Clinical Standard Operating Procedure (SOP)

ACUTE AORTIC DISSECTION

SETTING	Service-wide
FOR STAFF	All staff
PATIENTS	Patients who require transfer for management of acute aortic dissection (AAD)

Introduction

Acute aortic syndrome (AAS) encompasses type A aortic dissection (TAAD), type B aortic dissection (TBAD), intramural haematoma (IMH) and penetrating aortic ulcer (PAU). There has been significant focus on the diagnosis and management of these presentations in recent years, led by the Royal College of Emergency Medicine[1], Aortic Dissection Awareness UK[2] and other organisations. More recently, the Healthcare Safety Investigation Branch focused on the transfer of AAD patients[3] and Adult Critical Care Transfer Services are incorporated into the NHS England Acute Aortic Dissection Pathway Toolkit[4].

The Supra-regional SOP on the Acute Management of Aortic Dissections[5] was developed by a large multi-disciplinary team to support the standardisation the management of AAS across Southern England. Retrieve has been a key stakeholder in its development.

This SOP integrates the contents of the supra-regional SOP with Retrieve processes and its contents have been developed and agreed by the cardiac and vascular centres in Bristol and Plymouth. It describes the management of AAD patients during stabilisation and transfer and the referral pathways for these patients.

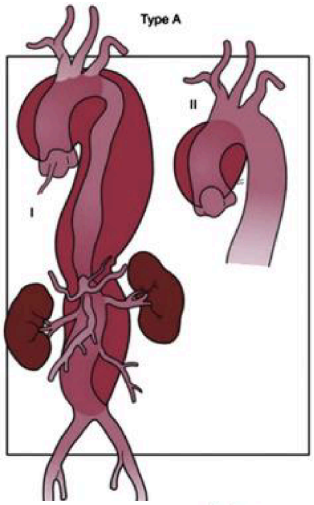
Acute aortic dissection

Aortic dissection is the disruption of the medial layer of the aorta, resulting in separation of the aortic wall layers and subsequent formation of a true lumen and a false lumen (with or without communication). It affects around 3-4 per 100,000 people per year, with a male preponderance, and is most common between the ages of 50 and 70 years.

Approximately 50-75% of patients have hypertension, and many have other risk factors include pre-existing aortic disease, aortic valve disease, family history of aortic dissection or aneurysm, smoking history, direct blunt chest trauma, intravenous drug abuse (cocaine, amphetamine), Marfan's syndrome or other connective tissue disease.

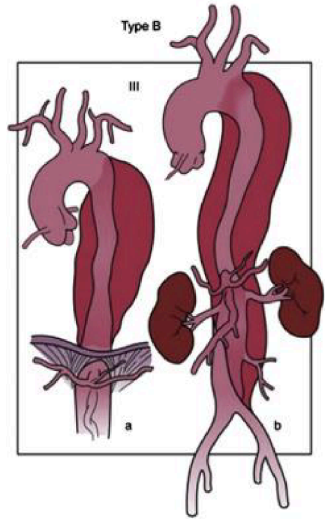
Without intervention, mortality for TAAD is 50% by 2 days and for TBAD 10% by 30 days.

The Stanford Classification of AAD is the most used system and can be summarised as follows:



Type A (TAAD)

- Involving the aortic root and proximal aortic arch.
- Should always be referred to a cardiac surgery unit (even if for a discussion of non-operative management).
- Immediate management is intensive blood pressure control, using a combination of beta-blockade and analgesia.
- Immediate aortic root surgery is required to prevent aortic rupture, myocardial infarction or pericardial tamponade.
- Note: non-A/non-B involves the aortic arch and then threatens to extend retrograde (TAAD) or antegrade (TBAD). **Treat as TAAD**.



Type B (TBAD)

- Distal to the left subclavian artery and extends distally only.
- Managed by both cardiac surgery and vascular surgery (see below for regional service arrangements).
- Immediate management is intensive blood pressure control, using a combination of beta-blockade and analgesia.
- Aortic rupture, malperfusion - limb ischaemia or acute kidney injury; or uncontrolled pain – are indications for intervention with a thoracic aortic stent graft (TEVAR).
- All patients should be managed with invasive arterial monitoring in a critical care setting.

Referral

The diagnosis is based upon clinical presentation and CT aortogram. This should then prompt immediate referral to a **single point of contact in the nearest cardiac surgery or vascular surgery unit** capable of managing such patients (see below).

