

Aortic Dissection Quick Reference Guide

CONSIDER AORTIC DISSECTION
Unexplained Severe Pain <ul style="list-style-type: none"> - Chest, back or abdomen - Sharp, tearing or ripping - Sudden onset
With or without high risk features <ul style="list-style-type: none"> - Perfusion deficit (limb weakness, BP differential) - Hypotension or shock or collapse - New heart murmur with pain



CT FOR A DEFINITIVE DIAGNOSIS
Dissection cannot be excluded by normal CxR, examination or ECG



MANAGEMENT	
Move to resus	
Measure BP in RIGHT ARM	
Haemodynamic Targets <ul style="list-style-type: none"> - Systolic BP 100-120 - MAP <80 	ED Treatment <ul style="list-style-type: none"> - Analgesia (Morphine) - Anti-emetic (Ondansetron) - BP Control (see page 8) 1) Labetolol (first choice) 2) Nicardipine 3) Hydralazine



Type A dissection	Type B Dissection	
	With complication; <ul style="list-style-type: none"> - Persistent or recurrent pain - Uncontrolled hypertension - Malperfusion - Early aortic expansion - Signs of aortic rupture <ul style="list-style-type: none"> - Haemothorax - Increasing mediastinal & periaortic haematoma 	Without Complication
Refer to Cardiothoracic Surgery at GJNH	Refer to Vascular at QUEH	Refer to Medicine (CCU)



Aortic Dissection Guideline

Introduction

Thoracic aortic dissection is a rare life-threatening condition that results when bleeding occurs between the innermost layers of the aortic wall and they are separated, creating a false lumen.

It can be difficult to diagnose and a high index of suspicion is required.

Aortic dissection is an emergency that is often fatal when missed.

The aim of this guideline is to provide guidance of the assessment and management of adults presenting to Clyde Emergency Departments with suspected or confirmed thoracic aortic dissection.

These guidelines have been adapted from the European Society of Cardiology guidance on Aortic Syndromes and BMJ best practice guidance.

The treatment has been taken from the NHS GG&C guideline 'Medical Management of Acute Type B Aortic Dissection' with the permission of Mr K Hussey, Consultant Vascular Surgeon.

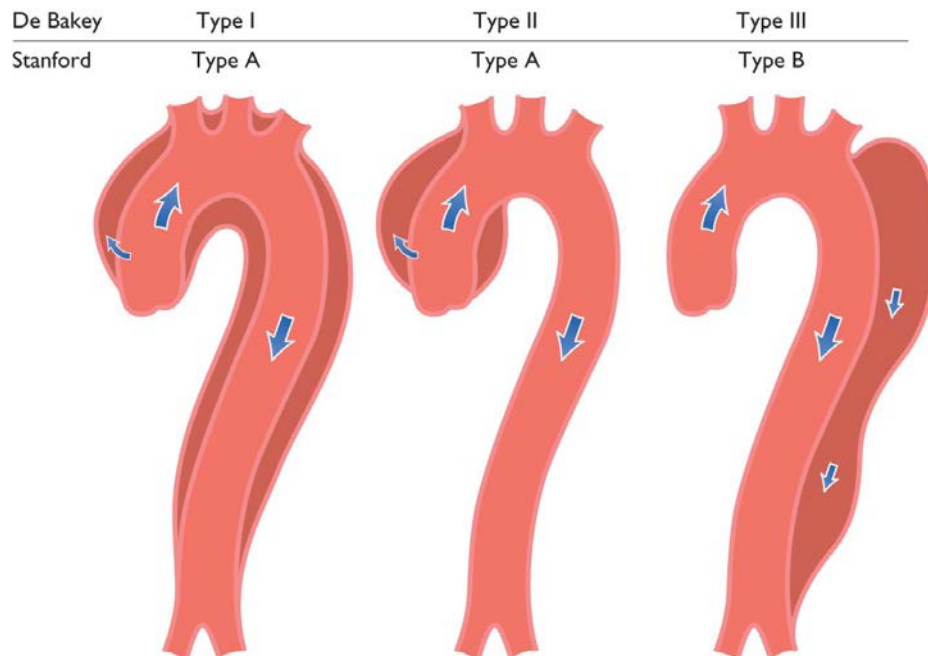
Epidemiology

The incidence of aortic dissection is estimated at 6 per 100,000 persons per year. It is more common in men and increases with age. Prognosis is poorer in women due to atypical presentations and delayed presentation.

