AME Medical Book 1A020

Acute Aortic Syndromes

Editors:
Paul Schoenhagen
Eric E. Roselli

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Acute Aortic Syndromes

Acute aortic syndromes (AAS) are a group of medical/surgical emergencies associated with significant mortality despite recent advances in management (1). Following initial clinical assessment, imaging is critical for rapid, and definitive diagnosis (2-10). Because of its speed of image acquisition, widespread availability, and superior image quality, CT is the imaging modality of choice. Final interpretation is typically performed by radiologists, but analysis of specific CT imaging details is necessary for a wider group of health care professionals to directly guide treatment decisions. The modern aortic team involves multiple subspecialties including Cardiovascular Imaging, Cardiovascular Surgery, Vascular Surgery, Cardiology, Anesthesiology, and Nursing, all of whom have point of care access to the images and are involved in their interpretation (11-16).

This book is a visual introduction to interpreting CT image findings in patients with acute aortic pathology. More than 120 representative cases are presented from patients admitted to a state of the art acute aortic treatment center specializing in advanced aortic care. The case presentations include clinical information, imaging findings, and management decisions. Each case is accompanied by a key image and representative movie files.

The clinical cases are organized to emphasize important lessons about making accurate diagnoses and to facilitate identification of specific pathologic and morphologic details. Initial cases demonstrate how to differentiate AAS from false positive findings, including imaging artifacts and other pathologies (differential diagnosis). Subsequent cases of patients with AAS are organized by pathology and by segmental anatomic location along the aorta proximal to distal (i.e., root to infrarenal segment).

This atlas is intended to be an introduction to a very complex group of medical conditions from an imaging perspective. The highest quality of care for aortic diseases should be delivered by a multi-disciplinary team of experienced healthcare providers dedicated to the understanding, pathology diagnosis, and treatment of aortic pathology based on current clinical guidelines (17-21).

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He received his medical degree from the Eberhard Karls Universitaet, Tuebingen, Germany and doctoral degree from the the Philipps-Universitaet, Marburg, Germany. He received clinical training in Cardiology and Radiology in Stuttgart, Germany and at the Cleveland Clinic, US and assumed a staff position at the Cleveland Clinic in 2003.

His clinical interest is focused on cardiovascular imaging with computed tomography and magnetic resonance imaging for cardiac and aortic disease. Dr. Schoenhagen has been honored for his clinical research focused on computed tomography and magnetic resonance imaging in the context of aortic disease and transcatheter aortic valve replacement (TAVR), as well as implications of plaque vulnerability, using intravascular ultrasound. He has published numerous original and review articles in leading peer-reviewed journals and is first author of textbooks of Cardiovascular Computed Tomography and Coronary Intravascular Ultrasound Imaging. He has been invited to present at medical conferences in the United States, Asia, and Europe.

Dr. Eric Roselli, MD, is a Staff Surgeon at the Department of Thoracic and Cardiovascular Surgery in the Cleveland Clinic and Director of the Aortic Center, Heart and Vascular Institute, Cleveland Clinic Foundation. Dr. Roselli did his undergraduate work at the University of Michigan where he received the David J. Hallisey Memorial Academic Scholarship. He received his medical degree from Loyola University Chicago Stritch School of Medicine. Then he completed residencies in both surgery, and thoracic and cardiovascular surgery at Cleveland Clinic followed by additional training in catheter-based interventions and endovascular surgery. He was appointed to Cleveland Clinic in 2005 in the Department of Thoracic and Cardiovascular Surgery.

He has authored or co-authored several book chapters and articles in peer-reviewed journals on root, arch, and thoracoabdominal aortic aneurysms, endovascular aortic surgery, reoperative cardiac surgery, aortic valve disease, cardiac tumors, cardiac CT, atrial fibrillation, and transcatheter aortic valve development. Dr Roselli participates in the peer review process as a reviewer for prestigious medical journals.

Dr. Roselli's research is focused on thoracic aortic dissection and aneurysms, and aortic valve and multi-valve disease. Specifically, his projects are directed at improving and developing safer and less invasive approaches to treat these problems. He is regularly invited to present his research at medical and surgical conferences worldwide.

Dr. Roselli is a fellow of the American College of Surgeons and a member of the American College of Cardiology. He has served as a chairman and member of the program committee for multiple national meetings, co-authored practice guidelines for the treatment of cardiovascular diseases, and is an active member of the American Association for Thoracic Surgery and the Society of Thoracic Surgeons. He is also a member of the International Society of Minimally Invasive Cardiac Surgery and is Chair of the Committee on Post-graduate Education for the Joint Council on Thoracic Surgical Education.

About the artist

Dr. Anthony P. Yim had an enviable education, surgical training, and later career. He received his secondary school education from a local Jesuit School, the Hong Kong Wah Yan College. In 1975, he went to Merchant Taylor's School in England for his Sixth Form education which led him to be admitted to Queens' College, Cambridge in 1978 to study medicine. Having graduated from Cambridge with double First Class Honors in Medical Sciences Tripos (Part II Pathology), he was admitted to Oxford University Medical School on the Hobson Memorial Scholarship, where he graduated with distinction. He pursued a career in cardiothoracic surgery and was trained in some of the top medical institutions, both in UK and USA. He returned to Hong Kong in 1992 to join the Department of Surgery at the Chinese University of Hong Kong. He pioneered the development of Minimally Invasive Thoracic Surgery or keyhole surgery of the chest, which earned him a widely acclaimed international reputation. He was promoted to be the Chief of Cardiothoracic Surgery in 1995, and Chair Professor of Surgery in 2002. In 2017, he decided to give up his highly successful career as a surgeon to pursue after his childhood dream of becoming an artist.

Artist's statement

This painting is taken from a set of three on the same theme. I was experimenting using Chinese ink and colour on gold card paper instead of the conventional Xuan paper. The biggest technical challenge is to get the paint to stick to the smooth, shinny surface of the card paper. Acrylic paint would have been easier but it lacks the fluidity of the Chinese medium. The title of the painting is 2017.12.24 as I name my abstract painting by the date of completion, and in this case, last Christmas Eve. Abstract paintings allow viewers to use their imagination, and giving it a worldly name would defeat the purpose of its existence.

Editor's comment

We noticed the striking similarities between the painting and the typical findings from immunohistochemistry slides of patients who present with acute ascending dissection where the bright blue staining represents the pathologic accumulation of the proteoglycans aggrecan and versican recently discovered to be present in massive amounts by our research team including Dr. Roselli and others at the Cleveland Clinic.

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1.1 Type-A aortic dissection: PEA arrest

H&P

A 40-year-old man with a history of hypertension who was transferred from Affiliated Hospital emergently after the discovery of a type-A aortic dissection extending from the aortic valve to the iliac bifurcation. Patient arrived to cardiac intensive care unit (CICU) in extremis after a period of cardiopulmonary resuscitation at the Affiliated Hospital prior to transfer.

CT

Type A aortic dissection with dissection flap extending from the aortic valve to the iliac bifurcation:

(I) Coronaries of true lumen;
(II) Small true lumen;
(III) Diameter proximal ascending aorta 5.7 cm;
(IV) Dissection involves entire aorta;
(V) Apparent prolapse of non-coronary cusp of aortic valve and dissection flap, with suspected large regurgitant orifice, likely severe AI;
(VI) Dilated LV;
(VII) Small pericardial effusion.

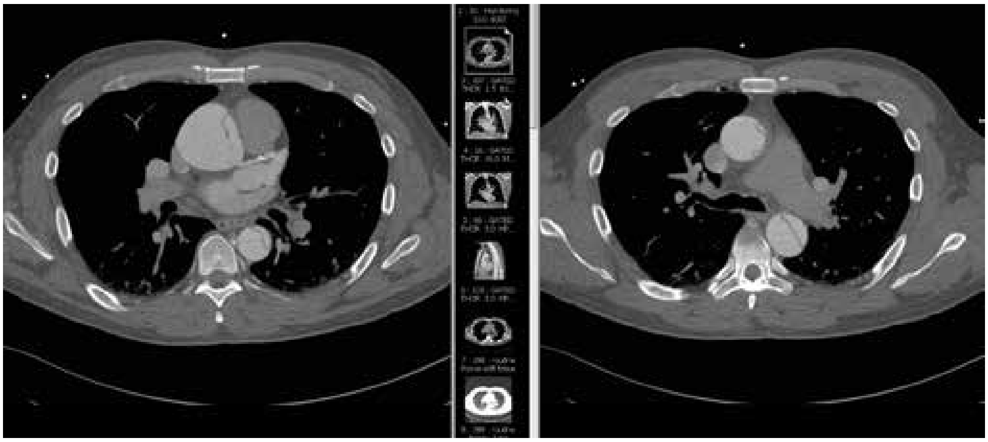
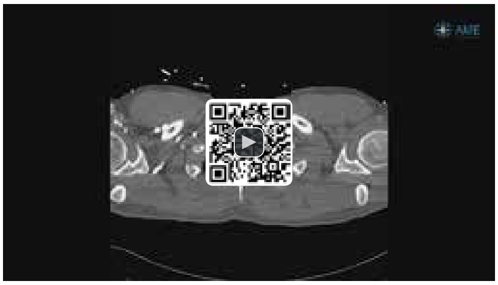


Figure 1 Images show dissection flap in the aortic root (left panel) with compressed true lumen ascending aorta.



Video 1 Images demonstrate extent of aortic dissection. Available online: http://www.asvide.com/article/view/23471

Diagnosis

Type-A aortic dissection.

Management

Shortly after arrival the patient developed pulseless electrical activity. He was treated aggressively with advanced cardiovascular life support (ACLS) protocol resuscitation but ultimately expired.

Outcome

Exitus letalis (1).

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1.2 Motion artifact ascending aorta

H&P

A 42-year-old male presents with recent episode of left parasternal pain/pressure and subsequent reported blood-tinged sputum.

He reports a short episode of left parasternal pressure radiating to left shoulder a few days ago, which occurred while driving and spontaneously resolved after ~5 mins. Has been chest pain free since, but over last 2 days has had blood-tinged sputum from his chronic cough (which is otherwise unchanged).

Initial evaluation in ED with CT to rule out PE. Scan was negative PE but was suspicious for intimal flap in ascending aorta.

CT

Appearance of focal intimal flap in the medial aspect of the mid-ascending aorta. Differential diagnosis includes motion artifact versus focal intimal uplifting. Assessment is limited in the CT, which is acquired without ECG-synchronization.

Repeat CT with ECG-synchronized = gated CT clears suspicion of flap.

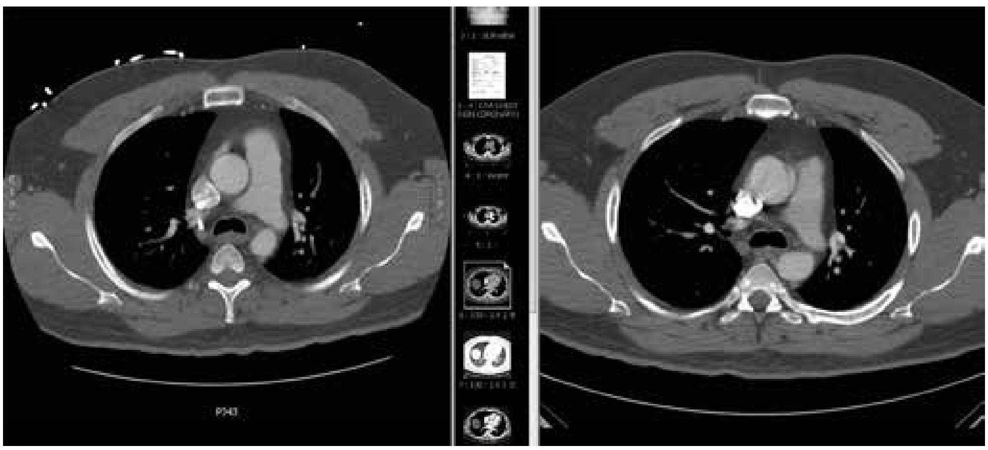


Figure 1 Right and left panel show non-ECG synchronized (right) and ECG-synchronized (left) CT scan at the level of the mid ascending aorta. Note appearance of flap in the non-synchronized study.

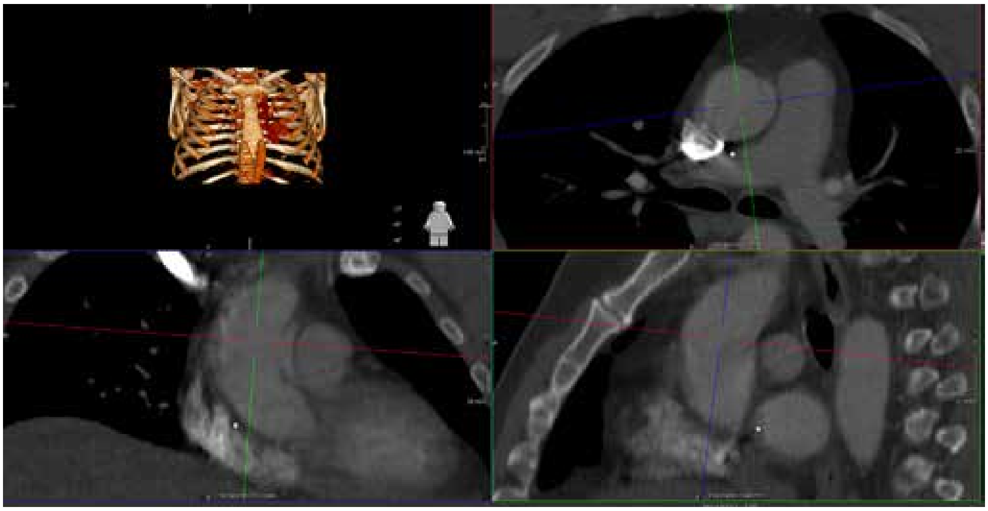


Figure 2 Above shows 3-D reconstruction of the non-ECG synchronized CT. The symmetric appearance of the flap (lateral and medial) suggests motion artifact.

Video 1 The non-ECG synchronized CT scan demonstrated the flap-like appearance at the level of the mid ascending aorta.
Available online: http://www.asvide.com/article/view/23903

Video 2 The subsequent ECG synchronized CT scan shows no evidence of dissection.
Available online: http://www.asvide.com/article/view/23904

Diagnosis

Motion artifact ascending aorta.

Management

Medical management.

Outcome

Discharged home with plans for follow-up with primary care physician.

1.3 Suspected aortic dissection on abdominal ultrasound

H&P

A 78-year-old man transferred from OSH for questionable aortic dissection identified on abdominal ultrasound.

Patient presented initially for episodes of bilateral facial numbness, slurred speech and lower extremity weakness. These episodes have been increasing in frequency over the past several weeks. History of paroxysmal atrial fibrillation on sotalol. Anticoagulation with aspirin and clopidogrel therapy only. Associated chest pain.

A stat CT of the head w/o contrast was done which was negative for acute findings.

Because of reported history of contrast allergy, a CTA was not performed prior to transport.

Upon arrival, the patient was hemodynamically stable and in no acute distress. He denied chest pain, abdominal pain, shortness of breath, or palpitations. He reported having a shellfish allergy as well as an IV contrast allergy for which he "swells up" when given contrast. He reports he is premedicated with steroids prior to getting any CT scans.

CT (after pre-medication)

No acute aortic syndrome:

(I) Normal size thoracic and abdominal aorta, with calcified wall changes;
(II) Central and lobar pulmonary arteries show no evidence of PE;
(III) Diffuse, calcified atherosclerotic changes of the coronary arteries, precluding precise assessment with CT;
(IV) Evidence of prior coronary bypass surgery;
(V) Left ventricle: dilated, with—thinning of the basal and mid lateral wall, consistent with scar.

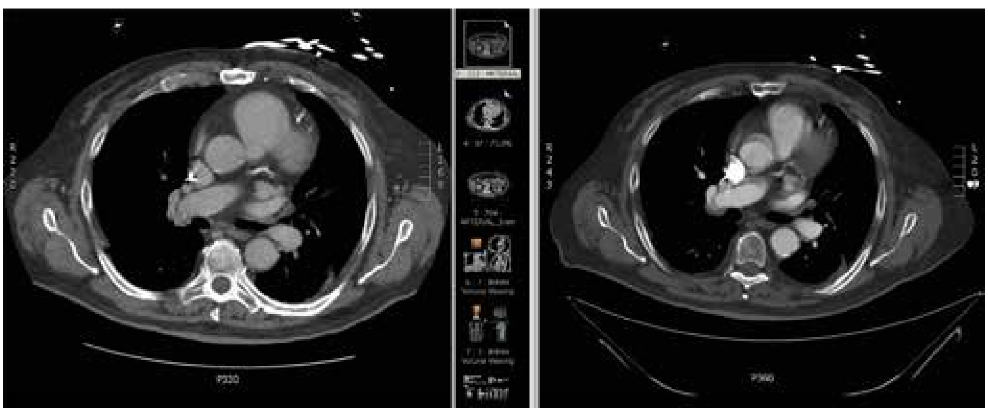


Figure 1 ECG-synchronized ("gated"; left panel) and non-synchronized acquisitions show no evidence of dissection. Note the symmetric motion artifact in the ascending aorta in the non-synchronized acquisition.

Video 1 ECG-synchronized ("gated"; left panel) and non-synchronized acquisitions show no evidence of dissection. Note the symmetric motion artifact in the ascending aorta in the non-synchronized acquisition.
Available online: http://www.asvide.com/article/view/23905

Diagnosis

No evidence of aortic dissection.

Management

Medical Manage anticoagulation for atrial fibrillation.

Outcome

Discharged home with plans for follow-up with primary care physician.

1.4 Differential diagnosis: acute coronary syndrome

H&P

A 56-year-old male with PMH of hypertension:

(I) Presented to OSH ED with squeezing chest pain radiating to his left arm and associated sweating while lifting a box from his car. He took two tablets of aspirin and it went away in few minutes. Similar chest pain recurred 2 hours later with radiation to his back between his shoulder blades which made him to go to ED;

(II) At OSH BP was 190/130. His initial ECG at the time demonstrated a right bundle branch block with precordial T-wave changes and borderline ST elevation in V1 and V2;

(III) TEE reportedly showed questionable aortic tear with anterior wall motion abnormalities;

(IV) On admission patient was not in acute distress, vitals stable with BP 119/74, HR 63/min.

His EKG did not show any acute ischemic changes. Cardiac enzymes were elevated. Bedside Echo showed EF 40% with severe anteroseptal and apical hypokinesis (LAD territory).

CT

No aortic pathology: suspected myocardial perfusion in LAD territory.

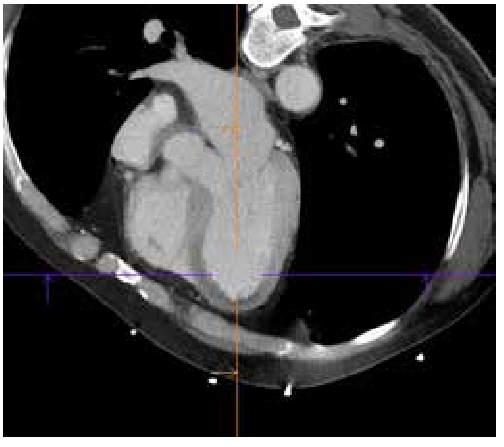


Figure 1 CT shows lower Hounsfield unit at the LV apex, most consistent with perfusion defect.

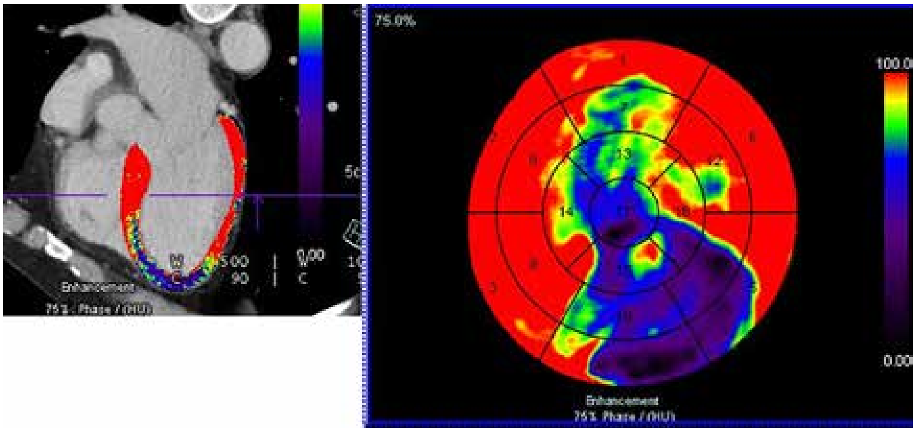
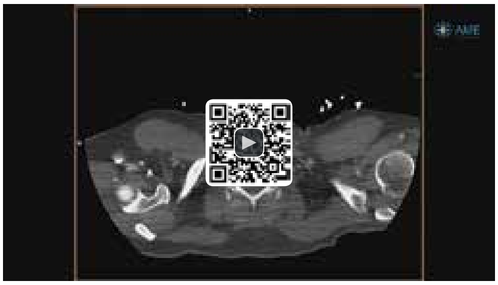


Figure 2 Color coding further highlights the suspected perfusion defect in the LAD territory.



Video 1 Images show normal aortic anatomy and suspected myocardial perfusion defect.
Available online: http://www.asvide.com/article/view/23906

Cardiac catheterization

Coronary anatomy: right dominant.
LMT normal.
LAD proximal LAD 95%; proximal LAD 30%; distal LAD 50%.

Diagnosis

ACS, NSTEMI.

Management

PCI.

Emergent/urgent surgery/intervention

PCI with DES to proximal LAD.

Outcome

Discharged home with plans for follow-up with cardiologist.

1.5 Known TAA: acute ACS with myocardial hypoperfusion

H&P

A 71-year-old female with CAD, admitted to OSH with NSTEMI. Underwent PCI with DES to the LCX. Subsequently was transferred for evaluation of a large descending thoracic aortic aneurysm and stenotic disease of the celiac artery and common iliac arteries.

CT

TAA:

(I) Max. Diameter (level of diaphragm): 6.6 cm;

(II) Severe stenosis of the proximal celiac artery.

Infrarenal abdominal aorta: focal prominence; diameter: 2.4 cm.

(I) Adherent wall thrombus and intimal uplifting with appearance of PAU;

(II) Severe luminal narrowing proximal to the aortic bifurcation.

Iliac arteries: ostial narrowing CIA (about 5 mm).

Diffuse, calcified atherosclerotic changes of the coronary arteries, precluding precise assessment with CT. Stent LCX: LV—suspected hypoperfusion proximal LCX territory (basal inferolateral LV myocardium and papillary muscle).

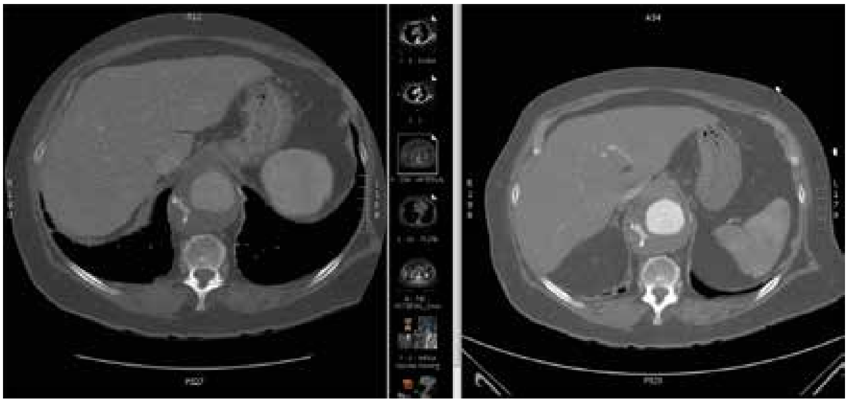
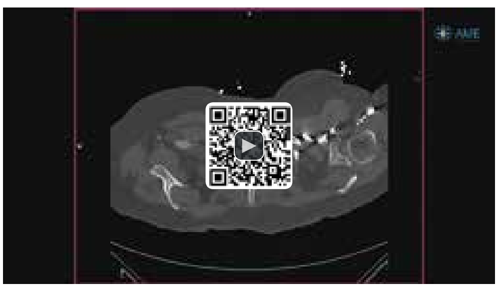


Figure 1 Images show aneurysm at the level of the diaphragm (arterial and venous phase images right and left). There are calcifications within the thrombosed aneurysm sac.

Figure 2 Images of the myocardium show hypodense myocardial segment in the LCX territory, consistent with perfusion defect/recent myocardial infarct.



Video 1 Arterial phase images show TAA with maximum diameter at the diaphragm, stenosis/occlusion of the ostial celiac artery and severe stenotic disease of the common iliac arteries.
Available online: http://www.asvide.com/article/view/23907

Video 2 Venous phase images better show the hypoperfusion in the LCX territory.
Available online: http://www.asvide.com/article/view/23908

Diagnosis

Chronic TAA; recent ACS. Suspected hypoperfusion proximal LCX territory (basal inferolateral LV myocardium and papillary muscle).

Management

Discharge home after recovery from PCI. In setting of recent DES and need for anticoagulation, plan for AAA repair >6 months unless interval change.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

1.6 Differential diagnosis: acute MI with myocardial perfusion defect

H&P

A 69-year-old female developed substernal chest pain radiating to both arms the night prior to admission. She initially ignored it. When she presented for an appointment for an EGD the next morning, she was send to the ED for evaluation of the chest pain. An ECG showed ST elevations in leads V1–V6. A ST elevation myocardial infarction was diagnosed and she was transferred to the catheterization laboratory in the tertiary care center. A total LAD occlusion was identified and she underwent PCI to mid LAD.

CT

Perfusion defect LAD territory, no AAS, no PE.

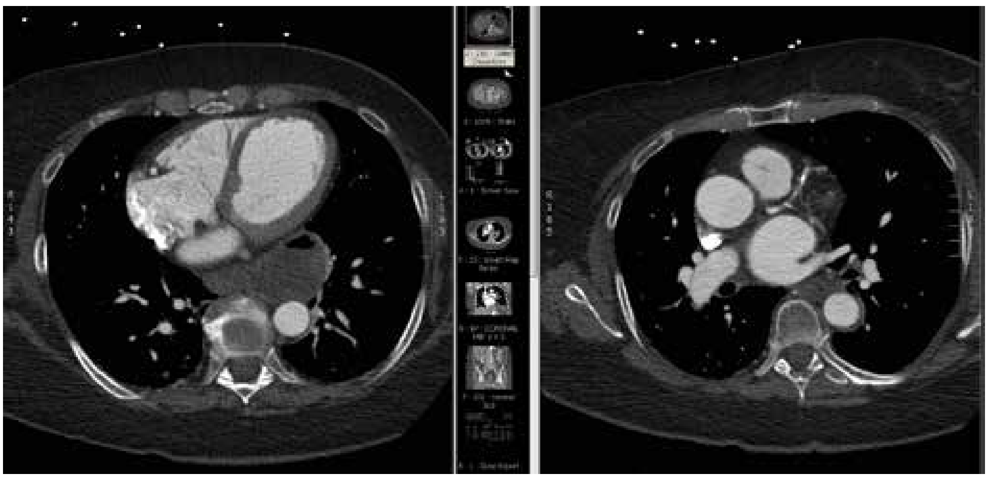


Figure 1 Axial images showing perfusion defect in LAD territory (left panel) and calcified athcerosclerotic changes of the LAD (right panel).

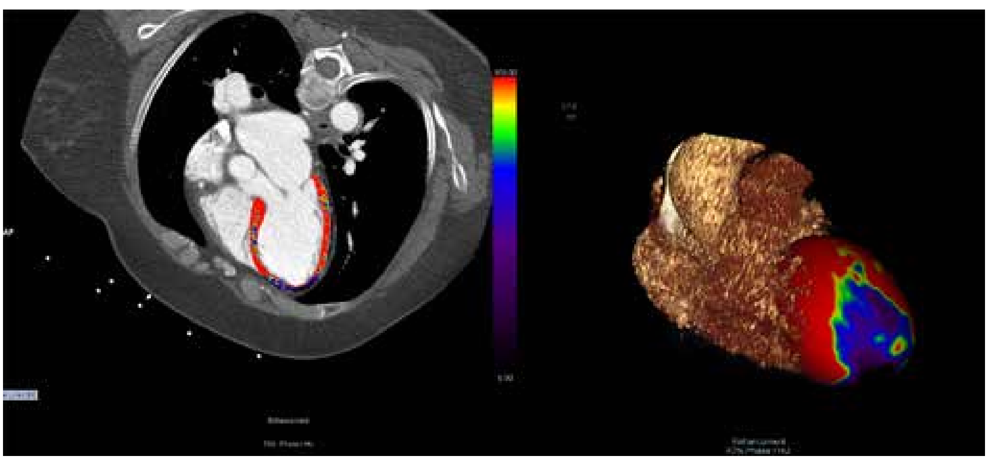


Figure 2 Perfusion images based on HU showing perfusion defect.

Video 1 Images showing perfusion defect in LAD territory. Available online: http://www.asvide.com/article/view/23909

Diagnosis

Acute MI.

Management

PCI.

Outcome

Discharged home with plans for follow-up with cardiologist.

1.7 Submassive pulmonary embolism (PE)

H&P

A 61-year-old male presented to OSH with complaints of persistent exertional SOB and fatigue, which began several weeks ago. He also has noticed a dry cough, some back pain, but no chest pain.

CT

Bilateral lobar pulmonary embolism (PE).

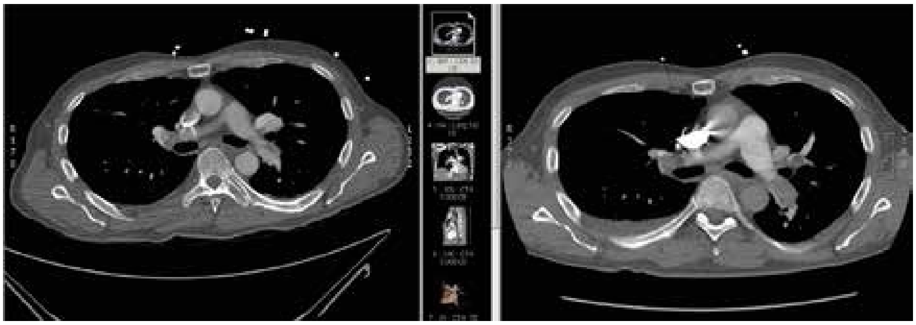


Figure 1 Images shows bilateral lobar PE.

Video 1 Images show bilateral lobar PE. Available online: http://www.asvide.com/article/view/23910

Diagnosis

Submassive PE.

Management

Admitted and started on heparin.

Subsequent TTE revealed moderate RV dilation but preserved RV function.

Duplex US showed DVT in the posterior proximal calf muscle. An IVC filter was placed.

Outcome

Discharged home with plans for follow-up with pulmonologist.

1.8 Chronic history of repaired aortic dissection—admitted with massive pulmonary embolism

H&P

An 82-year-old female patient presented to OSH from skilled nursing facility after syncopal episodes.

Known history of type-A dissection, s/p surgical repair 4 months prior to admission: h/o atrial fibrillation (on amiodaron and digoxin, but off anticoagulation secondary to rectus sheath hematoma 1 month prior to admission).

On admission found to be hypotensive requiring pressors, hypoxic and tachycardic.

CT

Chest: acute massive saddle pulmonary embolism (PE); RV dilation; near occlusion of the distal right main PA.

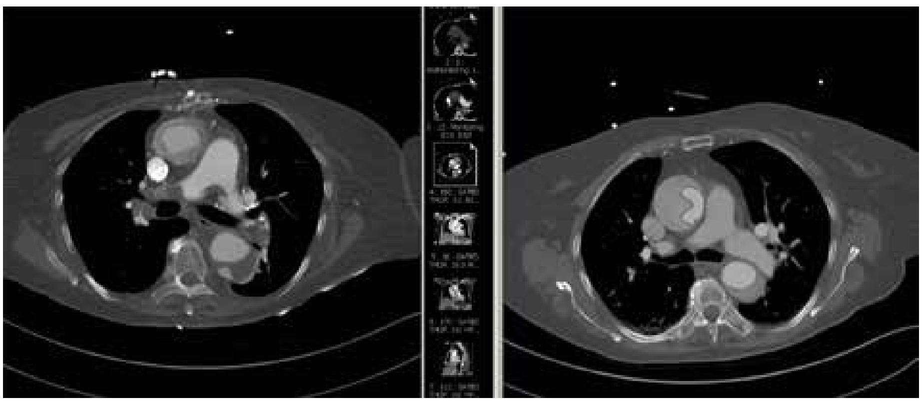


Figure 1 Images at current admission (left panel) and initial admission 4 months prior. The left panel shows the pulmonary artery bifurcation with evidence of PE, straddling the bifurcation and extending into the left and right pulmonary arteries. Also seen is the distal anastomosis of the supra-coronary graft (left panel) and the dissection flap in the mid-ascending aorta (right panel).

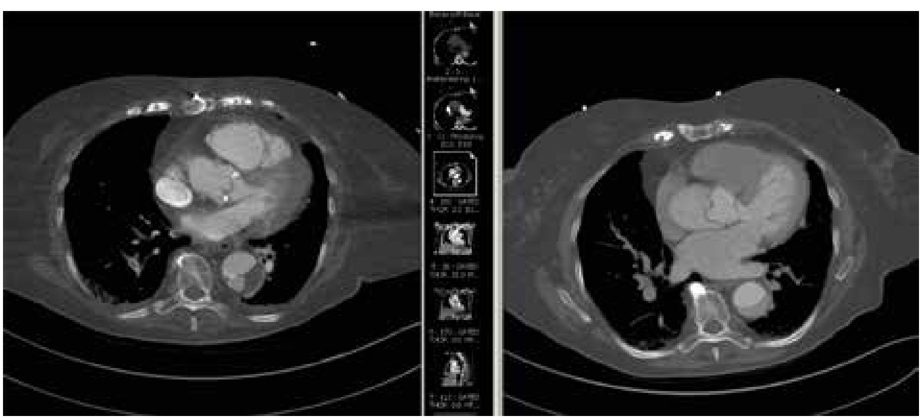


Figure 2 Images at current admission (left panel) and initial admission 4 months prior. The left panel shows the proximal anastomosis of the supra-coronary graft and the residual, partially thrombosed dissection flap in the descending thoracic aorta.

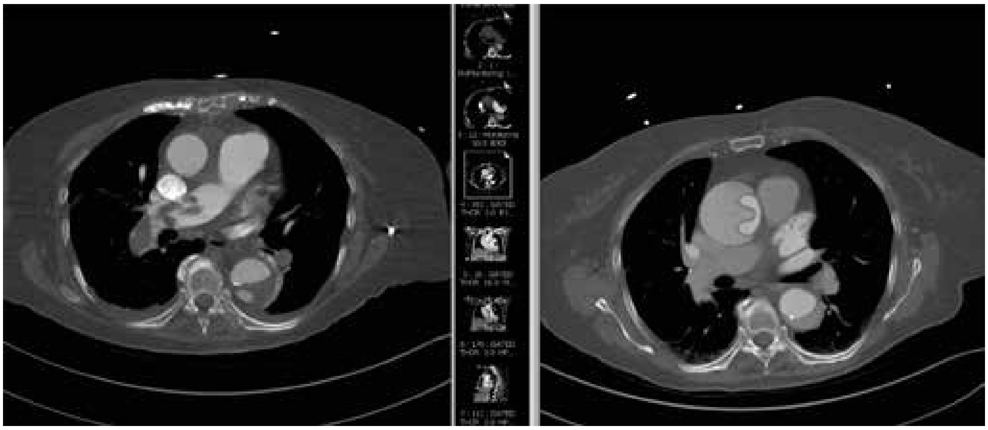
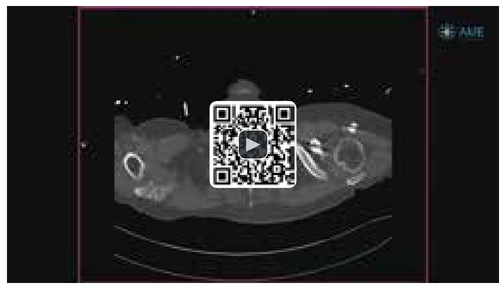


Figure 3 Images at current admission (left panel) and initial admission 4 months prior. The left panel shows the supra-coronary graft and the residual, partially thrombosed dissection flap in the descending thoracic aorta.

Video 1 Images at current admission show the large saddle PE, straddling the bifurcation and extending into the left and right pulmonary arteries. There is associated right ventricular enlargement. Also seen is supra-coronary graft and the residual dissection flap in the arch and descending aorta.
Available online: http://www.asvide.com/article/view/24009



Video 2 Images at the prior admission show findings consistent with type-A aortic dissection.
Available online: http://www.asvide.com/article/view/23911

Diagnosis

Cardiogenic shock in the setting of acute massive saddle PE.

Management

Pulmonary angiography/catheter directed lysis possible aspiration thrombectomy with IVC filter placement.

Current emergent/urgent surgery

Anesthesia
Mild sedation.

Procedure

(I) Bilateral pulmonary angiography, aspiration thrombectomy right pulmonary artery, catheter directed thrombolysis;

(II) Inferior vena cava filter placement.

Prior/remote surgery

Four months prior to admission.

Anesthesia

General endotracheal.

Operation

Repair type-A aortic dissection 30-mm Gelweave graft, aortic valve replacement with 21-mm Carpentier-Edwards pericardial valve, tricuspid valve repair, and 25-mm Duran annuloplasty band.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

1.9 Focal atheroma at the aortic isthmus

H&P

A 74-year-old female who presented to OSH with right-sided chest pain associated with nausea. A chest CT revealed concerns of a penetrating aortic ulceration/IMH. The patient was transferred for further management.

She states that she was shopping when developed the sudden onset of chest pain. She took a sublingual nitroglycerin with some relief. However, shortly after she developed light-headedness. In the ED patient was hypotensive. Blood pressure improved after fluid resuscitation.

She had traveled to Texas a few weeks prior to admission and reported “leg swelling” that had subsequently resolved.

A CT chest performed to rule out PE revealed area of attenuation abnormality along left lateral aortic arch with peripheral calcification concerning for thrombosed penetrating atherosclerotic ulcer. Patient was transferred for further evaluation and management.

On admission was chest pain free.

CT

Focal filling defect at the isthmus with peripheral calcification. Findings most consistent with atheroma at the level of the left subclavian artery. No surrounding inflammatory changes or intramural hematoma.

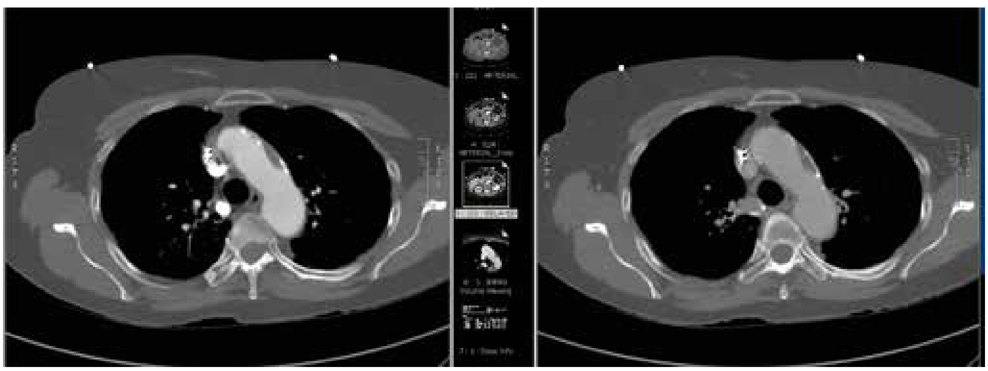


Figure 1 Focal filling defect at the isthmus with peripheral calcification. Findings most consistent with atheroma at the level of the left subclavian artery. No surrounding inflammatory changes or intramural hematoma.

Video 1 Findings most consistent with atheroma at the level of the left subclavian artery. No surrounding inflammatory changes or intramural hematoma.
Available online: http://www.asvide.com/article/view/23912

Diagnosis

Atheroma aortic arch.

Management

Medical management.

Outcome

Discharged home with plans for follow-up with primary care physician.

1.10 Linear thrombus versus intimal uplifting

H&P

A 46-year-old female who was admitted to OSH after she reportedly fell of a flight of stairs, shortly after she abruptly lost consciousness. Family witnessed the event and called 911.

At OSH she was initially slow to respond, then became unresponsive. She was intubated for airway protection. Subsequently became bradycardic and hypotensive and developed PEA arrest. CPR ×1–2 min, with return of pulse.

CT

Small luminal filling defects at the arch. Findings more consistent with atheroma instead of an acute transection.

TEE confirmed a large burden of mobile atheroma in the arch.

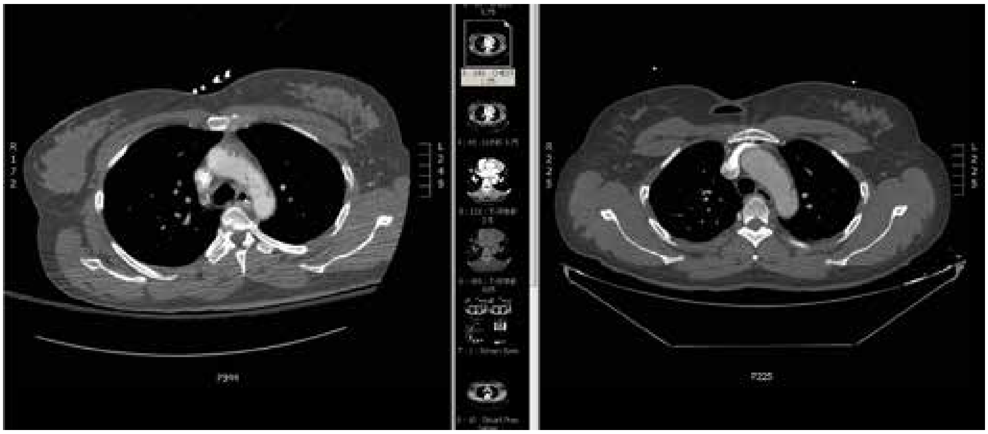
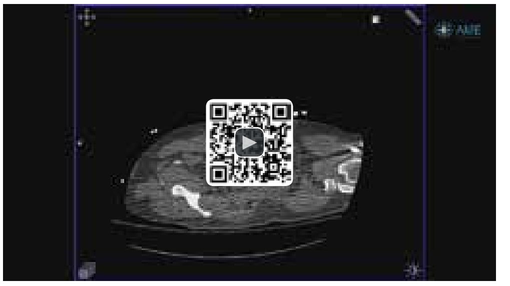


Figure 1 Axial images at the arch show small filling defects in arch on admission (right panel) and on subsequent CT 2 days later (left panel).

Figure 2 3D reconstruction showing small filling defects in arch on admission.

Video 1 Small filling defects in arch on admission CT 2 days later. Available online: http://www.asvide.com/article/view/23913



Video 2 Small filling defects in arch on subsequent CT 2 days later. Available online: http://www.asvide.com/article/view/23914

Diagnosis

Arch atheromatous changes.

Management

Medical management.

Neuro consultation.

Outcome

Discharged home with plans for follow-up with primary care physician.

1.11 Infected surgical graft ascending aorta

H&P

A 36-year-old male patient presented to OSH with 3 days history of pain in his right chest and mild swelling along the sternum. Past medical history notable for Marfan syndrome, s/p composite graft of the ascending aorta (4 years prior at OSH) transferred with suspected aortic graft infection on antibiotics. No fevers or chills.

CT

Composite surgical graft aortic root and ascending aorta:

(I) Re-suspended aortic valve: not well visualized, no leaflet calcification;

(II) Patent ostia of the re-implanted coronary arteries;

(III) Graft is surrounded by up to 15 mm rim of soft-tissue and fluid-density changes. Continuous with 3×1 cm fluid-density accumulation in the anterior mediastinum behind the mid-sternum, and similar changes extending to the central and right aspect of the mid sternum.

Findings concerning for infection/abscess.

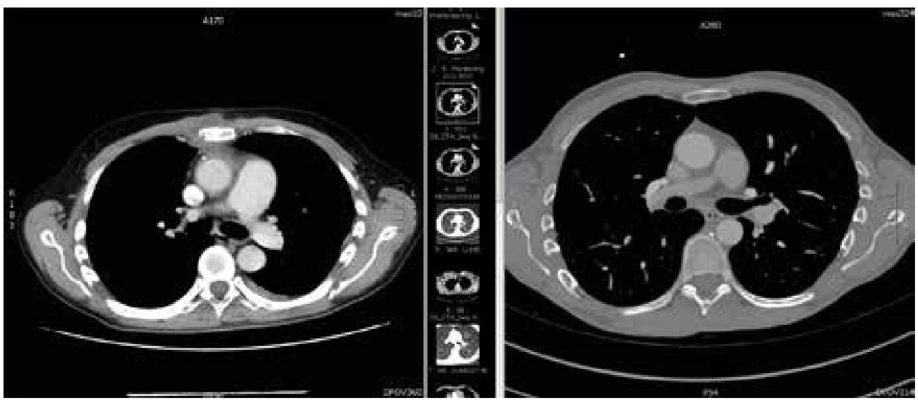


Figure 1 Images at the level of the mid ascending aorta; admission (left panel) and 4 years prior (prior to surgery, right panel), Images at admission show rim of soft tissue changes surrounding the grafted ascending aorta.

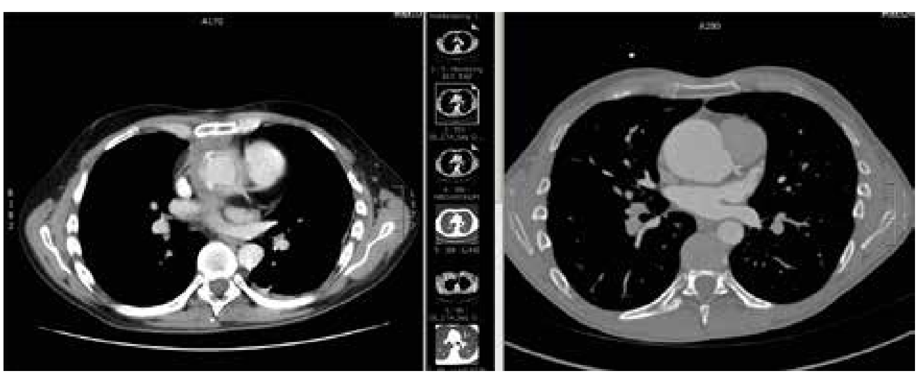


Figure 2 Images at the level of the aortic root, admission (left panel) and 4 years prior (prior to surgery, right panel), Images at admission show rim of soft tissue changes surrounding the grafted aortic root, most c/w graft infection.

Video 1 Images at admission show soft tissue changes surrounding the grafted aortic root and ascending aorta, most c/w graft infection. Available online: http://www.asvide.com/article/view/23915

Diagnosis

Infected surgical graft ascending aorta.

Management

Surgical evaluation/planned surgery.

Prior/remote surgery

Four years prior.

Anesthesia
General endotracheal.

Operations
Median sternotomy open heart, David procedure with reimplantation of the aortic valve and a 30-mm Hemashield graft.

Preoperative diagnosis
Aortic root aneurysm (Marfan syndrome).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

1.12 Retro-peritoneal bleed and abdominal aortic aneurysm

H&P

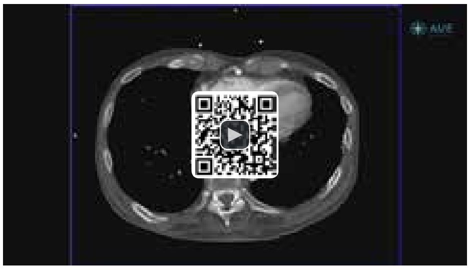
An 83-year-old male with h/o CAD, MI, s/p CABG, atrial fibrillation (on Coumadin) presented to OSH with 2-day h/o left sided back pain, radiating to the left groin. At an OSH a CTA demonstrated a 4.7-cm infrarenal abdominal aortic aneurysm (AAA) without evidence of rupture. In addition, there was a pancreas mass, right colon mass and multiple peritoneal and retroperitoneal masses consistent with metastatic disease. The patient was admitted for further work-up.

Two days later, while in the hospital, the patient fell. A repeat CT now demonstrated a large left retro-peritoneal hematoma. He was transferred for further management.

CT

Left retro-peritoneal hematoma.

Figure 1 The initial CTA (right panel) shows the AAA, without evidence of rupture. Partially seen are the changes of the right sided colon. Two days later (left panel), there is a large retroperitoneal hematoma. While this is adjacent to the AAA, there is no definitive evidence of leakage.



Video 1 The CT images at the time of the admission.
Available online: http://www.asvide.com/article/view/23916

Video 2 The CT images 2 days after the admission.
Available online: http://www.asvide.com/article/view/23917

Management

While the repeat CT scan demonstrates the left retroperitoneal hematoma, given the coagulopathy, the fall and the evidence for intraabdominal malignancy, the retroperitoneal bleeding may be spontaneous and not related to AAA. Further, given the overall poor prognosis of the patient, he is not a good candidate for surgery. He and his family agreed.

Diagnosis

Left retro-peritoneal hematoma; metastatic cancer.

Management

Blood transfusions and initial pressor support for worsening hypotension.

After re-evaluation and discussion with the family, pressure support was eventually withdrawn and palliative care provided.

Outcome

Exitus letalis.

1.13 Repaired Type-A aortic dissection

H&P

A 54-year-old female presented to OSH with severe substernal CP radiating to the back and shoulder blades, associated with diaphoresis and mild SOB. ECG showed no acute changes. A CT scan was performed due to history of previous repaired Type A aortic dissection. The patient was then life flighted for further management. At CICU, Impulse control was achieved with beta blockade and nitroprusside infusion. Patient became chest pain free on current medical regimen, CTS was consulted and recommended no surgical intervention.

CT

CT performed at OSH was compared to CT from 2 years prior:

(I) Composite graft root and ascending aorta, with bioprosthetic AVR;
(II) Residual dissection beyond graft;
(III) Max diameter descending 4.3 cm, with mild interval change compared to prior CT.

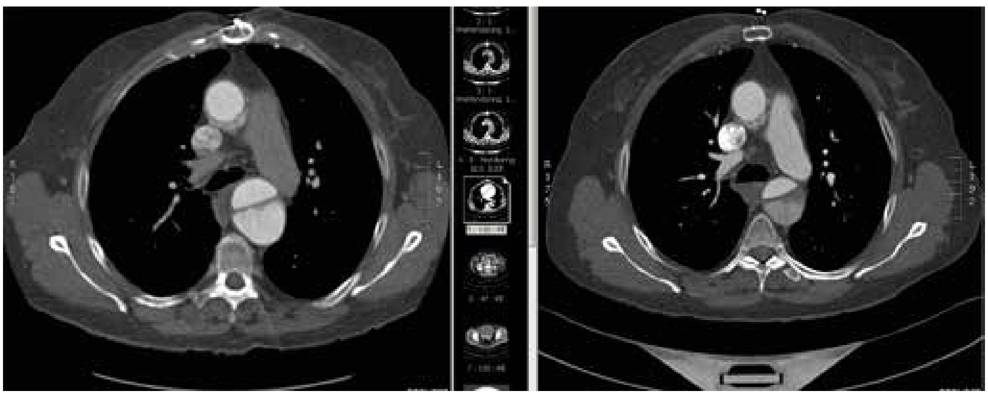


Figure 1 Right panel (2 years prior to admission); left panel (time of admission). Comparison shows residual dissection flap with mild interval increase of the dissected proximal descending segment.

Video 1 Two years prior to admission: composite graft root and ascending aorta. Residual dissection beyond the graft.
Available online: http://www.asvide.com/article/view/23918

Video 2 CT at the time of admission, stable graft, mild increase in size of proximal descending segment.
Available online: http://www.asvide.com/article/view/23919

Video 3 A follow-up CT, performed 6 months post admission, shows no interval change.
Available online: http://www.asvide.com/article/view/23920

Diagnosis

Stable repaired Type-A dissection.

Management

Medical management.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.1 Type-A aortic dissection: limited to ascending segment

H&P

A 60-year-old female patient with history of ESRD s/p kidney transplant on cellcept, prednisone and cyclophosphamide, DM, and HTN: s/p MI s/p recent stent.

On the day of admission, the patient started feeling pain in her left armpit and she felt a lump. Pain was radiating to chest. A CT demonstrate Type-A dissection.

CT

Type-A aortic dissection limited to ascending segment with associated enlargement of the aortic root and ascending aorta.

