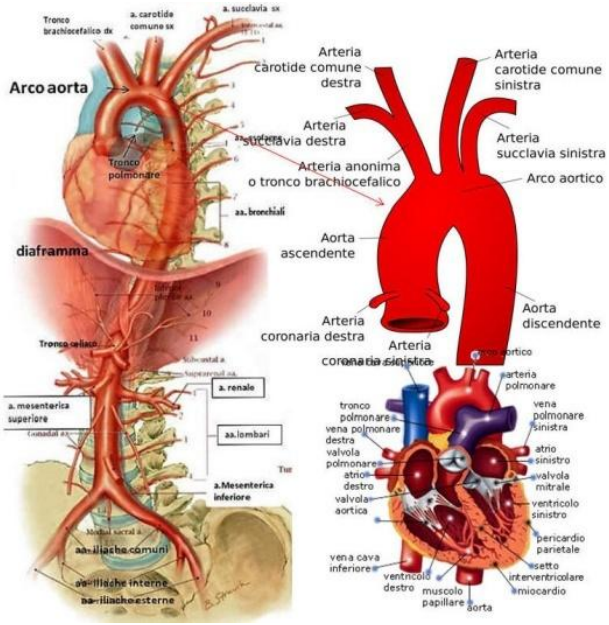
XI congresso nazionale

# simeu

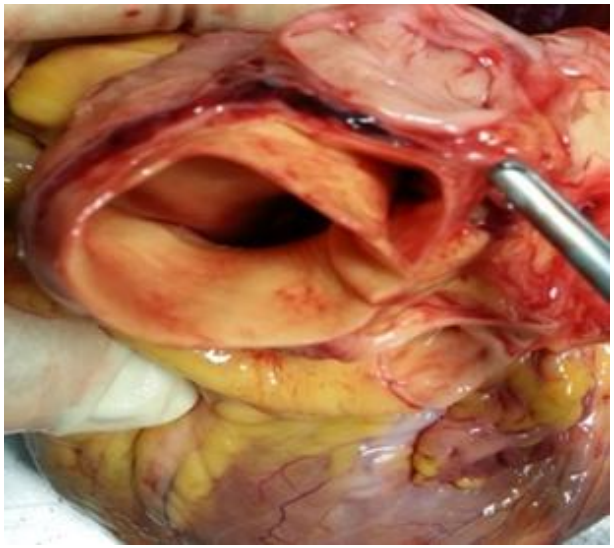
ROMA 24-26 MAGGIO 2018

# •Sindromi aortiche acute nel DEU: analisi del problema e casi clinici




- Franco Zanni

•Pronto Soccorso ASMN Reggio Emilia direttore A. Maria Ferrari



•Nessun’altra patologia come la dissecazione acuta dell’aorta anche in presenza di un’anamnesi cardiologica completamente silente può presentarsi improvvisamente e drammaticamente con un **ampio spettro di lesioni**.

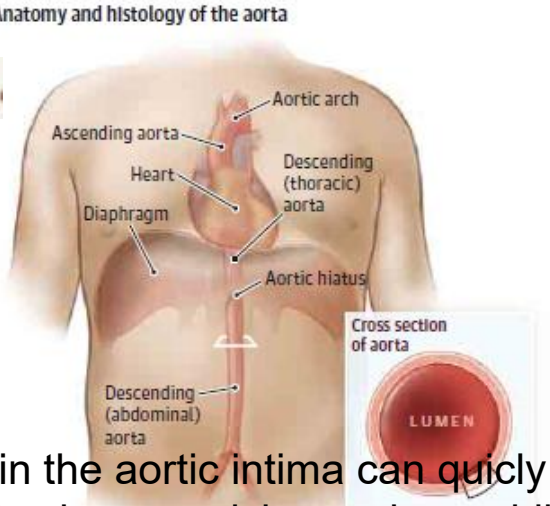
•Un’idea esatta della gravità della malattia è fornita dagli studi sulla storia naturale che riportano per i pazienti con dissecazione dell’aorta ascendente non trattata una **mortalità del 1% ogni ora nelle prime 48 ore** superiore al 80% entro la prima settimana e prossima al 100% entro un mese.

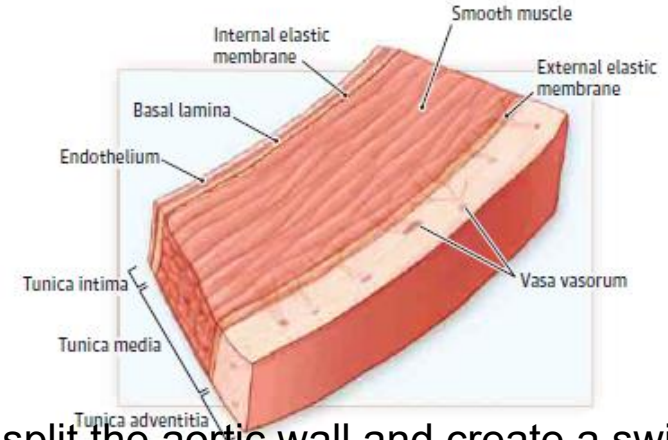
JAMA | Review

Acute Aortic Dissection and Intramural Hematoma
A Systematic Review

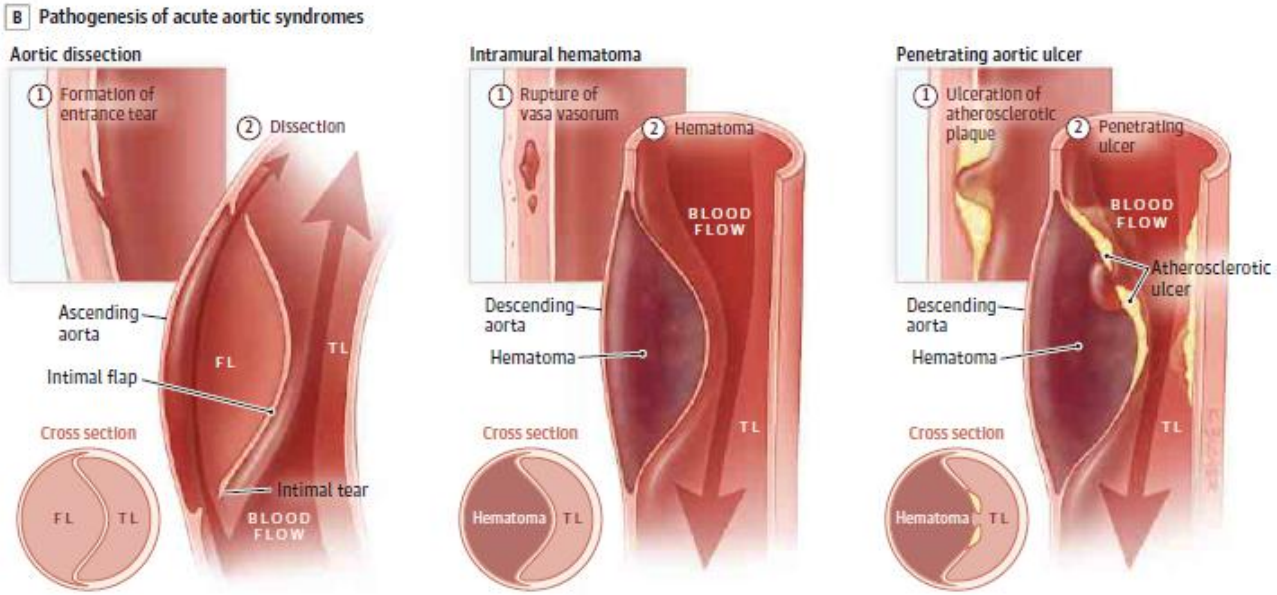
# •Sindromi aortiche acute

JAMA. 2016;316(7):754-763.



