Aortic Dissection (Acute Aortic Syndrome): Awareness and Diagnosis

Aims and Objective
To support awareness of an important low frequency condition
Identify key features for assessing clinicians
Clarity over discriminating investigations
Link to the LHCH pathway

Key Messages
Think Aorta Campaign
CT Angiogram the only discriminating investigation
Chest pain is a mandatory consultant sign-off
LHCH pathway in ED links (Background information, investigation, referral and transfer)

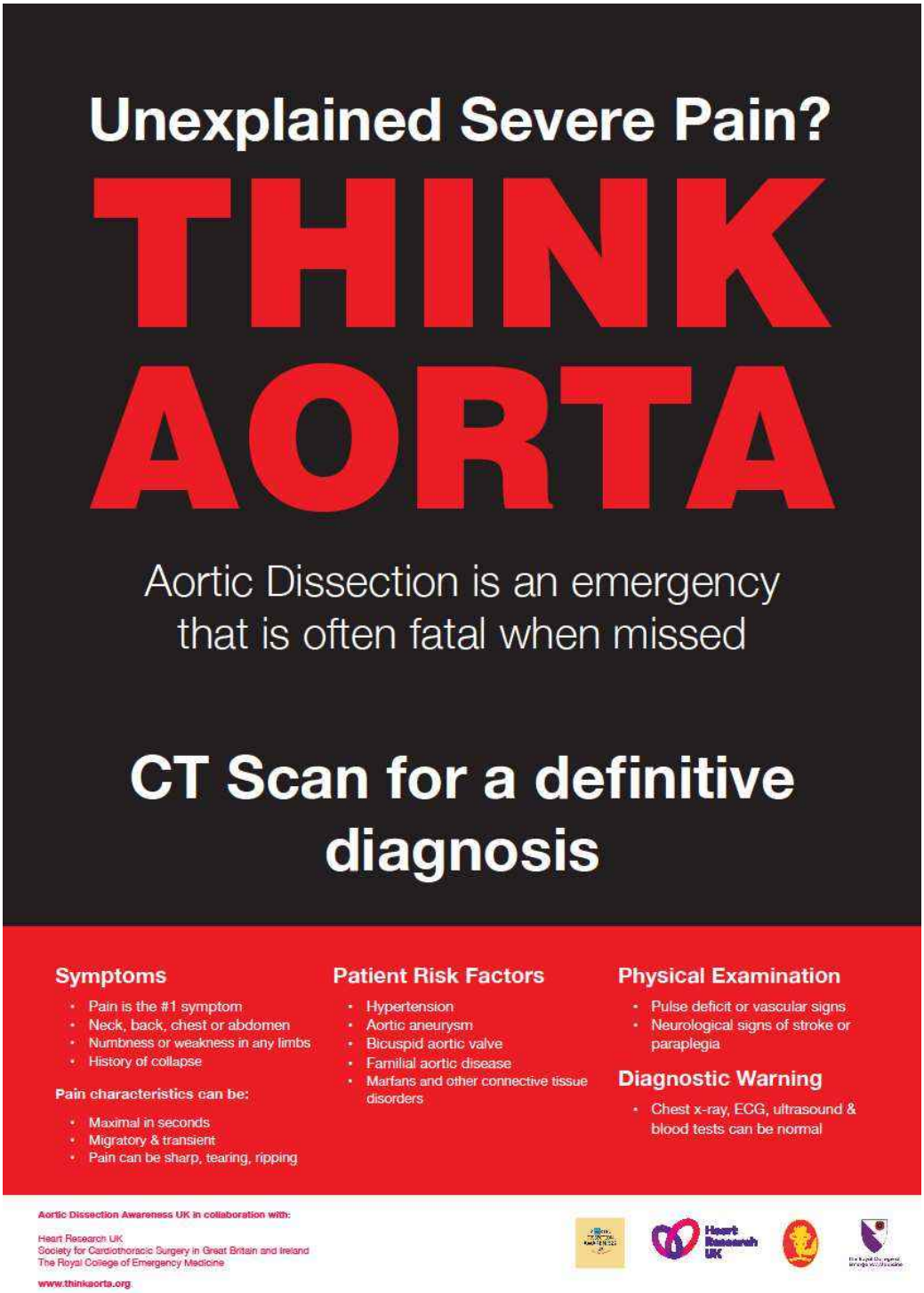
Aortic dissection is part of a spectrum of disease encompassed by the term acute aortic syndromes. The definition of dissection is an intimal tear of the aorta leading to false channelling of blood in the aortic wall. Intramural haematoma (IMH) and penetrating aortic ulcer (PAU) also form part of this spectrum of acute aortic syndrome.

