Acute Aortic Dissection Pathway Toolkit

March 2022

Version 1:0

J.Vasc.Soc.G.B.Irel. 2022;1(Supp4):S1–S30 http://doi.org/10.54522/jvsgbi.2022.034

Contents

Recommendation for improvement

This toolkit describes seven key principles and actions to improve care for emergency acute aortic dissection patients. These principles require a collective response and should include patient codesign. The principles are aimed at commissioners, service providers and clinicians.

The seven key principles

1) Regional governance
2) Coordination through a Regional Multi-Disciplinary Team (MDT) and a Multi-Disciplinary Meeting (MDM)
3) Regional rota & Single point of contact
4) Timely and reliable image transfer
5) Safe transfer
6) Specialist treatment for all acute aortic dissections
7) A regional education programme

The toolkit:

- supports the creation of rotas of specialists in regional networks or referring hospitals in a specific geographic area.
- describes the level of governance required to demonstrate improvement in outcomes and reduction in variation.
- provides an insight into how this can improve patient care using real life examples.

It is recognised that eventual agreed models will vary between regions according to local circumstances and personnel available. However, the principles for development should form the basis for all regional solutions and include all commissioned Cardiothoracic and Arterial Centres within the region that deliver emergency care for both type A and B aortic dissection. It is also recognised that regions will need to work together where natural patient flow crosses regional boundaries and where greater critical mass of population and clinical capability are required to deliver a high-quality service.

The model adopted should be underpinned by a Standard Operating Procedure (SOP) that addresses the principles described and is available to all and has been endorsed by Trust management and commissioners.

There are some parallels with the establishment of pathways for major trauma. These have seen a 19% reduction in mortality despite an almost 50% increase in transfer time. With regional rotas for acute aortic dissection we expect to see a similar pattern of reduced mortality due to improved pathways combined with improved critical care transport, notwithstanding the increase in transfer times.

Scope

The toolkit focusses on the acute aortic dissection pathway from the point of diagnosis through clinical decision making and treatment. It describes difficulties in the current patient pathway for emergency acute aortic dissection and highlights best practice.

The toolkit excludes the elective pathway and long-term management of patients with established aortic dissection. However, it is important to note that these patients require long-term surveillance to monitor dilation and aneurysm formation that may require eventual treatment and, where appropriate, genetic screening of affected individuals and of their relatives.

Readers should refer to The Diagnosis of Thoracic Aortic dissection in the Emergency Department for further advice and guidance to improving diagnosis pathways.
RCEM & RCR Best Practice Guideline » Diagnosis of Thoracic Aortic Dissection in the Emergency Department

Definitions

For this toolkit, acute aortic dissection includes intra-mural haematoma and penetrating aortic ulcer as well as aortic dissection.

Type B dissections are described as complicated or uncomplicated. Complicated type B dissections are likely to require intervention at a specialist centre.

Uncomplicated type B dissections may be managed in an appropriate setting such as a district hospital with coordinated support from the regional multi-disciplinary team. It should be noted that an initially 'uncomplicated' type B patient may become complicated if they develop end organ ischaemia, aortic dilatation or their pain does not settle.

The Seven Key Principles

Principle 1: Regional Governance

There should be formal written governance arrangements between providers for day to day management and contingency plans. Regional governance meetings should take place quarterly with an annual national review. This should be underpinned by a SOP that is available to all.

There will be a nominated clinical lead per region who will need appropriate multidisciplinary (Emergency Medicine, Vascular and Cardiothoracic Surgery, Cardiology, Radiology, Critical Care and Anaesthetics; Ambulance Service; Nursing) and managerial support.

The regional clinical lead and supporting team will need to ensure that there are/is:

- published emergency referral pathways
- a protocol for early medical management and treatment
- an imaging protocol for type B dissection treated medically
- a standardised imaging protocol for the diagnosis of aortic dissection
- a protocol for spinal cord protection
- a protocol for safe patient transfer
- a protocol for ongoing patient surveillance and follow up
- a rolling education programme for interdependent specialities

Where appropriate, there should be repatriation arrangements agreed between local providers.

All procedures should be reviewed and updated annually.

Using data

Data are needed to show service change, and improved outcomes for patients. Data are also needed to monitor equity of access. It is helpful to have baseline monitoring data prior to “go live”, followed by ongoing monitoring to ensure quality impacts are appropriately captured. The prospective data collection programme should review key performance indicators (KPIs) and compulsory data submission to national audits National Institute for Cardiovascular Outcomes Research and National Vascular Registry (NICOR & NVR).

The potential benefits that may be achieved through implementation of this toolkit include the following:

- Reduced presentation to treatment times
- Reduced mortality both short- and long-term
- Reduced complications
- Shorter length of stay
- Improved patient experience.

The following KPIs will need to be monitored as a minimum and reviewed by the services involved within the network of care.

KPI	Type A / B
In-Hospital mortality	Both
With intervention	Both
Without intervention	Both
1-year mortality	Both
Length of stay	Both
Number of referrals	Both
Number of interventions	Both
No intervention	Both
Time from presentation to CT	Both
Time from referral to intervention	Both
Deaths between diagnosis and intervention	Both
Deaths between diagnosis and start of definitive treatment	Both
Results of patient and relative satisfaction survey (annual)	Both

Principle 2: Coordination through a Regional Multi-Disciplinary Team (MDT) and a Multi-Disciplinary Meeting (MDM)

The MDT is the core element of the acute response which determines the intervention for the acutely unwell patient.