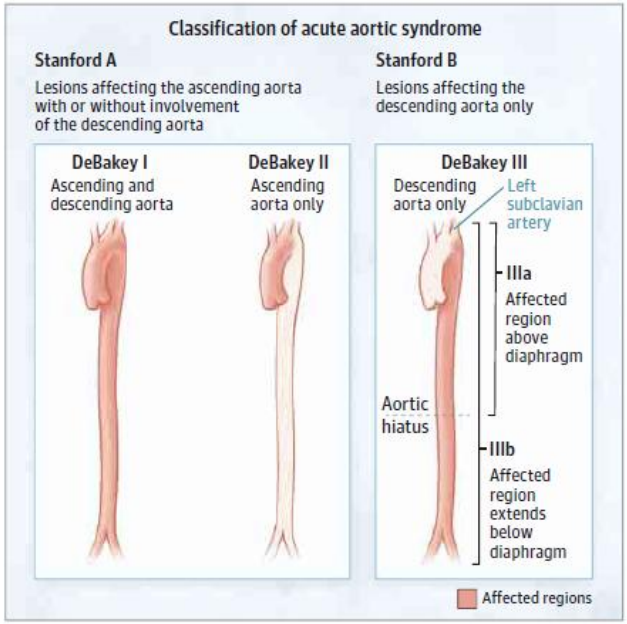

•A small tear in the aortic intima can quicly split the aortic wall and create a swiftly expanding false lumen, wich may be rapidly fatal even with prompt medical treatment




The intimal tear can progress along the aortic lumen for variable distance more common in an antegrade direction with the the risk of aortic rupture as the flap increases

European Heart Journal (2017) 0, 1–15
doi:10.1093/eurheartj/ehx319

Figure 3. Stanford and DeBakey Classification of Acute Aortic Syndrome




-Type A mortality 1-2% per hour after onset of symptoms  OPEN SURGERY (classe I)

-Type B not complicated 1 year survival up to 85%  MEDICAL THERAPY (classe II)

-Type B complicated (signs of rupture, organ malperfusion, aortic expansion) TEVAR/surgery

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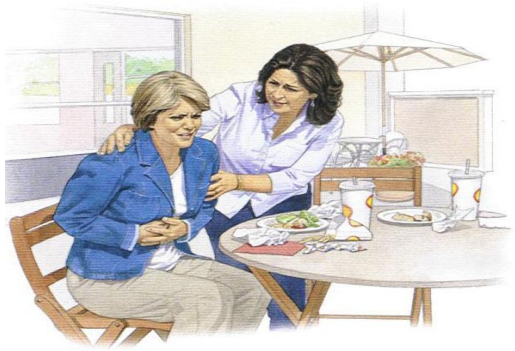
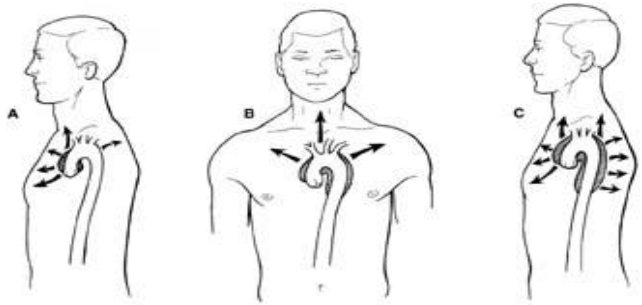
# •Dolore






Chest or back pain is the most common symptom (90%)

Abrupt on onset, typically severe (worst) not previously experienced

More often described as sharp (68%), ripping or tearing (50%)

Less often as migratory 19% and can radiate anywhere in the thorax or abdomen

Typically location as anterior chest in Type A, back or abdominal in type B (40%)

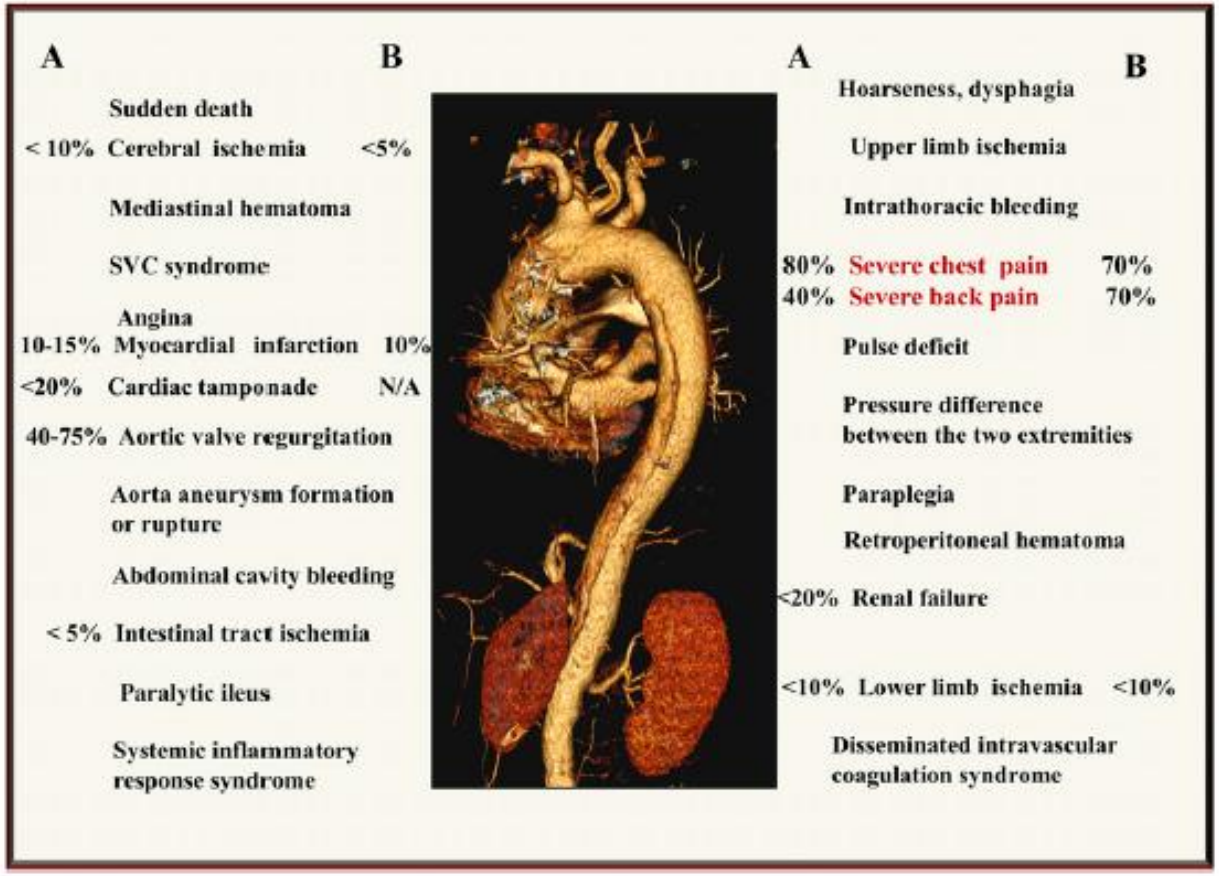
Older patients with a history of diabetes, aortic aneurism or cardiovascular surgery often had painless ascending aortic dissection

Pain can occur in isolation or be associated with syncope, heart failure, stroke, acute coronary syndrome or other clinical symptoms or sign

## • Symptoms and signs depend upon the extent of the dissection and the affected structures

*•la dissecazione segue comunemente il margine laterale dell'aorta ascendente, la parte superiore dell'arco e la parte laterale dell'aorta discendente o a spirale se incontra placche aterosclerotiche con coinvolgimento variabile dei rami aortici*

•




- Lacerazione e sede della lacerazione
- Progressione dello scollamento dei rami aortici collaterali
- Sindrome da compressione
- Sintomi da rottura

European Heart Journal (2017) **0**, 1–15
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# •Complicanze

•**SYNCOPE** (10%) often indicates the development of cardiac tamponade or involvement of the brachiocephalic vessels.

•**HYPOTENSION/SHOCK** (20%) may be related to aortic rupture or propagation of the dissection

•-**Cardiac tamponade** (15%) can lead to sudden death

•-**Acute aortic valve regurgitation** (40%) with a wide pulse pressure and heart failure

•-**Acute myocardial ischemia** ( 10%) most often right coronary occlusion, fluctuating troponin elevation and ECG abnormalities

•-**Hemothorax or hemoperitoneum**

•**STROKE or FOCAL NEUROLOGIC DEFICT** (10%) half time transient, may often dominate the clinical picture masking the underlyng condition

•Syncope, hypotension and/or shock at initial presentation are common in ascending aortic dissection whereas hypertension is more frequent in descending

•Acute renal failure (10%) , rare intestinal ischemia

**•Sincope, ipotensione /shock e deficit neurologici sono indici prognostici di complicanze e maggiore mortalità**

Donna di 72 anni , ipertesa, ex fumatrice, sindrome depressiva

Ore 23 giunge in PS per <u>astenia, capogiro, vaga cervicalgia</u>

Pz deambulante, EON negativo, polsi isosfigmici, non soffi, addome trattabile

ECG, esami di laboratorio e parametri vitali nella norma

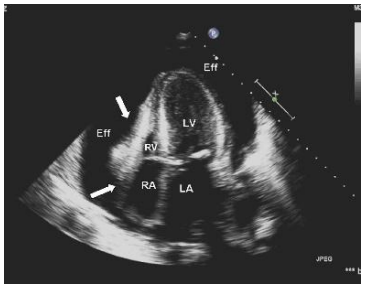
Dimessa asintomatica dopo paracetamolo

Ore 17 del pomeriggio successivo rientra in PS accompagnata dal MET per **dolore toracico, sincope ed ipotensione**