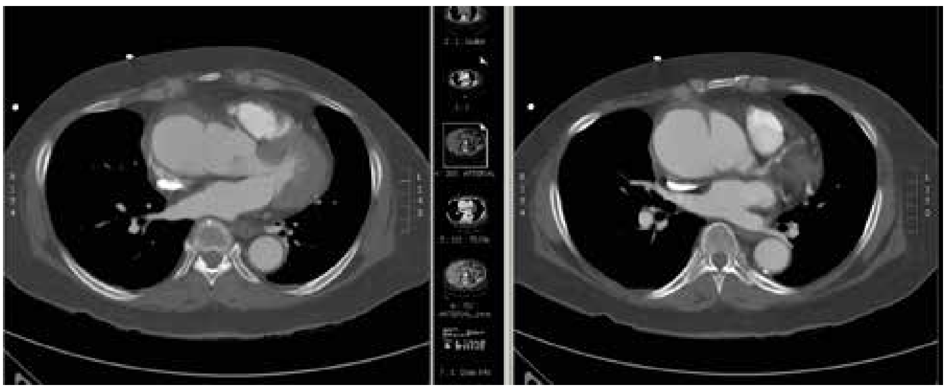


Figure 1 Images of the aortic root (left panel) and proximal ascending aorta (right panel) show the dissection flap in the proximal ascending segment.

Video 1 Images show the dissection flap in the proximal and mid ascending segment with associated aneurysmal dilatation of the ascending aorta. Available online: http://www.asvide.com/article/view/23922

Diagnosis

Type-A aortic dissection.

Management

Emergency surgical repair.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Operations
Repair of chronic Type-A aortic dissection with replacement of aortic root and ascending aorta with 30-mm Hemashield graft, reimplantation of coronary arteries.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.2 Type-A aortic dissection, limited to ascending segment, prior CABG

H&P

An 80-year-old male with h/o CAD s/p CABG 3 months prior to admission, presented with epigastric pain to OSH. CTA showed Type-A aortic dissection, originating just distal to aortic valve and extending to arch. Associated aneurysmal dilatation. Patient was transferred via helicopter to tertiary hospital.

Medical management initiated in CICU.

CT

OSH:

(I) Proximal Type-A aortic dissection, begins above coronary ostia and extends to distal ascending aorta (ostium of innominate);
(II) Max. Diameter prox. Ascending 7.2×5.8 cm;
(III) Calcified dissection flap with large fenestration;
(IV) Root 3.3 cm;
(V) No evidence of rupture/leakage;
(VI) No pericardial effusion;
(VII) CAD;
(VIII) LITA to LAD; SVGs to LAD and LCX not well visualized;
(IX) Moderate left pleural effusion.

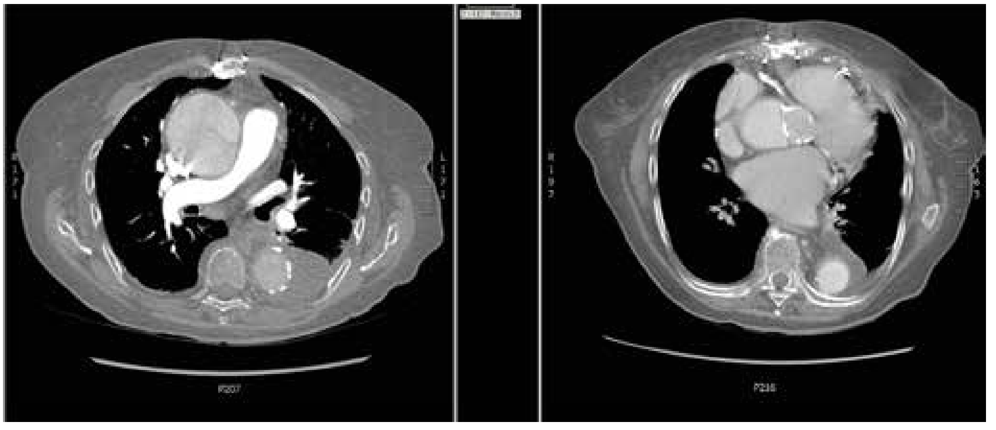


Figure 1 Dissection flap is seen at the aortic root (right panel) and dilated mid-ascending segment.

Video 1 Chest: the dissection flap is seen beginning at the aortic root and extending to distal ascending segment.
Available online: http://www.asvide.com/article/view/23926

Video 2 Images of the abdominal aorta, without dissection.
Available online: http://www.asvide.com/article/view/23927

Diagnosis

Proximal Type-A aortic dissection.

Management

Based on poor functional status and lack of recovery after recent CABG (3 months prior to admission), she was not deemed a surgical candidate (1).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

References

1. Roselli EE, Hasan SM, Idrees JJ, et al. Inoperable patients with acute type A dissection: are they candidates for endovascular repair? Interact Cardiovasc Thorac Surg 2017;25:582-8.

2.1.3 Type-A aortic dissection, ascending aorta and proximal arch

H&P

A 79-year-old male presented with acute severe chest pain this morning. Patient was pushing some heavy furniture when he felt an acute severe tearing pain in his chest radiating towards his neck. CTA chest was done at an outside hospital and demonstrated type-A dissection. Patient was transferred to tertiary hospital. On arrival patient was hemodynamically stable.

CT

Type-A dissection; tear end just distal to left subclavian artery.

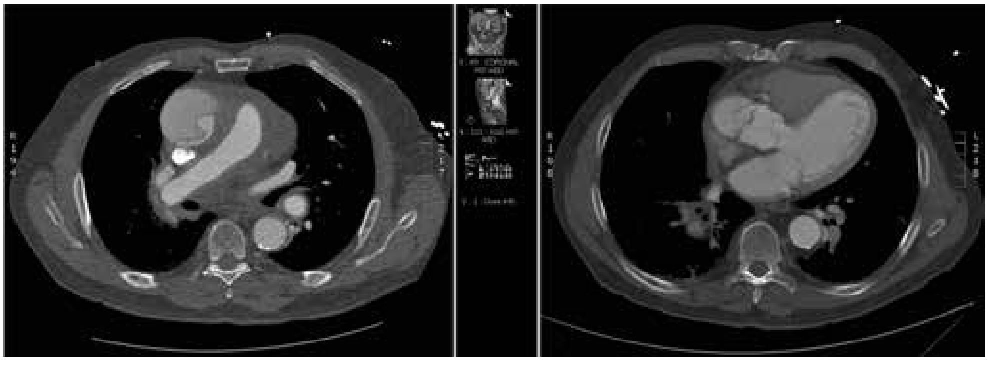


Figure 1 Images at admission show dissection flap in the aortic root and ascending aorta. Also seen is a small to moderate likely hemorrhagic pericardial effusion.

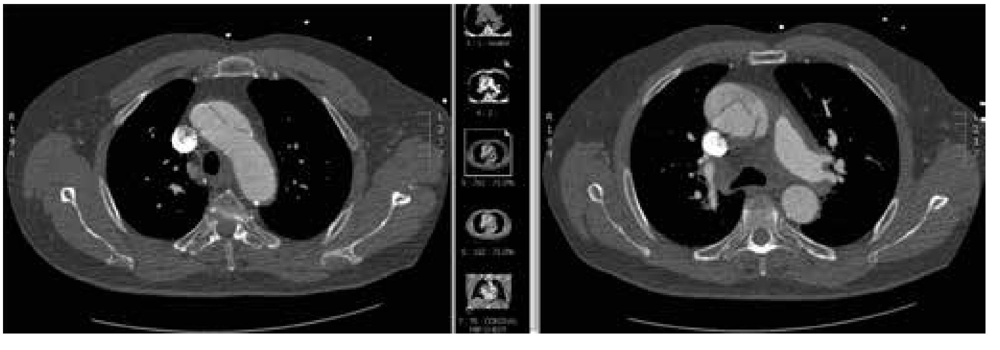


Figure 2 The images at admission show termination of the dissection flap in the aortic arch.

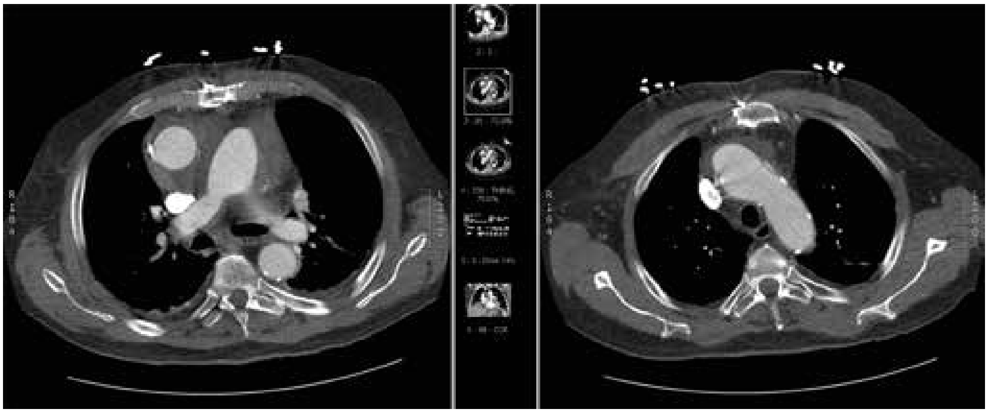


Figure 3 Post-operative images show the graft of the ascending aorta and the distal anastomosis in the proximal arch.

Video 1 The movie shows the post-operative anatomy with the intact supra-coronary graft. No residual dissection flap in the native distal arch and descending aorta.
Available online: http://www.asvide.com/article/view/23929

Diagnosis

Type-A aortic dissection.

Management

Emergency surgical repair.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Operation
Repair of type-A aortic dissection by replacement of the ascending and hemi-arch with an interposition surgical graft.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.4 Type-A aortic dissection, ascending aorta to distal arch

H&P

A 60-year-old male presented to ED complaining of intermittent substernal chest pain for 48 hours. He describes the pain as a burning sensation intermittently, radiating from the epigastric to the substernal notch. Patient states pain episodes lasting anywhere from 30–60 min.

H/o CAD s/p CABG ×3 in 2013.

CT

Type-A aortic dissection, beginning above native coronary ostia, extending to distal arch: aortic diameter about 5.2 cm (mid-ascending).

Diffuse calcified atherosclerotic changes of the native coronary arteries, precluding precise assessment with CT:

(I) Small patent LITA to LAD;
(II) SVG to RCA occluded (patent 2013); stump at true lumen;
(III) SVG to LCX occluded (occluded 2013), stump at true lumen.

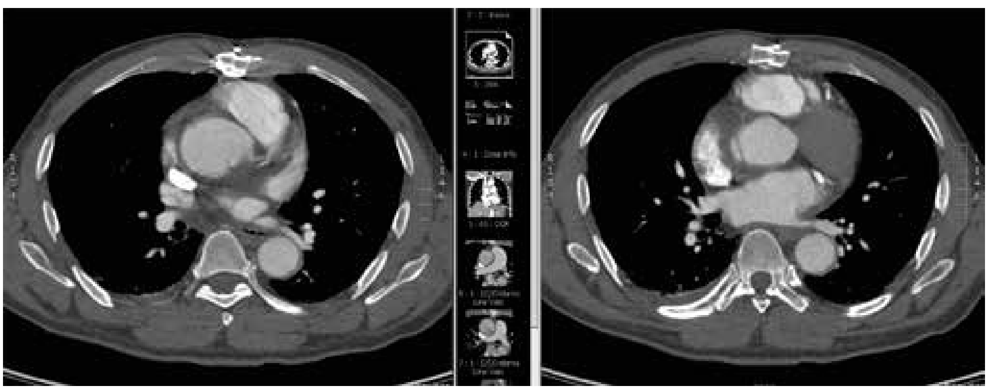


Figure 1 Images at admission show the dissection flap beginning at the level of the aortic root (right panel) and proximal ascending segment (left panel).

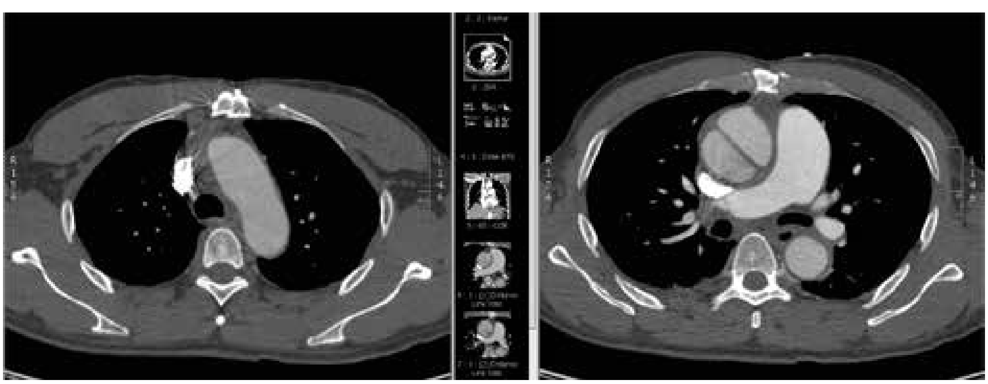


Figure 2 Images at admission show the dissection flap at the level of the mid ascending segment (right panel) and proximal arch (left panel).

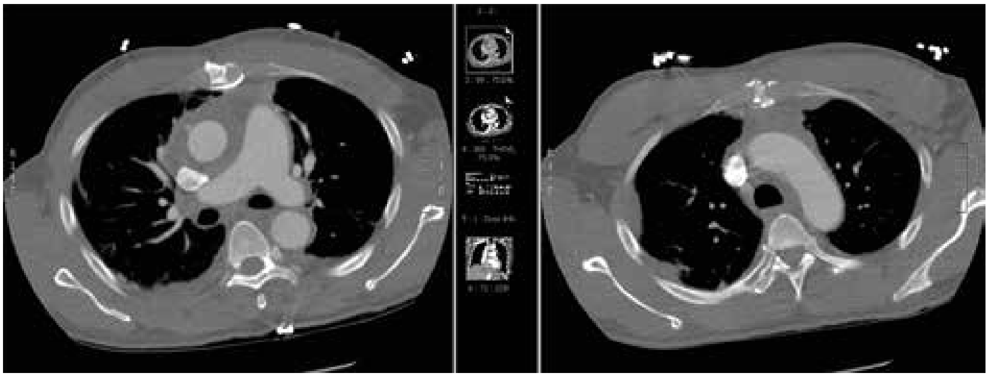
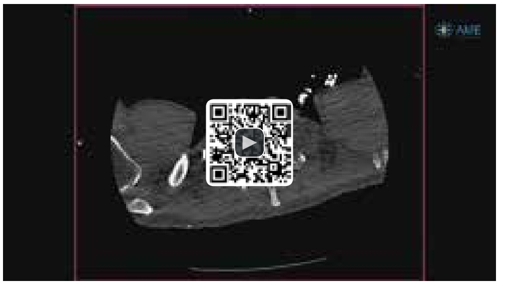


Figure 3 Post-operative images show the graft of the ascending aorta (left panel) surrounded by expected blood products and the distal anastomosis site (right panel).

Video 1 Images at admission show the dissection flap of the ascending aorta.
Available online: http://www.asvide.com/article/view/23930

Video 2 Images 2-year prior to admission show now evidence of dissection.
Available online: http://www.asvide.com/article/view/23931



Video 3 Images after surgery show the graft of the ascending aorta without residual dissection beyond the graft.
Available online: http://www.asvide.com/article/view/23932

Diagnosis

Type-A aortic dissection.

Management

Emergency surgery.

Current emergency surgery

Anesthesia
General.

Operation
Ascending aorta and hemiarch replacement with a 28-mm Dacron graft, repair of acute aortic dissection, coronary artery bypass grafting ×1 with saphenous vein graft to posterior descending artery, endoscopic vein harvest.

Prior/remote surgery

Two years prior to admission.

Coronary artery bypass grafting ×3 with left internal thoracic artery to the left anterior descending artery, reverse saphenous vein graft to the obtuse marginal artery and reverse saphenous vein graft to the posterior descending artery.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.5 Type-A aortic dissection, calcified dissection flap

H&P

A 69-year-old male patient presented to OSH ED with acute-onset chest pain and abdominal pain. At OSH he was diagnosed by CT scan with acute type A dissection and was transferred for definitive care. His pain improved with blood pressure control. He was taken emergently to the OR.

CT

Proximal type-A aortic dissection:

(I) Begins above coronary Ostia; mild calcification of LAD;
(II) Max. Ascending aorta diameter about 7 cm;
(III) Arch branch vessels of true lumen;
(IV) Small lumen descending;
(V) Visceral branch vessels patent;
(VI) Splenic and gastric off false lumen;
(VII) SMA with hepatic artery of true lumen;

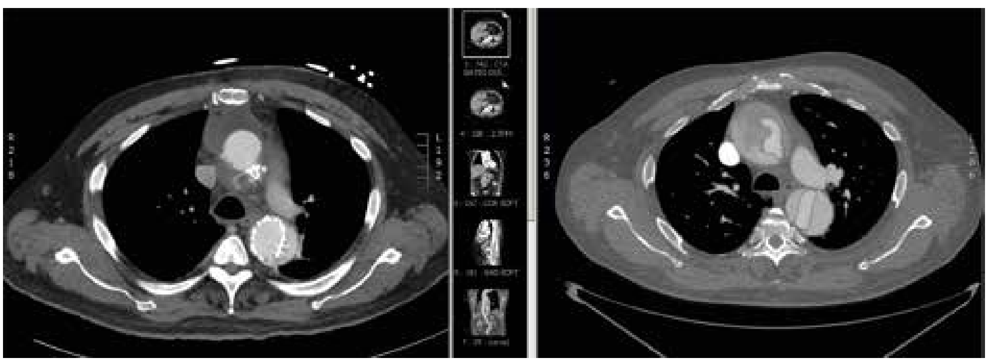


Figure 1 Right and left panel show ascending aorta prior to and following placement of a surgical graft. The pre-operative scan shows type-A aortic dissection. The post-operative scan shows the surgical graft of the ascending aorta and the stent graft of the arch and descending aorta.

Video 1 The non-contrast scan shows the calcified dissection flap in the proximal descending aorta.
Available online: http://www.asvide.com/article/view/23933

Video 2 The contrast scan shows type-A dissection with dissection flap beginning in the proximal ascending aorta and extending into the abdominal aorta.
Available online: http://www.asvide.com/article/view/23934

Video 3 The contrast scan shows extension of the dissection into the abdominal aorta.
Available online: http://www.asvide.com/article/view/23935

(VIII) Right renal of true lumen;
(IX) Left renal with dissection;
(X) Dissection extends into iliac arteries.

Diagnosis

Type-A aortic dissection.

Management

Emergency surgery.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Operation
Repair of type-A aortic dissection under deep hypothermic circulatory arrest utilizing right axillary cannulation with 8 mm Gelweave graft for antegrade cerebral perfusion and frozen elephant trunk for arch repair utilizing a 34-mm Gore Tag stent graft and ascending and proximal arch reconstruction with 34 mm Gelweave graft (1).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

References

1. Roselli EE, Idrees JJ, Bakaeen FG, et al. Evolution of Simplified Frozen Elephant Trunk Repair for Acute DeBakey Type I Dissection: Midterm Outcomes. Ann Thorac Surg 2017. pii: S0003-4975(17)31183-9.

2.1.6 Type-A aortic dissection, non-calcified dissection flap

H&P

A 48-year-old male patient presented with acute onset of chest at OSH. Found to have acute type-A aortic dissection. He was transferred here to undergo the emergency operation.

CT

Type-A aortic dissection.

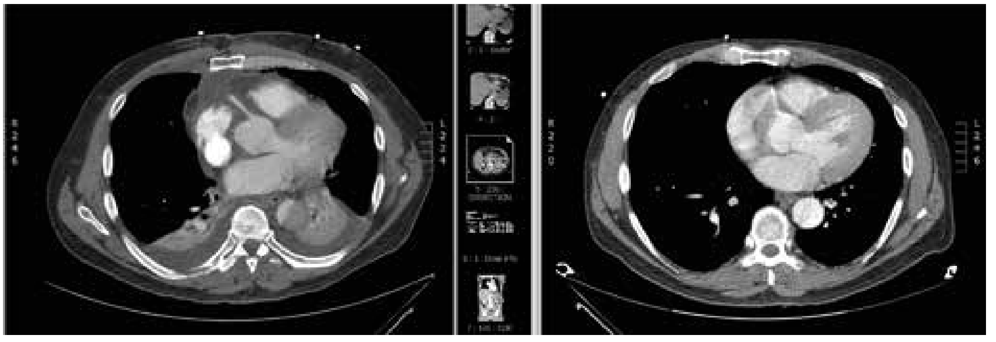


Figure 1 Right image (pre-operative) and left image (post-operative) at the level of the aortic root below dissection.

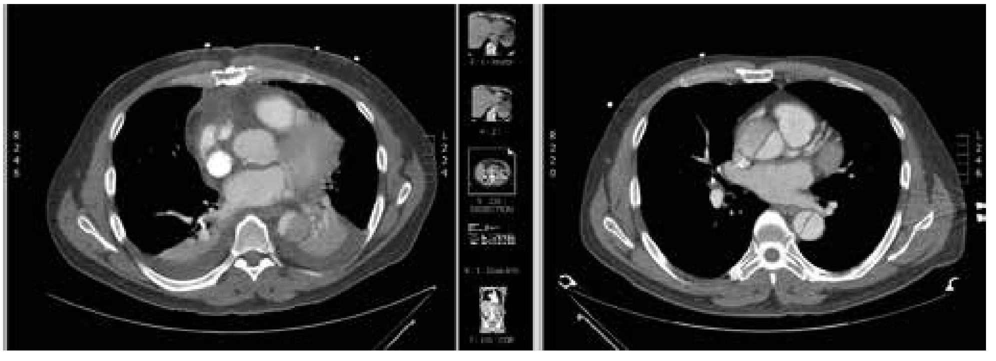


Figure 2 Right image (pre-operative) and left image (post-operative) at the level of the proximal supra-coronary graft.

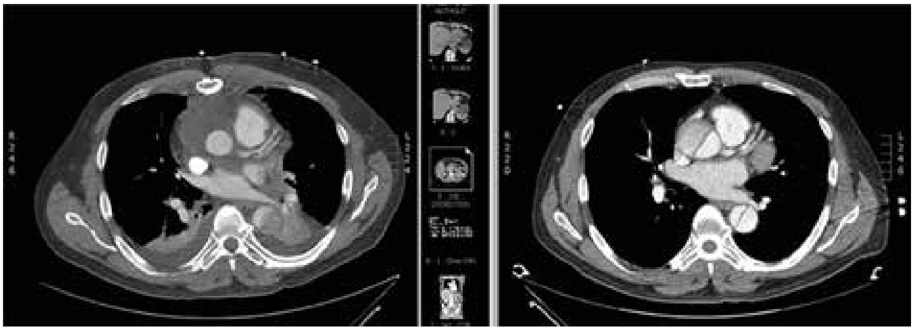


Figure 3 Right image (pre-operative) and left image (post-operative) at the level of the mid-ascending aorta.

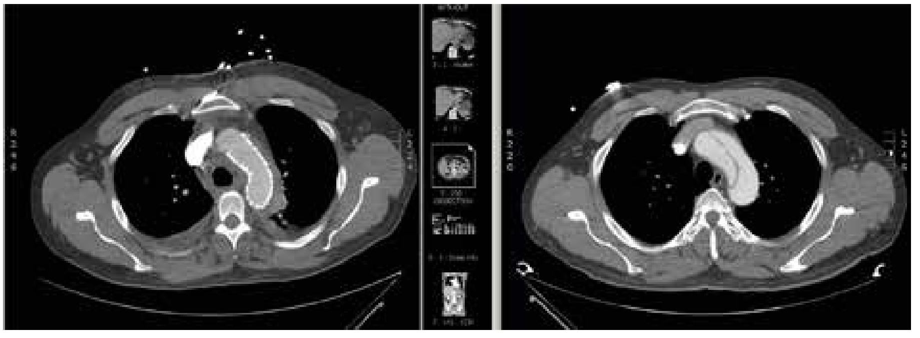


Figure 4 Right image (pre-operative) and left image (post-operative) at the level of the stented aortic arch.

Video 1 Non-contrast CT. As expected the dissection flap is not identified.
Available online: http://www.asvide.com/article/view/23936

Video 2 The dissection of the ascending aorta is identified on contrast CT.
Available online: http://www.asvide.com/article/view/23937

Video 3 Post-operative CT shows surgical graft ascending aorta, stent graft of the arch, and residual dissection descending aorta. Post-operative blood products and air surround the distal graft.
Available online: http://www.asvide.com/article/view/23938

Video 4 Anatomy at 1-year follow-up, with residual, retrograde filling of false lumen adjacent to stented descending aorta.
Available online: http://www.asvide.com/article/view/23939

Diagnosis

Type-A acute aortic dissection, with the mild-to-moderate aortic insufficiency.

Management

Surgery.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Operation
Emergency median sternotomy, repair of aortic dissection with resuspension of aortic valve, ascending, and total arch replacement with a 26-mm Dacron graft, proximal descending aortic repair with direct placement of a 31 mm × 10 cm C-TAG thoracic stent graft (frozen elephant trunk procedure) with on table fenestration of the device for the left subclavian and left common carotid arteries, hypothermic circulatory arrest with selective antegrade brain perfusion, and right axillary artery cannulation with 10-mm Dacron graft (1).

Operative findings
Significant blood staining in the mediastinum. Pericardial fluid was blood stained.

Tear in the aortic arch, one right at the level of the left subclavian artery and a smaller tear just proximal to that opposite of the innominate artery. The dissection extended all the way down to the sinotubular junction and around the right coronary artery. The aortic valve was tricuspid.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

References

1. Roselli EE, Idrees JJ, Bakaeen FG, Tet al. Evolution of Simplified Frozen Elephant Trunk Repair for Acute DeBakey Type I Dissection: Midterm Outcomes. Ann Thorac Surg 2017. pii: S0003-4975(17)31183-9.

2.1.7 Type-A aortic dissection/intramural hematoma and hemopericardium

H&P

A 84-year-old female symptomatic with sudden onset chest pain. She was transferred from an outside hospital with suspected Type A dissection with hemopericardium in the setting of supratherapeutic INR.

CT

Non-contrast, c/w type-A aortic dissection.

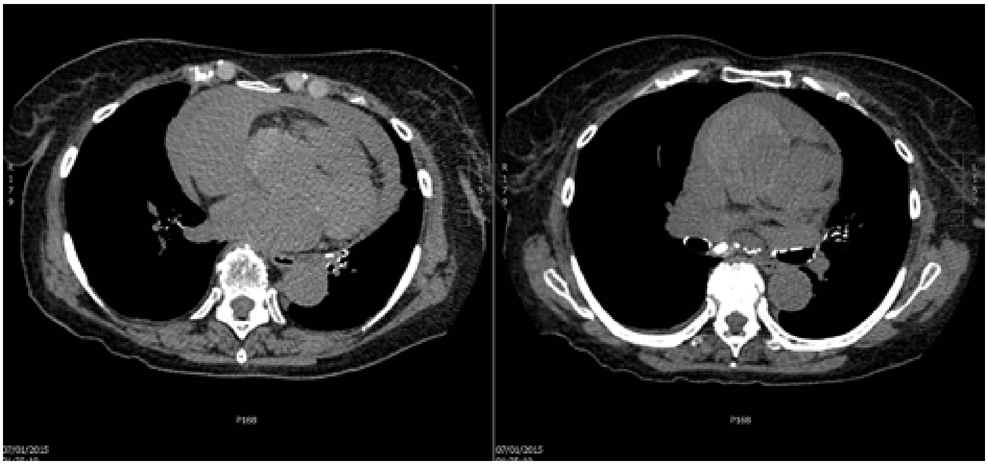


Figure 1 Non-contrast CT shows eccentric area of increase density, c/w IMH/dissection of the ascending aorta, hemo-pericardium (left panel).

Video 1 Non-contrast CT shows eccentric area of increase density, c/w IMH/dissection of the ascending aorta and hemo-pericardium. Available online: http://www.asvide.com/article/view/23940

Diagnosis

Type-A aortic dissection/IMH.

Management

(I) Anticoagulation was held;
(II) Initiated on impulse control;
(III) Evaluated by two CTS surgeons, who determined that her risk of surgery was prohibitive;
(IV) Patient and family made decision to pursue palliative care.

Outcome

Exitus letalis.

2.1.8 Type-A aortic dissection—confusion and right sided weakness

H&P

An 83-year-old female with past medical history of Hypertension, COPD, kyphoscoliosis and limited functional capacity. She presented to OSH on day of admission with confusion and right sided weakness, which started when she woke up in the morning.

At OSH, initial work up for stroke showed no acute findings:

(I) CT head without contrast: no acute intra cranial process, chronic ischemic changes and atrophy;

(II) MRI of the brain: multiple foci of restricted diffusion within cerebral hemisphere bilaterally worrisome for acute/subacute ischemia.

However, a CTA of the aorta showed type-A dissection with flap extending from beyond the coronary ostia to the proximal descending segment: she was then transferred for further management.

CT

Proximal type-A aortic dissection.

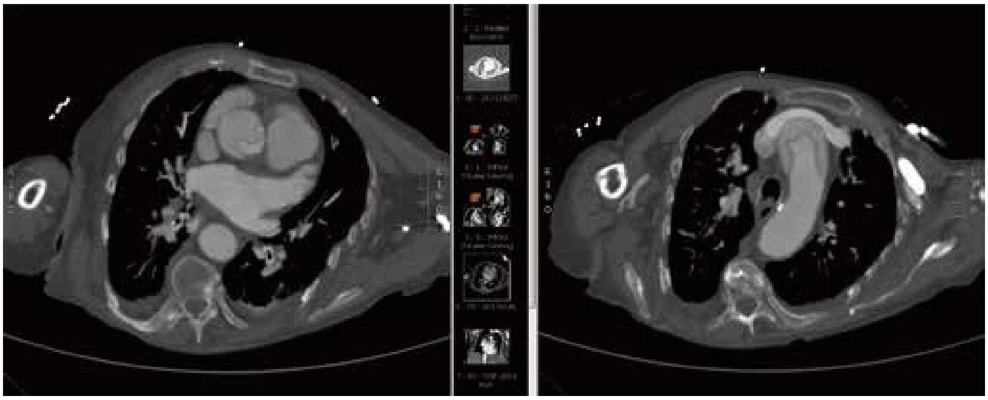
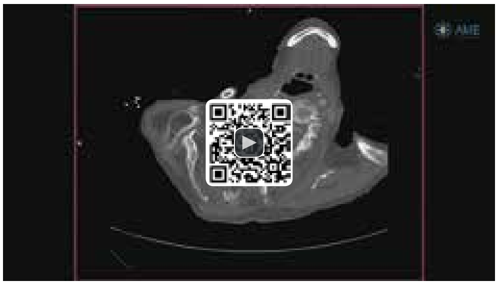


Figure 1 Relative normal size aortic size. The dissection flap is seen at the level of the ascending and proximal descending segments.



Video 1 Relative normal size aortic size. The dissection flap is seen beginning at the level of the coronary ostia and extending to the proximal descending segment/isthmus.

Available online: http://www.asvide.com/article/view/23942

Diagnosis

Proximal type-A aortic dissection.

Management

Cardiac surgery evaluation identified very high surgical risk secondary to age, frailty, and co-morbidities. Discussion with patient and family resulted in decision not to pursue surgery and change to DNR status. Patient expired later on day of admission.

Outcome

Exitus letalis.

2.1.9 Type-A aortic dissection—history of abdominal aortic aneurysm

H&P

A 52-year-old male transferred with chest pain, CT demonstrates ascending aortic dissection. Past medical history of abdominal aortic aneurysm (AAA), HTN, A fib on coumadin.

Patient was repairing his washing machine when he developed acute onset midsternal chest pressure, CTA of the chest was done and revealed type A aortic dissection originating from aortic valve and terminating in the right femoral artery. Patient was noted to have INR of 4.7 and he was ordered 4 units FFP. Known AAA and had been awaiting elective repair.

CT

Type-A aortic dissection; OSH images not uploaded.

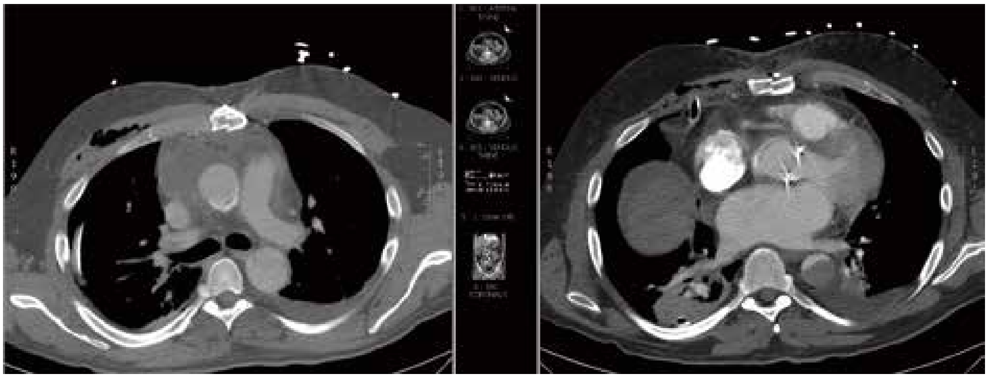


Figure 1 Pre-operative images are not available. Post-op images at the native aortic root (right panel) and proximal ascending aorta (left panel). The images show the bioprosthetic valve and the supra-coronary graft of the ascending aorta. Residual dissection of the descending aorta is seen.

Video 1 Post-op images show the bioprosthetic valve and the supra-coronary graft of the ascending aorta. Residual dissection of the descending aorta is seen.
Available online: http://www.asvide.com/article/view/23943

Diagnosis

Type-A aortic dissection.

Management

Emergency surgery.

Current emergent/urgent surgery

Anesthesia
General endotracheal anesthesia.

Operations
Right axillary cannulation, median sternotomy, bilateral pulmonary vein isolation, placement of LA clip, replacement of ascending aorta with #32 Hemashield graft requiring hypothermic circulatory arrest with retrograde brain perfusion (17 minutes circulatory arrest time), replacement of aortic valve with #25 Carpentier Edwards valve.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.10 Type-A aortic dissection—history of cocaine abuse

H&P

A 58-year-old male presented with acute onset substernal chest pain, radiating through to the back and described as an elephant sitting on his chest. Symptoms started 1–2 hours prior to presentation to ED.

H/o hypertension, cocaine and tobacco abuse.

During CT in ED became agitated and hypertensive and was intubated and sedated for further management. At time of transfer to ICU he was hemodynamically stable. A bedside echo demonstrated suspected bicuspid aortic valve, without evidence of AI or MR, LV systolic function grossly normal.

He was emergently evaluated by CT-surgery.

CT

Type A aortic dissection extending from the STJ down to the bilateral iliac arteries. Dissection involves the origin of the R innominate artery but does not appear to extend into the R common carotid or R subclavian. Dissection does not appear to involve the L common carotid or L subclavian. The mid ascending aorta is prominent (4 cm). The celiac, SMA and R renal arteries appear to come off the true lumen while the L renal artery appears to come off the false lumen. No significant pericardial or pleural effusions.

Figure 1 Pre-operative (right panel) and post-operative (left panel) images at the aortic root, just below the level of the proximal dissection flap. The dissection flap is identified in the descending aorta.

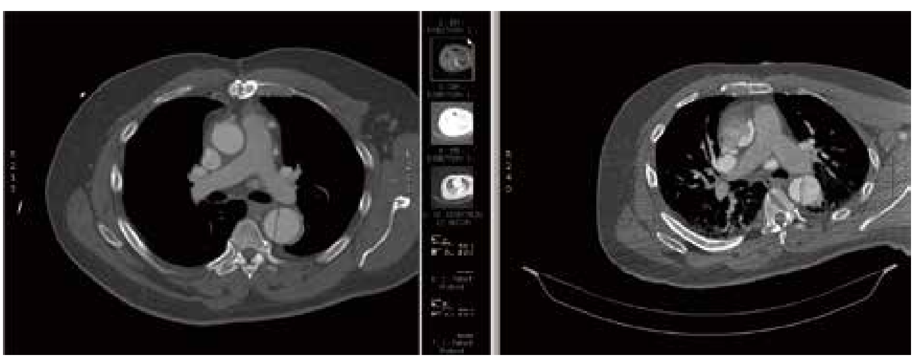
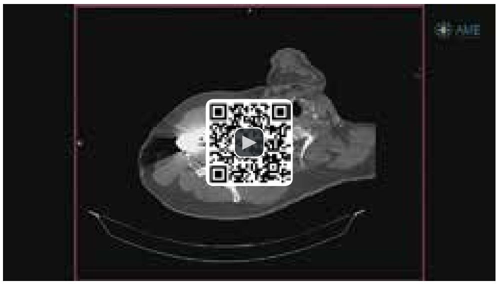


Figure 2 Pre-operative (right panel) and post-operative (left panel) images at the level of the mid ascending aorta. The dissected ascending segment is replaced by the surgical graft. There is residual dissection flap of the descending aorta. The origin and mid segments of the bypass grafts are identified.



Video 1 Pre-operative images show the dissection extending from just above the aortic root into the iliac arteries.
Available online: http://www.asvide.com/article/view/23944

Video 2 Post-operative images show the surgical graft of the ascending aorta, the bypass grafts, and the residual dissection flap beyond the graft.
Available online: http://www.asvide.com/article/view/23945

Diagnosis

Type A aortic dissection.

Management

Emergency surgery.

Current emergent/urgent surgery

Anesthesia
General endotracheal anesthesia.

Operation
Emergency repair of Type A aortic dissection with right axillary canulation, deep hypothermic circulatory arrest, hemi-arch replacement, coronary artery bypass ×2 with saphenous vein to lateral circumflex and saphenous vein to left anterior descending, aortic valve repair with resuspension.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.11 Type-A aortic dissection with aortic insufficiency

H&P

A 68-year-old female who presented to OSH with chest pain radiating to the jaw bilaterally. She felt better after taking Aspirin but still had some pain in her chest. The CTA revealed Type A dissection. She was transferred for surgical management. The echo showed 2–3+ AI, small pericardial effusion.

CT

Type-A aortic dissection.

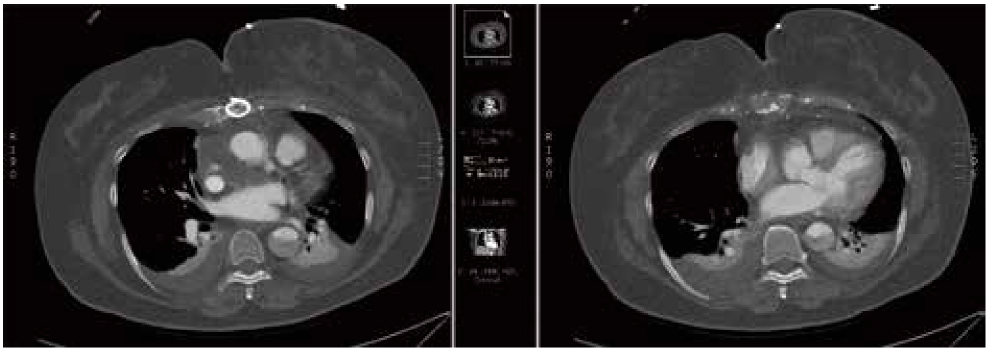


Figure 1 Post-operative images at the level of the native aortic root (right panel) and proximal anastomosis of the supra-coronary graft (left panel) The typical post-operative changes are seen at the grafted ascending segment.

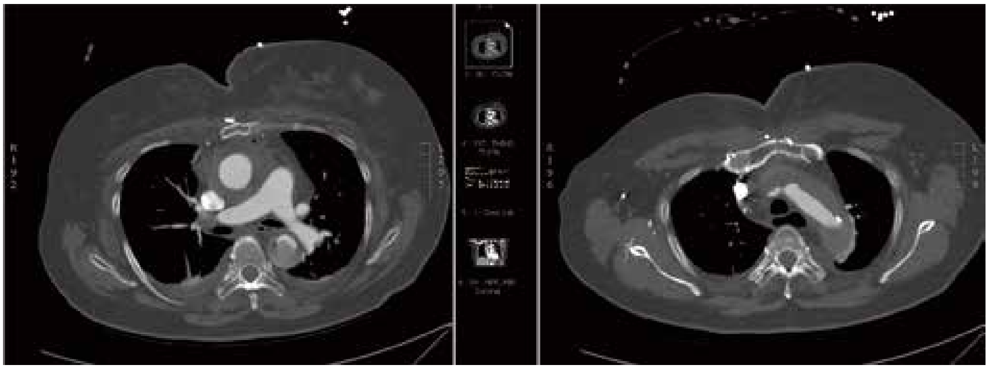
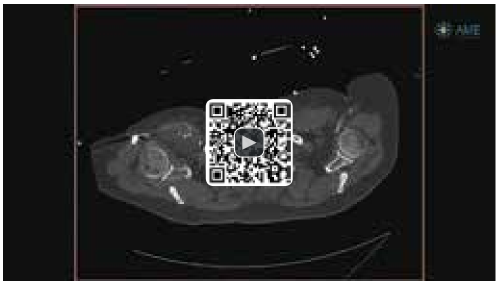


Figure 2 Post-operative images at the level of the grafted mid ascending aorta (left panel). The typical post-operative changes are seen surrounding the graft. Beyond the graft, there is expected residual dissection of the aortic arch (right panel).



Video 1 Post-operative images showing the native root, supra-coronary graft of ascending aorta with typical post-operative changes surrounding the graft. Beyond the graft, there is expected residual dissection of the aortic arch and descending aorta. The true lumen in the descending aorta is small (in the reconstructed diastolic phase images).
Available online: http://www.asvide.com/article/view/23946

Diagnosis

Type-A aortic dissection.

Management

Emergency surgery.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Operation
Emergency repair, type A aortic dissection.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.12 Type-A aortic dissection 3 days after bike accident

H&P

A 49-year-old male who presented to ED with crushing chest pain following a bike accident 3 days prior to admission. Past medical history is significant for hypertension and tobacco abuse. After the bicycle accident/fall he presented to a local ED where a chest X-ray showed a left fifth rib fracture. He was discharged but continued to have chest pain and difficulty breathing.

On the day of current admission, he developed severe, tearing sub-sternal chest pain radiation to the back after a coughing spell. He presented to ED. Chest CT with contrast was performed, which showed a Type-A dissection. Following the CT scan, the patient was urgently transferred for surgical management.

On admission, the patient complained of back pain.

CT

Type-A dissection.

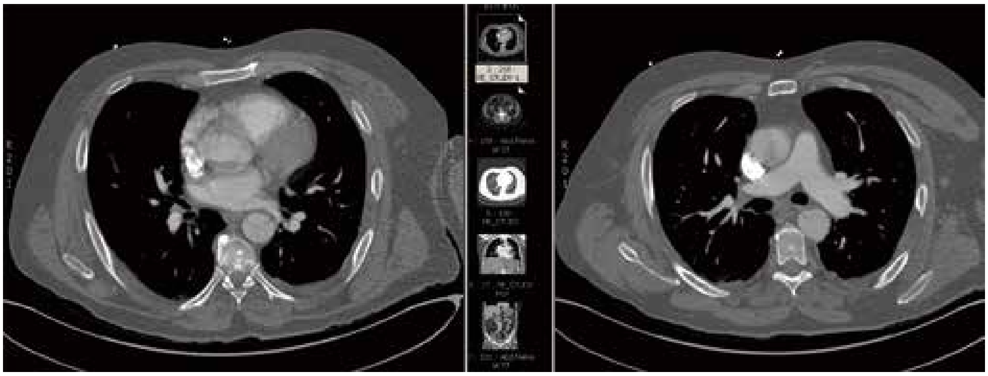


Figure 1 Image of the root (left panel) show significant motion artifact, precluding precise identification of the dissection flap. The image of the mid ascending aorta (right panel) demonstrated definitive evidence of a dissection flap.

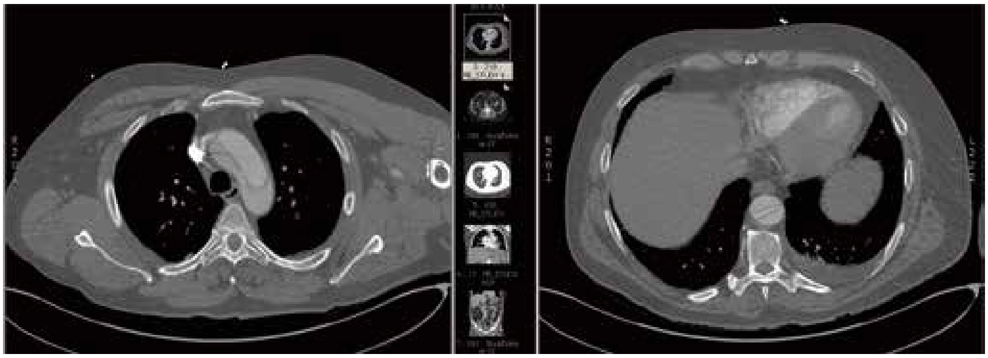


Figure 2 Images at the level of the arch (left panel) and descending aorta demonstrated definitive evidence of a dissection flap.

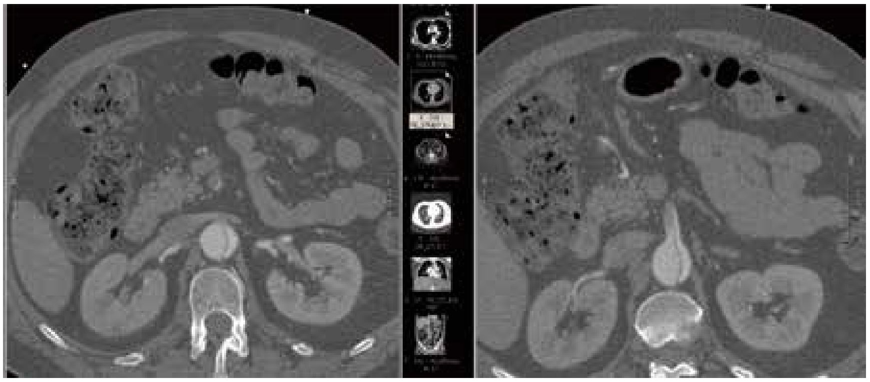


Figure 3 Image of the juxtarenal abdominal aorta show extension of dissection flap into the SMA.

Video 1 Image show significant motion artifact at the aortic root, the dissection flap beginning in the root/ascending aorta, small lumen in the descending aorta, and extension of dissection flap into the celiac artery and SMA.
Available online: http://www.asvide.com/article/view/23948

Diagnosis

Type A aortic dissection.

Management

Surgical repair.

Current emergent/urgent surgery

Anesthesia
General.

Operation
Median sternotomy, emergency type A aortic dissection with ascending aorta and hemiarch repair with hemashield graft #26, deep hypothermic circulatory arrest, and right axillary cannulation.

Operative findings
Hematoma of the ascending aorta, with tear at the level of STJ.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.13 Type-A aortic dissection—hemodynamic instability, PEA arrest

H&P

A 77-year-old female with PMH of thoracoabdominal aortic aneurysm and HTN presented to OSH with acute onset chest pain. CTA at OSH showed type-A aortic dissection. Transferred from OSH for further management.

Hemodynamically unstable on arrival to CICU. Maintaining BP on pressors. HR 40–50 s. Hb/Hct 9.4/31.3, platelets of 138. INR elevated at 4.9.

CT

Type-A aortic dissection, involving the entire aorta. Ascending portion dilated up to 5.2 cm. Dissection extending into R brachiocephalic trunk and R common carotid.

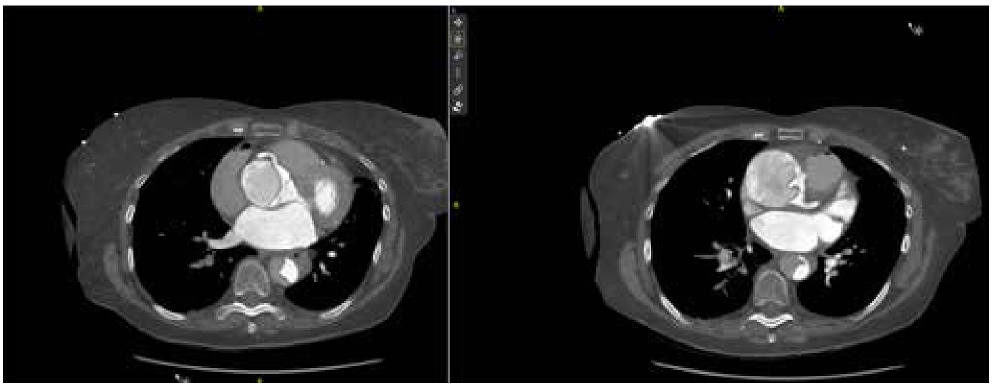


Figure 1 Images at the level of the aortic root show the dissection flap just distal to the coronary ostia;

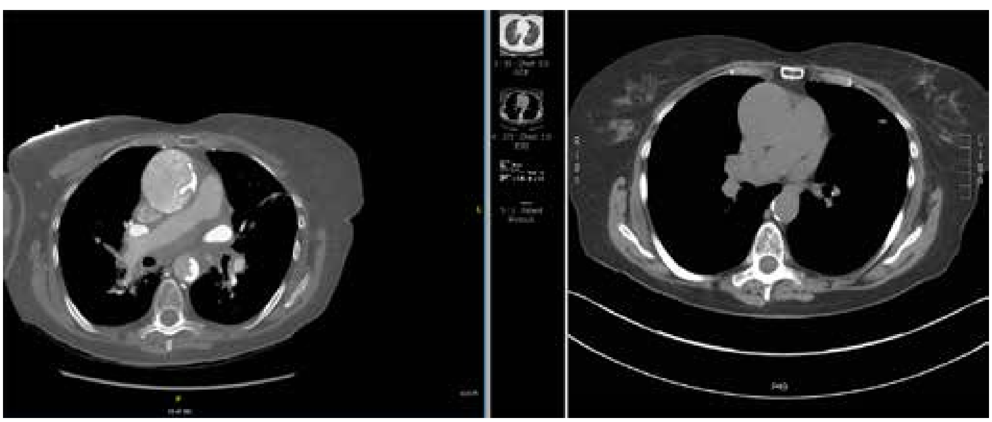


Figure 2 Images at the mid-ascending level on admission (left panel) and 2 years prior to admission (right panel, non-contrast study). Images at admission show the dissection flap and small medial true lumen.

Video 1 Images of the dilated ascending aorta 2 years prior to admission. Available online: http://www.asvide.com/article/view/23587

Diagnosis

Stanford type-A aortic dissection.

Management

- ❖ Emergent consult CTS and vascular surgery;
- ❖ Vitamin K, FFP, PCC to reverse warfarin;
- ❖ Volume resuscitate;
- ❖ Intubation;
- ❖ Plan for OR.

Subsequently, patient went into PEA/arrest. Underwent 20 minutes of CPR.

After discussion with patient's family CPR was stopped after 20 minutes.

Outcome

Exitus letalis.

2.1.14 Type-A aortic dissection—frozen-elephant graft

H&P

A 42-year-old male with PMH significant for hypertension who presented to OSH ED on the morning of admission after having 12 hours of chest pain. At the time he was hypertensive with BP 229/111. CT scan showed type-A aortic dissection, beginning in the aortic root. No pericardial effusion.

He was transferred for further treatment.

CT

Type-A aortic dissection which extends into the descending segment.

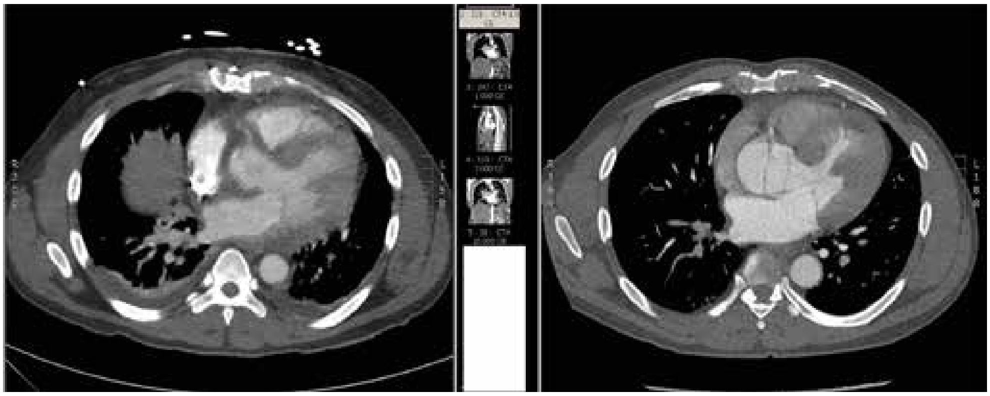


Figure 1 Images at the aortic root on admission (right panel) and following surgery (left panel).