Membership of the MDT will be determined by local circumstances and personnel available but as a minimum should include a cardiothoracic and vascular surgeon and an interventional radiologist. The three specialists should be sufficiently available to staff a 24/7 on call regional rota. The members of the MDT should also be regular attenders at the MDM and be involved in elective work on the thoracic aorta.

The MDT should have access to a wider range of skills including the support of Anaesthetics Cardiology and Critical Care as required via the receiving Trusts interventional on call rota. Wider MDT membership should also include older peoples medicine and other specialties as relevant.

All type A and type B patients should have a first discussion at the point of diagnosis with an appropriate member of the MDT. Contact should be made via the single point of contact (principle 3). The MDT member may choose not to transfer to a tertiary centre, but all patients and images should be discussed, and all decisions taken should be logged and documented in the patient's record.

If local management is agreed, then triggers for transfer, further CT scans and follow up should also be agreed and documented as clinically appropriate. The referring centre should be supported by the MDT and further discussion about all cases should occur with a member of the MDT.

The MDM is a regular forum where cases and outcomes are discussed. The MDM needs to be regular and frequent enough to allow timely decision making and review of practice. Acute MDM reviews should be enabled digitally.

There needs to be a facility to hold urgent ad-hoc MDM calls outside the formal MDM within a described on-call rota.

Appropriate administrative support should also be provided.

Aortic Dissection during pregnancy

"I have Marfan syndrome and my aorta dissected when I was 21, while I was pregnant with my first child. I should have received elective Aortic surgery two years before, but my scan results were incorrectly documented. So, I had an acute Type A dissection and extensive surgery during pregnancy to replace my aortic root and arch, which my daughter and I survived. I also have a medically managed residual Type B dissection.

Principle 3: Regional rota & Single point of contact

The regional rota should be staffed by the members of the MDT and should allow all patients within the region to access the same care pathway. Access must be through a single point of contact.

The aim is to make referral by Emergency Departments simple and rapid. If within a region the care pathways for type A and B dissection differ, the single point of contact should be the person that directs a patient along the appropriate pathway.

Emergency Departments should not be expected to make this distinction or make multiple calls to contact different specialties.

The single point of contact should be available 24/7 and be rapidly accessible. The single point of contact should be a fixed phone number that transfers to the on-call consultant member of the MDT.

The on-call consultant will decide on initial management and patient destination. They should have access to other specialties within the MDT to discuss cases as required and ensure a multidisciplinary approach where clinically appropriate, as described within principle 2. Regions should decide who the people on this rota are, according to local circumstances.

If the single point of contact cannot physically admit the patient to their unit due to emergency Critical Care pressures for instance, it is the responsibility of the single point of contact to locate a suitable alternative within the area for the patient and not for the referring team to manage.

The single point of contact answering the call should be a consultant grade who is capable of and experienced enough to take significant clinical decisions. There should be a backup mechanism as a default if the person on call is unavailable.

The contact number should be supported by a published rolling rota distributed to all hospitals within the network.

Principle 4: Timely and reliable image transfer

Systems should be in place to ensure images can be transferred to the tertiary centre as an emergency and interpreted by an appropriate radiologist 24/7.

Regions can determine how this is best done to suit their local circumstances; however, the system should be specific and included in the SOP.

The Royal College of Radiologists recommends that:

"Prompt sharing of acute imaging is vital in cases of suspected aortic dissection to ensure that lifesaving treatment is not delayed and instances where repeat imaging has to be obtained are minimised to the greatest extent possible.

Although IEP is suggested as one solution, it is important that the safest and fastest systems of sharing images are used, and as radiology networks are instituted, they are likely to facilitate this process and provide the optimum method of sharing imaging in these time-critical situations".

If the images are to be transferred through the Image Exchange Portal (IEP) pathway, the following is a suggested protocol.

- When dissection is confirmed, the reporting radiologist:
    - Alerts referring physician and reminds them of the contact number.
    - Arranges for image transfer to on-call centre.

- Image is transferred via IEP on the Clinical Emergency pathway.

- In the message field write Acute Aortic Dissection Pathway.

- For patient identification include NHS number, patient name (Forename, Surname) and date of birth (xx/xx/xxxx).

- The consultant on-call for the dissection rota should alert the PACS Office of the hospital receiving the images that they are being transferred.

Occasionally, an ECG gated CT scan is necessary to confirm the diagnosis. There should be local protocols for obtaining this.

A surgeon's perspective

"Despite numerous phone calls, the CT images had not arrived on our system 30 minutes after the patient had arrived in our intensive care unit.

There was no reassurance that the transfer of the images was imminent and therefore we were forced to undertake another CT scan to confirm the diagnosis of acute aortic dissection.

This was done and the patient went on to have a successful operation for their type A dissection.

Nevertheless, the need to do a second scan wasted time and should not have been necessary."

Principle 5: Safe Transfer

Clear protocols for the safe transfer of patients need to be set out locally and adhered to. This should detail what happens and what needs to be in place (see principle 1, Regional Governance).

Type A and complicated type B dissections will require a level 2/3 critical care bed and should be transferred where possible by the regional Adult Critical Care Transfer Service for the region the patient is in: NHS England » Adult Critical Care Transfer services. Clear arrangements should be in place for instances where this is not available including arrangements for a hospital team with appropriate training and education in critical care transfers to escort the patient.

For uncomplicated type B dissections requiring transfer, it may not be necessary to use the Adult Critical Care Transfer Service, depending on the clinical condition.

