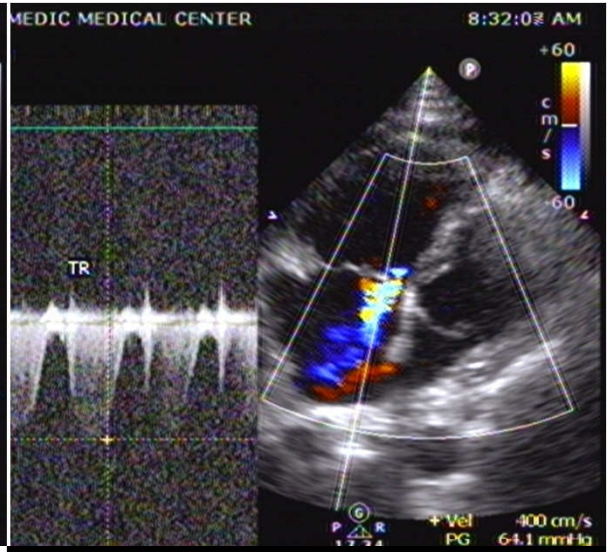
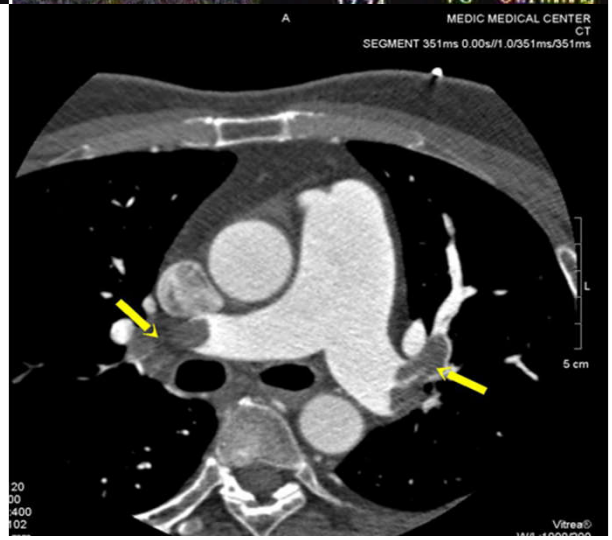




Case 3:

53M, chest pain 1 week , hsTroponin T 0.25ng/L, PAPs=74mmHg

PE /MSCT



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Suspected PE

Table 3. Suspected PE

Indication	CTPA	CompUS	VQ	PMRA	PCath
Likelihood by clinical scoring algorithm alone, patient not pregnant					
11. D-dimer negative Not high likelihood by a clinical scoring algorithm	R	R	R	R	R
12. D-dimer positive Not high likelihood by a clinical scoring algorithm	A	M	A	R	R
13. High likelihood by a clinical scoring algorithm	A	A	A	R	R
Pregnancy					
14. Patient with leg symptoms	M*	A	A	R	R
15. Patient with no leg symptoms	A	M*	A	R	R

Appropriate use key: A = appropriate; M = may be appropriate with rating panel consensus; M* = may be appropriate as determined by lack of consensus by rating panel; R = rarely appropriate.

CTPA = CT pulmonary angiography; CompUS = compression ultrasonography of the deep veins; PCath = catheter-based pulmonary angiography; PMRA = pulmonary MR angiography; VQ = ventilation-perfusion scan.

Rybicki et al . ***Appropriate Utilization of Cardiovascular Imaging in Emergency Department Patients With Chest Pain. J Am Coll Radiol 2016;13:e1-e29***