- The referral should be consultant-led, and the receiving centre will review the imaging.

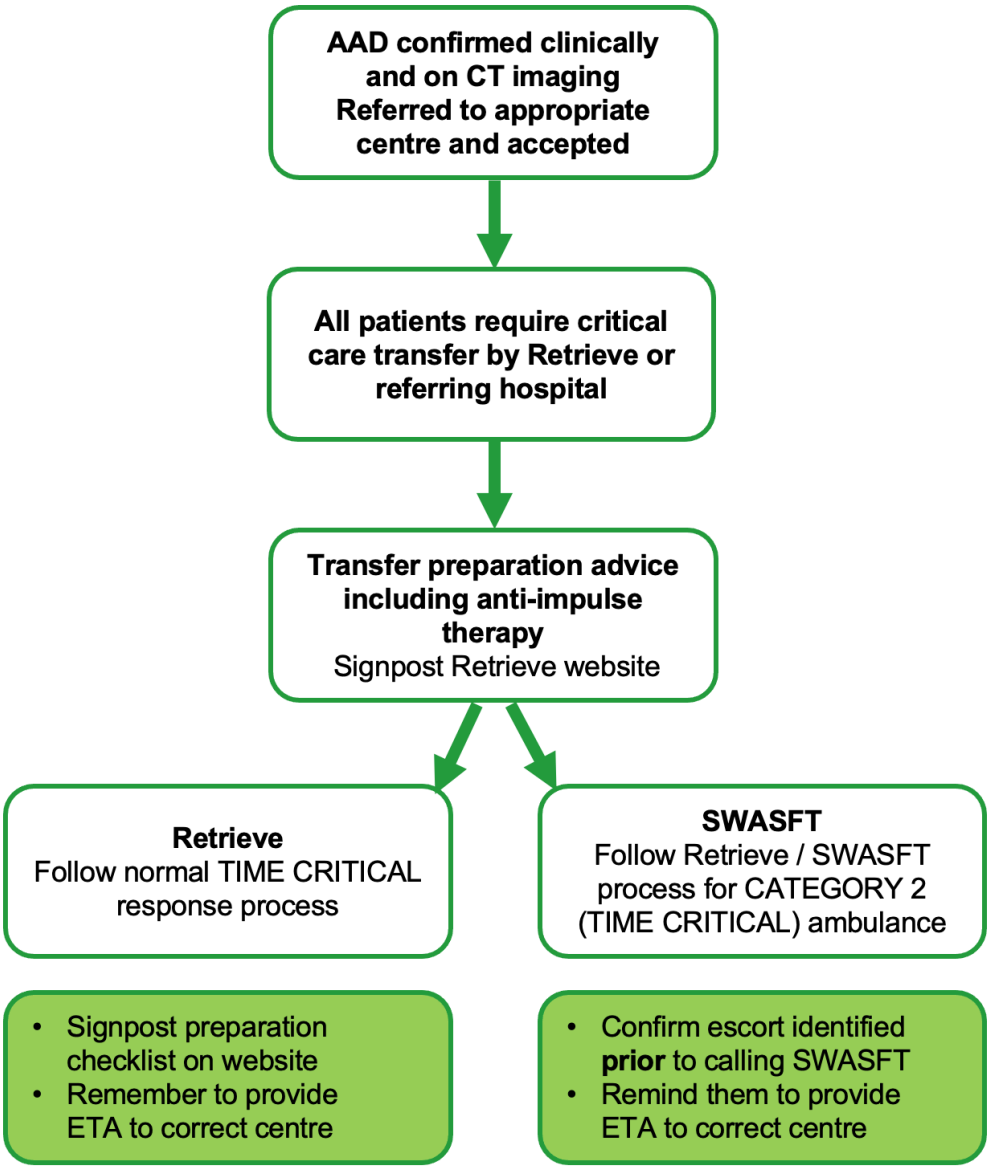
Contraindications to aortic intervention (and thus transfer) are described in the supra-regional SOP. The Retrieve Duty Consultant should be aware of these and is empowered to discuss cases with the receiving hospital Consultant if they believe initial information may have been incomplete.

- Cardiac arrest from aortic rupture.
- Frailty.
- Multiply co-morbid patient who will not survive operative intervention.
- Patient choice not to have intervention.