EO PA 95/60, soporosa, **afasica, emiparesi dx**, cute marezzata, **turgore giugulare, toni cardiaci ovattati, iposfigmia carotide sin**, SpO2 96% in AA

ECG TS aspecifiche alterazioni

ECO **DA tipo A, *flap intimale arco aortico/carotide sin, versamento pericardico subtamponante***




Ore 17.30  cardiochirurgo chiede angio TC encefalo + vasi sovraortici per approfondimento diagnostico, in radiologia **ACR in PEA**

•Uomo di 84 anni, ADK del colon operato, episodi di AISV, non farmaci

•Ore 22 giunge in PS accompagnato dai volontari per **sincope** associata ad **epigastralgia**, **nausea**, **capogiro** insorta mentre di trovava al ristorante

•EO PA 140/70, Toni validi, addome dolorabile in epigastrio, polsi isosfigmici,
•Esame obiettivo neurologico negativo

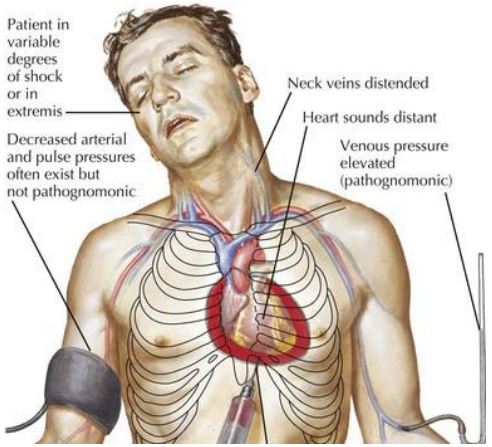
•ECG sinusale 50 b/min aspecifiche alterazioni

•Esami di laboratorio urgenti + troponina (I° punto) negativi

•Ore 24 in OBI stabile, asintomatico , nulla alla TMT durante la notte

•ECG + enzimi cuore ripetuti negativi

•Ore 11 del giorno seguente mentre esegue Ecodoppler




•**ACR in PEA** senza ROSC

•ECO **versamento pericardico tamponante**

## •DA tipo A (26 pz ) Pronto Soccorso ASMN RE 2012-2017

| | |
|---|---|
| **Epidemiologia** | maschi (17 pz), femmine (9 pz)<br>50-70 anni (maschi), 70-80 anni (femmine)<br>mattino (10 pz), pomeriggio (5 pz), sera (11 pz) |
| **Modalità di accesso** | 118 MET (18 pz), mezzi propri (8 pz) |
| **Presentazione clinica** | Dolore toracico (18 pz)<br>Dolore dorsale (12 pz)<br>Dolore addominale (6 pz)<br>Sincope (9 pz)<br>Ipotensione /shock (10 pz)<br>Ictus (2 pz), epilessia (1 pz), coma (1 pz)<br>Ischemia periferica (6 pz), ematemesi (1 pz) |
| **Fattori di rischio** | Ipertensione (20 pz), fumo (17 pz), diabete (4 pz) ,<br>dilatazione aorta (4 pz), valvulopatia (3 pz), protesi (1 pz),<br>Marfan (1 pz), abuso di droghe (1 pz) |
| **ADD risk score** | 0 (2 pz), 1 (7 pz), 2 (7 pz), 3 (10 pz) |
| **Indagini strumentali** | **ECO** flap (8 pz), dilatazione aorta (10 pz), versamento pericardico (11 pz) e pleurico (3 pz)<br>**TAC** flap (18 pz), ematoma (2 pz), ulcera (1 pz), dilatazione aorta (12 pz), versamento pericardico (11 pz)<br>Autopsia (1 pz), accidentale (1 pz) |
| **Esito** | Trasferiti in cardiochirurgia (16 pz)<br>Ricovero UTIC (1 pz)<br>Decessi (8 pz) 5 in PS, 2 in OBI, 1 dimesso |

## •DA tipo B (12 pz) Pronto Soccorso ASMN RE 2012-2017

| | |
|---|---|
| **Epidemiologia** | maschi (8 pz), femmine (4 pz)<br>50-70 anni (maschi), 70-80 anni (femmine)<br>mattino (9 pz), pomeriggio (2 pz), sera (1 pz) |
| **Modalità di accesso** | 118 MET (6 pz), mezzi propri (6 pz) |
| **Presentazione clinica** | Dolore toracico (6 pz)<br>Dolore dorsale (8 pz)<br>Dolore addominale (5 pz)<br>Sincope (2 pz)<br>Ipotensione /shock (2 pz)<br>Crisi ipertensiva (9 pz)<br>Ischemia periferica (3 pz) |
| **Fattori di rischio** | Ipertensione (10 pz), fumo (5 pz), diabete (3 pz) ,<br>dilatazione aorta (4 pz), protesi vascolare (2 pz) |
| **ADD risk score** | 0 (1 pz), 1 (6 pz), 2 (3 pz), 3 (2 pz) |
| **Indagini strumentali** | **ECO** flap (2 pz), dilatazione aorta (4 pz), versamento pleurico (1 pz) e addominale (1 pz)<br>**TAC** flap (8 pz), ematoma (1 pz), ulcera (1 pz), dilatazione aorta (6 pz), versamento pleurico (2 pz) |
| **Esito** | Ricovero chirurgia vascolare (2 pz)<br>Ricovero UTIC (6 pz), High Care (1 pz)<br>Decessi (2 pz) 1 in PS, 1 in Medicina |

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# •Presenting symptoms

**Table 3** Presenting symptoms, signs, chest X-ray, and electrocardiographic features from the International Registry of Aortic Dissection registry

| Category | Overall ($n = 5638$) | Type A AAD ($n = 3747$) | Type B AAD ($n = 1891$) | P-value |
|---|---|---|---|---|
| Symptoms and signs | | | | |
| Chest or back pain | 4692 (87.9%) | 3113 (87.5%) | 1579 (88.7%) | 0.191 |
| Severe or worst ever pain | 4692 (87.9%) | 3113 (87.5%) | 1579 (88.7%) | 0.191 |
| Abrupt onset of pain | 4220 (84.0%) | 2789 (83.3%) | 1431 (85.4%) | 0.052 |
| Migrating pain | 664 (14.8%) | 400 (13.7%) | 264 (16.8%) | 0.005 |
| Pain presenting within 6 h of symptom onset | 2950 (75.8%) | 1700 (77.0%) | 790 (73.1%) | 0.015 |
| Any focal neurological deficit | 695 (13.7%) | 575 (17.2%) | 120 (7.0%) | <0.001 |
| Hypotension, shock, or tamponade | 1136 (23.4%) | 1054 (32.6%) | 82 (5.0%) | <0.001 |
| Hypertension at presentation | 1943 (40.0%) | 893 (27.6%) | 1050 (64.6%) | <0.001 |
| Any pulse deficit | 1170 (32.3%) | 811 (35.9%) | 359 (26.3%) | <0.001 |
| Aortic regurgitation | 1440 (38.7%) | 1266 (51.8%) | 174 (13.6%) | <0.001 |
| Abdominal pain | 1442 (30.5%) | 766 (24.9%) | 676 (41.1%) | <0.001 |
| Chest radiography | | | | |
| Normal | 999 (28.1%) | 588 (26.9%) | 411 (30.2%) | 0.031 |
| Widened mediastinum | 1509 (49.5%) | 1016 (53.7%) | 493 (42.6%) | <0.001 |
| Abnormal aortic contour | 1289 (43.7%) | 760 (41.8%) | 529 (46.6%) | 0.011 |
| Electrocardiography | | | | |
| Normal | 1763 (39.1%) | 1147 (38.3%) | 616 (40.7%) | 0.120 |
| Left ventricular hypertrophy | 817 (23.1%) | 490 (20.9%) | 327 (27.3%) | <0.001 |
| Myocardial ischemia or infarction | 647 (18.0%) | 526 (21.9%) | 121 (10.1%) | <0.001 |

European Heart Journal (2017) 0, 1–15
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## •Fattori di rischio

•-Over 70% have a hystory **hypertension**
•(more prevalent in older AAD and Type B )

•-Patients < 40 years are more likely to have **genetic conditions, drug abuse** or **trauma**

•Possibility of iatrogenic aortic dissection after invasive
•vascular procedure or cardiac surgery

**Table 8. Risk Factors For Development Of Thoracic Aortic Dissection**

**Conditions associated with increased aortic wall stress**
- Hypertension, particularly if uncontrolled
- Pheochromocytoma
- Cocaine or other stimulant use
- Weight lifting or other Valsalva maneuver
- Trauma
- Deceleration or torsional injury (eg, motor vehicle crash, fall)
- Coarctation of the aorta

