Supplementary materials

Case series

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
1 ***2011-2012***	<70 M	Numb, weak left leg, GCS 9 and combative. Intubated & ventilated; admitted to ICU.	No	Not done	Antero-posterior film, difficult to interpret mediastinum size	10 hours	Acute-on-chronic Type A dissection involving the aortic root and ascending aorta. Suspicion of dissection extending to the bifurcation.	Unknown	Unknown (Limited notes available)
2 ***2011-2012***	≥70 F	Jaw pain and chest pain radiating to the back. Differential BP in arms.	No	Not done	Normal	5 days	Type A aortic dissection extending from the aortic valve to both common iliacs. Large pericardial effusion, bilateral pleural effusions and poor perfusion of the kidneys.	Unknown intervention, survived	Unknown (Limited notes available)
3 ***2011-2012***	≥70 F	Sudden onset lower left sided pleuritic chest pain	No. Suspected PE. Given therapeutic LMWH. Admitted medics for CTPA following morning	3539 (positive)	Large left sided mediastinal mass, small left basal effusion (similar to 2009)	12 hours	Ruptured descending thoracic aortic aneurysm	Palliative management, died on day 3.	No evidence of consideration of AAS. Satisfied by alternative diagnosis of probable PE.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
4 ***2013-2014***	<70 M	Moderate 'choking' neck pain prior evening, then woke with severe central chest heaviness, worse deep inspiration.	No. Suspected ACS but normal initial ECG and troponin. Admitted Medics. Cardiac arrest on ward, intubated, admitted to ICU.	Not done	Abnormal right mediastinal contour in keeping with widening of the aortic root (similar to previous)	8 hours	Type A aortic root dissection. Large pericardial haematoma/ effusion with associated tamponade.	Died in theatre 10 hrs after ED presentation	No evidence of consideration of AAS. Symptoms atypical ('heaviness'). Felt exclusion of ACS all that was necessary.
5 ***2013-2014***	≥70 F	Central chest pain and tightness radiating to back, worse bending forwards, new fast AF. Hypotensive.	No. Treated as ACS and LRTI.	206 (negative)	Normal	24 hours	Thin intramural haematoma in the descending aorta which may be due to an aortic dissection without an intimal tear.	Medical management, survived	No evidence of consideration of AAS. Lack of recognition of the history and of an episode of prehospital haemodynamic instability.
6 ***2013-2014***	<70 M	Sudden onset mild chest tightness followed by palpitations. Presyncope, hypotension. Ejection systolic murmur radiating to carotids. Family history of AVR.	No. Discharged and arranged to come back next day for urgent TTE for ?aortic stenosis. Found AAS on TTE.	Not done	Signs of mild congestive heart failure	16 hours	Type A aortic dissection	Surgical repair, survived	No evidence of consideration of AAS. Symptoms atypical for AAS ('tightness'). Attributed to suspected aortic stenosis.
7 ***2013-2014***	≥70 M	Sudden onset severe sharp, gripping left sided chest pain.	No. Suspected ACS, nil acute on ECG,	Not done	Possible interval enlargement	15 hours	Type B aortic dissection with intramural haematoma	Medical management, survived	No evidence of consideration of AAS.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
			normal initial troponin. Admitted Medics for repeat troponin.		in the mediastinal contour				Felt exclusion of ACS all that was necessary.
8 ***2013-2014***	<70 M	Sudden onset chest and epigastric pain at rest, vomiting	No. Suspected ACS, normal initial ECG and troponin. Admitted for repeat troponin. Discharged by medics ?GORD. Reattended ED 5 days later with ischaemic right hand. Referred to Vascular surgery. AAS still not considered.	Not done	Unfolding of the thoracic aorta, but similar to previous	Post mortem diagnosis	N/A	Death 5 days after ED presentation. (Unknown whether type A or B dissection from post mortem)	No evidence of consideration of AAS on either presentation. Felt exclusion of ACS all that was necessary.
9 ***2013-2014***	<70 M	Syncope/seizure, hypotensive, right leg neurological deficits and weak pulse	Yes, considered, but not pursued	Not done	Normal	9 hours	Type A aortic dissection on background of 7.5 cm aneurysmal ascending aorta.	Surgical repair, survived	Diagnosis of AAS considered but not pursued in absence of chest/back pain

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
10 ***2013-2014***	≥70 F	Sudden onset atraumatic thoracic back pain, SVT	No. Thought to have thoracic crush fracture (clinically and on XR)	Not done	Unfolding of the thoracic aorta. Large left pleural effusion.	56 hours	Type B dissection, almost completely thrombosed.	BP management, survived	No evidence of consideration of AAS. Felt to have more likely alternative diagnosis (vertebral fracture).