Regional thoracic aortic centres in South West

Unit and hospital	Receiving location for transfers	Single point of contact	Switchboard number	Conditions managed
Cardiac Surgery Derriford Hospital	Derriford Hospital Plymouth	Cardiac Surgery Registrar	01752 202082 Bleep 0771	**TAAD TBAD**
Cardiac Surgery Bristol Heart Institute	Level 5 rear entrance to Cardiac Intensive Care Unit	Cardiac Surgery Registrar	0117 9230000 Bleep 2325	**TAAD**
Vascular Surgery Southmead Hospital	'Crossroads' in Emergency Department via ambulance entrance	Vascular Surgery Registrar	0117 9505050 Ask for Vascular Registrar mobile	**TBAD**

The process of referral is summarised in the following flowchart:



Stabilisation and management during transfer

Rapid stabilisation of AAD patients is essential in reducing the risk of progression and/or aortic rupture. This must be emphasised in the referral conversations by both the surgical centre and Retrieve Duty Consultant, and support offered by both with ongoing advice, as required.

The priorities are:

- Management in ED resus or equivalent high-care area.
- Continuous HR, ECG and BP monitoring. Blood pressures in each arm may be unequal. Use the right arm preferentially for invasive and non-invasive blood pressure monitoring, as blood pressure reading on the left arm may be affected by the dissection.
- Analgesia following RCEM guidelines (morphine sulphate 2-5mg IV every 5-30 minutes, or equivalent).
- Make patient nil by mouth unless otherwise indicated by surgical team.
- Insertion of arterial line to facilitate continuous BP monitoring – this is not essential and should not delay transfer but can usually be performed rapidly and often inserted prior to arrival of the Retrieve team or SWASFT ambulance.

- **Commence 'anti-impulse therapy' (see below) to achieve physiological targets**:
  - Systolic BP (sBP) 100-120 mmHg within 30 minutes of diagnosis.
  - Heart rate (HR) 60-75 bpm within 60 minutes of diagnosis.
- Observe for signs of **rupture** and/or side-branch **malperfusion:**
  - Hypotension
  - Limb ischaemia / absent pulses
  - Poor urine output
  - Sensory loss or weakness/paralysis

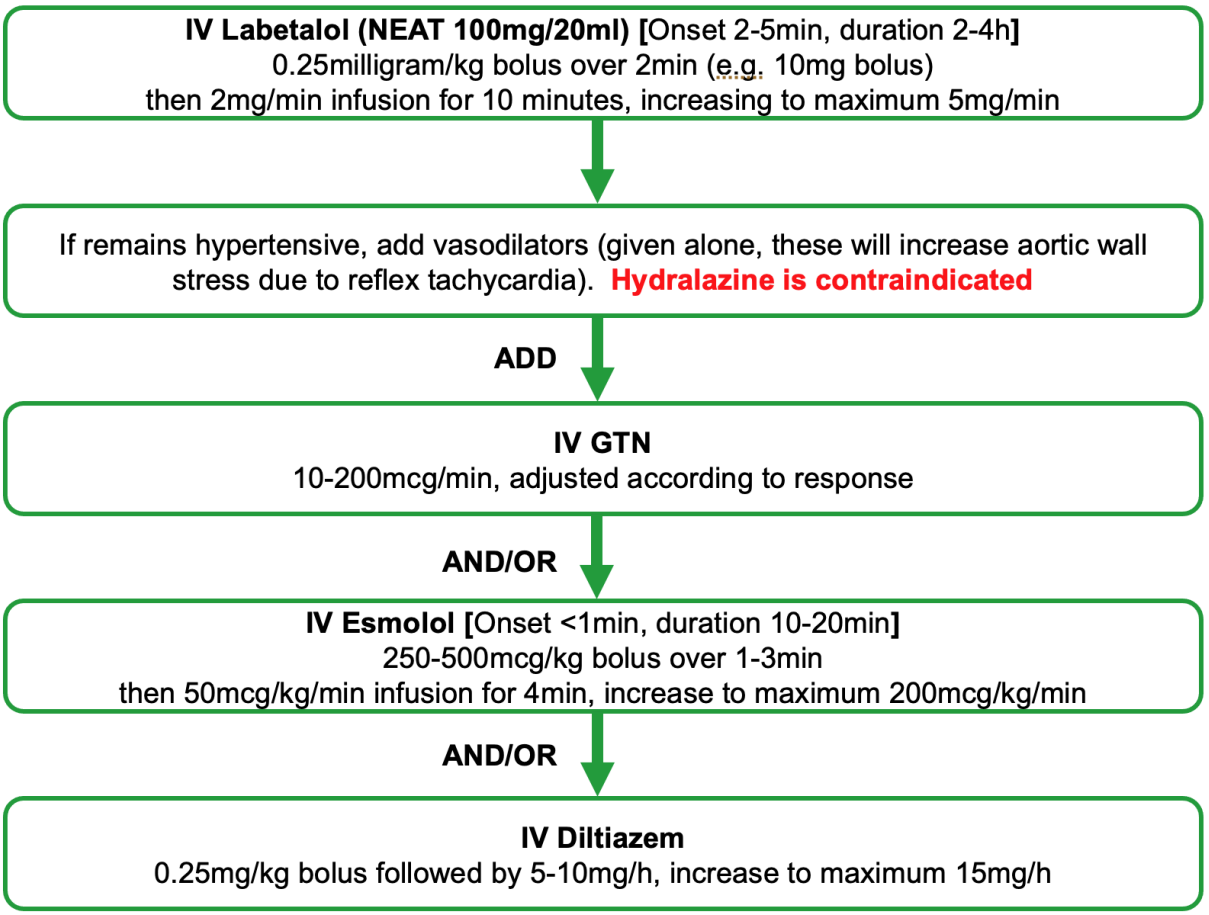
Hypertension and tachycardia management with 'anti-impulse therapy'