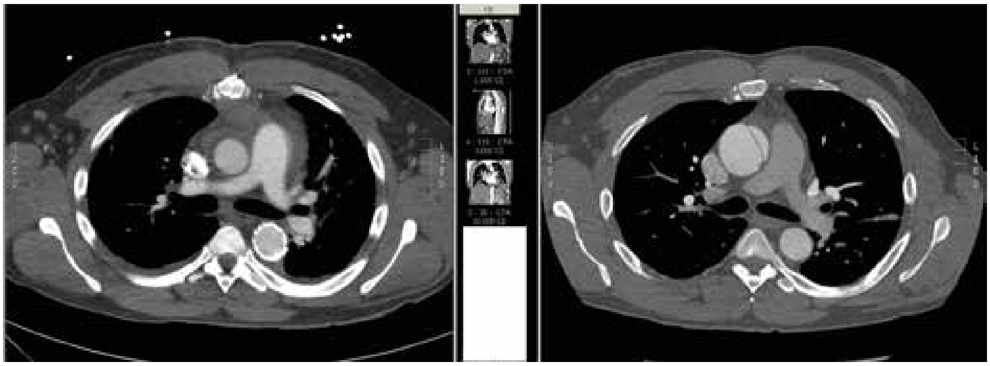


Figure 2 Images at the mid ascending level on admission (right panel) and following surgery (left panel). The post-operative images show the surgical graft of the ascending aorta and the endovascular stent graft of the descending thoracic aorta.

Video 1 Images on admission show the dissection of the ascending aorta and arch.
Available online: http://www.asvide.com/article/view/23590

Video 2 Images following surgery show the surgical graft of the ascending aorta and the endovascular stent graft of the descending thoracic aorta.
Available online: http://www.asvide.com/article/view/23591

Diagnosis

Type-A aortic dissection.

Aortic root aneurysm, aortic insufficiency.

Management

Emergency surgery.

Emergent/urgent surgery

Anesthesia
General endotracheal.

Operation
Emergency median sternotomy, right axillary artery cannulation with a 10-mm Dacron graft, remodeling of the aortic root with repair of noncoronary sinus of Valsalva and aortic annuloplasty, resuspension and repair of the aortic valve, ascending aorta replacement with a 26-mm graft and total arch and proximal descending aortic replacement with a 28 mm × 10 cm C-TAG thoracic stent graft with on-table fenestration for the left subclavian artery (simplified frozen elephant trunk procedure), hypothermic circulatory arrest with selective antegrade brain perfusion (1).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

References

1. Roselli EE, Idrees JJ, Bakaeen FG, et al. Evolution of Simplified Frozen Elephant Trunk Repair for Acute DeBakey Type I Dissection: Midterm Outcomes. Ann Thorac Surg 2017. pii: S0003-4975(17)31183-9.

2.1.15 Type-A aortic dissection—h/o hypertension

H&P

A 60-year-old male patient with history of hypertension. He presents to the ED with sudden onset chest pain and nausea. Pain described as sharp sensation extending to back and progressing into the abdomen.

A CTA in the ED showed evidence of type-A dissection.

CT

Type-A aortic dissection.

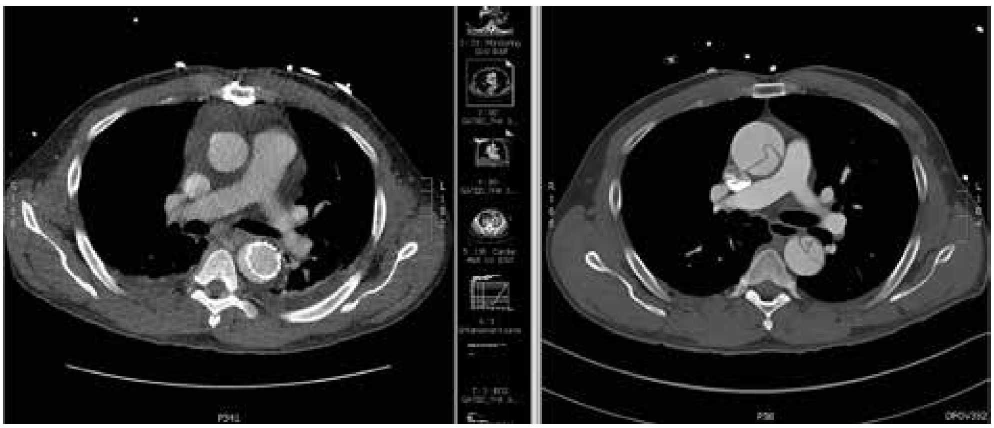


Figure 1 Images at the time of admission (right panel) show evidence of type-A dissection with dissection flap in the ascending and descending aorta. The left panel shows images 3 days after surgical repair with the surgical graft of the ascending aorta and the stent graft extending into the descending segment.

Figure 2 An image of the aorta reconstructed along the aortic centerline 3 days after surgical repair shows the surgical graft of the ascending aorta and the stent graft extending into the descending segment. The residual dissection flap of the descending and abdominal aorta is identified.

Video 1 Images at the time of admission show evidence of type-A dissection with dissection flap in the ascending and descending aorta. The true lumen in the descending segment is small.
Available online: http://www.asvide.com/article/view/23592

Video 2 Images 3 days after surgical repair show the surgical graft of the ascending aorta (with small kink in the mid segment) and the stent graft extending into the descending segment. The residual dissection flap of the descending and abdominal aorta is identified.
Available online: http://www.asvide.com/article/view/23593

Diagnosis

Type-A aortic dissection.

Management

- Impulse control therapy;
- Emergency surgical repair.

Current emergent/urgent surgery

Anesthesia
General endotracheal anesthesia.

Operation
Median sternotomy, open-heart surgery, repair of type-A aortic dissection, replacement of the ascending aorta and aortic arch and implantation of a frozen elephant trunk utilizing a 30-mm Hemashield graft along with a 34×10 Gore Tag endoprosthesis, aortic valve repair (resuspension of the aortic valve), cannulation of the right axillary artery with an 8-mm Gelweave graft, deep hypothermic circulatory arrest, retro brain perfusion, antegrade cerebral perfusion.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.16 Type-A aortic dissection—3-D reconstruction

H&P

A 62-year-old gentleman admitted with chest pain. Comorbidities include hypertension, hyperlipidemia, known coronary artery disease, status post multiple stents, atrial flutter.

CT

CT scan shows a type-A aortic dissection beginning at the level of the sinotubular junction and terminating at the iliac bifurcation with a maximum size of the ascending aorta approximately 5 cm. Aortic root and arch are normal in size.

Echocardiogram reveals LVEF of 45% and trivial to 1+ aortic insufficiency. Suspected wall motion abnormality in RCA territory.

Figure 1 Time of admission. Left panel shows origin of left main from true lumen (axial image). Middle panel shows frontal image, larger false lumen spirals around true lumen. Right panel shows centerline reconstruction of the entire aorta.

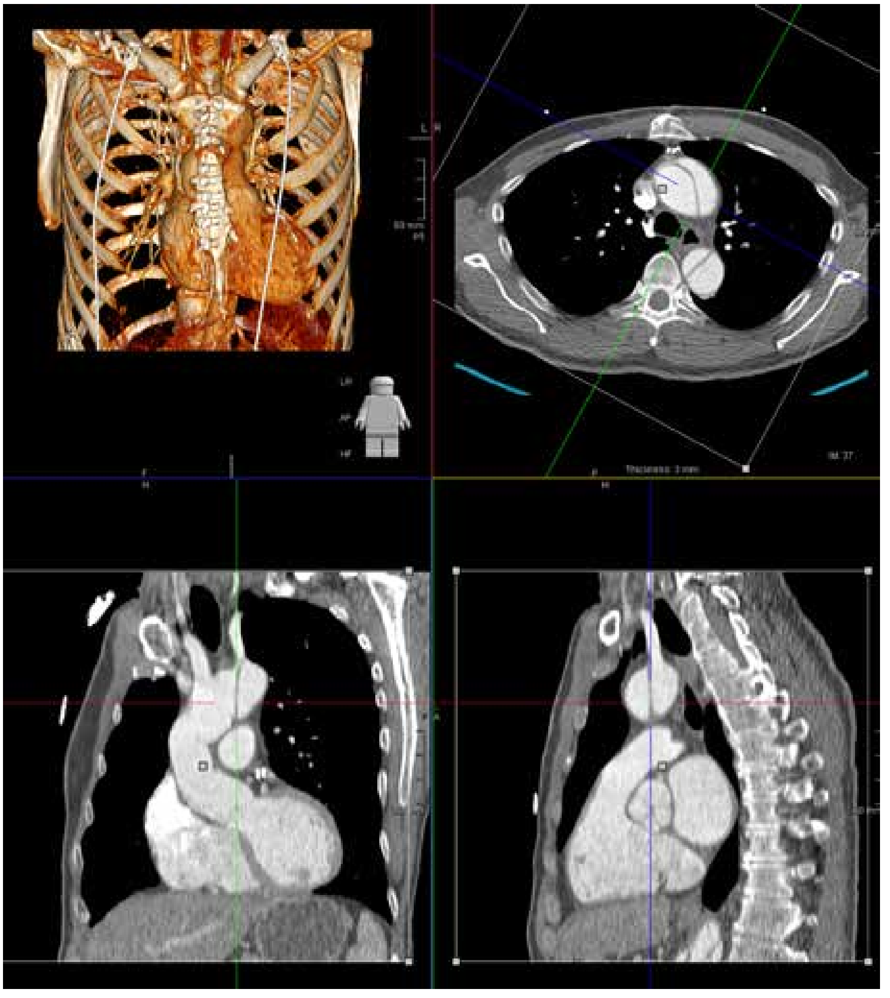
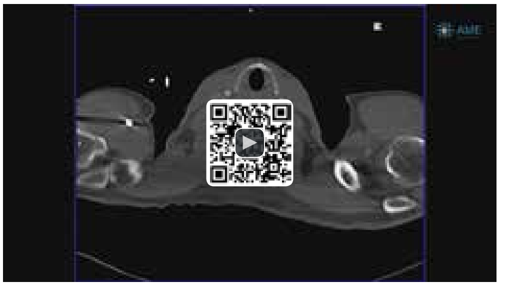


Figure 2 Follow-up: post-operative images are shown. Native aortic root with intact supra-coronary surgical graft. Note residual dissection beyond the graft, which is typical for this type of repair.

Video 1 Time of admission. Images show extent of dissection.
Available online: http://www.asvide.com/article/view/23594



Video 2 Follow-up: post-operative images show native aortic root, the intact supra-coronary surgical graft, and expected residual dissection beyond the graft.
Available online: http://www.asvide.com/article/view/23595

Diagnosis

Type-A aortic dissection, coronary artery disease, suspected coronary malperfusion.

Management

Emergency surgery.

Emergency surgery

Anesthesia
General.

Operations

Emergency median sternotomy, open-heart surgery, repair of a type-A aortic dissection, replacement of the ascending aorta and hemiarch utilizing a 30-mm Gelweave graft, coronary artery bypass ×1 utilizing reverse saphenous vein graft to the distal right coronary artery, placement of a left atrial appendage clip, cannulation of the right axillary artery with an 8-mm Gelweave graft, deep hypothermic circulatory arrest, retro-brain perfusion

Operative findings

Ascending aorta was ecchymotic. Tear in the mid ascending aorta that terminated before the aortic arch. The root was normal. There was a dissection that traveled around the right coronary artery, but there were no intimal tears in the root and the root was normal size. The aortic valve was trileaflet with no calcification. No evidence of a myocardial infarction in the distribution of RCA. The distal right coronary artery was suitable for grafting.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.17 Initial acute type-A aortic dissection, with subsequent new type-B aortic dissection

First admission

H&P

A 78-year-old male with h/o ascending aortic aneurysm. Presented to urgent care with 1-day symptoms of L arm pain (elbow to shoulder) and 2-day history of headache. EKG showed no ischemic changes, but initial troponin was mildly elevated. D-dimer was elevated.

A CT to evaluate for suspected PE showed interval increase of known ascending aortic aneurysm from 5.9 cm 8 months prior to 6.8 cm on admission, now with evidence of a dissection flap.

CT 1st admission

Type-A aortic dissection.

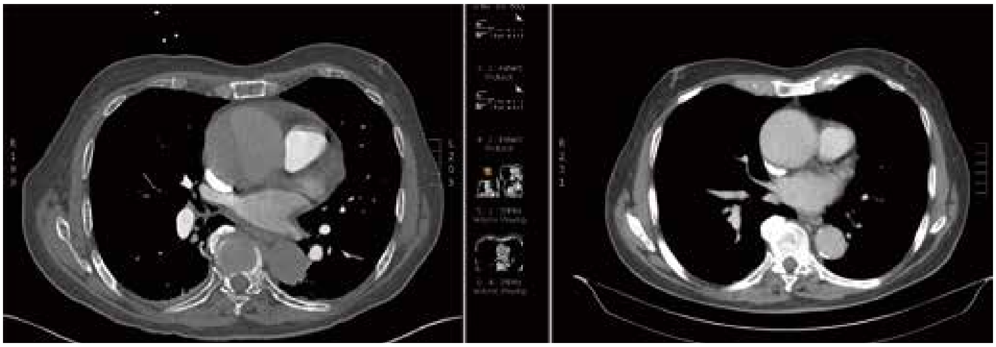


Figure 1 First admission. Left and right panel show ascending aorta on admission (left panel) and 6 months prior. On admission, the dissection flap is seen in the ascending segment, associated with dilatation of the ascending aorta. However, the CT acquisition protocol was optimized for pulmonary artery enhancement (PE-protocol). There is therefore limited contrast enhancement of the ascending aorta.

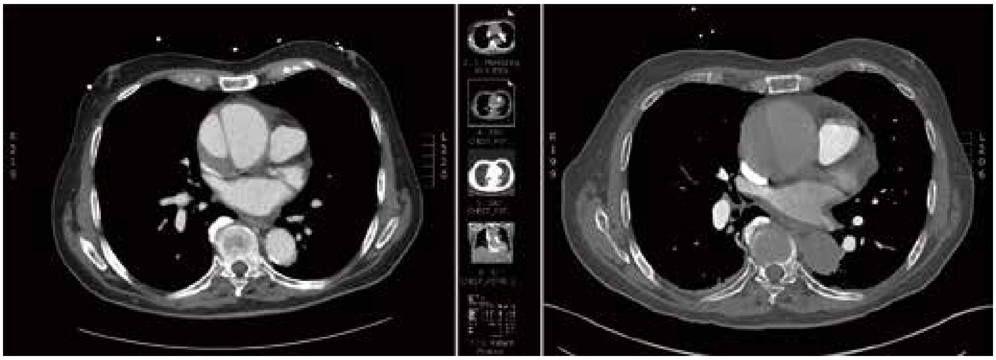


Figure 2 First admission. A repeat scan with optimization of contrast enhancement in the aorta better show true and false lumen, with partial thrombosis of the false lumen (left panel).

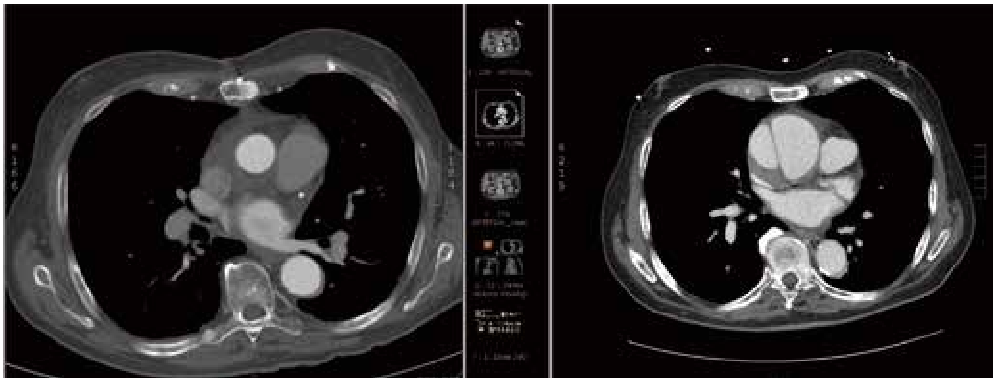


Figure 3 First admission. The patient underwent surgical repair with a graft of the ascending aorta. Right and left panel show the ascending aorta prior to (right) and after (left surgery). The graft of the ascending aorta is surrounded by post-operative changes.

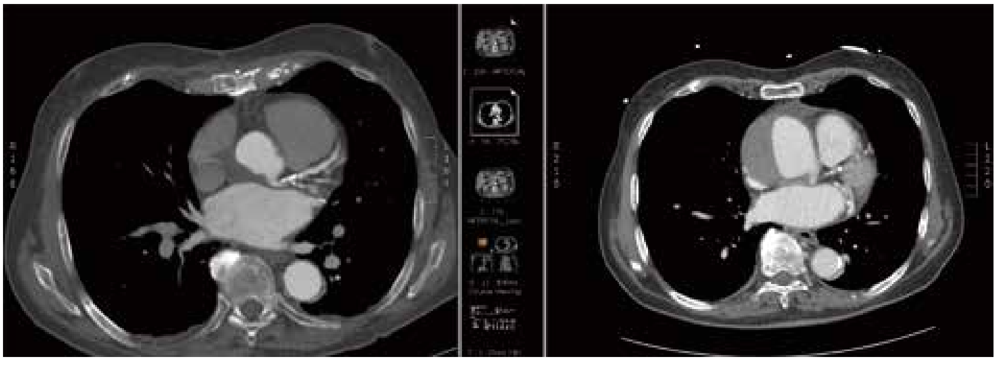


Figure 4 First admission. Shows images at the proximal graft anastomosis at the STJ prior to (right) and after (left) surgery. The left main ostium of the native aortic root is visualized.

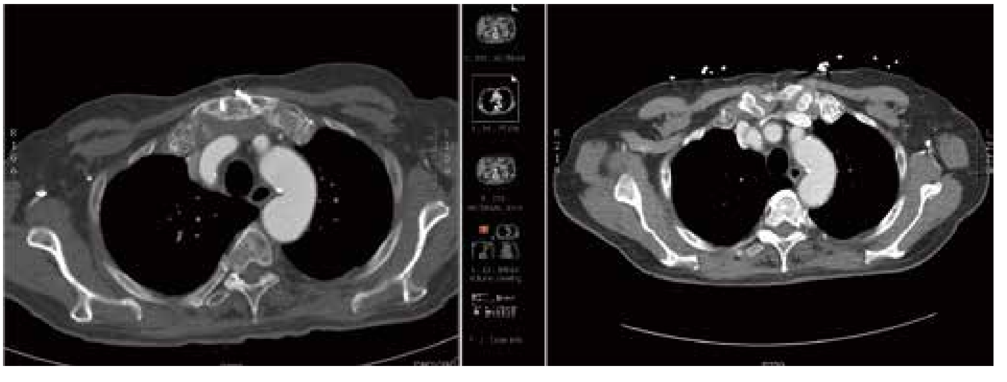


Figure 5 First admission. Shows images beyond the distal anastomosis, before (right) and after (left) surgery. There is no dissection beyond the surgical graft.

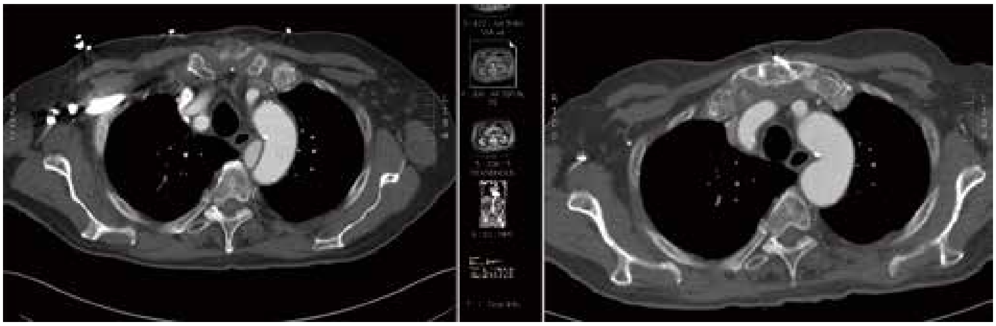
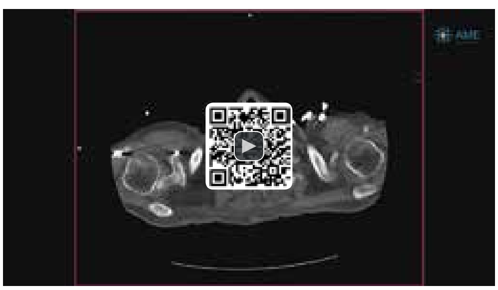


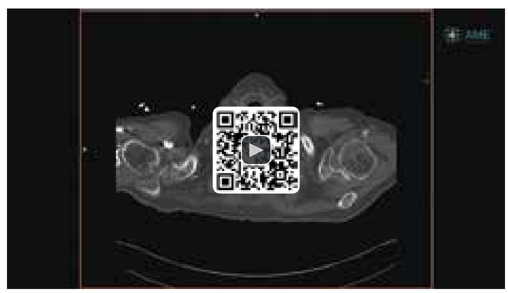
Figure 6 Second admission. Images at the time of the second admission (left panel) show interval development of type-B dissection with dissection flap in the descending segment.

Video 1 First admission. Images at admission (non-gated acquisition) show type-A dissection with flap limited to the ascending aorta.
Available online: http://www.asvide.com/article/view/23596

Video 2 First admission. Images at admission (gated acquisition) show type-A dissection with flap limited to the ascending aorta.
Available online: http://www.asvide.com/article/view/23597



Video 3 First admission. Images after surgery show the native root, the surgical graft of the ascending aorta, which is surrounded by small amounts of air and blood product. Note that there is no residual dissection beyond the graft in the arch and descending aorta.
Available online: http://www.asvide.com/article/view/23598



Video 4 Second admission. Images of 5 months after surgery show the intact graft but interval development of a type-B dissection beginning beyond the left subclavian artery.
Available online: http://www.asvide.com/article/view/23599

Diagnosis

Type-A dissection.

Management

Urgent surgery.

Second admission (5 months after initial admission)

Patient presented to ED with 8/10 left sided, tearing, constant back pain.

CT 2nd admission

Intact graft ascending aorta; new type-B dissection, no signs of mal perfusion.

Management

Endovascular repair.

Emergent/urgent surgery (1st admission)
Anaesthesia
General.

Operation
Repair of type A dissection supracoronary tube graft and hemiarch repair and left atrial appendage amputation.

Subsequent urgent surgery (2nd admission)
Anesthesia
General.

Operation
Thoracic endograft.

Operative procedure
After marking the origin of the celiac artery, a GORE CTAG 34×150 was placed just above the celiac artery. Another GORE CTAG 37×200 was deployed just distal to the subclavian artery.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.18 Type-A aortic dissection—staged repair

H&P

A 72-year-old male with PMH of thoracic aortic aneurysm, hypertension, CAD, recently diagnosed with a 4.9-cm fusiform ascending aortic aneurysm at OSH after he presented there with back and jaw discomfort.

Early am on day of admission sudden onset of chest pain which radiated to his left arm. He presented to the ED, where a CT demonstrated a type-A dissection.

CT

Type A aortic dissection, extending from aortic root to the right common iliac artery, involves the SMA.

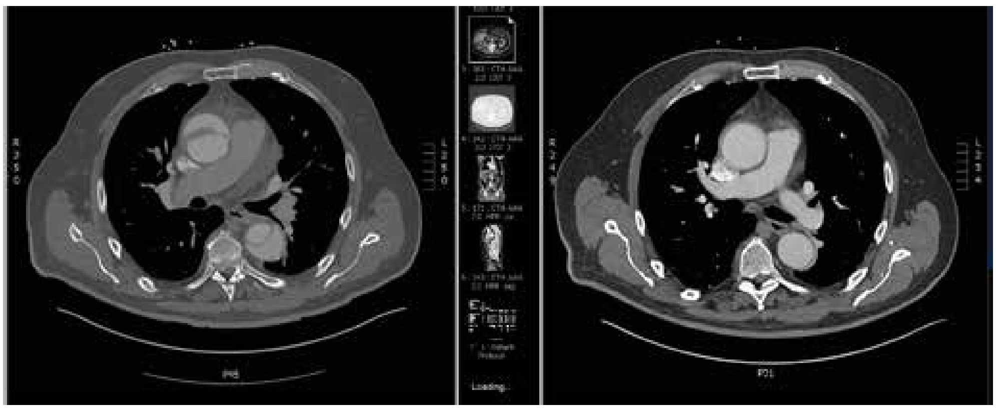


Figure 1 Images of the mid ascending aorta 1 month prior (right panel) and at the time of admission (left panel). The images at admission show interval development of type-A aortic dissection.

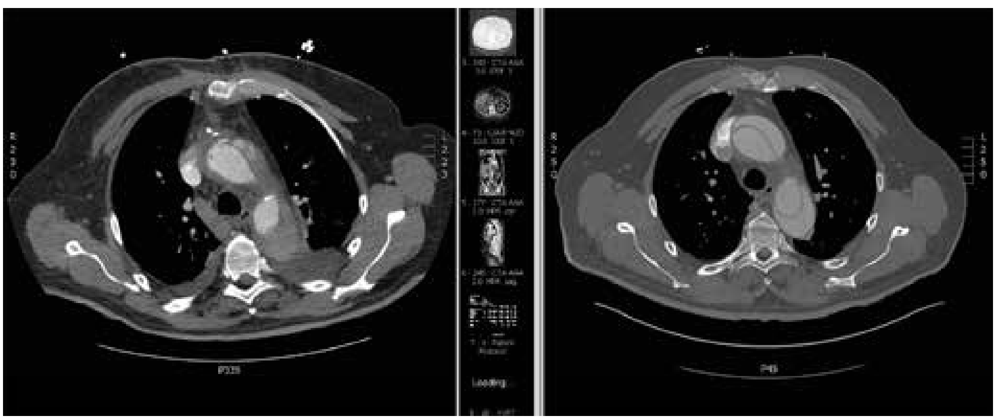


Figure 2 Images of the distal ascending aorta at the time of admission (right panel), and 4 days after surgery. The image on the left shows the level of the distal graft anastomosis. There are post-operative blood products surrounding the aorta.

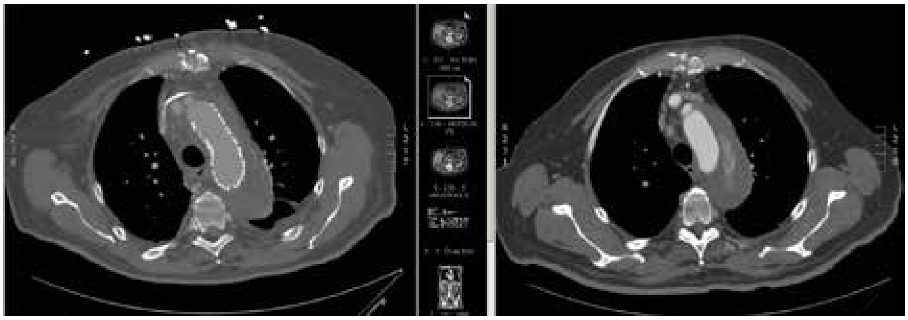


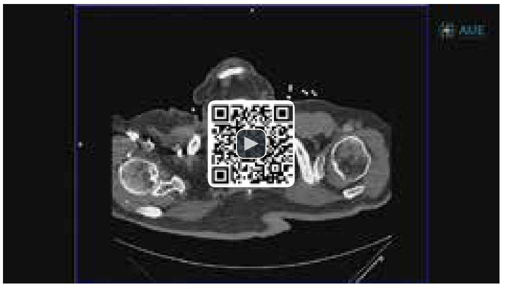
Figure 3 Images of the proximal descending aorta at the time of admission (right panel), and 4 days after surgery (left panel) show the endovascular stent in the distal arch and descending thoracic aorta.

Video 1 Images show the type-A aortic dissection beginning in the aortic root and extending to the iliac arteries. There is involvement of the visceral branch vessels.
Available online: http://www.asvide.com/article/view/23600

Video 2 This movie shows anatomy 1 month prior to admission. There is no evidence of aortic dissection.
Available online: http://www.asvide.com/article/view/23601

Video 3 This movie shows the graft of the ascending aorta and the residual dissection beyond the graft with dilatation of the descending thoracic aorta (3 months after admission).
Available online: http://www.asvide.com/article/view/23602

Video 4 This movie shows the graft of the ascending aorta and the interval placement of the endovascular stent graft of the descending aorta a few days after surgery. There is a small amount of air in the excluded false lumen.
Available online: http://www.asvide.com/article/view/23603



Video 5 Images at 1-year follow-up shows resolution of the air. Available online: http://www.asvide.com/article/view/23604

Diagnosis

Acute ascending aortic dissection.

Management

Emergency surgery.

Emergent/urgent surgery

Anesthesia
General.

Operation
Emergency median sternotomy, repair and replacement of ascending aortic dissection with 32-mm Hemashield graft, right axillary artery cannulation, hypothermic circulatory arrest, with hypothermic retrograde cerebral perfusion.

Subsequent surgery

Five months after emergency 1st surgery.

Operations

Redo median sternotomy, redo right axillary artery cannulation with a 10-mm Dacron graft, distal ascending and total arch replacement with a 30-mm graft, separate reimplantation and bypass to the innominate artery with a 10-mm graft, reimplantation and bypass of the left common carotid artery with a 10-mm graft, distal arch and proximal descending aortic repair with direct placement of a 34 mm × 15 cm C-TAG thoracic stent graft with on-table *in situ* fenestration and branch reconstruction with a bypass to the left vertebral artery with a 6 mm × 2.5 cm Viabahn stent graft and bypass to the left subclavian artery with a 13 mm × 2.5 cm Viabahn stent graft (modified branched frozen elephant trunk procedure), hypothermic circulatory arrest with selective antegrade brain perfusion.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.19 Type-A aortic dissection—'frozen-elephant-trunk' repair

H&P

A 39-year-old male with h/o hypertension and obesity presented with chest pain that started in the morning of the admission day. Pain radiated down right arm and was associated with nausea and diaphoresis. He was initially evaluated at an affiliated hospital and a CT scan demonstrated a type-A aortic dissection. He was emergently transferred for cardiac surgery evaluation.

CT

Type-A aortic dissection from root up to arch.

- Ascending aorta is dilated to 4.7 cm;
- Dissection extends into ostia of the arch branch vessels.

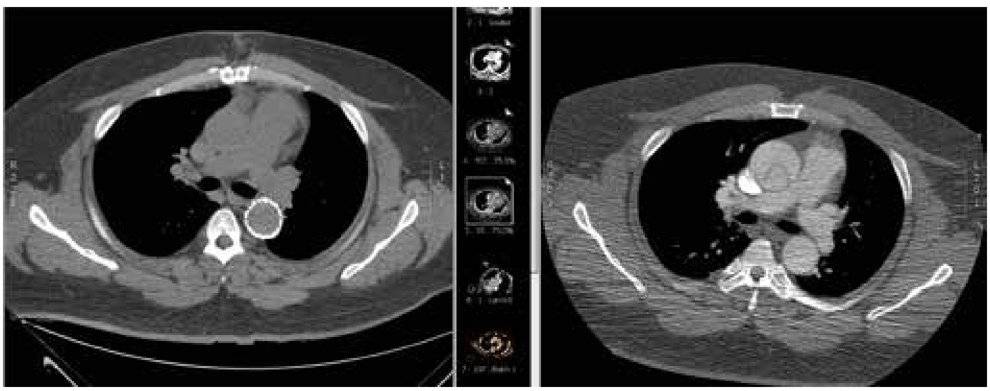


Figure 1 Images showing type-A dissection at time of admission (right panel) and at 3-month follow-up (left panel, non-contrast enhanced scan). The surgical graft of the ascending aorta and the stent graft of the descending aorta are identified.

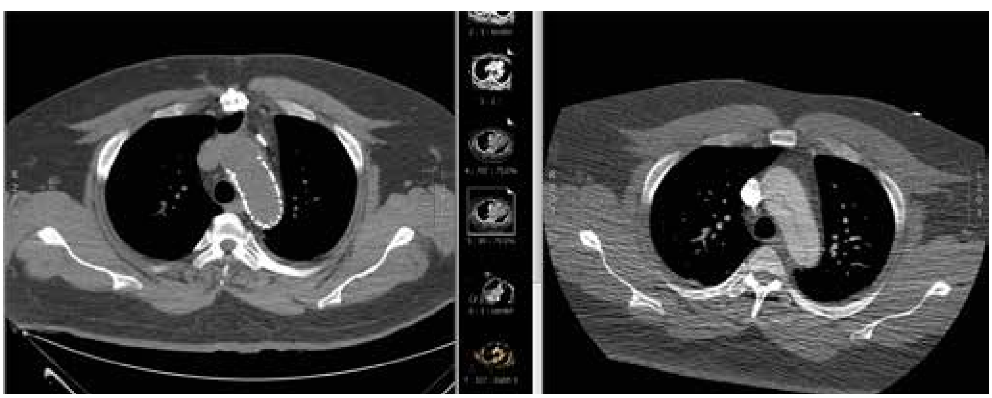
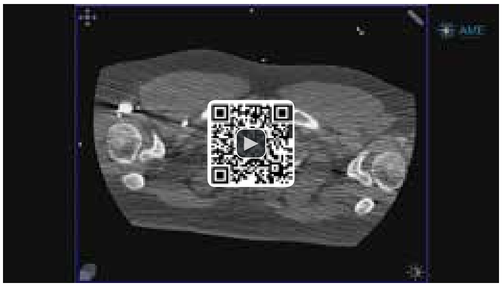
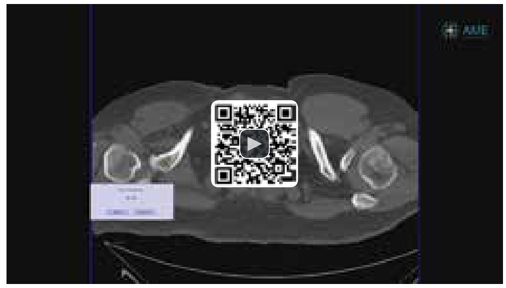


Figure 2 Images showing distal arch and isthmus at time of admission (right panel) and at 3-month follow-up (left panel, non-contrast enhanced scan). The anastomosis between surgical graft and the stent graft is seen.



Video 1 Images at the time of admission show the dissection of the ascending aorta and arch.
Available online: http://www.asvide.com/article/view/23605



Video 2 Non-contrast CT at 3-month follow-up show the surgical graft of the ascending aorta and the stent of the descending aorta.
Available online: http://www.asvide.com/article/view/23606

Diagnosis

Type-A aortic dissection.

Plan

Emergency surgical repair.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Operative procedure

Emergency median sternotomy, right axillary artery cannulation with a 10-mm Dacron graft, ascending and total arch repair with a 28-mm Dacron graft and direct placement of a 31 mm × 10 cm C-TAG thoracic stent graft with on-table fenestration of the stent graft (single anastomosis, frozen elephant trunk procedure), aortic valve repair with plication of the conjoined cusp with 5-0 Ethibond suture and aortic annuloplasty with Dacron ring over 25-mm Hegar dilator, aortic valve resuspension, and hypothermic circulatory arrest with selective antegrade brain perfusion.

Operative findings

Large tear in the aorta, just above the sinotubular junction, which extended about halfway around the circumference of the aorta.

Aortic valve showed partial fusion of the right and left cusps with an immature right and left commissure with a focal area of calcium underneath that commissure. The cusp tissue otherwise was healthy. The aortic root architecture was preserved. The ascending aorta was not dilated. The dissection extended through the arch. There was a tear near the base of the left subclavian artery, which was repaired with absorbable sutures. There was a pericardial effusion that was under pressure, but not bloody.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.1.20 Type-A aortic dissection/IMH—endovascular stent and regression

H&P

A 61-year-old male presented to OSH with h/o episode of acute chest pain about a week ago. CT demonstrated aortic dissection with appearance of intramural hematoma in the ascending segment and communicating dissection of the descending segment. Initially planned surgery was aborted for unclear reasons at OSH and the patient was treated medically.

A repeat CT, performed on day #3 showed expansion of the ascending intramural hematoma and increased size of the descending aorta. The patient was then transferred for further management.

CT

Type-A aortic dissection. Appearance of intramural hematoma in the ascending segment and communicating dissection of the descending segment. Suspected entry tear proximal descending segment.

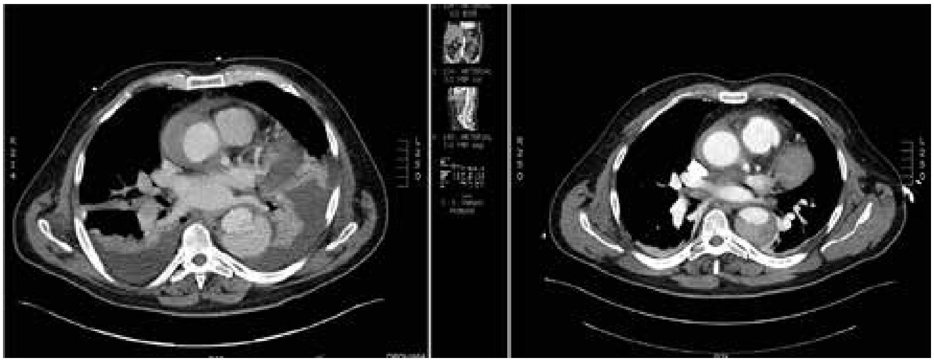


Figure 1 Right and left panel show CT performed at OSH on day #1 and day #3 of admission. CT demonstrates expansion of intramural hematoma of the ascending segment and increase in size of the descending segment.

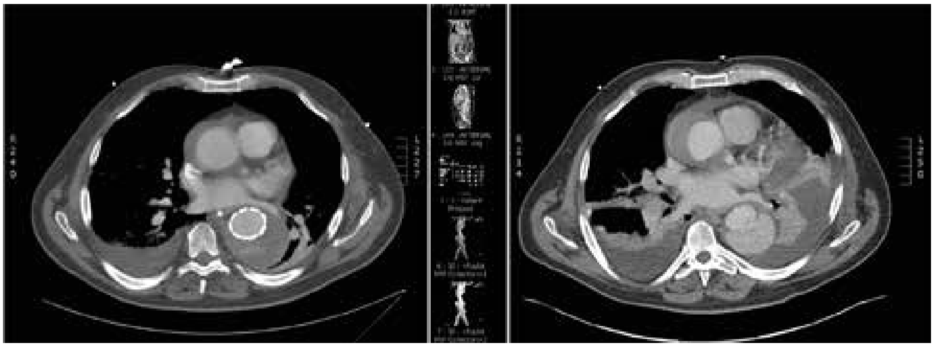
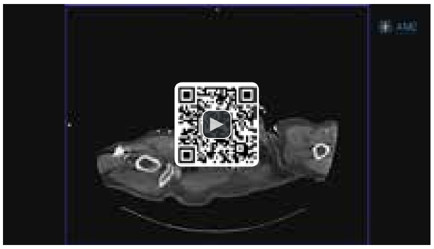


Figure 2 Right and left panel show CT images prior to and 14 days after endovascular stent placement. The intramural hematoma of the ascending segment has decreased in size.



Video 1 CT on day #1 demonstrates intramural hematoma of the ascending segment and communicating dissection of the descending segment.
Available online: http://www.asvide.com/article/view/23607

Video 2 CT on day #3 demonstrates expansion of intramural hematoma of the ascending segment and increase in size of the descending segment.
Available online: http://www.asvide.com/article/view/23608

Video 3 CT images on 14 days after endovascular stent placement show interval decrease in size of the intramural hematoma of the ascending segment. Available online: http://www.asvide.com/article/view/23609

Diagnosis

Type-A aortic dissection.

Management

Surgery.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Procedure

Thoracic endovascular aortic repair with placement of a 37 mm × 20 cm C-TAG device ×3, unilateral exposure of the right common femoral artery, intravascular ultrasound, aortogram, placement of left pleural chest tube, and drainage of pleural effusion.

Operative findings

Patient was oxygenating poorly upon arrival to OR, which was part of the reason why open repair of the ascending aorta was not performed. In addition, the entry tear of his aorta was in the descending aorta.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.2.1 Intramural hematoma with retrograde extension in the ascending aorta

H&P

A 74-year-old female patient with multiple comorbidities, who fell on day of admission while washing dishes with an acute onset of chest and back pain. An initial CT demonstrated aortic intramural hematoma/dissection involving ascending aorta.

CT

Intramural hematoma/dissection involving ascending aorta. However, the entry tear appears to be located in the descending aorta with extension into the proximal ascending aorta.

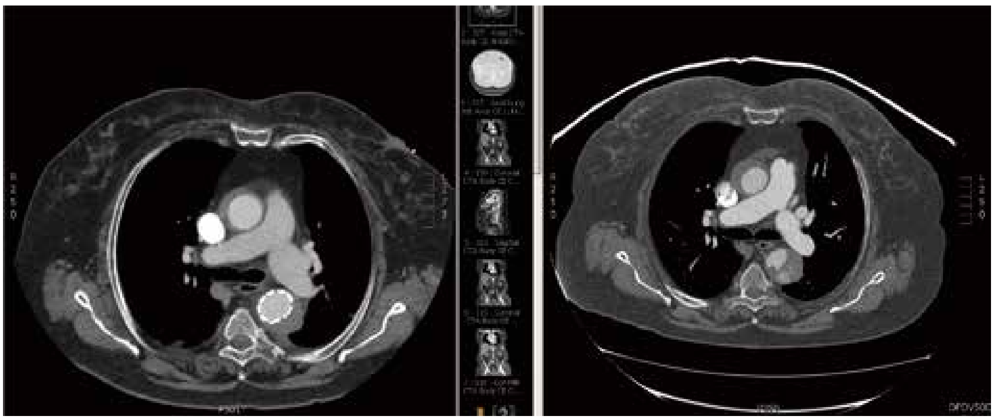


Figure 1 Right panel (admission) and left panel (after stent placement) shows intramural hematoma involving ascending and descending aorta.

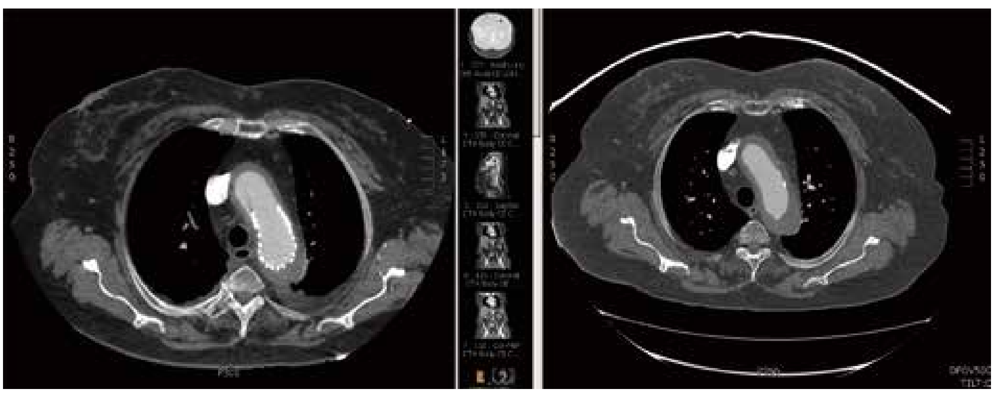


Figure 2 Right panel (admission) and left panel (after stent placement) shows intramural hematoma involving the arch.

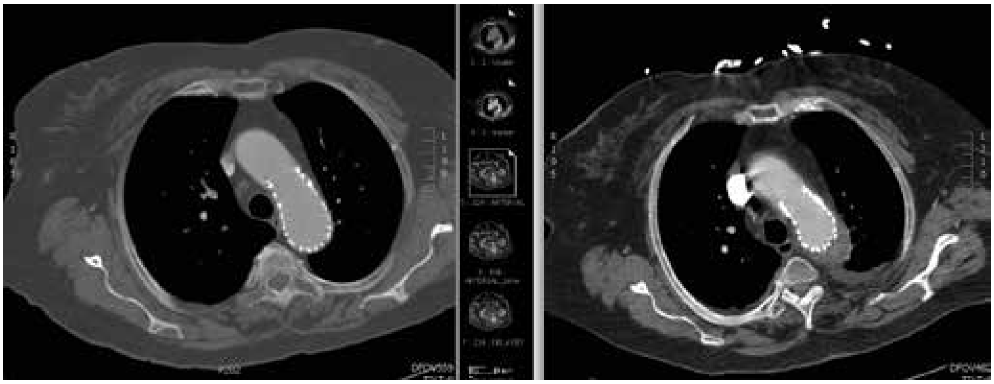
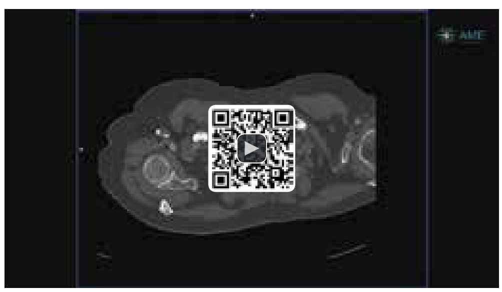


Figure 3 Right panel (1-month F/U) and left panel (6-month F/U) shows resolution of intramural hematoma.

Video 1 CT at time of admission show intramural hematoma/dissection of the ascending and descending thoracic aorta.
Available online: http://www.asvide.com/article/view/23610

Video 2 CT early after endovascular stent placements shows intramural hematoma/dissection of the ascending and descending thoracic aorta.
Available online: http://www.asvide.com/article/view/23611



Video 3 CT 6 months after endovascular stent placements shows almost complete resolution of intramural hematoma/dissection in the ascending segment and stented descending segment.
Available online: http://www.asvide.com/article/view/23612

Diagnosis

Acute type-A aortic dissection with distal entry tear and retrograde dissection, severe lung disease on home oxygen, history of recent lymphoma, status post chemotherapy and steroids, morbid obesity, hypertension.

Management

Given her high surgical risk, and the location of the entry tear in the descending aorta, endovascular therapy was recommended as a first line of treatment.

Emergent/urgent surgery

Anesthesia
General endotracheal.

Operations
Thoracic endovascular aortic repair with unilateral exposure of the right common femoral artery, placement of a 34 mm × 20 cm CTAG thoracic stent graft not involving coverage of the left subclavian artery, completion angiogram, intravascular ultrasound.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.2.2 Dilated ascending aorta with intramural hematoma and small dissecting flap at proximal aortic arch

H&P

An 85-year-old male with h/o CAD, s/p 3V CABG; abdominal aortic aneurysm (AAA) s/p repair; dilated ascending aorta with aortic insufficiency; Alzheimer's disease, nursing home resident.

Presented to ED with hypertension and chest pain/heaviness at OSH. ASA and NTG given without relief. Subsequently negative ECG, and cardiac enzymes.

CT

Dilated ascending aorta with intramural hematoma, with ulcer-like projection and small intimal uplifting/flap at isthmus.

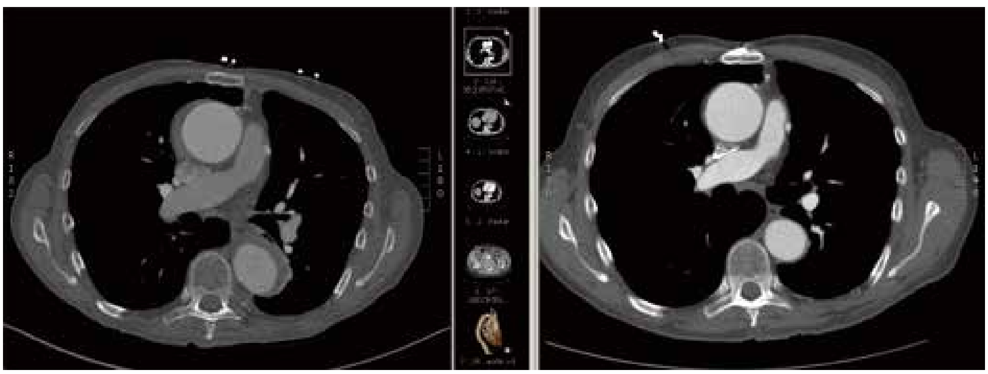


Figure 1 Images at admission (left panel) and 5 years prior (right panel) show new intramural hematoma of the ascending aorta.

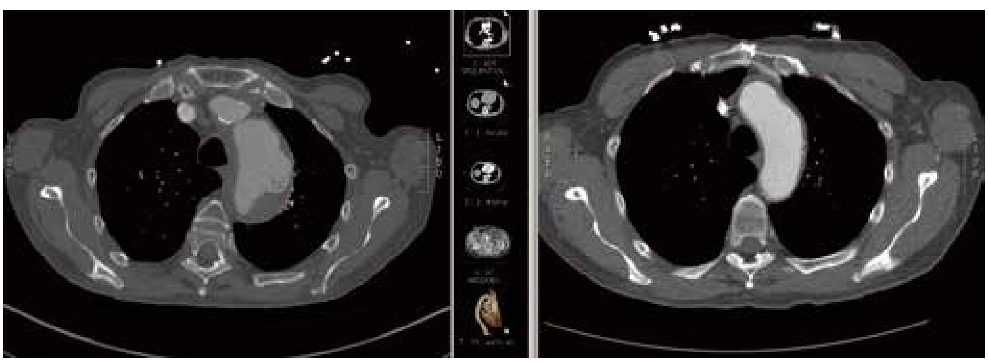


Figure 2 Images at admission (left panel) and 5 years prior (right panel) show changes at isthmus, with ulcer-like projection and small intimal uplifting/flap.

Video 1 Images at admission show intramural hematoma of the ascending aorta and changes at isthmus, with ulcer-like projection and small intimal uplifting/flap.
Available online: http://www.asvide.com/article/view/23613

Video 2 Images 5 years prior to admission.
Available online: http://www.asvide.com/article/view/23614

Diagnosis

Intramural hematoma ascending aorta.

Management

Per discussion with family, non-surgical management of aortic dissection.

Outcome

Discharged with plans for follow-up examination and tomographic aortic imaging if indicated.

2.2.3 Type-A intramural hematoma extending to level of diaphragm

H&P

An 81-year-old female patient presented to ED with chest pain and SOB. States she woke up at 4:00 am that morning and after waking, began to have chest pain, rated as 7/10.

CT

Type-A intramural hematoma extending from the aortic root at the level of the coronary arteries to just above the diaphragmatic hiatus. Ulcer-like projection at the aortic root. Small amount of mediastinal hematoma.

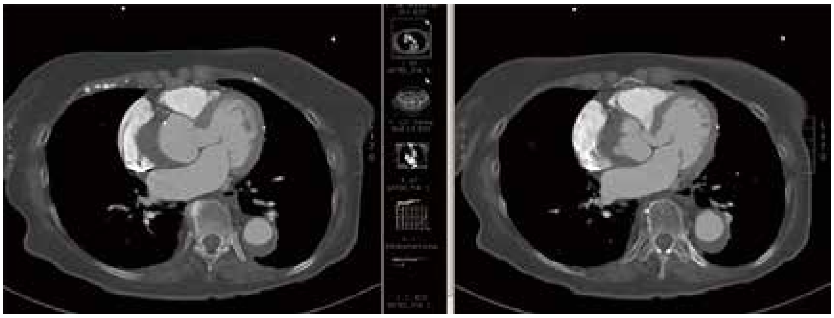


Figure 1 This figure shows the small tear at the aortic root (right panel) and the intramural hematoma of the proximal ascending segment (left panel).

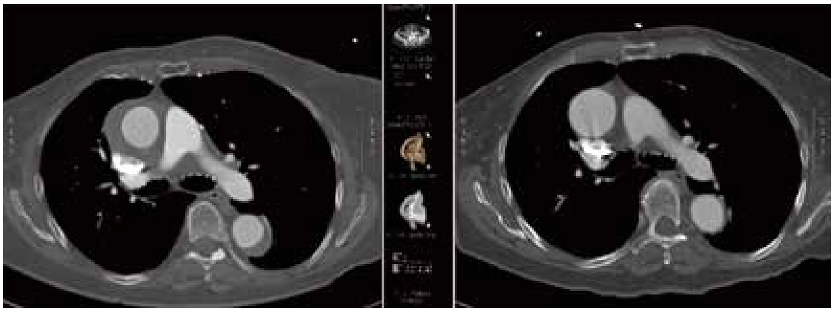
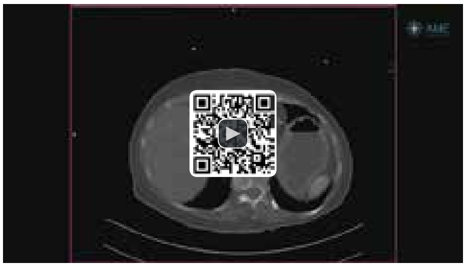


Figure 2 This figure shows the intramural hematoma of the ascending and descending aorta at admission (left panel). The right panel shows the anatomy 5 years prior to admission.

Video 1 The images at admission show the intramural hematoma extending from the dilated aortic root to the diaphragm.
Available online: http://www.asvide.com/article/view/23615



Video 2 Beyond the intramural hematoma, the abdominal aorta has normal dimensions.
Available online: http://www.asvide.com/article/view/23616

Video 3 At follow-up the images show the surgical graft of the root and ascending aorta and the endovascular stent graft of the distal arch and descending aorta.
Available online: http://www.asvide.com/article/view/23617

Diagnosis

Type-A intramural hematoma.

Management

Emergency type-A aortic repair and aortic valve repair replacement.

Current emergent/urgent surgery

Anesthesia

General endotracheal.