11 ***2013-2014***	≥70 M	Sudden onset interscapular pain radiating to right hip	Seems to have been considered as checked for BP differential and radial-radial delay. More convinced of PE as alternative diagnosis.	6667 (positive)	Thought to show consolidation	5 hours	Acute aortic syndrome with type B dissection, intramural haematoma and haemomediastinum	BP management in ICU. Had a PE and then cardiac arrest - died 11 days after diagnosis.	Clinician considered diagnosis but was satisfied to rule it out on basis of no radial-radial delay or BP differential. More convinced of PE as alternative diagnosis

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
12 ***2015-2016***	<70 F	Syncope/seizure, hypotensive, persisting low GCS, normal CT head. Improving GCS in ED but persisting confusion, slurred speech and (later) leg pain	No. Unclear cause for neurological deficit - differential diagnosis of seizure or CNS infection. Admitted medics for observation. Developed abdominal pain, lower limb neurology and shock on ward. Intubated. CT chest, abdomen, pelvis arranged.	Not done	Non-specific increased opacification both lung bases	14 hours	Aortic dissection, probably arising at the level of the left subclavian artery, with retrograde extension occluding the left common carotid artery...possibly extends into the ascending aorta. Antegrade extension into the abdominal aorta... Extensive infarction and swelling in brain.	ICU admission, impression unsurvivable pathology, life support withdrawn in ICU, death 21 hrs after ED presentation	No evidence of consideration of AAS. Atypical presentation without pain and limited history (low GCS). Only primary neurological causes considered.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
13 ***2015-2016***	<70 M	Sudden onset right flank pain & vomiting. Marfan's syndrome.	No. Thought to be renal colic. Admitted medics for imaging as not settling, US showed "Incidental ectasia of the abdominal aorta to 4cm at the level of the coeliac axis". Discharged by medics. Re-presented to ED feeling generally unwell. Readmitted ?infective endocarditis in context of AVR.	Not done	Cardiomegaly	1 week	Type B aortic dissection extending from the upper abdominal aorta proximal to the coeliac axis to the right common iliac artery	BP management, survived	No evidence of consideration of AAS. Atypical presentation with flank pain. US considered to be adequate assessment of aorta.
14 ***2015-2016***	≥70 M	Sudden onset lower back/right flank pain	No. Thought to be renal colic	Not done	Not done	18 hours	Acute aortic syndrome with penetrating ulcers in the aorta and right common iliac artery, and intramural haematoma.	Thought to be mycotic. Antibiotics and surgical intervention. Survived.	No evidence of consideration of AAS. Atypical symptoms. History suggestive of renal colic.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
15 ***2015-2016***	≥70 M	Chest pain. Complete heart block on ECG with lateral ST depression	No. Thought to be ACS	Not done	Abnormal widening of mediastinum & left pleural effusion	14 hours	Type B aortic dissection, contained leak from thoracic aorta	Medical management, survived	Possibly considered AAS but inappropriately reassured by equal bilateral pulses. ECG findings supportive of ischaemic myocardium.
16 ***2015-2016***	≥70 M	Sudden onset central chest pain at rest. Intermittent, worse on deep inspiration. Hypertensive, tachycardic 115bpm. Ischaemic ECG	No. Raised troponin and ACS diagnosed. Medics found hypoxia, requested CTPA for ?PE	297 (positive)	Bilateral lower zone patchy airspace opacification , suggestive of infection	CTPA 15 hours later, CT aorta 18 hours later	Type B thrombosed descending thoracic aortic dissection, acute/subacute intramural haematoma with a small descending aorta atherosclerotic penetrating ulcer, localised persisting dissection.	Medical management, survived	No evidence of consideration of AAS. Symptoms typical but ED clinician led by ischaemic ECG and raised troponin to diagnosis of ACS.