Classification

Aortic dissection is classified by the Stanford Classification

- **Type A** dissection involves the **ascending aorta**
 - With or without involvement of arch or descending aorta
- **Type B** dissection **does not involve the ascending aorta**
 - Predominantly involves the descending thoracic aorta and abdominal aorta



Clinical Presentation and Complications

Chest and back pain are the most common symptoms.

Pain may also be present in the neck and abdomen.

Pain is often described as **sharp, tearing or ripping** and is **maximal in seconds**.

Resolution of pain does not exclude dissection.

Pulse deficit is present in up to 30% of patients with type A and 15% in type B although limb ischaemia is rare.

The frequency of the main symptoms are outlined in the table below

Symptom	Type A	Type B
Chest pain	80%	70%
Back pain	40%	70%
Acute onset of pain	85%	85%
Migrating pain	<15%	20%

Features on clinical examination that raise suspicion of aortic dissection

- Pulse deficit. Pulse may be absent
- Blood pressure discrepancy between arms (>15mmHg)
- Neurological signs e.g. stroke or paraplegia
- New aortic regurgitation
- Features of cardiac tamponade – Becks Triad (muffled heart sounds, hypotension, distended neck veins)
- Severe hypertension or hypotension

A number of **high risk features** have been identified that raise suspicion of aortic dissection. These are summarised below.

High risk conditions	High risk pain features	High risk examination features
<ul style="list-style-type: none"> ○ Marfans (or other connective tissue disorder) ○ Family history of aortic disease ○ Known aortic valve disease ○ Known thoracic aortic aneurysm ○ Previous aortic manipulation (Inc. cardiac surgery) 	<ul style="list-style-type: none"> ○ Chest, back or abdominal pain explained as any of <ul style="list-style-type: none"> ○ Abrupt onset ○ Severe intensity ○ Ripping or tearing 	<ul style="list-style-type: none"> ○ Evidence of perfusion deficit <ul style="list-style-type: none"> ○ Pulse deficit ○ Systolic BP difference ○ Focal neurological deficit (with pain) ○ Aortic diastolic murmur (new and with pain) ○ Hypotension or shock

Cardiac complications are the most common. Aortic regurgitation may be present in up to 75% of type A dissections.

Death is most commonly caused by aortic rupture. Aortic regurgitation is the second biggest cause and these patients may present with heart failure and/or cardiogenic shock.

The mortality rate in type A is double that of type B (25% vs 12%).

The main complications are outlined in the table below.

Complication	Type A	Type B
Aortic regurgitation	40-75%	N/A
Cardiac tamponade	<20%	N/A
Myocardial ischaemia or infarction	10-15%	10%
Heart failure	<10%	<5%
Pleural effusion	15%	20%
Syncope	15%	<5%
Major neurological deficit (coma/stroke)	<10%	<5%
Spinal cord injury	<1%	NR
Mesenteric ischaemia	<5%	NR
Acute renal failure	<20%	10%
Lower limb ischaemia	<10%	<10%

N/A = not applicable. NR = not recorded

Investigations

CT scan is required for a definitive diagnosis. CXR and ECG are often equivocal

DO NOT DELAY CT IF AORTIC DISSECTION IS SUSPECTED

The whole aorta should be imaged – request a CT angio aorta on TrakCare.

CT is the most commonly used imaging modality as it is readily available and has excellent sensitivity for aortic dissection (>95%). It has high sensitivity and specificity for diagnosis of aortic arch involvement (93% and 98% respectively) with an overall accuracy of 96%. MRI may also be used and is considered the leading imaging technique but has limitations in terms of availability and practicality of use in unwell patients.

Echocardiography can be used in diagnosis although is not readily available from the Emergency Department. Trans-thoracic echo is up to 80% sensitive and 93-96% specific in detecting involvement of the ascending aorta. Trans-oesophageal echo is more sensitive (99%) and may be useful in unstable patients and can be used in ITU or theatre to monitor changes.

Laboratory investigations to consider are outlined below

Laboratory Investigation	To look for
Hb	Blood loss, anaemia
WCC	Infection, inflammation
CRP	Inflammatory response
CK	Re-perfusion injury, rhabdomyolysis
Troponin	Myocardial ischaemia, myocardial infarction
D-dimer	Aortic dissection, PTE
U+Es	Renal failure – new or developing
LFTs	Liver ischaemia, liver disease
Glucose	Diabetes mellitus
Lactate	Bowel ischaemia, metabolic disorder
Blood gas	Metabolic disorder, oxygenation
Group and save or crossmatch	May require transfusion

An **elevated D-dimer** raises suspicion of aortic dissection. The levels typically rise quickly.

