THE AORTIC DISSECTION CHARITABLE TRUST

UK Interventional Radiology Trainee Research Collaborative

BSIRT

IRJ

VERN Vascular and Endovascular Research Network

CAASP

Collaborative Acute Aortic Syndrome Project

A multi-centre service evaluation project to understand current acute aortic syndrome (AAS) pathways

Version 1.2: February 2022

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The Aortic Dissection Charitable Trust (TADCT)

Registered charity No. 1191420 (UK)/ SC051517 (Scotland)

Supporting organisations:

British Society of Interventional Radiology (BSIR)

British Society of Endovascular Therapy (BSET)

Vascular Endovascular Research Network (VERN)

Vascular Society of Great Britain and Ireland (VSGBI)

Circulation Foundation

Cardiothoracic Interdisciplinary Research Network (CIRN)

List of abbreviations

AAD	Acute aortic dissection
AD	Aortic dissection
AAS	Acute aortic syndrome
AI	Artificial intelligence
BP	Blood pressure
CAASP	Collaborative Acute Aortic Syndrome Project
COVID-19	Coronavirus disease 2019
CT	Computed Tomography
CTA	Computed Tomography Angiogram
CTPA	Computed Tomography Pulmonary Angiogram
DGH	District General Hospital
ED	Emergency department
FY	Foundation Year Doctor
ICU	Intensive care unit
IMH	Intramural haematoma
MDT	Multidisciplinary team
MRI	Magnetic Resonance Imaging
PAU	Penetrating atherosclerotic ulcer
PCR	Polymerase chain reaction
RIS	Radiology information system
TEVAR	Thoracic endovascular aortic repair
US	Ultrasound

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STUDY SUMMARY

Project Title	CAASP – Collaborative Acute Aortic Syndrome Project: A multi-centre service evaluation project to understand current acute aortic syndrome (AAS) pathways
Project Design	Multi-centre retrospective service evaluation project
Participants	Patients with Acute Aortic Syndrome detected on imaging (Ultrasound, Computed Tomography or Magnetic Resonance Imaging)
Eligibility Criteria	Inclusion Criteria: ● Patients with a diagnosis of AAS (AD type A, AD type B, AD non-A non-B, PAU, IMH) ● Date of diagnosis from 01/01/2018 to 01/06/2021 Exclusion Criteria: ● Non-AAS pathology • Acute on chronic AAS presentation ● Patients under the age of 18
Objectives	
Primary Objective	To outline the current national and international diagnostic and management pathways for AAS, and inform and facilitate improvements in clinical practice.
Secondary Objectives	- To ascertain mortality, complications, intervention and re-intervention rates for AAS patients up to 6 months from diagnosis. - To identify any differences in diagnostic pathways and outcomes between specialist cardiovascular and non-cardiovascular hospitals. - Identify geographical and socioeconomic variation in AAS detection and outcomes. - Identify the proportion of positive scans from all imaging referrals performed to investigate for AAS. - Identify the proportion of AAS cases diagnosed incidentally (where AAS was not suspected clinically).
Follow-up Duration	6 months from first diagnosis of AAS based on imaging (CT, US, MRI).
Timeline	04/04/2022: Estimated date for study live date 04/04/2022 – 14/06/2022: Local project registration / data collection commencement 10/05/2022: Interim Lead Investigator meeting for resolution of discrepancies 14/06/2022 – 14/07/2022: Review and synthesis of results

	01/09/2022 – 1/10/2022: Dissemination by manuscript draft 1. 01/11/2022 – VSGBI and BSIR presentation 01/12/2022 – Manuscript submitted to peer reviewed journal

Lay Summary

The aorta is the main blood vessel that leaves the heart and travels through the chest and abdomen, giving off branches that deliver blood to all the parts of the body. It is a large blood vessel (tube) that carries blood. The wall of the aorta is layered, much like an onion. These layers can tear, separate, or split. Acute aortic syndrome (AAS), which includes acute aortic dissection (AAD), is a life threatening emergency and is the most common emergency affecting the aorta. AAD is a tear in the innermost layer of the aorta, allowing blood to get underneath this layer. Blood under the inner layer of the wall of the aorta can 'strip' this layer off the other layers of the wall of the aorta. The blood supply to parts of the body can become blocked and can rapidly lead to medical emergencies such as heart attack, stroke, dead parts of bowel, lack of blood to arms or legs, bursting of the aorta, and even death.