**Conditions associated with aortic media abnormalities**
- Genetic
  - Marfan syndrome
  - Ehlers-Danlos syndrome, vascular form
  - Bicuspid aortic valve (including prior aortic valve replacement)
  - Turner syndrome
  - Loeys-Dietz syndrome
  - Familial thoracic aortic aneurysm and dissection syndrome
- Inflammatory vaculitides
  - Takayasu arteritis
  - Giant cell arteritis
  - Behcet arteritis
- Other
  - Pregnancy
  - Polycystic kidney disease
  - Chronic corticosteroid or immunosusppression agent administration
- Infections involving the aortic wall either from bacteremia or extension of adjacent infection

European Heart Journal (2014) **35**, 2873–2926
doi:10.1093/eurheartj/ehu281

# 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases

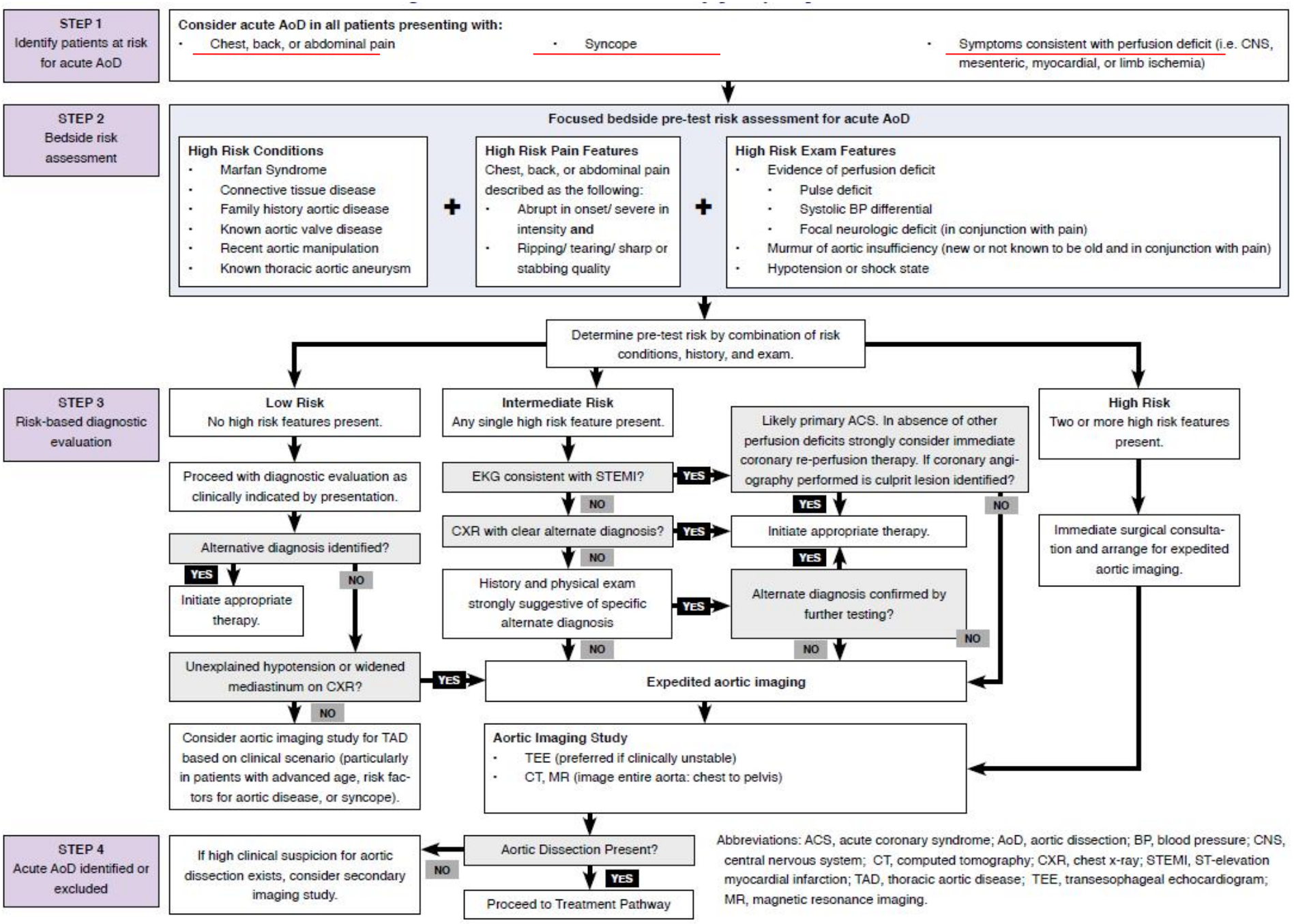
## •Stratificazione del rischio

•In 2010, the AHA guidilines proposed a risk assesment scoring system based on three groups of information: **PREDISPOSING CONDITIONS, PAIN FEATURES and CLINICAL EXAMINATION**.

•The presence of 0, 1, 2, or 3 groups of information is associated with increasing **pre-test probability**.

**e 7 Clinical data useful to assess the a priori probability of acute aortic syndrome**

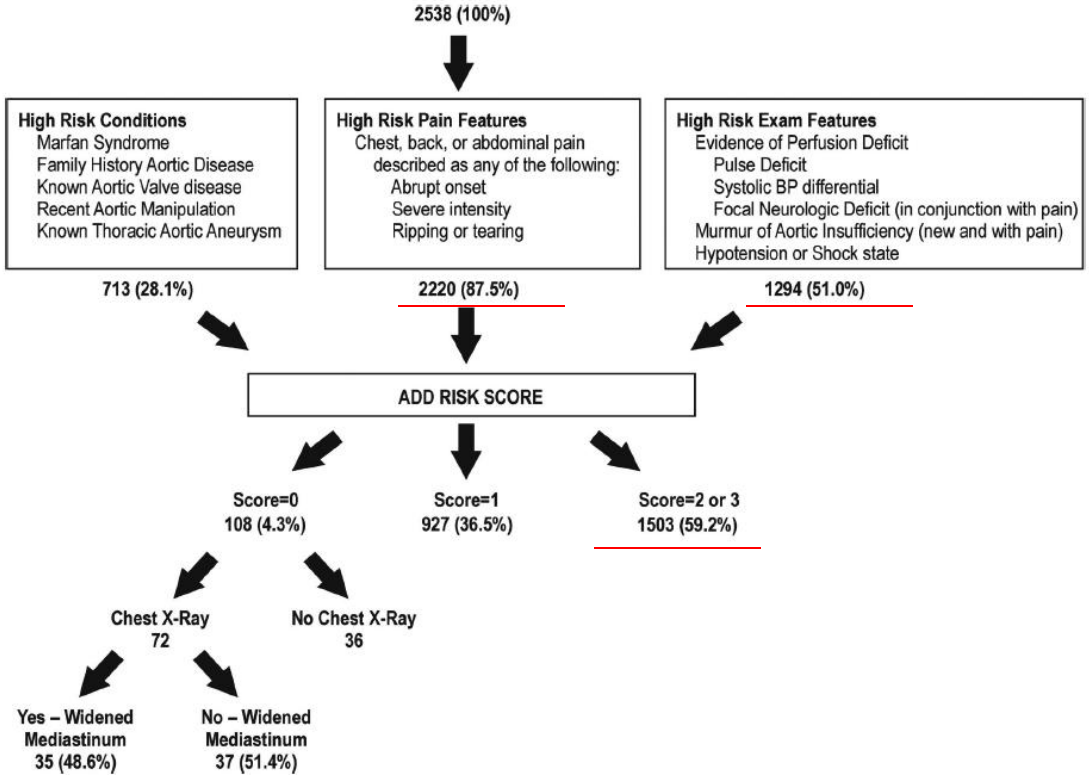
| High-risk conditions | High-risk pain features | High-risk examination features |
|---|---|---|
| • Marfan syndrome (or other connective tissue diseases)<br>• Family history of aortic disease<br>• Known aortic valve disease<br>• Known thoracic aortic aneurysm<br>• Previous aortic manipulation (including cardiac surgery) | • Chest, back, or abdominal pain described as any of the following:<br>- abrupt onset<br>- severe intensity<br>- ripping or tearing | • Evidence of perfusion deficit:<br>- pulse deficit<br>- systolic blood pressure difference<br>- focal neurological deficit (in conjunction with pain)<br>• Aortic diastolic murmur (new and with pain)<br>• Hypotension or shock |




Abbreviations: ACS, acute coronary syndrome; AoD, aortic dissection; BP, blood pressure; CNS, central nervous system; CT, computed tomography; CXR, chest x-ray; STEMI, ST-elevation myocardial infarction; TAD, thoracic aortic disease; TEE, transesophageal echocardiogram; MR, magnetic resonance imaging.

