Dissection of the Thoracic Aorta (Acute) - Full Clinical Guideline

Reference no: CG-CARDIO/2023/016

Introduction

Acute dissection of the thoracic aorta (DTA) is a relatively uncommon but life-threatening emergency, occurring in 1: 350 emergency admissions with chest pain. This guideline covers when to suspect it, immediate investigations and management in adults.

Aim and purpose

To improve the investigation and immediate management of patients presenting with DTA.

Definitions/abbreviations

DTA = dissection of the thoracic aorta

This guideline is for adults only (over 16s) and does **not** cover chronic aortic dissections or ruptured abdominal aortic aneurysms (AAA).

Acute aortic dissection is caused by an aortic intimal tear with propagation of a false channel in the medial layer. Depending on the site and extent of the tear, it may cause pain, collapse, or malperfusion (transient or persistent ischaemia of any organ as a result of arterial branch obstruction).

When to suspect DTA

'Think aorta' whenever a patient presents with pain in the thorax that is:

- Abrupt in onset
- Severe
- Sharp, tearing, 'knife-like' and typically different from other causes of chest pain

The abruptness of onset is the most specific characteristic of DTA. The most common site of pain is in the chest (80%) but it can be in the back (40%), abdomen (25%) or neck. The pain may migrate from its point of origin to other sites, following the dissection path as it extends through the aorta. Syncope occurs in 15% of Type A DTAs.

DTA is often accompanied by complications:

- Aortic regurgitation (40-75% in Type A)
- Pleural effusion which is usually left sided (15-20%)
- Acute kidney injury due to renal hypoperfusion or infarction (10-20%)
- Pericardial effusion or tamponade (<20% Type A)
- Myocardial ischaemia (10-15%)
- Acute heart failure (<10%)
- Neurological complications (<10%) e.g. stroke or paraplegia, which can distract from the underlying cause. In half of cases the neurological symptoms and signs caused by ischaemia can be transient
- Mesenteric or acute limb ischaemia occurs in <5% of patients

Some conditions are risk factors for DTA:

- Marfan's and other connective tissue diseases (e.g. Ehlers-Danlos)
- Known aortic root dilatation or aneurysm
- Coarctation of the aorta
- Aortic valve disease/abnormality or previous valve or aortic surgery

Table 1 shows features that can be used to score the clinical probability of DTA before imaging.

For each feature that is present, the patient scores 1 point.

For example, if the patient is known to have an aortic root replacement (1 point) and presents with an abrupt onset of pain in their chest/back (1 point) and there is a difference between the blood pressure in each arm (1 point) then they score 3 points in total.