How common is it at Whiston ED?
Prevalence is 2-3/100 000 per year
6-10 cases a year
1: 10000 ED attendances

*[The rarity of acute Type A is the Achilles heel of the disease. Doctors in ED will rarely if ever see such a patient. Campaigns encourage doctors (http://www.aorticdissectionawareness.com/aortic-dissection/) to think aortic dissection however by far the biggest reasons for chest pain are myocardial infarction, pulmonary embolism and non-specific musculoskeletal aetiologies.: **LHCH Aortic Syndrome Pathway**]*

How risky is it?
Every hour has 1% mortality for the first 48h

Awareness


Unexplained Severe Pain?
THINK AORTA
Aortic Dissection is an emergency that is often fatal when missed
CT Scan for a definitive diagnosis
Symptoms
Pain is the #1 symptom
Neck, back, chest or abdomen
Numbness or weakness in any limbs
History of collapse
Pain characteristics can be:
Maximal in seconds
Migratory & transient
Pain can be sharp, tearing, ripping
Patient Risk Factors
Hypertension
Aortic aneurysm
Bicuspid aortic valve
Familial aortic disease
Marfans and other connective tissue disorders
Physical Examination
Pulse deficit or vascular signs
Neurological signs of stroke or paraplegia
Diagnostic Warning
Chest x-ray, ECG, ultrasound & blood tests can be normal
Aortic Dissection Awareness UK in collaboration with:
Heart Research UK
Society for Cardiothoracic Surgery in Great Britain and Ireland
The Royal College of Emergency Medicine
www.thinkaorta.org
Heart Research UK

Diagnosis

The following has been summarised from RCEM FOAMEd learning resources with amendments

It is diagnostic challenge because the condition can present with a range of symptoms including:

- Chest pain
- Back pain
- Epigastric pain
- Collapse
- Stroke

Patients presenting with these symptoms are far more likely to have another more common condition, such as MI, PE, stroke

History Taking

Very sudden, often severe thunderclap chest pain that's often resolved or improved by the time the patient attends the ED.

Often these patients are previously fit and well, had never been to hospital, or had to call an ambulance because of the severe nature of the pain.

Pain is often maximal at onset.

The pain could be transient in nature, and it could recur in a different place. Occasionally patients presented with symptoms that don't quite fit, or experience transient neurological signs associated with the chest pain.

Key features

- Abrupt onset
- Severe chest pain (Given opiates / Called ambulance)
- May have resolved or improved by the time the patient attends the ED.
- Pain is often maximal at onset.
- Although rare, chest pain plus neurology is suggestive

Risk factors from PMH

- Hypertension
- Bicuspid Aortic Valve / Aortitis / Coarctation
- Connective Tissue diseases (Marfans or Ehlers-Danlos)
- Cocaine use
- Pregnancy

Red flags from Family History (Don't omit to ask)

- Aortic Dissection
- Sudden Cardiac Death

Examination

There is often very little to find on examination

High risk signs:

- Pulse deficit in either arm,
- Systolic blood pressure difference in either arm,
- Chest pain **plus a focal neurological deficit**
- New aortic murmur
- Hypotension or shock.

Absence of any of these signs does NOT exclude the diagnosis.

Investigation

To reiterate the Think Aorta campaign:
ECG and all laboratory tests, including Highly Sensitive Troponin and D-Dimer may be normal

No blood test can exclude the diagnosis

CT the key investigation

CT Angiography

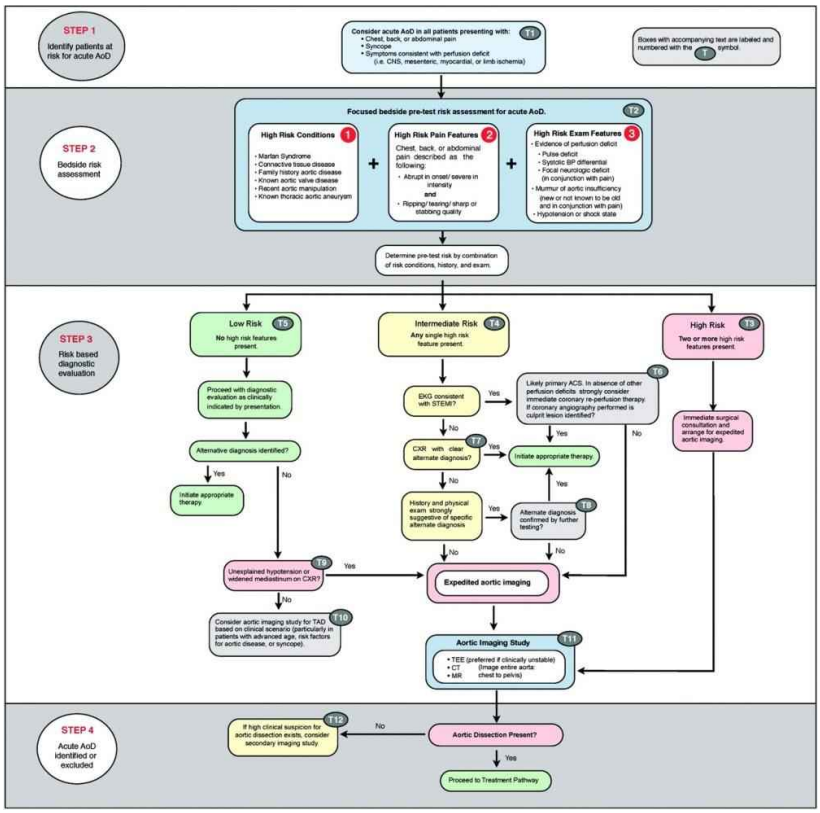
Urgent CT Thorax with contrast is the discriminating investigation, and can be provided 24h a day