# Sensitivity of the Aortic Dissection Detection Risk Score, a Novel Guideline-Based Tool for Identification of Acute Aortic Dissection at Initial Presentation

## Results From the International Registry of Acute Aortic Dissection




***Methods and Results***—We examined patients enrolled in the International Registry of Acute Aortic Dissection from 1996 to 2009. The number of patients with confirmed acute aortic dissection who presented with 1 or more of 12 proposed clinical risk markers was determined. An aortic dissection detection (ADD) risk score of 0 to 3 was calculated on the basis of the number of risk categories (high-risk predisposing conditions, high-risk pain features, high-risk examination features) in which patients met criteria. The ADD risk score was tested for sensitivity. Of 2538 patients with acute aortic dissection, 2430 (95.7%) were identified by 1 or more of 12 proposed clinical risk markers. With the use of the ADD risk score, 108 patients (4.3%) were identified as low risk (ADD score 0), 927 patients (36.5%) were intermediate risk (ADD score 1), and 1503 patients (59.2%) were high risk (ADD score 2 or 3). Among 108 patients with no clinical risk markers present (ADD score 0), 72 had chest x-rays recorded, of which 35 (48.6%) demonstrated a widened mediastinum.

***Conclusions***—The clinical risk markers proposed in the 2010 thoracic aortic disease guidelines and their application as part of the ADD risk score comprise a highly sensitive clinical tool for the detection of acute aortic dissection. (***Circulation***. **2011;123:2213-2218.**)

**Table 2. Number of Patients With Acute Aortic Dissection Identified by Each Clinical Risk Marker (n=2538)**

| | No. of Patients | Percentage of Patients |
|---|---|---|
| 01: Marfan syndrome | 110 | 4.3 |
| 02: Family history of aortic disease | 48 | 1.9 |
| 03: Known aortic valve disease | 303 | 11.9 |
| 04: Recent aortic manipulation | 70 | 2.8 |
| 05: Known thoracic aortic aneurysm | 374 | 14.7 |
| 06: Abrupt onset of pain | 2012 | 79.3 |
| 07: Severe pain intensity | 1845 | 72.7 |
| 08: Ripping or tearing pain | 551 | 21.7 |
| 09: Pulse deficit or SBP differential | 515 | 20.3 |
| 10: Focal neurological deficit (in conjunction with pain) | 273 | 10.8 |
| 11: Murmur of aortic insufficiency (new in conjunction with pain) | 599 | 23.6 |
| 12: Hypotension or shock state | 407 | 16.0 |

**Table 1. Number of Patients With Acute Aortic Dissection Presenting With 1 or More Clinical Risk Markers (n=2538)**

| No. of Risk Markers | No. of Patients | Percentage of Patients |
|---|---|---|
| 0 | 108 | 4.3 |
| 1 | 307 | 12.1 |
| 2 | 666 | 26.2 |
| 3 | 750 | 29.6 |
| 4 | 426 | 16.8 |
| 5 | 187 | 7.4 |
| 6 | 79 | 3.1 |
| 7 | 15 | 0.6 |
| Total | 2538 | 100.0 |

Uomo di 27 anni, fumatore, iperteso, dislipidemia, uso di cocaina

Ore 21 giunge in PS per **intenso dolore retrosternale irradiato al dorso** da 30 minuti

EO PA 130/80, pallido, sofferente, eupnoico, non soffi, addome trattabile

ECG sinusale, Rx torace negativo, Troponina negativa

**ADD risk score 1**


ECO cuore e arco aortico regolare, non versamenti, cistifellea alitiasica

Ore 23 in OBI comparsa di **dolore epigastrico a barra**

Ore 24 profilo biliopancreatico negativo, **D dimero 6105**

Ore 1 angio-TC torace **DA tipo A** dal piano valvolare fino al carrefour
con origine dal lume vero dei tronchi sovraortici, tripode celiaco, mesenteriche

Ore 1.30 stabile, trasferito in cardiochirurgia - intervento di sostituzione aorta ascendente con protesi vascolare in CEC e protezione cerebrale senza complicanze

Giovane di 30 anni , anamnesi silente

Ore 24 giunge in PS per improvviso **dolore toracico trafittivo retrosternale irradiato al dorso** insorto dopo cena ora associato a parestesie arto inferiore sin

EO pallido, sofferente, **pectus excavatum**, aspetto marfanoide, MV simmetrico, addome trattabile, **polso femorale sin iposfigmico**

PA 110/50 FC 60 FR 20 SpO2 98% in AA

ECG nei limiti, Rx torace negativo


ECO arco aortico dilatato, non accessibili le finestre parasternali, **flap aorta discendente**

**ADD risk score 3**

Ore 1 Angio TC torace **DA tipo A (De Bakey I)** senza Interessamento dei tronchi sovraortici

Ore 1.40 trasferito in cardiochirurgia - intervento di sostituzione valvolare aortica e dell'aorta ascendente con protesi e reimpianto degli osti coronarici

In follow up Angio TC per residua dissezione fino alla biforcazione delle iliache, successivo intervento di riparazione mitralica per prolasso

Uomo di 49 anni, fumatore, iperteso in terapia, IRC moderata

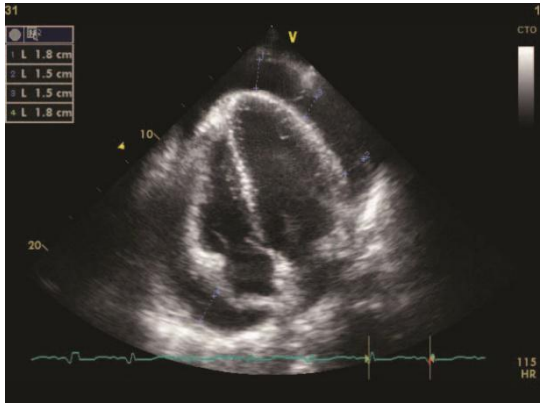
Ore 24 accompagnato dal MET per **dolore toracico irradiato al dorso, sincope**, **ipotensione**

EO PA 80/40, FC 100, SpO2 96%, vigile, sofferente, non deficit di lato, pallido, **toni ovattati, giugulari distese**, polsi isosfigmici , addome trattabile

ECG tachicardia sinusale ST sopraconcavo in sede inferiore senza specularità

**ADD risk score 3**

ECO **radice aortica dilatata** con **flail**, **versamento pericardico** subtamponante




**DA tipo A con instabilità emodinamica**

Ore 1.30 dopo infusione di liquidi e crociatura di EC + PFC trasferimento immediato in cardiochirurgia senza diagnostica radiologica

•Uomo di 56 anni iperteso, fumatore, colelitiasi, stripping VGS

•Ore 9 giunge in PS per **improvviso dolore a barra in regione epigastrica irradiato al dorso** con parestesie alla gamba dx

•EO PA 150/90, sofferente, pallido, sudato, toni validi, MV simmetrico, polsi isosfigmici, addome trattabile, Giordano e Murphy neg,

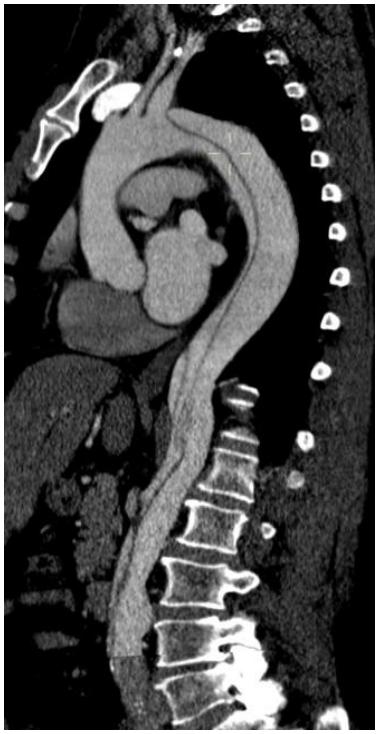
•ECG sinusale nei limiti

•ECO cuore e aorta regolare, non idronefrosi, colelitiasi, non versamenti

•Ore 10 sta meglio

•Troponina  e profilo biliopancreatico negativi

•Ore 11 comparsa di **dolore alla gamba dx** con arto pallido e freddo



**•ADD risk score 2**

•Angio-TC torace **DA tipo B** *subito dopo l'emergenza della succlavia sin estesa alla biforcazione con interessamento delle arterie iliache comuni*