Diagnosis can be challenging and, sadly, it is estimated that one in five patients will die before they reach hospital because AAD is not recognised or considered as a possibility. Early hospital admission and careful blood pressure control, to prevent the tear from worsening, is vital to prevent life-threatening problems. If the aorta goes on to burst, only 2 in 10 patients will survive.

Quick diagnosis is essential to start the correct treatment. However, as AAD is relatively rare compared to other more common medical problems that can present in a similar way and mimic AAD, such as a heart attack, bone or joint pain or a blood clot in the lung, there can be delays to diagnosing AAD. Given the management of AAD is time sensitive, these delays can worsen the outcome for patients. The diagnosis of AAD is nearly always made on a CT ('polo mint'/'doughnut') scan, sometimes performed for other reasons (i.e. not looking for an aortic dissection).

This study will look back at all patients who have had a CT scan in their local hospital (with symptoms possibly coming from an AAS) to find out how many actually had an aortic dissection. The study will then focus more closely on those patients with a new aortic dissection and assess whether the diagnosis (and subsequent management) was made in a timely manner and, where this was not the case, see why the delays occurred. We will also look at how these delays impacted on their outcomes 6 months after the initial diagnosis in terms of their survival and the number of repeat procedures to their aorta.

Introduction

Background

Acute aortic syndrome (AAS) is a term encompassing a heterogenous group of patients with interlinked clinical profiles including penetrating atherosclerotic aortic ulcer (PAU), intramural haematoma (IMH), and aortic dissection (AD)[1]. Classic acute AD results from a tear in the intimal arterial layer, which allows blood to propagate within the medial layer dividing the aorta into a true and false lumen. When defined by chronicity, dissections less than 14 days are defined as acute, subacute 14 days to 3 months, and chronic greater than 3 months. Anatomically, dissections are most commonly defined by the Stanford and DeBakey classification systems. There are multiple risk factors for AD, however they can generally be summarised as those that increase intimal shear stress such as hypertension, present in the majority of patients with AD, and those which cause weakening of the vessel wall such as atherosclerosis or connective tissue disorders including Marfans, Ehlers Danlos or Loeys-Dietz syndromes. A number of patients will also have a family history of aortic dissection, with 13-22% of patients with AD having a first degree relative with previous AD[2].

The incidence of AD is 4.5-6 per 100 000 of the population per year, translating to approximately 2500 cases per year in England[3,4]. Clinical presentation of patients with AD can be varied, with symptoms such as chest and back pain that can mimic a range of other more common conditions. In order to make a timely diagnosis, a high degree of clinical

suspicion and a low threshold for cross-sectional imaging is required. Prompt diagnosis is key to the successful management of patients with AAD, however in 16-40% of cases there is a delay in diagnosis[3].

Type A AD requires emergency open surgical repair unless there are contraindications to major surgery. Type B AD is typically stratified into being complicated or uncomplicated. Complicated Type B dissections include those patients with rapid aortic expansion, aortic rupture and/or hypotension/shock, visceral, renal, or limb ischaemia, paraplegia/paraparesis, peri-aortic haematoma, recurrent or refractory pain, and refractory hypertension despite adequate medical therapy. Patients with uncomplicated Type B dissection have an absence of the above 'complicating' features and are predominantly managed medically with aggressive BP control - guided by invasive arterial monitoring - to reduce stress on the aortic wall and left ventricular strain. Thoracic endovascular aortic repair (TEVAR) is now the first line option in managing patients with complicated Type B AD[5], the aim of the procedure being to cover the intimal tear, reduce the pressure within the false lumen and encourage re-modelling.

The Royal College of Radiologists and Royal College of Emergency Medicine have produced a joint statement (https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfcr216_diagnosis_of_thoracic_aortic_dissection.pdf) to provide a consensus opinion with regards to which patients should be considered for CT scanning to diagnose AAS.

