XI congresso nazionale

simeu

ROMA 24-26 MAGGIO 2018

LA DISSEZIONE AORTICA ACUTA

Peiman Nazerian

Med. e Chir. d'Accettazione e di Urgenza. AOU Careggi, Firenze

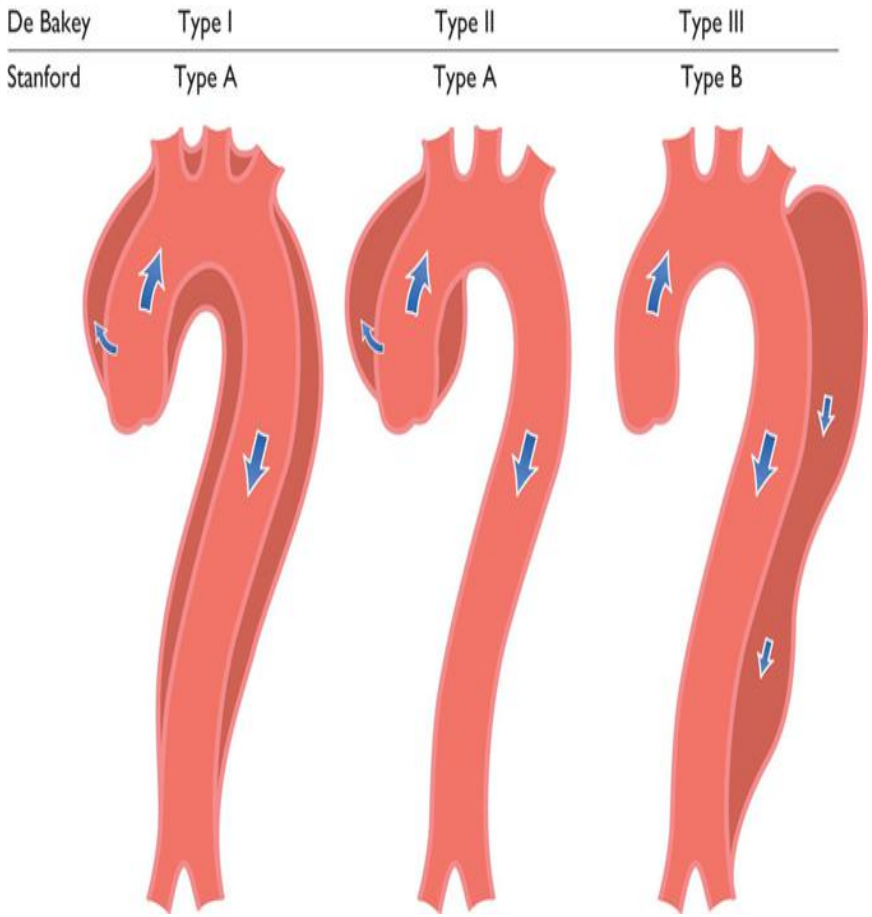
Sindrome Aortica Acuta (SAA)

- **Dissezione aortica** 80-90%
  Stanford A 60-70%
  Stanford B 20-30%

- **Ematoma intramurale aortico** 5-20%
  Stanford A 20-30%
  Stanford B 70-80%

- **Ulcera penetrante aortica** 2-7%

- **Rottura/fissurazione aortica**

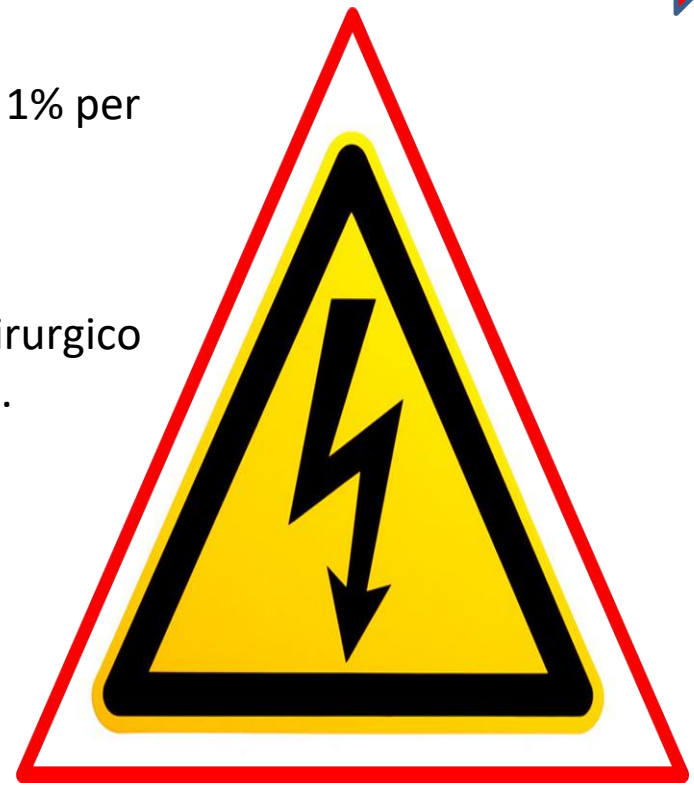


SAA: Epidemiologia e Clinica

Bassa incidenza

6/100.000 persone/anno.
0.2-2% dei dolori toracici in Dip Emergenza.

La mortalità aumenta del 1% per ogni ora trascorsa senza trattamento.
Mortalità a 1 mese 80%.
Il trattamento medico-chirurgico riduce la mortalità al 30%.



Numerose diagnosi differenziali

Conseguenze mortali

Eterogeneità clinica

Differential diagnosis

Chest pain

- Acute coronary syndromes
- Pericarditis
- Pulmonary Embolism
- Pleuritis
- Pneumothorax
- Esophageal disease
- Muscle-scheletal pain

Abdominal pain

- Intestinal occlusion/perforation/Ischemia
- Kidney colic
- Biliary colic

Cardiac arrest/Shock/Syncope

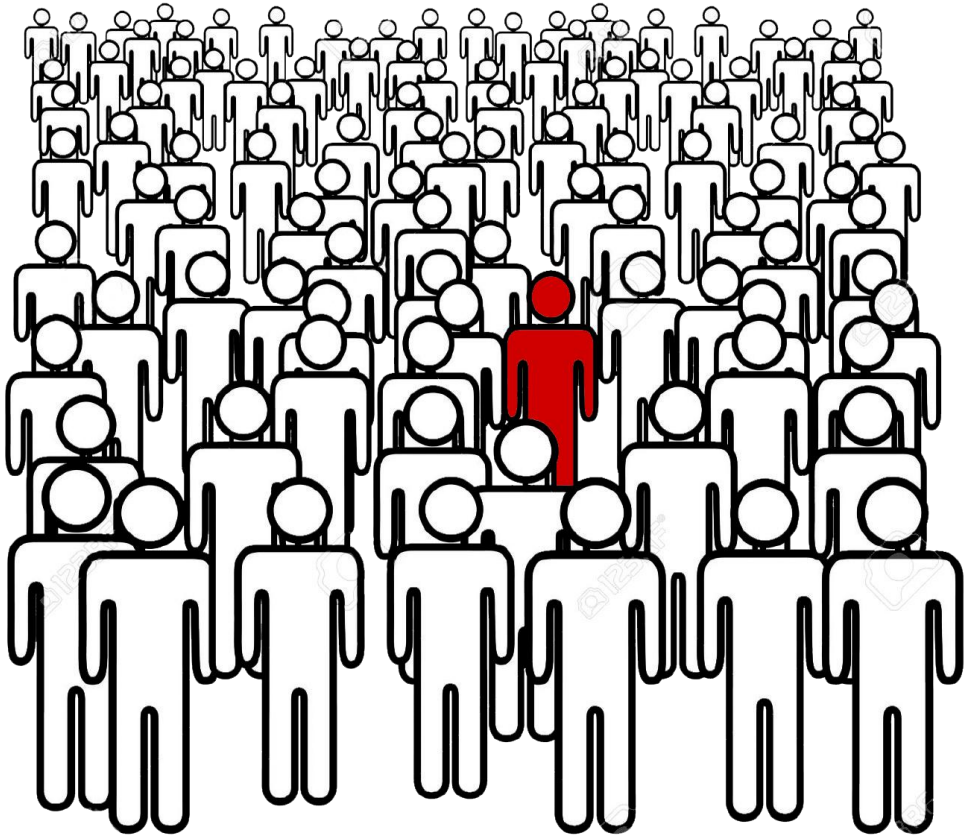
- …

Neurologic deficit

- Stroke
- Cauda equina syndrome

Limbs ischemia

- Athero-embolic disease



The misdiagnosis rate of AAS ranges from 14 to 39%,

Kurabayashi et al. *Journal of Cardiology.* 2011;58(3):287-293.
Hansen MS et al. *Am J Cardiol.* 2007;99(6):852-856.
Zhan et al. *J Clin Hypertens* 2012;14(4):256-260.