•Ore 12 stabile, Tp nitroderivato ricovero in UTIC per monitoraggio

•dopo 2 gg trasferito in chirurgia vascolare  -  impianto di graft endovascolare TEVAR + BP carotido succlavio sin

Uomo di 72 anni, iperteso, pregressa TEP, episodi di FA/FLA in TAO, IRC

Ore 20 accompagnato dal MET per **dolore toracico a barra irradiato al dorso** con sudorazione algida sensibile al nitrato

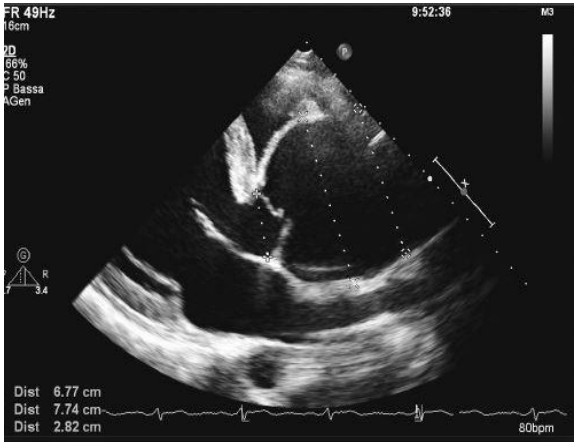
EO PA 130/70, eupnoico, **soffio diastolico** 2/6, polsi isosfigmici, non edemi

ECG sinusale BAV I grado, Rx torace **ombra cardiaca ingrandita**
Troponina (I punto) negativa

Ore 22 in OBI asintomatico durante la notte

Curva enzimatica negativa

Ore 12 ECO **dilatazione della radice aortica** senza evidenti flap intimali




**ADD risk score 2**

Ore 13 Angio-TC TORACE **DA tipo A** dal piano valvolare e si estende ad interessare l'arco e il tratto discendente fino all'arteria renale sin

Ore 14 infusione di vitamina K + complessi protrombinici trasferito in cardiochirurgia intervento di sostituzione dell'aorta ascendente con tubo vascolare senza complicanze

Uomo di 73 anni, iperteso in terapia

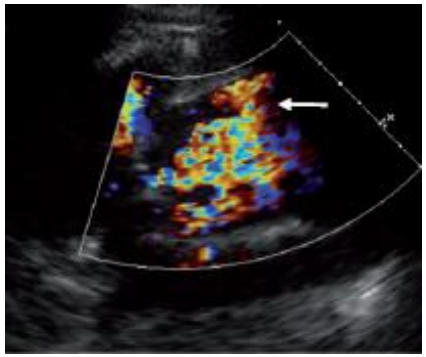
Ore 11 soccorso dal MET per **crisi epilettica** mentre camminava per strada, intubato per stato di coma, riferito (moglie) **dolore al collo**

EO PA 90/60, pallido, **ipoteso**, **polso femorale sin iposfigmico**

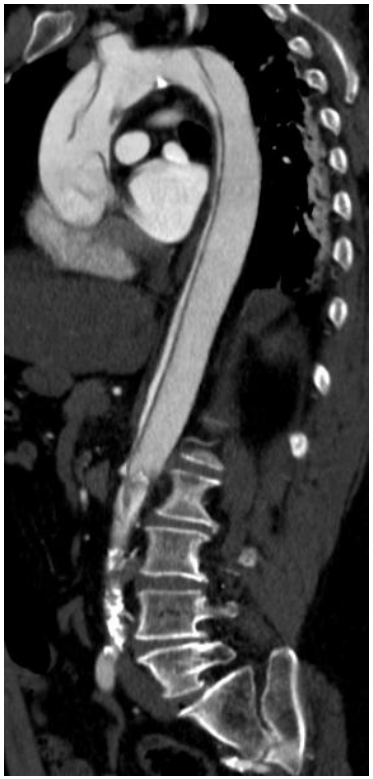
ECG sinusale, non alterazioni ischemiche

**ADD score risk 3**

ECO **aorta ascendente ectasica con flap intimale**, non versamento pericardico



Ore 12 Angio TC torace **DA tipo A** dal piano valvolare al carrefour con coinvolgimento origine dei tronchi sovraortici, arteria renale ed iliaca esterna sin con segni ipoperfusivi



Ore 13 trasferito in cardiochirurgia - intervento di sostituzione dell'aorta ascendente fino alla emergenza del tronco anonimo con protesi in dacron + plastica valvolare aortica (complicato da ictus silviano dx, IR con trachestomia, IRA con CVVH e sepsi)

**Diagnosi Differenziale**

•• Aneurisma senza dissezione
•• Cardiomiopatia
•• Urgenza ipertensiva
•• Versamento pleurico
•• Stenosi aortica
•• Pericardite
•• Infarto miocardico
•• Insufficienza aortica
•• Insulto cerebrovascolare
• Esofagite o mediastinite
•• Polmonite
•• Sanguinamento gastrointestinale
•• Shock emorragico
•• Shock cardiogeno
•• Pneumotorace
•• Colecistite
• Pancreatite acuta
• Infarto intestinale
• Colica renoureterale
•• Dolore muscoloscheletrico
•• Embolia polmonare
•• Gastrite
•• Sindrome dello stretto toracico

European Heart Journal (2017) **0**, 1–15
doi:10.1093/eurheartj/ehx319

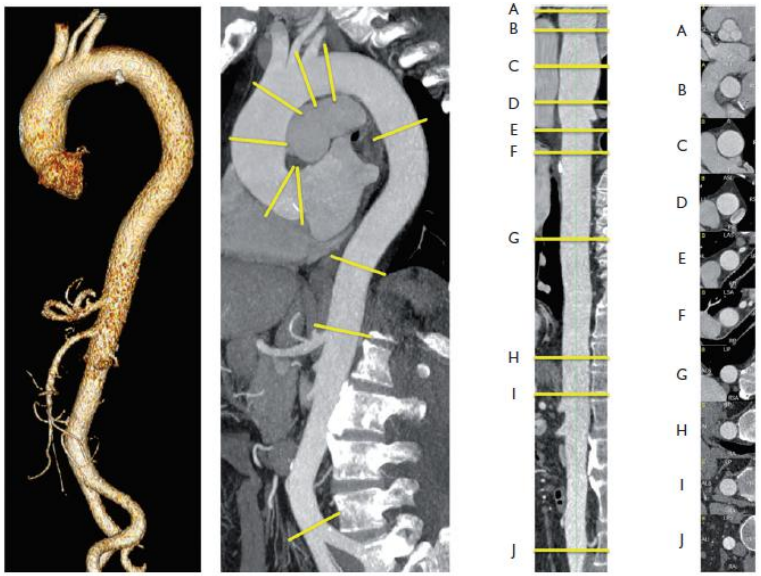
# •Angio TAC

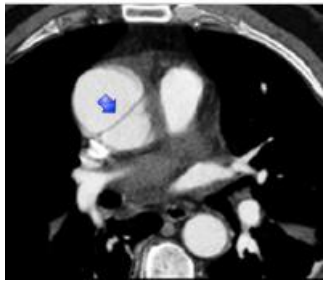
•-**COMPLETE AND DETAILED MAP** of the entire aorta and its branches.

•-Do not allow bedside use and may limit their feasibility in unstable patients.

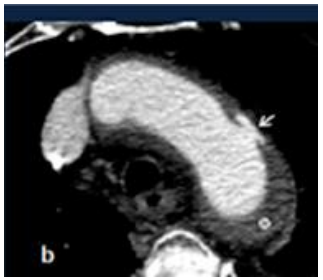
•-**DIFFERENTIAL DIAGNOSIS** among AAS, pulmonary embolism, coronary artery disease

•-Risk for allergic reaction and renal insufficiency for iodinated contrast agents.