Rationale for Study

At present there is very limited understanding of the current pathways to diagnosis for all acute aortic syndromes (e.g. aortic dissection, penetrating atherosclerotic ulcers or intra-mural haematoma). We hypothesise that there is likely to be considerable variation in such pathways, with regional dissimilarity in diagnosis timeframes and referrals to a specialist centre, potentially impacting on patient outcomes. Without understanding the care of acute

aortic syndrome patients and their journey, we are vulnerable to missed diagnosis and delays in management which could lead to patient lives lost.

The CAASP has been developed to understand the current processes when AAS is suspected and highlight any variations in practice that might impact on patient outcomes, with a view to developing a standardised care pathway and supporting an improved awareness across healthcare and public forums. Determining the most important factors contributing to diagnostic and treatment delays will likely improve the diagnostic process and overall patient care pathway.

CAASP Aims

CAASP aims to evaluate current acute aortic syndrome (AAS) pathways and consequent patient outcomes in a collaborative fashion. The outcome and data will be used to inform and develop an improved national patient care pathway via The Aortic Dissection Charitable Trust.

Objectives and outcome measures

Primary objectives

- To outline the current national and international diagnostic and management pathways for AAS, and inform and facilitate improvements in clinical practice.

Secondary objectives

- To ascertain mortality, complications, intervention and re-intervention rates for AAS patients up to 6 months from diagnosis.
- Identify differences in diagnostic pathways and outcomes between tertiary aortic centres and other hospitals.
- Identify geographical and socioeconomic variation in AAS detection and outcomes.

- Identify the proportion of positive scans from all imaging referrals performed to investigate for AAS.
- Identify the proportion of AAS cases diagnosed incidentally (where AAS was not suspected clinically).

Primary outcome measures

Outcome	Timepoints measured at:
Mortality	30 days 6 months
Median time from symptom onset to hospital presentation (hours)	Admission
Median time from hospital presentation to imaging diagnosis (hours)	Admission
Median time from imaging diagnosis to treatment (hours)	Admission

Secondary outcome measures

Outcome	Timepoints measured at:
Mortality	30 days 6 months
Complications: - AAS related - Treatment related	6 months
Reinterventions	6 months
Index of multiple depression	Admission

Study design and setting

This is a multicentre, retrospective service evaluation project of adult patients diagnosed on imaging with acute aortic syndrome (AAS). The study will be delivered through the Vascular and Endovascular Research Network (VERN), UK National Interventional Radiology Trainee Research (UNITE) network, the British Society of Interventional Radiology Trainees (BSIRT) network, and the Society of Interventional Radiology Resident and Fellow Section Research and Innovation (SIR RFS R&I) Committee (a collaboration with Massachusetts General Hospital, irlab.mgh.harvard.edu). VERN, UNITE, and SIR RFS R&I group are all trainee-led national research collaboratives that are run by, and engage with, research-active vascular and interventional radiology trainees, and allied health professionals. The co-investigators

have experience in designing and delivering multi-centre collaborative studies. The project is supported by The Aortic Dissection Collaborative Trust who have funded the project.

We estimate that at least 12 UK sites and 4 US sites will be enrolled in this project.

Identifying the cases of AAS will be done by using a focused search strategy on the electronic radiology information system (RIS) available in each enrolled centre. Data for patients diagnosed with AAS will be retrospectively collected for the defined search time-period (01/01/2018 to 01/06/2021). 6 months of follow-up data will be collected for each patient from the first imaging diagnosis of AAS. The start date for centres is flexible to allow for local registration and/or any relevant local approvals. All centres can submit data until 14/06/2022 (subject to change) which is when data from all sites will be collated and analysed.

The patients will not be contacted at any point. Only pseudonymised / de-identified patient data will be sent to the central research team for analysis. This will be using the NHS mail server.

Each centre can enrol up to five medical or allied health professionals, plus one lead clinician, as the data collection team. Data collectors will be recognised under collaborative authorship on subsequent paper(s). Teams will register CAASP with their vascular / radiology department and/or any research and development departments required to give local approval. All centres that are enrolled must first register this project locally as a national service evaluation project before commencing with data collection. Centres must show local evidence of project approval before they may submit data for the study. This may require a Caldicott Guardian letter (in the UK) for justification of the project. A template letter will be produced which can be used for local registration. US and other non-UK centres will be required to show evidence of appropriate approvals in accordance with local regulations; this may require institutional review board approval.