Sospetta EP. Algoritmi diagnostici standardizzati

Wells score

Modified Wells score

US Wells score

Pulmonary embolism rule out criteria (PERC)

D-dimer cut-off

Geneva score

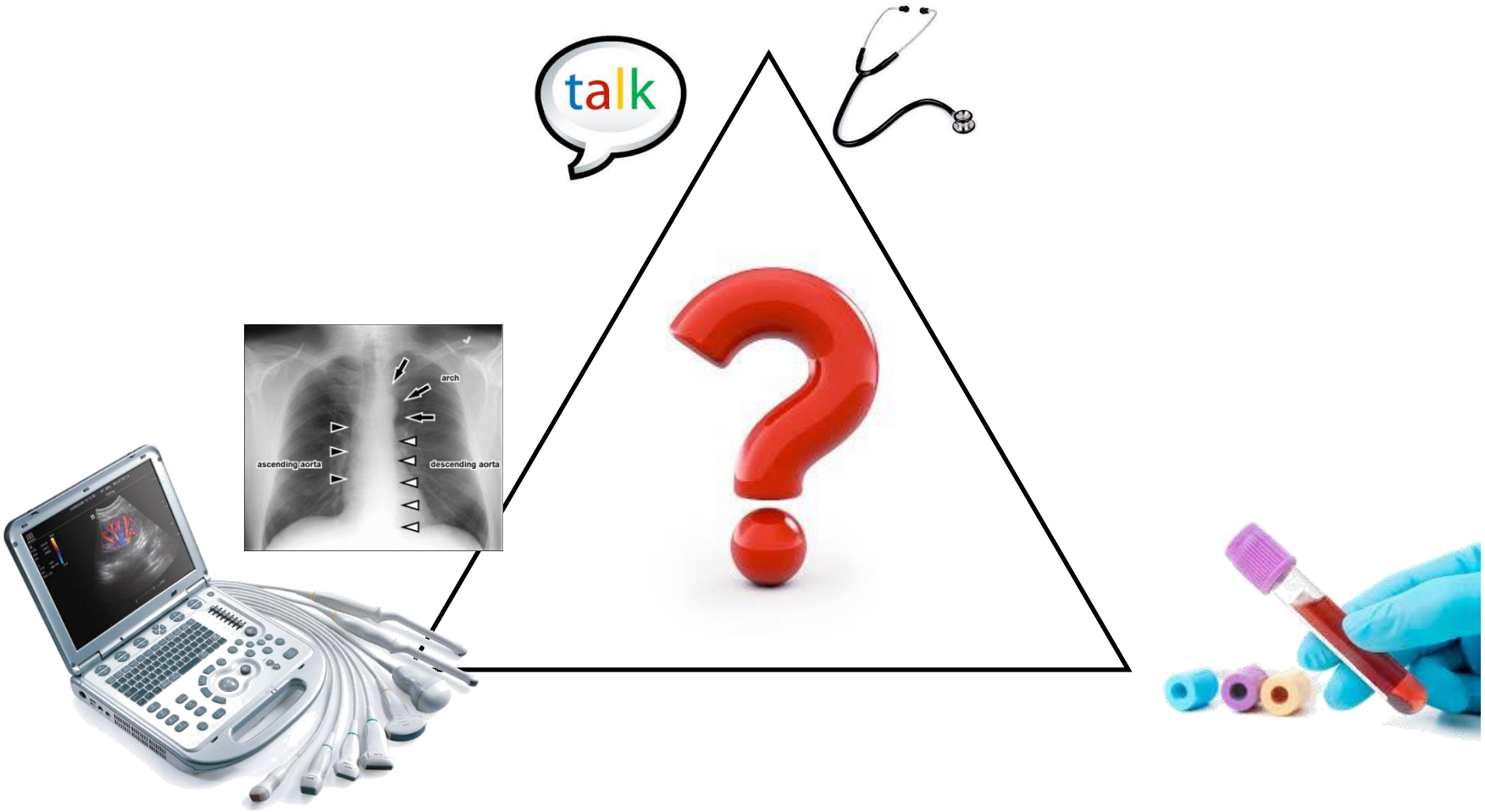
Modified Geneva score

YEARS

D-dimer age adjusted cut-off

Valutazione 1° livello nel sospetto di s. aortica

Aortic Dissection Detection risk score (ADD-RS)



Clinical Policy ACEP Board of Directors, Ann Emerg Med 2015

Critical Issues in the Evaluation and Management of Adult Patients with Su

1) In adult patients with suspected acute nontraumatic thoracic aortic dissection, are there **clinical decision rules** that identify a group of patients at very low risk for the diagnosis of thoracic aortic dissection?

2) Does a normal **chest X ray** rule out thoracic aortic dissection in patients at low risk?

3) Does an abnormal **bedside TTE** establish the diagnosis of thoracic aortic dissection?

4) Is a negative serum **dimer** sufficient to identify a group of patients at very low risk for the diagnosis of thoracic aortic dissection?

Future Research - **Large prospective studies** are needed to better assess historical information, physical examination findings, and diagnostic testing combinations for the diagnosis of acute nontraumatic aortic dissection.

Future Research - A prospective study evaluating D-dimer levels on undifferentiated ED patients who present with signs and symptoms concerning for thoracic aortic dissection is warranted. **Studies clarifying the best way to integrate D-dimer testing into clinical algorithms that include risk stratification are needed**

Future research should address the **diagnostic characteristics of CXR and of bedside TTE by emergency physicians in ED** patients with acute presentations concerning for thoracic aortic dissection.

Original scientific paper

Diagnostic performance of the aortic dissection detection risk score in patients with suspected acute aortic dissection

Peiman Nazerian[1], Francesca Giachino[2], Simone Vanni[1], Maria G Veglio[2], Matteo Castelli[1], Davide Lison[2], Luca Bitossi[1], Corrado Moiraghi[2], Stefano Grifoni[1] and Fulvio Morello[2]

European Heart Journal Acute Cardiovascular Care
EUROPEAN SOCIETY OF CARDIOLOGY®

Medicine®
DIAGNOSTIC ACCURACY STUDY

OPEN

Plasma Lactate Dehydrogenase Levels Predict Mortality in Acute Aortic Syndromes

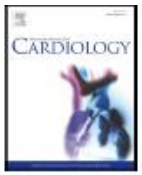
A Diagnostic Accuracy and Observational Outcome Study

Fulvio Morello, MD, PhD, Anna Ravetti, MD, Peiman Nazerian, MD, Giovanni Liedl, MD, Maria Grazia Veglio, MD, Stefania Battista, MD, Simone Vanni, MD, Emanuele Pivetta, MD, Giuseppe Montrucchio, MD, Giulio Mengozzi, MD, Mauro Rinaldi, MD, Corrado Moiraghi, MD, and Enrico Lupia, MD, PhD

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard



Combined use of aortic dissection detection risk score and D-dimer in the diagnostic workup of suspected acute aortic dissection