Operation

Median sternotomy, right axillary artery cannulation with a 10-mm graft, total root replacement with reimplantation of the coronary arteries and valve replacement with 23 mm freestyle bioprosthesis, ascending replacement with a 24-mm Dacron graft, and total arch replacement with direct placement of a 28 mm × 10 cm CTAG thoracic stent graft with branch grafting of the left subclavian artery with direct placement of a 10 mm × 2.5 cm Viabahn stent graft (branched single anastomosis frozen elephant trunk procedure. Ligation of the left atrial appendage.

Operative findings

Blood staining in the mediastinum and a bloody pericardial effusion. Tear identified in the non-coronary sinus of her aorta with blood products extending all around the root and the ascending aorta and through the arch. Tissue and her aortic root was fragile and aortic valve, although tricuspid was thin-walled with many fenestrations at the commissures.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.2.4 Type-A intramural hematoma ulcer-like projection

H&P

A 45-year-old female presented to OSH with sudden onset of retrosternal chest pain and tingling in both hands. Known h/o HTN with blood pressure at presentation to OSH of 260/150. CTA chest demonstrated an intramural hematoma beginning in the ascending aorta.

She was transferred for further management. On arrival she was chest pain free and her blood pressure was well controlled at 120/60. H/o previous TIA on Plavix.

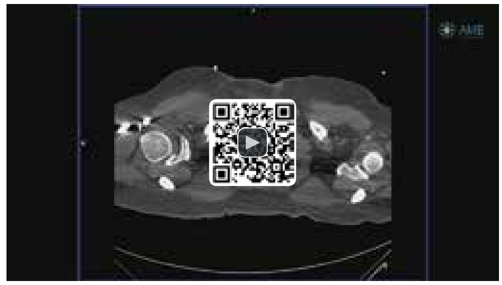
CTA

Type-A intramural hematoma/dissection beginning at the STJ and extending through the proximal descending aorta. Focal communicating focal false lumen at the arch ('ulcer-like projection'); involvement of the left common carotid artery.

Mid ascending measures about 4.5 cm.

Figure 1 Shows wall thickening of the ascending aorta and arch, with focal communicating false lumen at the arch.

Video 1 Shows wall thickening of the ascending aorta and arch, with focal communicating false lumen at the arch.
Available online: http://www.asvide.com/article/view/23618



Video 2 Post-operative images show graft of the ascending aorta and arch, and continuous endovascular stent graft.
Available online: http://www.asvide.com/article/view/23619

Diagnosis

Type-A intramural hematoma/dissection.

Management

Urgent surgery with graft ascending aorta, total arch, frozen elephant trunk, and CABG with graft to RCA.

Current emergent/urgent surgery

Anesthesia
General endotracheal anesthesia.

Operation

Emergency repair of acute type-A dissection utilizing deep hypothermic circulatory arrest, right axillary cannulation with 8-mm Vascutek graft, selective antegrade cerebral perfusion, frozen elephant trunk repair of the arch with size 31×10 Gore Tag endograft with fenestration into the left subclavian and deployment of a 13×2.5 Viabahn endograft and reconstruction of the remainder of the arch and ascending with size #30 Vascutek graft, coronary artery bypass ×1, and saphenous vein to PDA.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.3.1 Focal intimal tear/limited dissection c/w type-A aortic dissection

H&P

A 48-year-old male patient with h/o HTN presented to OSH with acute chest pain. Pain was described as pressure like, not radiating, associated with nausea and sweating. There was concern for an intramural hematoma of the ascending aorta on a non-ECG-synchronized CTA. The patient was transferred for further management.

CT (repeat CTA with ECG-synchronisation)

Type-A aortic dissection with limited tear/flap in the ascending segment (medial aspect of mid-ascending aorta.

Intramural hematoma of the ascending aorta and arch, extending into the proximal left carotid artery.

Small size likely hemorrhagic pericardial effusion.

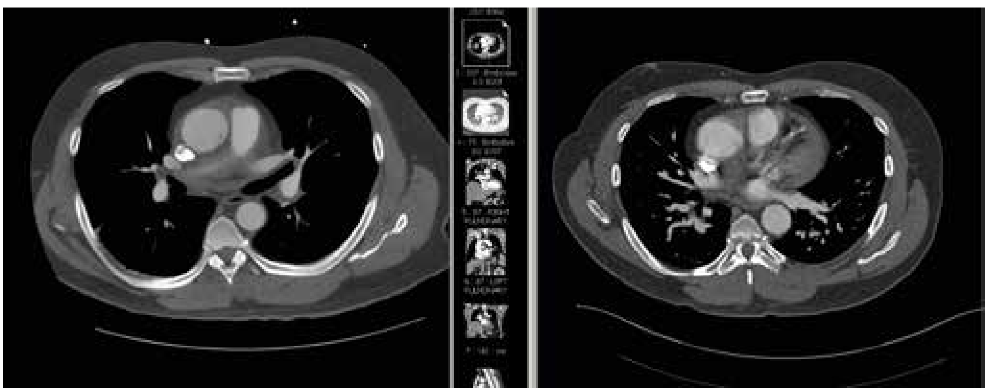


Figure 1 Images at the mid ascending aorta (non-ECG-synchronized study right panel; repeat ECG-synchronized study left panel) show a limited tear/dissection flap in the medial aspect of the mid ascending aorta.

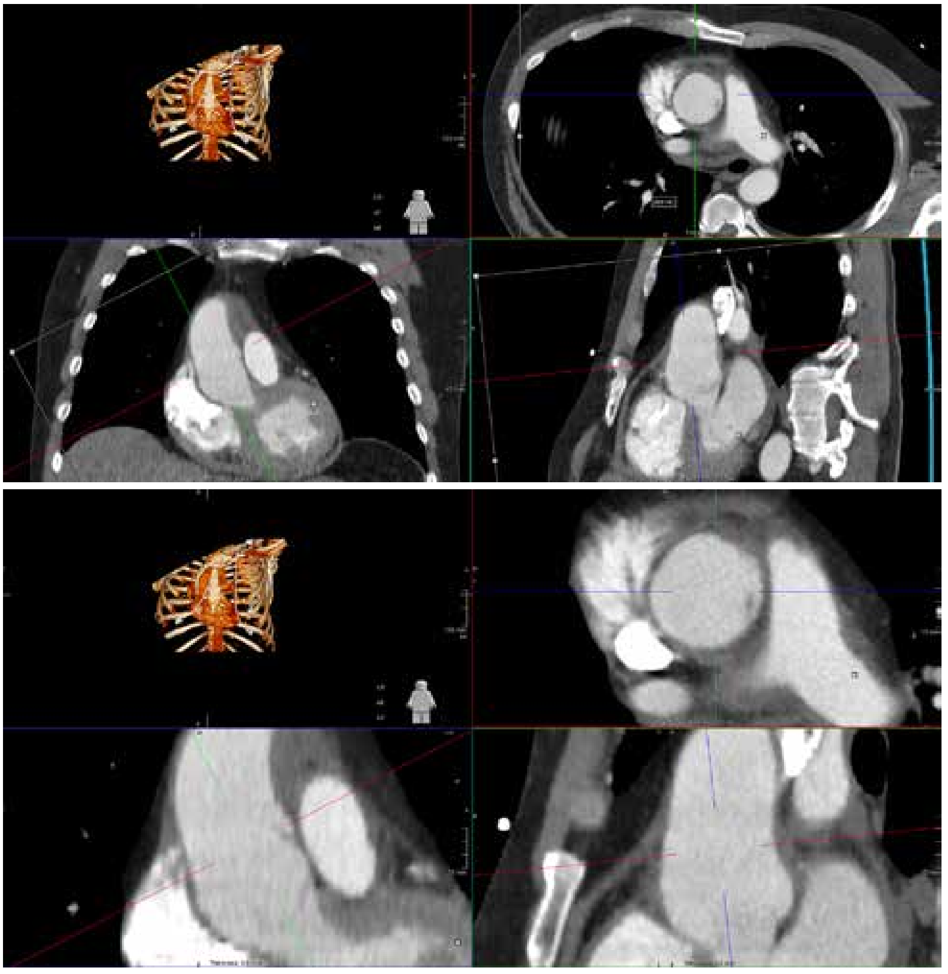


Figure 2 The limited tear/dissection flap in the medial aspect of the mid ascending aorta is better demonstrated on reconstructed MPR images.

Video 1 Initial non-ECG-synchronized CTA at OSH shows findings c/w an intramural hematoma involving the distal ascending aorta and arch (including proximal left carotid artery). Also seen is a likely hemorrhagic pericardial effusion.
Available online: http://www.asvide.com/article/view/23620

Video 2 The subsequent ECG-synchronized CTA again shows the intramural hematoma involving the ascending aorta and arch. In addition, a limited tear/flap is seen in the medial aspect of the mid-ascending aorta (masked by motion artifact in the non-ECG-synchronized study). Also seen is a likely hemorrhagic pericardial effusion.
Available online: http://www.asvide.com/article/view/23621

Video 3 A CT scan a few days after surgery shows the supra-coronary graft of the ascending aorta and arch, and the endovascular stent of the descending aorta. A side stent is seen in the ostium of the left subclavian artery. There are moderate post-operative blood products surrounding the grafted ascending aorta and there is a moderate size post-operative pericardial effusion.
Available online: http://www.asvide.com/article/view/23623

Video 4 A CT scan 3 months after surgery shows the supra-coronary graft of the ascending aorta and arch, and the endovascular stent of the descending aorta. A side stent is seen in the ostium of the left subclavian artery.
Available online: http://www.asvide.com/article/view/23624

Diagnosis

Type-A aortic dissection.

Management

Surgical intervention planned by CTS team.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Operation

Emergency median sternotomy, valve-preserving aortic root replacement with reimplantation of the coronary arteries and aortic valve with a 30-mm Valsalva graft (a modified David's reimplantation procedure), ascending aorta replacement with 26-mm Dacron graft, total arch and proximal descending aortic repair with direct placement of a 28 mm × 10 cm CTAG thoracic stent graft with on-table fenestration of the stent graft and direct stent grafting of the left subclavian artery with placement of a 13 mm × 2.5 cm Viabahn stent graft (branched single anastomosis frozen elephant trunk repair), hypothermic circulatory arrest with selective antegrade brain perfusion.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.3.2 Type-A aortic dissection/focal intimal tear

H&P

An 83-year-old female patient with PMHx significant for essential tremor who presented to OSH with chest pain of 1-day duration and progressively worsening. Pain was described as 10/10 in severity, relieved by leaning forward and exacerbated by lying flat; associated symptoms included nausea, vomiting, and dry cough. A CT chest was done at the OSH and showed 7 cm ascending aortic aneurysm with possible dissection. In addition, a moderate pericardial effusion was noted. The patient was transferred to the tertiary care center.

On arrival in the ICU, her systolic B/P started to drop to 60–70 s, she required 3 liters of NS and 1 unit of blood.

CT

Repeat CT showed the finding c/w for type-A dissection with intimal flap and hemopericardium.

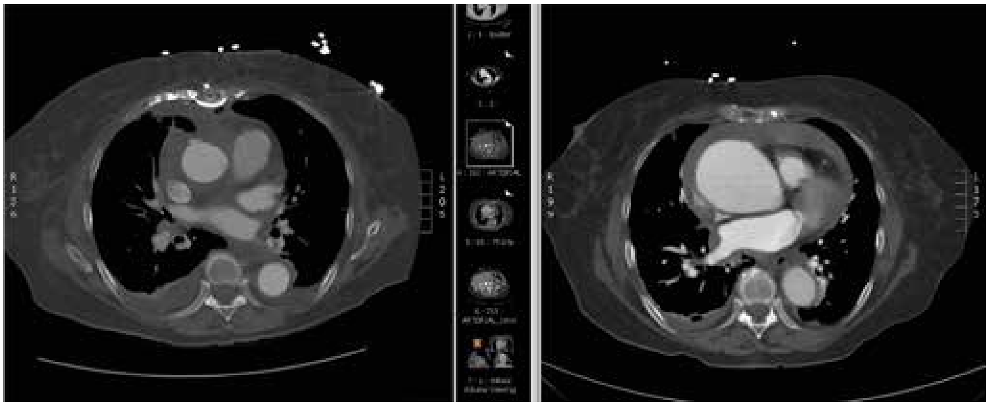


Figure 1 The CT on admission (right panel and *Figure 2*) shows aneurysmal dilatation of the ascending aorta with a small intimal tear in the anterior aspect of the mid-ascending aorta. There is a moderate size hemorrhagic pericardial effusion. The left panel shows a post-operative image at the level of the mid-ascending aorta.

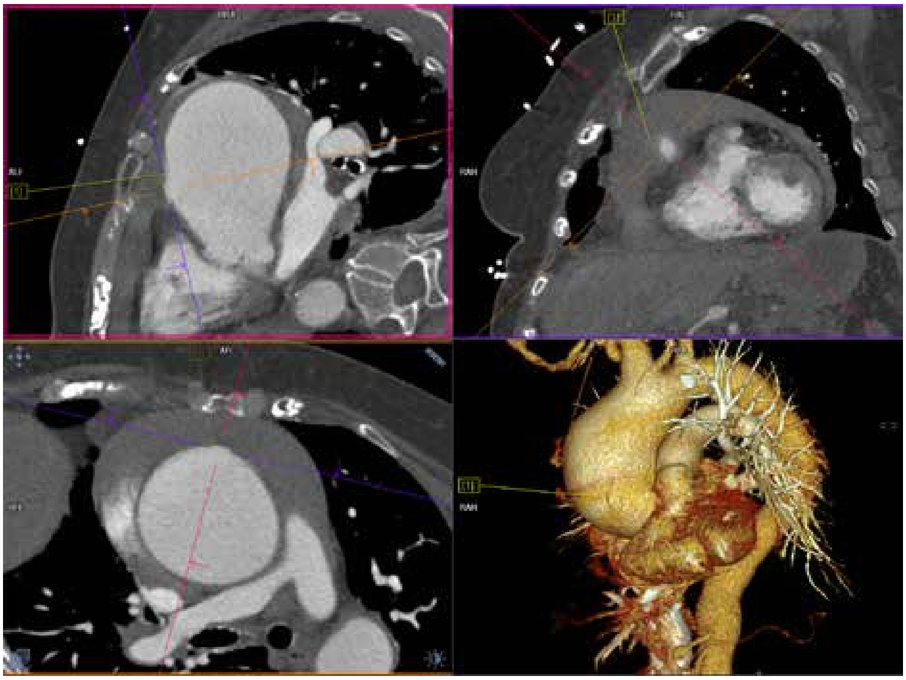


Figure 2 Reconstructed MPR images clearly show the focal intimal tear in the anterior aspect of the mid ascending aorta. This is also seen on the VRI image (right lower panel).

Video 1 The CT shows aneurysmal dilatation of the ascending aorta with a small intimal tear in the anterior aspect of the mid-ascending aorta. There is a moderate size hemorrhagic pericardial effusion. The ECG-synchronized CT (*Figure 1*) shows the small intimal tear more clearly.
Available online: http://www.asvide.com/article/view/23625

Video 2 In the non ECG-synchronized CT, the intimal tear is not clearly identified.
Available online: http://www.asvide.com/article/view/23626

Video 3 The post-operative CT shows the bio-prosthetic valve and the supra-coronary graft of the ascending aorta. There is residual dissection in the innominate and right subclavian artery.
Available online: http://www.asvide.com/article/view/23627

Diagnosis

Type-A aortic dissection.

Management

Emergency surgical repair.

Emergent/urgent surgery

Anesthesia
General endotracheal.

Operation

Emergent repair with aortic valve replacement with 21 mm Carpentier-Edwards pericardial valve, supra-coronary graft ascending aorta.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.1 Acute type-A dissection and severe aortic regurgitation

H&P

A 60-year-old female with h/o hypertension and smoking. She developed severe chest pain on day of admission.

CT

Type-A aortic dissection.

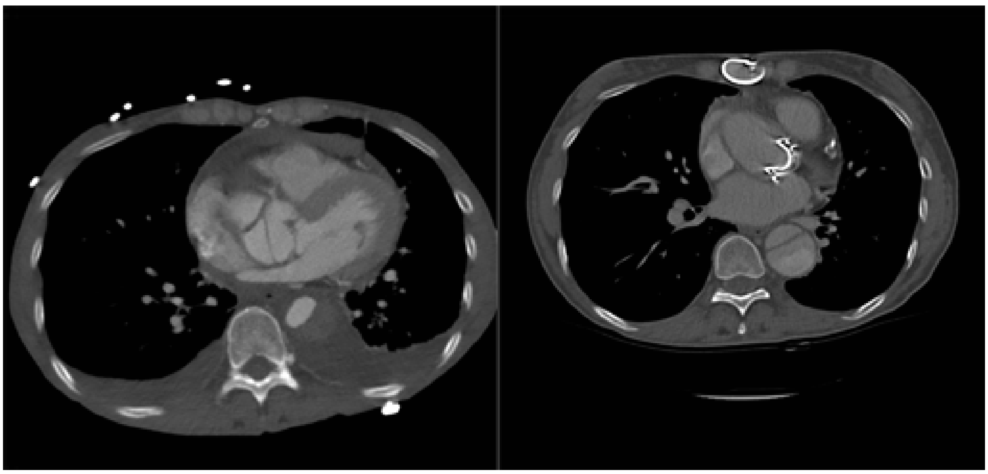


Figure 1 Left and right panel show aortic root prior and after surgery (AVR).

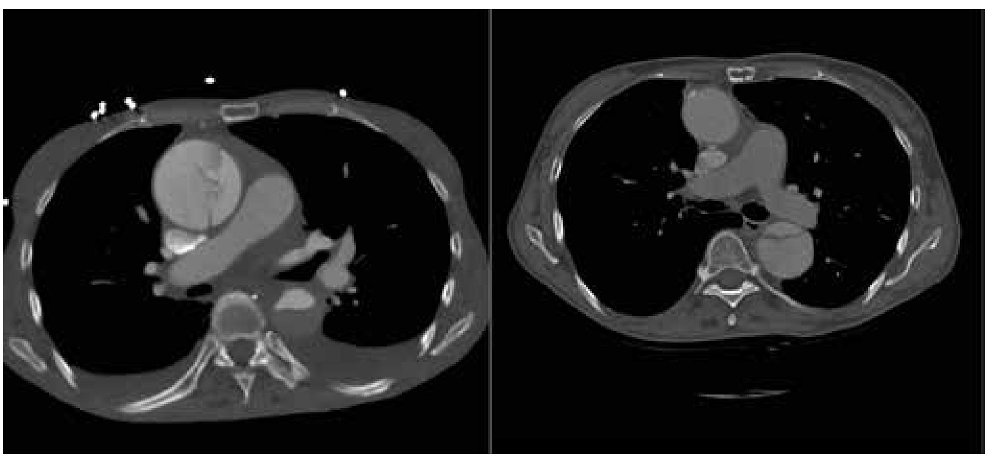
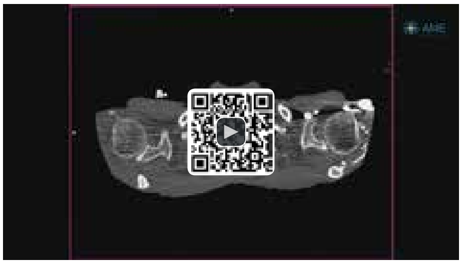


Figure 1 Left and right panel show mid ascending aorta prior and after surgery.



Video 1 This video shows aortic anatomy at the time of admission (chest).
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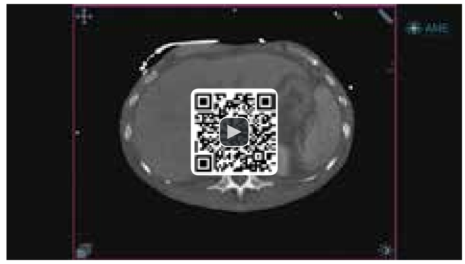


Video 2 This video shows aortic anatomy at the time of admission (abdomen).
Available online: http://www.asvide.com/article/view/23629

Video 1 This video shows aortic anatomy after surgery (chest). Available online: http://www.asvide.com/article/view/23630

Diagnosis

Acute type-A dissection with severe aortic regurgitation.

Management

Emergency surgery.

Emergent/urgent surgery

Anesthesia
General.

Procedure

Median sternotomy, open heart, ascending aorta replacement with AVR conduit, aortic valve replacement with #25 Carpentier Edwards valve, and ascending aorta replacement with Gelweave graft #32.

Operative findings

Dilated ascending aorta, with circumferential dissection above the STJ. Proximal tear was identified at the level of the ST junction. Associated 3 to 4+ AI. The intima of the aortic arch was completely intact. The re-entry tear was not identified.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.2 Acute type-A aortic dissection with pericardial effusion

H&P

A 61-year-old male with a past medical history of hypertension, presented to ED on day of admission with ongoing abdominal discomfort, lower extremity weakness, and confusion. A CT scan at the OSH demonstrated type-A aortic dissection with pericardial effusion. Following the CT scan the patient demonstrated decreased neurological function and was intubated prior to transfer.

During transport (helicopter) the patient became bradycardia and developed asystole. CPR/ACLS was successfully performed.

On arrival in the ICU, a bedside echo showed normal LVEF, no gross AV pathology but a complex pericardial effusion with diastolic collapse of RV consistent with tamponade.

CT

Type-A aortic dissection with pericardial effusion.

Dissection extending from the aortic root to the bilateral iliac arteries.

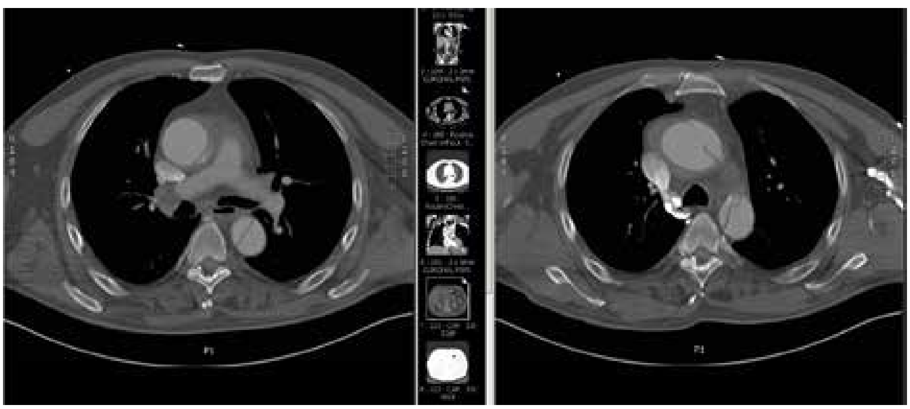


Figure 1 Images show type-A aortic dissection with flap seen in the ascending aorta. There is a large tear in the distal ascending segment (right panel).

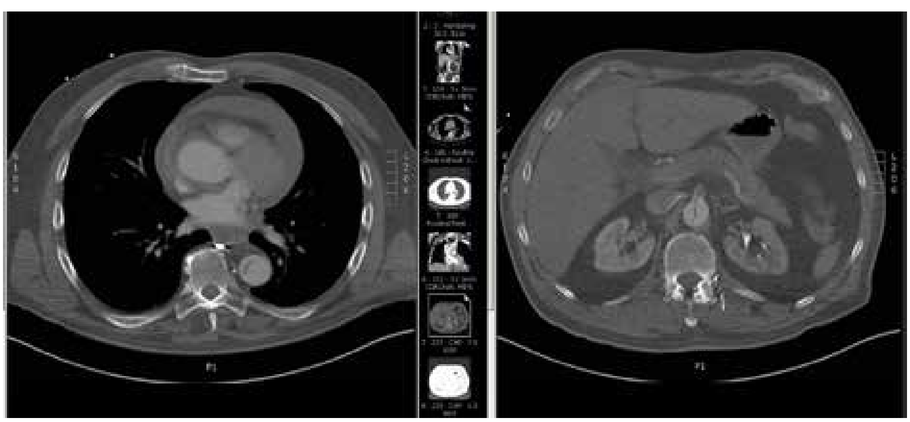
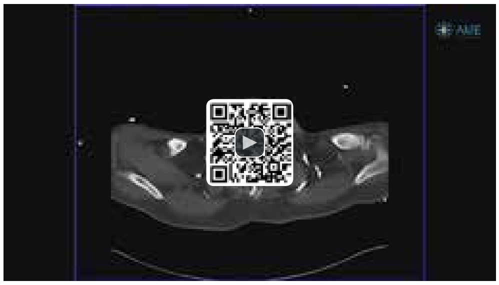


Figure 2 Images show hemorrhagic pericardial effusion and extension into the visceral branch vessels.



Video 1 Images show type-A aortic dissection with flap seen in the ascending aorta. There is a large tear in the distal ascending segment hemorrhagic pericardial effusion and extension into the visceral branch vessels.
Available online: http://www.asvide.com/article/view/23631

Diagnosis

Type-A aortic dissection with tamponade.

Management

Emergency surgery.

Emergent/urgent surgery

Anesthesia
General.

Operations
Emergency type-A aortic dissection repair with an ascending aorta and hemiarch replacement, right axillary cannulation and deep hypothermic circulatory arrest. The ascending aorta and hemiarch was replaced with a 32-mm Gelweave graft.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.3 Type-A aortic dissection with hemorrhagic pericardial effusion and blood products/stranding in the mediastinum

H&P

A 73-year-old female patient with h/o HTN and reported aortic ectasia presented to regional hospital with sharp thoracic pain. Pain started at 1:30 am when she woke up with upper back pain extending from one shoulder to the other. Pain lasted around 10 minutes, 10/10 stabbing feeling. Took some ibuprofen with minimal relief. Called 911 around 9 am and was taken to ED.

After CT scan was transfer to tertiary hospital. She received 1 unit of blood *en route*.

She still experienced back pain rated 4/10 when she arrived in CICU.

CT

Type-A aortic dissection, with small hemorrhagic pericardial effusion and blood products/stranding in the mediastinum.

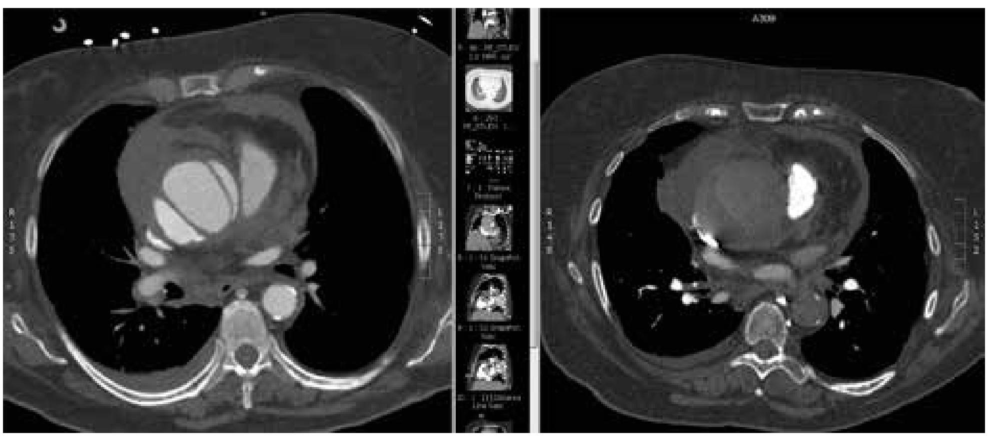
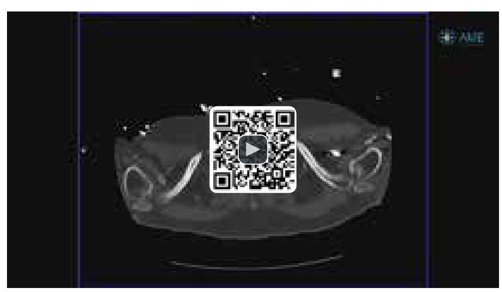


Figure 1 Contrast timing for the initial scan in the ED was timed for the pulmonary artery, with limited contrast in the aorta (right panel). The repeat scan (2 hours later) clearly shows the dissection flap (left panel). Also seen is the hemorrhagic pericardial effusion and the blood products stranding in the mediastinum.

Video 1 Initial scan in the ED was timed for the pulmonary artery, with limited contrast in the aorta.
Available online: http://www.asvide.com/article/view/23632



Video 2 Repeat scan (2 hours later) clearly shows the dissection flap in the ascending aorta. Also seen is the hemorrhagic pericardial effusion and the blood products stranding in the mediastinum.
Available online: http://www.asvide.com/article/view/23634

Diagnosis

Type-A dissection with mediastinal blood products/evidence of leakage.

Management

Emergency surgery.

Current emergent/urgent surgery

Operations

Emergency median sternotomy and type-A aortic dissection repair with a supracoronary graft, Gelweave graft #30, and chest open.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.4 Type-A IMH with cardiac tamponade

H&P

An 81-year-old male patient presented to OSH with chest pain. A CT at the OSH identified type-A IMH. He was transferred for further management. Immediately after arrival in the ICU, he developed unstable hemodynamics and pressors were started. However, the patient remained hypotensive (systolic 60's) and lethargic.

CT

Type-A aortic IMH/dissection:

- 5 mm eccentric rim ascending aorta, c/w IMH;
- Hemorrhagic pericardial effusion;
- Stranding surrounding ascending aorta and arch, suspicious for blood products;
- Linear appearance medial aspect of mid ascending, but unclear if motion artifact.

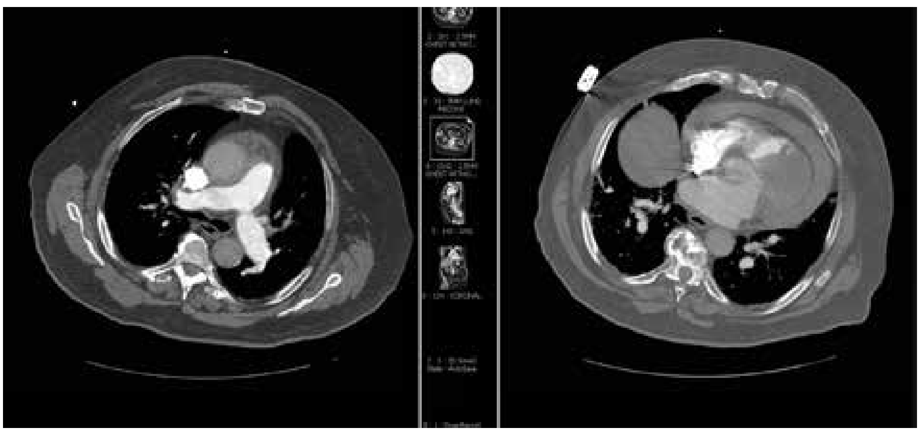


Figure 1 Shows type-A IMH with thin rim surrounding the ascending aorta. In addition, there is a hemorrhagic pericardial effusion.

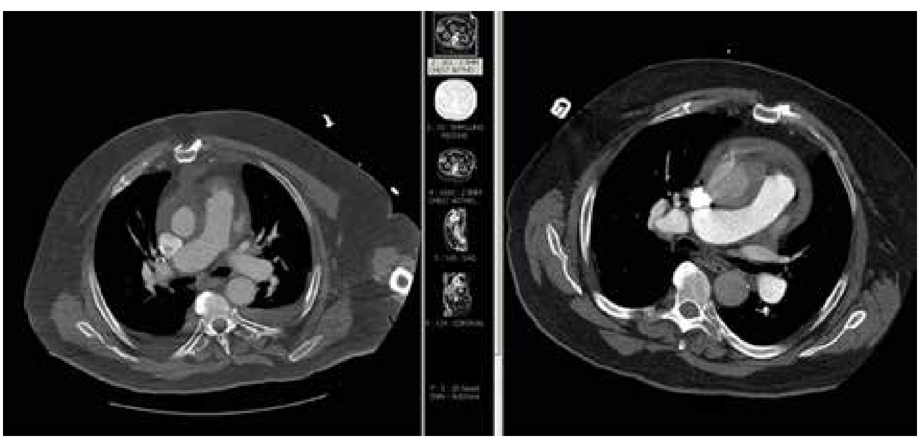
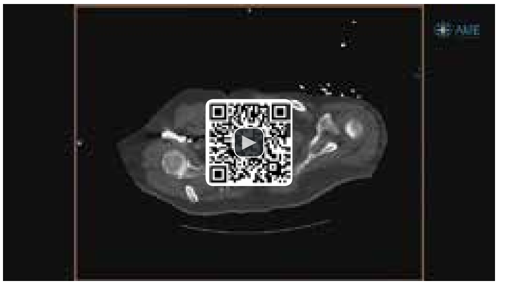


Figure 2 Image at the mid ascending level, prior to and early after surgery. The post-operative images show an expected moderate amount of blood products surrounding the grafted ascending aorta.

Video 1 Pre-operative CT show the type-A IMH and hemorrhagic pericardial effusion.
Available online: http://www.asvide.com/article/view/23636



Video 2 Post-operative CT show the graft of the ascending aorta surrounded by blood products.
Available online: http://www.asvide.com/article/view/23637

Diagnosis

Type-A IMH with hemorrhagic pericardial effusion/tamponade

Management

An emergent bedside echo showed an enlarging pericardial effusion.

Therefore, an emergent salvage pericardiocentesis with echo cardiographic guidance with access through the left 5th intercostal space below the nipple was performed.

Three hundred mL of blood was aspirated and the hemodynamics of the patient immediately improved.

Subsequent emergency surgical repair.

Current emergent/urgent surgery

- ❖ General anesthesia;
- ❖ Ascending aorta replacement (Hemashield 30).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.5 Type-A aortic dissection with mediastinal hemorrhage—metastatic rectal cancer

H&P

A 68-year-old male with PMH of HTN, adenocarcinoma of rectum with metastasis to the lungs.

He presented to OSH with tearing sharp chest pain radiating to the back along with fatigue, SOB, and sweating. A CT identified a type-A aortic dissection and suspected saddle pulmonary embolism. He was transferred to the tertiary care center for further management.

CT

Type-A dissection with mediastinal hemorrhage and severe compression of PA branches

Narrowing of the true lumen descending thoracic aorta near the level of the diaphragm, almost completely occluded. Solid and cavitary lung lesions, most consistent with metastasis.

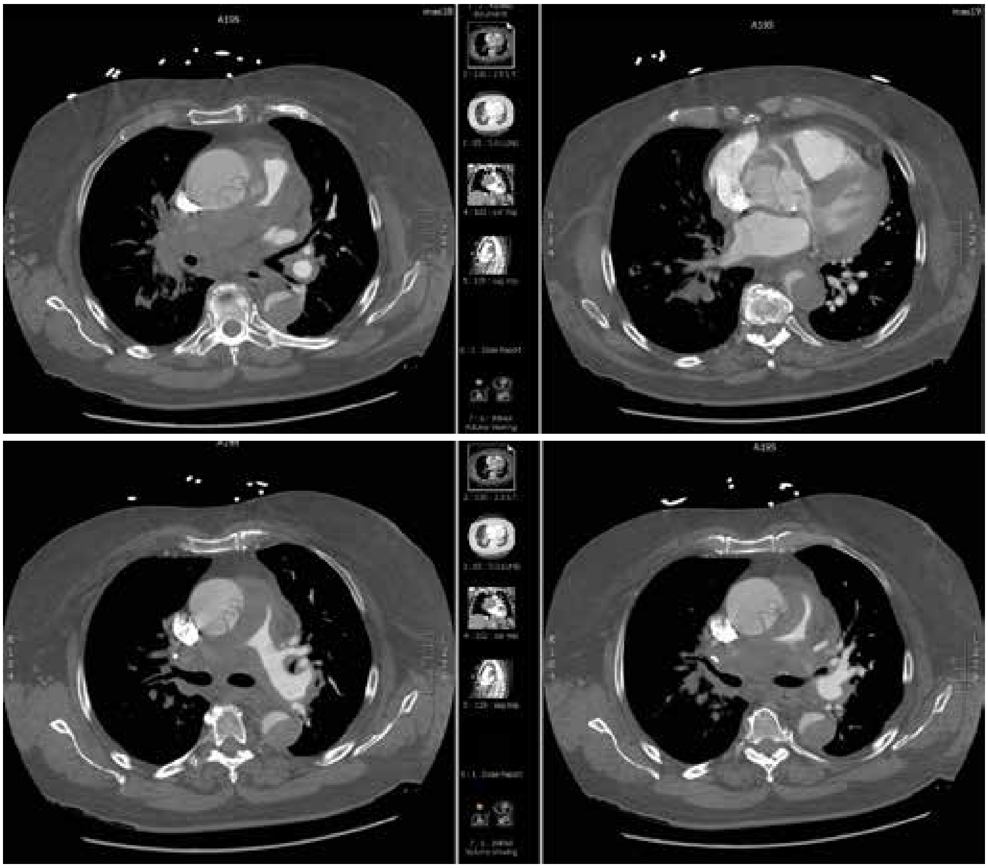


Figure 1 Images at admission show type-A dissection and mediastinal blood products; compression of the PA branches.

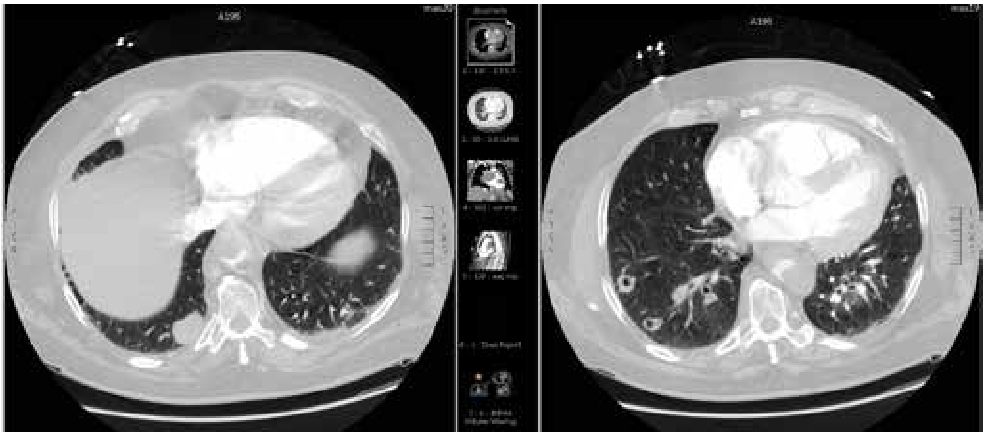
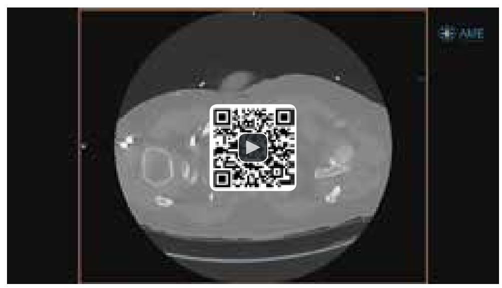


Figure 2 Solid and cavitary lung lesions, most c/w metastasis.

Video 1 Image shows type-A dissection and mediastinal blood products.
Available online: http://www.asvide.com/article/view/23638



Video 2 Image shows lung lesions.
Available online: http://www.asvide.com/article/view/23639

Diagnosis

Type-A aortic dissection with mediastinal hemorrhage.

Metastatic rectal cancer.

Management

- ❖ Patient was not surgical candidate;
- ❖ Medical management;
- ❖ Palliative care.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.6 Type-A aortic dissection with evidence of contained rupture

H&P

An 85-year-old female patient with h/o HTN, remote hx of nephrectomy due to kidney cancer.

On day of admission presented with sudden onset severe 10/10 back pain and associated SOB, nausea and diaphoresis. The pain started while she was going up a flight of stairs, was initially located between her shoulder blades and the radiated to her chest. Her BP upon arrival was 179/90 mmHg.

Just before having a CT scan she became unresponsive and was intubated. She became bradycardic with a brief episode of asystole. Atropine and epinephrine were given once and one round of chest compression was performed. Patient came back into sinus rhythm with normal BP. She then underwent CTA showing type-A aortic dissection and was transferred to main campus ICU.

At arrival, patient's HR was 70 and BP was 122/65. A CT brain was done which was negative.

CTA was reviewed by our radiologist who read the film as aortic dissection starting from the sinuses of Valsalva, including the initial branch of the RCA. It extends to the mid arch then stops. It was complicated by a rupture and mediastinal hematoma with possible extension to the left pleural space. Her brachiocephalic and common carotids are spared.

CT

- Proximal type-A from root to arch;
- Diameter ascending about 5.4 cm;
- Mediastinal blood products c/w contained rupture;
- Small amount of pericardial fluid;
- No involvement of arch branch vessels.

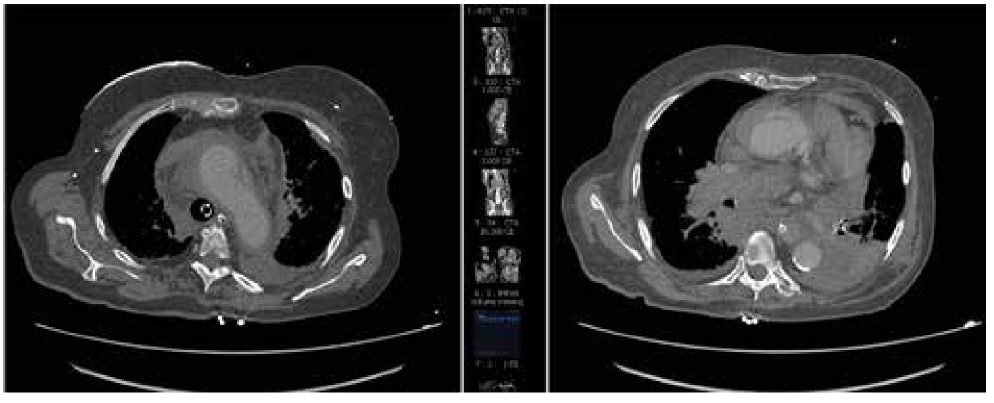


Figure 1 The images show the dissection flap of the ascending aorta and arch, with surrounding blood products in the mediastinum.

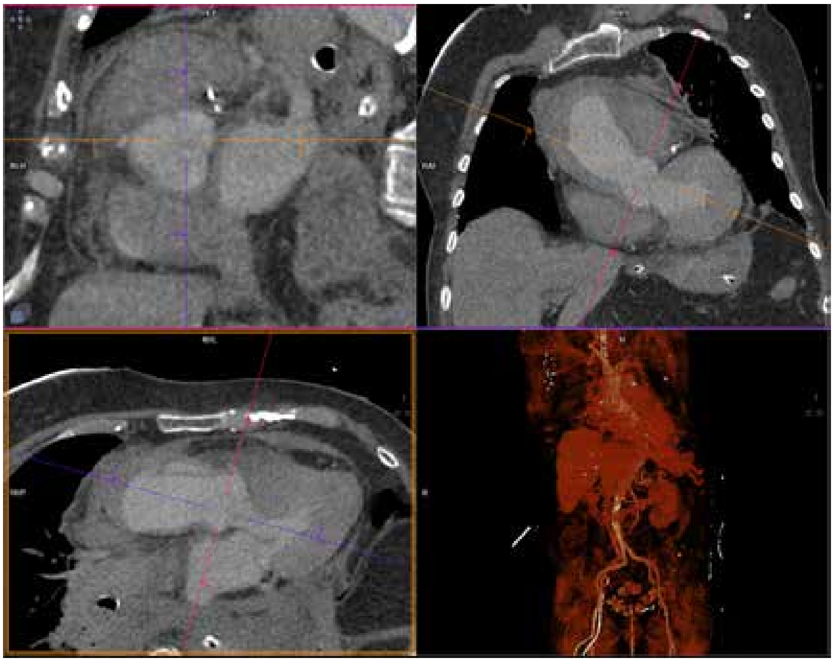
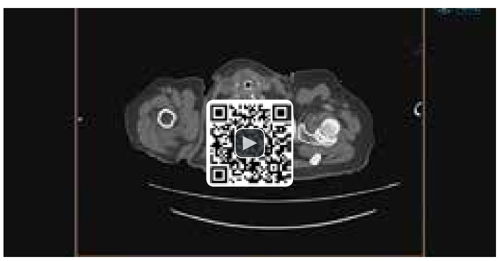


Figure 2 3D MPR reconstructions images show the dissection flap just above the origin of the coronary arteries.



Video 1 The image shows the dissection flap of the ascending aorta and arch, with surrounding blood products in the mediastinum. Available online: http://www.asvide.com/article/view/23640

Diagnosis

Type-A aortic dissection with contained rupture.

Management

While the CT head showed no hemorrhage, the patient did not follow commands, and showed evidence of multi-organ failure.

After discussion with cardiothoracic surgery and family, it was decided that the patient is not a surgical candidate. Her code status was changed to DNR/DNI. Her clinical condition continued to decline and she passed away without any visible distress 3 days after admission.

Outcome

Exitus letalis.

2.4.7 Type-A dissection with bilateral carotid artery occlusion

HPI

A 52-year-old female with a history of hypertension, and remote cryptogenic right occipital lobe infarct. Admitted to ED after collapsing suddenly at work. CT-head showed no acute intracranial hemorrhage. However, chest CTA showed type-A aortic dissection with flap extending from the aortic root into the descending aorta with involvement of the innominate, right and left common carotids, and left subclavian arteries.

She was transferred after intubation for further management.

CT

Type-A aortic dissection with bilateral carotid artery occlusion.

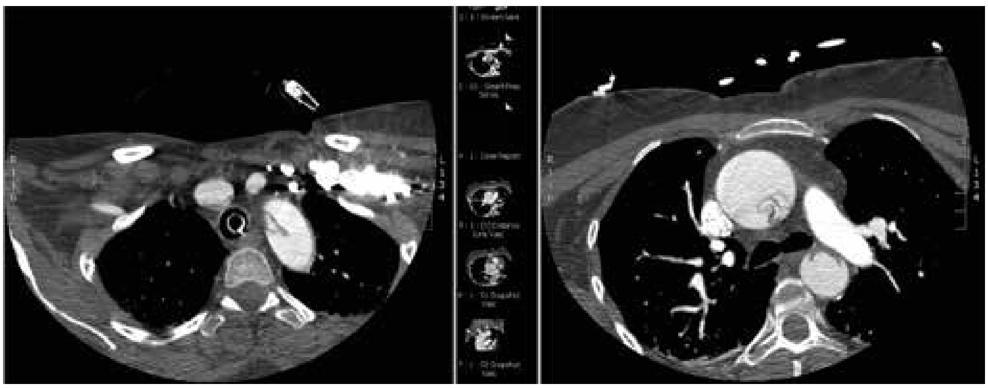


Figure 1 CT at admission shows type-A aortic dissection with small true lumen ascending segment and compressed true lumen descending segment.

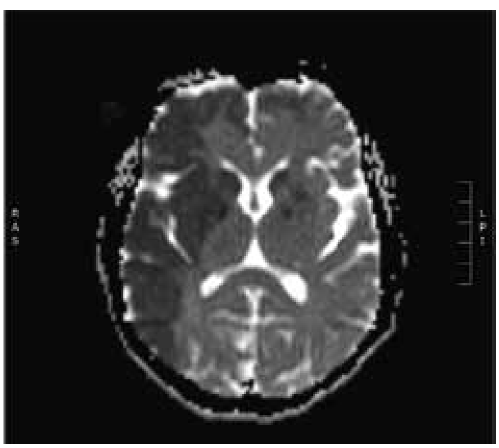


Figure 2 Brain MRI shows extensive damage in right hemisphere.

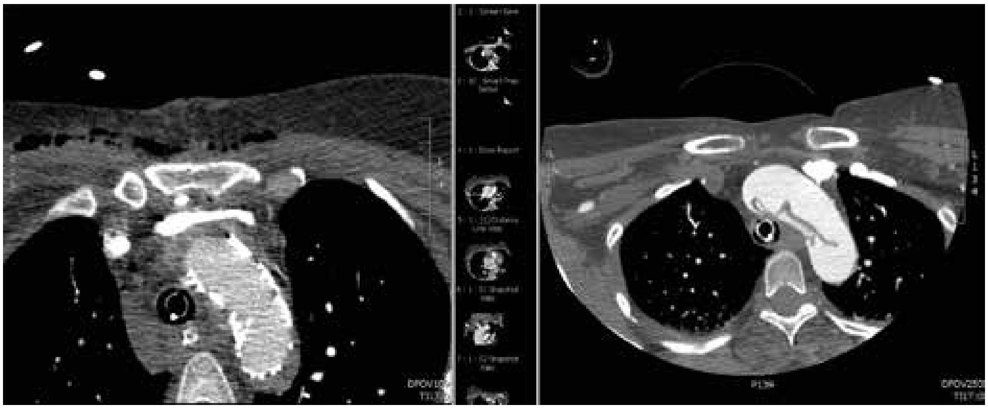


Figure 3 Images post-surgical repair shows stented proximal descending segment (left panel); pre-operative anatomy at the time of admission (right panel).

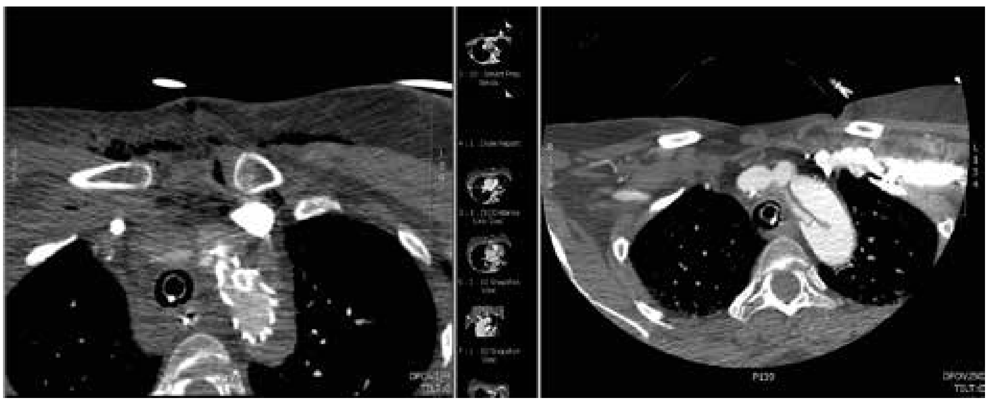


Figure 4 Images post-surgical repair shows side stent in the left subclavian artery (left panel); pre-operative anatomy at the time of admission (right panel).

Video 1 Image shows extent of dissection flap, with compressed false lumen in the carotid arteries.
Available online: http://www.asvide.com/article/view/23641

Diagnosis

Type-A aortic dissection with anoxic brain injury.

Management

Emergency surgery.

Emergency surgery

Anesthesia
General.

Procedure
A unicuspid valve was identified. AVR/root replacement (#23 Freestyle), Ascending/arch replacement (24 Gelweave T-graft), frozen elephant trunk (28×10 TAG), LSCA stent (10×2.5 Viabahn).

Outcome

Exitus letalis.

Patient did not recover from anoxic brain injury.

2.4.8 Type-A aortic dissection with compressed true lumen aorta and branch vessels

H&P

A 72-year-old male who presents with a past medical history significant for hypertension, tobacco use (>50 pack years), diabetes mellitus, secondary hemochromatosis myelodysplastic syndrome. He presented to an outside hospital with 3–4 hours history of abdominal pain.

A CT scan demonstrated type-A aortic dissection.

CT

Type-A aortic dissection:

- ❖ Flap begins at level of RCA ostium;
- ❖ Mid-ascending aorta measures 5.3 cm;
- ❖ Mediastinal blood products/stranding (extending along PA);
- ❖ Compressed/occluded true lumen right carotid;
- ❖ Compressed true lumen descending thoracic and juxtarenal, involving visceral branch ostia;
- ❖ Compressed/occluded left renal;
- ❖ Flap appear to end in infrarenal;
- ❖ Calcified CAD;
- ❖ Dilated LV.

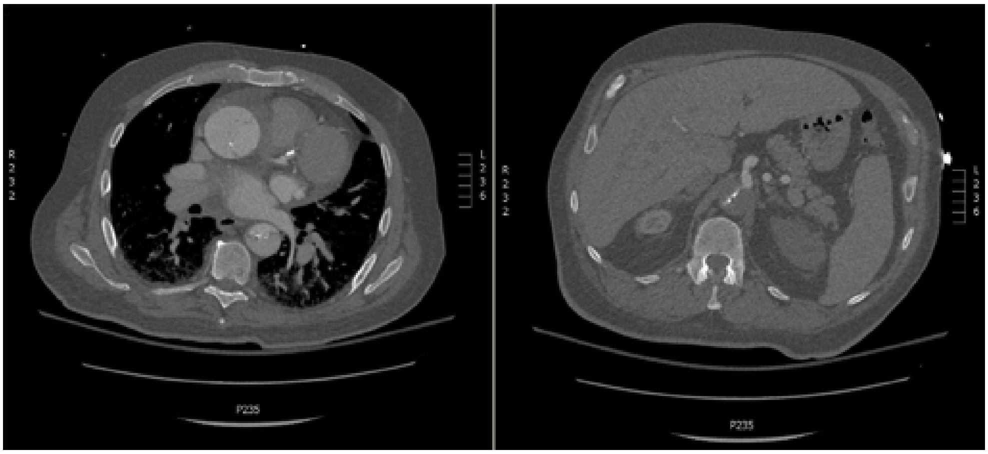
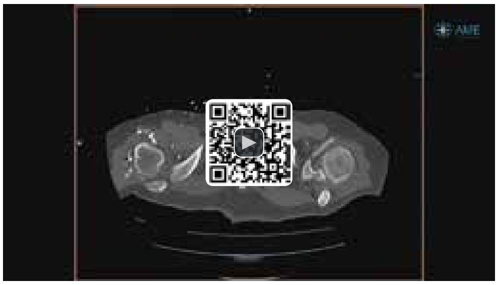


Figure 1 Images at the time of admission show dissection flap in the ascending and descending aorta (left panel). The true lumen is severely compressed in the abdominal aorta (right panel).