- The risk of delay is 1% per hour mortality
- If there is evidence of distal occlusion such as abdominal pain or limb ischaemia, discuss extending the CT to the whole aorta

Appendix

Evidence background

In 2010 the ACC / AHA proposed the Aortic Dissection Dissection-Risk Score (ADD-RS) as part of a wider clinical practice guideline



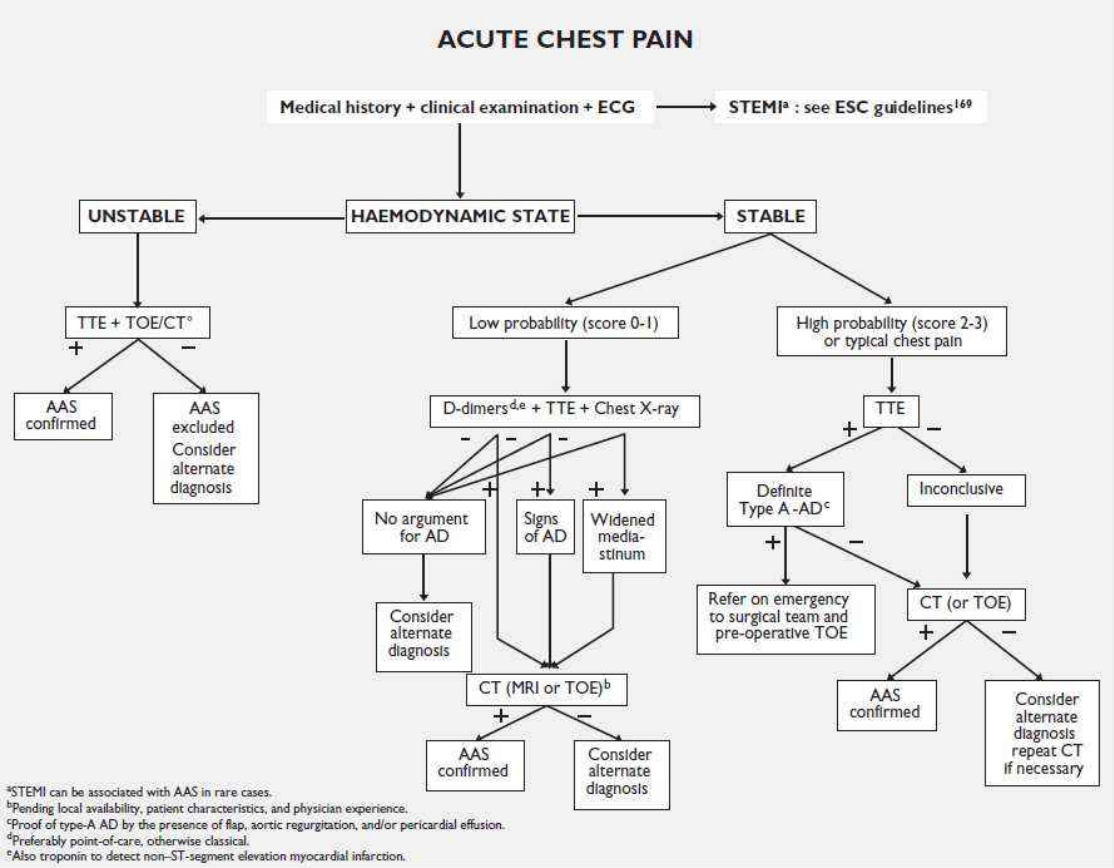
Hiratzka LF, et al Circulation 2010;121(13):e266-369

It has been validated retrospectively on the IRAD Aortic Dissection Registry data set (Rogers AM, Hermann LK, Booher AM, et al. Circulation 2011;123(20):2213)

Pitfalls:

- 4.3% of Aortic Dissection were ADD-RS Zero
- Validated on a RETROSPECTIVE KNOWN data set
- Predicted to be less reliable on an UNDIFFERENTIATED (ED) population

There is a European Society of Cardiology guideline from 2014
(European Heart Journal (2014) 35, 2873–2926)



The probability scores in this are the same as the AHA / ACC ADD-RS score

The low probability strategy is from a cardiology perspective and is impractical for ED use
(Echo plus D-dimer plus CXR)
It isn't validated

Can D-Dimer in conjunction with a low risk score be used as a rule out?

This question has been investigated by the ADvISED Prospective Multicenter Study
(Nazerian P, et al Circulation 2018 Jan 16;137(3):250-258)

Although this does suggest a low failure rate of 0.3%, caution is advised for the following reasons:

- This was a tertiary centre based study with a prevalence of 13% of those investigated
- Provider decision to rule out Aortic Syndrome, difficult to standardise in a DGH
- It has not been externally validated in an ED population
- Mean time of presentation was 7.5h, and 2/3 ADD-RS failures presented at 2h