17 ***2015-2016***	<70 M	Sudden onset central chest pain radiating to back of neck and diaphoresis. Pain was 6/10; down to 1/10 on arrival. Ischaemic ECG - not for cath lab as pain settled	No. Diagnosed ACS. Previous stents and CABG, HTN, strong Family history IHD. Admitted coronary care unit as NSTEMI. AAS suspected in cath lab/TTE.	Not done	Cardiomegaly	27 hours	Type A aortic dissection extending from the root of aorta to the origin of the left CCA, small pericardial effusion.	Unknown	No evidence of consideration of AAS. Under-recognition of suggestive features in history.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
18 ***2015-2016***	≥70 F	Severe abdominal/ flank pain, dull and constant. Worsened by movement/bending. Feverish. AVR last year. Known large vessel vasculitis.	No. Diagnosed pyelonephritis	Not done	Nil acute	36 hours	Dilated aortic root. Extensive thrombus with subsequent thickening of the thoracic aorta. Acute dissection flap at the level of T11 (Type B) with blood tracking down false lumen to infrarenal level.	Medical management, survived this admission	Satisfied with presumed alternative diagnosis of pyelonephritis
19 ***2015-2016***	≥70 F	Sudden onset back and abdominal pain, bilateral flank pain radiating round to the left upper quadrant and left shoulder tip.	No. US abdominal aorta done in ED: diameter <2cm throughout. Admitted to surgeons as non-specific abdominal pain. Surgeons concerned about PE - left high flank pain, pleuritic in nature, feeling slightly SOB, tachycardic. Family history of venous thrombosis, Raised D-dimer, arranged CTPA	382 (positive)	Normal	22 hours	Acute intramural haematoma of the descending thoracic aorta, from the left subclavian artery to the level of the crus of the diaphragm.	ICU admission, BP control. CT 3 days later: progression of the intramural haematoma. TEVAR 2 weeks later. Cardiac arrest 2 weeks later in ED – cause of death thoracic aortic dissection.	No evidence of consideration of AAS. Considered aortic pathology (AAA) but reassured by bedside US.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
20 ***2015-2016***	<70 M	Tight band across chest to the back and jaw, worse leaning forward, previous similar pains ?indigestion. Felt better after vomit. Found unresponsive 6 hours after ED discharge in PEA cardiac arrest	No. ACS excluded.	Not done	Not done	Post mortem diagnosis	N/A	Death 6 hours after ED discharge	No evidence of consideration of AAS Reassured by pain improving. Discharged home.
21 ***2015-2016***	<70 M	Wakened in night by severe chest tightness, like a band across chest radiating through to back, up to neck and down both arms. Known severe AR and HTN	1st troponin ok, 2nd troponin elevated - thought to be ACS. Given ACS treatment. Cath lab 2 days later – AAS detected	Not done	Cardiomegaly	53 hours	Type A dissection of the ascending aorta and arch with involvement of the brachiocephalic trunk, left subclavian and left common carotid arteries	Died <24hrs after diagnosis.	No evidence of consideration of AAS. Symptoms typical but raised troponin led to diagnosis of ACS.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
22 ***2015-2016***	<70 M	Sudden onset central chest pain, radiating to throat, severe, crushing, lasted 3 hours then subsided. Headache, confused and vomiting.	No. ACS suspected. CT head normal. Headache thought to be due to GTN. 2nd troponin elevated (1st normal). Had TTE showing bicuspid aortic valve with severe AR and no evidence dissection. Coronary angiogram normal, so CT aortogram requested.	Not done	AP film, tortuous aorta	70 hours	Type A aortic dissection	Surgical management, survived.	No evidence of consideration of AAS. History more in-keeping with ACS, Trop rise.
23 ***2017-2018***	<70 M	Sudden onset CP whilst driving, 4/10 severity, radiation to jaw, nausea. Hypertensive.	Considered but felt to be unlikely. No D dimer done on 1st ED presentation. Returned 3 days later – positive D dimer. CTPA no PE but small pericardial effusion and pleural effusions. Review 3 days later – CT aorta done	2131 (positive)	Normal	6 days from 1st ED arrival	Type A dissection flap on a dilated ascending aorta with eccentric thrombus on the right side within the false lumen.	Emergency repair, good outcome	AAS considered - checked for radial-radial delay and commented on normal mediastinal diameter on CXR. Discussed with senior - felt AAS unlikely and not pursued

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
24 ***2017-2018***	<70 M	Sudden onset central chest pain at rest, tight/gripping, radiating to back and abdomen, pacing uncomfortable, normotensive	Possible. CXR request stated "?widened mediastinum". ACS ruled out with 2 troponins. Still in pain, reluctant to go home so admitted for ongoing analgesia. Deteriorated on ward – reduced GCS and left sided weakness.	Not done	Normal	15 hours	Extensive type A aortic dissection extending superiorly to involve the carotid arteries and inferiorly to the superficial femoral arteries	Emergency surgery.	Diagnosis considered but reassured by normal CXR.