In establishing arrangements, regional ambulance service(s), Adult Critical Care Transfer Service and Adult Critical Care networks should be involved from an early stage to secure their agreement and ensure they work within the principles of NHS England and NHS Improvement guidance on Interfacility Transfers NHS England » National Framework for Inter-Facility Transfers.

The HSIB Perspective

In 2019 the Healthcare Service Investigation Branch published a report 'Transfer of critically ill adults' (Transfer of critically ill adults - Healthcare Safety Investigation Branch (hsib.org.uk).

The index case that led to this investigation concerned the death, during ambulance transfer, of a 54-year-old man with acute aortic dissection.

It made recommendations that there should be national guidance for transfer of critically ill patients.

Principle 6: Specialist treatment for of all acute aortic dissections

Patients with acute aortic dissection need to be treated in a place which can provide the appropriate level of care for their clinical needs, in a timely manner and as close to their home as is safe.

As described in Principle 2, all cases should be discussed with the consultant on-call for the dissection rota and a decision taken (and documented) regarding transfer or management locally.

Type A dissections

Unless there are very clear reasons why operative intervention is inappropriate, all cases should be transferred to the regional specialist centre on-call for assessment. Transfer should be to Critical Care or theatre, depending on the patient's circumstances and advice from the consultant on-call.

Decisions about pre-transfer and intra-transfer management should be made in conjunction with the consultant on-call. There is helpful advice in the Bristol Acute Aortic Dissection Pathway.

If the decision is made to treat the patient palliatively, patients should not be transferred, and arrangements made for end of life care. All such decisions must be fully documented in the patient notes.

Type B dissections

Patients with complicated Type B dissection requiring immediate intervention should be transferred to the regional specialist centre for assessment. All patients should be cared for in a level 2/3 critical care area, where invasive blood pressure monitoring and control can be managed.

Those not requiring immediate intervention can be transferred to the specialist centre for medical management or managed locally if there is a regional pathway agreed and protocols in place to help guide the local team (see principle 1 – Governance). There needs to be clear agreement documented for each case about when the management of a type B patient should be escalated.

Non type A or B (primary entry tear in the arch)

The images for patients suspected of having this condition need to be transferred to the specialist centre on call for expert interpretation and management. These patients are complicated to manage as they may require intervention. This should be decided on a case by case basis. Non type A or B patients should therefore be transferred to the regional specialist centre under the joint care of the cardiothoracic and vascular surgery teams. For centres where these two specialities are not on the same site, the patient should be transferred to the cardiothoracic site.

Principle 7. Run a regional education program

There needs to be an education programme for staff involved in all stages of the patient pathway. This should address how the regional pathway works. This needs to include as a minimum training for: ambulance and paramedic crews, Emergency Department front line staff, diagnostic teams, cardiothoracic and vascular teams, critical care, and coronary care teams.

This training needs to be in place before the launch of the pathway and repeated at appropriate intervals and should include as appropriate patient's lived experience.

Implementing Change

Regions are primarily responsible for ensuring improved pathways of care for Aortic Dissection patients. Each region and system will be starting from a different point and have different challenges to implementing the seven principles of the toolkit. This section of the toolkit sets out the practical steps a region will need to undertake to deliver the principles with practice examples provided along the way.

Eventual agreed models may vary between regions; however, the seven principles should be met and include all commissioned Cardiothoracic and Arterial Centre who deliver emergency care for both type A and B aortic dissection.

It is also recognised that regions may need to work together across boundaries as determined by existing patient flows, critical mass of their populations and the clinical capability to deliver a high-quality service.

It will be necessary to ensure that no Trust is excluded or left to develop a stand-alone system which does not meet the principles of the toolkit.

Implementation considerations within each principle:

Principle	Key considerations
Regional governance	Formalise arrangements and an agreement of governance in a written document. This must include day-to-day working arrangements and contingency plans and cover the whole pathway including repatriation. An example of such a pathway is given in the examples section of this toolkit (Liverpool's AAA pathway). Introduce data collection across providers for the metrics within principle 1, alongside patient experience metrics. Hold regular regional review and governance meetings. Appoint a network-wide clinical lead to champion and drive the changes required, alongside appropriate management and administrative support.

Principle	Key considerations
Co-ordination through a Regional Multi-Disciplinary Team (MDT) and a Multi-Disciplinary Meeting (MDM)	When looking at the model consider: • The geography of the surgical centres/networks to be included locally • Ensuring the appropriate availability /capacity to commit to the MDT and MDM processes • The skillset required within the local MDT either as core membership or wider clinical opinion.
Regional rota & Single point of contact	How to run a rota e.g. the number of surgeons per unit, the frequency of on-call per unit etc. Consider the additional complexity this brings across sites when balancing day to day Trust needs with that of the AAD rota. Ensure each Trust's management team is signed up and supportive of the rota implementation. How to establish a single point of contact and ensure this is widely communicated and used. What is the back-up if the single point of contact fails?
Timely and reliable image transfer	Ensuring protocols cover different Trusts' IT systems and their limitations. Ensure each Trust has in place internal protocols to: • Alert referring physician and remind them of the contact number. • Arrange for image transfer to on-call centre.
Safe transfer	Clarify the expected impact on the regional Ambulance Services. Working with Ambulance services and Critical Care networks: • Consider the number of patient transfers required per year and the distances covered • Put in place robust clinical support systems to prevent patient dying in transit. Safe transfer policies must be documented. For example, the proposed Yorkshire rota protocol for Inter Facility Transfer Level 2 (IFT2) transfers:

Principle	Key considerations
	Transfers patient according to IF2 protocol. • Do you need our clinical help right now to deliver an immediate life-saving intervention / or are you declaring an emergency? NO • Is there a need for an immediate intervention that cannot be carried out at the current facility and the patient is at immediate risk of death or life changing loss of a limb or sight? YES • Support needed during transfer should be determined according to clinical needs of patient jointly by the referring physician and on-call surgeon. • The on-call surgeon should be available on the standard contact number (to be added here) for advice during transfer if necessary. • If the patient suffers a cardiac arrest, ambulance pulls over and crew start CPR, call standard contact number, for further advice. • In the event of CPR being unsuccessful or abandoned the ambulance returns to original hospital.
Specialist treatment	• Build in contingencies; what happens if there is no theatre or Critical Care capacity in the on-call Trust? How will images be transferred in cases of IT failure? • How should arrangements for repatriation and inoperable patients be managed? • What are the trigger points for transfer of Type B cases?
A regional education programme	• Ensure all those involved in the pathway know how it works and where to turn for help • Consider method of delivery, This maybe an online resource • Provide access to other groups' education – the British Society for Interventional Radiology for instance.

Project Management considerations

Know your system & stakeholders

Once your system has been agreed it is vital to map all stakeholders who are involved with or affected by the Acute Aortic Dissection pathway.

The acute aortic dissection pathway includes many stakeholders all of whom will need to be engaged with throughout to different levels. The table below suggests the main stakeholders you will need to engage as minimum and their possible level of influence. This will vary from region to region so it's important to map locally.

Once your stakeholders are mapped, you will then need a clear engagement strategy for each group. We would advise early face to face communication with those stakeholders who have a high level of interest or influence such as Regional Ambulance service(s) and Trust Medical Directors to secure their agreement in principle, and ongoing face to face communications though a working group or other mechanisms throughout the change process.

Suggested Stakeholders for involvement or consultation
• Ambulance service

• Trust departments and clinical teams e.g.
  ○ Emergency Departments
  ○ Radiology including interventional radiologists
  ○ Vascular and cardiothoracic surgeons
  ○ Anaesthetists
  ○ Critical care team
  ○ Theatre teams
  ○ Rota management staff

• Commissioners (NHSEI and ICS)
• Trust Boards including Medical Directors
• Critical care networks/transfer services
• Patient groups and bodies
• GIRFT Regional Implementation Teams
• Cardiac Networks
• Clinical senate
• Wider public
• Wider agencies

Early discussions with local Health Overview and Scrutiny Committees within a region may also be beneficial and advisable as a critical friend to help ensure patient and community impacts are considered.

Develop your project structure & risk management

For any change to be successful, overall project management is required. As a minimum, most organisations require a Project Initiation Document (PID), overarching plan and risk assessment to be completed before work begins. This does not need to be onerous but should meet your organisation's requirements and set out the issues faced, the change required and a brief time scaled plan of action.
An example project plan and risk log can be found in the examples section of this toolkit.

Leadership and meetings

Whilst beneficial to bring together all relevant stakeholders into a project group, it is also key to appoint an appropriate clinician and management leader (covering operational, commissioning and financial management) who can lead the improvement programme and be the point of contact with outside agencies.

The nominated leads will need to drive progress, ensure group members are updated on progress and liaise with colleagues on key stakeholder engagement arrangements, for example ahead of contacting Medical Directors.

Audit and Baseline

The national team can supply indicative data on patient numbers and flow. In addition, it will be necessary for teams to map their local demand. This should include:

- activity at the specialist centres and local hospitals.
- ambulance transfer times.
- data against the key metrics.

Regions can also triangulate their local numbers against the Oxford Vascular Study using the calculator (found in the examples section of this toolkit).

Gaining sign off and support

Once the audits and baseline assessment are complete, most organisations and commissioners (NHSEI and ICS affected by any planned change will require a written proposal including an appraisal of all options available to meet the toolkit's principles. This should include a risk benefits analysis and quality, equality and financial impacts.

This proposal for change should be approved by provider and Ambulance Trust management, commissioners, and patient groups prior to any change commencing.

All changes should be integrated into local Cardiac Networks, Critical Care networks and Action on Vascular programmes.

From agreement to implementation

Once a proposal is agreed in principle, the implementation process will again require close project management. There are several common actions which need to be taken across a region or system, which will include but are not exclusive to:

- A communications plan to ensure the change is effectively communicated and embedded in all Trusts and departments including the Ambulance Service.
- A rolling programme of training and audit to include all staff involved in the pathway.
- Agreement between providers to enable the MDM rota to be maintained at an appropriate level.
- Consideration of the need for pilots for some changes, e.g. image transfer
- A go live date

Post implementation

It is vital that the changes made are closely monitored using the suggested metrics within this toolkit and patient experience tools to ensure that the changes made have a positive benefit for patients with no unexpected consequences of change.

For the longer term it is advised that the Aortic Dissection rota is managed in line with principle 1 with regular audit and shared learning.

Problem solving and support

There will be times when implementing the changes required become challenging. Regional teams and commissioners can seek support and advice locally from their Clinical Senates and Health Overview and Scrutiny Committees. They can also ask for support from the National Specialised Commissioning and Getting it Right First Time (GIRFT) teams, alongside professional societies including but not exclusively the Vascular Society for Great Britain and Ireland, The Society for Cardiothoracic Surgery, British Society of Interventional Radiology and the British Cardiovascular Society who will support regions in the following ways:

- Providing impartial evidence-based advice and guidance
- Producing National level baseline data and analysis
- Supporting the initial educational programme
- Coordinating a national annual review and peer learning day.