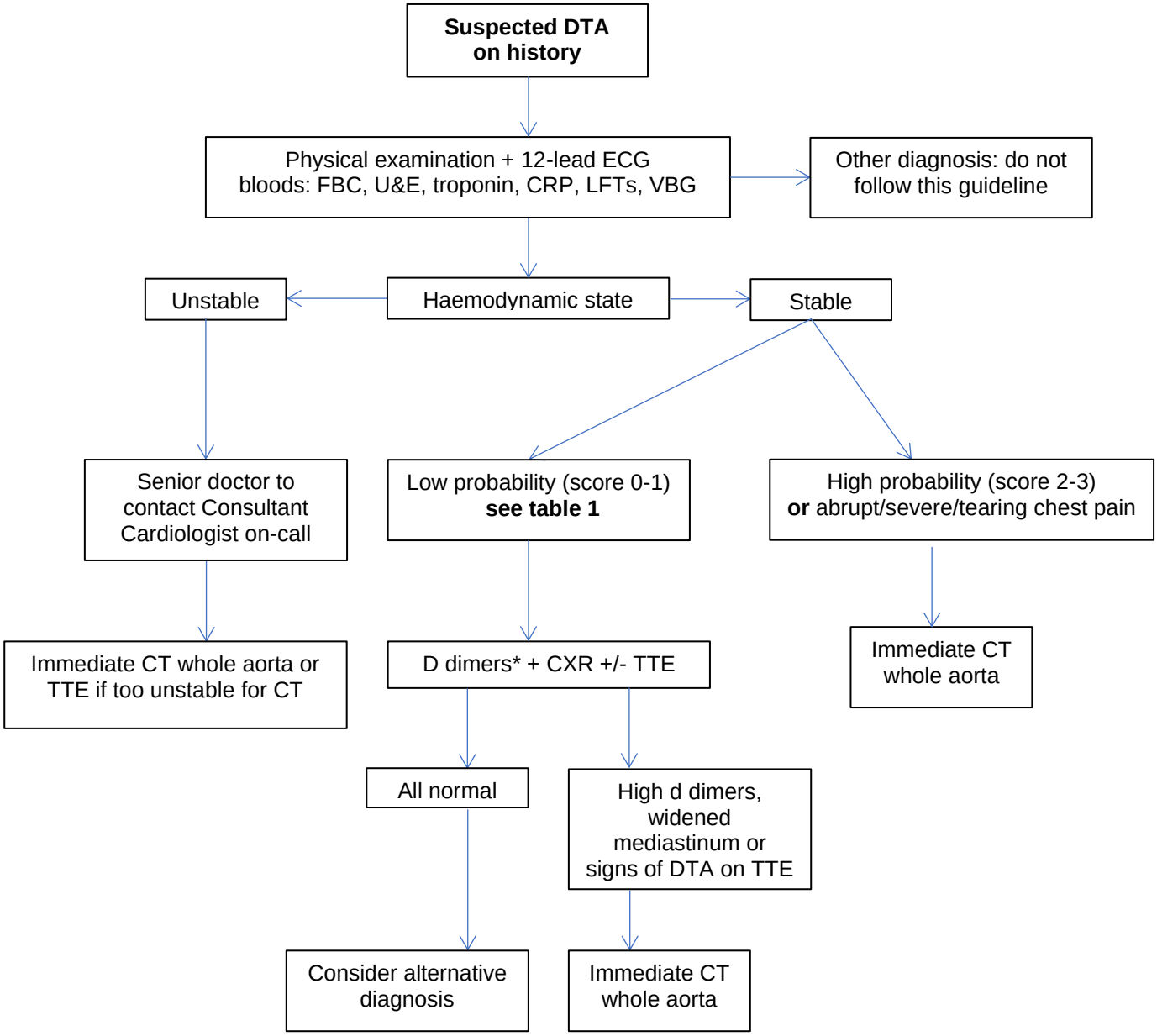
Table 1: clinical data to assess the a priori probability of DTA:

High risk conditions	*High risk pain features*	*High risk examination features*
• Marfan's (or other connective tissue disease) • Family history of aortic disease • Known aortic valve disease • Known thoracic aortic aneurysm • Previous aortic manipulation (including cardiac surgery)	• Chest, back or abdominal pain described as any of the following: ○ Abrupt onset ○ Severe ○ Ripping or tearing	• Evidence of perfusion deficit: ○ Pulse deficit ○ Systolic blood pressure difference ○ Focal neurological deficit (in conjunction with pain) • Aortic diastolic murmur (new and with pain) • Hypotension or shock

What to do if DTA is suspected clinically

A senior doctor **must** personally assess and supervise the management of any patient with suspected DTA. If clinically indicated, this investigations flow chart should be followed and investigations should be requested immediately.

This is NOT a 'chest pain' guideline; this is what to do when you suspect a dissection of the thoracic aorta



*Do not request d dimers in high probability cases.
TTE = transthoracic echocardiogram

If DTA is confirmed, ensure the CT images are immediately transferred to Nottingham University Hospitals PACS system and contact the on-call Cardiothoracic Surgical Registrar or Consultant on-call via Nottingham City Hospital's switchboard.

Immediate management of DTA

All patients with confirmed DTA require immediate medical treatment for pain, heart rate and blood pressure control. Intravenous morphine is recommended to treat chest pain. Intravenous labetalol is the first line agent to reduce heart rate and lower the systolic blood pressure to 100-120 mmHg. If beta-blockers are contraindicated then alterative agents, e.g. GTN infusion, may be used. GTN cannot be used for a prolonged duration as patients rapidly develop tolerance to it, so is only suitable as a bridging treatment pending transfer to cardio-thoracic surgery.