Peiman Nazerian [a,1,2], Fulvio Morello [b,*,1,2], Simone Vanni [a,1], Alessia Bono [b,1], Matteo Castelli [a,1], Daniela Forno [b,1], Chiara Gigli [a,1], Flavia Soardo [b,1], Federica Carbone [b,1], Enrico Lupia [b,1], Stefano Grifoni [a,1]

[a] *Department of Emergency Medicine, Careggi University Hospital, Firenze, Italy*
[b] *Department of Emergency, A.O. Città della Salute e della Scienza, Molinette Hospital, Torino, Italy*

Intern Emerg Med (2014) 9:665–670
DOI 10.1007/s11739-014-1080-9

EM - ORIGINAL

Diagnostic performance of emergency transthoracic focus cardiac ultrasound in suspected acute type A aortic dissection

Peiman Nazerian · Simone Vanni · Matteo Castelli · Fulvio Morello · Camilla Tozzetti · Giovanni Zagli · Giuseppe Giannazzo · Ruben Vergara · Stefano Grifoni

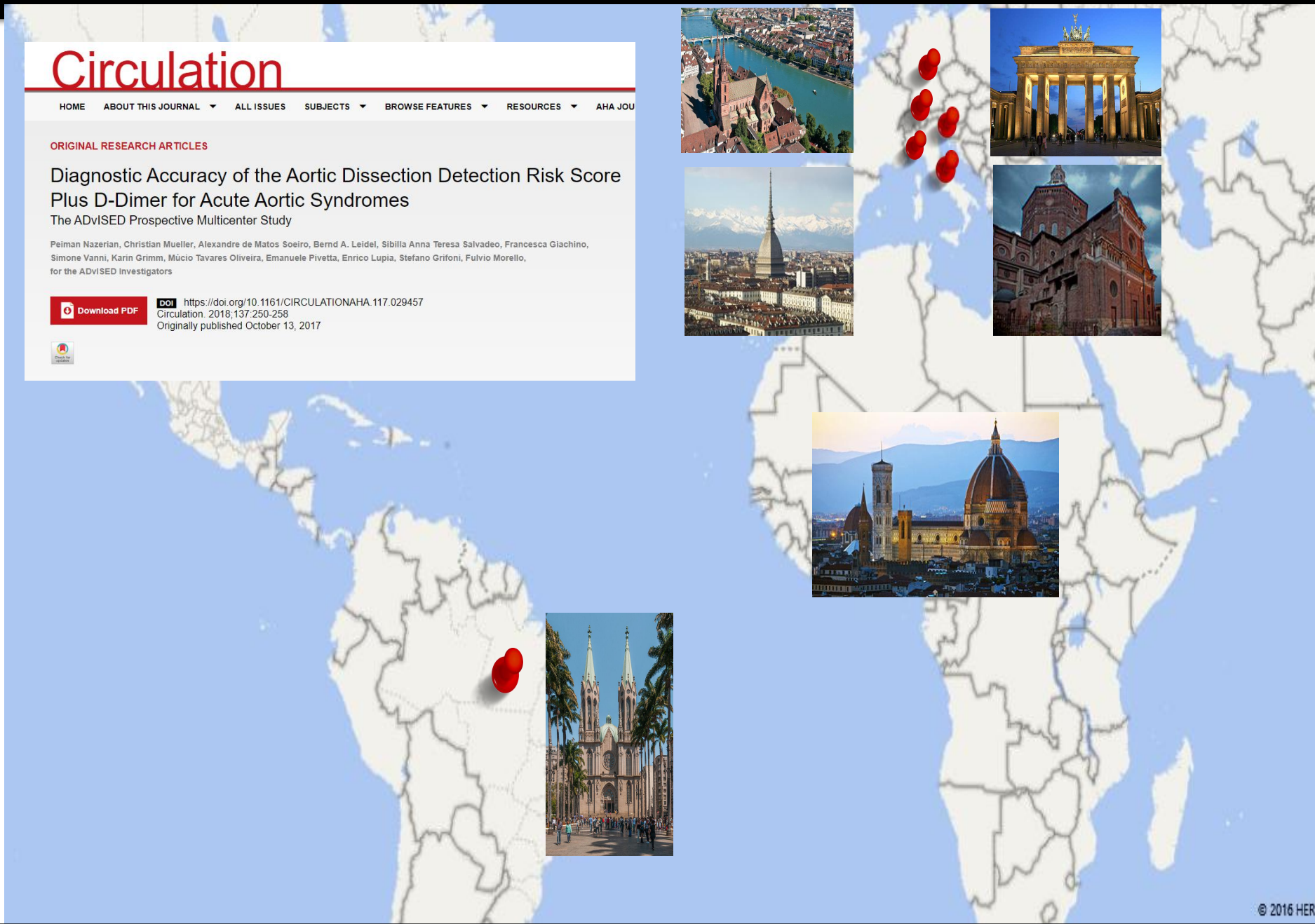
Academic Emergency Medicine
Official Journal of the Society for Academic Emergency Medicine

ORIGINAL RESEARCH CONTRIBUTION

Diagnostic Performance of Focused Cardiac Ultrasound Performed by Emergency Physicians for the Assessment of Ascending Aorta Dilation and Aneurysm

Peiman Nazerian, MD, Simone Vanni, MD, PhD, Fulvio Morello, MD, PhD, Matteo Castelli, MD, Maddalena Ottaviani, MD, Claudia Casula, MD, Alessandra Petrioli, MD, Maurizio Bartolucci, MD, and Stefano Grifoni, MD

Studio ADvISED: Aortic DissectIon ScorE plus D-dimer



Circulation

ORIGINAL RESEARCH ARTICLES

Diagnostic Accuracy of the Aortic Dissection Detection Risk Score Plus D-Dimer for Acute Aortic Syndromes

The ADvISED Prospective Multicenter Study

Peiman Nazerian, Christian Mueller, Alexandre de Matos Soeiro, Bernd A. Leidel, Sibilla Anna Teresa Salvadeo, Francesca Giachino, Simone Vanni, Karin Grimm, Múcio Tavares Oliveira, Emanuele Pivetta, Enrico Lupia, Stefano Grifoni, Fulvio Morello, for the ADvISED Investigators

DOI https://doi.org/10.1161/CIRCULATIONAHA.117.029457
Circulation. 2018;137:250-258
Originally published October 13, 2017

Metodi dello studio

Criteri d'arruolamento:
1. Sospetta SAA

Criteri d'esclusione:
1. Pazienti con trauma primario
2. Diagnosi alternativa ovvia
3. Non consenso