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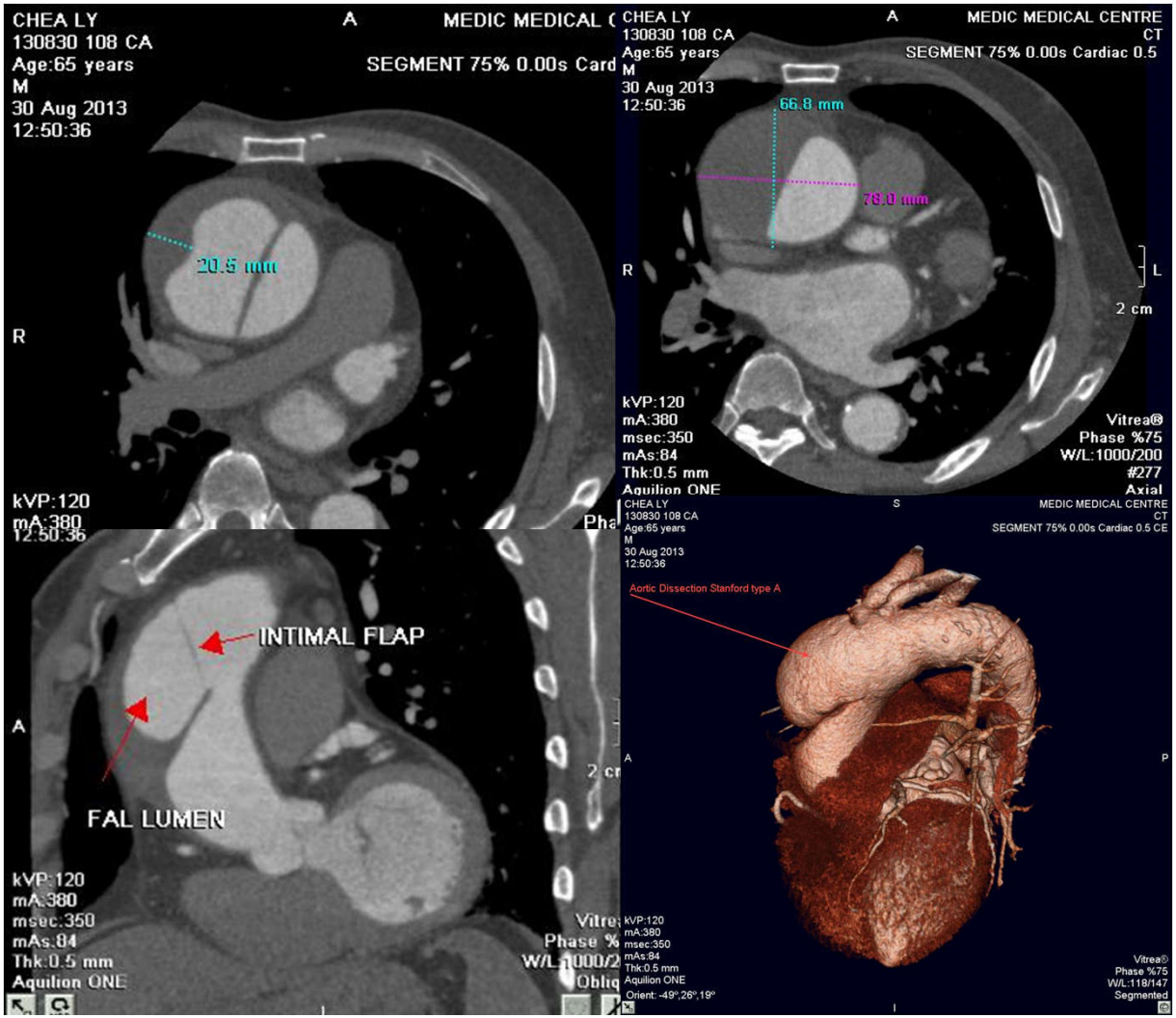
CASE 4