Many patients will be hypertensive and tachycardic. It is very important that the physiological targets described above are emphasised and communicated with the referring clinician. Treatment must be commenced immediately and should not wait until the arrival of Retrieve or local clinical escort.

First line treatment should be with IV labetalol. It is recommended that an infusion is prepared even if the patient is not hypertensive/tachycardic at the time of diagnosis to ensure that prompt therapy is initiated at any point that they become so during the transfer.

If the patient remains hypertensive, the flow chart on the next page suggests appropriate additional medications.

Anti-impulse therapy **must not be stopped** simply to aid transfer without clinical escort. AAD patients are critical care patients and require appropriately trained and experienced escorts in order that their physiology is managed and deterioration managed appropriately. They are not suitable for transfer by 999 ambulance crews.



Hypotension management

If the patient is hypotensive and accepted for transfer:

- Resuscitate with blood products (remember to request these at time of referral as per 'Blood' SOP).
- Aim sBP >90 mmHg.
- Consider 1g tranexamic acid.

In event of deterioration, see the next section.

Deterioration prior to, or during, transfer

Whilst every effort is made to ensure deterioration does not occur during transfer, it is recognised that occasionally patients with AAD may deteriorate acutely during transfer and often some distance from the receiving hospital.

Advice should be sought from the Retrieve Duty Consultant (if not present) and the receiving hospital team should be involved (usually via direct consultant-to-consultant telephone call).

A pragmatic patient-centred decision should be made which may be to:

- Return to the referring hospital.
- Continue to the receiving hospital.
- Divert to a nearby hospital (this is the least preferred option as it is often logistically complex).

End of life care is usually best delivered in the patient's local hospital where next of kin can be present.

Document Change Control

Date of Version	Version Number	Lead for Revisions	Type of Revision	Description of Revision
02/24	1.2	Retrieve Clinical Director	Minor	Updates to reflect changes to supra-regional AAD pathway and SOP
03/25	1.3	Severn Base Lead Nurse	Minor	BP monitoring clarification following learning from a case review.

Document Governance

REFERENCES	1. Diagnosis of thoracic aortic dissection in the Emergency Department. Royal College of Emergency Medicine and Royal College of Radiologists, 2021. https://rcem.ac.uk/wp-content/uploads/2021/12/Diagnosis_of_Thoracic_Aortic_dissection.pdf (accessed 26th December 2021) 2. Think Aorta. Aortic Dissection Awareness UK and Ireland. https://www.thinkaorta.net (accessed 26th December 2021) 3. Transfer of critically ill adults. Healthcare Safety Investigation Branch, 2019. https://www.hsib.org.uk/investigations-and-reports/transfer-of-critically-ill-adults (accessed 26th December 2021) 4. NHS England Acute Aortic Dissection Pathway Toolkit, 2021 5. Supra-regional SOP on the acute management of aortic dissections. NHS England South West and NHS England South East, 2024.
RELATED DOCUMENTS AND PAGES	Bristol Bath Weston Vascular Network – Safe adult critical care transfer for acute aortic dissection. BBWVN, 2021.
AUTHORISING BODY	Retrieve Leadership Team
SAFETY	
QUERIES AND CONTACT	Retrieve Leadership Team