

- **Greater Manchester Cardiac and Vascular Networks**
 - **Pathway of Care**
 - **ACUTE AORTIC DISSECTION**

SETTING	Emergency Departments (EDs) GM Cardiac and Vascular Networks
FOR STAFF	Emergency Medicine, Vascular Surgery, Cardiac Surgery, Cardiology, Anaesthesia, Intensive Care, Radiology & Nursing
PATIENTS	Patients who present to network ED sites with suspected or diagnosed acute aortic syndrome, including aortic dissection. Excludes trauma and management of children (< 18 years old).

Based upon European Society for Vascular Surgery 'Management of Descending Thoracic Aortic Disease'
[https://www.ejves.com/article/S1078-5884\(16\)30178-2/pdf](https://www.ejves.com/article/S1078-5884(16)30178-2/pdf)

1. Aims

To standardise the management of acute aortic syndrome, including Type A aortic dissection (**TAAD**), Type B aortic dissection (**TBAD**), intramural haematoma (**IMH**) and penetrating aortic ulcer (**PAU**), such that

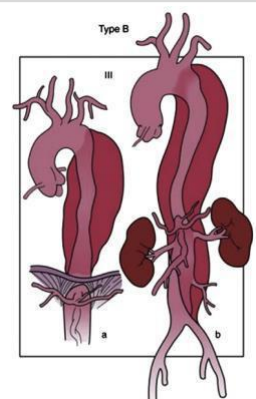
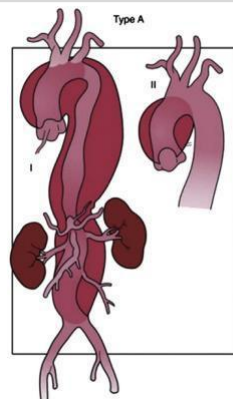
- **Risk of missed or delayed diagnosis of acute aortic syndrome, including dissection, is minimised.**
- Any person with **aortopathy** (or diagnosed first degree relative), **aortic dilatation**, **bicuspid aortic valve** or with **past aortic surgery** presenting with new onset chest pain has a CTA to exclude acute aortic syndrome.
- In all people, new onset pain consistent with aortic dissection triggers an urgent request for CT aortogram.
- Stabilisation, including blood pressure and pulse rate control, including pain relief, are instigated immediately.
- Patients with acute aortic syndrome **involving the ascending aorta and/or arch** are discussed immediately with the cardiac registrar at WTWA.
- Patients with acute aortic syndrome **distal to the left subclavian artery** are discussed immediately with the vascular registrar at MRI.
- Patients are transferred safely.
- That people for whom this is an end of life event, who are unsuitable for surgery, or who decline transfer for surgery, receive end of life supportive care in their local hospital close to family and friends.

TAAD ascending aorta and/or arch

Immediate surgery is required to replace the aortic root to prevent myocardial infarction, pericardial tamponade or aortic rupture.

TBAD distal to the left subclavian artery

Immediate management is intensive blood pressure control, **unless** aortic rupture, malperfusion, spinal cord ischaemia, limb ischaemia or acute kidney ischaemia.





2. Diagnosis

- See RCEM eLearning <https://www.rcemlearning.co.uk/foamed/aortic-dissection/>
- Without intervention, mortality for TAAD is 50% by 2-days and for TBAD is 10% by 30-days.¹
- Acute aortic syndrome must be considered in any adult patient presenting with
Sudden onset of pain in the neck, back, chest or abdomen
Pain described as 'sharp', 'tearing' or 'ripping', is maximal in seconds and then migratory or transient
Sudden numbness or weakness of any limb or limbs
Unexplained collapse
- The following are risk factors for aortic dissection, and when present imaging is indicated
 - Marfan's or other connective tissue disease
 - Familial aortic disease
 - Bicuspid aortic valve
 - Aortic dilatation
- Additional points for emergency department doctors
 - In younger patients' aortic dissection may be caused by **heavy lifting** or **cocaine** use
 - A history of vomiting is common, this may lead to miss-diagnosis
 - Pain may well have eased or resolved by the time that the patient is assessed
- When acute aortic syndrome is a differential diagnosis, i.e. unexplained new onset neck, back, chest or abdominal pain, even if pain has since resolved, **aortic pathology must be excluded by imaging with CT.**
- A chest x-ray can diagnose aortic dissection, but interpretation is difficult, it can be normal, and therefore as an investigation it is unhelpful, other than to make an alternative diagnosis.