25 ***2017-2018***	≥70 F	Woke with central chest pain, constricting in nature, radiating to back and jaw, nauseous. ECG ischaemic (but similar on previous ECG).	No. Diagnosed as ACS.	Not done	AP film ?unfolding aorta	8 hours	Small haemopericardium, penetrating plaques in the thoracic aorta, small intramural haematoma.	Survived admission, died 10 days after discharge	No evidence of consideration of AAS. Satisfied with diagnosis of ACS.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
26 ***2017-2018***	≥70 F	Sudden onset 10/10 chest pain, sharp, presyncopal, worse on deep inspiration, resolved with analgesia	Yes. AAS considered vs PE. PE felt to be more likely. Admitted monitored bed, anticoagulation, requested daytime CTPA	3114 (positive)	Normal	8 hours	Aortic intramural haematoma with no evidence of dissection.	Labetalol infusion, interval scan 24 hours no change. Not fit for intervention so no surveillance.	AAS clearly considered but was reassured that pain had settled with analgesia, no radial-radial delay, no neuro deficit. Clinician felt PE more likely.
27 ***2017-2018***	≥70 F	Dizzy/collapse. Known existing aortic ulcer and IMH for conservative management. Chest pain, palpitations and breathless on mild exertion. Very hypertensive.	No. Thought to have a POCS.	Not done	Nil acute	15 hours	Marked increase in the size of the aortic root, with a mural dissecting flap (Type A) and a further separate descending aortic dissection	Managed conservatively. Survived admission	No evidence of consideration of AAS. Satisfied with alternative diagnosis.
28 ***2017-2018***	<70 M	Sudden onset sharp chest pain started 1 day ago, radiating to left side and jaw, worse on deep inspiration and lying flat.	No. Diagnosed pericarditis. Admitted to medics. TTE 3 days later suspicious for aortic dissection, confirmed with CT	Not done	Widened mediastinum (not done in ED)	3 days after ED arrival	Aneurysmal ascending aorta with type A dissection. Haemopericardium with features of CCF.	Transferred for surgical intervention. Died during admission.	No evidence of consideration of AAS.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
29 ***2017-2018***	≥70 F	Sudden pulsing pain in throat then aching epigastric pain radiating across upper abdomen and to mid scapula. With sweating, breathless and right hand numbness. Very hypertensive.	AAS considered and CT aorta requested from ED. Scan reported incorrectly as normal. Next morning consultant checked scan.	Not done	Unfolded thoracic aorta	12 hours	Type A distribution of acute intramural haematoma extending into the descending aorta	Labetalol infusion/ BP control. Interval scan no change. Discharge to outpatient follow up in different region	Incorrect CT interpretation overnight.
30 ***2017-2018***	<70 M	Sudden reduced conscious level at home, GCS 10 in Resus, hypotensive, lactate 15, GCS fell to 3. CT head: subtle signs raised intracranial pressure. Treated for CNS infection.	No After admission to ICU, developed ST elevation on ECG. Dissection discovered during PCI	Not done	Unremarkable.	7 hours	Type A aortic dissection with extension into multiple arteries, including both carotid arterial systems, and SMA, with associated complete obstruction from mid-SMA	Refractory cardiogenic shock – palliative care. Died 11 hours after ED presentation	No evidence of consideration of AAS in undifferentiated shock with reduced conscious level. When CT head non-diagnostic, assumed to be CNS infection.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
31 ***2017-2018***	≥70 F	Sudden onset central chest pain whilst brushing teeth. With vomiting and diaphoresis. Syncopal at home. Cold peripherally. ECG: minimal ST elevation, biphasic T wave. Troponin normal, raised white cell count.	No. Thought to be infective gastritis with syncopal episode Admitted medics. Small troponin rise. Cardiology review: likely ACS. Type A dissection detected during PCI	Not done	Unremarkable.	36 hours	Type A aortic dissection with extension into the left common carotid and left brachial cephalic artery.	Emergency aortic dissection repair with perioperative multi-focal infarcts. Good recovery.	No evidence of consideration of AAS.