DA classica




Ulcera penetrante di parete

European Journal of Echocardiography (2010) **11**, 645–658
doi:10.1093/ejechocard/jeq056

**Echocardiography in aortic diseases:
EAE recommendations for clinical practice**

# •Ultrasound point of care

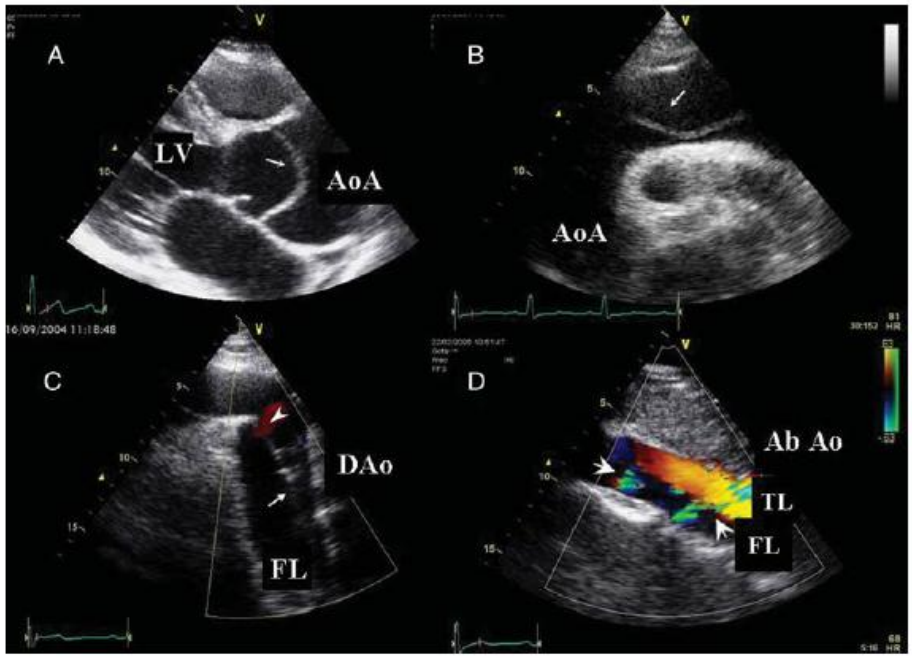



**Figure 6** Aortic dissection diagnosis by transthoracic echocardiography. Intimal flap (arrows) and two lumina are visualized in: (*A*) aortic root, (*B*) aortic arch and distal ascending aorta, (*C*) proximal descending aorta (arrowhead shows the entry tear), and (*D*) dissection of abdominal aorta. Colour Doppler helps to identify the true lumen (TL). Arrowheads signal secondary communications.

•-The diagnosis of AD is based on detecting **INTIMAL FLAP** in the aorta with fluttering of the
• ruptured intimal borders that divides the aorta into two, TRUE and **FALSE LUMEN.**

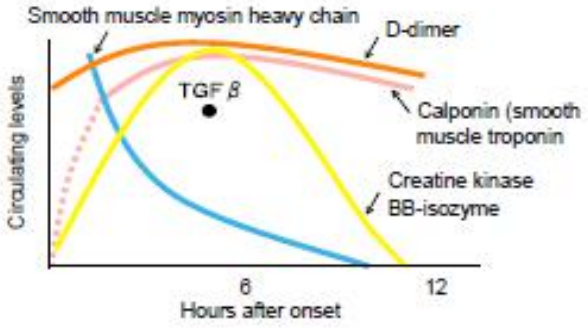
•**-**In most cases, false lumen flow and smaller intimal tears can be detected by COLOUR DOPPLER.

# Biomarkers of aortic diseases

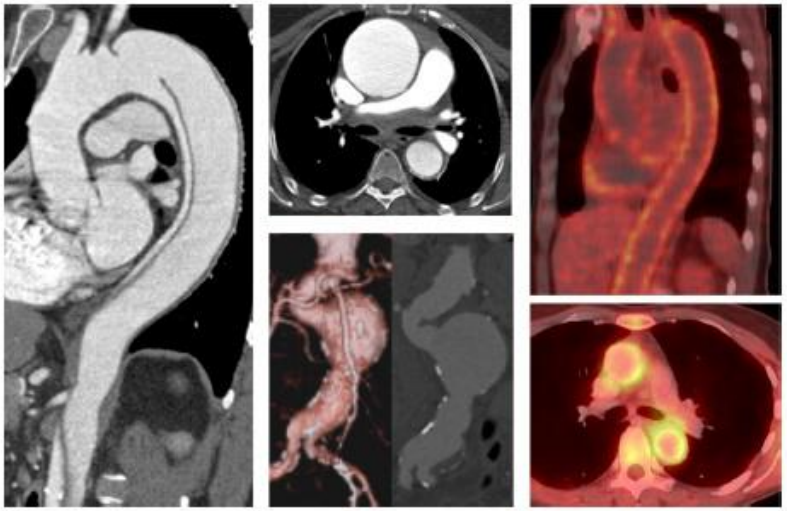
Toru Suzuki, MD,[a] Eduardo Bossone, MD,[b,c] Daigo Sawaki, MD,[c] Rolf Alexander Jánosi, MD,[d] Raimund Erbel, MD,[c] Kim Eagle, MD,[e] and Ryozo Nagai, MD[a] *Tokyo, Japan; Milan, and Salerno, Italy; Essen, Germany; and Ann Arbor, MI*

The development of diagnostic biomarkers of acute cardiovascular disease remains an important topic of interest given potential use to aid in early diagnosis. Cardiac biomarkers of ischemia and heart failure have already proven to be clinically useful. Biomarkers of aortic diseases are also needed, especially for life-threatening conditions such as aortic dissection. In this review, we discuss the present status of the development of biomarkers of aortic diseases. Although aortic dissection has been most vigorously pursued, there has also been notable recent progress in biomarkers of aneurysms and inflammatory aortic disease. (Am Heart J 2013;165:15-25.)

**Figure 2**




Time course of biomarkers in aortic dissection. Modified from Suzuki et al[38].



**Aortic dissection**

Smooth muscle myosin heavy chain, BB-isoenzyme of creatine kinase, calponin, elastin, C-reactive protein (CRP), matrix metallo-proteinases (MMP), circulating transforming growth factor α (TGF-α), D-dimer

**Aortic aneurysm**

Pro-collagen, MMP-9, fibrinogen, D-dimer, tissue plasminogen activator, interleukin-6

**Aortitis**

Pentraxin-3 (PTX-3)
High sensitive CRP (hsCRP)
Erhythrocyte sedimentation rate (ESR)

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

Stephen E. Asha, MBBS, MMed (Clin Epi)*; James W. Miers, BSc, MBBS

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**Study objective:** The aim of this systematic review and meta-analysis is to determine the diagnostic accuracy of D-dimer as a rule-out test for acute aortic dissection. Previous meta-analyses have had methodological problems with conflicting conclusions, and new diagnostic accuracy studies have been published since.

**Methods:** All prospective cross-sectional analytic studies of D-dimer as a diagnostic test for acute aortic dissection were included where diagnosis was confirmed by an accepted reference standard. Studies were identified with MEDLINE, EMBASE, Medion, Google Scholar, Web of Science, and bibliographies of relevant articles and previous systematic reviews. Two reviewers independently screened articles for inclusion, assessed study quality, and extracted data.

**Results:** Abstracts from 800 articles were reviewed, yielding 30 potentially relevant studies that were reviewed in full text. Five studies met all eligibility criteria. Data from 4 studies (1,557 participants) that used a D-dimer cutoff of 0.50 μg/mL were pooled to estimate sensitivity, specificity, and positive and negative likelihood ratios. Overall, sensitivity and negative likelihood ratio were 98.0% (95% confidence interval [CI] 96.3% to 99.1%) and 0.05 (95% CI 0.03 to 0.09), respectively. These measurements had little statistical heterogeneity. Specificity (41.9%; 95% CI 39.0% to 44.9%) and positive likelihood ratio (2.11; 95% CI 1.46 to 3.05) showed significant statistical heterogeneity. When applied to a low-risk population as defined by the American Heart Association (prevalence 6%), the posttest probability for acute aortic dissection was 0.3%.

**Conclusion:** This meta-analysis suggests that a negative D-dimer result may be useful to help rule out acute aortic dissection in low-risk patients. [Ann Emerg Med. 2015;66:368-378.]

Please see page 369 for the Editor's Capsule Summary of this article.

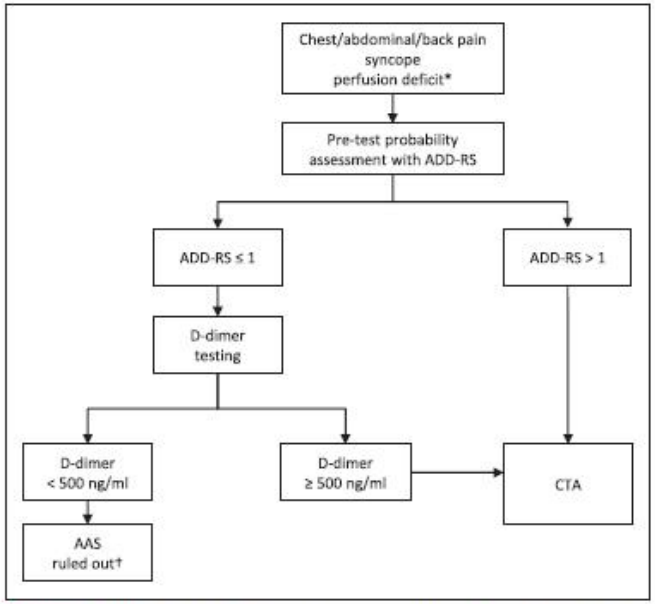


**Figure 3. Proposed diagnostic algorithm based on pre-test probability assessment and D-dimer.**

## What Are the Clinical Implications?

- Integration of ADD-RS with D-dimer may help to standardize diagnostic decisions on advanced imaging for suspected AAS, balancing the risks of misdiagnosis and overtesting.
- Patients at high probability of AAS (ie, ADD-RS >1) should proceed to computed tomography angiography or other conclusive imaging regardless of D-dimer levels.
- ADD-RS=0 plus D-dimer <500 ng/mL and ADD-RS ≤1 plus D-dimer <500 ng/mL are possible rule out diagnostic strategies for AAS.
- The ADD-RS ≤1 plus D-dimer <500 ng/mL strategy may avoid up to 1 in 2 computed tomography angiography examinations in patients with suspected AAS.