3. Immediate management - **PULSE AND BLOOD PRESSURE CONTROL UNLESS RUPTURED**

- **The most senior doctor available should lead and be actively involved in the care of the patient.**
- Move to **Resus bay**, monitor pulse, BP and ECG status regularly.
- **Pain relief**, following the College of Emergency Medicine guidelines. ¹
 - i.e. Morphine sulphate 2-5 mg intravenously every 5-30 minutes
- **CT aortogram**, this should be requested stating 'EXCLUDE or CONFIRM ACUTE AORTIC SYNDROME'. Where possible this should be a gated CT scan. *CTA from carotid arteries to common femoral arteries is needed to confirm the diagnosis and to assess type and extent of pathology. Cannula should ideally be placed in right arm to avoid artefact around arch vessels.*
- **Referring teams need to ensure that CT images can be viewed on GM SECTRA PACS OR are transferred to WTWA or MRI using the image exchange portal (IEP).**
- Insertion of an arterial line can be helpful for IV blood pressure control but is not essential.
- Treat **Hypertension** and **Tachycardia** to achieve
 - Systolic blood pressure (SBP) of 100-120 mmHg within 30min. Pulse rate (PR) of 60-75 bpm within 60mins.
IV Labetalol (onset 2-5 min, duration 2-4hr): 0.25milligram/kg bolus over 2 min (i.e. 10mg bolus), followed by 2mg/min infusion for 10minutes and increase infusion up to 5mg/min.
If still hypertensive following beta-blockade, next add vasodilators (given alone these will increase wall stress due to reflex tachycardia). **Hydralazine is contra-indicated in acute dissection.**
 - IV Glyceryl trinitrate (GTN)**: 10–200 micrograms/minute, adjusted according to response.
Caution with COPD/asthma as β -blocker may cause respiratory distress – use Esmolol AND/OR Diltiazem.
 - IV Esmolol** (onset < 1min, duration 10-20min): 250-500 micrograms/kg bolus over 1-3min, followed by 50



7. Transfer

- Accepting registrar will arrange bed at WTWA or MRI and inform referring doctor of its location of transfer.
- Referrer to arrange a time-critical ambulance transfer by calling '999' and requesting a 'blue light and sirens' ambulance with a paramedic crew to immediately transfer patient to receiving hospital.
 - **Cardiac Intensive Care Unit** (CICU at MRI or CTCCU at Wythenshawe) for Type A Dissection or HDU for Type B dissection will be Informed of the planned transfer
 - **Emergency Department** (ED) at either WTWA/MRI will be informed of the planned transfer
- Patients requiring transfer do not require a medical escort unless they are receiving IV infusions.
- Patients should not travel with blood products unless the transfusion has already commenced.

8. Management of Acute Type A Aortic Dissection

- Patients will have been transferred to the base hospital of the cardiac surgeon on call for Acute type A aortic dissection that day (switchboard will have the relevant information)
- Absence of a CICU bed at the time of referral should not prevent transfer to the on-call site (bed will be found whilst patient being assessed and in theatre)
- On-call cardiac surgery and anaesthetic teams assess patient's benefit from surgery. Trust consent process should be followed based on patient capacity/condition.
- Blood samples for urgent cross match shall be sent to blood bank immediately on arrival of patient and 6 units cross match for blood requested as standard, along with other blood components/products as required; Massive Transfusion and anticoagulation reversal guidelines should be used as needed.
- Theatre team prepare cardiac theatres.
- Transfer patient **promptly** to theatre for definitive procedure.
- Vascular surgery or Interventional Radiology support may be accessed by contact the relevant on call team to assist (e.g. malperfusion of limb or internal organ, need for extra-anatomic bypass/fasciotomy/fenestration of dissection flap/TEVAR. In case of emergency assistance Vascular surgeon and Vascular interventional radiologist shall travel to Wythenshawe/MRI site as needed.
- Use rapid brief as for 'damage control surgery'