32 ***2017-2018***	≥70 M	Sudden onset pain neck to abdomen, clammy, vomiting, brief speech disturbance, pain improved a bit with morphine.	Yes – was considered, CXR request "?widened mediastinum" bilat BPs checked (no difference). Felt to be oesophageal spasm. Returned later with worsening abdominal pain, increasing lactate, looking unwell – referred to General Surgery with ?perforation.	Not done	Mediastinum appears widened compared with previous CXR.	3 hours after 2nd ED arrival (12hrs after 1st ED arrival)	Extensive Type A aortic dissection with complete occlusion of various segments of descending aortic lumen and extension of dissection flap into carotid arteries	Emergency surgery. Died post-op 24 hours after initial ED presentation	AAS considered but seem to have been diverted from diagnosis due to absence of radial-radial delay and pain being abdominal. On re-presentation felt to have a surgical abdomen.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
33 ***2017-2018***	<70 M	Sudden onset severe epigastric pain, known dilated aortic root. Pain-free after analgesia hours later. Fast AF.	Considered by first doctor. Senior review felt unlikely and not scanned. Admit medics as AF ?ACS. Post-take review next morning requested CT abdomen/pelvis ?surgical pathology – seemed unaware of dilated aortic root	Not done	Unfolding of the thoracic aorta unchanged.	10 hours	Type B aortic dissection ending at level of coeliac axis. Unclear whether acute or chronic. Retroperitoneal haematoma felt to be unrelated.	BP control, home with Vascular follow-up – surveillance approach	AAS considered. Seem to have been reassured by absence of radial-radial delay and nil acute on CXR.
34 ***2019-2020***	<70 F	Sudden onset sharp upper back pain whilst walking, persisting, worse on movement and lying down, anxious Recent posterior STEMI with PCI	No – "?NSTEMI, posterior MI, pericarditis, PE" D dimer elevated so CTPA requested following morning, and reported normal. Cardiology requested CT aorta.	357 (positive), 2200 on repeat	Mild unfolding of the thoracic aorta and cardiomegaly, otherwise the cardio-mediastinal contour is grossly normal.	25 hours	Extensive Type B aortic dissection originating from just distal to left subclavian to the left common iliac	Medical management, survived	No evidence of consideration of AAS despite typical symptoms. Diverted by recent MI and felt to be related to this, or PE.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
35 ***2019-2020***	<70 M	Sudden onset sharp left sided chest pain whilst walking. Nausea and vomiting. Unable to keep walking. Ischaemic ECG.	No. Treated as NSTEMI and transferred for urgent angiogram – suspicious for AAS	Not done	Not done in ED	90 mins	Type A aortic dissection involving the right internal carotid artery and extending distally to the right internal and external iliac arteries. Normal major abdominal organ arterial supply. Haemopericardium.	Emergency surgery, ICU post-op, survived	No evidence of consideration of AAS. Symptoms typical but ED clinician led by ischaemic ECG to diagnosis of ACS (though troponin normal).
36 ***2019-2020***	<70 F	Sudden onset central chest pain, stabbing, worse on deep inspiration, clammy, vomited, rolling around in bed,	No. Presumed oesophageal spasm. Normal troponin, normal ECG, AKI ?cause. Admitted medics for pain control. Given LMWH on basis of elevated D dimer, but patient deteriorated overnight waiting for CTPA and CT aorta organised	73000 (done on ward) (positive)	Normal	14 hours	Type A dissection of the thoracoabdominal aorta complicated by rupture into the mediastinum and pericardium. Large volume acute mediastinal haematoma compresses and almost completely occludes the main pulmonary arteries. Small volume haemopericardium.	Emergency surgery, survived	No evidence of consideration of AAS despite typical symptoms and acute kidney injury.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
37 ***2019-2020***	≥70 F	Sudden onset chest pain while opening a can, sharp and dull in nature, central, not radiating. Hypoxic.	No. ?ACS ?PE - D dimer elevated so anticoagulated and CTPA requested and admitted medics.	2560 (positive)	Not done	15 hours	Intramural haematoma extending from the aortic arch just distal to the great vessels into the descending thoracic aorta.	Survived admission. Re-scanned 2 weeks later - extension of IMH so underwent surgical intervention	No evidence of consideration of AAS. Satisfied with presumed diagnosis of PE in view of elevated D dimer.
38 ***2019-2020***	≥70 F	Tooth pain and right scapula pain; also developed chest pain about 2 hours after being in ED	No. Suspected PE in view of high D dimer	3770 (positive)	Widened mediastinum	10 hours	Type A aortic dissection arising from aortic root with aneurysm of ascending aorta up to 6cm. Pericardial effusion/ haematoma. Right carotid reduced perfusion due to large dissection flap, left kidney reduced perfusion from false lumen	Death during admission without surgical intervention	No evidence of consideration of AAS. Satisfied with presumed diagnosis of PE in view of elevated D dimer. No recognition of widened mediastinum on CXR.