CHEA LY
130830 108 CA
Age:65 years
M
30 Aug 2013
12:50:36
A
MEDIC MEDICAL
SEGMENT 75% 0.00s Card
20.5 mm
R
kVP:120
mA:380
CHEA LY
130830 108 CA
Age:65 years
M
30 Aug 2013
12:50:36
A
MEDIC MEDICAL CENTRE
CT
SEGMENT 75% 0.00s Cardiac 0.5
66.8 mm
78.0 mm
R
L
2 cm
kVP:120
mA:380
msec:350
mAs:84
Thk:0.5 mm
Aquilion ONE
Vitrea®
Phase %75
W/L:1000/200
#277
Axial
INTIMAL FLAP
FAL LUMEN
A
kVP:120
mA:380
msec:350
mAs:84
Thk:0.5 mm
Aquilion ONE
CHEA LY
130830 108 CA
Age:65 years
M
30 Aug 2013
12:50:36
MEDIC MEDICAL CENTRE
CT
SEGMENT 75% 0.00s Cardiac 0.5 CE
Aortic Dissection Stanford type A
A
P
kVP:120
mA:380
msec:350
mAs:84
Thk:0.5 mm
Aquilion ONE
Orient: -49°,26°,19°
Vitrea®
Phase %75
W/L:118/147
Segmented

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Suspected AAS

Table 4. Suspected AAS

Indication	CTAo	MRAo	TTE	TEE	AoCath
Hemodynamically unstable patient					
16. Prior or no prior aorta intervention	A	M*	M*	M*	M*
Hemodynamically stable patient					
17. No prior aorta intervention	A	A	M	A	R
18. Prior aorta intervention	A	A	M	M*	M*

Appropriate use key: A = appropriate; M = may be appropriate with rating panel consensus; M* = may be appropriate as determined by lack of consensus by rating panel; R = rarely appropriate.

AoCath = catheter-based aortography; CTAo = CT aortography; MRAo = MR aortography; TEE = transesophageal echocardiography; TTE = transthoracic echocardiography.

Rybicki et al . ***Appropriate Utilization of Cardiovascular Imaging in Emergency Department Patients With Chest Pain. J Am Coll Radiol 2016;13:e1-e29***

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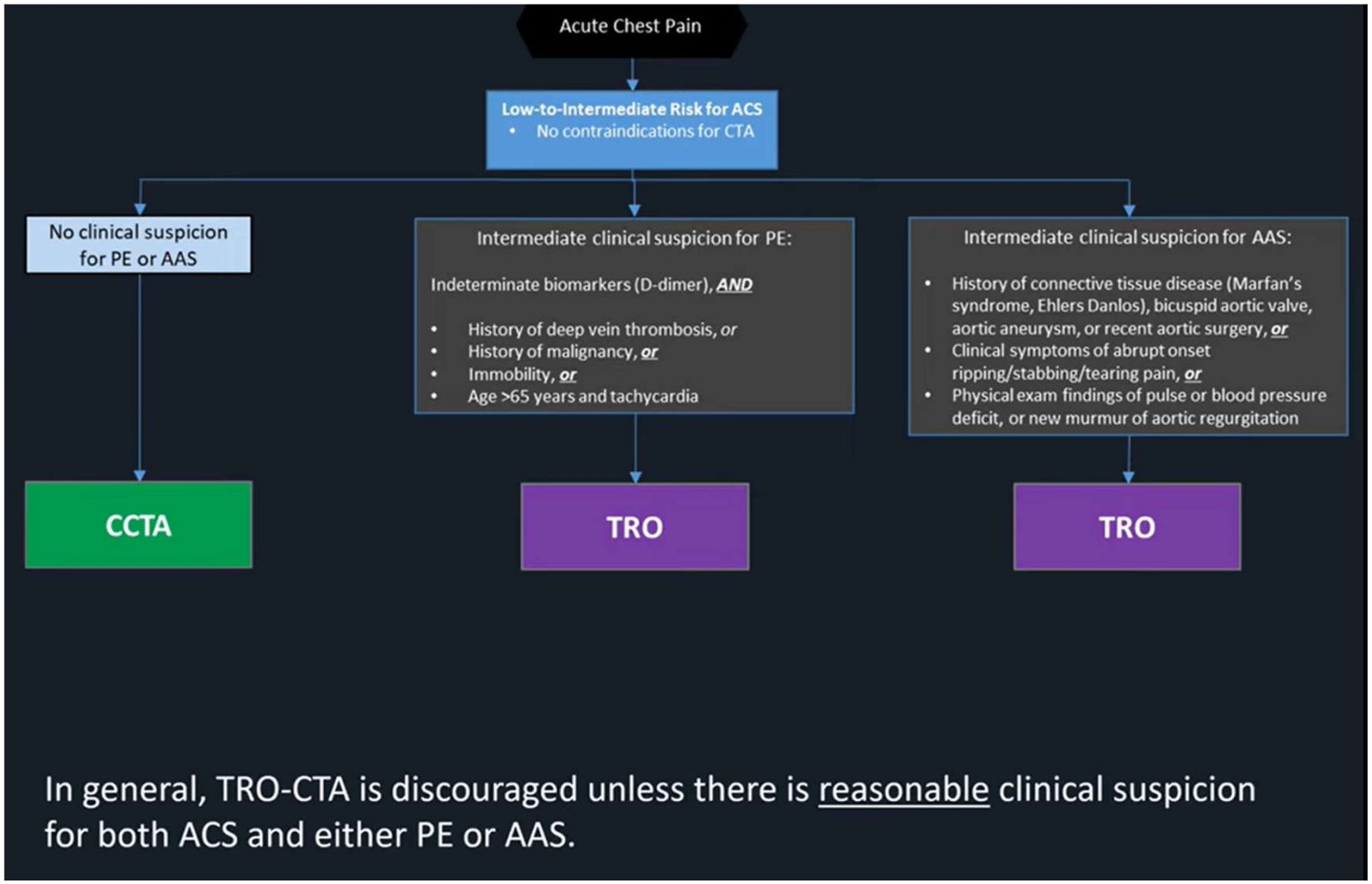
Acute Chest Pain
Low-to-Intermediate Risk for ACS
• No contraindications for CTA
No clinical suspicion for PE or AAS
Intermediate clinical suspicion for PE:
Indeterminate biomarkers (D-dimer), AND
• History of deep vein thrombosis, or
• History of malignancy, or
• Immobility, or
• Age >65 years and tachycardia
Intermediate clinical suspicion for AAS:
• History of connective tissue disease (Marfan's syndrome, Ehlers Danlos), bicuspid aortic valve, aortic aneurysm, or recent aortic surgery, or
• Clinical symptoms of abrupt onset ripping/stabbing/tearing pain, or
• Physical exam findings of pulse or blood pressure deficit, or new murmur of aortic regurgitation
CCTA
TRO
TRO
In general, TRO-CTA is discouraged unless there is reasonable clinical suspicion for both ACS and either PE or AAS.