9. Management of Acute Type B Aortic Dissection

ACUTE COMPLICATED TBAD - aortic rupture, mesenteric ischaemia or lower limb ischaemia

- On-call vascular surgery and anaesthetic teams assess patient's benefit from emergency TEVAR and/or revascularisation and/or laparotomy. Patient consented for surgery.
- Two blood samples sent to transfusion lab.
- **On call radiographer alerted** as to possibility of emergency TEVAR.
- Theatre team prepare vascular hybrid theatres.
If Hybrid theatre is not available check for availability of an Interventional Radiology suite.
- Decision on surgery to be immediately conveyed to ET1 coordinator .
- Vascular surgeon may contact either on call IR Consultant or second vascular Consultant..
- Transfer patient **immediately** to theatre for definitive procedure.
- Use rapid brief as for 'damage control surgery' Prepare Massive Transfusion Protocol if required/ cell salvage.

COMPLICATED TBAD - spinal cord ischaemia

- a. Blood pressure targets relaxed to improve spinal cord perfusion – mean arterial blood pressure (MAP) >



80mmHg, using inotropic support if necessary.

- b. If no improvement, then a spinal drain is inserted (as per complex endovascular surgery protocol).
- c. Proceed as per 'Acute complicated TBAD' above.

8. Audit standard

Systolic BP, 100-120mmHg, achieved \leq 30 minutes of diagnosis (acceptable $>$ 90%, achievable $>$ 95%).

Pulse rate, less than 60 bpm, achieved \leq 60 minutes of diagnosis (acceptable $>$ 90%, achievable $>$ 95%).



9. Cardiac and Vascular contact details

Cardiac surgery registrar	Contact via MFT switchboard (0300 3309444)
Vascular surgery registrar	Contact via MFT switchboard (0300 3309444 Blp 4055)
On call cardiac or vascular consultant	Contact via MFT switchboard (Mobile)

Vascular surgeon presence day time at a network hospital can be obtained by contacting the vascular Consultant OC1 via MFT switchboard.

SIGNED OFF BY

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GM Vascular Network Lead

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SAFETY

Adherence to this protocol is necessary to ensure best practice for the emergency management of people with acute aortic dissection.

QUERIES

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ACCOUNTABILITIES

Production

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Dissemination

Medical Directors, Cardiac and vascular network hospitals

Compliance

Non-compliance with this pathway to be reported to the vascular network clinical governance lead within 1 week.



APPENDIX - SUPPORTING INFORMATION FOR MFT TYPE A AORTIC DISSECTION SERVICE

As of February 2023, this on call service is provided by 5 Aortic Surgeons:

- Mr. I Kadir based at Wythenshawe
- Mr. V Mehta based at Wythenshawe
- Mr. P Waterworth based at Wythenshawe
- Mr. A Sepehripour based at MRI
- Miss. S Iyer based at MRI

Patients accepted for surgery by the consultant on call would be transferred for treatment to the site where the surgeon is based (in line with national guidelines); this includes patients at Wythenshawe when an MRI surgeon is on call, and vice versa. It is envisaged that once the MFT cardiac surgery merger is completed, all surgeons will be on one site.

If the on-call consultant is already in theatre operating or is committed to a heart/ lung transplant or another aortic dissection, or if after concerted effort there is absolutely no likely ICU capacity for the patient post-operatively, consideration will be given to transferring the patient to either:

- the second Manchester cardiac centre if a second Aortic surgeon is available (acceptance by the second aortic surgeon will depend on availability of the surgeon, theatre team, theatre, ICU bed etc and is at the surgeon's discretion) or
- the Liverpool Regional Aortic Surgery service.

This would be after direct consultant-to-consultant discussion has taken place between the referrer and the on call aortic consultant. Whenever possible the on call aortic consultant will facilitate this change in pathway.

Consultants not involved in the aortic dissection rota should only perform emergency aortic surgery in exceptional circumstances.