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

## The ADvISED Prospective Multicenter Study

Editorial, see p 270

**BACKGROUND:** Acute aortic syndromes (AASs) are rare and severe cardiovascular emergencies with unspecific symptoms. For AASs, both misdiagnosis and overtesting are key concerns, and standardized diagnostic strategies may help physicians to balance these risks. D-dimer (DD) is highly sensitive for AAS but is inadequate as a stand-alone test. Integration of pretest probability assessment with DD testing is feasible, but the safety and efficiency of such a diagnostic strategy are currently unknown.

**METHODS:** In a multicenter prospective observational study involving 6 hospitals in 4 countries from 2014 to 2016, consecutive outpatients were eligible if they had ≥1 of the following: chest/abdominal/back pain, syncope, perfusion deficit, and if AAS was in the differential diagnosis. The tool for pretest probability assessment was the aortic dissection detection risk score (ADD-RS, 0–3) per current guidelines. DD was considered negative (DD–) if <500 ng/mL. Final case adjudication was based on conclusive diagnostic imaging, autopsy, surgery, or 14-day follow-up. Outcomes were the failure rate and efficiency of a diagnostic strategy for ruling out AAS in patients with ADD-RS=0/DD– or ADD-RS ≤1/DD–.

**RESULTS:** A total of 1850 patients were analyzed. Of these, 438 patients (24%) had ADD-RS=0, 1071 patients (58%) had ADD-RS=1, and 341 patients (18%) had ADD-RS >1. Two hundred forty-one patients (13%) had AAS: 125 had type A aortic dissection, 53 had type B aortic dissection, 35 had intramural aortic hematoma, 18 had aortic rupture, and 10 had penetrating aortic ulcer. A positive DD test result had an overall sensitivity of 96.7% (95% confidence interval [CI], 93.6–98.6) and a specificity of 64% (95% CI, 61.6–66.4) for the diagnosis of AAS; 8 patients with AAS had DD–. In 294 patients with ADD-RS=0/DD–, 1 case of AAS was observed. This yielded a failure rate of 0.3% (95% CI, 0.1–1.9) and an efficiency of 15.9% (95% CI, 14.3–17.6) for the ADD-RS=0/DD– strategy. In 924 patients with ADD-RS ≤1/DD–, 3 cases of AAS were observed. This yielded a failure rate of 0.3% (95% CI, 0.1–1) and an efficiency of 49.9% (95% CI, 47.7–52.2) for the ADD-RS ≤1/DD– strategy.

**CONCLUSIONS:** Integration of ADD-RS (either ADD-RS=0 or ADD-RS ≤1) with DD may be considered to standardize diagnostic rule out of AAS.

**CLINICAL TRIAL REGISTRATION:** URL: https://www.clinicaltrials.gov. Unique identifier: NCT02086136.

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Sources of Funding, see page 257

**Key Words:** aorta ■ dissection ■ fibrin fragment D ■ syndrome

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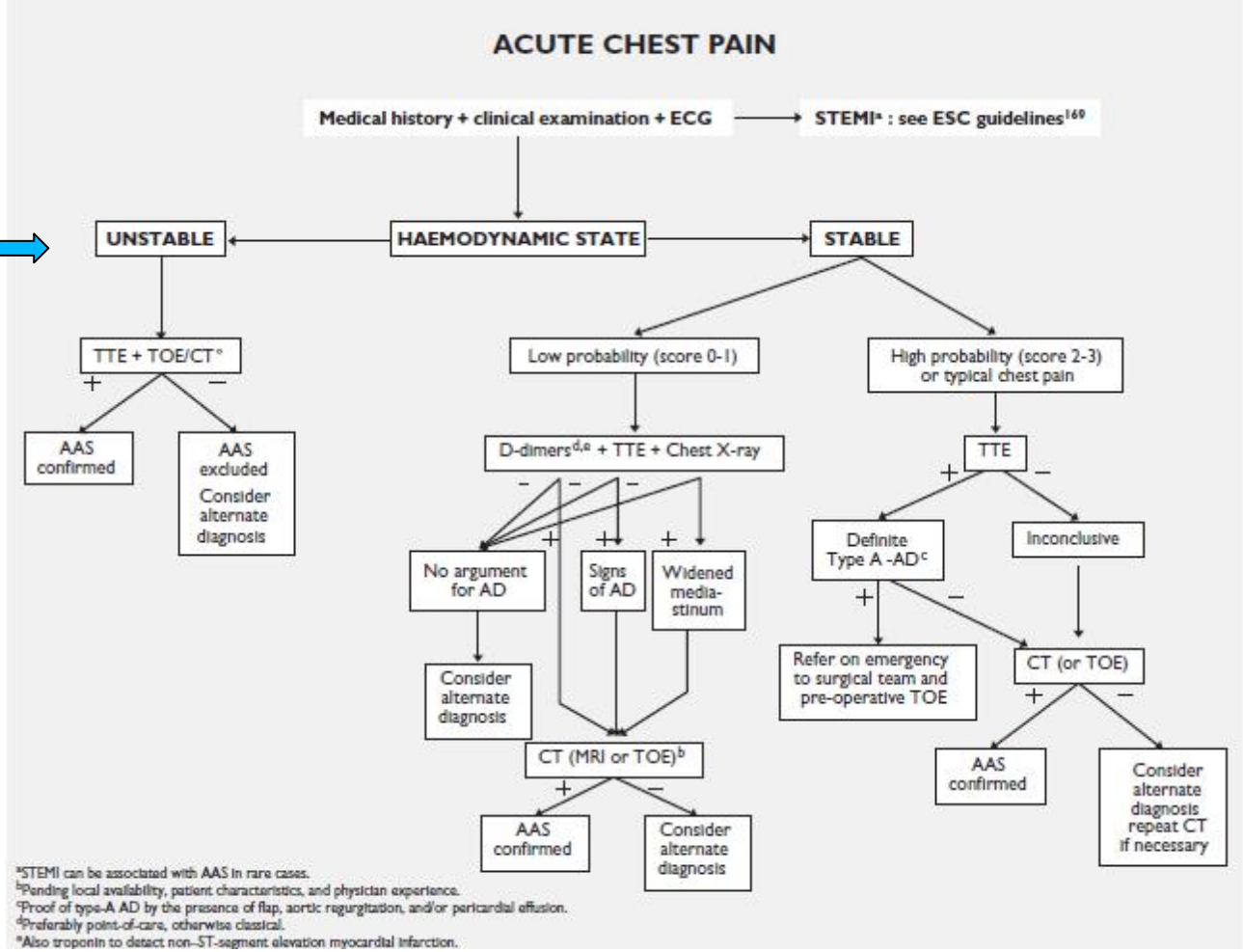
**•The diagnostic flow chart combines the pre-test probability according to CLINICAL DATA, and the LABORATORY and IMAGING TESTS, as should be done in clinical practice in emergency or chest pain units**




-Slargamento mediastino 48% Rx torace poco

-Ddimero negativo 1-2% ADD risk s

-Pauci/asintomatico 5% dolore in

-Troponina /alterazioni ECG fluttuanti misdiagnosis vs IM

-Giovani

-Sincope 15 % c

-ECO point of care poc

-Deficit neurologici focali 10% sintomi cor

-Pazienti instabili T


•**Take home message**

•-ADD risk score pre test molto utile nell’indirizzare il work up diagnostico

•-ECO point of care strumento affidale nella diagnosi precoce delle complicanze

•-D dimero molto sensibile per il rule out dei pazienti a basso rischio (ADD-RS ≤ 1)

• ma soprattutto

• **ALTO INDICE DI SOSPETTO**

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GRAZIE PER L' ATTENZIONE


"la vita è breve, l'arte è lunga, l'occasione fuggevole, l'esperimento pericoloso, il giudizio difficile«

Ippocrate