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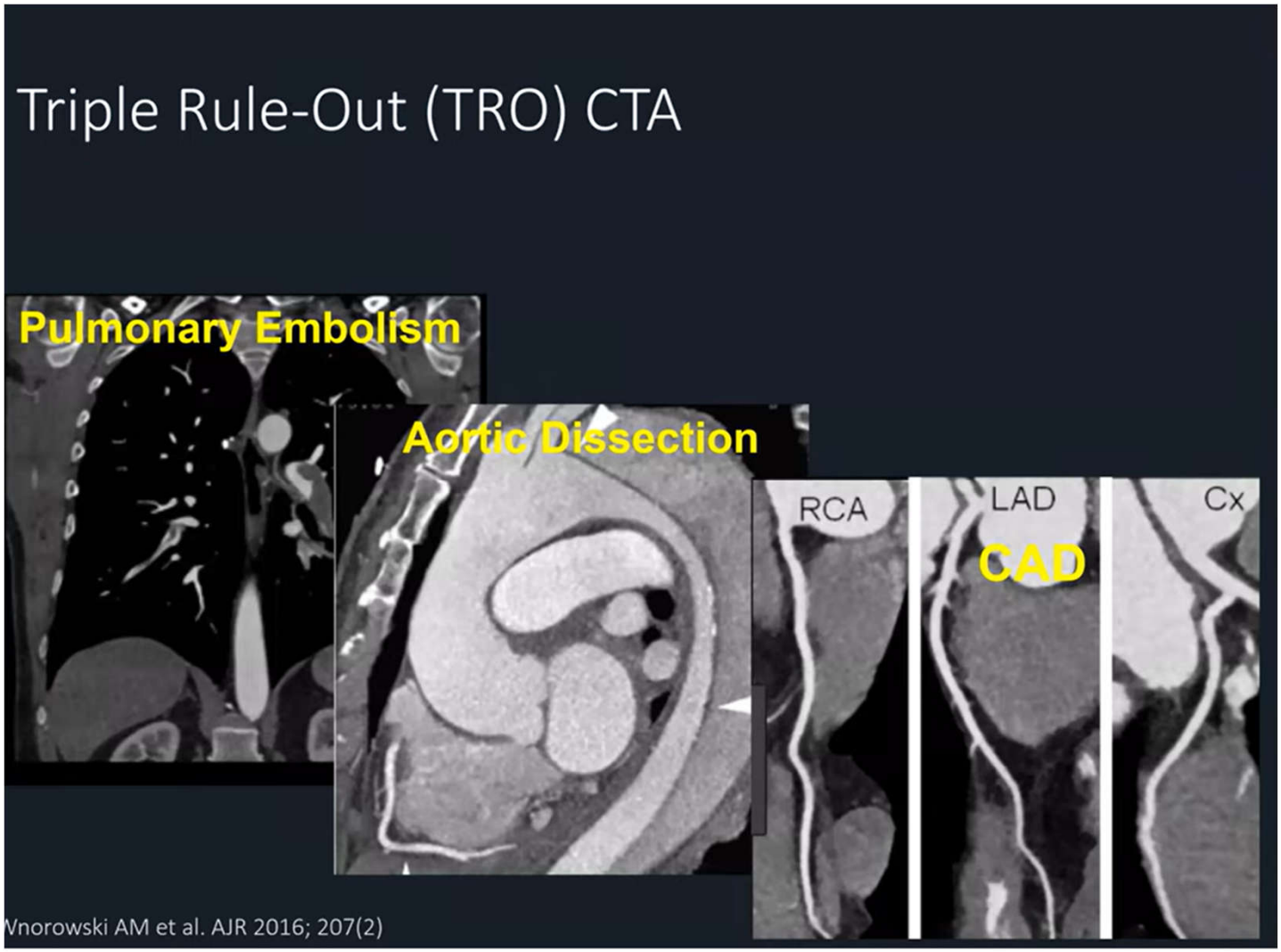
Triple Rule-Out (TRO) CTA