Data points

Patient demographics:

- (DoB)/ Age and Sex
- Ethnicity (White/ Black / Asian / Other) – If other option to write open box text
- Distance from home (if ambulance was called to another location please use this if available) to presenting hospital (Based on postcode – use google maps)
- Index of Multiple Deprivation (IMD) Decile (See attached CSV and use URL - https://findthatpostcode.uk/ to find Lower Super Output Area code in 'secondary areas' section to search in CSV to find decile)
- Aortic Pathology: AD Type A / AD Type B / AD non-A non-B / PAU / IMH

Presentation Timing Details

- Recorded date and time of symptom onset in notes (Y/N)?
- Date of symptom onset (DD/MM/YY)
- Time of symptom onset (HH:MM)
- Time from symptom onset to hospital presentation/ first point of medical contact (hours)
- Time and date of arrival to emergency department or first point of contact with hospital for this episode
- Type of admission hospital (tertiary aortic centre or non-tertiary aortic centre incl. district general hospital)
- Mode of ED presentation (drop down): direct self-presentation / GP referral / Ambulance / Other (free text)

Symptoms (all Y/N/ not recorded):

- chest pain/ sudden onset pain/back pain/ neck pain/ abdominal pain/ migratory pain/ severe intensity pain/ collapse/ focal neurology (e.g. numbness or weakness in limbs)/ other (free text other)

Patient Risk Factors (all Y/N/ not recorded):

- Hypertension / Known Aortic Aneurysm / Previous Aortic Dissection / Bicuspid Aortic Valve / History of myocardial infarction / Cardiac Failure / Previous cardiac surgery / Prior catheterization or angioplasty / Known familial aortic disease / Known Marfans or other connective tissue disorder / Diabetes

Physical Exam (Y/N/not recorded):

- New murmur on examination / Difference in Bilateral BP (>20 mmHg) / Pulse deficit (a difference in the apical pulse and the peripheral pulse)/ Vascular Signs (Ischaemic limb?)/ Objective neurological deficit
- First recorded admission BP (systolic/ diastolic) / HR / RR (in emergency department)
- Hypotension (Defined as BP less than 90 mmHg systolic or 60 mmHg diastolic) (Y/N)
- Presenting with clinical features compatible with circulatory shock (*See definition in appendix*) (Y/N)
- Presenting with clinical or radiological features compatible with likely cardiac tamponade (*See definition in appendix*) (Y/N)
- Fever (Defined as >37.5°C) (Y/N)
- Coma / altered consciousness (Y/N)

Investigations

- ECG (Normal / Abnormal / Not done)
- Imaging diagnosis date and time
- With which imaging modality was the diagnosis of AAS first confirmed (Ultrasound incl Echo/CT/MR)
- CT done to confirm diagnosis (Y/N)
- Date and time of CT scan
- Date and time of CT report verification
- Type of CT study: CTA / CTPA / Non-contrast CT / Portal venous abdomen / Other
- Complicated / uncomplicated disease (Define in supplementary material for data collectors)

- Time from arrival to hospital to first imaging diagnosis (hours) (estimate if unclear from clinical notes)
- Was AAD or AAS clinically suspected in the pre-imaging clinical notes? (Y/N) - If No, incidental diagnosis (to be analysed separately)
- Was AAD or AAS mentioned on the imaging request? (Y/N)
- Date/ Time of vascular/ cardiothoracics referral
- Time from admission to vascular/ cardiothoracics referral

Bloods:

- Point of care bloods: pH on venous bloods/ blood gas (record value or leave blank if not recorded)
- FBC: Haemoglobin (g/dL)/ WBC (10^9/L)/ Platelets (10^9/L) (record value or leave blank if not recorded)
- D-dimer (use absolute cut-off) / Troponin (Normal/ Abnormal/ Not recorded)
- CRP / ALT / Amylase / Lactate / Glucose (record value or leave blank if not recorded)
- Creatinine / eGFR (record value or leave blank if not recorded)