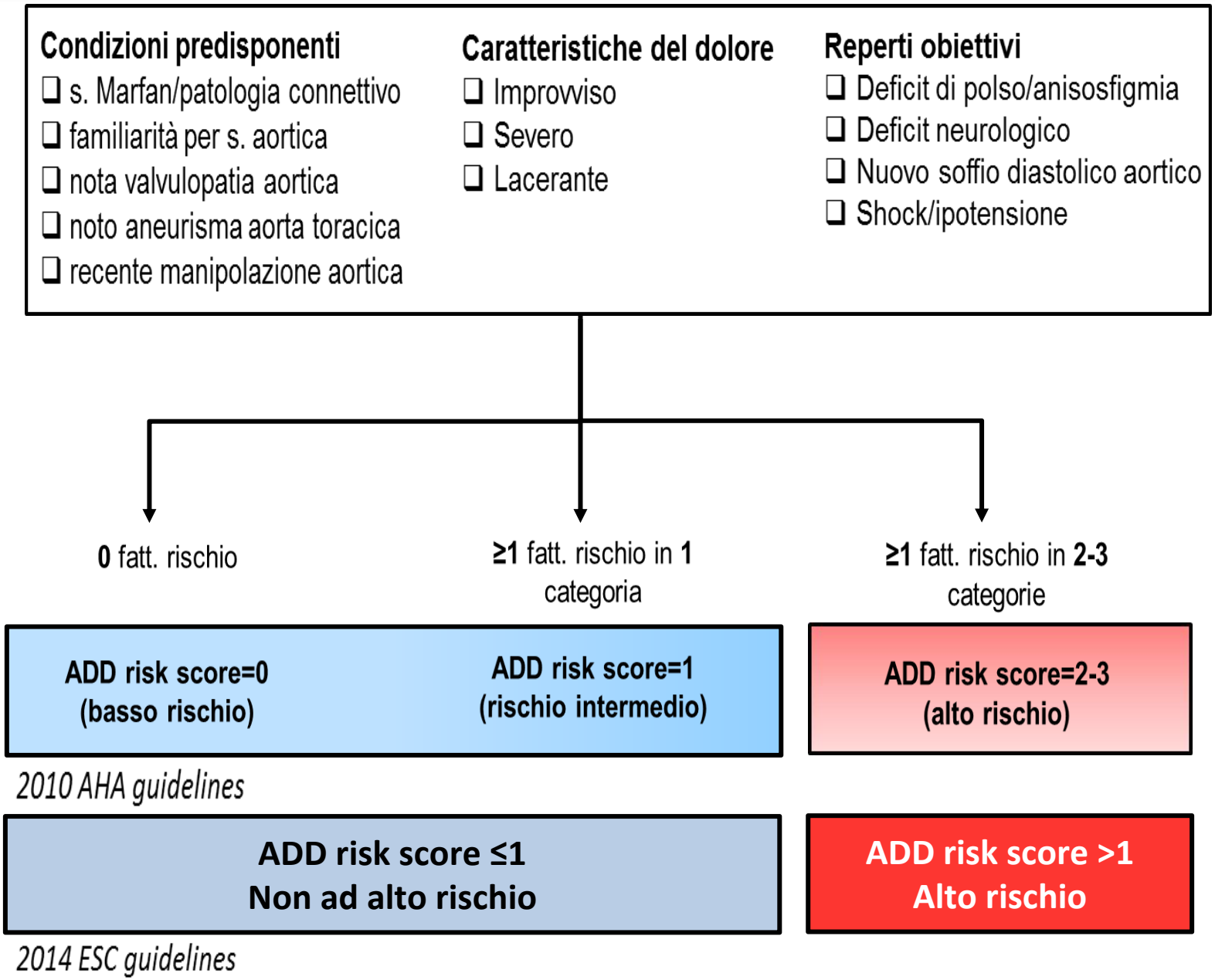
24h/24 h, 7/7gg
2014 - 2016

Valutazione clinica e calcolo ADD risk score

Cut-off 500ng/ml

Angio TC
ETE
RM
Report operatorio
Autopsia
Follow up a 14 gg

Aortic Dissection Detection risk score



Biomarcatori

Potenziali/di interesse scientifico

Calponin

Myosin light chain (MLC)

Matrix metalloproteinases (MMP)

Soluble ST2

Profilo biochimico dell'urgenza

WBC

PLT

fibrinogeno

troponina I/T

proteina C reattiva

LDH

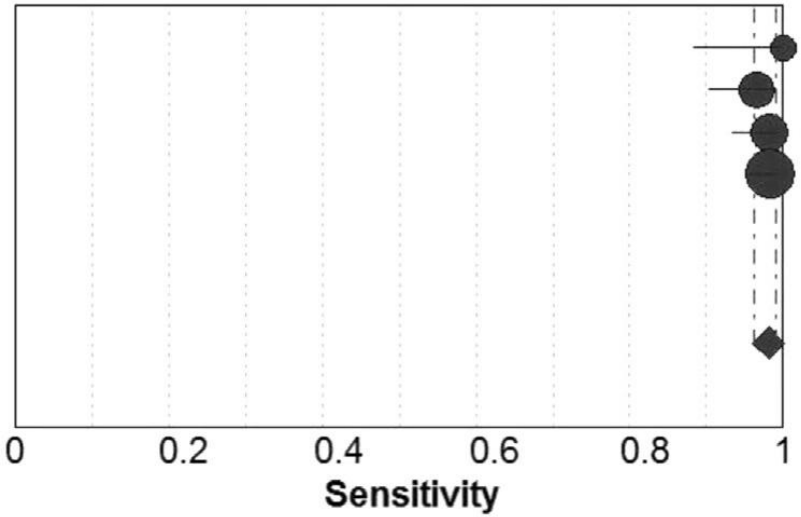
Applicabili nella pratica clinica

D-dimero

Is a negative serum dimer sufficient to rule out AAS?

A Systematic Review and Meta-analysis of D-dimer as a Rule-out Test for Suspected Acute Aortic Dissection

Asha S. Ann Emerg Med 2015



	TP/(TP+FN)	Sensitivity (95% CI)
Akutsu 2005	30/30	1.00 (0.88 - 1.00)
Suzuki 2009	84/87	0.97 (0.90 - 0.99)
Fan 2010	105/107	0.98 (0.93 - 1.00)
Nazerian 2014	229/233	0.98 (0.96 - 1.00)

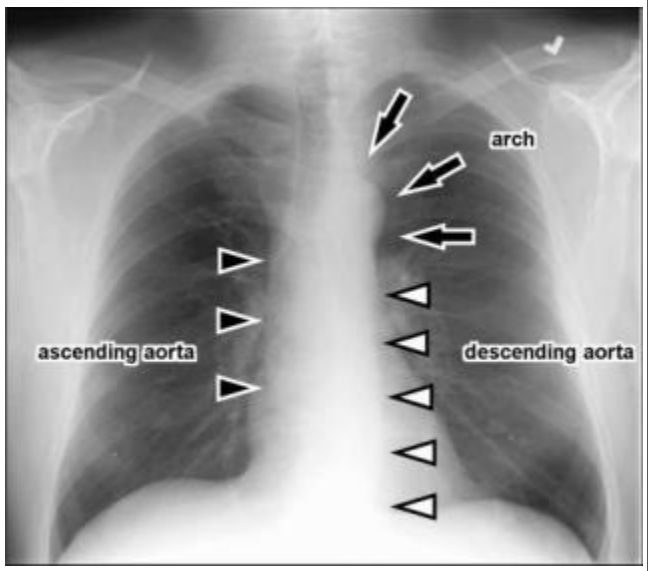
Pooled Sensitivity = 0.98 (0.96 to 0.99)
Chi-square = 2.09; df = 3 (p = 0.5546)
Inconsistency (I-square) = 0.0 %

- Il clinico deve però ricordare che il D-dimero ha una bassa specificità e un suo uso inappropriato in pazienti con sintomi non specifici per i quali non considererebbe normalmente un valutazione diagnostica per SAA potrebbe risultare in un paradossale aumento delle richieste di test diagnostici di secondo livello per escludere la SAA.

- L'approccio del clinico deve essere quindi di considerare il D-dimero per escludere la SAA nei pazienti non ad alto rischio in cui avrebbe richiesto un test di imaging in caso il D-dimero non fosse stato disponibile.

Rx torace

- Double aortic knob sign
- Diffuse enlargement of the aorta with poor definition or irregularity of the aortic contour
- Inward displacement of aortic wall calcification by more than 10 mm
- Tracheal displacement to the right
- Displacement of a nasogastric tube
- Pleural effusion (more common on the left side; suggests leakage)
- Pericardial effusion
- Cardiac enlargement
- Left apical opacity



Does a normal chest X ray rule out AAS in patients at low risk?