Wnorowski AM et al. AJR 2016; 207(2)

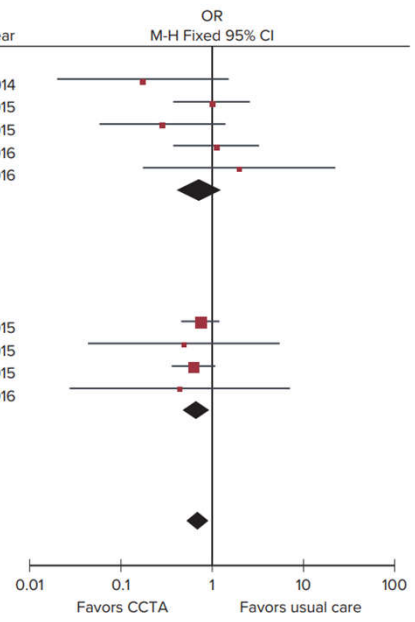
Role of Coronary CT Angiography in the Evaluation of Acute Chest Pain and Suspected or Confirmed Acute Coronary Syndrome

Tasveer Khawaja, MD, Scott Janus, MD, and Sadeer G Al-Kindi, MD

Department of Medicine, Harrington Heart & Vascular Institute, University Hospitals, Cleveland, OH

Figure 1: Forest Plot from a Meta-analysis of MI Following Coronary CT Angiography Versus Standard Care in Stable and Acute Chest Pain