Treatment

- Definitive treatment during first admission: Medical (BP control) / Surgery / Endovascular
- Discharge home (Y/N)
- Transfer to another centre (Y/N)
- Time from CT to the implementation of the documented definitive management plan (Hours) (e.g. if documented definitive management plan is TEVAR then time to TEVAR or time from CT to hospital transfer to aortic centre)
- Prescribed BP Target (mmHg) – systolic
- Prescribed heart rate target (beats per minute)
- Was an Intravenous antihypertensive/beta blocker used to control blood pressure and heart rate? (Y/N)
- If Yes which was used first line (Tick one):

    - Labetalol/ Esmolol/ Metoprolol/ GTN/ Sodium Nitroprusside/ Nicardipine/ Hydralazine/ Verapamil/ Diltiazem/ Other Beta blocker, please specify/ Other calcium channel blocker, please specify/ Other please specify
- If Yes which was used second line (Tick one):
    - Labetalol/ Esmolol/ Metoprolol/ GTN/ Sodium Nitroprusside/ Nicardipine/ Hydralazine/ Verapamil/ Diltiazem/ Other Beta blocker, please specify/ Other calcium channel blocker, please specify/ Other please specify/ Second line IV agent not required
- Time from commencement of BP treatment to achieving BP/ HR target (hours)

Hospital Stay

- Which of the below best describes the type of ward area to which the patient initially admitted (tick one):
    - Intensive care unit (level 3 capability)
    - High Dependency Unit (Level 2 capability)
    - High observation area (Level 1 capability)
    - Coronary Care Unit
    - Specialist vascular ward
    - None specialist ward
- Admission to a critical care ward (ICU/ HDU/ CCU) during hospital stay (Y/N)
- Length of ICU stay (days)
- Length of total hospital stay (days) from date of admission to discharge
- Alive at discharge (Y/N)
- Last known alive date
- Date of death
- Alive at 30 days(Y/N)
- Alive at 90 days(Y/N)
- Alive at 6 months (Y/N)
- COVID: Negative PCR / Positive PCR / Radiological evidence only/ Clinical concern only for COVID/ not recorded

Risk assessment

No changes will be made to 'usual patient care' and their inclusion in the study will not influence clinical decision making. The patients will not be contacted at any point during the study. As such, no additional risk will be posed to study patients. This is a retrospective study.

Site and Investigator selection

This study will be carried out at participating sites across the globe. All UK sites who are interested in participating in the study will be required to register the study with their relevant local departments. Centres from outside the UK will need to follow local policies, prior to identifying patients. At each centre, a named lead clinician / study coordinator will have overall responsibility for acquiring relevant local approval, searching for patients via the imaging search tools, data collection and ensuring the study protocol is adhered to. Up to five additional medical or allied health care professionals at each centre may comprise the local study team (6 total), and participate in patient identification, baseline and follow-up data collection. In the case where district general hospitals around a tertiary centre are enrolled in the study, the study coordinator at the tertiary centre has the responsibility of communicating with the district general hospital teams to cross check patient identifiers and avoid patient duplication. All communication must be via NHS email only.