Video 1 Images at the time of admission show dissection flap in the ascending and descending aorta. The true lumen is severely compressed in the abdominal aorta.
Available online: http://www.asvide.com/article/view/23642

Diagnosis

Type-A aortic dissection.

Plan

Emergency surgical repair.

Current emergent/urgent surgery

Anesthesia
General

Procedures

Ascending aortic dissection repair, #32 Hemashield graft ascending aorta and hemi-arch, AVR #25 Carpentier Edwards.
Developed overwhelming acidosis, failure to wean from cardiopulmonary bypass, exitus letalis.

Outcome

Exitus letalis in operating room.

2.4.9 Type-A aortic dissection with iliac occlusion

H&P

A 72-year-old male with h/o CAD, s/p CABG, ICM with severe LV systolic dysfunction, significant mitral regurgitation.

Reportedly experienced intermittent pain in his chest and right leg in the 2 weeks prior to admission. On the day of admission, he experienced crushing midsternal chest pain radiating to the back. The right lower extremity was cold and pulseless. A CT demonstrated type-A dissection with extension into the iliac arteries.

Patient was then transferred for further management.

He was evaluated by a cardiothoracic and vascular surgery. The consensus was that he be too high risk for surgical repair.

CT

Type-A dissection by CT. The dissection began at the aortic valve and extends well into the iliac resulting in total iliac occlusion.

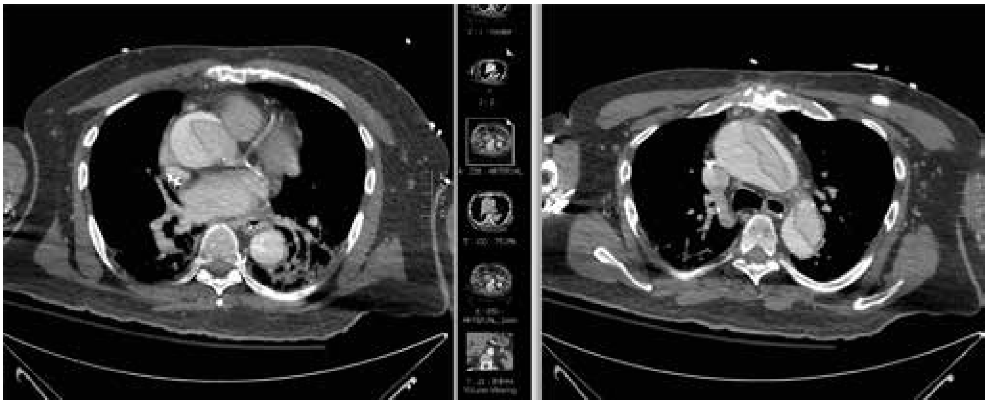


Figure 1 Images on admission show the dissection flap in the ascending and descending aorta.

Video 1 The movie shows the extensive dissection with compressed true lumen in the abdominal aorta and occlusion of the right iliac artery. Available online: http://www.asvide.com/article/view/23643

Diagnosis

Aortic dissection with ischemic right leg.

Management

Hospice.

Outcome

Exitus letalis 2 days after admission to hospice.

2.4.10 Type-A aortic dissection with occluded right iliac arteries

H&P

An 83-year-old male with h/o prostate adenocarcinoma, s/p brachytherapy presented to an OSH with sudden onset chest and back pain.

He was in his usual state of health until 5 am, when he awoke to find himself on the floor next to his bed. He was unable to recall the events prior to waking up and does not know how he fell or how long he was on the floor. He noticed right leg weakness and numbness but was still able to climb back into bed. He then began experiencing significant back pain. The pain was 10/10, not sharp, and located throughout his low and mid back. It did not radiate anywhere. The pain persisted, and his family subsequently called 911.

CTA showed evidence of type-A aortic dissection.

He was transferred for surgical management. On admission reports that his chest and back feel sore but pain has improved. Right leg cool and numb below knee.

Upon arrival to CCF, the patient was found to be awake and alert. He continued to complain of back pain, but improved. He also reports that his numbness and tingling in his foot has improved but is still present to a degree.

CT

Type-A aortic dissection extending from root to right external iliac with compromise of the right leg and:

- Aneurysmal dilatation of the dissected ascending aorta (about 5 cm);
- Left renal artery not well perfused;
- Right EIA occluded with dissection flap;
- Pericardial effusion.

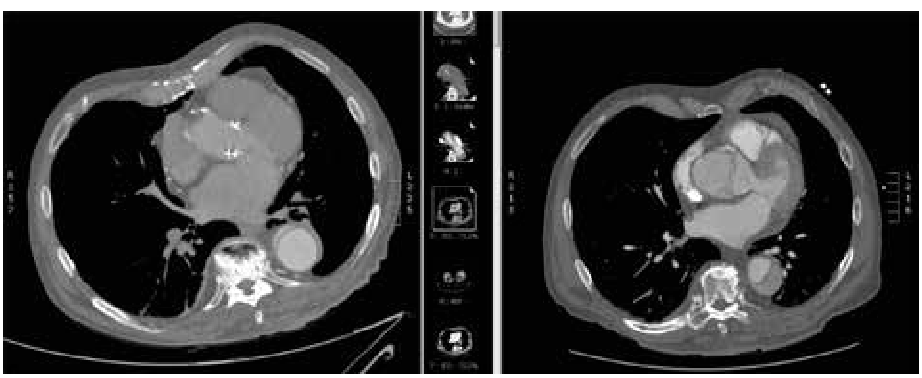


Figure 1 Images at time of admission and at 6 months. Image at admission shows flap at root (right panel); image at follow surgical shows surgical graft (left panel).

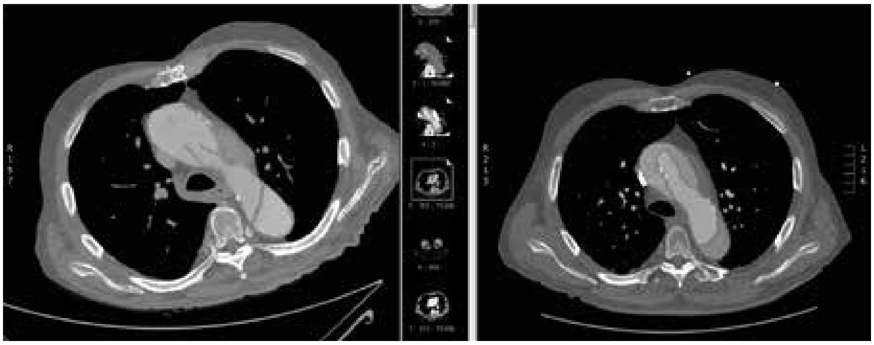


Figure 2 Images at level of the distal graft anastomosis of the ascending aorta, at time of admission and at 6 months.

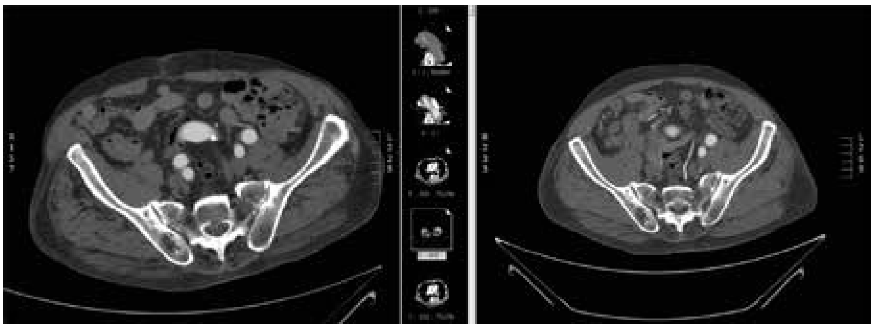


Figure 3 Images at level of iliac arteriesat timeof admission and at 6 months. Images at admission show occluded right iliac arteries (right panel), which are re-perfused at follow-up.

Video 1 Images of the chest at time of admission show the extensive aortic dissection with occluded right iliac arteries.
Available online: http://www.asvide.com/article/view/23645

Video 2 Images of the abdomen at time of admission show the extensive aortic dissection with occluded right iliac arteries.
Available online: http://www.asvide.com/article/view/23646

Video 3 Images at 6 months show the intact graft of the root and ascending aorta, and the residual dissection beyond the graft. The right iliac arteries remain patent.
Available online: http://www.asvide.com/article/view/23647

Echo

Severe AR.

Impression

Extensive type-A dissection extending from the aortic root to the right common femoral artery and involving the L renal artery.

Management

Emergency surgery with repair of type-A dissection and femorofemoral bypass.

Current emergent/urgent surgery

Anesthesia
General.

Operation

Emergent AVR and ascending aorta-hemiarch replacement with Bio-Bentall 27-mm CE valve and 34-mm Gelweave graft.
Additional femoral-femoral bypass with 8-mm PTFE graft.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.11 Type A aortic dissection with occlusion of true lumen of right iliac artery

H&P

A 66-year-old male with h/o hypertension, who woke up on day of admission with midsternal chest pain, no radiation and also right leg feeling "dead". He called EMS, got 4 aspirin and 2 NTG, without relief, and was taken to ED where he had CT chest which revealed type-A dissection with occlusion of right iliac artery.

An echocardiogram shows normal ventricular function and bicuspid aortic valve with trivial aortic insufficiency.

CT

Type-A dissection extending from ascending thoracic aorta into bilateral iliac arteries with occlusion of right iliac true lumen.

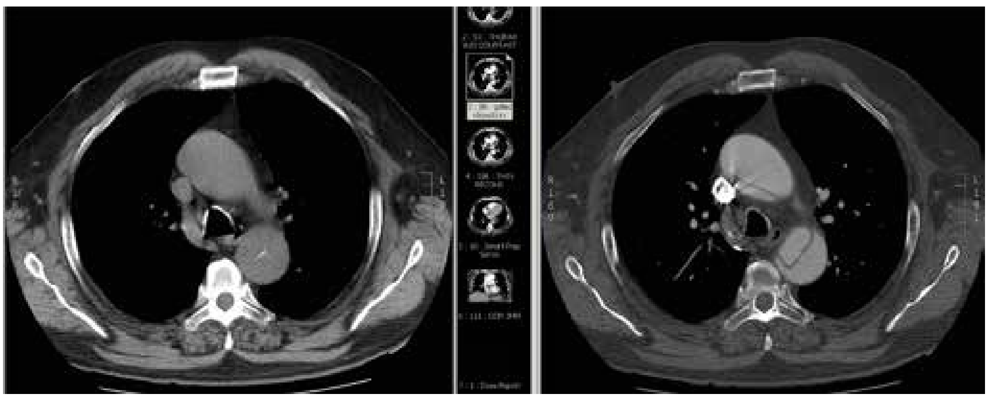


Figure 1 Image before (left panel) and after (right panel) contrast administration. The contrast-enhanced imaged (right panel) show the dissection flap in the ascending and descending aorta. Note that only the calcified flap in the descending aorta can be seen in the non-contrast phase (left panel).

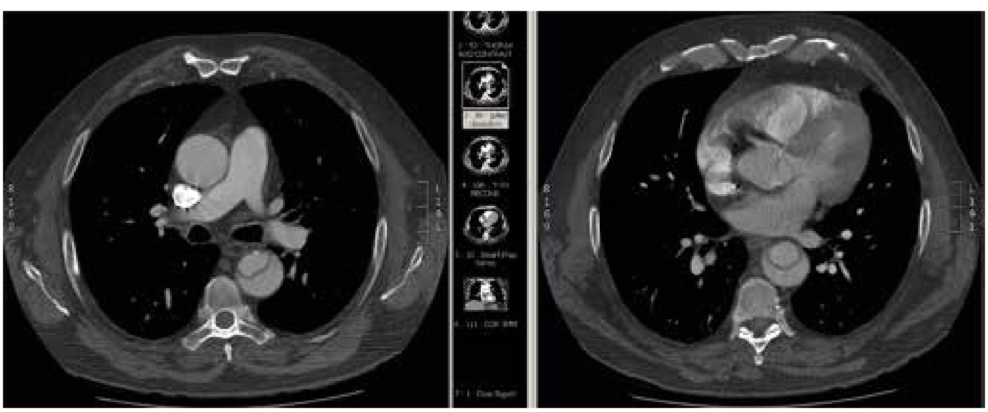


Figure 2 Image at the aortic root (right panel) and mid-ascending aorta (left panel), proximal to the beginning of the dissection flap.

Video 1 Images on admission show the dissection flap beginning in the distal ascending aorta.
Available online: http://www.asvide.com/article/view/23649

Video 2 Images show the flap in the abdominal aorta and iliac arteries with occlusion of the true lumen of the right common iliac artery.
Available online: http://www.asvide.com/article/view/23651

Diagnosis

Type-A aortic dissection.

Management

Emergency surgery.

Emergent/urgent surgery

Anesthesia
General endotracheal anesthesia.

Operation
Median sternotomy, open-heart surgery, repair of type A aortic dissection, replacement of the ascending aorta and aortic arch utilizing a 30-mm Gelweave graft, deep hypothermic circulatory arrest, retro brain perfusion.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.12 Type-A aortic dissection with complicated distal extension

H&P

A 45-year-old male with h/o CAD s/p CABG, PCI who presented with chest pain. CT demonstrated type-A aortic dissection. He was admitted to the CICU, started on metoprolol and clevidipine and CTS was consulted. Plan to delay surgery for 1–2 days due to his recent plavix use (on dual antiplatelet therapy after PCI). However, patient left against medical advice.

He returned to ED 1 day later with recurrent chest pain, shortness of breath and diaphoresis.

CT (second admission)

Large entry tear in the ascending aorta with extension of the dissection into the right iliac. The left iliac is previously stented and appears occluded. His true lumen is collapsed.

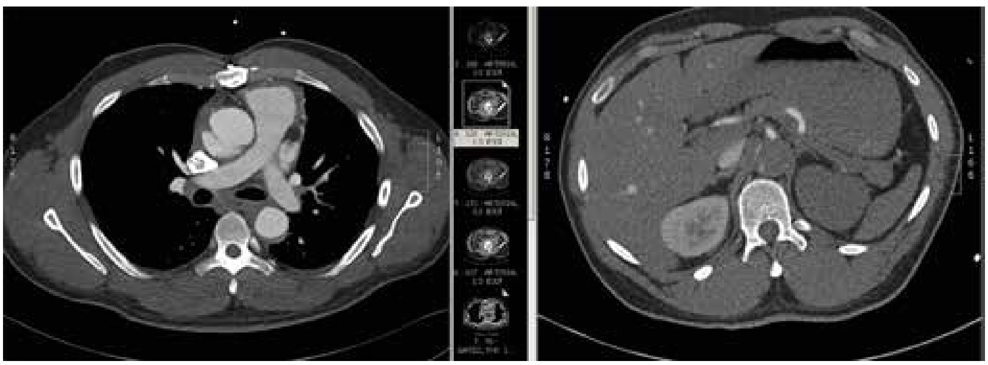


Figure 1 Left panel shows first admission: dissection flap ascending aorta, patent true lumen descending aorta; right panel shows second admission: collapsed true lumen descending thoracic and abdominal aorta.

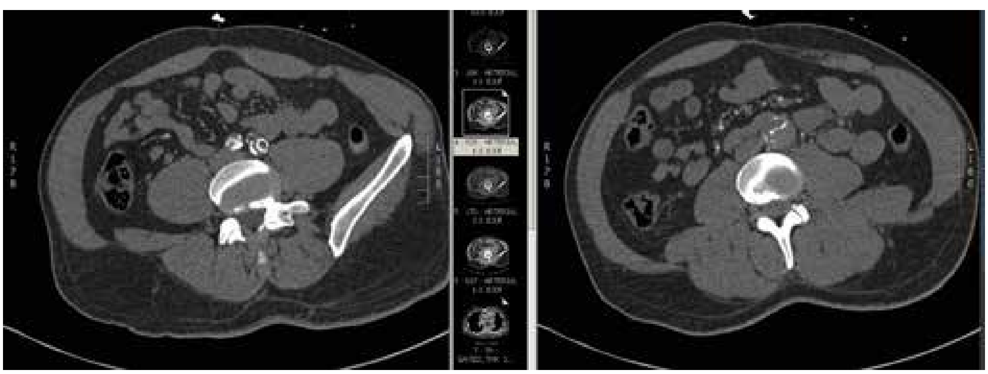
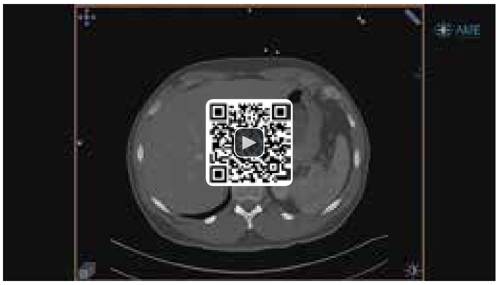
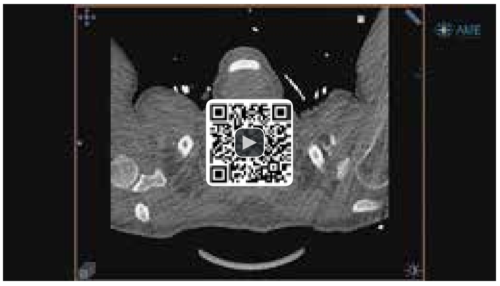


Figure 2 Second admission: collapsed true lumen infrarenal abdominal aorta and occluded iliac arteries.

Video 1 First admission (chest): dissection flap ascending aorta, patent true lumen descending aorta.
Available online: http://www.asvide.com/article/view/23718



Video 2 First admission (abdomen): patent true lumen abdominal aorta and stented left iliac artery.
Available online: http://www.asvide.com/article/view/23720



Video 3 Second admission (chest): distal extension with compressed true lumen descending thoracic segment.
Available online: http://www.asvide.com/article/view/23721

Video 4 Second admission (abdomen): distal extension with collapsed true lumen infrarenal abdominal aorta and occluded left iliac artery.
Available online: http://www.asvide.com/article/view/23723

Diagnosis

Type A aortic dissection.

Management

During preparation for Emergency surgery, rapid clinical deterioration and cardiopulmonary arrest likely due to malperfusion.

Outcome

Exitus letalis.

2.4.13 Type-A aortic dissection with prolapsed flap

H&P

A 65-year-old male transferred from OSH—5 days prior to transfer developed acute numbness on his left arm while driving which lasted for 15 minutes. Completely asymptomatic since then. No chest pain, SOB and dyspnea on exertion, blurred vision, vision loss or any other lower or upper extremity motor or sensory weakness.

CT

Type-A with prolapsed flap—dilated ascending aorta.

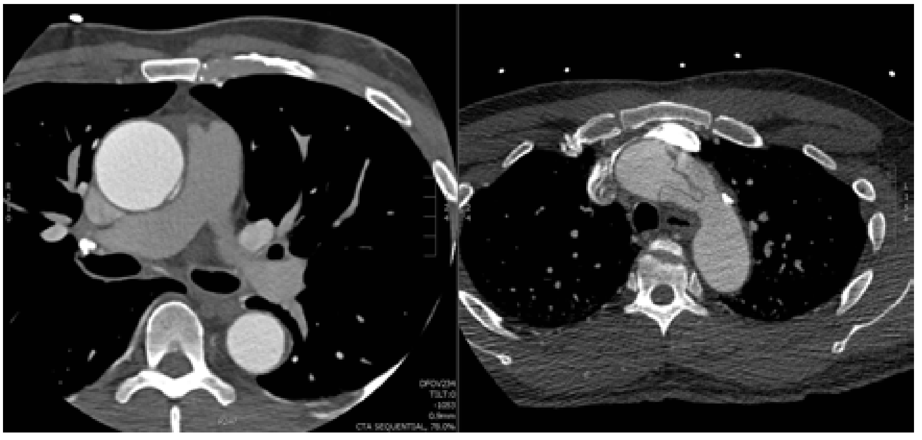


Figure 1 Time of admission: left panel shows dissection flap in ascending segment; right panel shows intussuscepted flap at the arch.

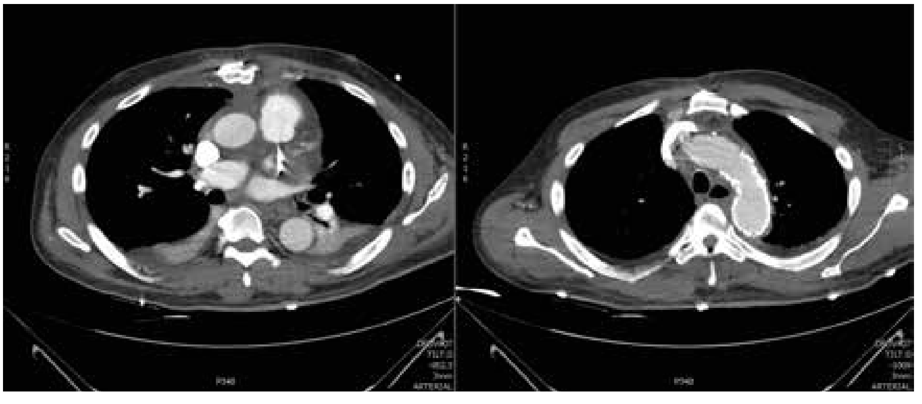
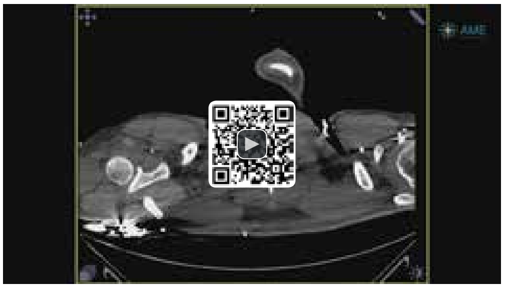


Figure 2 Following surgery: post-op surgical graft ascending aorta (left panel) and endovascular stent graft descending aorta.

Video 1 Time of admission: images show dissection flap in ascending segment with intussuscepted flap at the arch.
Available online: http://www.asvide.com/article/view/23724



Video 2 Following surgery: shows surgical graft ascending aorta and endovascular stent graft proximal descending aorta.
Available online: http://www.asvide.com/article/view/23725

Diagnosis

Type-A with prolapsed flap.

Management

Urgent surgery.

Emergent/urgent surgery

- General endotracheal anesthesia;
- Median sternotomy, ascending and total arch repair with a 28-mm Dacron graft, repair and fenestration of innominate artery dissection, bypass of the left common carotid artery with an 8-mm graft, distal arch and proximal descending aortic repair with direct placement of a 31 mm × 10 cm CTAG thoracic stent graft with fenestration of the stent graft in the area of the left subclavian artery under hypothermic circulatory arrest with selective antegrade brain perfusion (frozen elephant trunk procedure), ligation of the left atrial appendage with a 45-mm AtriCure clip.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.4.14 Type-A aortic dissection with prolapse of dissection flap

H&P

A 55-year-old male with h/o HTN, presented to ED with sudden onset severe chest pain that radiated to back and down his spine. Associated nausea, vomiting and diaphoresis. Found to have markedly elevated BP with SBPs in the 200 s on his right arm, and ~100 in his left arm. CT showed type-A dissection.

Transported by helicopter to tertiary care center for further management.

CT

Type A aortic dissection with dissection flap torn off in the ascending aorta and prolapsed into the arch.

Small hemorrhagic pericardial effusion.

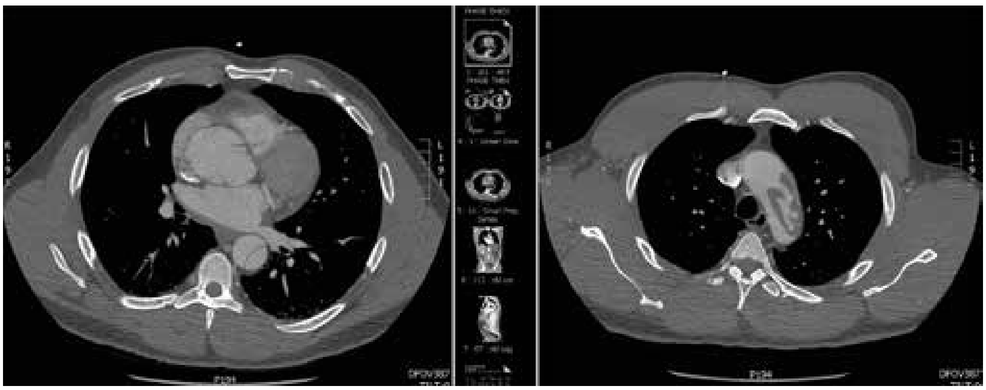


Figure 1 Images at admission show dilated aortic root (left panel). Motion artifact precludes precise assessment but a dissection flap is not clearly identified in the root and ascending aorta. Note the thick, folded dissection flap in the arch (right panel), which represents a torn intima in the ascending aorta, prolapsed into the ach.

Video 1 Images at admission show dilated aortic root (left panel). Motion artifact precludes precise assessment but a dissection flap is not clearly identified in the root and ascending aorta. There is thick, folded dissection flap in the arch, which represents a torn intima in the ascending aorta, prolapsed into the ach.
Available online: http://www.asvide.com/article/view/23726

Video 2 Images at 1-month follow-up show the supra-coronary graft of the ascending aorta, followed by residual dissection of the arch and descending aorta.
Available online: http://www.asvide.com/article/view/23727

Diagnosis

Type-A aortic dissection.

Management

Emergency surgery.

Emergent/urgent surgery

Anesthesia
General.

Operation
Graft ascending aorta with valve suspension.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.5.1 LM dissection with retrograde extension into the root in the setting of STEMI

H&P

A 62-year-old male patient transferred from OSH with LAD and aortic dissection post cardiac catheterization.

On day of admission, he presented to OSH with left sided shoulder and chest pain. An EKG showed an anterior STEMI on EKG and he underwent LHC. The LHC showed a totally occluded RCA, left to right collateral filling, severe proximal LAD and proximal LCx disease. Balloon PTCA and DES were performed in mid LAD. PCI was complicated by LAD dissection. The dissection flap extended to left main and aortic root. An IABP placed and the patient was transferred. Anechocardiogram showed a LVEF of 30%, with akinetic apex and anterolateral wall.

On arrival in the ICU he denied chest pain or shortness of breath.

CT

CT shows evidence of focal dissection with contrast pooling in the posterior wall of the proximal ascending aorta.

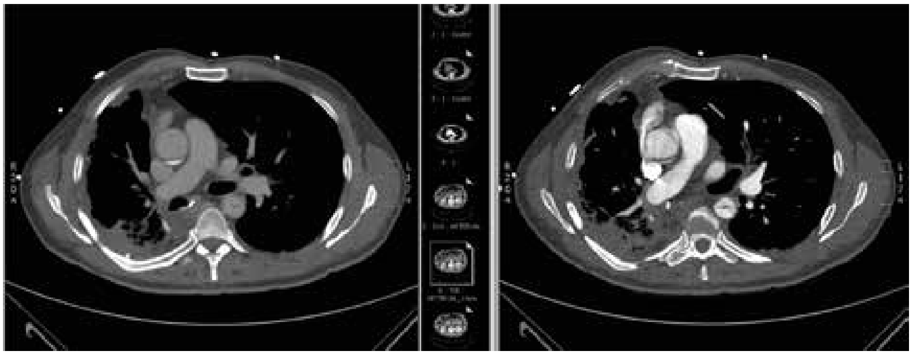


Figure 1 Images at the time of admission show contrast pooling in the posterior aspect of the proximal and mid ascending aorta. This is better seen in the venous phase acquisition (left panel). The arterial phase acquisition is limited by motion artifact of the ascending aorta. Also seen is the tip of the IABP in the mid descending aorta.

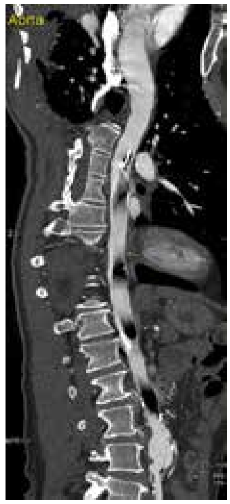


Figure 2 A curved MPR images of the aorta, reconstructed along the centerline, better defines the Balloon of the IABP. Note that the balloon is not seen as a continuous inflated structure because of the ‘non-gated’ image acquisition (not synchronized to heart beat).

Video 1 The arterial phase acquisition is limited by motion artifact of the ascending aorta. Also seen is the tip of the IABP in the mid descending aorta. Note that the balloon is not seen as a continuous inflated structure because of the ‘non-gated’ images acquisition (not synchronized to heart beat).
Available online: http://www.asvide.com/article/view/23731

Video 2 Images at the time of admission show contrast pooling in the posterior aspect of the proximal and mid ascending aorta, which is better seen in the venous phase acquisition.
Available online: http://www.asvide.com/article/view/23733

Diagnosis

LAD, LM dissection with retrograde extension into the root in the setting of STEMI.

Management

- ❖ Initial observation;
- ❖ Follow-up within 4 weeks with CT aorta and repeat heart Cath to determine need and timing of surgery (CAGB, aortic repair).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.5.2 Iatrogenic type-A aortic dissection—medical management with interval improvement

H&P

An 82-year-old male with h/o CAD, s/p MI, ICM (EF =35%), s/p remote CABG, s/p several PCIs with DES to the proximal RCA, distal RCA LMT into LCx.

He presented for an elective coronary angiography in setting of 3 months of DOE (CCS III anginal equivalent). Cardiac catheterization revealed a severe 90% heavily calcified stenosis of the ostium of the RCA, as well as severe 70% stenosis of the mid RCA between the previously placed stents, and a severe 90% heavily calcified stenosis of the distal RCA just prior to the bifurcation of the PDA and PLV. PCI was performed with 2 DES to dRCA and 1 DES to mRCA. Procedure was complicated by a guide induced aortic dissection.

TTE confirmed an aortic dissection extending from the non-coronary sinus extending throughout the ascending aorta (max diameter of 4.1 cm).

Upon arrival to the CICU, he has been asymptomatic.

CT

CTA showed type A dissection from STJ to the distal arch ending proximal to the left subclavian diameter of dissected ascending aorta: 4.4×4 cm, with the false lumen ~16 mm.

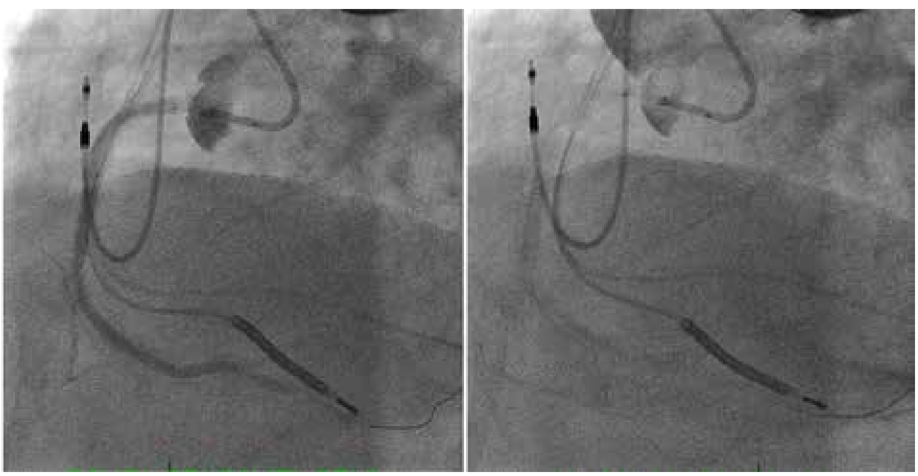


Figure 1 Coronary angiography shows contrast pooling at the root (right cusp).

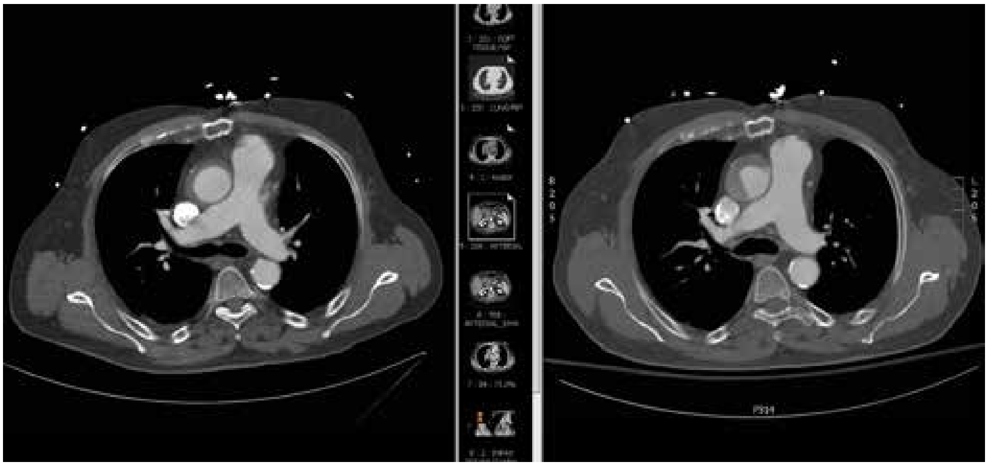


Figure 2 Contrast-enhanced images at admission (right panel) and 2-day follow-up, showing interval regression of false lumen size.

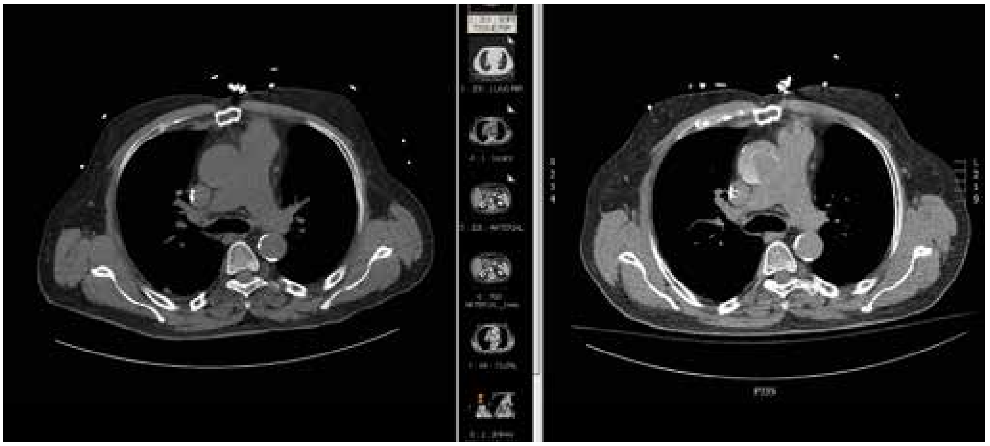
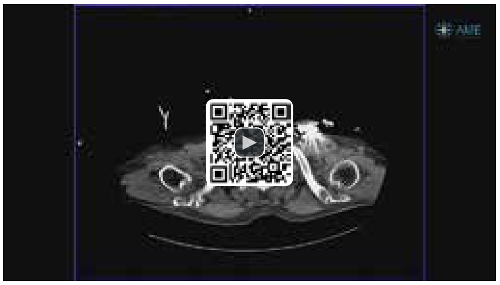


Figure 3 Non-contrast CT images at admission (right panel) and 2-day follow-up. The contrast enhancement of the false lumen at admission is secondary to contrast pooling from the prior cardiac catheterization.

Video 1 Non-contrast enhanced CT at admission.
Available online: http://www.asvide.com/article/view/23734

Video 2 Contrast enhanced CT at admission.
Available online: http://www.asvide.com/article/view/23735



Video 3 Non-contrast enhanced CT 2 days after admission. The contrast enhancement of the false lumen at admission is secondary to contrast pooling from the prior cardiac catheterization.
Available online: http://www.asvide.com/article/view/23738

Video 4 Contrast enhanced CT 2 days after admission. The contrast enhancement of the false lumen at admission is secondary to contrast pooling from the prior cardiac catheterization.
Available online: http://www.asvide.com/article/view/23739

Diagnosis

Iatrogenic type-A aortic dissection.

Management

Medical management.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.5.3 Iatrogenic type-A aortic dissection post PCI

H&P

A 51-year-old female who presented with an inferior STEMI. Cardiac catheterization identified an occluded RCA (mid-vessel). She underwent PCI/stent to the RCA after pre-medication with Ticagrelor. A final angiography revealed evidence of contrast staining in the root concerning for aortic dissection.

CT

Aortic dissection involving the ascending aorta.

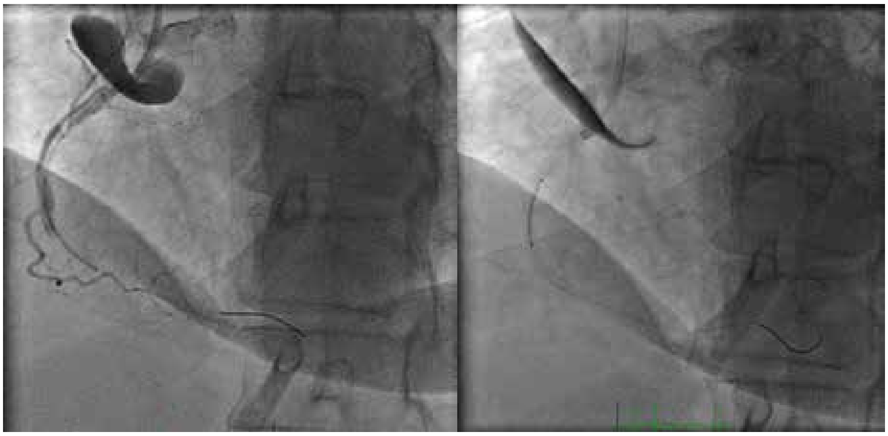


Figure 1 Angiographic images show the RCA with guidewire in place. There is contrast staining at the aortic root and ascending aorta, extending from the RCA ostium to the mid ascending level, c/w Type-A aortic dissection.

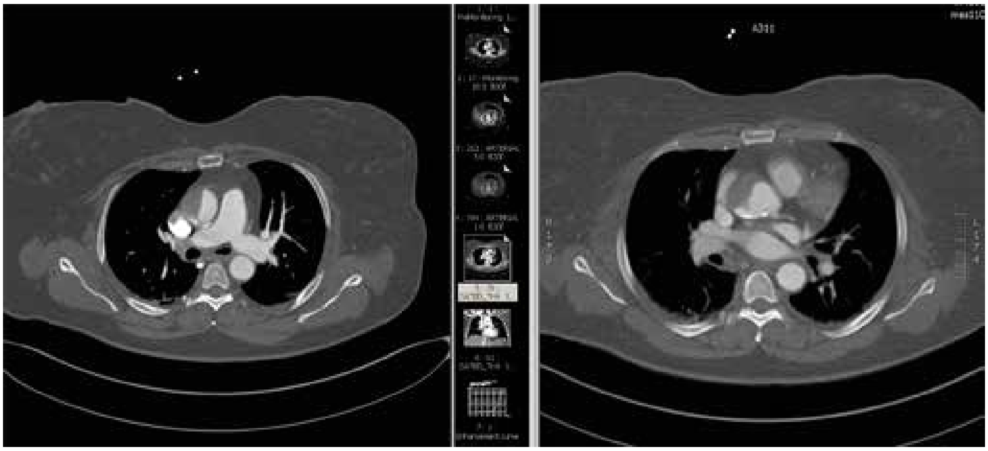


Figure 2 The CT shows a proximal type-A dissection with partial contrast filling of the false lumen (right panel at level of LM ostium, left panel at level of mid-ascending aorta).

Figure 3 A centerline reconstruction of the aorta shows the extent of the dissection extending into the mid ascending level.

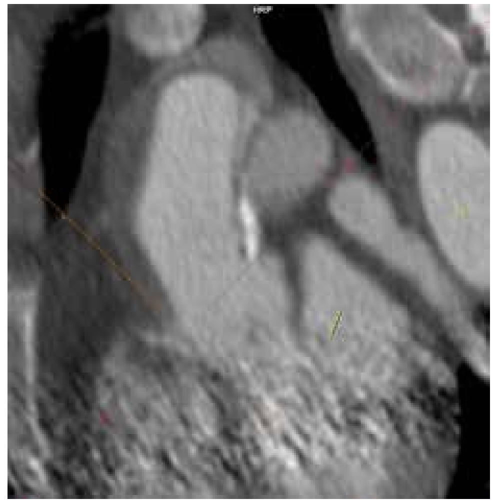
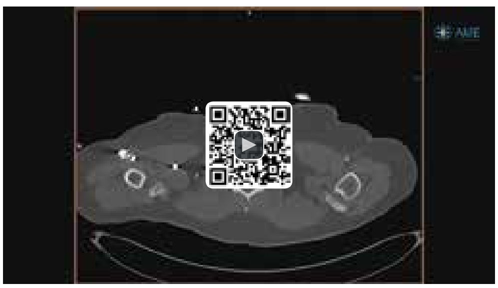
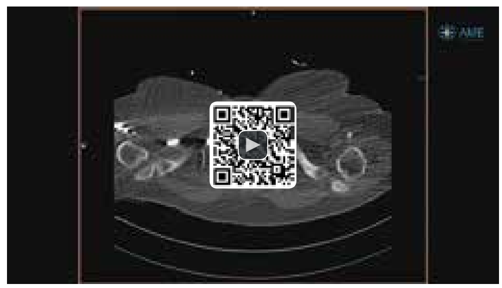


Figure 4 This images shows a 3D MPR reconstruction at the RCA ostium.



Video 1 CT images show the dissection of the ascending aorta with partial contrast filling of the false lumen. The CT was acquired as a 2 phase protocol with an initial non-ECG synchronized acquisition of the chest/abdomen/pelvis.
Available online: http://www.asvide.com/article/view/23740



Video 2 CT images show the dissection of the ascending aorta with partial contrast filling of the false lumen. The CT was acquired as a 2 phase protocol followed by an ECG-synchronized acquisition of the chest.
Available online: http://www.asvide.com/article/view/23741

Diagnosis

CAD s/p STEMI with PCI to RCA complicated by type-A aortic dissection.

Management

Emergency surgery

Current emergent/urgent surgery

Anesthesia
General endotracheal anesthesia.

Operation

Exposure of right axillary artery and cannulation for cardiopulmonary bypass using 8 mm Gelweave side graft, median sternotomy, Coronary artery bypass surgery with reverse saphenous vein graft to PDA, replacement of ascending aorta with #26 Gelweave graft.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.5.4 Iatrogenic dissection of the ascending aorta

H&P

An 84-year-old African American female presented to OSH with chest pain, and was noted to have inferior STEMI on EKG. Emergent LHC at OSH showed severe 3-vessel disease. The RCA showed 90% hazy proximal and mid RCA stenosis. Patient underwent PTCA of RCA with 2.0 mm × 9 mm Maverick balloon. Procedure was complicated by probable retrograde dissection to aorta-dye stain/blushing seen at aortic root. No stents were placed and procedure was terminated. Patient was transferred to tertiary center for further management.

CT

Aortic root dissection with discrete, thrombosed dissection flap that originates at the level of the sinotubular junction within the anterolateral ascending aorta. The dissection flap appears to terminate in the distal ascending aorta. Unable to exclude involvement within the aortic root or arch due to motion-related artifact.

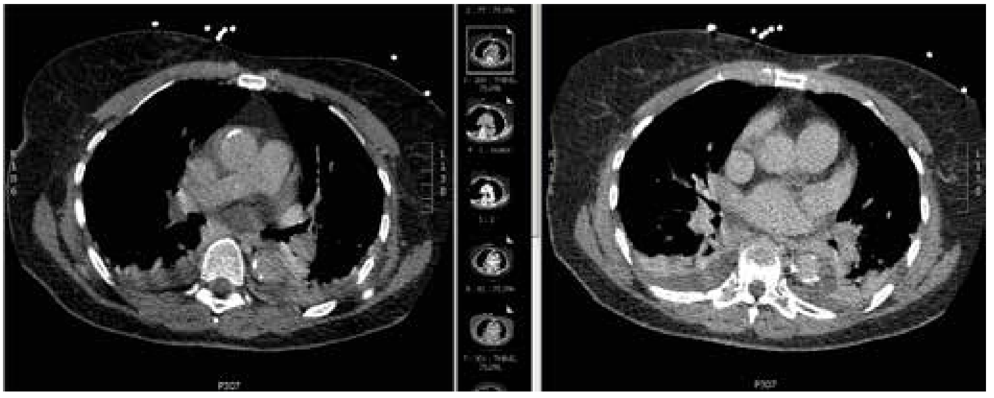
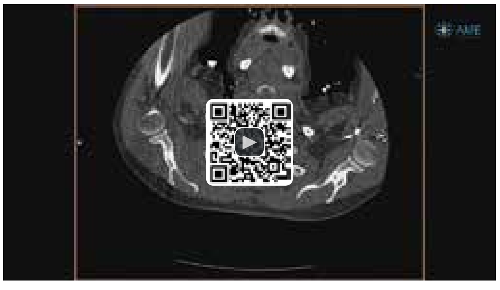


Figure 1 Arterial (right panel) and venous phase (left panel) images show mild wall thickening along the ascending aorta. Images quality is limited, but findings are better seen in the venous phase images.



Video 1 Arterial phase image show mild wall thickening along the ascending aorta.
Available online: http://www.asvide.com/article/view/23742

Video 2 Venous phase image show mild wall thickening along the ascending aorta. Image quality is limited, but findings are better seen in the venous phase image.
Available online: http://www.asvide.com/article/view/23743

Diagnosis

Aortic root dissection, iatrogenic.

Management

Medical management and hospice consult.

Outcome

Discharge to hospice.
Expired 1 month after discharge.

2.5.5 Iatrogenic focal type-A dissection after LHC

HPI

A 72-year-old female with a history of CAD, s/p several PCI/stents.

Admitted to the CICU after LHC/PCI at OSH complicated by type-A aortic dissection seen on aortic angiogram.

On day of admission she underwent elective angiography at OSH for evaluation of stable angina. PCI was performed with Xience Alpine EES 2.75×38 mm, 3.0×38 mm, and 2.5×12 mm in the LAD and a Synergy 3.0×16 mm in the mRCA. Placement of the stent in the RCA was complicated by proximal dissection, demonstrated by angiography a extending into the ascending aorta. She was transferred to CICU.

Upon arrival to the CICU, she was hemodynamically stable and chest pain free.

CT

Suboptimal contrast enhancement due to contrast bolus timing:

- Type-A dissection/Intramural hematoma of the ascending aorta;
- Max. thickness 8 mm;
- Extends from root to arch;
- Aortic diameter about 4.2 cm.

Figure 1 The angiographic images show delayed contrast clearance from the false lumen at the minor curvature of the ascending aorta at the time of the angiography.

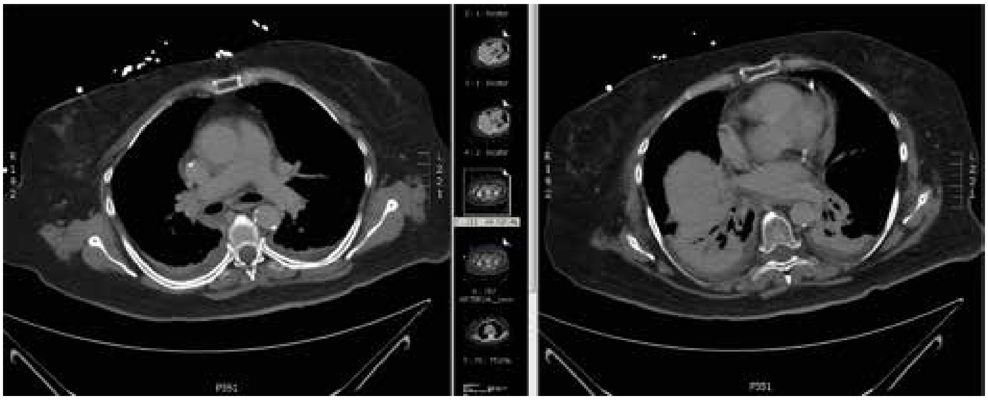


Figure 2 The CT shows a rim of wall thickening with increased Hounsfield units, consistent with intramural hematoma.

Video 1 The images show the rim of wall thickening with increased Hounsfield units, consistent with intramural hematoma. Incidental finding of an anomalous origin of the right subclavian artery.
Available online: http://www.asvide.com/article/view/23744

Diagnosis

Iatrogenic type-A Aortic Dissection/Intramural hematoma.

Management

Initial observation in CICU.

Continued medical management.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.1 Chronic type-A dissection with previous supra-coronary graft and hemi-arch repair

H&P

A 50-year-old male with h/o type-A aortic dissection, s/p supracoronary/hemi-arch repair 1 year ago. He presented with sudden onset left sided chest pain and numbness in left hand, similar to the pain with the previous dissection.

CT

Stable repair of type-A dissection:

- Residual dissection of arch and proximal descending aorta, unchanged compared to prior CT;
- Stable mild dilatation of aortic root;
- Subclavian artery patent.

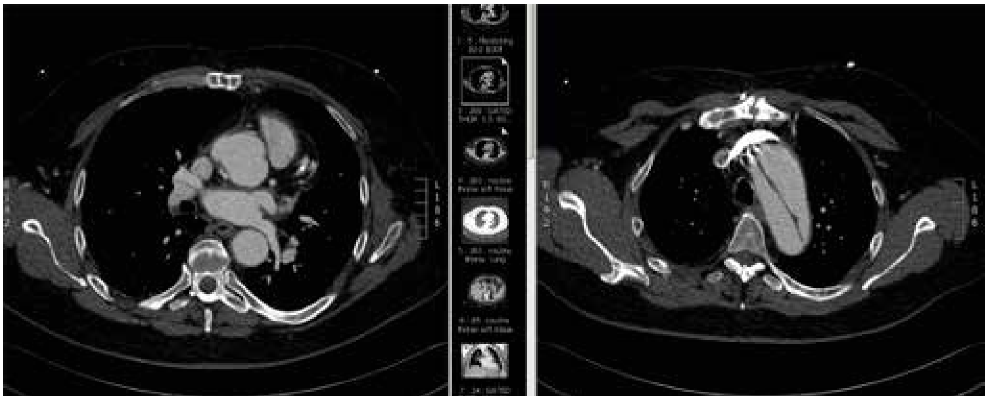


Figure 1 Left panel shows proximal graft anastomosis at the aortic root; right panel shows stable residual dissection beyond the graft.

Video 1 Dilated native root, intact supracoronary graft, and residual dissection in arch.
Available online: http://www.asvide.com/article/view/23745

Diagnosis

Stable repair of type-A dissection.

Management

- Continued blood pressure control;
- Investigation of alternative diagnoses for chest pain & Lt arm numbness/tingling, including CAD, primary neurological condition/radiculopathy;
- F/U in aortic clinic for thoracic aortic dilatation post discharge from hospital.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.2 Repaired type-A aortic dissection—hypertensive urgency

H&P

A 57-year-old female patient with history of repaired type-A aortic dissection, admitted with hypertensive urgency and 1 week history of non-traumatic right sided chest discomfort.

- 6 months prior to admission she underwent repair for type A aortic dissection (dissection flap extended from the aortic root to the iliac arteries);
- Associated basilar neurological symptoms characterized by headaches, diplopia.

CT

Stable with unchanged residual disease of the aortic arch, CT brain was negative for acute ischemic changes.

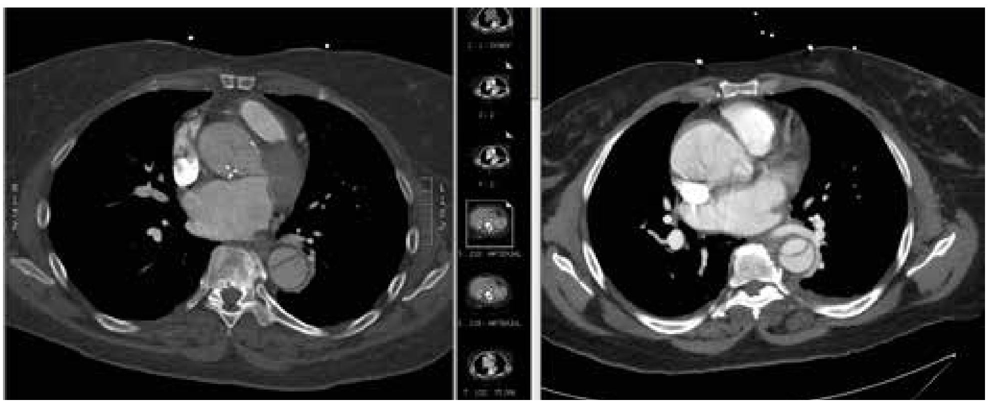


Figure 1 Level of the aortic root prior to (right) and after (left) surgical repair.