Study or subgroup	CCTA Events	CCTA Total	Usual care Events	Usual care Total	Weight	OR M-H Fixed 95% CI	Year
2.5.1 Acute chest pain							
CT-STAT (2011)[10]	1	330	5	297	5.0%	0.18 [0.02, 1.53]	2014
PROSPECT (2015)[15]	9	209	9	200	8.1%	1.00 [0.39, 2.57]	2015
CATCH (2015)[14]	2	285	7	291	6.5%	0.29 [0.06, 1.39]	2015
ACRIN-PA (2016)[49]	11	870	5	444	6.2%	1.12 [0.39, 3.26]	2016
PERFECT (2016)[50]	2	206	1	205	0.9%	2.00 [0.18, 22.23]	2016
Subtotal (95% CI)		1891		1437	26.7%	0.74 [0.42, 1.29]	
Total events	25		27				
Heterogeneity: χ^2=4.72, d.f.=4 (p=0.32); I^2=15%							
Test for overall effect: Z=1.06 (p=0.29)							
2.5.2 Stable chest pain							
PROMISE (2015)[51]	30	4996	40	5007	37.5%	0.75 [0.47, 1.21]	2015
CAPP (2015)[52]	1	243	2	245	1.9%	0.5 [0.05, 5.57]	2015
SCOT-HEART (2015)[53]	22	2073	35	207	32.7%	0.62 [0.37, 1.07]	2015
CRESCENT (2016)[54]	1	239	1	108	1.3%	0.45 [0.03, 7.26]	2016
Subtotal (95% CI)		27551		7433	73.3%	0.68 [0.48, 0.97]	
Total events	54		78				
Heterogeneity: χ^2=0.41, d.f.=3 (p=0.94); I^2=0%							
Test for overall effect: Z=2.15 (p=0.03)							
Total (95% CI)		9442		8870	100.0%	0.70 [0.52, 0.94]	
Total events	79		105				
Heterogeneity: χ^2=5.26, d.f.=8 (p=0.73); I^2=0%							
Test for overall effect: Z=2.39 (p=0.02)							
Test for subgroup differences: χ^2=0.05, d.f.=1 (p=0.82); I^2=0%							



Radiology: Cardiothoracic Imaging

ORIGINAL RESEARCH

Comparative Effectiveness of Coronary CT Angiography and Standard of Care for Evaluating Acute Chest Pain: A Living Systematic Review and Meta-Analysis

Maurício F. Barbosa, MD, PhD • Arzu Canan, MD • Yin Xi, PhD • Harold Litt, MD, PhD • Deborah B. Diercks, MD, MSc • Subny Abbara, MD • Fernando U. Kay, MD, PhD