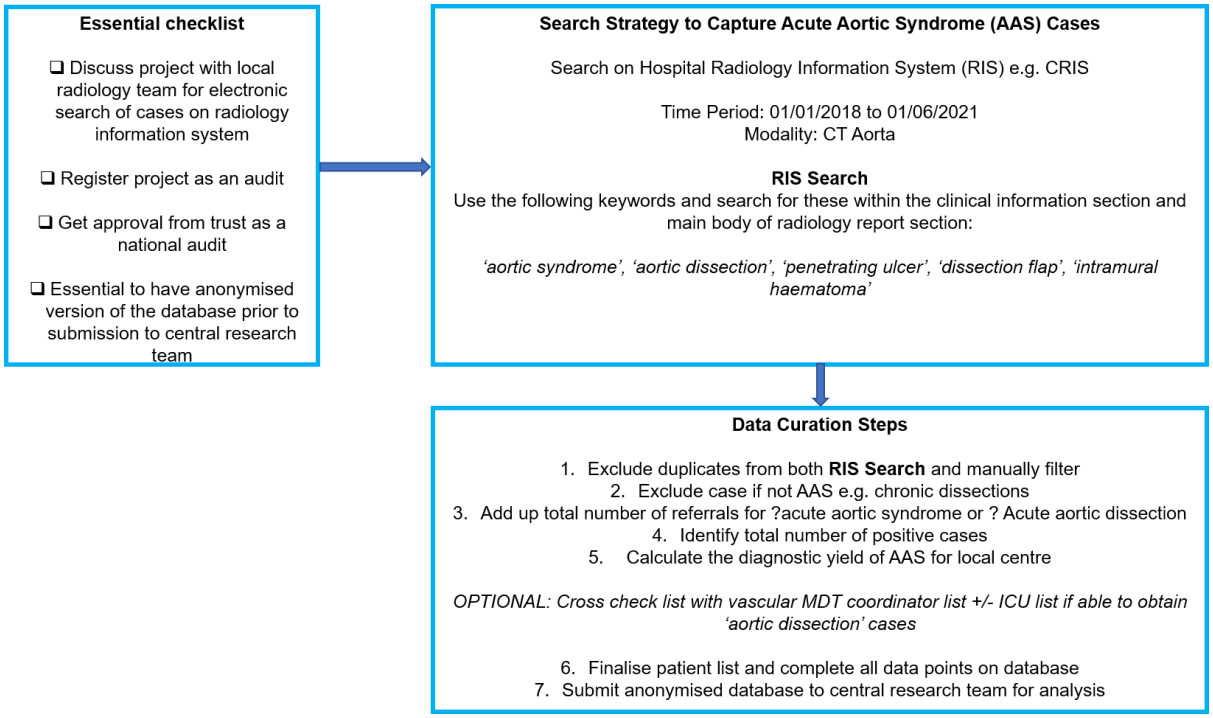
Patient selection

Patients are eligible for the study if they meet all inclusion criteria and none of the exclusion criteria apply. All AAS patients will be identified by using a focused search strategy on the electronic radiology information system (RIS) available in each enrolled centre (See Radiology Search Strategy). This can be cross checked with further local patient lists if available e.g. Local vascular database, vascular MDT coordinator or ICU list.

Patients will not be approached or contacted during any part of the study. All queries about patient eligibility should be directed to the local study coordinator before registration.

Radiology Search Strategy

Summary



Step by step guide

- Contact Radiology IT Department to obtain RIS search enquiry document
- Complete RIS search enquiry sheet as per the RIS Search Strategy above and obtain signature from Radiology Consultant for authorisation
- Ensure the following data points are requested:
    - Patient identifier (e.g. NHS number, Medical Record Number (MRN))
    - Date of Birth
    - Sex
    - Date of Scan
    - Clinical Information on scan request
    - Radiology scan report
- Radiology IT should generate this patient list within 2-3 days

- Check patient list for duplicates and exclude cases which are not AAS
- Complete all data points as per protocol

Inclusion criteria

1. Patients with a diagnosis of AAS (AD Type A, AD Type B, AD non-A non-B, PAU, IMH)
2. Date of AAS imaging diagnosis from 01/01/2018 to 01/06/2021

Exclusion criteria

1. Non-AAS pathology
2. Acute on chronic AAS presentation
3. Patients under the age of 18

Data Collection

Data will be collected by each participating centre and will be maintained on an anonymised database/ spreadsheet. The data collection template will be shared with all site leads. The local site lead will be in charge of keeping one database with local identifiers and an assigned Centre number / patient number (pseudonymised). They will also require a second sheet which only includes the pseudonymised assigned patient/study number. Only the pseudonymised data sheet will be transferred via the secure NHS mail.