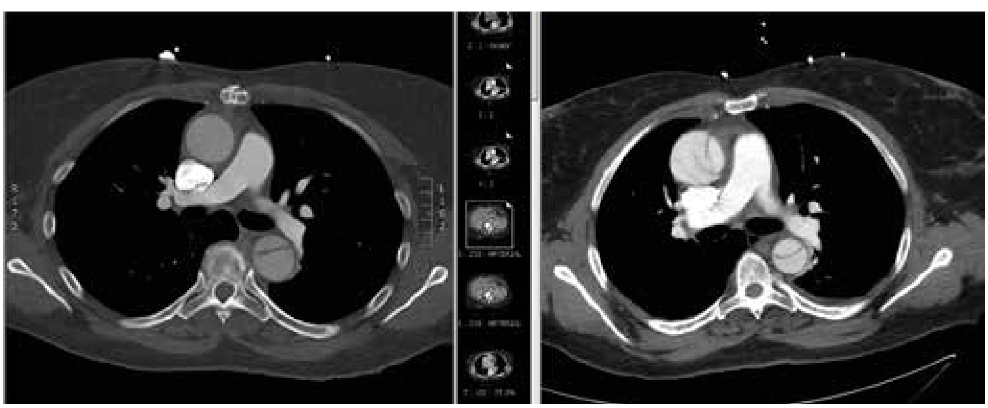


Figure 2 Level of the mid-ascending aorta prior to (right) and after (left) surgical repair, showing the surgical graft of the ascending aorta.

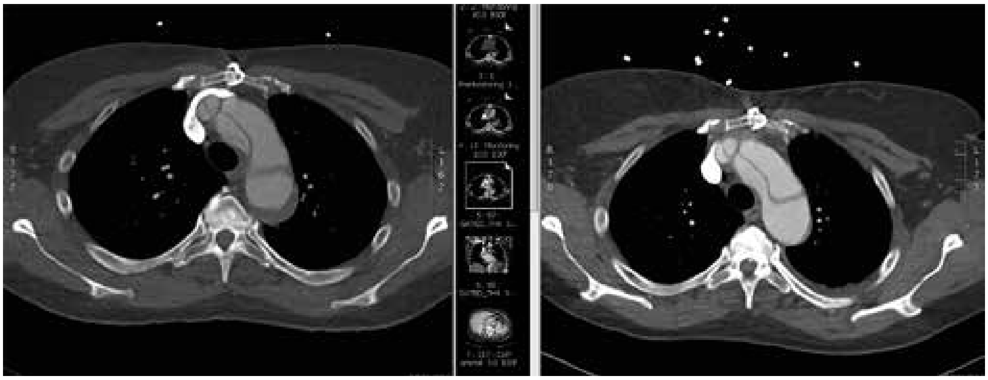


Figure 3 Level of the aortic arch prior to (right) and after (left) surgical repair, showing stable dissection flap.

Video 1 At the time of original admission with type-A aortic dissection. The dissection flap is seen beginning in the aortic root.
Available online: http://www.asvide.com/article/view/23746

Video 2 A CT 1 month prior to current/index admission shows stable repair of type-A aortic dissection. Residual dissection flap beyond the surgical graft.
Available online: http://www.asvide.com/article/view/23747

Video 3 A CT at the time of the current/index admission shows stable repair of type-A aortic dissection.
Available online: http://www.asvide.com/article/view/23748

Diagnosis

Stable repair of type-A dissection.

Management

Medical management.

Prior/remote surgery

Date

Six months prior to admission.

Operations

Repair of type A aortic dissection, replacement of the ascending aorta and hemiarch using a 32-mm Gelweave graft, replacement of the aortic valve and aortic root utilizing a 32-mm Valsalva Gelweave graft along with a 27-mm St. Jude Trifecta bovine pericardial aortic valve, reimplantation of the coronary arteries, cannulation of the right axillary artery, moderate hypothermia, and circulatory arrest with antegrade cerebral perfusion.

Outcome

Discharged with plans for follow-up examination and tomographic aortic imaging if indicated.

2.6.3 Repaired type-A aortic dissection—interval progression descending aorta

H&P

A 59-year-old female with h/o type-A aortic dissection, s/p repair of ascending aorta with Hemashield graft (2 years prior to admission):

- ❖ Began to have back and epigastric pain night before admission;
- ❖ Upon arrival at the hospital hypertensive (SBP 190's).

CT

Graft ascending aorta; residual dissection of the descending aorta—interval change with additional false lumen and interval increase in size.

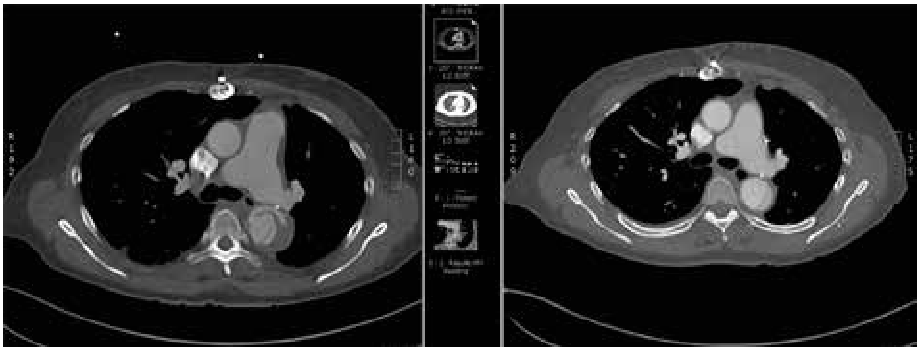


Figure 1 Right panel (3 months prior to admission) shows axial image of the ascending and de-scending aorta at the level of the pulmonary artery bifurcation. The graft of the ascending seg-ment is intact. There is residual dissection of the descending segment. Left panel (at the time of initial admission) shows same level of the ascending and descending aorta. There is interval change with additional false lumen and interval increase in size.

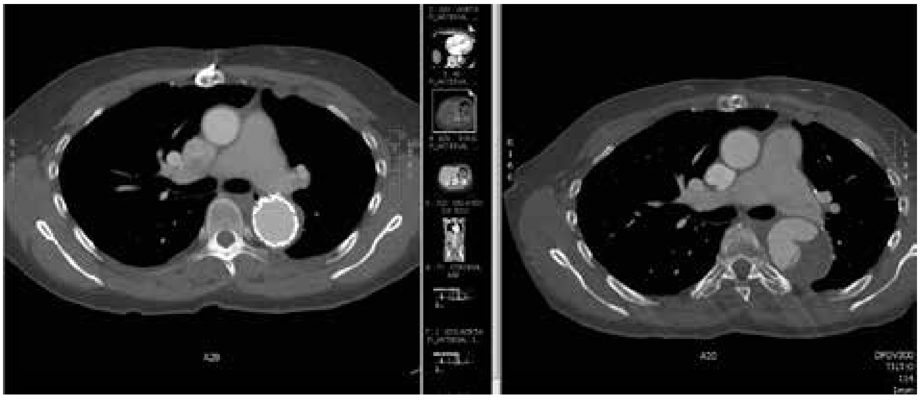
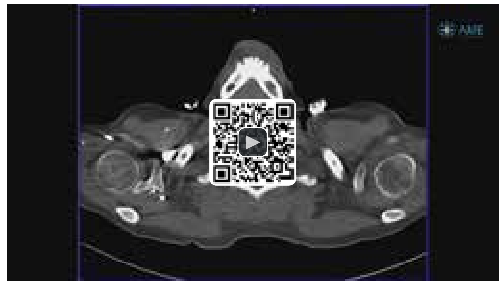


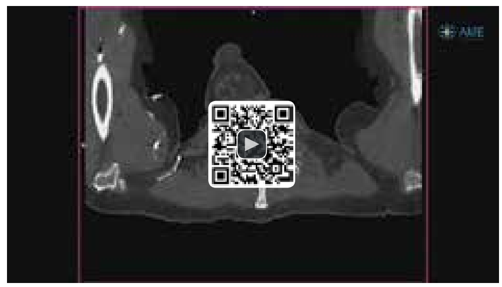
Figure 2 Right panel (1 month after initial admission) shows further significant interval increase in size of false lumen of the descending aorta; left panel (5 months after surgery) shows axial image of the ascending and descending aorta at the level of the arch. The endovascular stent graft is seen surrounded by excluded false lumen.

Figure 3 Panel (5 months after surgery) shows proximal end of the stent at the level of the left subclavian artery origin.



Video 1 Time of admission: intact supra-coronary graft of the ascending segment and residual dissection of the descending segment.
Available online: http://www.asvide.com/article/view/23749

Video 2 One month following admission: interval significant increase in size of false lumen and overall aortic dimensions.
Available online: http://www.asvide.com/article/view/23750



Video 3 Images after surgery show the endovascular stent graft in the descending aorta.
Available online: http://www.asvide.com/article/view/23751

Diagnosis

Symptomatic residual type-B aortic dissection with interval change but without mal-perfusion.

Management

Initial medical management and planned staged surgery:

- ❖ Repeat CTA 1 month after admission (patient not symptomatic) showed further signifi-cant interval increase in size of false lumen;
- ❖ Patient re-admitted for surgery

Staged surgery (most recent first)

(I) Placement of TEVAR with left subclavian coverage and attempted coil embolization of the subclavian artery (1 month following initial admission)
    (i) General anesthesia;
    (ii) Right femoral cutdown; left brachial access;
    (iii) Intravascular ultrasound of the thoracic aorta and abdominal aorta, ascertained presence in true lumen from below;

(iv) Endovascular stent graft placed at the left subclavian origin and deployed without diffi-culty. The 2nd device placed and overlapped with the primary device by 5 cm for full coverage of the dissection;
(v) Unsuccessful attempts to coil embolize left subclavian artery;
(vi) Good seal noted after completion angiogram, left subclavian artery had a dissection in the proximal segment, vertebral artery patent.

(II) Left carotid to subclavian bypass with 8-mm ring PTFE and anastomotic bovine peri-cardial pledgets (6 days earlier).

Prior/remote surgery (2 years prior to admission)

Median sternotomy, repair of ascending aorta with #26 Hemashield graft.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.4 Repaired type-A aortic dissection—subsequent hybrid repair

H&P

A 54-year-old male with prior h/o bicuspid aortic valve and type-A aortic dissection:

- ❖ S/p remote emergent repair;
- ❖ Chronic claudication involving the buttocks and thighs;
- ❖ Current admission with chest /back pain, improved with blood pressure control.

CT

CT demonstrates stable repair ascending aorta and residual dissection beyond graft:

- ❖ No evidence of acute visceral/renal malperfusion;
- ❖ No evidence of significant growth or rupture;
- ❖ However, mild true lumen compression (descending aorta), left renal artery narrowing, and narrowing of true lumen of right iliac artery.

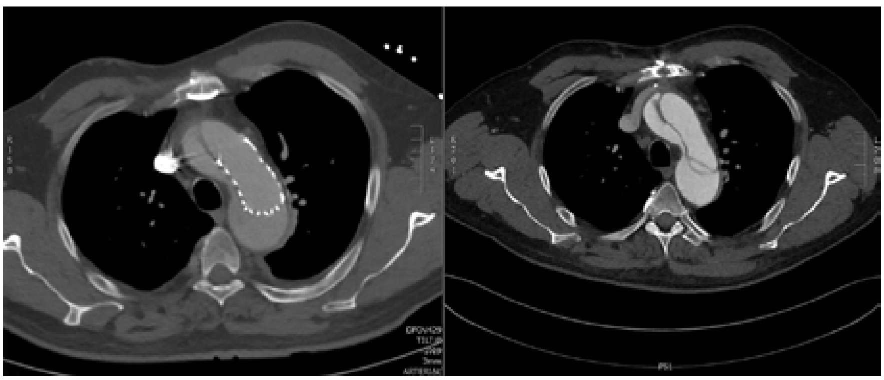


Figure 1 Right panel shows CT of thoracic aorta at initial presentation; left panel shows CT after endovascular stent (4 months post admission).

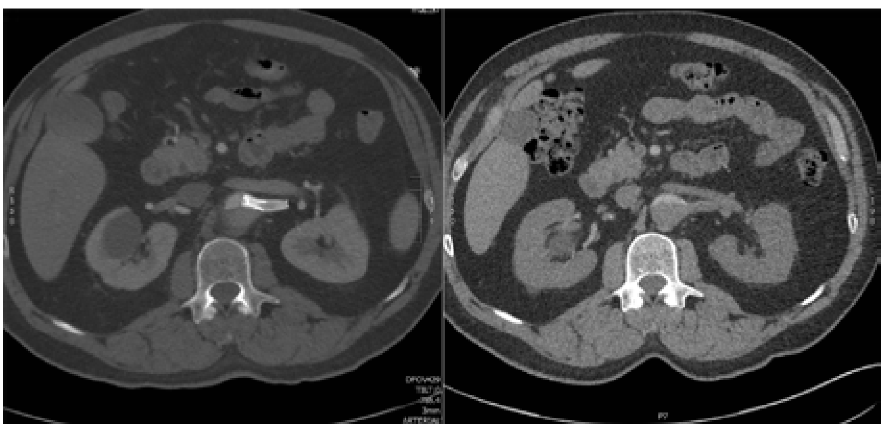


Figure 2 Right panel shows CT of abdominal aorta at initial presentation; left panel shows CT after left renal artery stent (4 months post admission).

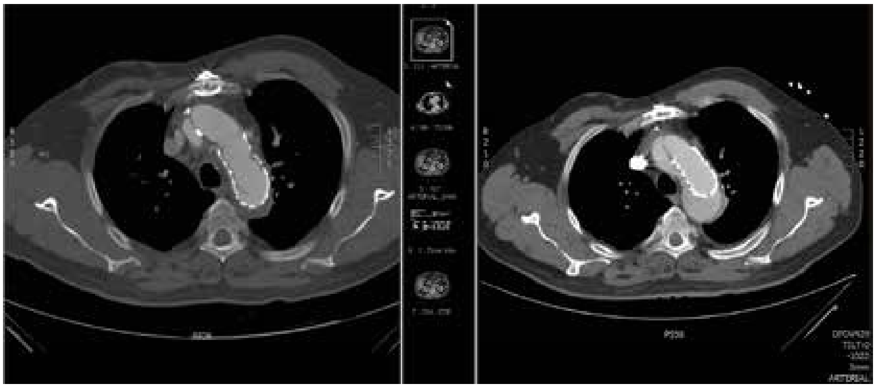
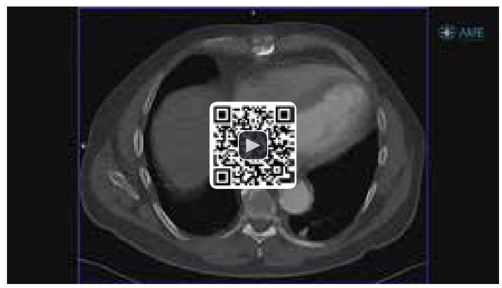


Figure 3 Right panel shows CT at the aortic arch after initial stent 4 months post initial admission. Left panel shows same level after arch surgery, 5 months post initial admission.

Video 1 CT chest and upper abdomen at time of admission shows intact graft ascending aorta and residual dissection descending aorta with small true lumen at retrocardiac segment.
Available online: http://www.asvide.com/article/view/23752



Video 2 CT abdomen and pelvis at time of admission shows narrowing of true lumen of infrarenal segment and right iliac artery.
Available online: http://www.asvide.com/article/view/23753

Video 3 CT chest and abdomen after endovascular stent placement (5 months after admission).
Available online: http://www.asvide.com/article/view/23754

Video 4 CT chest and abdomen after second surgery (6 months after admission).
Available online: http://www.asvide.com/article/view/23755

Diagnosis

Stable, residual dissection of the descending aorta:

❖ Mild true lumen compression descending aorta, left renal artery narrowing, and narrowing of true lumen of right iliac artery

Management

No indication for acute intervention:

- ❖ Initial medical management;
- ❖ Subsequent elective surgical repair.

Elective surgery (newest on top)

(I) Replacement of the distal ascending aorta and aortic arch, and implantation of an 'elephant-trunk graft' (5 months post initial admission):
  (i) Indication: proximal endostent leak, symptomatic with back pain;
  (ii) Detail: redo median sternotomy; CABG ×1 with SVG to LAD; replacement of the distal ascending aorta and aortic arch, and implantation of an elephant trunk utilizing a 26-mm Gelweave Sienna graft with separate side branch grafts to the left common carotid and innominate artery.

(II) Endovascular repair of thoracoabdominal aneurysm (4 months post initial admission):
  (i) Indication: mild true lumen compression (descending aorta), left renal artery narrowing, and right iliac artery stenosis;
  (ii) Detail: thoracic endovascular endograft Gore 34×20 and Gore 34×15, left renal artery stent placement with iCAST 7×22 stent and 8×30 smart stent, and right iliac stenting with complete SE 10×80 self-expanding stent.

(III) Left carotid to subclavian bypass (4 months post admission; 3 days prior to B).

Prior/remote surgery

S/p emergency surgical repair of type A, with distal extension.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.5 Complex repair type-A aortic dissection

H&P

A 75-year-old male patient transferred from OSH for further management of suspected type-A aortic dissection. Aortic history:

- History of Type-B Aortic dissection 3 years prior to admission with right leg malperfusion requiring fem-fem bypass and repair of left fem artery dissection;
- S/p AVR and CABG 2-year prior to admission;
- Staged carotid-subclavian bypass and thoracic endovascular repair with thoracic stent graft TEVAR 1-month prior to admission.

A repeat CT scan the day of admission showed persistent flow in the false lumen of the descending aorta adjacent to endovascular stent and s thin rim of intramural hematoma of the ascending aorta.

CT

Persistent false lumen perfusion descending thoracic aorta with type-2 endoleak from left subclavian artery, and retrograde filling of the false lumen distally with rapid expansion of aneurysm.

Small rim of intramural hematoma of the ascending aorta.

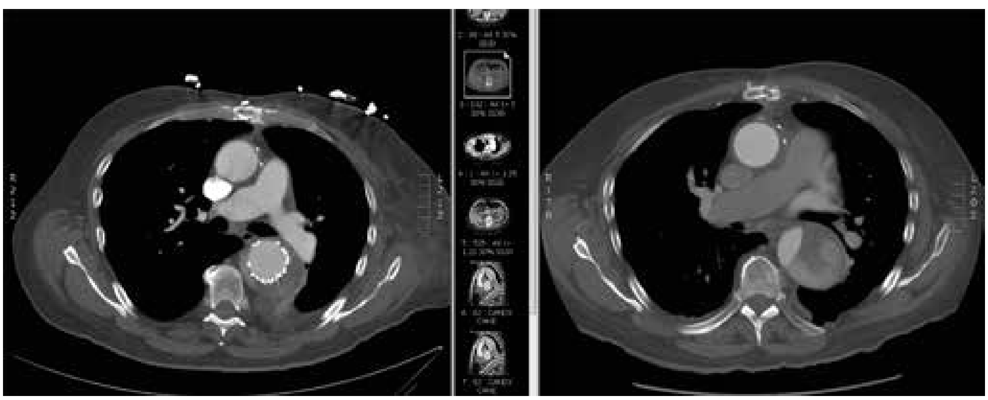


Figure 1 Right and left panel show images of the descending aorta 1 month and 2 weeks prior to current admission. The stent placed in the descending aorta and initial regression in size of the false lumen is identified.

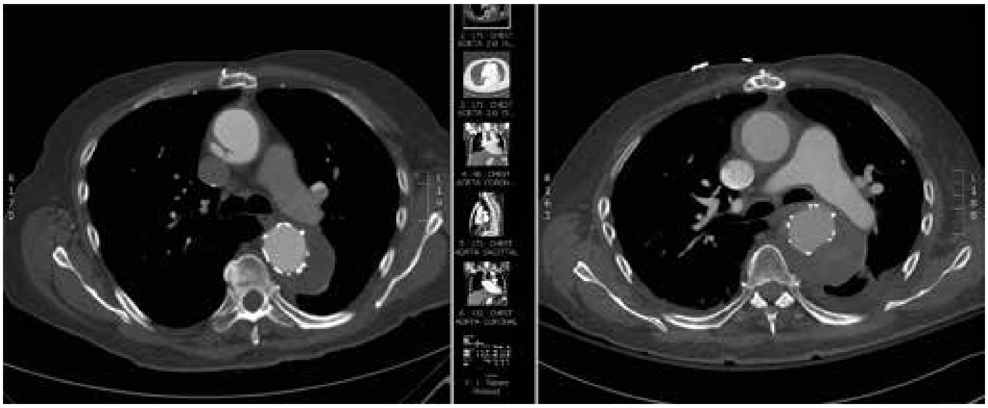


Figure 2 Right and left panel show images of the descending aorta at the time of admission and 4 months after admission. At the time of admission (right panel) there is increased size of the stented descending aorta with type II endoleak. Also seen is a thin rim of intramural hematoma of the ascending aorta. 3 months after additional endovascular repair (details above) there is regression in size of the descending aorta. The IMH of the ascending aorta shows partial flow in the false lumen.

Video 1 Images of the aorta 3 months prior to current admission, show chronic type-B aortic dissection with enlarged size of the proximal descending aorta.
Available online: http://www.asvide.com/article/view/23756

Video 2 Images 1 month prior to current admission, after stenting of the descending aorta.
Available online: http://www.asvide.com/article/view/23757

Video 3 Images at the time of admission show increased size of the stented descending aorta with type II endoleak. Also seen is a thin rim of intramural hematoma of the ascending aorta.
Available online: http://www.asvide.com/article/view/23758

Video 4 Images at the time of admission after additional endovascular repair (details above) show exclusion of endoleak of the descending aorta. There is no partial flow in the false lumen of the ascending aorta.
Available online: http://www.asvide.com/article/view/23761

Video 5 Three months after current admission, there is regression in size of the descending aorta. Stable partial flow in the false lumen of the ascending aorta.
Available online: http://www.asvide.com/article/view/23762

Diagnosis

Persistent false lumen perfusion descending thoracic aorta with type-2 endoleak.

Management

Endovascular repair.

Current surgery

Anesthesia
General.

Operations
Bilateral femoral artery exposure and cutdown on the left brachial artery, coil embolization of the left subclavian artery, selective angiogram of left subclavian artery, aortogram proximal thoracic aortic endovascular extension with placement of a 36 mm × 15 cm Valiant thoracic stent graft, embolization of the false lumen of the descending thoracic aorta with placement of 20 mm Zenith iliac plug devices ×2.

Prior/remote surgery

One month prior to admission
Operations
Thoracic endovascular aortic repair involving coverage of the left subclavian artery with placement of a 36 mm × 20 cm Valiant thoracic stent graft, 42 mm × 15 cm Valiant thoracic stent graft, 42 mm × 10 cm Valiant thoracic stent graft, unilateral exposure of the right common femoral artery through a longitudinal incision, percutaneous access to the left brachial artery using ultrasound guidance for puncture, and angiography prior to placement, coil embolization of the left subclavian artery with placement of multiple 16 and 14 mm Nester coils. Angiography documented adequate embolization and intravascular ultrasound.

1.5 months prior to admission
Operation
Left carotid subclavian bypass graft.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.6 Complex aortic repair in patient with Marfan syndrome and aortic dissection

H&P

A 35-year-old male with h/o Marfan syndrome and Aortic Dissection, s/p repair:

- ❖ Mechanical aortic valve replacement 13 years prior;
- ❖ Ascending aortic replacement 9 years prior;
- ❖ Descending aortic replacement 5 year prior;

Known residual dissection of the abdominal aorta.

On the day of admission, the patient had an acute 'cooling sensation of the chest'. The patient states this started in the center of the chest and radiated outwards in all directions. It happened several times, and the patient then reported to an OSH emergency room. There the patient had a CT scan of his chest abdomen pelvis, which demonstrated the residual dissection He was transferred for further management. On arrival, the patient did not have any complaints of chest pain, chest discomfort, or abdominal pain.

CT

Intact composite graft of the aortic root and ascending aorta:

- ❖ AVR with mechanical valve;
- ❖ Stable changes at the level of the aortic root, most consistent with adherent wall thrombus inside the graft, associated with mild prominence: (4.2 cm);
- ❖ Stable kink the mid-level of the graft.

Stable, short dilated segment of the arch, which appears native:

- ❖ Maximum diameter 6.3 cm × 5.3 cm;
- ❖ Interval slight increase in size (9 months prior): 5.7 cm × 5.3 cm.

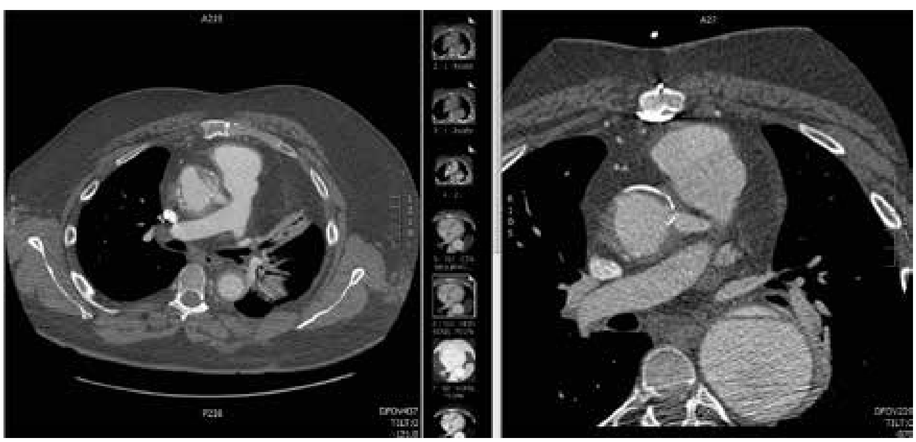


Figure 1 Images show aorta at the time of admission (left panel) and 5 years prior (right panel). The descending aorta was replaced with a surgical graft 5 years prior to the current admission.

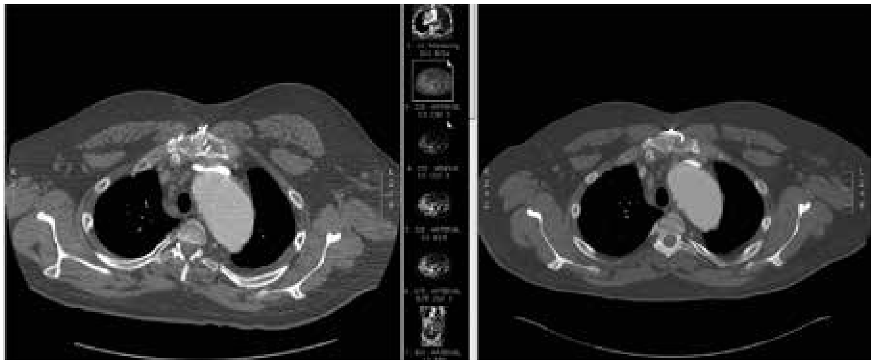


Figure 2 Images show the dilated native segment of the arch at the time of admission (left panel) and 9 months prior (right panel).

Video 1 Images at the time of admission show the grafts of the ascending and descending aorta, the dilated native segment of the arch, and the residual dissection of the abdominal aorta.
Available online: http://www.asvide.com/article/view/23763

Video 2 Images show similar appearance of the aorta 9 months prior to admission.
Available online: http://www.asvide.com/article/view/23764

Diagnosis

Complex aortic repair; stable residual aortic dissection.

Management

No surgical intervention is warranted at this time as patient has no symptoms and dissection is stable.

Plans for future redo arch repair. Unclear whether a device that fits his anatomy is feasible.

Prior/remote surgery

Nine years prior to admission
Operation
Reoperation with replacement of the ascending aorta with repair of the right coronary artery with a patch.

Five years prior to admission
Operation
Replacement of the distal arch and thoracoabdominal aorta.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.7 Repaired type-A dissection; ruptured TAA/residual dissection

H&P

A 67-year-old female patient with history of repaired type-A aortic dissection (9 years prior to current admission). Also h/o ESRD on peritoneal dialysis, hypertension.

On the day of admission she developed sudden onset back pain. Her sister called the EMS, and she was transported to an affiliated hospital. On arrival she was initially hypertensive to 180s, but BP dropped after IV labetalol. She also became hypoxic and was intubated.

After CT scan, the patient received 6 units of blood at the outside hospital and was transferred for further management. On arrival at tertiary care center ICU, the patient was unresponsive, intubated, and hypotensive

CT

Know repaired type-A aortic dissection with residual dissection beyond graft; prior diameter descending about 5 cm:

- Now CT with evidence of contained rupture centered around level of diaphragm;
- Right hemithorax.

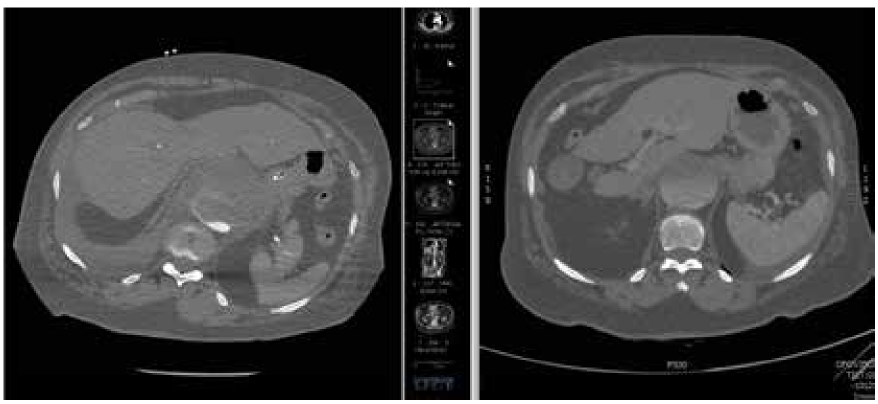


Figure 1 Images at current admission (left panel) and 3 month prior (right panel). Images prior to admission (right panel) show residual dissection of the descending aorta with small, posterior true lumen. The larger, anterior false lumen is partially thrombosed (better seen in movie file). At the time of the current admission (left panel), there are blood products surrounding the dissected aorta with right hemothorax. No definitive contrast extravasation at time of scan. Findings c/w acute rupture.

Video 1 Images 3 month prior to current admission show native aortic root, intact supra-coronary graft of the ascending aorta and residual dissection beyond the graft. There is associated aneurysmal degeneration of the dissected descending aorta. At the level of the diaphragm the posterior true lumen is small. The larger, anterior false lumen is partially thrombosed.
Available online: http://www.asvide.com/article/view/23765

Video 2 Images at the time of the current admission show blood products surrounding the dissected aorta with right hemothorax. No definitive contrast extravasation at time of scan. Findings c/w acute rupture.
Available online: http://www.asvide.com/article/view/23766

Diagnosis

Ruptured TAA/residual dissection.

Management

Emergency surgical repair.

Emergency surgery

Anesthesia
General.

Operation
Emergency repair of thoracoabdominal aortic aneurysm utilizing cannulation of the left femoral artery and left femoral vein and left superior pulmonary vein for left heart bypass with the use of the oxygenator, temporary closure of the thoracoabdominal cavity with packing.

Prior/remote surgery: 9 years prior to current admission

Emergent median sternotomy, emergent repair of ascending aorta dissection with replacement of ascending aorta with 30-mm Hemashield graft, and re-suspension of aortic valve, right axillary artery cannulation, hypothermic circulatory arrest, and retrograde cerebral perfusion.

Anesthesia
General endotracheal anesthesia.

Outcome

Exitus letalis:
- Following surgery, patient was coagulopathic and required continued resuscitation. Airway pressures and ventilation continued to worsen and patient could no longer oxygenate;
- ECMO treatment was considered, but after discussions with family her code status was changed to DNR. Patient expired shortly after surgery

2.6.8 H/o repaired type-A aortic dissection; subsequent admission with concern for peri-aortic graft hematoma *vs.* infection

H&P

A 42-year-old male with a history of Ehlers-Danlos type IV with complex history of aortic disease:

- ❖ Six months prior to current admission: Ruptured left common iliac artery (CIA) aneurysm, treated with left CIA stent and embolization of left internal iliac artery;
- ❖ Two months prior to current admission type A dissection, treated with emergent repair of ascending aorta and arch;
- ❖ One month prior to current admission aborted repair of his right CIA aneurysm. Subsequently developed right leg DVT and underwent successful lysis.

On the day of admission, the patient started having upper abdominal pain. A CT scan revealed suspected mediastinal perigraft hematoma with suspected interval increase size compared to prior postoperative CTs. In addition the patient described vague symptoms of fevers, chills. Vital signs showed mild hypotension and tachycardia. The patient was admitted with a clinical suspicion of sepsis.

CT (current admission)

- ❖ Surgical graft ascending aorta with suspected interval increase in surrounding blood products;
- ❖ Stable residual dissection beyond graft;
- ❖ Stent graft in L CIA s/p coil embolization of hypogastric;
- ❖ Saccular right CIA aneurysm.

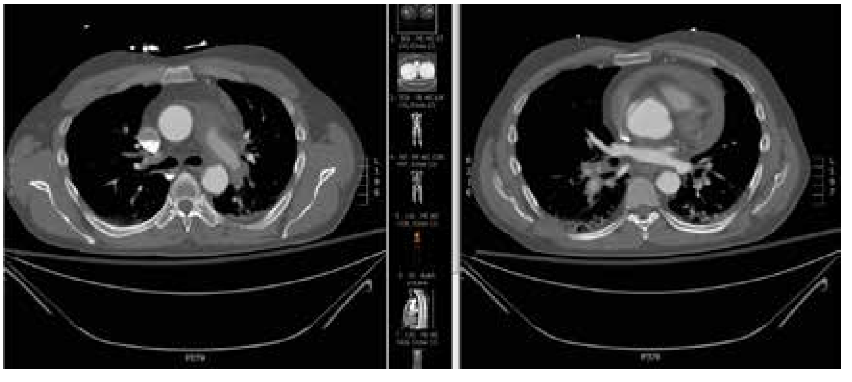


Figure 1 Images of initial admission with type-A aortic dissection. Images at the proximal ascending aorta (right panel), show dissection flap just above the aortic root, but not in the mid-ascending segment. Also seen is a moderate size hemorrhagic pericardial effusion. The left panel shows the compressed small true lumen in the right anterior aspect of the proximal descending segment.

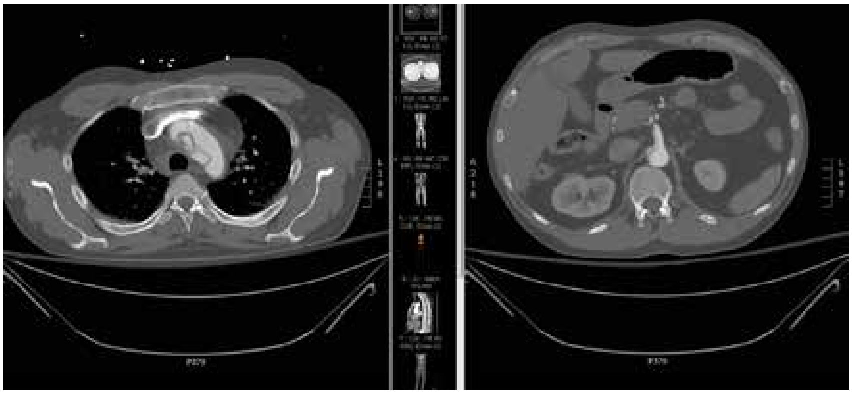


Figure 2 Images of initial admission at the level of the arch show the dissection flap with a ‘crowded’rappearance (left panel). This is consistent with prolapse of the dissection flap in the arch. At the level of the SMA (right panel) the extension of the dissection with small true lumen is identified.

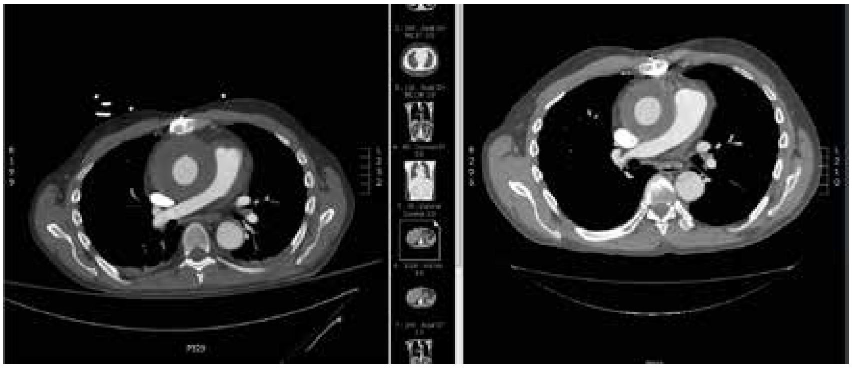


Figure 3 Images at the time of the current admission (2-months post-surgical repair, left panel) and 1 month post repair (right panel) show the blood-products surrounding the graft of the ascending aorta. While this could be just expected post-operative changes, the appearance of increase (left panel) was of unclear significance but thought to be secondary to lysis for right leg DVT.

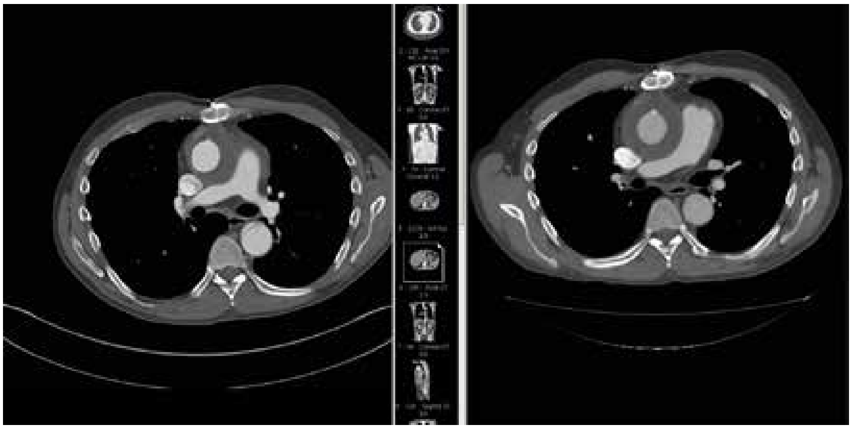
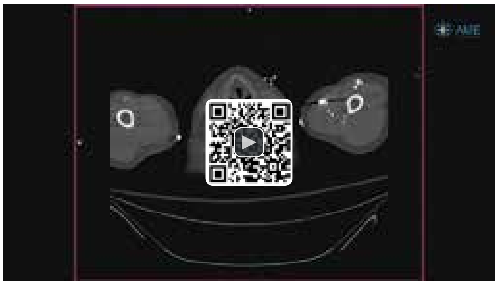
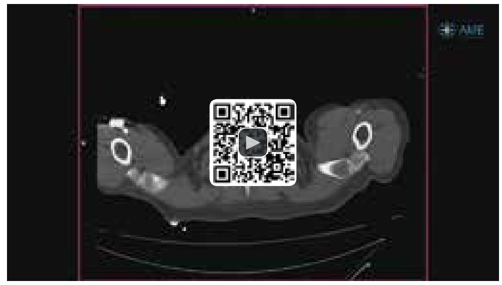


Figure 4 Images 2 months following the current admission (4 months post-surgical repair, left panel) compared to current admission (right panel) show subsequent decrease in the amount of the blood-products surrounding the graft of the ascending aorta.



Video 1 Images of initial admission with type-A aortic dissection show the extensive dissection flap with prolapsed flap in the arch and small, compressed lumen in the descending thoracic and abdominal aorta. Also seen is involvement of the iliac arteries with stent on the left. Also seen is a moderate size hemorrhagic pericardial effusion.
Available online: http://www.asvide.com/article/view/23767



Video 2 Images at the time of the current admission (2 months post-surgical repair, show the blood-products surrounding the graft of the ascending aorta. While this could be just expected post-operative changes, the appearance of increase was of unclear significance, but thought to be secondary to lysis for right leg DVT (see *Figure 3*).
Available online: http://www.asvide.com/article/view/23768

Video 3 Images 2 months following the current admission (4 months post-surgical repair) show subsequent decrease in the amount of the blood-products surrounding the graft of the ascending aorta.
Available online: http://www.asvide.com/article/view/23769

Diagnosis

Peri-aortic graft hematoma *vs.* infection:
- ❖ Most likely perigraft hematoma which enlarged following lysis for right leg DVT.

Management

- ❖ Observation;
- ❖ Culture and antibiotic treatment per infectious disease recommendation;
- ❖ Treatment of right CIA aneurysm by vascular surgery;
- ❖ F/u CT to assess stability of peri-graft hematoma.

Current surgery

Anesthesia
- ❖ General.

Operation
- ❖ Pelvic angiogram, deployment of a 13×10 Viabahn to exclude right common iliac artery aneurysm.

Prior/remote surgery

- Stent left CIA;
- Type-A aortic dissection repair at OSH.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.9 Aortic root pseudo-aneurysm

H&P

A 66-year-old male symptomatic with chest pain and shortness of breath.

- ❖ H/o remote type A dissection 6 years prior to admission; s/p replacement of aortic valve with mechanical valve and replacement of the ascending aorta for.

CT

- ❖ Aortic root pseudoaneurysm partially compressing the superior vena cava and right atrial junction.
- ❖ Difficult to determine exactly the origin/communication of pseudoaneurysm.

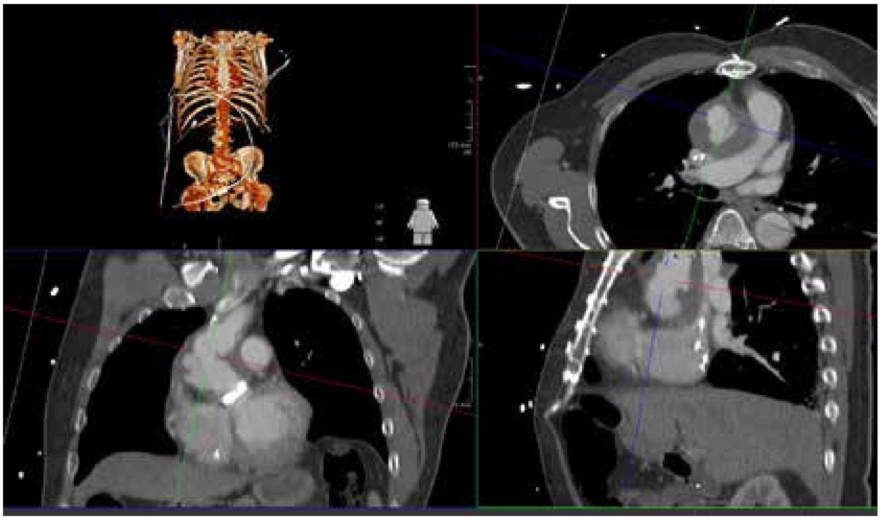


Figure 1 (At time of admission) Composite graft of the aortic root and ascending aorta, extending to the distal ascending segment. Note kink in surgical graft at the level of the mid-ascending segment (this sometimes appears flap-like on axial images). Contrast-filled cavity of the pseudo-aneurysm is seen in the right aspect of the proximal graft (left lower panel).

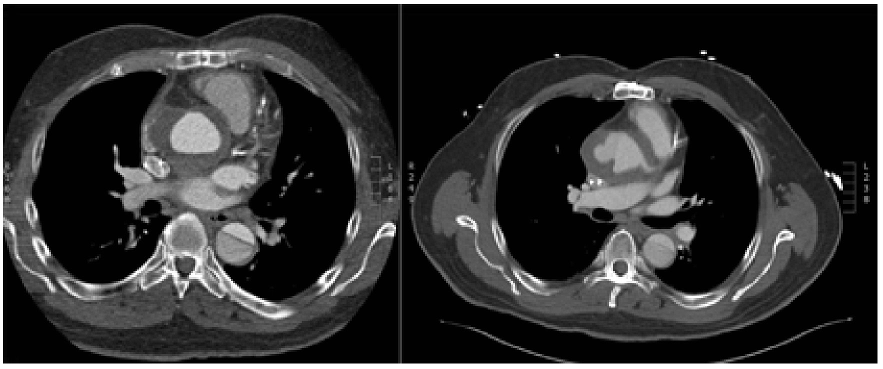
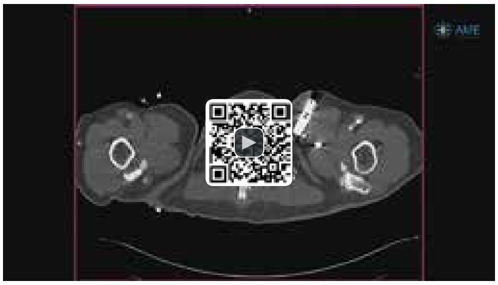


Figure 2 Right panel shows axial image of the pseudo-aneurysm at time of presentation. Left panel shows repaired graft after surgery (6 months after surgery) with surrounding residual surgical changes.



Video 1 Images demonstrate contrast-filled cavity of the pseudo-aneurysm in the right aspect of the proximal graft.
Available online: http://www.asvide.com/article/view/23770

Video 2 Images demonstrate exclusion of pseudo-aneurysm 6 months after surgery.
Available online: http://www.asvide.com/article/view/23771

Diagnosis

Aortic root pseudo-aneurysm.

Management

Surgery during current admission

Repair of aortic root pseudoaneurysm.

Surgical detail

Anesthesia
General endotracheal anesthesia.

Findings
Mechanical valve conduit with reimplantation of the right and left coronaries; communication of pseudoaneurysm likely at partially detached right coronary artery button.

Operative procedure
After careful dissecting out the heart and previous aortic graft, the heart was arrested. Pseudoaneurysm cavity was entered and the previous graft-to-graft anastomosis completely transected. The right coronary artery button was detached and reattached it in an end-to-side fashion. Following this, the graft-to-graft anastomosis was re-anastomosed in an end-to-end fashion.

Prior/remote surgery

Prior ascending aortic replacement with mechanical aortic valve replacement for type A dissection (6 years prior to admission).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.10 Pseudoaneurysm of the ascending aorta

H&P

A 68-year-old male patient with prior h/o AVR (Bjork-Shiley valve) and composite graft aortic root graft with re-implantation of the coronary ostia:

- One year h/o of abdominal pain and 3 months of atypical chest pain;
- An elective LHC was done. Interventionalist was unable to engage coronaries, an aorto-gram was done concerning for a Type A dissection;
- Subsequent CT scan with concern for Type A aortic dissection prompting transfer;
- Patient reported some chest discomfort after the LHC.

CT

Pseudoaneurysm adjacent to aortic root.

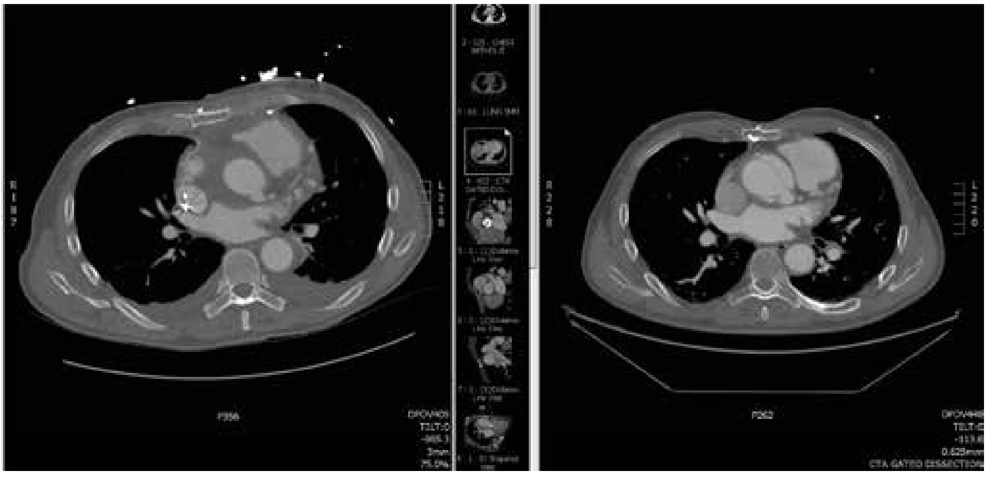
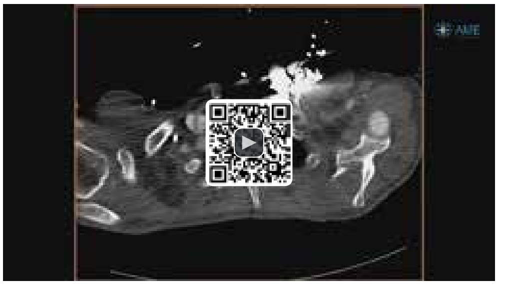


Figure 1 Right panel pseudoaneurysm at the root; left panel new graft post-surgery.

Video 1 Images prior to surgery show pseudoaneurysm at root graft. Available online: http://www.asvide.com/article/view/23772



Video 2 Images following surgery show new graft. Available online: http://www.asvide.com/article/view/23773

Diagnosis

Pseudoaneurysm of the ascending aorta with a leak left coronary button.

Management

Surgery.

Emergent/urgent surgery

Anesthesia
General.

Operation
Redo sternotomy, coronary artery bypass ×2 with a vein graft to the left anterior descending and vein graft to the obtuse marginal. Modified Bentall with the size #27 St. Jude aortic valve graft composite left epicardial lead placement.

Operative findings
Large left coronary button. The side-to- side anastomosis from the left coronary button to the aortic graft had dehisced with some fresh clot in the space between the ascending aortic graft and native aorta.

Prior/remote surgery

Remote classic Bentall with Bjork-Shiley valve and a graft with a side-to-side anastomosis of the patient's previous coronary ostia to the neoaortic graft. Patient also had a Cabrol fistula.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.11 Pseudoaneurysm repaired aortic root

H&P

A 44-year-old male with history of aortic root repair presented with mid sternal burning chest pain since 2:30 am (similar to his previous aneurysm chest pain). Cardiac enzymes negative ×2. ECG without new change.

CT

Pseudoaneurysm of ascending aorta superior to prior patch repair with possible hematoma *vs.* thrombus. No aortic dissection noted.

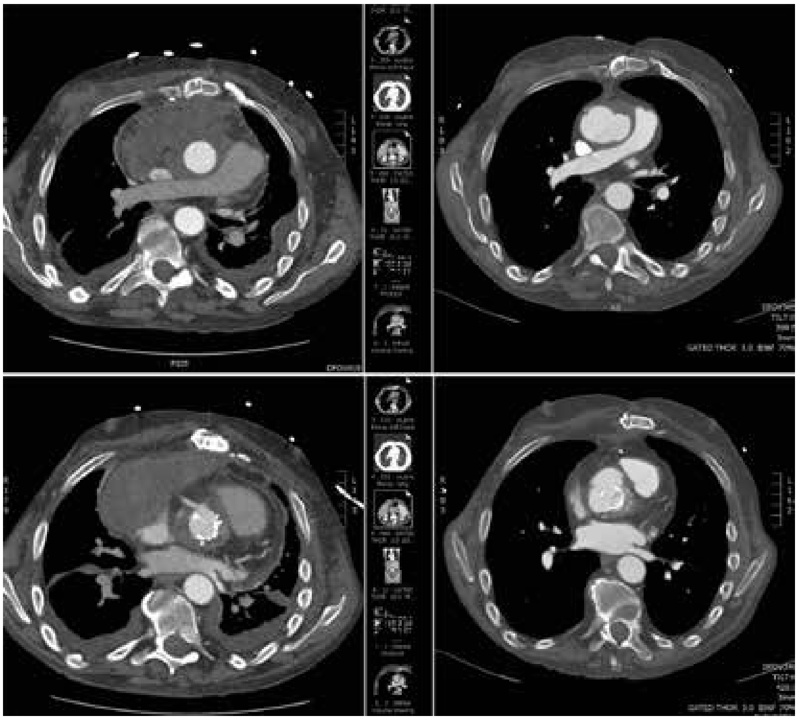
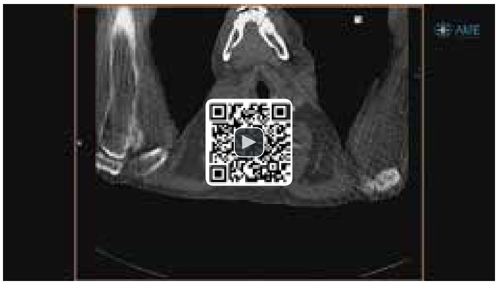
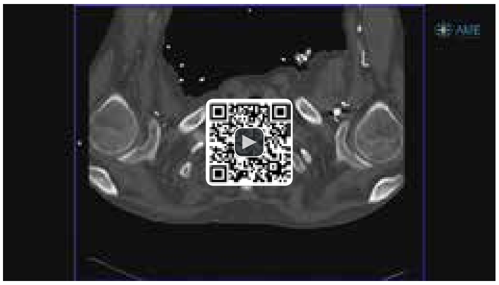


Figure 1 Right panel pre-op pseudo-aneurysm at the root (right upper at level of pseudoaneurysm, right lower at valve level); left panel post-op showing graft with surrounding post-operative blood products (left upper panel) and new bio-prosthetic aortic valve.