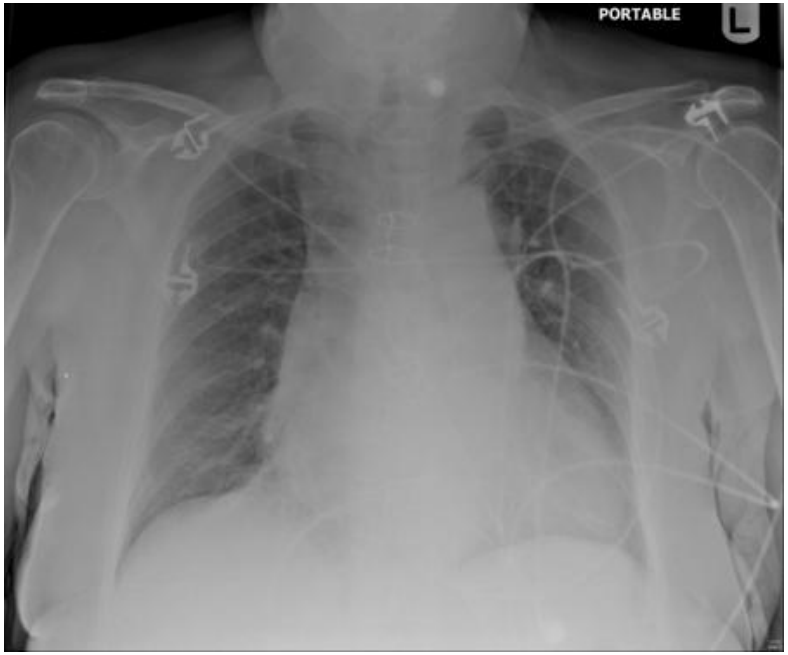
Widened mediastinum

Maximum width >80 mm at the level of the aortic knob, a ratio of mediastinum to chest width >0.25

von Kodolitsch Y, et al. *Am J Med* 2004

Pooled data from 10 studies: Sens of a widened mediastinum 64%

Klompas M. JAMA 2002



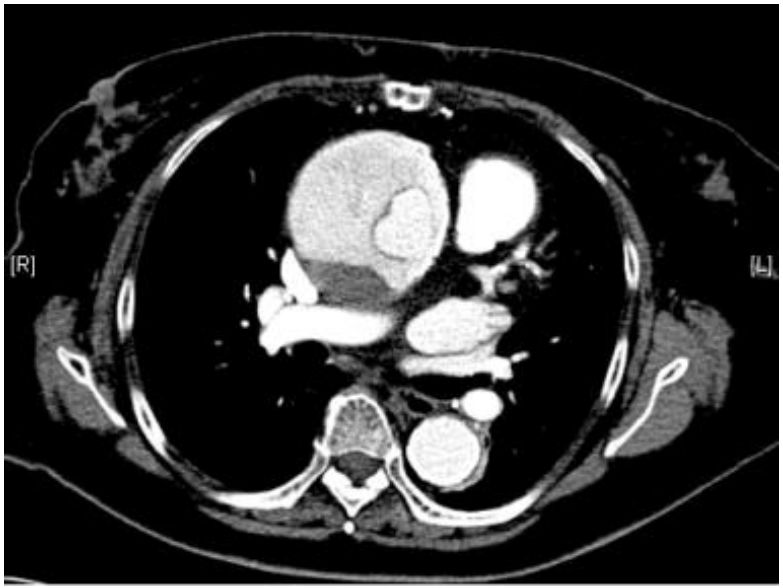


Table 3. Radiographic Features of Aortic Disease on Chest Radiography

Radiographic Feature	Aortic Disease (n = 109)	No Aortic Disease (n = 107)	Likelihood Ratio (95% Confidence Interval)	
	Number (%)		Positive	Negative
Widened aortic contour	75 (69)	23 (21)	3.2 (2.2–4.7)	0.4 (0.3–0.5)
Widened mediastinum	63 (58)	28 (26)	2.2 (1.5–3.7)	0.6 (0.5–0.7)
Tracheal displacement	28 (26)	32 (30)	0.9 (0.6–1.3)	1.1 (0.9–1.2)
Displaced calcification	17 (16)	3 (3)	5.6 (1.7–18.4)	0.9 (0.8–0.9)
Aortic kinking	52 (48)	5 (5)	10.2 (4.2–24.6)	0.6 (0.5–0.7)
Opacified pulmonary window	40 (37)	17 (16)	2.3 (1.4–3.8)	0.8 (0.7–0.9)
Blurred aortic contour	11 (10)	4 (4)	2.7 (0.9–8.2)	0.9 (0.8–1.0)

Pooled data from 10 studies:
- Sensitivity of a widened mediastinum 64%
- Sensitivity of an abnormal aortic contour 71%
- Sensitivity of all abnormal radiographic findings 90%

Klompas M. JAMA 2002

- Il 16 % dei pazienti con DA ha un RX torace normale

IRAD. JAMA 2000

- Specificity of chest x-ray for aortic pathology 86%

von Kodolitsch. Am J Med. 2004

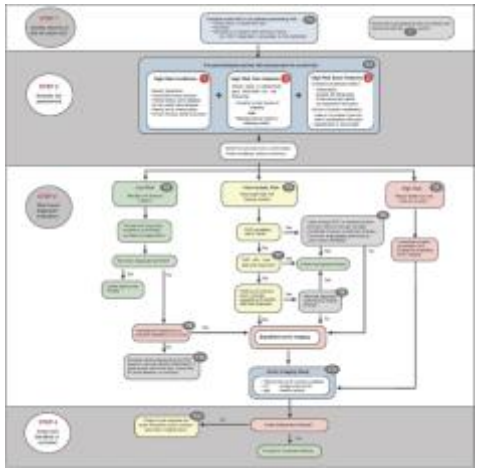
Journal of the American College of Cardiology
© 2010 by the American College of Cardiology Foundation and the American Heart Association, Inc.
Published by Elsevier Inc.

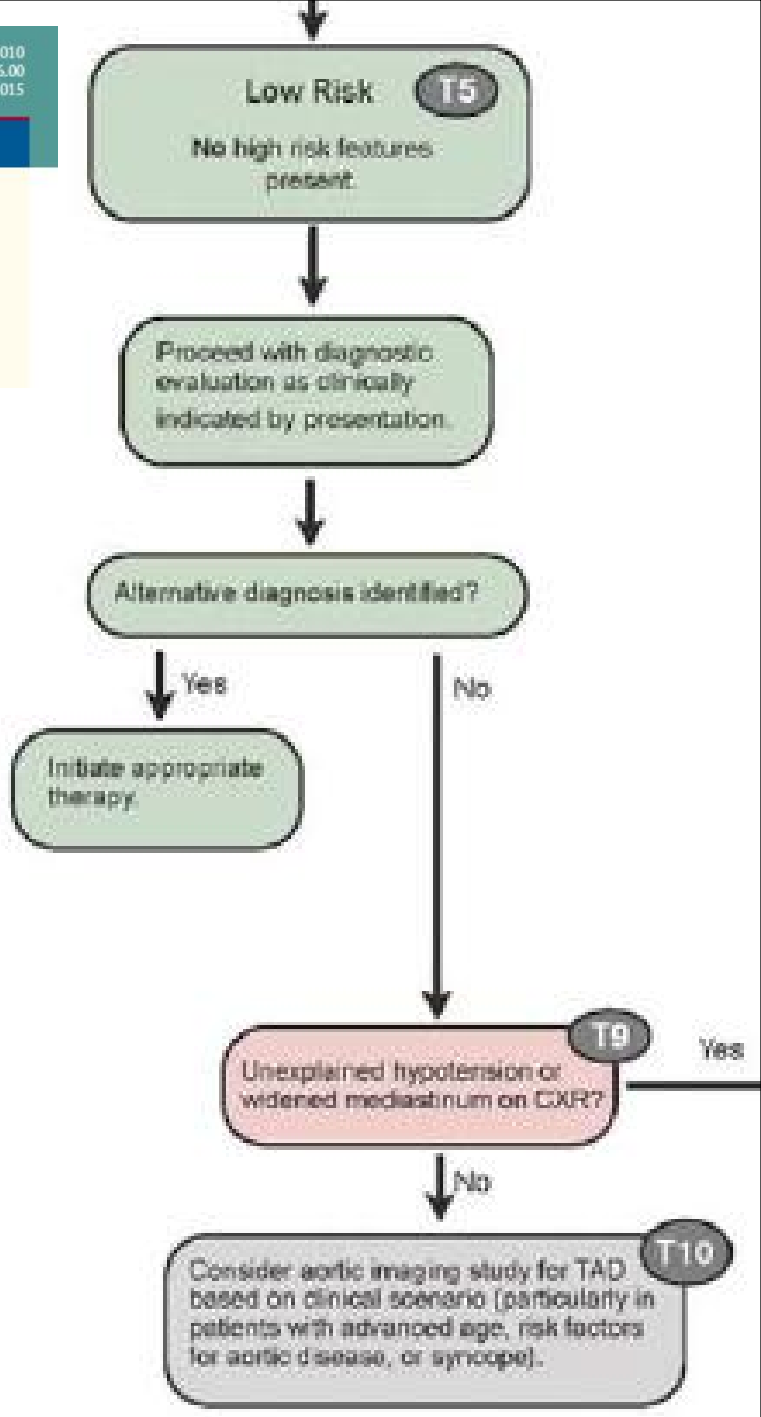
Vol. 55, No. 14, 2010
ISSN 0735-1097/10/$36.00
doi:10.1016/j.jacc.2010.02.015