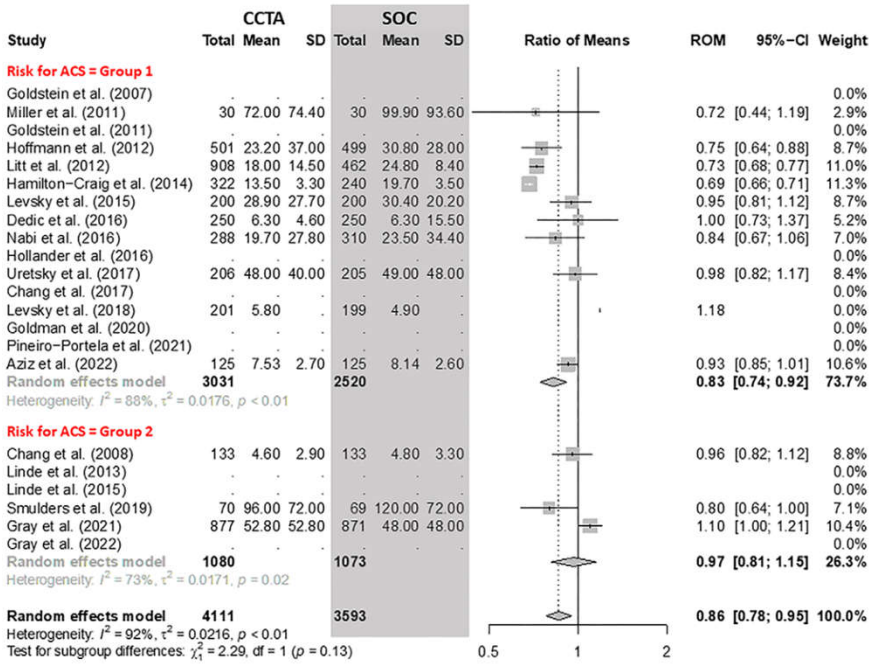


Figure 2: Comparison of the length of stay between coronary CT angiography (CCTA) and standard of care (SOC) arms. Forest plot shows the ratio of means (ROM) for length of stay (in hours) for CCTA compared with SOC arms in participants with acute chest pain, stratified by group (group 1 = low-to-intermediate risk for acute coronary syndrome [ACS] and group 2 = high risk for ACS). The overall ratio of means was 0.86 (95% CI: 0.78, 0.95). The size of central markers reflects the weight of each study. While all studies are listed, some of them have not studied all outcomes, which explains the missing values.

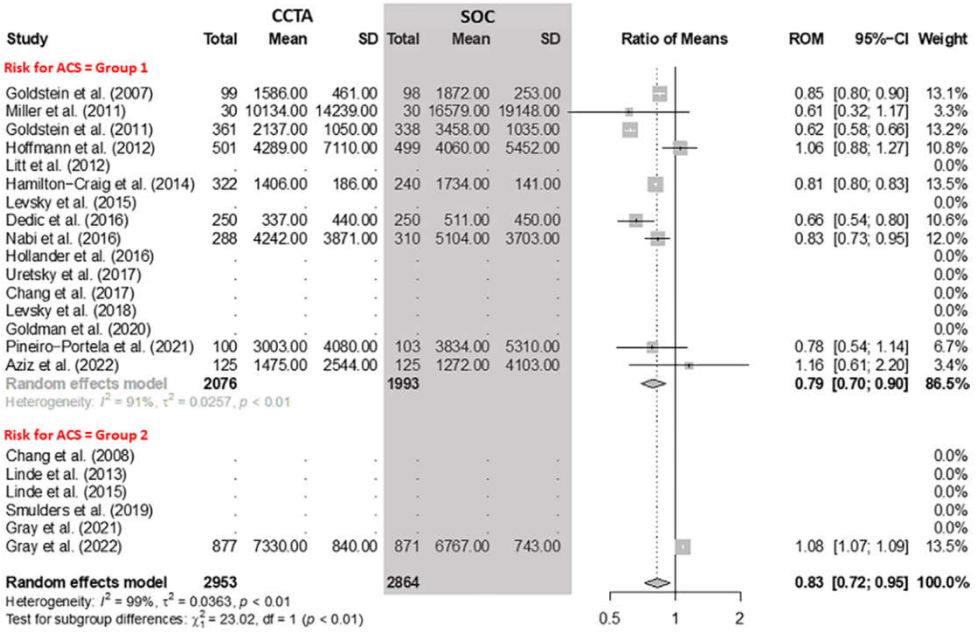


Figure 9: Comparison of costs between coronary CT angiography (CCTA) and standard of care (SOC) arms. Forest plot shows the ratio of means (ROM) for costs (U.S. dollars) for CCTA arms compared with SOC arms in participants with acute chest pain, stratified by group (group 1 = low-to-intermediate risk for acute coronary syndrome [ACS] and group 2 = high risk for ACS). The overall ROM was 0.83 (95% CI: 0.72, 0.95). The size of central markers reflects the weight of each study. While all studies are listed, some of them have not studied all outcomes, which explains the missing values.