Key responsibilities

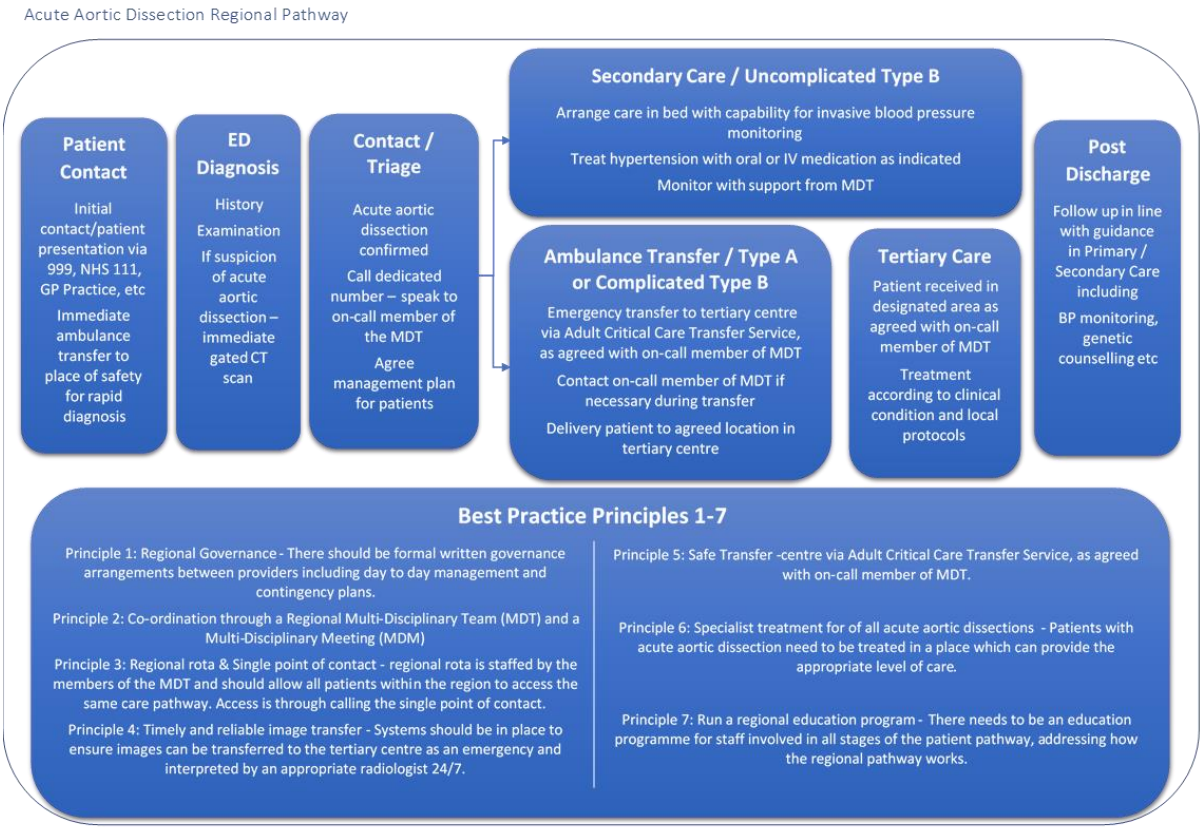
Responsible Group	Actions	Outputs
NHSEI Regional Team	**Regions are responsible for ensuring improved pathways of care for Aortic Dissection patients.** ***Regional Medical Directorate:*** SRO oversight of the required changes • Arrange initial meeting of key stakeholders to form a regional project implementation team. • Gain support from Trust Boards to sign off planned changes. • Oversee changes required. • Coordinate support from Clinical Senates, national bodies and specialty associations. • Identify and facilitate cross regional working. • Approve Regional governance proposals **Specialised Commissioning:** • Support the development of a regional project initiation document. • Support the changes required through commissioning of services as appropriate. • Ensure changes meet all statutory requirements. • Implement robust monitoring of KPIs (added to the contract as appropriate). • Support the development of regular clinical meetings and shared learning	Clear Regional leadership and oversight to support change. Trust Boards recognise AAD as a priority and support proposals. The Regional Implementation team are appropriately supported and guided. Cross regional relationships are developed as appropriate. Change supported though robust contracting and commissioning arrangements. KPIs are included within contracts and monitored. Shared learning and development introduced.

Responsible Group	Actions	Outputs
Regional Project Implementation Team	As a minimum should include Lead Clinician, Lead Managers from across the Trusts, Commissioning representation and Finance representation. **Planning**: Review current numbers, processes, capacity and geography. Make recommendations for the future which meet local need and the key principles. **Consult**: Identify all key stakeholders, ensure consultation with stakeholders on the proposed model and adapt the model accordingly. **Approval**: Finalise a plan for approval by commissioners and providers, develop detailed implementation plans and timelines. **Implement:** Oversee implementation of the changes including necessary education and training. **Evaluation and Monitoring:** Once the service is operational monitor progress.	A working group with appropriate representation is agreed by providers and region to drive overall change process. Clear clinical leadership and administrative support to deliver: • Project initiation documentation • Baseline position • Options papers • Stakeholder consultation • Implementation • Outcomes monitored and continuous learning Deliver robust risk management and assessment.

