BRISTOL BATH WESTON VASCULAR NETWORK

Pathway of Care

Acute Aortic Dissection (AAD)

SETTING Emergency Departments (EDs)

FOR STAFF Emergency Medicine, Vascular Surgery, Cardiac Surgery, Cardiology, Anaesthesia, Intensive Care, Radiology & Nursing

PATIENTS Patients who present to network ED 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.

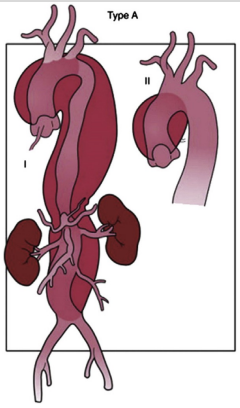
1. Aims

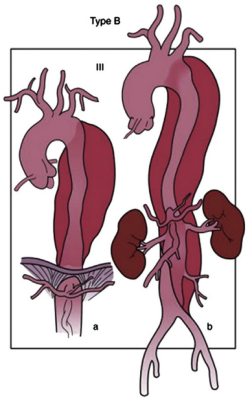
To standardise the management of acute aortic syndromes, including Type A aortic dissection (**TAAD**), Type B aortic dissection (**TBAD**), intramural haematoma (**IMH**) and penetrating aortic ulcer (**PAU**), such that

- **The diagnosis of an acute aortic syndrome, including aortic dissection, is never missed nor delayed.**
- Any person with **aortopathy** (*or diagnosed first degree relative*), **aortic dilatation**, **bicuspid aortic valve** or with **past aortic surgery** presenting with new onset pain has a CT aortogram to exclude aortic dissection.
- In all people, new onset pain consistent with aortic dissection triggers a CT aortogram.
- Stabilisation, including blood pressure and pulse rate control, including pain relief, are instigated immediately.
- Individuals with acute aortic syndrome **involving the ascending aorta and/or arch** are discussed immediately with the cardiac registrar at the Bristol Heart Institute.
- Individuals with acute aortic syndrome **distal to the left subclavian artery** are discussed immediately with the vascular registrar at Southmead Hospital.
- The safe transfer of patients to a specialist aortic centre for surgical intervention (or monitoring).
- That people for whom this is an end of life event, who are unsuitable for surgery or who decline surgery are given 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 infaction, 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

• 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 can 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**.

• 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.

• **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'. *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.*

• CT images must be transferred to BHI or NBT 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 micrograms/kg/min infusion for 4 min and increase infusion up to 200 micrograms/kg/min. AND/*OR*
IV Diltiazem: 0.25 mg/kg bolus, followed by 5-10 mg/hour infusion until maximum 15 mg/hour.

• Observe for signs of **rupture** (hypotension) and branch artery **malperfusion**

- abdominal / back pain, tenderness or vomiting
- limb pain with lost pulses
- poor urine output
- sensory loss or weakness/paralysis

• Assess the patient's current clinical state and premorbid level of function using information from the patient, relatives, previous imaging and clinic letters.

• Keep nil by mouth.

4. Investigations

• If FBC, U&E, Troponin, Lactate, Lipase and ABG can be performed without causing delay they are helpful.

5. Referral

• **TAAD** – **ascending aorta or aortic arch** - immediately refer to the cardiac surgery registrar at the Bristol Heart Institute (0117 923 0000).

• **TBAD** – **distal to the left subclavian artery** – immediately refer to the vascular registrar at Southmead Hospital (0117 950 5050).

Patients with past cardiac surgery, including in childhood, a known aortopathy (i.e. Marfan's syndrome) should also be discussed with the cardiac surgery team.

• Contraindications to aortic intervention, and therefore transfer, are

- **Cardiac arrest from aortic rupture**
- **Frail or co-morbid patient who will not survive operative intervention**
- **Patient choice**

• Patients with severe comorbidities (e.g. ischaemic heart disease, chronic pulmonary disease, or malignancy) may not benefit from invasive management and should be evaluated individually.

• If achieving blood pressure control is difficult in a TBAD, local cardiology or medical or ICU registrar should be involved in immediate care to stabilise patient prior to transfer.

• The following patients must be discussed with a consultant surgeon prior to considering transfer

- **cardiac arrest with intubation** (unlikely to survive)
- **patients with severe systemic disease** (intervention may be of no benefit)
- **aged 85 years or older** (survival benefit reduced – intervention may be inappropriate)

6. End of life care

• End of life care should happen in the patient's local hospital, close to family and friends, with support from the local palliative care team, the network vascular registrar and, if required, arterial centre nursing staff.

• A palliative approach to care will provide a dignified death. This includes pain relief, anxiety relief, maximising comfort and support from family and/or carers.

• Admission to the local hospital must under a named Consultant.

7. Transfer

• Referrer to arrange a time-critical transfer in a 'Blue light' 999 ambulance with a paramedic crew to

- Cardiac intensive care unit (CICU – C604) at the Bristol Heart Institute
  Inform CICU of the planned transfer (Tel: 0117 342 5941)
- Emergency Department Resus Bay (ED Resus) or Intensive care unit (ICU) at Southmead Hospital
  Inform Southmead ED of the planned transfer (Tel: 0117 414 4100)

• Patients requiring transfer do not require a medical escort unless they are receiving IV infusions.

8. Management at Bristol Heart Institute

ACUTE TYPE A AORTIC DISSECTION

- Cardiac surgery and anaesthetic teams assess patient's benefit from emergency aortic root replacement. Patient consented for surgery.
- Two blood samples sent to transfusion lab.
- Theatre team prepare cardiac theatre.
- Decision on surgery to be immediately conveyed to Heygrove theatre coordinator - **Bleep 2549**.
- Transfer patient **immediately** to theatre for definitive procedure.

9. Management at Arterial Centre, Southmead Hospital

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 theatre.
  If Hybrid theatre is not available check for availability of an Interventional Radiology suite.
- Decision on surgery to be immediately conveyed to Level 2 coordinator - **Bleep 1535**.
- Vascular surgeon may contact either on call IR Consultant or second vascular Consultant.
  Only if the IR Consultant is in can the on-call radiology nurses be asked to scrub for case.
- Transfer patient **immediately** to theatre for definitive procedure.
- Use rapid brief as in 'damage control surgery'.

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 ≤ 30 minutes of diagnosis (acceptable > 90%, achievable > 95%).

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

9. Cardiac and Vascular contact details

Cardiac surgery registrar	Contact via BRI switchboard (0117 923 0000)
Vascular surgery registrar	Contact via NBT switchboard (0117 950 5050)
On call cardiac or vascular consultant	Contact via UHB and NBT Switchboards respectively **(Mobile)**

Vascular surgeon presence at a network hospital can be obtained by contacting the vascular network managers, 0117 414 0798 (day time only).

[redacted]

1. Management of pain in adults. 2010. www.collemergencymed.ac.uk

RELATED DOCUMENTS	Bristol Bath Weston Vascular Network High-level Clinical Model
SAFETY	Adherence to this protocol is necessary to ensure best practice for the emergency management of people with acute aortic dissection.
[redacted]	[redacted]