PRACTICE GUIDELINE: FULL TEXT

2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the Diagnosis and Management of Patients With Thoracic Aortic Disease

….. Chest x-ray is inadequately sensitive to definitively exclude the presence of AoD in all except the lowest-risk patients and therefore rarely excludes the disease…….





Current FoCUS guidelines not consider evaluation of patients with suspected AAS

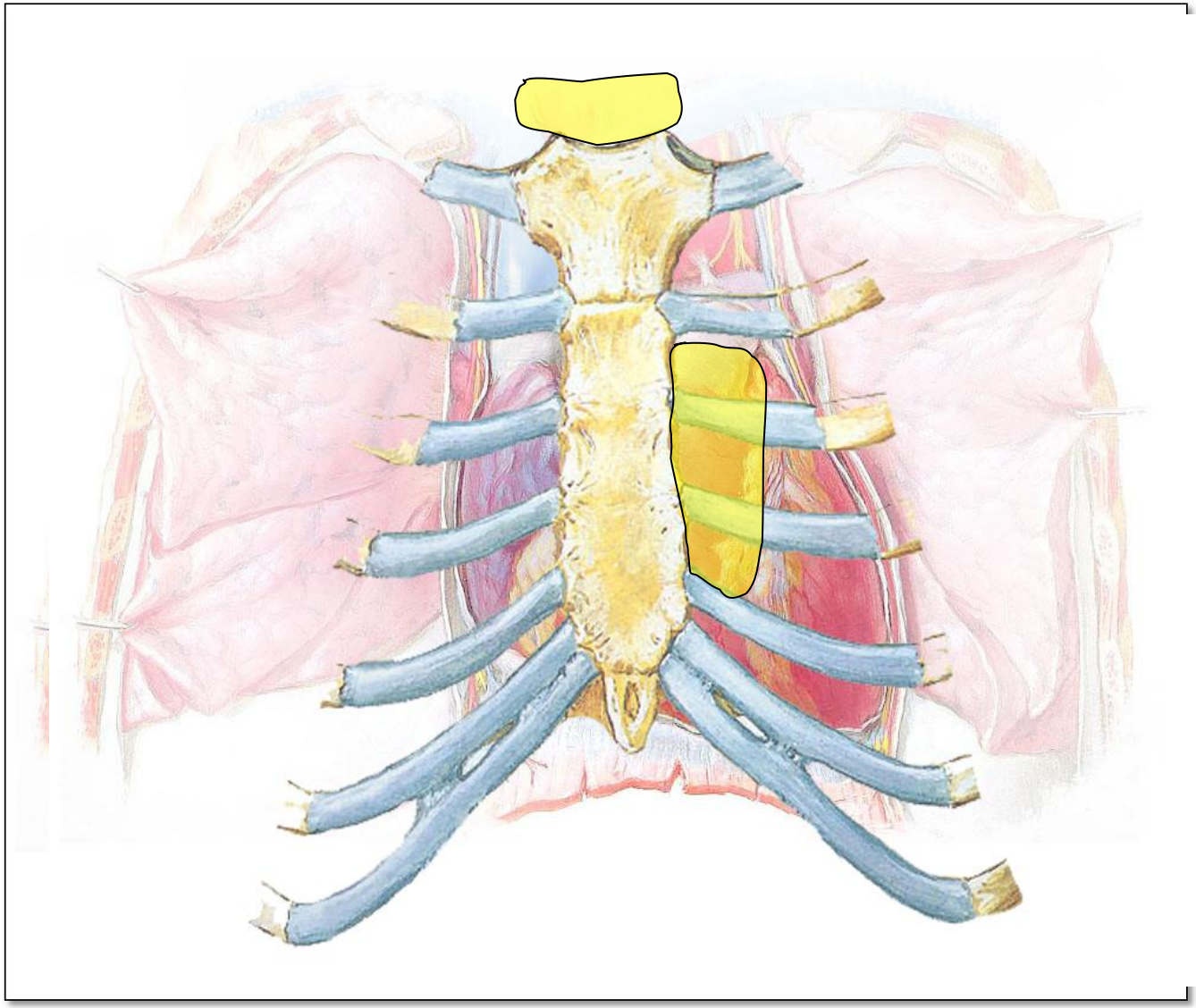
Focused cardiac ultrasound in the emergent setting: a consensus statement of the American Society of Echocardiography and American College of Emergency Physicians.
Labovitz AJ, J Am Soc Echocardiogr 2010

International evidence-based recommendations for focused cardiac ultrasound
Via G, J Am Soc Echocardiogr 2014