Responsible Group	Actions	Outputs
NHSEI National Team & relevant Speciality Associations	**The National Team is responsible for setting policy and standards and alongside Specialty Associations will providing support to Regions in developing their pathways of care.** • Provide impartial guidance and support to Regions to deliver change. • Enable mechanisms for national data capture and reporting. • Provide information to Regions to support change. • Ad-hoc support as required to ensure implementation. • Coordinate a national annual review day.	• Peer learning and development • Improved data capture and monitoring • Coordination of GIRFT, National Programmes such as the Cardiac Pathways Improvement Programme (CPIP) and Action on Vascular to support the delivery of change • National support for regional pathways • National learning, peer review and • Benchmarking.
Wider Stakeholders	Advise on changes required Review proposed pathways and model of care Support implementation	New model which is widely supported.

Appendix 1: Example documentation and support

National best practice emergency pathway



Project management templates

Item	Link
Project plan	AAD Toolkit Project Timeline (Active) v1.(
Risk log	AAD Toolkit Risk Tracking (Active) v1.(
Lessons learnt	AAD Toolkit Lessons Learnt (Acti

Data and Calculators:

Item	Link
Oxford Vascular Study calculator	Copy of Aortic Dissection Calculato

Clinical tools

Item	Link

Bristol AAD Pathway	BBWVN - Pathway of Care - Acute aorti
Liverpool AAA protocol	rAAA pathway Final version Nov 7th 201
Spinal cord protection policies	Spinal Protection Policy v 3.0.docx GSTT SPINAL CORD PROTECTION PROTC GSTT SPINAL CORD PROTETION PROTO GSTT SPINAL CORD PROTECTION PROTC
Spinal drains	Spinal drains.pdf Lumbar drian protocol v1.docx SpinalDrainSOP Amended March 202
Type B management Protocols	Imperial Type b protocol.docx
Follow up Guidance for clinicians	Aortic-Dissection-Field-Guide-for-Prima

Patient information

Item	Link
Yorkshire and Humber proposed draft patient leaflet	Rota info leaflet v5.doc

Support Offers from Patient Group & Charites

There are two National Patient group/charities who focus on Acute Aortic Dissection both of whom have offered bespoke support to help systems and regions in developing their services. The table below provides an overview of their offers of support:

Organisation	Support offer
Aortic Dissection Awareness UK and Ireland	• Direct patient involvement and patient leads to support change. • Examples of patient stories to demonstrate change requirements and success stories. • Support links for services for patients and relatives, including bereaved relatives, to the national patient association for post-dissection support. • Access to a National Aortic Dissection Community of Practice on the Health-Shared.com platform, where implementors can find their video educational resources and share their own content to help others. • Ability to report progress, metrics, and best practice case studies via their website. Website link: Home - Aortic Dissection Awareness UK & Ireland
The Aortic Dissection Charitable Trust	• Provide bespoke system wide training and education to systems and providers on best practice either face to face of via webinars. • Measure impacts of change for systems. • Direct patient involvement and patients leads to support change. • Provide access to national research studies. Website link: The Aortic Dissection Charitable Trust

Appendix 2: Background & Context

An aortic dissection occurs when the inner wall of the aorta tears, causing blood to leak between the layers. This is a sudden event and presents as a medical emergency. After an acute event, patients who survive are at risk of future chronic complications requiring intervention.

There are two main types of aortic dissection, type A and type B. Each type is in a different area of the aorta and the treatment and management of each is different.

- Type A starts in the ascending aorta (the part from the heart to the aortic arch). The risk of rupture is high, and usually requires emergency surgery to repair the aorta by a Cardiothoracic Aortic Surgeon.

- Type B starts in the descending aorta. The risk of rupture is less than for type A and doesn't always require immediate surgery. It is initially managed with blood pressure control in a high dependency setting together with close observation for potential complications. These may be managed by Cardiothoracic or Vascular Surgeons or other specialties such as Cardiology depending on the local circumstances.

In addition, about 10% patients may have a dissection which falls between the two types described above (non A non B). These patients also require specialised care from a multi-disciplinary team including vascular, cardiothoracic surgical and interventional radiology input.

An Intra-mural haematoma occurs when there is bleeding into the aortic wall without a tear in the inner wall. This condition is essentially managed the same as aortic dissection.

A penetrating atherosclerotic ulcer is an ulcerated lesion penetrating the layers of the aortic wall which is associated with hematoma formation within the aortic wall.

There is uncertainty around the overall incidence of acute aortic dissection, particularly for type B dissection. A mid-range estimate is an incidence of 6 cases per 100,000 per year. Establishing region wide networks with appropriate data collection, as recommended in this toolkit, will give us more accurate data.

Type A dissection requires emergency surgery, this is complex and has a high mortality rate, typically around 20%.

For type B dissection the initial mortality rate is lower, and many can be treated medically. However, approximately 15-20% of type B dissections require intervention to treat ongoing pain, refractory hypertension, extension of the dissection, malperfusion or end-organ ischaemia (gut, kidneys, spinal cord, legs) and rupture and up to 40% will require intervention in the future to treat complications such as aortic dilation and aneurysm formation. Lifelong surveillance is essential for these patients to identify complications and treat them in a timely fashion.

Care pathways for aortic dissection vary greatly across NHS England and evidence shows this can impact on patient outcomes. This toolkit sets out the issues with current pathways and supports regional stakeholders to improve their pathways. It provides clinicians, services, and commissioners but specialised and local with recommendations to improve care and outcomes for the future.