Definition: 'Acute' aortic syndrome describes the presentation of patients with one of a number of aortic pathologies that give rise to similar clinical presentations including aortic dissection (Type A, type B and non-A-non-B), penetrating ulcer or intramural haematoma[6].
A tertiary referral centre for the purposes of this project means a hospital which provides specialist cardiothoracic surgery, vascular surgery and/or Interventional Radiology.
Time durations analysed will include time from symptom onset (if available from emergency department (ED) notes) to hospital presentation (time of arrival to ED), the time from initial ED presentation to imaging diagnosis (time of scan) and time from imaging diagnosis to

definitive treatment (beginning of surgery, endovascular intervention or blood pressure control instigated and time of achievement of blood pressure target).

Data Analysis

Descriptive and summary statistics regarding the time to presentation, mortality, complication, and re-intervention rates for AAS patients within the first 6 months of 'imaging' diagnosis will be calculated. Univariate analysis will be used to identify any significant predictor variables of delay and then used in a multi-stage backward stepwise multiple linear regression model to calculate coefficients of predicted delay times/delay time ratios (DTRs) for individual correlates / factors potentially contributing to delays in diagnosis or management.

Differences in diagnostic pathways (e.g. time from symptom onset to hospital admission / time to imaging diagnosis / time to treatment) between specialist cardiovascular and non-cardiovascular hospitals will be compared. Geographical and socioeconomic (by Index of multiple depression) variation on AAS detection will also be included in the regression analysis.

Ethical and Regulatory Compliance

Ethical Approval and Registration

Each centre involved will be expected to register this service evaluation project with their local hospital audit and quality improvement department. A template registration form will be provided for this purpose. US and other non-UK centres will be required to show evidence of appropriate approvals in accordance with local regulations; this may require institutional review board approval which documented evidence will be required before that site can submit data for the project. All data will be held anonymised at the point of collection and no patient identifiable information will be stored (see Data Collection section on page 18 for the step wise process).

Funding

This project is funded by The Aortic Dissection Charitable Trust (TADCT). TADCT have not influenced the development of the project. Data will be collected at all centres by clinical staff who are otherwise salaried and will be contributing data for free in exchange for appropriate recognition in the research outputs of the study.

Publication Policy

Results of the study will be disseminated via presentations at appropriate scientific meetings and conferences, and publication in appropriate peer-reviewed journals. Authorship will involve named individuals involved in study design (steering group) and manuscript preparation with the UK IR Trainee Research group and VERN, with individuals collecting data at hospital sites being specifically named as collaborators. There is no specific maximum on individuals from each centre but this is estimated to be in the order of 6 study personnel per centre.

ESTIMATED TIMELINES

21/02/2022: Completion of Protocol by VERN / UNITE / BSIRT

04/04/2022: Estimated date for study live date

04/04/2022 – 14/06/2022: Local project registration / data collection commencement

10/05/2022: Interim Lead Investigator meeting for resolution of discrepancies

14/06/2022 – 14/07/2022: Review and synthesis of results

01/09/2022 – 1/10/2022: Dissemination by manuscript draft 1

01/11/2022 – VSGBI and BSIR presentation

01/12/2022 – Manuscript submitted to peer reviewed journal

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APPENDICES

Definition for Shock

1. Systolic blood pressure <90 mmHg >30 min or vasopressors required to achieve ≥90 mmHg
2. Pulmonary congestion or elevated LV filling pressures (e.g. PCWP>18 mmHg)
3. Signs of impaired organ perfusion with at least one of the following criteria:
   a) Altered mental status
   b) Cold, clammy skin and extremities
   c) Oliguria with urine output <30 mL/hour
   d) Serum lactate >2.0 mmol/L

(Based on European Society of Cardiology Guidelines - https://www.escardio.org/static-file/Escardio/Medias/associations/acute-cardiovascular-care-association/AcuteCVDays/IACC-Textbook-Cardiogenic-Shock.pdf)

Cardiac Tamponade

Select YES if Clinical Signs of Cardiac Tamponade e.g. Beck´s triad (sinus tachycardia, elevated jugular venous pressure, low blood pressure) and pulsus paradoxus (a decrease in systolic blood pressure of more than 10 mmHg during inspiration).

Select YES if any documented radiological Signs of cardiac tamponade on echocardiogram or CT.

Based on European Society of Cardiology Publication –https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-15/Cardiac-tamponade-a-clinical-challenge)