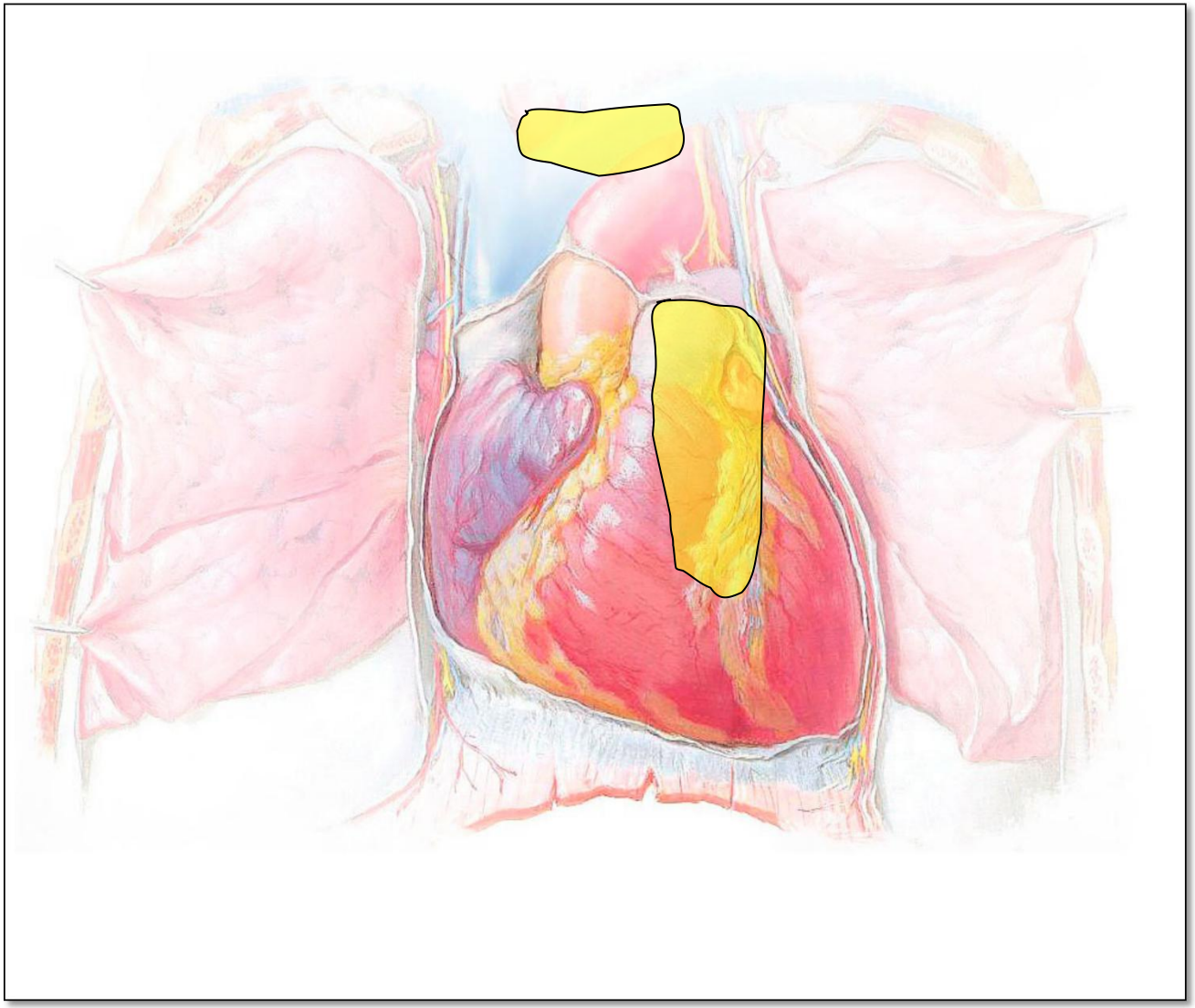
FoCUS: views for suspected AAS

- **Most important views**
  - **Parasternal long axis: aortic root and ascending aorta**
  - **Suprasternal notch view: aortic arch**
- **Additional views of thoracic aorta**
  - Parasternal short axis: aortic valve (bi vs tricuspid)
  - Right parasternal long axis: ascending aorta
  - Subcostal 5 chamber: aortic root
  - Apical 5 and 3 chamber views: aortic root
  - Apical 4 and 2 chamber views: descending aorta
- **Views other than thoracic aorta**
  - **Abdominal aorta, carotids and limbs' arteries**

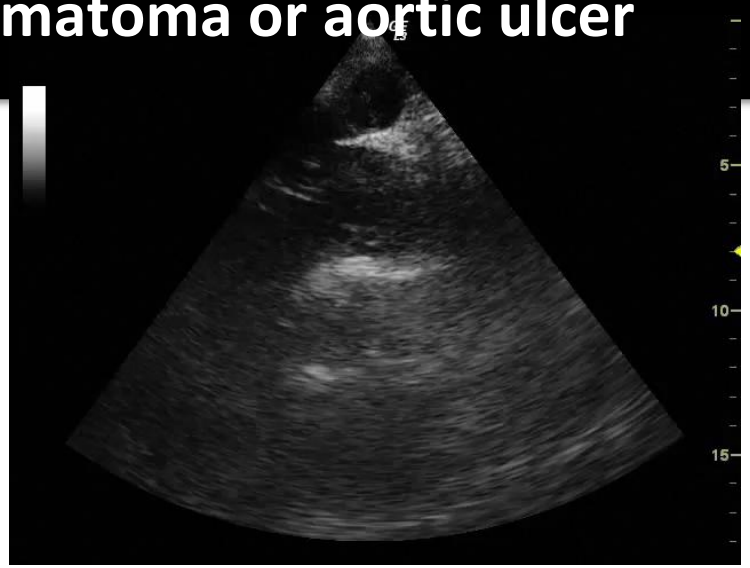
Parasternal LAX and Suprasternal notch



Parasternal LAX and Suprasternal notch

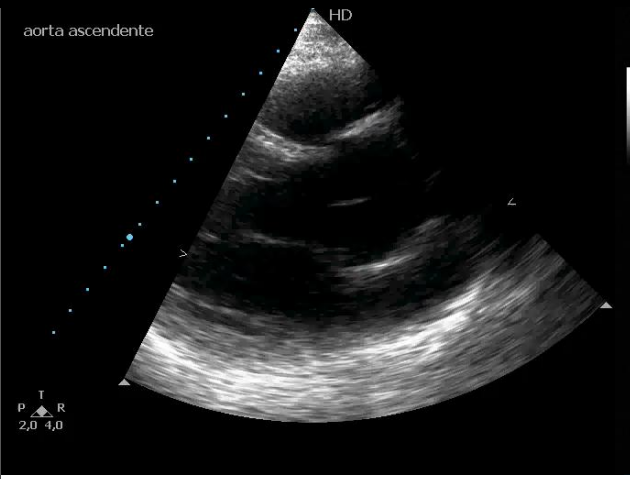


Direct signs: intimal flap, intramural hematoma or aortic ulcer

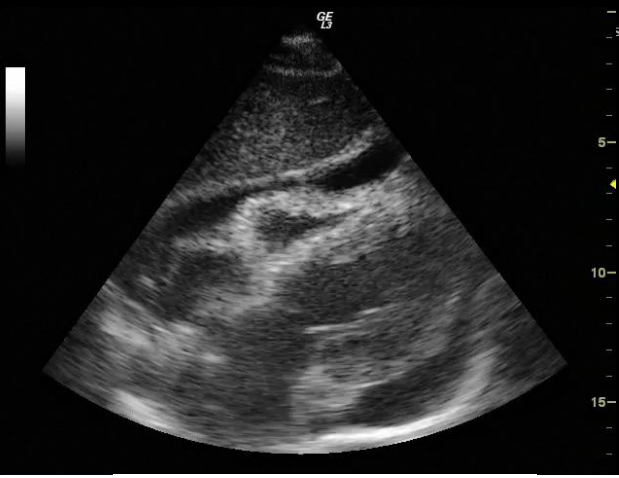


Indirect signs

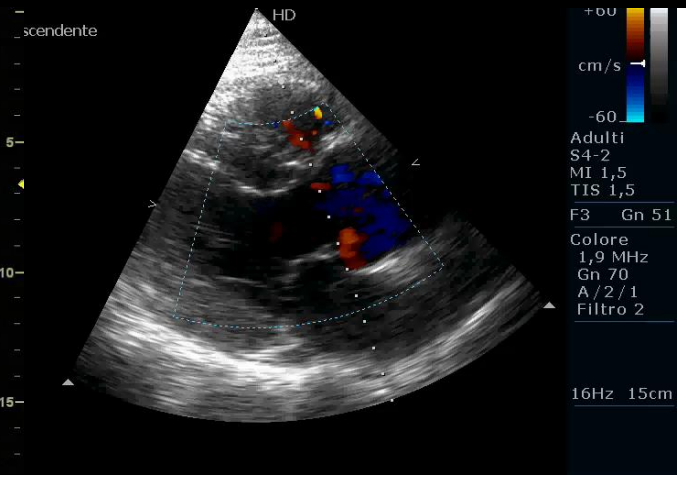
aortic dilatation (≥40 mm)



pericardial effus./tamponade



aortic valve insufficiency



ADvISED project results

Which is the best single test tu rule out AAS?

	ADD-RS=0 (1848 pts)	**D-dimer neg (1848 pts)**	**CXR No enlarged mediastinum (1030 pts)**	**FOCUS neg (839 pts)**
Sens % (95% CI)	95 (91.5-97.4)	96.7 (93.6-98.6)	54 (39.2 – 68.6)	89 (82.8-93.6)
NPV % (95% CI)	97.3 (95.3-98.6)	99.2 (98.5-99.7)	97.6 (96.9-98.3)	97 (95.3-98.1)
Spec % (95% CI)	26.4 (24.3-28.7)	64 (61.6-66.4)	92.4 (90.5-93.9)	74.5 (71-77.7)
PPV % (95% CI)	16.2 (14.3-18.3)	28.7 (25.6-32)	25.7 (13.8-37.7)	42.3 (39-45.8)

ADvISED project results

Which is the best single test tu rule out AAS?