39 ***2019-2020***	<70 M	Sudden onset chest pain radiating to L arm when bent forwards, worse on deep inspiration, no shortness of breath	No. Normal ECG and troponin. Diagnosed costochondritis	Not done	Normal	Post-mortem diagnosis	N/A	Death	No evidence of consideration of AAS. Satisfied with exclusion of ACS and normal CXR.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
40 ***2019-2020***	<70 M	Sudden onset sharp chest pain and SOB/cough, worse on inspiration, clammy/sweaty. In AF. Lactate raised.	No. Admitted as ACS, TTE showed severe AR and dilated aortic root	Not done	Appearances consistent with possible COVID-19 infection	30 hours	Type A aortic dissection extending from the level of the aortic valve down to the left external iliac artery. The aortic root is aneurysmal measuring approximately 5.9 cm in diameter. Incidental finding lung tumour.	Conservative management in view of concurrent new lung cancer diagnosis for palliative management. Survived this admission.	No evidence of consideration of AAS.
41 ***2019-2020***	≥70 F	Sudden onset dizziness and tiredness, feeling of impending doom, no CP or SOB, 4/7 worsening leg oedema, periorbital swelling. Complete heart block.	No. Diagnosis symptomatic bradycardia secondary to complete heart block. Cardiologists did TTE - suspicious of dissection flap.	Not done	Nil acute	13 hours	Type A dissection of the ascending thoracic aorta with marked dilatation of the artery at the level of the dissection of 6.2 cm maximum diameter.	Survived this admission with conservative management	No evidence of consideration of AAS. Satisfied with alternative explanation for symptoms - CHB. Atypical presentation; no pain.
42 ***2019-2020***	≥70 M	Central chest pain whilst moving barrels in garden, heavy, no radiation, worse on movement and deep inspiration. Improved in ED, discharged. Returned following day feeling clammy/dizzy then collapse	Not on first attendance - ACS excluded and discharged. Diagnosis made correctly on repeat attendance.	Not done	Cardiomegaly	17 hours	Type A aortic dissection with a large volume haemopericardium	Surgical intervention, survived	No evidence of consideration of AAS. Satisfied with exclusion of ACS and alternative diagnosis of MSK pain in context of history.

Case *Year*	Age Group (years) /Sex	Presentation	Was AAS considered in ED? Alternative?	D dimer	Chest X-Ray findings	Time to Diagnosis (to nearest hour, after ED arrival)	CT aortogram findings	Outcome	Reason for miss in ED
43 ***2019-2020***	<70 M	Chest pain onset as bent forward to lift something, radiating to left arm, worse on deep inspiration. Ejection click heard - for outpatient TTE.	No. Diagnosed costochondritis. ACS excluded.	Not done	Normal	Post Mortem diagnosis	N/A	Died 6 days after ED attendance. PM report ruptured aortic dissection	No evidence of consideration of AAS. Satisfied with exclusion of ACS.
No. of cases with missing data	0	0	0	32	4	0	4	3	0

Abbreviations

AAA	Abdominal aortic aneurysm
AAS	Acute aortic syndrome
ACS	Acute coronary syndrome
AF	Atrial fibrillation
AR	Atrial regurgitation
AVR	Aortic valve replacement
BP	Blood pressure
CABG	Coronary artery bypass graft
CNS	Central nervous system
CT	Computed tomography
CTPA	CT pulmonary angiogram
CXR	Chest X-Ray
ECG	Electrocardiograph
ED	Emergency Department
ESM	Ejection systolic murmur
GCS	Glasgow coma score
GTN	Glycerin trinitrate
HTN	Hypertension
ICU	Intensive care unit
IMH	Intramural haematoma
LMWH	Low molecular weight heparin
LRTI	Lower respiratory tract infection
MSK	Musculoskeletal
NSTEMI	Non-ST elevation myocardial infarction
PCI	Percutaneous intervention
PE	Pulmonary embolism
PEA	Pulseless electrical activity
POCS	Posterior Circulation Syndrome
SMA	Superior mesenteric artery
STEMI	ST elevation myocardial infarction
SVT	Supraventricular tachycardia
TEVAR	Thoracic Endovascular Aortic Repair
TTE	Trans-thoracic echocardiogram
US	Ultrasound