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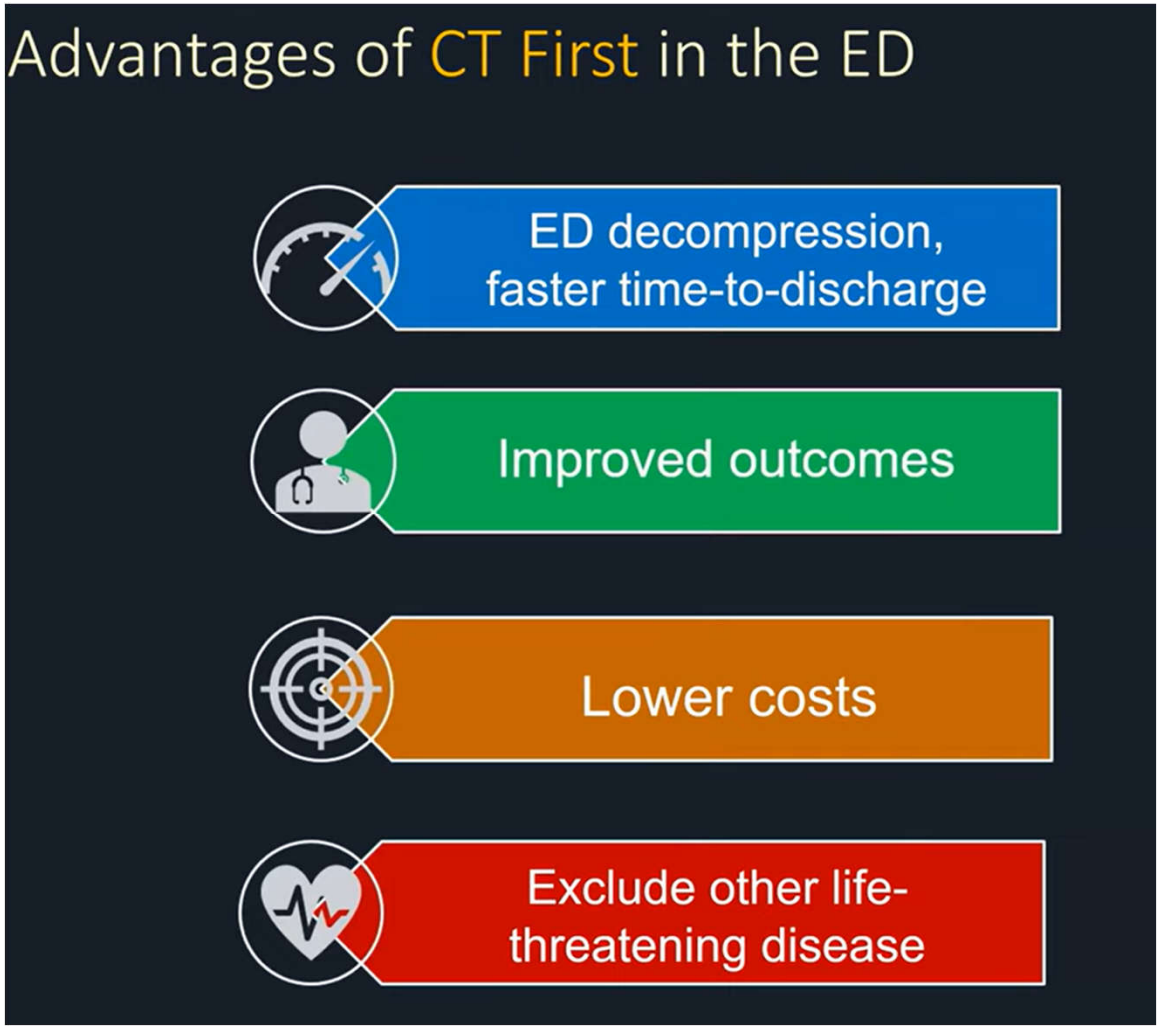
Advantages of CT First in the ED
ED decompression, faster time-to-discharge
Improved outcomes
Lower costs
Exclude other life-threatening disease

MEDIC

CONCLUSION: CCTA in the ACP

- **CCTA has a high sensitivity (98-100%), Specificity 85% , NPV 100%.**
- **Combined High-risk plaque features and PCAT CT attenuation may allow for Risk Stratification of Patients With Acute Chest Pain**
- **CCTA as first test for low-intermediate risk pts with potential ACS**
- **Combination of hs Troponins and CCTA may play a valuable role in future strategies for the management of patients with ACP.**
- **CCTA demonstrated effectiveness as a safety strategy for evaluation of participants presenting with ACP**
- **The use of CCTA in low- to intermediate-risk participants was associated with a 17% reduction in length of stay and a 21% decrease in immediate costs**

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Thank You