Current Pathways and their impact on patient care

Dissection requires rapid diagnosis and management to prevent death. There is additional complexity because aortic dissection is a clinical mimic, with patients often admitted under a variety of specialties because of initial misdiagnosis. This is further compounded by the fact that regional pathways for patients with acute aortic dissection are frequently unclear. This has been highlighted in several studies (see references below). This section examines the current pathways and how these impact on patient care.

Why is the pathway so important?

Acute Aortic Dissections carry a high risk of fatality. In 50% of Type A cases, death occurs before patients reach hospital. Of the remainder, a further 50% will be dead within 24 hours without surgical treatment. It is vital that patients move as quickly as possible from initial presentation to the operating theatre at a specialised cardiothoracic centre.

How do patients usually present?

The presentation of acute aortic dissection may be varied but typically its occurrence is associated with sudden onset of severe pain. This may occur in the chest, back, abdomen or neck and may radiate from one site to another. There are frequently associated symptoms such as collapse. The pain may quickly settle such that by the time the patient arrives at the Emergency Department (ED), they are pain free.

Aortic dissection is more common in older people and risk is further increased by hypertension.

How are patients currently diagnosed?

A contrast enhanced computerised tomography (CT) scan is currently the gold-standard diagnostic imaging modality, offering a sensitivity and specificity of nearly 100%. There are no blood tests that can confirm or exclude an aortic dissection and a chest x-ray may appear normal.

Diagnosis of an aortic dissection on a CT scan is usually straight-forward and this should be possible in District General Hospitals (DGHs). However, to plan treatment often requires more specialist interpretation which is available only in specialist centres. Therefore, rapid transfer of CT scan images is essential. Occasionally an ECG gated CT scan is required to make the diagnosis.

The Diagnosis of Thoracic Aortic dissection in the Emergency Departments which should be used by local teams when developing their diagnostic pathways.

Once diagnosed, how are patients treated?

Once diagnosed in a local hospital there is often no streamlined path of referral from district hospitals to the cardiothoracic or Arterial Centres. The referral process is often haphazard and uncertain, requiring several phone calls and significantly lengthening time to treatment.

Once diagnosed patients with a type A dissection require to be transferred to a cardiothoracic surgical unit for treatment. The options for patients with a type B dissection are more varied. They may require transfer or may be able to be cared for in their local hospital. In either event they require the input of specialists including cardiothoracic surgeons, vascular surgeons, interventional radiologists, cardiologists and critical care teams.

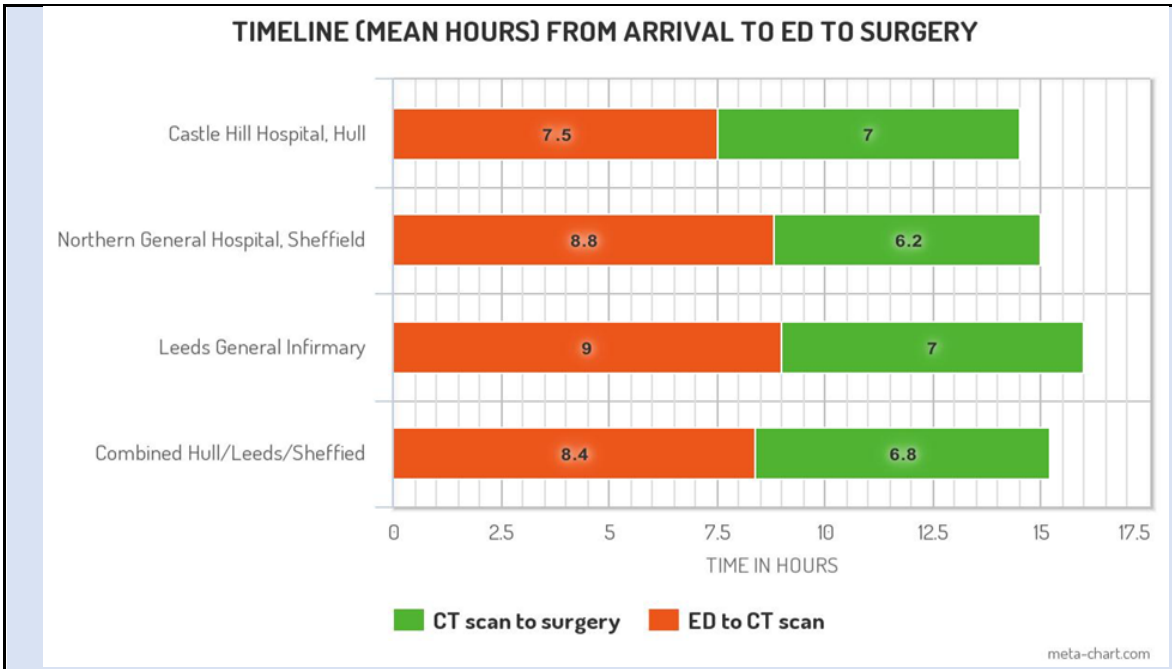
Type A Dissections

Currently Type A dissection operations are carried out in the Cardiothoracic Surgical Units who are commissioned via the Specialised Commissioning Specification A10/S/a Cardiac Surgery. Most units currently operate on patients presenting in their catchment area and do not network with other Surgical Units.

Typically, the on-call consultant cardiothoracic surgeon would carry out the operation. Whilst they would be a fully qualified cardiothoracic surgeon, they may not be a specialist aortic surgeon.