Type A (proximal) aortic dissection

Type A dissections originate in the ascending aorta. Surgery is the treatment of choice. Type A DTA has a mortality of 50% within the first 48 hours without surgery. Perioperative mortality is around 25% and neurological complications occur in around 18% of cases. However, surgery reduces a 1 month mortality from 90% to 30%. The patient should be referred immediately to cardio-thoracic surgery and if accepted should be transferred without delay.

Any treatment that is required (e.g. to lower heart rate and/or blood pressure) should be started without moving the patient to another department as this will only delay their treatment, create an unnecessary handover to another clinical team, and potentially delay their transfer to cardio-thoracic surgery.

Type B (distal) aortic dissection

Type B dissections originate in the descending aorta, distal to the left subclavian artery. In the absence of malperfusion or signs of early disease progression, Type B DTA is managed medically. The patient should be referred immediately to the Consultant Cardiologist on-call and transferred to CCU for therapy to control pain, heart rate and blood pressure, with close surveillance to monitor for signs of malperfusion or disease progression. Repeated imaging may be necessary.

Intravenous labetalol

Intravenous labetalol can be obtained in an emergency by dialling 3333 (emergency Pharmacist). It should also be available in Resus. Labetalol is available in 20ml ampoules each containing 100mg of labetalol (100mg in 20ml). In severe hypertension, a ‘stat’ dose of 50mg may be given (slow bolus over 2 minutes) by a doctor. A continuous infusion is administered at 15-120mg per hour, adjusted according to clinical response. 40ml of labetalol should be drawn up through a filter needle in to a 50ml syringe and administered via a pump. Patients should be in the supine position when receiving intravenous labetalol and for 3 hours afterwards (due to the risk of excessive postural hypotension).

Labetalol infusions for DTA can be administered in the Emergency Department (Resus) and the Medical Assessment Unit. In cases of acute DTA outside CCU, the patient should be on a cardiac monitor and have 15 minute blood pressure measurements. A senior doctor should personally supervise treatment and a competent doctor/ACP should remain with the patient in order to adjust the infusion and monitor the patient, pending transfer to either cardiothoracic surgery or CCU.

Transfer of patients to cardiothoracic surgery

If the patient is accepted by cardiothoracic surgery, transfer should occur without delay by blue light ambulance. Please be aware that EMAS cannot guarantee a paramedic ambulance and only paramedic ambulances carry opioid analgesia. Infusions must only be stopped for clinical reasons and never stopped because of an ambulance transfer to cardio-thoracic surgery. A suitably trained member of staff should accompany the patient in order to monitor their pain, heart rate and blood pressure every 15 minutes and adjust the infusion accordingly. This person

should verbally hand over the patient to the cardio-thoracic team. Photocopies of all clinical notes including observation charts should accompany the patient. The Trust is expected to organise a taxi back to Royal Derby Hospital if the ambulance crew cannot bring the member of staff and infusion pump back.

A suitably trained member of staff means someone with the experience and skills to monitor the patient, adjust the infusion or give other treatment and hand over medical information to the receiving team. This will usually be a senior nurse (if with a paramedic crew), or a qualified ACP or core trainee or above (if with a non-paramedic crew).

References

2014 European Cardiology Society Guidelines on the diagnosis and treatment of aortic diseases. European Heart Journal 2014; 35: 2873–2926. doi:10.1093/eurheartj/ehu281

University Hospitals of Derby & Burton NHSFT. Labetalol drug monograph for use on adult intensive care units. Reference: CG-ICU/2019/014.

Documentation controls

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Approved By:	Cardiology/ED/Acute Medicine ACDs: 7/2/20 Reviewed no change - Dr Cooper - Dec 23 Medical Division:
Review Date:	December 2026
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Key words: dissection, thoracic dissection, dissection of thoracic aorta, labetalol.