Video 1 Images 1 year prior to current admission after.
Available online: http://www.asvide.com/article/view/23774



Video 2 At admission, showing aortic root pseudoaneurysm.
Available online: http://www.asvide.com/article/view/23775

Video 3 After current surgery. Available online: http://www.asvide.com/article/view/23776

Diagnosis

Pseudoaneurysm repaired aortic root.

Management

Surgery.

Emergent/urgent surgery

Anesthesia
General.

Operations
Bentall procedure with size #23 bioprosthetic CE valve and 26-mm Hemashield graft.

Operative findings
The pseudoaneurysm was caused by disintegration of the patient's previous Freestyle graft at the level of the aortic root. The pseudoaneurysm was contained by the surrounding scar tissue. Previous aortic valve prosthesis was well seated and free of any disease.

Prior/remote surgery

One year prior to admission
Re-do sugery for pseudoaneurysm of the aortic root, placement of #21 CE valve into the anulus. A tailored Dacron patch and sewed on to the anterior wall of the aortic root encompassing both coronary ostia. On the cranial end, this patch was sewn onto the native aorta, on the lateral end, this patch was sewn to the remnant of aortic root, and on the caudal end, it was sewn onto the remnants of the freestyle aortic root just distal to the right coronary artery.

Six years prior to admission
Aortic valve replacement and root replacement with a freestyle valve.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

2.6.12 Large aortic root pseudoaneurysm/abscess cavities

H&P

A 39-year-old male patient with h/o bicuspid aortic valve and remote type-A aortic dissection. S/p AVR (mechanical valve) and replacement of ascending aorta 10 years prior to admission.

He now presented to OSH with fevers and confusion. Per records 2/2 blood cultures were growing GPCs in clusters. His TTE showed AV vegetation and suspected pseudoaneurysm anterior to the aortic root. He had been started on Ceftriaxone, Vancomycin, and rifampin prior to transfer to CICU with suspected infective endocarditis.

CT

Cavities surrounding the aortic root, c/w pseudoaneurysm/abscess cavities.

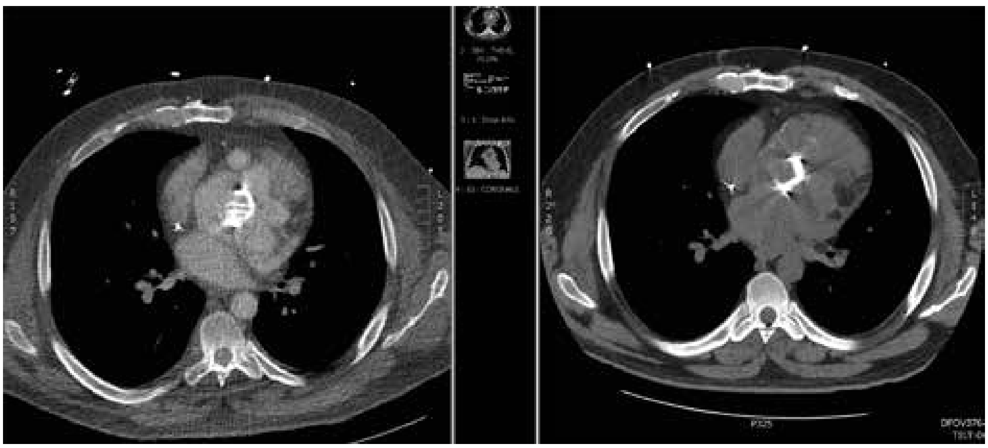


Figure 1 Non-contrast (right panel) and contrast enhanced (left panel) CT show cavities surrounding the aortic root.

Video 1 Non-contrast CT show surgical graft of root and ascending aorta and suspected cavities surrounding the aortic root.
Available online: http://www.asvide.com/article/view/23777

Video 2 Contrast enhanced (left panel) CT demonstrates contrast filling of the cavities surrounding the aortic root.
Available online: http://www.asvide.com/article/view/23778

Diagnosis

Infected ascending aortic graft and Bentall composite graft, status post mechanical composite valve graft for aortic dissection, aortic insufficiency, large aortic root pseudoaneurysm.

Management

Temporary transvenous pacemaker placement for prolonged PR interval.

Emergent/urgent surgery

Anesthesia
General endotracheal.

Operations
Redo aortic root replacement with 28 mm Homograft, redo ascending aorta and hemi-arch replacement with Rifampin soaked 28 mm Gelweave graft with right axillary cannulation and deep hypothermic circulatory arrest

Findings
Near complete dehiscence of the composite valve graft at the root and left coronary button. Chronic appearing pseudoaneurysm cavity surrounding most of the root. Acute vegetation on the valve-graft. All existing prosthetic material was removed.

Prior/remote surgery (10 years prior)

Bentall and hemi-arch replacement for type A dissection

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.1.1 Aortic dissection beginning in the aortic arch and distal malperfusion

H&P

A 54-year-old male with known type-B dissection transferred from OSH with suspected progression of disease.

The patient presented to the OSH initially 4 months prior to current admission with chest pain, and a CT scan demonstrated a type-B aortic dissection, which was managed conservatively.

On day of admission started feeling palpitations and chest tightness and went to the hospital. A repeat CT scan showed progression of the dissection.

CT

Aortic dissection arch, descending thoracic and abdominal aorta:

- ❖ Flap begins at the level of the innominate artery;
- ❖ Dilated descending thoracic aorta: 4.5 cm; small compressed true lumen;
- ❖ Diameter juxtarenal Abdominal Aorta: 4.5 cm (at celiac level); compressed true lumen;
- ❖ Celiac artery and SMA: from compressed true lumen.

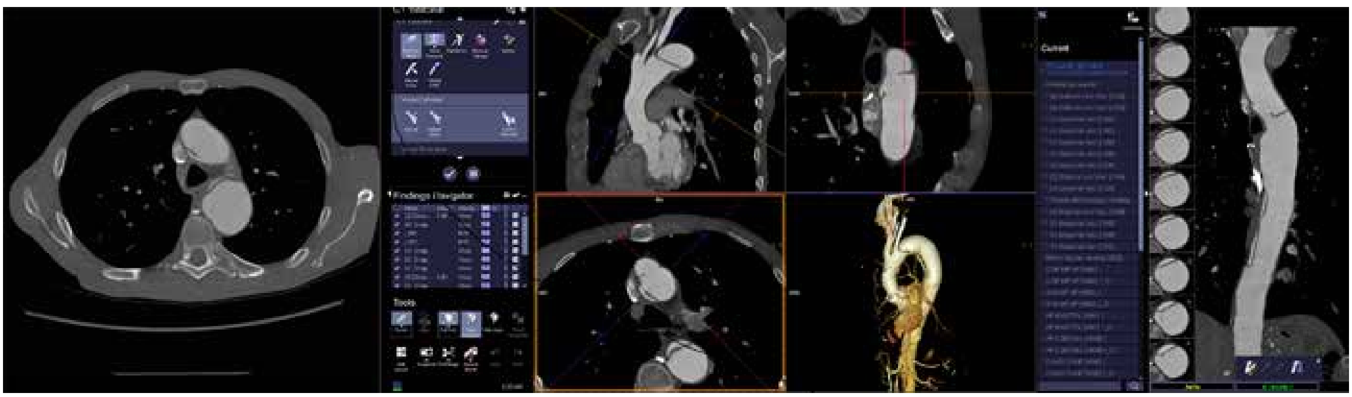


Figure 1 Images showing dissection flap beginning in the mid arch. Also seen is compressed true lumen in the descending and abdominal segments.

Video 1 Image of the chest.
Available online: http://www.asvide.com/article/view/23779

Video 2 Image of the abdomen.
Available online: http://www.asvide.com/article/view/23780

Diagnosis

Aortic dissection with dissection of the aortic arch and distal malperfusion.

Management

Plan for urgent frozen elephant trunk.

Emergent/urgent surgery

Anesthesia
General endotracheal.

Procedure
Median sternotomy, ascending and total arch replacement, proximal descending aortic repair of aortic dissection with 24-mm Dacron graft, direct placement of a 31 mm C-TAG thoracic stent graft, direct stent grafting of the left subclavian artery with a 10 mm × 2.5 cm Viabahn stent graft, hypothermic circulatory arrest with selective antegrade brain perfusion (modified branch frozen elephant trunk procedure, repair of aortic dissection, and intravascular ultrasound.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.1.2 Distal arch and descending aortic intramural hematoma with possibly limited extension in the distal ascending aorta

H&P

A 67-year-old male with h/o 4 cm abdominal aortic aneurysm (AAA) and HTN.

He presented with a 5-day history of left sided sharp, stabbing chest pain with radiation to the back. It was initially severe but improved with time. He eventually presented to a OSH on the day of admission because the pain did not resolve and he felt that he might be having a heart attack. CT chest with IV contrast with suspected Type-A dissection (intra-mural hematoma). Patient was transferred to for further management. Upon presentation, patient was still having chest pain, hypertensive with SBP 180 s.

CT

Distal arch and descending aortic intramural hematoma with possibly some extension in the distal ascending aorta. Additionally, small pericardial effusion, likely hemorrhagic, and small left pleural effusion.

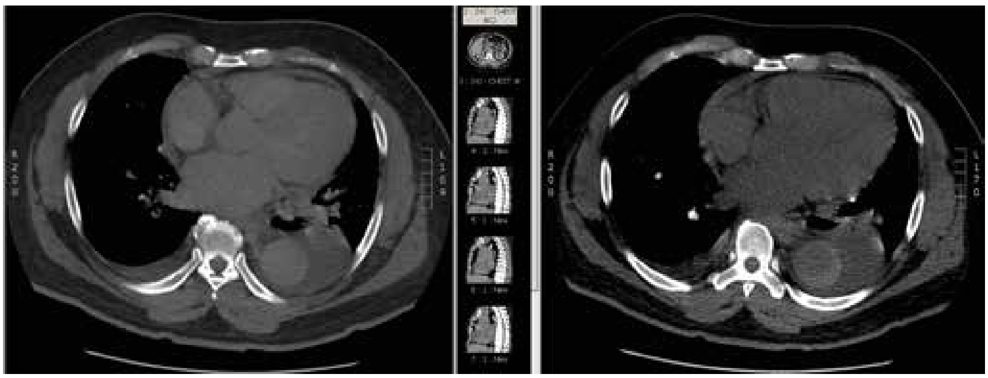


Figure 1 Images show normal root and intramural hematoma of the descending aorta. The non-contrast acquisition (right panel) better shows the hyperdense rim of the IMH next to the aortic lumen. Note the small amount of pericardial fluid/effusion to the left of the descending aorta.

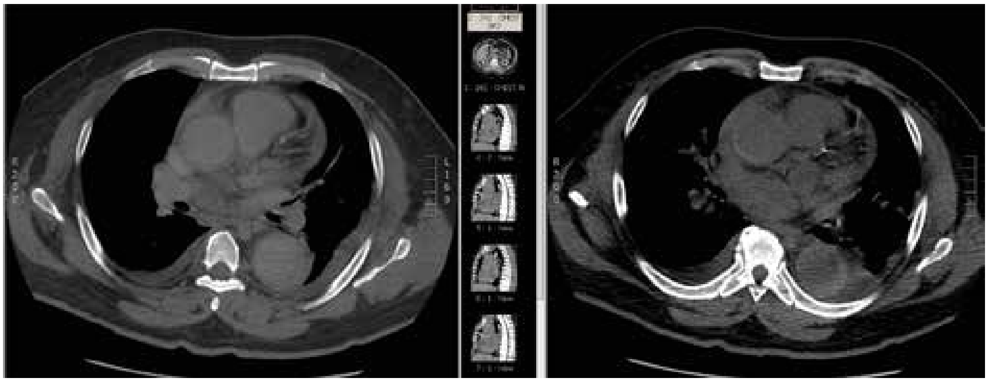


Figure 2 Images at the level of the mid ascending and descending aorta show the intramural hematoma of the descending aorta. There is a thin hyperdense rim of the ascending aorta, which is of unclear significance.(non-contrast = right panel; contrast-enhanced images = left panel).

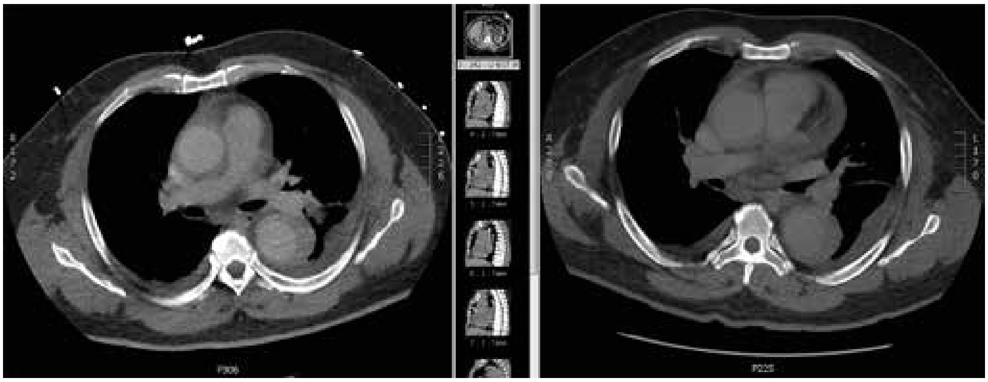


Figure 3 A follow-up CT scan was performed because of further chest pain shows similar finding.

Video 1 Images show intramural hematoma of the arch and descending aorta. The small amount of pericardial fluid in the fold adjacent to the ascending aorta complicates assessment for ascending aortic involvement.
Available online: http://www.asvide.com/article/view/23781

Video 2 Follow-up scan on day-2 shows similar findings.
Available online: http://www.asvide.com/article/view/23782

Video 3 Images show the endovascular stent graft of the descending aorta. Available online: http://www.asvide.com/article/view/23783

Diagnosis

Distal arch and descending aortic intramural hematoma with possibly some extension in the distal ascending aorta.

Management

Initially treated medically with blood pressure control:

- However, recurring episodes of pain;
- Follow-up CT scan demonstrated small area of contrast filling in the intramural hematoma (IMH) of the descending segment.

Emergent/urgent surgery

Anesthesia
General endotracheal.

Operation
Percutaneous access of the right common femoral artery with ultrasound guidance for needle placement, intravascular ultrasound of the aorta, thoracic endovascular aortic repair involving coverage of the left subclavian artery with placement of 34 mm × 20 cm Valiant thoracic stent graft and placement of 34 mm × 15 cm Valiant thoracic stent graft, and completion aortogram.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.1.3 Type-B aortic dissection—uncomplicated

H&P

A 44-year-old male with h/o hypertension:

- Day of admission developed back pain while weight lifting;
- No abdominal pain or tenderness;
- Palpable pulses throughout.

CT

Type-B dissection with flap extending from level of left subclavian artery to iliac arteries:

- SMA fills from both true and false lumen; right renal artery from true lumen; left renal artery, celiac, and inferior mesenteric artery of false lumen.

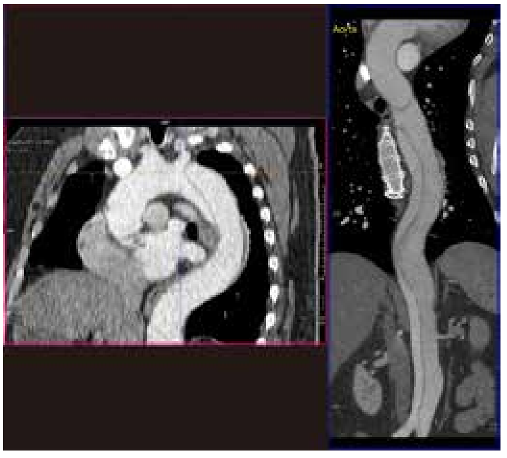


Figure 1 Left panel shows oblique 3-dimensional reconstruction with beginning of dissection flap at level of left subclavian artery; right panel shows centerline reconstruction along the entire length of the aorta.

Video 1 Note suspected proximal tear just beyond origin of left subclavian artery, smaller true lumen descending thoracic aorta, and origin of visceral branch vessels.
Available online: http://www.asvide.com/article/view/23784

Diagnosis

Acute type-B aortic dissection.

Management

Medical management.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.1.4 Type-B aortic dissection—CFA pseudo-aneurysm

H&P

A 64-year-old male with PMH significant for HTN presented to OSH on day of admission with RLQ acute abdominal pain that started during the night. He was admitted 2 months earlier with a history of perforated appendicitis, when an abscess was drained percutaneously. He was started on antibiotics (Augmentin) and surgical removal of his appendix was planned. Of note, he was also found to have an SMV thrombosis during that admission and has been on Lovenox to Coumadin bridging.

Upon arrival, the patient was on a nicardipine drip which was started by the transport team. He was hemodynamically stable and complained of abdominal and back pain and was diaphoretic. He denied chest pain or shortness of breath.

CT

OSH CT abdomen performed to evaluate the RLQ pain which was significant for dissection of the aorta with an intimal flap beginning at the level of the left subclavian artery and extending inferiorly to below the renal arteries with involvement of the proximal inferior mesenteric artery and visceral malperfusion

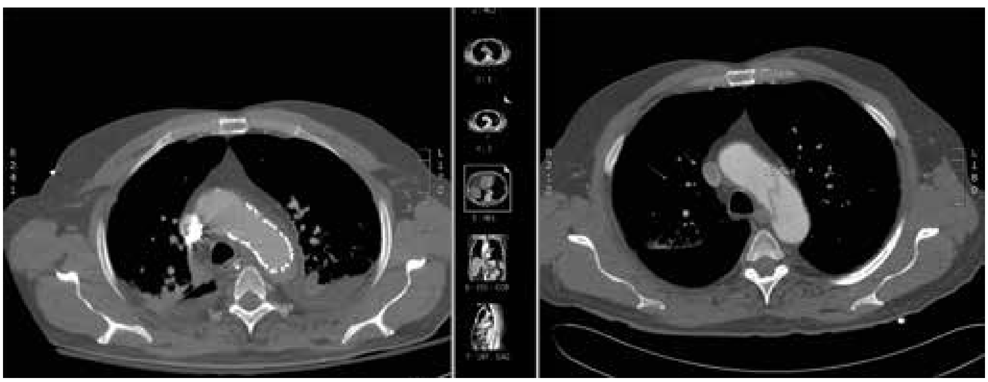


Figure 1 Right and left panel shows dissected arch prior to (right) and after (left stent placement).

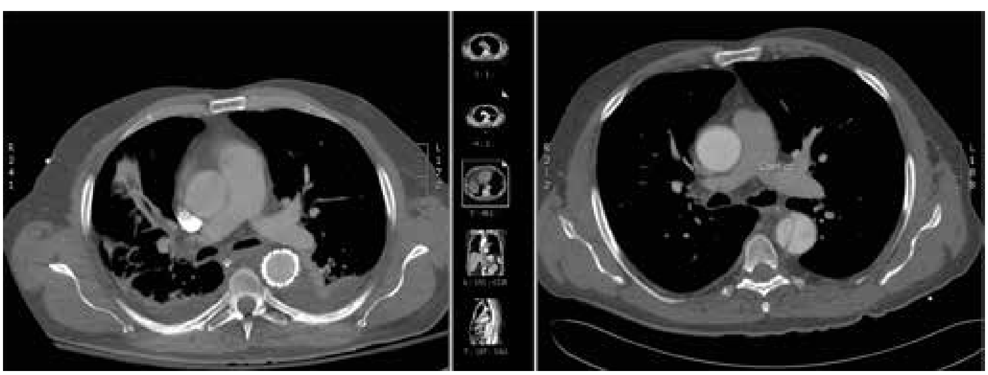


Figure 2 Right and left panel shows dissected descending aorta prior to (right) and after (left stent placement).

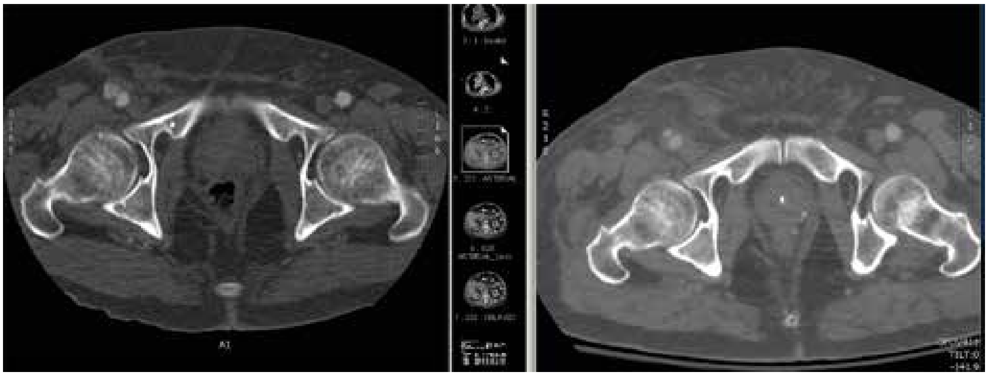


Figure 3 Small right common femoral pseudoaneurysm, with interval growth after initial discharge from the hospital.

Video 1 Images at admission show the type-B dissection with small true lumen.
Available online: http://www.asvide.com/article/view/23785

Video 2 Images following surgery show the stent in the true lumen of the descending aorta.
Available online: http://www.asvide.com/article/view/23786

Video 3 Images at 1 month follow-up show stent in the true lumen of the descending aorta and decreased size of false lumen adjacent to stent.
Available online: http://www.asvide.com/article/view/23787

Diagnosis

Type-B aortic dissection.

Management

Surgery.

Current emergent/urgent surgery

Anesthesia.
General.

Operation
Endovascular repair of type B thoracic aortic dissection, stenting of superior mesenteric artery, suction thrombectomy of superior mesenteric artery via catheter, intravascular ultrasound.

Subsequent/non-urgent surgery

Three months post-surgery.

Operation
Surgical repair of right common femoral pseudoaneurysm.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.1.5 Complicated type-B aortic dissection—presentation with endoleak 2 month after endovascular stent placement

H&P

A 63-year-old male with no prior cardiac history transferred for the management of acute type-B aortic dissection. Sudden onset sharp chest pain radiating to back while have sex with wife morning of admission. Associated diaphoresis and nausea.

In ED blood pressure was 170/102 mmHg, normal EKG and cardiac enzymes normal, with mildly elevated D-Dimer. CTA to rule out PE.

Readmission 2 months post-endovascular stent placement with back pain.

CT

Type-B aortic dissection.

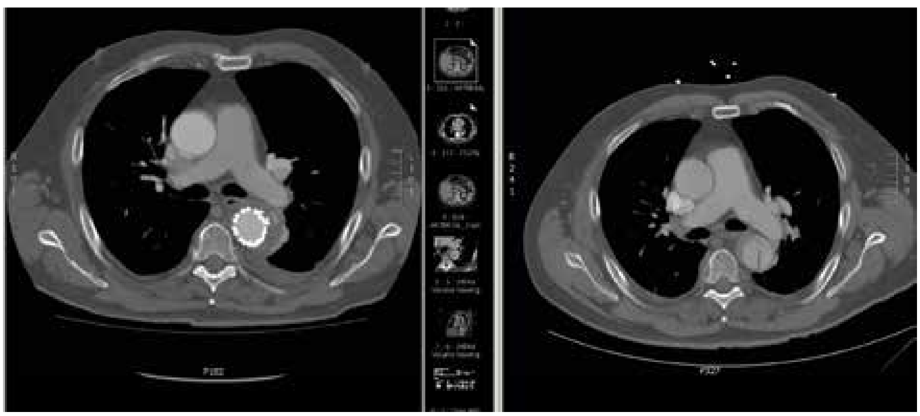


Figure 1 Right and left panel show mid descending aorta at time of admission and 2 months after the initial stent placement, when patient presented with back pain. The left panel shows a small endoleak (type-3).

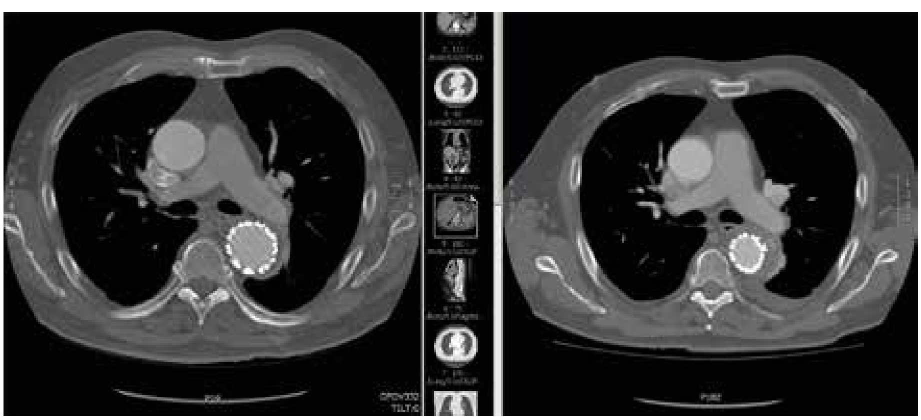
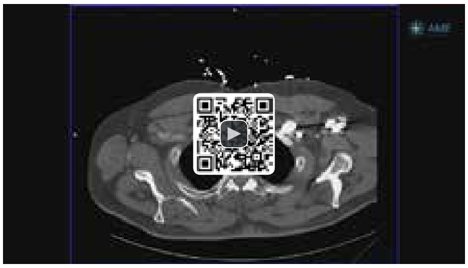


Figure 2 The right and left panel show mid descending aorta before and 1 month after the second stent placement. At follow-up the endoleak is resolved.



Video 1 Images prior to stent placement showing type-B dissection.
Available online: http://www.asvide.com/article/view/23789

Video 2 Images at the time of presentation with back pain 2-months after first stent placement. The small type-3 endoleak is visible.
Available online: http://www.asvide.com/article/view/23790

Video 3 Images after placement of the second stent (3 months post initial admission).
Available online: http://www.asvide.com/article/view/23791

Diagnosis

Type B aortic dissection.

Management

Initial medical management.
Plan for elective surgery.

Staged elective surgery (2 months after admission)

Endovascular stent graft
One day after left carotid subclavian transposition.

Anesthesia
General.

Procedure
- IVUS thoracoabdominal aorta;
- TEVAR with 45×200 and 40×200 mm cTAG devices;
- Right renal artery stenting with 7×38 mm iCast.

Left carotid-subclavian transposition
One day prior to endovascular stent.

Subsequent surgery

Indication
Subsequent back pain at home after discharge. Follow-up CTA demonstrates type-3 endoleak.

Anesthesia
General.

Procedure (2 month after endovascular stent placement)
- ❖ Ultrasound guided access, right femoral artery;
- ❖ Thoracic aortogram with arch and distal runoff;
- ❖ Percutaneous TEVAR with 45×150 mm cTAG device.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.1.6 Type-B aortic dissection

H&P

A 76-year-old white male with h/o hypertension, transferred form OSH for management of type-B dissection. Patient started having symptoms of abdominal pain a few days prior to admission.

Specifically he had been complaining of pain in his right lower quadrant over the course of the last 5 days. On day of admission a CT scan of his abdomen was performed demonstrating an aortic dissection extending from above the level of the diaphragm to the renal arteries. Initial BP was 159/60 with a HR of 98. He was subsequently transferred for further management.

Upon arrival he was hemodynamically stable, BP was 149/72 with a HR of 85. He then underwent an urgent CTA of the entire aorta, which demonstrated a type B thoracoabdominal aortic dissection arising immediately distal to the L subclavian artery and extending to the level of the renal arteries with likely thrombosis of the false lumen and fenestration.

CT

Type B dissection

- ❖ Large right intrahepatic mass with extrahepatic extension into the R paracolic gutter along with multiple cysts in the liver.

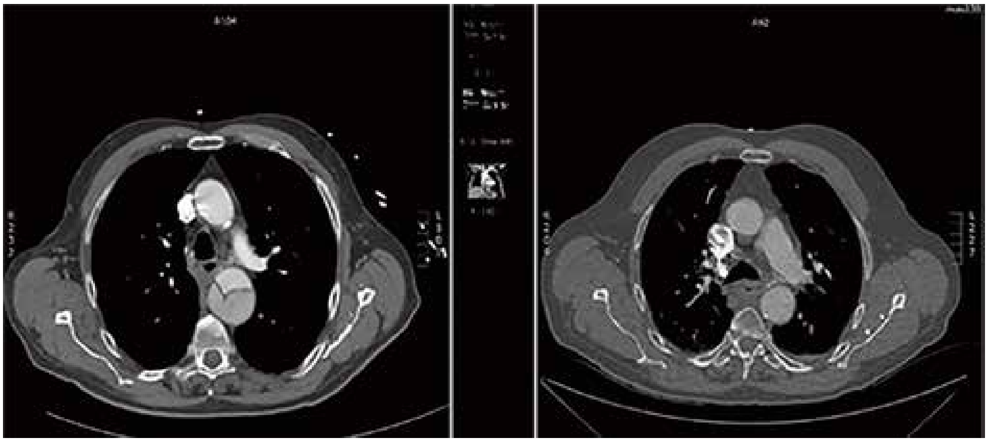


Figure 1 Images at admission (left panel) and 6 years prior to admission (right panel). The left panel shows the new dissection flap in the descending aorta, associated with enlargement of the descending segment.

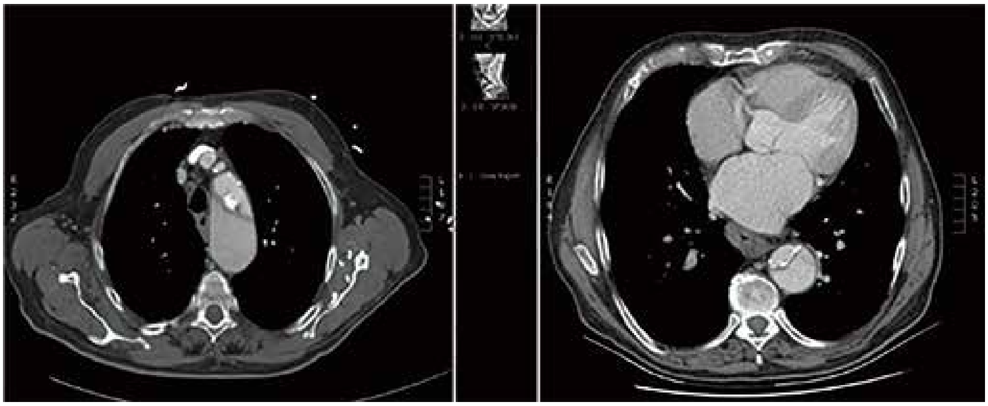


Figure 2 Images at admission show dissection flap beginning beyond the origin of the left subclavian artery (left panel). The right panel shows the normal aortic root.

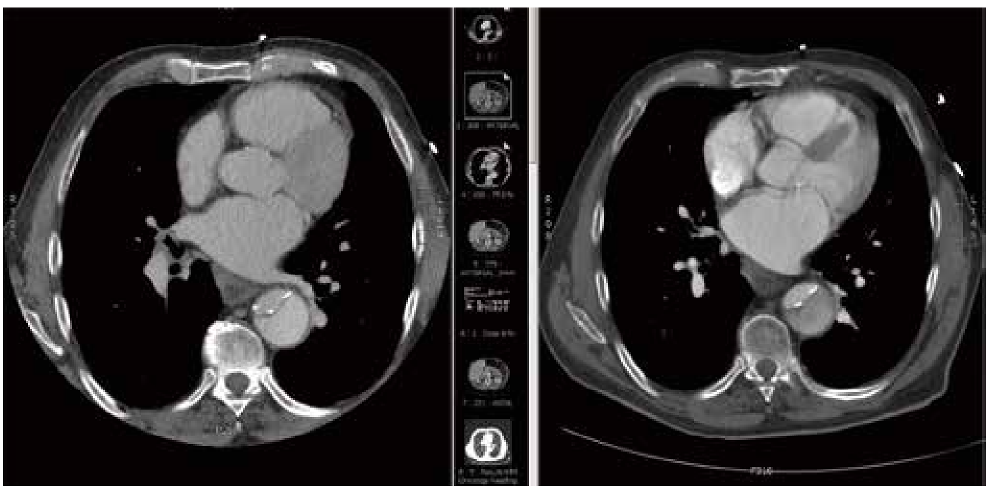


Figure 3 Images of the aortic root with (left) and without (right) ECG-synchronization ('gating') show symmetric motion artifact at the aortic root in the non-synchronized acquisition. Motion artifact limits precise assessment for subtle wall changes.

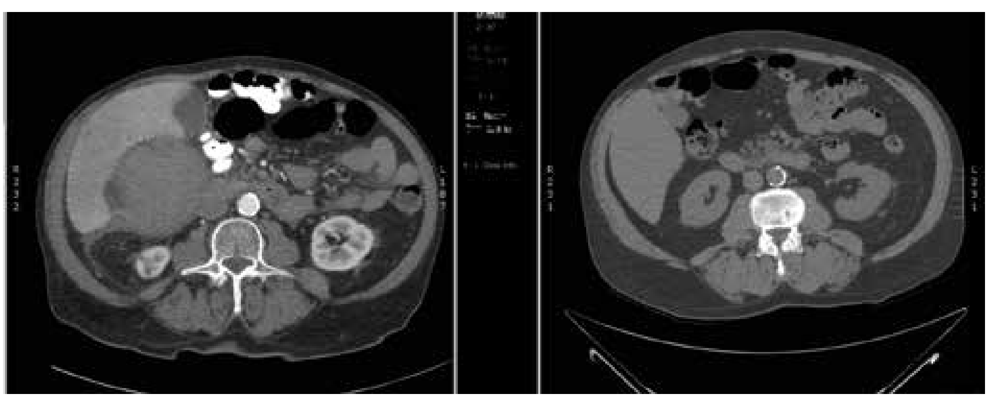


Figure 4 Liver lesion (left panel). Follow-up imaging demonstrated features, most c/w a hemorrhagic cyst. Right panel shows absence of the lesion 6 years prior to admission.

Video 1 Images at admission shows the dissection flap in the descending aorta, associated with enlargement of the descending segment. Available online: http://www.asvide.com/article/view/23633

Diagnosis

Type B dissection

- Liver cyst *vs.* malignancy.

Management

- Impulse control therapy.
- No need for immediate vascular surgical intervention.
- Evaluation of his liver mass.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging. A follow-up liver CT was performed after discharge and liver findings were interpreted as c/w hemorrhagic liver cyst.

3.1.7 Complicated type-B aortic dissection with mediastinal hemorrhage

H&P

A 73-year-old female with an h/o of HTN and AI presented to ED with chest pain described as 5/10 radiating to the back. Pain started the day prior to admission at work. She initially went home and took aspirin and sublingual nitroglycerin with only minimal relief. She reported to the ED the next morning.

CTA showed type-B aortic dissection with evidence of mediastinal hemorrhage. She was started on an esmolol drip and transferred to the tertiary care center.

CT

Aortic root: normal size.

Ascending aorta: aneurysm, diameter 5.1 cm.

❖ Surrounded by small amounts of fluid in pericardial recesses.

Distal ascending aorta and aortic arch: normal size.

❖ Surrounded by stranding/blood products; most c/w blood products tracking along wall from descending segment rather than intramural hematoma (IMH).

Descending thoracic aorta: dissection flap beginning at left subclavian artery.

❖ Tear just beyond left subclavian.

❖ Normal size.

❖ Surrounded by stranding.

Pulmonary artery: no evidence of central or lobar thrombus. Stranding surrounding proximal branches.

Pericardium: trivial pericardial effusion anterior to RV with increased HU, measuring 3 mm; small amount of fluid in pericardial recesses.

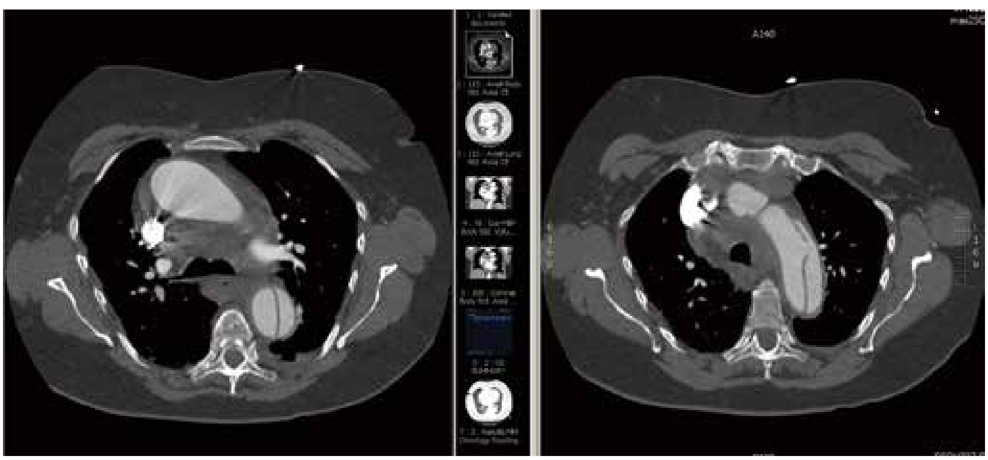
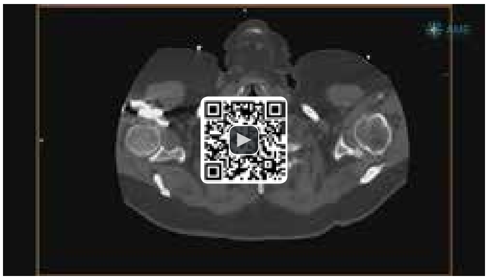
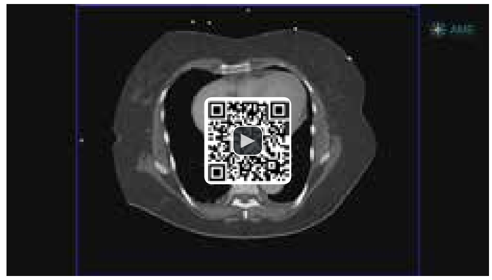


Figure 1 Images on admission show dissection flap beginning at left subclavian artery, with tear just beyond left subclavian. There are suspected blood products with stranding along the arch and visualized distal ascending aorta.



Video 1 Images on admission (chest) show evidence of a type-B dissection with dissection flap beginning at the left subclavian artery, with a tear beyond left subclavian. There are suspected blood products with stranding along the arch and distal ascending aorta.
Available online: http://www.asvide.com/article/view/23635



Video 2 Images on admission (abdomen). The dissection extends into the abdominal aorta.
Available online: http://www.asvide.com/article/view/23644

Video 3 One month follow-up: images at 1 month following the stent placement show the intact stent and dissection of the infrarenal aorta beyond the stent.
Available online: http://www.asvide.com/article/view/23648

Diagnosis

Acute aortic dissection type B, complicated by mediastinal hematoma.

Management

TEVAR with coverage of left subclavian artery, possible mesenteric stenting.

- ❖ Cardiac surgical back up in case of a retrograde dissection.

Emergent/urgent surgery

Anesthesia
General.

Operations
Emergency TEVAR extending from the left subclavian down to just above the celiac takeoff utilizing a 31×15 and 31×10 three separate Gore-TAG stent grafts utilizing the right transfemoral access and left brachial access.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.1.8 Type-B aortic dissection with massive aneurysmal dilatation

H&P

A 45-year-old male with h/o of untreated HTN and chronic positional chest pain for 2 years. Chest pain initially began in relation to powerlifting, which he has since discontinued. Patient reports chest pain became acutely worsened approximately two weeks prior to admission. He describes the pain is a tearing 10/10 mid-left sided chest pain that is almost always present, but exacerbated when he leans forward. He denies any recent trauma.

On day of admission, presented to ED with acute increase in pain. After diagnosis of type-B dissection on CT scan, the patient was transferred for further management.

CT

Type-B aortic dissection extending from ostium of left subclavian (dissection extends into LSCA) to the iliac arteries. Dissection extends into left subclavian artery, celiac artery, and SMA. Aneurysmal degeneration with maximum diameter of 7.4 cm. Additional subclavian aneurysm.

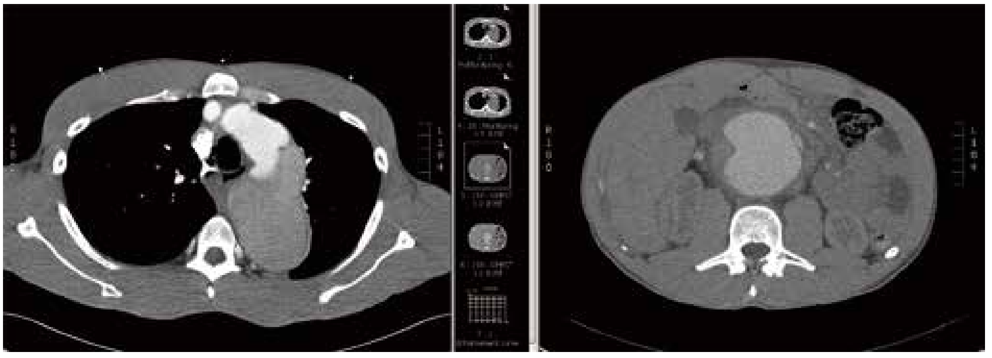


Figure 1 The images show type-B dissection with extensive thoracoabdominal aneurysmal dilatation both at the thoracic level (left panel) and abdominal level (right panel).

Video 1 The images show type-B dissection with extensive thoracoabdominal aneurysmal dilatation both at the thoracic level and abdominal level. Available online: http://www.asvide.com/article/view/23650

Diagnosis

Type B dissection, no evidence of malperfusion.

Management

Staged repair.

Staged surgery

(I) Operation: left common carotid to left subclavian artery bypass with 8 mm Gore-Tex graft, repair of left subclavian artery dissection with endarterectomy and interposition graft with a 10-mm Dacron graft.
Anesthesia: general endotracheal.

(II) Operation (8 days later): aortic arch repair, thoracoabdominal aortic aneurysm type 2 repair, and repair of right common iliac artery aneurysm with a 24-mm Dacron graft with bypass to the celiac artery with a 10-mm graft, bypass to the superior mesenteric artery with a 10-mm graft, bypass to the right renal artery with an 8-mm graft, bypass to the left renal artery with a 10-mm graft. Reconstruction of the iliac artery and repair of the iliac artery aneurysm with a 10-mm graft and 20-mm bifurcated graft, oversewing and ligation of left subclavian artery aneurysm.
Placement of femoral vein to femoral artery arteriovenous ECMO.
Anesthesia: general endotracheal plus CSF drainage.

Outcome

Multiorgan failure following thoracoabdominal repair. Exitus Letalis.

3.2.1 Type-B distribution intramural hematoma—regression during follow-up

H&P

A 61-year-old white male patient with history of hypertension admitted with a type-B distribution intramural hematoma. He awoke the morning of the admission at 03:00 with 10/10 chest pain and presented to local ED where initial an assessment for ACS was negative. At approximately 09:30 am he reported having difficulty moving his lower extremities. This prompted CTA of the aorta that demonstrated an intramural hematoma beginning at the origin of the subclavian artery and extending into the abdomen (poor contrast opacification beyond the diaphragm). He was transferred here for ongoing management.

On arrival to intensive care unit (ICU) he denied chest or back pain. He has motor function in both lower extremities although he seems to have difficulty voluntarily moving his legs.

CT

Intramural hematoma originating at the level of the left subclavian artery origin and extending to the level of the proximal abdominal aorta.

Suspected small amount of intramural hematoma involvement of the left subclavian artery origin and proximal left common carotid artery.

Small amount of fat stranding and haziness in the left upper mediastinum, suspicious for small amount of mediastinal blood.

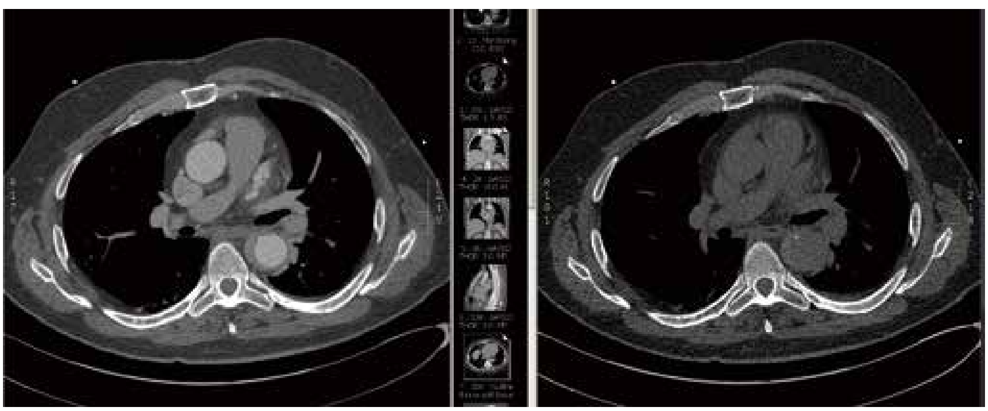


Figure 1 Images at the time of admission show eccentric hyperdense (60 HU) rim of wall thickening if the descending aorta, c/w intramural hematoma (IMH). Note that the rim of calcification lies outside the small calcification (left panel). Because the density of the blood products of the IMH (60 HU) is higher than that of non-enhanced blood (30 HU) the IMH is seen as a hyperdense rim on the non-contrast image (right panel).

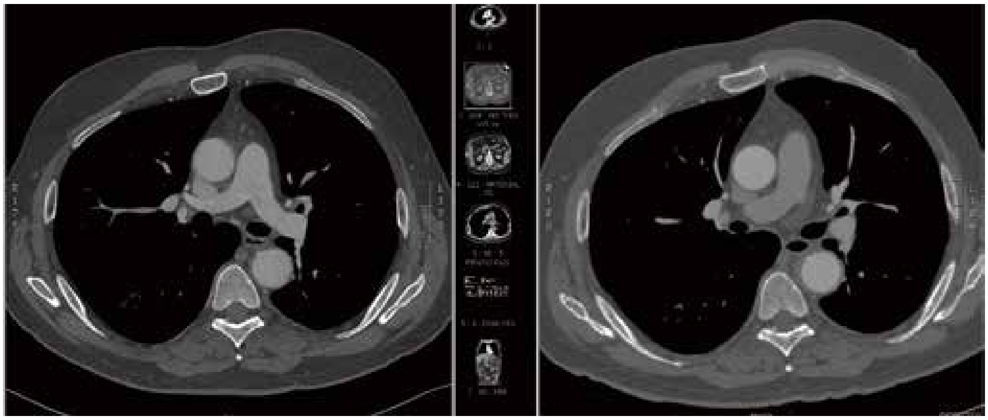


Figure 2 Images at 2 and 6 months follow-up show gradual decrease in thickness of the wall thickening, consistent with regression of the intramural hematoma (IMH).

Video 1 Contrast-enhanced acquisition: images at the time of admission show eccentric hyperdense (60 HU) rim of wall thickening if the descending aorta, c/w intramural hematoma (IMH). Note that the rim of calcification lies outside the small calcification.
Available online: http://www.asvide.com/article/view/23652

Video 2 Non-contrast-enhanced acquisition: because the density of the blood products of the intramural hematoma (IMH) (60 HU) is higher than that of non-enhanced blood (30 HU) the IMH is seen as a hyperdense rim on the non-contrast image (right panel).
Available online: http://www.asvide.com/article/view/23653

Video 3 Image at 2 months follow-up shows gradual decrease in thickness of the wall thickening, consistent with regression of the intramural hematoma (IMH).
Available online: http://www.asvide.com/article/view/23654

Video 4 Image at 6 months follow-up shows gradual decrease in thickness of the wall thickening, consistent with regression of the intramural hematoma (IMH).
Available online: http://www.asvide.com/article/view/23656

Diagnosis

Type-B distribution intramural hematoma.

Anterior spinal artery syndrome with paralysis (partial) and loss of sensation in lower extremities.

Management

- ❖ Continue pulse control per CICU.
- ❖ CTA in 1 month with out-patient follow-up. No acute intervention needed during this stay.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.2.2 Type-B intramural hematoma—local discordant interval progression/regression

H&P

A 75-year-old female presented to ED with chest pain. Chest pain reportedly started 1 day prior to admission but was initially intermittent. On day of admission it became persistent and increased to 8/10 in intensity. Pain felt similar to that at the time of prior admission with type-B dissection 3 months prior. In the ED patient was hypertensive to 160 s.

She has a history of uncontrolled HTN (non-compliant with medications) and remote SAH.

Three months prior to current admission she was admitted with an acute type-B intramural hematoma/aortic dissection, which was managed conservatively.

CT

- ❖ Change in residual appearance of intramural hematoma (IMH) with development of focal outpouchings in the proximal descending thoracic aorta and at the level of the diaphragm.
- ❖ Findings c/w progression of IMH.

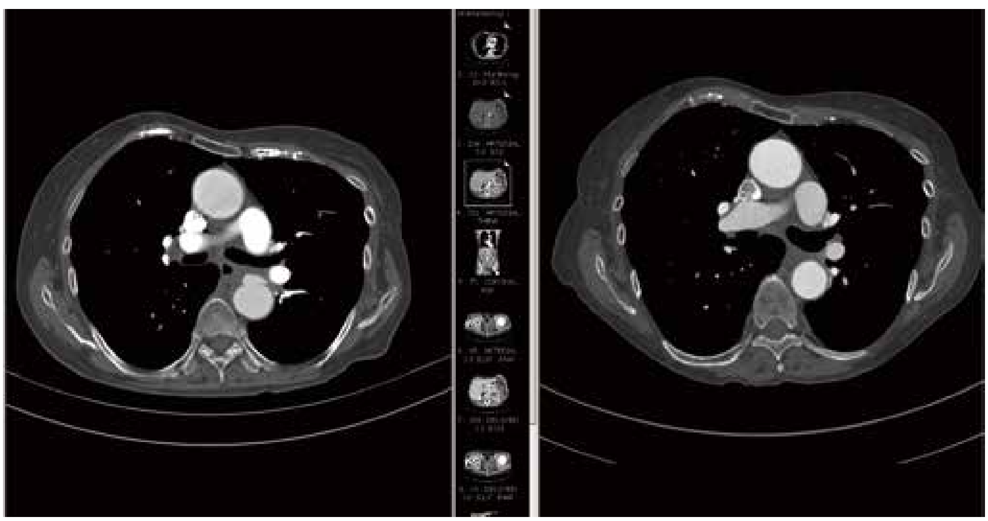


Figure 1 Images proximal descending aorta at current admission (left panel) and 1 month prior to current admission. There is interval development of a focal, contrast-filled outpouching in the anterior aspect of the aorta, most consistent with breakdown in the wall affected by the IMH. IMH, intramural hematoma.

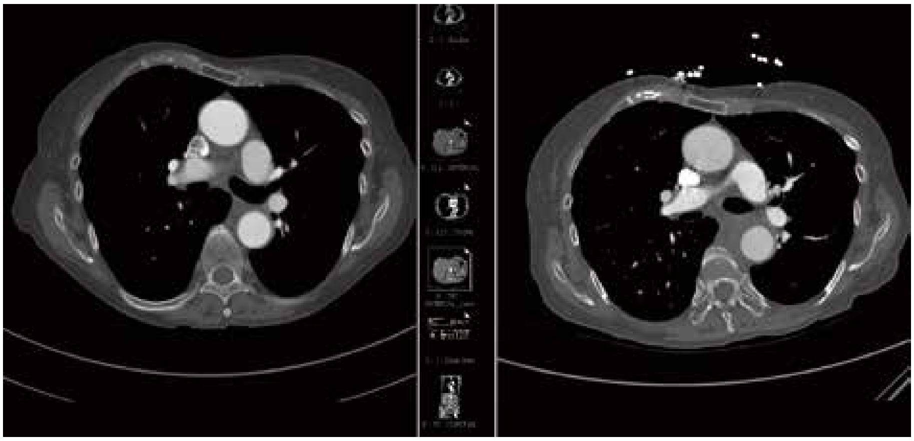


Figure 2 Images at the level of the proximal descending aorta 1 month (left panel) and 3 months (right panel) prior to current admission. Images 3 months prior to current admission show the initial wall thickening of the IMH, with initial partial regression at 1 month.

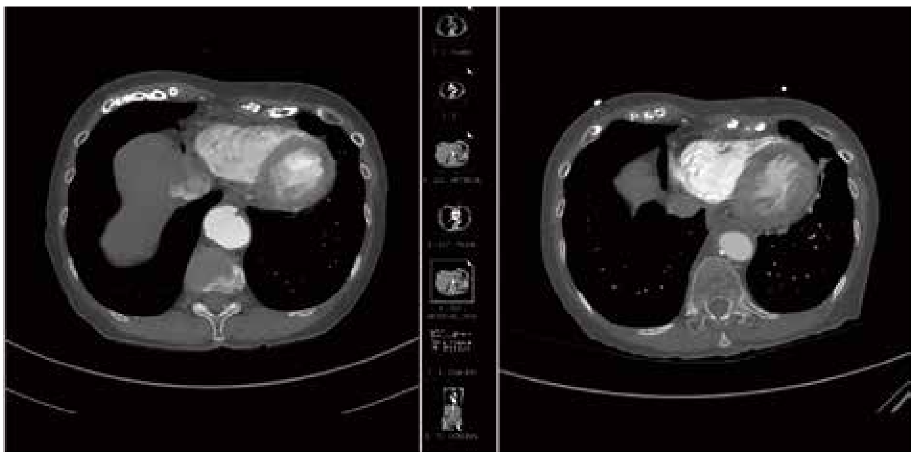


Figure 3 Images at the level of the diaphragm at current admission (left panel) and 3 months prior to current admission. There is development of a focal, contrast-filled outpouching in the right anterior aspect of the aorta, most consistent with breakdown in the wall affected by the IMH diaphragm (images at 1 month prior to admission appears similar, see movie files).