A normal D-dimer does not excluded dissection as a diagnosis.

CXR is useful to identify other causes of pain. CXR features of aortic dissection which may be present include:

- A widened or abnormal mediastinum (present in approx. 75%)
- A 'double knuckle' aorta
- Left pleural effusion (present in approx. 20%)
- Deviation of trachea to right
- Separation of two parts of wall of calcified aorta by >5m

Treatment

- **Manage patient in Resus**
- **Get senior help**
- **Refer early (see below)**

Key principals of mangement

1. ABC assessment
2. High flow O2 via facemask
- 3. 2x large bore IV cannulas**
4. Aggressive BP control
5. Analgesia and antiemetic

Blood pressure management

- **Measure blood pressure from the RIGHT arm**

If requiring inotropes or beta-blockers insert arterial line

Initial haemodynamic targets;

- **Systolic BP 100-120mmHg**
- **MAP <80mmHg**

Targets to change ONLY after consultation with vascular

If the patient develops leg weakness then this may indicate spinal cord ischaemia. Discuss with vascular immediately– repeat imaging may be required. May require raised BP targets or emergency CSF drain

Analgesia – IV morphine – titrate to effect

Anti-emetic – IV ondansetron 4mg

Cyclizine and metoclopramide second line

BP CONTROL

Hypertension

1) Labetalol (first choice)

- Start with **slow IV bolus** injections – 10mg repeated every 2 minutes to max 200mg
- **Also start IV infusion** to maintain BP control - Concentration 5mg/mL if via central access 1mg/1mL if giving via peripheral access
- **Start at 15mg/hr and titrate to clinical effect** – usual dose 10-60mg/hr
- Beta-blockade is essential to reduce pulsatile pressure on the thinned walls of the false lumen. Use of beta blockers may prevent extension of the dissection in the hypertensive patient.

2) Nicardipine (second line in addition to labetalol, or first line if contra-indications to beta-blocker)

- **IV infusion** (change IV infusion site every 12h if peripherally administered).
- Concentration 25mg made up to 250ml (5% glucose) = 100micrograms/ml
Dose – titrated to clinical effect
- **Start at 50ml/hour (5mg/hour)**. The rate may be increased every 10 mins by 25ml/hour to a maximum of 150ml/hour 15mg/hour)
- Once target BP is achieved reduce dose gradually, usual maintenance dose 2-4mg/hour

3) Hydralazine (third line)

- **IV bolus** – 5mg slow IV injection bolus at 20-minute intervals to a usual maximum of 20mg.
- **Followed by IV infusion** - Concentration 60mg made up to 60ml (0.9% sodium chloride) = 1mg/ml
- **Start at 3ml/hr** (50micrograms/min). The rate may be increased every 10 mins by 3ml/hour to a maximum of 18ml/hour (300micrograms/min)

Hypotension

- **IV fluid resuscitation – may need blood products**
- **Noradrenaline** via central access may be required if **hypovolaemic shock**. Initial dose 0.5 – 1 microgram/Kg/minute. Titrate to response – usual dose 2-12microgram/Kg/min. Max dose 30microgram/Kg/min
- **Dobutamine** if evidence of **cardiogenic shock**. Initial dose 0.5 – 1 micrograms/Kg/min. Titrate to response - usual dose 2-20micrograms/kg/min. Max dose 40micrograms/Kg/min

Referral

Type A – management is surgical. **Refer to Cardiothoracics at GJNH**

Acute type A dissection has a mortality of 50% in first 48hours if not operated on. Peri-operative a neurological complications remain high. Surgery reduces 1 month mortality from 90% to 30%.

Complicated Type B – Thoracic endovascular repair (TEVAR). **Refer to vascular at QEUH**

The most common complications are visceral and limb malperfusion.

A complicated type B dissection presents with

- Persistent or recurrent pain
- Uncontrolled hypertension despite maximal medical treatment
- Malperfusion
- Early aortic expansion
- Signs of rupture
 - Haemothorax
 - Increasing mediastinal and periaortic haematoma

Uncomplicated Type B – management is medical – **refer to CCU**

Management is aimed at controlling pain, heart rate and blood pressure. Repetitive imaging is necessary. Patients should be monitored for signs of disease progression or malperfusion.

If complications develop, patients need referral to vascular.