Example of current pathway for Type A:

In Yorkshire, for 2016/17 to 2018/19 the mean time from presentation at the Emergency Department to having a CT scan (necessary to make the diagnosis) was 8.4 hours and the mean time from having a CT scan to surgery was 6.8 hours giving an overall pathway taking 15.2 hours, (figure below). From evidence provided by emergency department teams, we believe that the delay before CT scan represents a delay in considering the diagnosis rather than a queue for the scan itself. The delay from diagnosis to surgery reflects the current complex and non-standardised inter-hospital referral pathways. We do not have any information on how many patients die on this pathway before reaching surgery.



Type B Dissections

Patients with type B dissection who require intervention need to be transferred as an emergency to a specialist centre. Intervention usually involves the placement of an endovascular stent graft.

For type B dissection, the ideal initial management for most patients is admission to a level 2 or 3 area such as a Coronary Care unit (CCU), a High Dependency Unit (HDU) or an Critical Care Unit for invasive blood pressure reduction with intravenous beta blockers and pain control. This step is often overlooked, and patients are often managed on general wards. This leads to persistent pain and poor BP control and increases the risk of patients developing complications that may be fatal or require intervention.

Unfortunately, errors are frequent in this management pathway and lead to death. This is reflected in concerns raised by centres, coroners, relatives and MPs. The Healthcare Safety Investigation Branch (HSIB) released two reports in 2019 and 2020 detailing failings in the care of aortic dissection patients that focused on the safe transfer of critically ill patients. The current management of these patients is at times unsatisfactory and this needs to change.

Lack of clinical awareness about risks from Type B

"I was told that nobody dies from a type B dissection"

Appendix 3: Evidence base for change

Type A aortic dissections

In Liverpool, implementation of a policy by which the surgery for type A dissections is carried out by experienced and specialist surgeons has halved delays, halved operative mortality and reduced post-operative length of stay by a third from 18 days to 12 days. In Liverpool they did this by introducing a separate on-call rota for aortic specialist surgeons (3).

In London, they have implemented a rota between hospitals so that, in rotation, one hospital in the North and one in the South takes all the dissections in their area on any one night. This has halved operative mortality and reduced time from diagnosis to surgery from 10.8 hours to 6.5 hours (4).

The UK national cardiothoracic Getting it right first time (GIRFT) review of cardiothoracic surgery (5) has recommended that acute aortic dissection patients are only operated upon by rotas of acute aortic dissection specialist teams. This is based on their analysis of the UK national data set using HES and NICOR. The review focussed mostly on acute aortic activity; however, it does have implications for elective work. They specifically advised:

- Creating rotas of specialist surgeons allied to networks of referring hospitals to cover geographic areas.
- Defining minimum activity thresholds for the surgeons.
- Ensuring that all surgeons on the rota meet minimum activity thresholds.
- Establishing formal agreements between referring hospitals, receiving specialist units and ambulance service for transfer of acute aortic dissection patients to the relevant specialist centre. The arrangements should include a dedicated phone number for referrals and service coordination.

Type B aortic dissection

The evidence for management of type B aortic dissections by specialists is less strong due to historical clinical coding issues. The facts below are based upon a combination of published evidence that exists combined with experiential evidence common-sense and a pragmatic approach.

- The initial management for type B aortic dissections is medical with active BP control using intravenous beta-blockers in a Level 2/3 area that allows continuous invasive blood pressure monitoring. There should also be immediate discussion with a specialist centre to agree a management plan including advice for target BP management.
- For most type B aortic dissections this initial management is all that is required, however, complications will occur in 15-20% of cases who may develop refractory hypertension, ongoing pain, malperfusion or leak/rupture.
- Complicated cases should be transferred early to a regional centre under the care of a vascular team and may require HDU or Critical Care admission.

- If acute intervention is required, an endovascular approach is associated with lower mortality compared to open surgery (11% versus 33%).

It is unclear whether selected uncomplicated cases should undergo intervention to prevent aortic dilation in the 'sub-acute' phase. Patients with an initial aortic diameter of >4cm and/or continuous false lumen perfusion are thought to be at higher risk of subsequent future dilation and aneurysm formation. It is expected that the in-hospital mortality for uncomplicated cases (80%) should be <10% with this approach – 70% of these acute deaths will occur in the first two weeks.

Appendix 4: Supporting the Change - Key References and Contacts

Key references

1. Bottle, Mariscalco et al and the UK Aortic Forum, 'Unwarranted Variation in the Quality of Care for Patients With Diseases of the Thoracic Aorta'; Journal of the American Heart Association. 2017:6

2. Bashir, Harky, Howard, Bartram, 'Type A Aortic Dissection in the United Kingdom: The Untold Facts'; Seminars in Thoracic and Cardiovascular Surgery, Volume 31, Issue 4, 2019, Pages 664-667

3. Bashir M, Shaw M, Field M, Kuduvalli M, Harrington D, Fok M, Oo AY. Repair of type A dissection-benefits of dissection rota. Ann Cardiothoracic Surgery 2016;5:209-215.

4. Khan H, Hussain A, Chaubey S et al. Acute aortic dissection type A: Impact of aortic specialists on short term and long term outcomes.J Card Surg 2021;36:952-958.

5. http://gettingitrightfirsttime.co.uk/wp-content/uploads/2018/07/CardiothoracicReportMar18-F.pdf GIRFT guidance: Cardiothoracic Surgery - GIRFT Programme national Specialty Report by David Richens, March 2018.