	ADD-RS=0 (1848 pts)	D-dimer neg (1848 pts)	CXR No enlarged mediastinum (1030 pts)	FOCUS neg (839 pts)
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NPV % (95% CI)	97.3 (95.3-98.6)	99.2 (98.5-99.7)	97.6 (96.9-98.3)	97 (95.3-98.1)
Spec % (95% CI)	26.4 (24.3-28.7)	64 (61.6-66.4)	92.4 (90.5-93.9)	74.5 (71-77.7)
PPV % (95% CI)	16.2 (14.3-18.3)	28.7 (25.6-32)	25.7 (13.8-37.7)	42.3 (39-45.8)

ADvISED project results

Diagnostic strategies to rule out high mortality diseases in ED

Accettable failure rate for

- Pulmonary Embolism
  Upper limit of the 95%CI around failure rate <3%

Righini M, JAMA. 2014
Perrier A, N Engl J Med. 2005
Van Belle A, JAMA. 2006

- Acute coronary syndrome
  Major adverse cardiac events 1-2%

Poldervaart JM, Ann Inter Med 2017

- Acute aortic syndromes
  Upper limit of the 95%CI around the failure rate <2%

Which is the best diagnostic strategy to rule out AAS?

	ADD-RS≤1 plus D-dimer (1848 pts)	ADD-RS≤1 plus CXR (1030 pts)	ADD-RS≤1 plus FoCUS (839 pts)
Failure rate % (95% CI)	0.3 (0.1-**1.1**)	1.94 (1.1-**3.1**)	1.9 (0.9-**3.6**)
Efficiency % (95% CI)	49.9 (47.7-52.2)	80.2 (77.6-82.6)	56.7 (53.3-60.1)
Sensitivity % (95% CI)	98.8 (96.4-99.7)	66.7 (51.6 – 79.6)	93.8 (88.6-97.1)
Specificity % (95% CI)	57.3 (54.9-59.7)	82.5 (80-84.8)	67.4 (63.8-70.9)
PPV % (95% CI)	25.8 (23-28.7)	15.7 (12.5-18.9)	37.7 (35.1-40.5)
NPV % (95% CI)	99.7 (99.1-99.9)	98.1 (97.3-98.8)	98.1 (96.5-99)

Which is the best diagnostic strategy to rule out AAS?

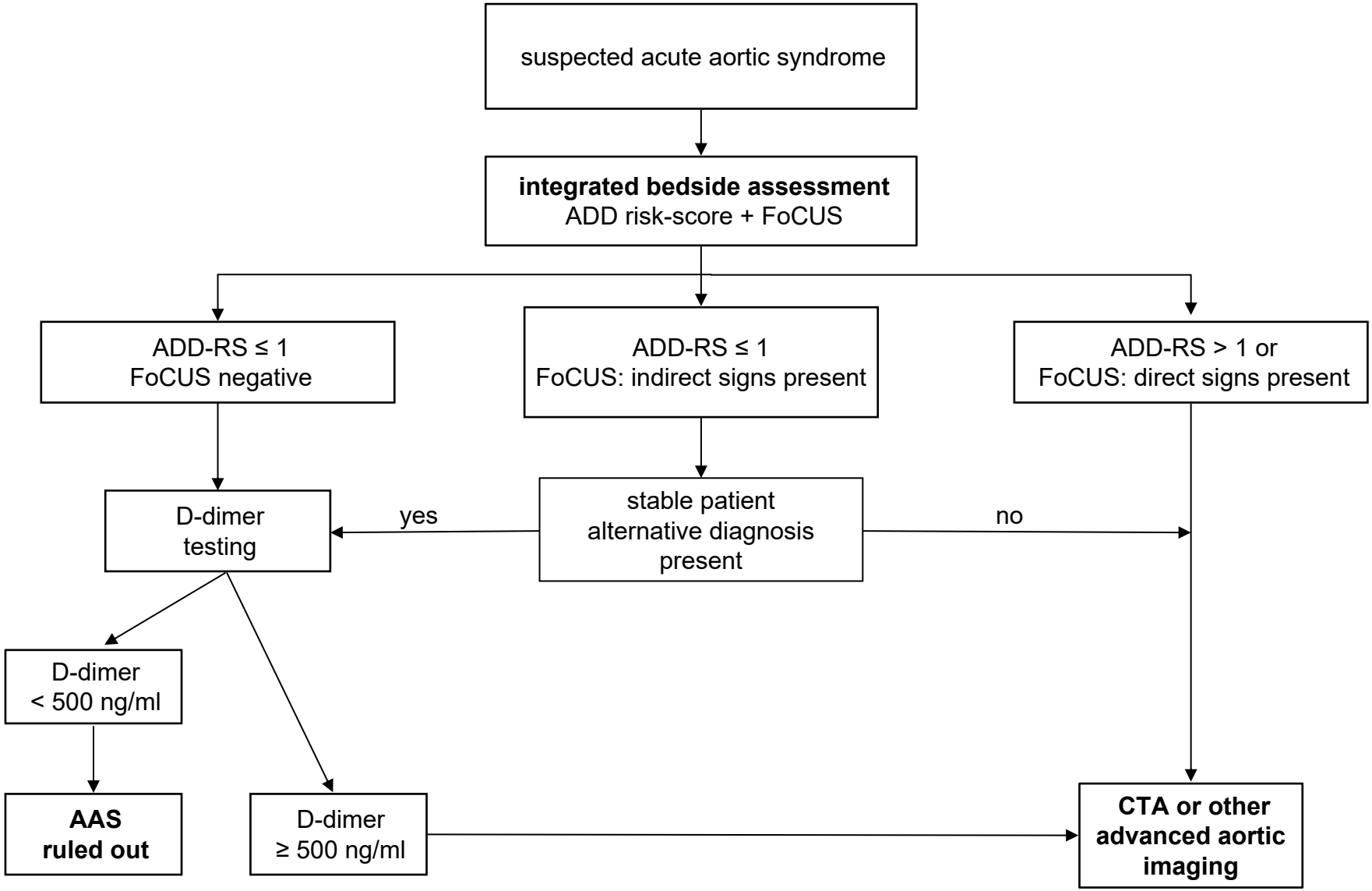
	D-dimer plus ADD-RS≤1 (1848 pts)	CXR plus ADD-RS≤1 (1030 pts)	FOCUS plus ADD-RS≤1 (839 pts)
Failure rate % (95% CI)	0.3 (0.1-**1.1**)	1.94 (1.1-**3.1**)	1.9 (0.9-**3.6**)
Efficiency % (95% CI)	49.9 (47.7-52.2)	80.2 (77.6-82.6)	56.7 (53.3-60.1)
Sensitivity % (95% CI)	98.8 (96.4-99.7)	66.7 (51.6 – 79.6)	93.8 (88.6-97.1)
Specificity % (95% CI)	57.3 (54.9-59.7)	82.5 (80-84.8)	67.4 (63.8-70.9)
PPV % (95% CI)	25.8 (23-28.7)	15.7 (12.5-18.9)	37.7 (35.1-40.5)
NPV % (95% CI)	99.7 (99.1-99.9)	98.1 (97.3-98.8)	98.1 (96.5-99)

Which is the best diagnostic strategy to rule out AAS?

Diagnostic strategy combining ADD-RS, FOCUS and D-dimer

	ADD-RS≤1 and FoCUS neg plus d-dimer<500 ngml (839 pts)
Failure rate^ % (95% CI)	**0**
Efficiency+ % (95% CI)	40.3 (36.9-43.7)
Sensitivity % (95% CI)	100 (97.3-100)
Specificity % (95% CI)	48.4 (44.5-52.2)
PPV % (95% CI)	28 (26.6-29.5)
NPV % (95% CI)	100

Proposed diagnostic algorithm based on ADD-RS and FoCUS plus D-dimer



Grazie.

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