Figure 4 Images 3 months post endovascular stent placement (left and middle panel) show regression of excluded outpouching at the proximal descending level (middle panel), and stable outpouching beyond the stent at the level of the diaphragm (left panel).

Video 1 Images 3 months prior to current admission images show eccentric wall thickening of the descending thoracic and suprarenal abdominal aorta, beginning beyond left subclavian artery and extending to the level of the SMA. Findings c/w IMH. IMH, intramural hematoma.
Available online: http://www.asvide.com/article/view/23659

Video 2 Images 1 month prior to current admission images show interval regression of the IMH/wall thickening at the proximal descending level. In contrast, there is interval progression with mild increase in size and breakdown of the false lumen with anterior contrast-filled outpouching at the level of the diaphragm. IMH, intramural hematoma.
Available online: http://www.asvide.com/article/view/23660

Video 3 Current admission: images show interval progression at the level of the proximal descending segment, with breakdown of the false lumen with anterior contrast-filled outpouching.
Available online: http://www.asvide.com/article/view/23661

Video 4 Images 3 months post endovascular stent placement show regression of excluded outpouching at the proximal descending level and stable outpouching beyond the stent at the level of the diaphragm.
Available online: http://www.asvide.com/article/view/23662

Diagnosis

Progression of IMH.

Management

Endovascular repair.

Urgent surgery

Anesthesia
General.

Operation
Left iliofemoral conduit 10 mm Dacron graft end-to-side to the left common iliac, delivery of 31 mm × 31 mm thoracic aortic graft—Gore 150 mm in length, the descending thoracic aorta left brachial artery puncture, selective catheterization of the subclavian arch, catheters and guide wires via the left iliofemoral system and delivery of graft from the left iliac conduit.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.2.3 Intramural hematoma arch and descending aorta with evidence of leakage in mediastinum

H&P

A 99-year-old female admitted with sudden onset chest pain. CT at regional hospital confirms intramural hematoma (IMH) of the arch and descending aorta with extravasation of blood products.

CT

IMH arch and descending aorta

- Evidence of leakage/rupture with blood products in surrounding mediastinum with small area of suspected contrast extravasation;
- Suspected hemorrhagic left pleural effusion;
- Trivial pericardial effusion.

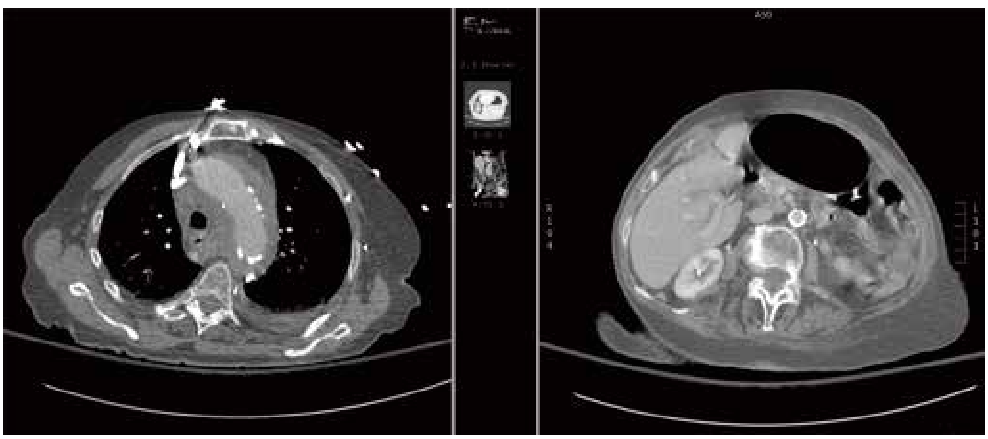
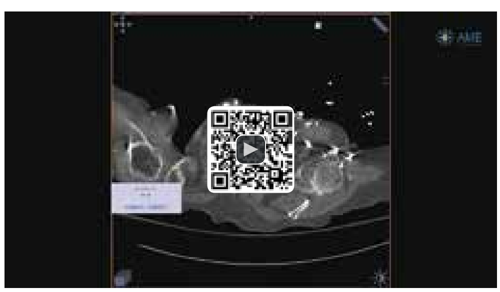


Figure 1 Blood products adjacent to arch.



Video 1 IMH aortic arch with mediastinal blood products. IMH, intramural hematoma.
Available online: http://www.asvide.com/article/view/23663

Diagnosis

Intramural hematoma arch and descending aorta with evidence of leakage in mediastinum.

Management

Patient is not candidate for surgical intervention given her age and co-morbidities.

- ❖ Blood pressure control;
- ❖ Pursue palliative care.

Outcome

Discharge to palliative care.

3.2.4 Type-B intramural hematoma (IMH)

H&P

A 61-year-old previously healthy man with recently diagnosed mild hypertension, managed with weight loss program and exercise.

Admitted with acute, 10/10 severe lower back pain.

CT

Intramural hematoma (IMH) descending thoracic aorta.

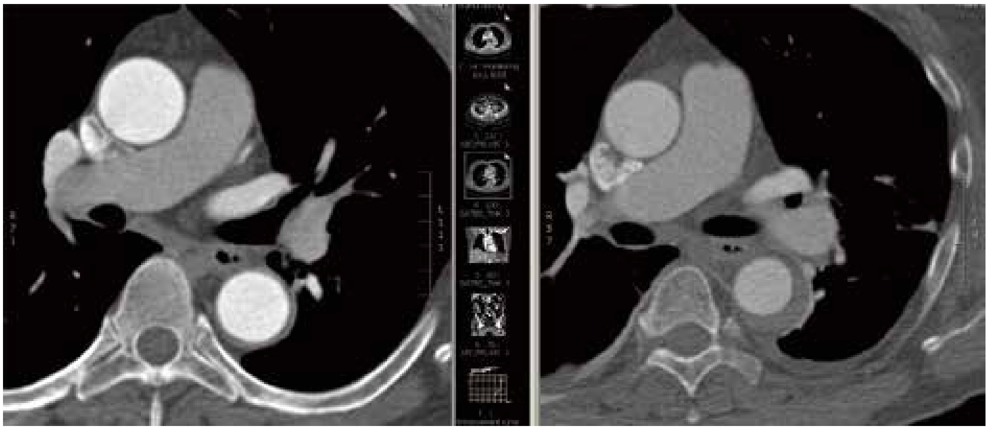


Figure 1 Eccentric wall thickening descending aorta (right panel on admission). Interval partial resolution at 1 month follow-up.

Video 1 On admission: eccentric wall thickening descending aorta.
Available online: http://www.asvide.com/article/view/23664

Video 2 Follow-up scan 2 days after admission.
Available online: http://www.asvide.com/article/view/23665

Video 3 Follow-up scan 1 month after admission, with partial resolution of wall thickening/IMH. IMH, intramural hematoma.
Available online: http://www.asvide.com/article/view/23666

Diagnosis

Type B IMH/dissection.

Management

Medical management:

- ❖ No need for urgent surgical intervention;
- ❖ Medical management, with strict blood pressure control;
- ❖ Monitor for new chest, back, or abdominal pain.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.3.1 Type-B aortic dissection distal to surgical graft

H&P

A 53-year-old female with h/o proximal descending thoracic aortic aneurysm repair via left thoracotomy 1 year prior to admission. Now admitted with intermittent chest pain for several months, more pronounced on day of admission.

CT scan demonstrates type-B aortic dissection. After admission and control of her hypertension, she continued to have episodes of chest and back pain.

CT

Surgical graft proximal descending aorta.

Type-B dissection distal to surgical graft with associated dilatation resulting in a type 3 TAA appearance.

Dissection continues to left iliac bifurcation.

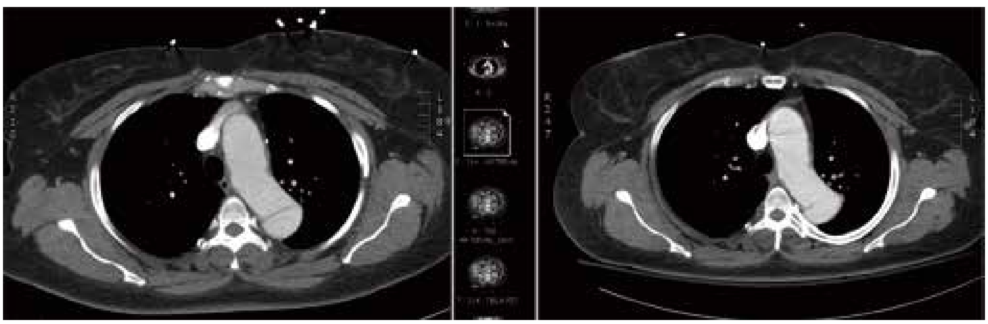


Figure 1 Right and left panel show stable surgical graft of the proximal descending aorta.

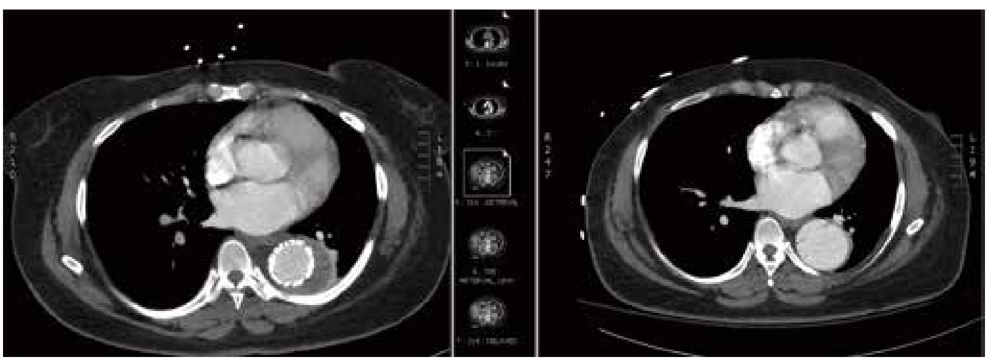


Figure 2 Right and left panel show dissection flap of the descending aorta at admission (right panel) and endovascular stent graft (left panel).

Video 1 Images at admission show intact graft proximal descending aorta and dissection flap beyond graft, c/w type-B aortic dissection.
Available online: http://www.asvide.com/article/view/23667

Video 2 After placement of endovascular stent graft, proximally overlapping with surgical graft.
Available online: http://www.asvide.com/article/view/23668

Diagnosis

Symptomatic type-B dissection.

Management

Initial blood pressure and pain control.

Repeat CT imaging in 48 hours.

Urgent surgery (1 week after admission)

Anesthesia
General.

Operation
Placement of a thoracic endograft without subclavian coverage with a 37×15 Gore endograft ×2, intravascular ultrasound of the thoracic and abdominal aorta, femoral cutdown and closure, placement of catheter in the aorta from a left brachial approach, placement of catheter in the aorta from the left femoral approach.

Prior/remote surgery

Thoracic aneurysm repair via thoracotomy one year prior to admission.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.3.2 Type-B aortic dissection—h/o Marfan syndrome

H&P

A 25-year-old female presented to ED with chest pain.

PMH of Marfan syndrome, s/p aortic valve and aortic root replacement and mitral valve repair (mechanical St. Jude's AV, MV Cosgrove Edwards annuloplasty ring).

Patient states that chest pain began the morning of day of admission. The pain was mid-sternal and radiated into her back. It was associated with shortness of breath.

CT demonstrated type-B aortic dissection.

Patient was transferred via critical care flight team for further evaluation and treatment.

Upon arrival, patient had 2/10 chest pain radiating to the back.

CT

Type B thoracic aortic dissection; extends from the level of the left subclavian artery through the descending aorta to the origin of the SMA and right renal artery.

No pericardial or pleural effusion was seen.

Figure 1 Images show grafted aortic root with re-implanted coronary arteries.

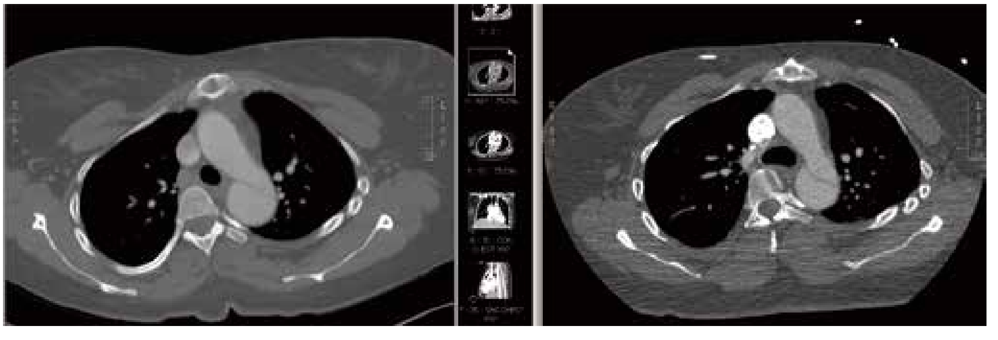


Figure 2 Images show type-B dissection with flap beginning in the proximal descending segment.

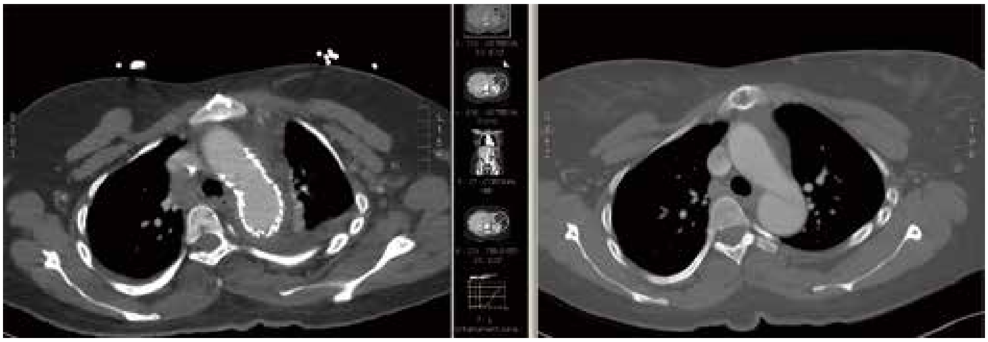
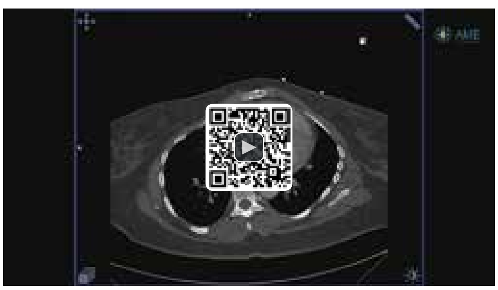


Figure 3 Images show descending aortic segment prior to (admission, right panel) and after endovascular stent placement (left panel).

Video 1 Images show new type-B dissection of chest compare with baseline *Video 2*.
Available online: http://www.asvide.com/article/view/23669

Video 2 Images show aorta without dissection 1 month earlier.
Available online: http://www.asvide.com/article/view/23673



Video 3 Images show new type-B dissection of abdomen.
Available online: http://www.asvide.com/article/view/23672

Video 4 Images show 6 months follow-up.
Available online: http://www.asvide.com/article/view/23674

Video 5 Images after stent placement (7 months after admission).
Available online: http://www.asvide.com/article/view/23675

Video 6 Images 1 year follow-up.
Available online: http://www.asvide.com/article/view/23676

Diagnosis

Acute type B; h/o. Marfan syndrome and prior AVR and ascending aortic repair.

Management

Initial medical management.

Subsequent/non-urgent surgery (7 months after admission)

Anesthesia
General.

Procedure
- Left carotid subclavian bypass with 8-mm ringed PTFE and bovine pericardial circumferential pledgets for the subclavian and carotid anastomoses.
- Thoracic endovascular aortic repair with placement of a 31 mm × 15 cm C-TAG device ×2 and a 31 mm × 10 cm C-TAG device ×2, percutaneous access to the right common femoral artery with a Perclose devices for the closure and percutaneous access to the left brachial artery with ultrasound guidance for needle placement and intravascular ultrasound of the aorta and balloon fracture fenestration of chronic dissection and coil embolization of native left subclavian artery, status post carotid-subclavian bypass.

Prior/remote surgery (10 years prior to admission)

Mitral valve repair with plication of flail segment of posterior leaflet; Insertion of 36 mm Cosgrove Edwards annuloplasty ring. Composite aortic root replacement (25 mm St Jude valve in 28 mm).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.3.3 Type-B aortic dissection—several prior surgeries ascending aorta

H&P

A 47-year-old male with h/o congenital AS s/p remote St Jude AVR. Remote repair of ascending aortic aneurysm complicated by pseudoaneurysm formation requiring multiple repairs (all surgeries at OSH; limited data available).

Admitted to OSH for chest and back pain.

On an abdominal CT without contrast a type-B aortic dissection was suspected (based on linear, luminal calcification).

The patient was transferred for further management.

CT (repeat CT chest and abdomen with contrast)

Type B dissection.

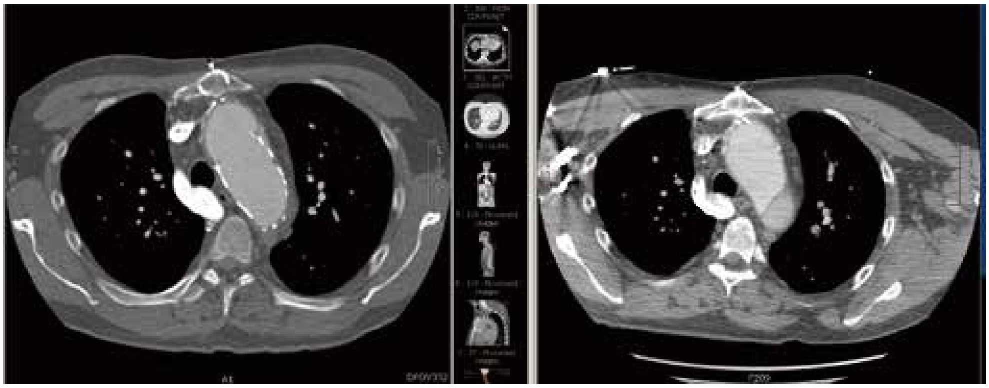


Figure 1 Right and left panel show dissection flap of the proximal descending aorta before and after stent placement.

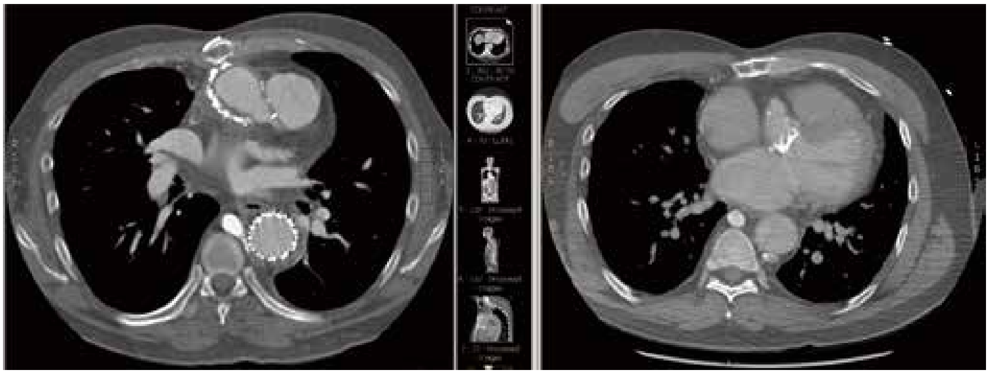
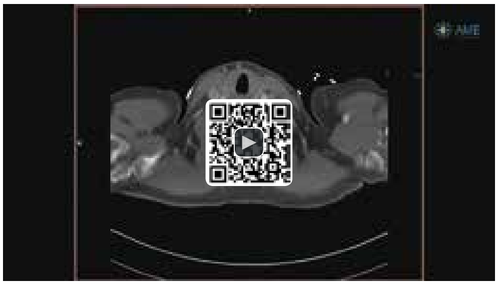


Figure 2 Right and left panel show mechanical aortic valve (right panel) and graft of the ascending aorta (left panel). Further, the dissection flap in the descending aorta is seen before and after stent placement.



Video 1 Images at admission show evidence of AVR with a mechanical valve as part of a composite graft of the root and ascending aorta and the dissection flap of the native descending aorta beginning beyond the left subclavian artery.
Available online: http://www.asvide.com/article/view/23709

Video 2 Images at follow up show the stent in the descending aorta and residual dissection beyond the stent in the abdominal aorta.
Available online: http://www.asvide.com/article/view/23710

Diagnosis

Type-B aortic dissection.

Management

Urgent surgery.

Current staged surgery

(I) Five days after initial admission.
- ❖ Operation: left carotid subclavian bypass with 8-mm ring PTFE and bovine pericardial circumferential pledgeting along the subclavian anastomosis.

(II) Seven days after initial admission.
- (i) Operation
  - ❖ Placement of thoracic aortic endograft with a Cook Zenith 2PT-42-158 and then 2PT-38-152.
  - ❖ Coil embolization of the left subclavian artery.
  - ❖ Right external iliac to common iliac interposition graft with 10 mm Dacron graft.
  - ❖ Balloon angioplasty and stenting with a 13×100 Viabahn and 13×55 Viabahn within the right external iliac artery.
- (ii) Anesthesia: general.

Prior/remote surgery

Remote AVR and repair of ascending aortic aneurysm.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.3.4 Type-B aortic dissection—intermittent chest pain after discharge

1st admission

H&P

A 38-year-old African American male, active smoker, with history of ESRD on HD presented to OSH with chest and right leg pain. CT showed type-B dissection. Patient was transferred for further management. On admission complains of headache, chest pain and right calf and foot pain which is new with weakness and difficulty walking.

CT

CT (chest only) at OSH showed aortic dissection starting just distal to the take-off of the left subclavian artery extending down to the most distal image of study just past origin of the SMA. Aneurysmal dilatation of distal aortic arch and proximal descending thoracic aorta measuring up to 4.6 cm

CTA runoff revealed near occlusion of left common femoral artery and weak pulse on the left.

Right kidney mass 4.2 cm.

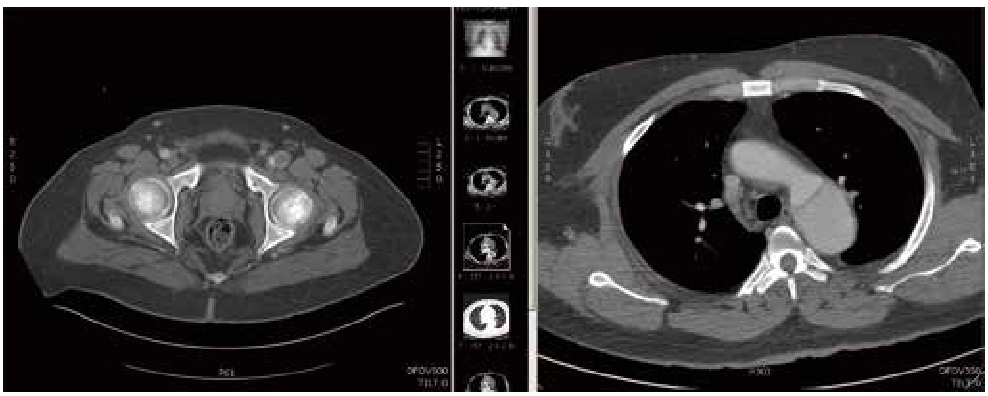


Figure 1 Right and left panels show the dissection flap beyond the left subclavian artery and at the level of the left common femoral artery.

Video 1 The image at admission (chest) shows the type-B dissection, with flap extending from beyond the left subclavian artery into the iliac arteries.
Available online: http://www.asvide.com/article/view/23711

Video 2 The image at admission (abdomen) shows the type-B dissection, with flap extending from beyond the left subclavian artery into the iliac arteries. There is subtotal occlusion at the level of the left common femoral artery.
Available online: http://www.asvide.com/article/view/23712

Video 3 Images at 3 months follow-up show no significant interval change.
Available online: http://www.asvide.com/article/view/23713

Diagnosis

Type B dissection, with occlusion of left CFA.

Management

Pain: initial medical management.

Likely intervention/operation for left CFA, but as long as there is no critical limb ischemia, delay until medically optimized and ideally when dissection chronic.

Renal mass work-up.

2nd admission (3 months later)

After discharge, intermittent chest pain, and several ED visits for HTN and chest pain.

On OSH CT chest concern for crescent-like hematoma *vs.* motion artifact anterior wall of ascending aorta, prompting transfer.

CT

No significant change; motion artifact ascending aorta.

Management

Plan: for carotid-subclavian bypass followed by TEVAR pending final urology/endocrinology recommendations.

Surgery/procedure date (during 2nd admission)

(I) Left carotid-subclavian artery transposition.
- ❖ Anesthesia: general.

(II) One day later TEVAR with cTAG 34 mm × 200 mm × 2 from left carotid to celiac artery.
Left femoral aneurysmorrhaphy with 10 mm Hemashield Gold ileoprofunda bypass and 6 mm Hemashield Gold jump graft to SFA.
- ❖ Anesthesia: general

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.3.5 Type-B aortic dissection—prior surgical graft ascending aorta

H&P

A 21-year-old female with past history of Marfan's syndrome, s/p remote valve sparing aortic root replacement, and remote mechanical mitral valve replacement presented to OSH with complaints of chest pain and shortness of breath over the last 9 months. An MRI at the OSH reported interval increase in dimensions of the aortic arch and descending aorta with new type-B dissection

CT

Native?/Repaired? Aortic root: ectasia; diameter 3.8 cm (stable).

Intact surgical graft ascending aorta.

Distal ascending aorta and aortic arch: massive aneurysmal dilatation.

- ❖ Diameter proximal arch 5.4 cm.
- ❖ Significant interval increase in size, 2013: 4.3 cm.
- ❖ No evidence of dissection.

Interval development of type-B aortic dissection.

Descending thoracic aorta: massive bi-lobar aneurysmal dilatation, tortuous with kinks.

- ❖ Dissection flap in the dilated descending aorta.
- ❖ Maximun diameter proximal retrocardiac aorta 6.9 cm × 6.6 cm.
- ❖ Massive interval increase in size; entire aorta in 2013: 2.5–3 cm.

Visualized suprarenal abdominal aorta: ectasia, diameter about 4 cm.

- ❖ Dissection flap, small true lumen.
- ❖ Visceral branch vessels: as describes above.

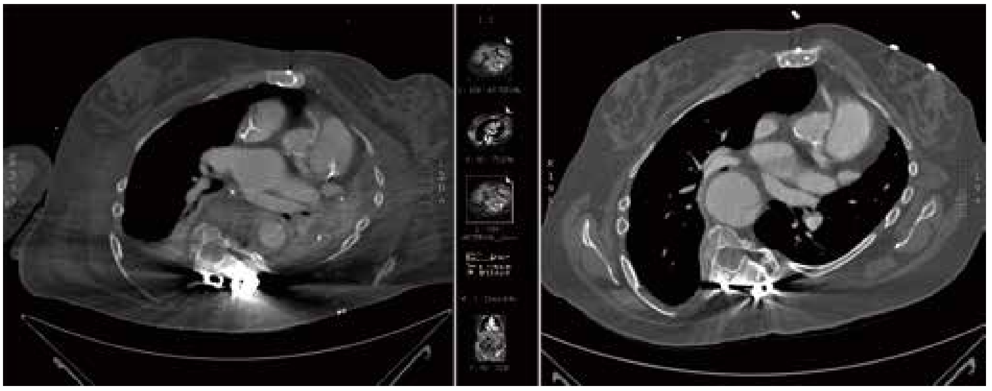
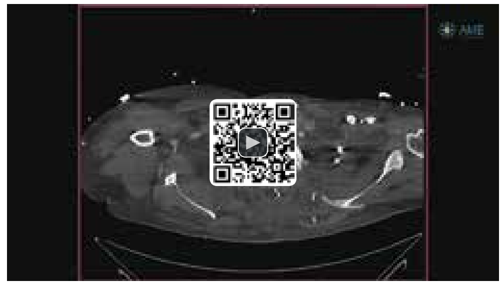


Figure 1 The right and left panel show the graft of the ascending aorta and the aneurysm of the descending aorta with dissection flap (right panel). The post-operative images (left panel) show the graft of the descending aorta.

Video 1 Images at the time of admission show the graft of the ascending aorta, the aneurysmally dilated arch and the dissection of the descending aorta with associated massive dilatation.
Available online: http://www.asvide.com/article/view/23714



Video 2 Images after surgery show the new graft of the descending thoracic and juxtarenal aorta with re-implanted visceral branch vessels.
Available online: http://www.asvide.com/article/view/23715

Diagnosis

Type-B aortic dissection; prior surgical graft ascending aorta.

Management

Surgery.

Current surgery

Anesthesia
General endotracheal anesthesia with a bronchial blocker and a spinal drain.

Operations
Repair of type 2 thoracoabdominal aortic aneurysm dissection utilizing a 24 mm multi-branched Gelweave graft and a 20-mm Gelweave graft with separate grafts to the celiac, superior mesenteric and renal arteries, atrial femoral bypass, cannulation of the left common femoral artery with a 6-mm Gelweave graft, moderate hypothermia, and intrathecal papaverine.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.4.1 Spontaneous external iliac and femoral artery dissection with large thigh hematoma

H&P

A 27-year-old female with h/o vascular type Ehlers-Danlos syndrome confirmed by skin biopsy, history of bilateral carotid artery aneurysms, vertebral aneurysm, coronary aneurysm, right renal artery aneurysm.

She presented to OSH with 2 days h/o abdominal pain and bloody stools. Was initially treated with antibiotics and sent home. She then started to have lower abdominal pain that radiated down to her left groin. CT in ED there showed long segment dilation and irregularity of left external iliac and common femoral arteries with possible focal left external iliac artery dissection flap and apparent 1.7 cm × 1.3 cm pseudoaneurysm at level of the left common fem artery bifurcation. There is associated large hematoma in anterior compartment of left thigh extending superiorly into the left pelvis via the iliopsoas muscle belly.

Upon transfer complained about persistent lower abdominal and thigh pain. Physical examination was remarkable for a hematoma on left anterior superior thigh and increase girth of left thigh compared to right, associated with diminished distal pulses.

CT

Spontaneous external iliac and femoral artery dissection with large thigh hematoma.

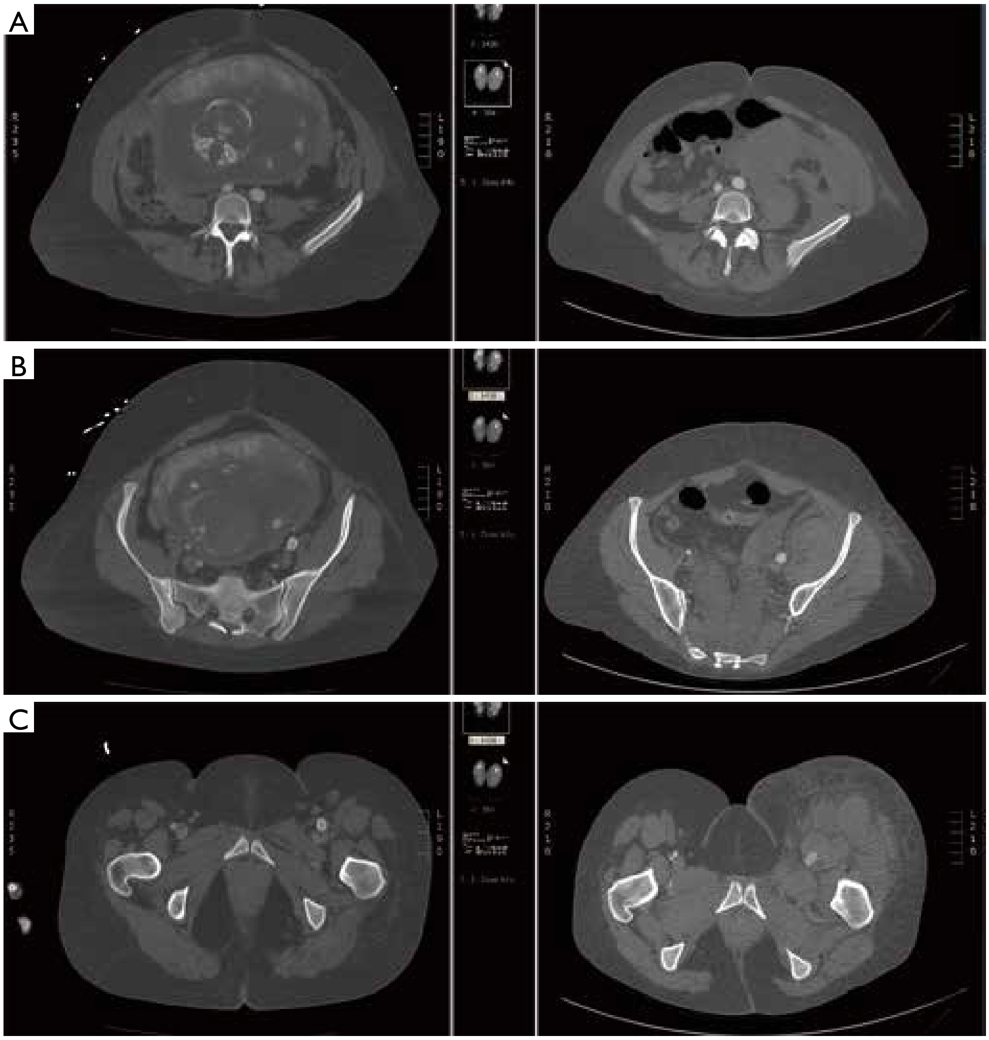


Figure 1 Images on admission [A-C (right)] and at 6-month follow-up [A-C (left)] show the dissection flap in the left external iliac and femoral artery, with extensive left retroperitoneal hematoma. Images at follow up show evidence of pregnancy.

Video 1 Images on admission show the dissection flap in the left external iliac and femoral artery, with extensive left retroperitoneal hematoma.
Available online: http://www.asvide.com/article/view/23716

Video 2 Images at 6 months follow up, acquired at an OSH, show the repaired, stented artery segments. Note the finding of pregnancy.
Available online: http://www.asvide.com/article/view/23717

Diagnosis

Spontaneous iliac dissection with rupture in relatively young woman with ED type IV (vascular type).

Management

Endovascular therapy.

Urgent surgery

Operation
Endovascular exclusion of external iliac common femoral and superficial femoral artery dissection and rupture utilizing 8×100 and 8×150 Viabahn stent graft through SFA exposure and placement.

Anesthesia
General endotracheal.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.4.2 Symptomatic penetrating thoracic aortic ulcer

H&P

Presented to OSH with 4 days history of worsening chest pain, acutely worse on day of admission. Pain described sharp, pleuritic 10/10, radiating to the back; improvement with nitroglycerin

CT

Penetrating thoracic aortic ulcer.

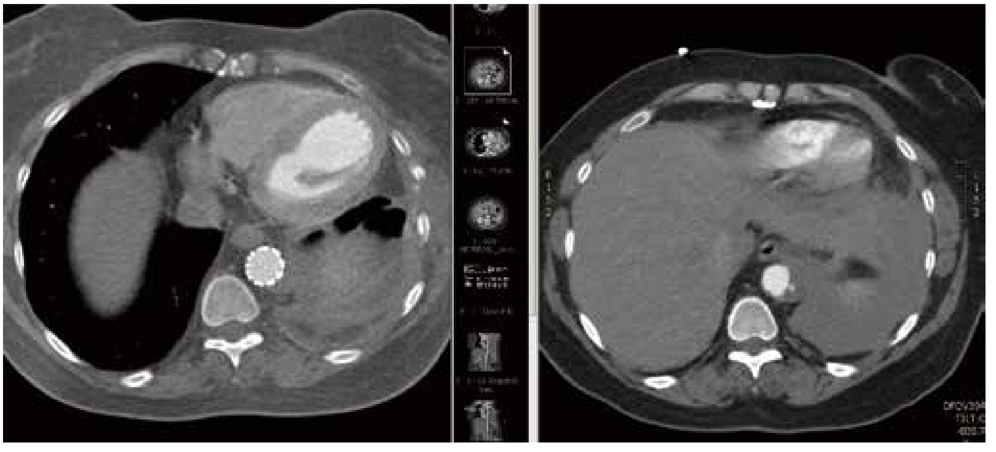
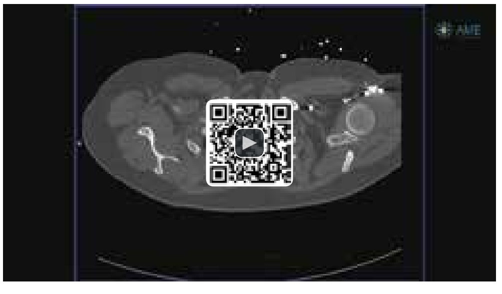


Figure 1 Right and left panel show PAU prior and after endovascular stent placement.



Video 1 Images prior to procedure show small PAU.
Available online: http://www.asvide.com/article/view/23719

Video 2 Images after procedure shows PAU covered by stent.
Available online: http://www.asvide.com/article/view/23722

Diagnosis

Symptomatic penetrating thoracic aortic ulcer.

Management

Surgery.

Emergent/urgent surgery

Anesthesia
General.

Procedure

- ❖ Retroperitoneal exposure left iliac artery, left common iliac artery endarterectomy;
- ❖ Placement of 10 mm Dacron conduit, left common iliac artery;
- ❖ Thoracic aortogram with branch runoff;
- ❖ Placement of thoracic endograft, cTAG 26×100;
- ❖ Abdominal aortogram with mesenteric and pelvic runoff.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

3.4.3 Witnessed rupture of chronic type-B dissection with hemoptysis

H&P

A 66-year-old male with known type-B aortic dissection with aneurysmal degeneration, which was diagnosed 6 months prior to current admission. He initially underwent medical management, but was subsequently evaluated for endovascular stenting secondary to increase in size of the descending aorta.

On day of admission, the patient presented for pre-operative evaluation. He suddenly complained of coughing and developed hemoptysis. He desaturated and became hypotensive. After intubation and fluid resuscitation, a CTA which confirmed rupture of the aneurysmally degenerated dissected descending aorta.

CT

Rupture of the aneurysmally degenerated, dissected descending aorta.

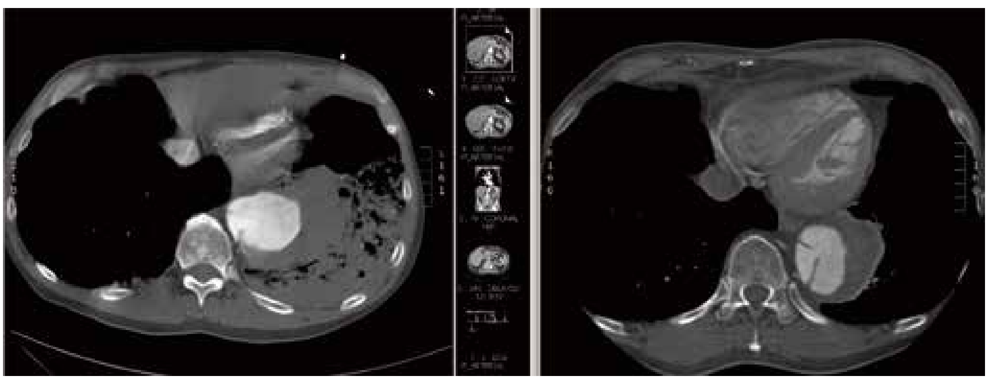


Figure 1 Images at the time of admission (left panel) and 1 month prior (right panel). There is aneurysmal degeneration of the dissected descending aorta (right panel). The images at the time of admission (left panel) show evidence of rupture with blood products in the left lower lung lobe.

Video 1 Images 1 month prior to admission show evidence of a type-B dissection with aneurysmal degeneration and maximum diameter above the diaphragm.
Available online: http://www.asvide.com/article/view/23728

Video 2 Images at the time of admission show interval evidence of rupture with blood products in the left lower lung lobe.
Available online: http://www.asvide.com/article/view/23729

Video 3 Images 3 months after endovascular stent graft placement. Available online: http://www.asvide.com/article/view/23730

Diagnosis

Witnessed rupture or chronic type-B dissection with hemoptysis.

Management

Emergency surgery.

Emergent/urgent surgery

Anesthesia
General.

Procedure
TEVAR (34 mm × 150 mm, 40 mm × 150 mm Gore TAG).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.1 Extensive aortic aneurysmal disease, with interval growth of the thoracic aorta

H&P

A 73-year-old male patient with known thoracoabdominal aortic aneurysm, prior endovascular repair of abdominal aorta. Transferred secondary to interval increase in size of thoracic aorta. No chest, back or abdominal pain.

CT

Extensive aortic aneurysmal disease, infrarenal endovascular stent graft.

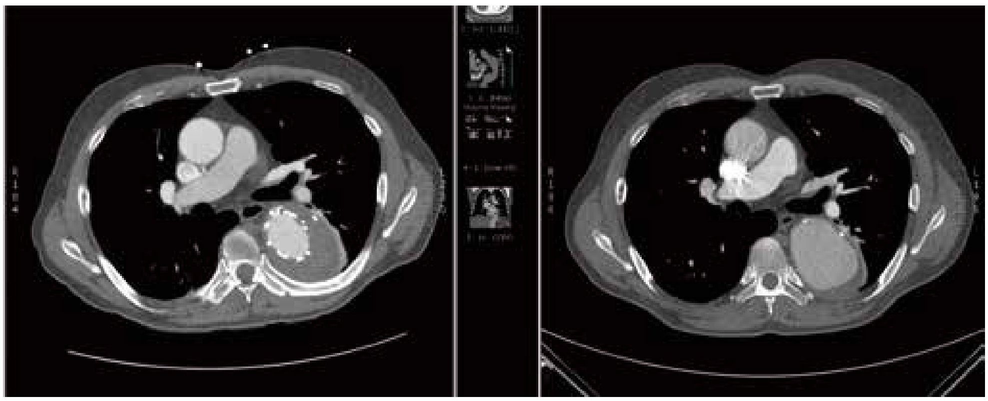


Figure 1 right and left panel show TAAA prior to (right) and after stent placement (left).

Video 1 Non-contrast CT 5 years prior to current admission shows pre-existing thoracoabdominal aneurysmal disease.
Available online: http://www.asvide.com/article/view/23732

Video 2 Contrast-enhanced CT at admission shows interval increase in size.
Available online: http://www.asvide.com/article/view/23736

Video 3 A contrast-enhanced CT 3 months post endovascular stent placement shows the excluded aneurysm sac. Small type 2 endoleak at the distal end of the stent.
Available online: http://www.asvide.com/article/view/23737

Diagnosis

Extensive aortic aneurysmal disease, with interval growth of the thoracic segment.

Management

The distal landing zone was not sufficient to treat with a TEVAR alone. Repair would require either open surgery or branched endograft.

Surgery

Anesthesia
General endotracheal plus CSF drainage.

Operations
Thoracic endovascular repair of descending aortic aneurysm with placement of a 34 mm × 15 cm Valiant thoracic stent graft, 38 mm × 20 cm Valiant thoracic stent graft, and a 42 mm × 15 cm Valiant thoracic stent graft; aortogram prior to placement and completion angiogram, unilateral exposure of the right common femoral artery

Prior/remote surgery

Remote infrarenal endovascular aortic repair.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.2 Thoracic aortic aneurysm—endovascular repair

H&P

A 65-year-old female with known h/o thoracic aortic aneurysm (TAA) (reportedly 4.3 cm one year prior). Intermittent chest pain during last month prior to admission (pressure and discomfort over her L chest, without radiation to the back). Patient subsequently presented to ED for evaluation, and was found to have enlargement of her TAA in comparison with previous CT with question of type B dissection. She was then transferred for further management.

On admission hypertensive (200/109), but otherwise hemodynamically stable.

CT

Descending thoracic aortic aneurysm with irregular lumen surface of adherent wall thrombus. Descending thoracic aorta measured up to 6.1 cm.

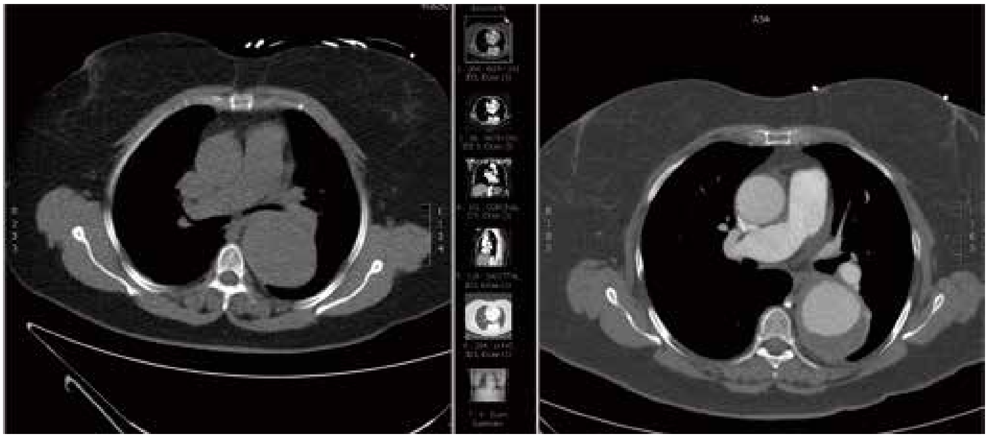


Figure 1 Non-contrast (left panel) and contrast-enhanced (right panel) of the aneurysmal descending aortic segment.

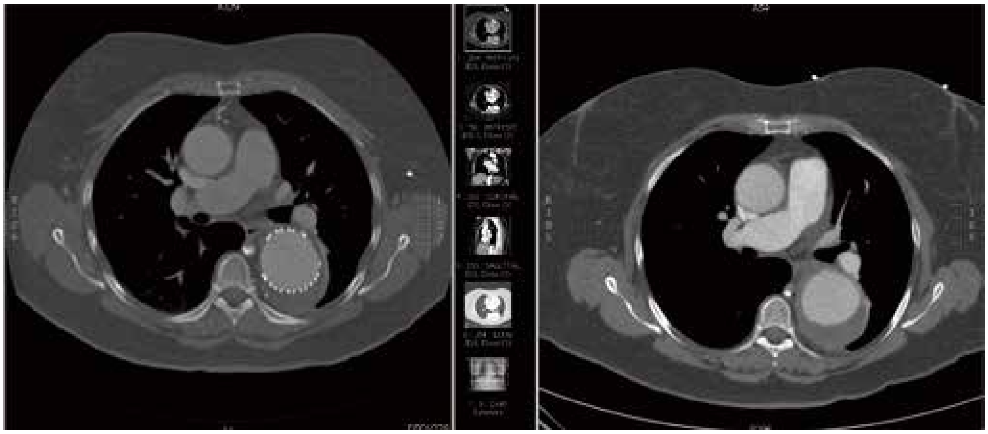


Figure 2 Images before (right panel) and after (left panel) endovascular stent placement of the descending aorta.

Video 1 Images on admission show the descending aortic aneurysm with irregular luminal surface of the adherent wall thrombus. No definitive evidence of dissection.
Available online: http://www.asvide.com/article/view/23794

Video 2 Arterial phase images at 3-month follow up show the intact stent.
Available online: http://www.asvide.com/article/view/23795

Videos 3 In venous phase images there is a small area of endoleak in the anterior aspect of the proximal descending segment.
Available online: http://www.asvide.com/article/view/23796

Diagnosis

Thoracic aortic aneurysm.

Management

Adequate anatomy for TEVAR repair with LSCA bypass.

Schedule for an outpatient surgery (carotid subclavian bypass/transposition and TEVAR).

Subsequent/non-urgent surgery

One month post admission.

Anesthesia
General.

Procedure(s)
- ❖ Left carotid subclavian transposition.
- ❖ Thoracic endovascular repair using a 40×200 TX2, oversewing of the left subclavian artery.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.3 Symptomatic enlarging TAA—prior endovascular stent repair

H&P

A 92-year-old female patient with h/o CAD and thoracic aortic aneurysm.

s/p emergent EVAR in 5 years prior to current admission for suspected rupture. Subsequent replacement of the ascending aorta and repeat interventions to treat a series of endoleaks at descending segment. About 2 years prior to current admission, the patient discontinued follow-up.

On day of current admission, she presented to OSH with abdominal and right-sided back pain. CT identified increase in size of known aneurysm sac from 9 to 11 cm and distal endoleak. Also biochemical evidence of pancreatitis. She was transferred for further management.

On arrival to CICU, she complained of mild R upper back pain.

CT

Large thoracic aortic aneurysm (TAA) with distal endoleak.

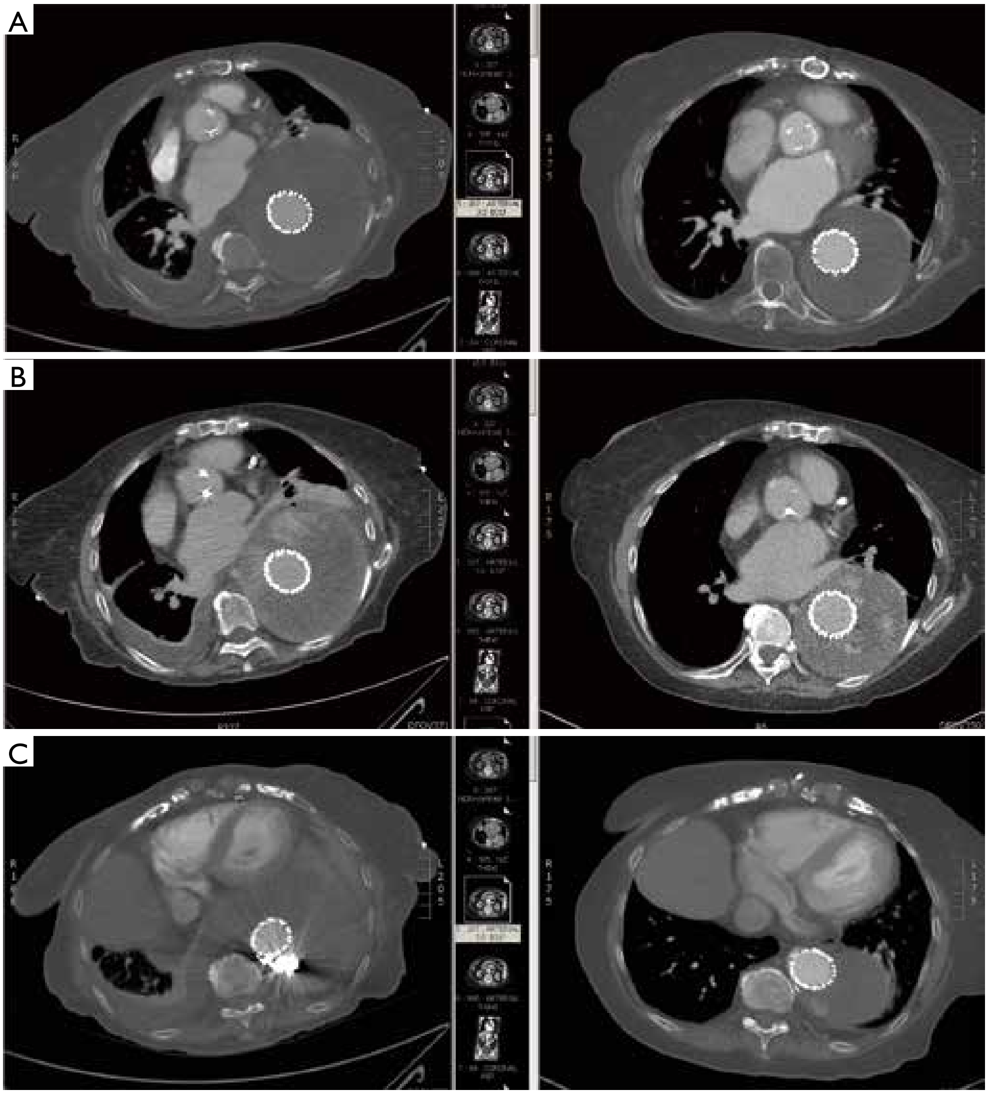


Figure 1 Image of the stented descending thoracic aorta 2 years prior to surgery [A,B,C (right panel)] and at time of admission [A,B,C (left panel)]. (A) At the retrocardiac level, arterial phase images show significant increase in size of the large aneurysm sac at the time of admission; (B) delayed, venous phase images at the same level, show significant areas of residual endoleak at both time points; (C) images obtained closer to the diaphragm show evidence of coil occlusion of prior endoleak (left: on admission; right: 2 years prior).

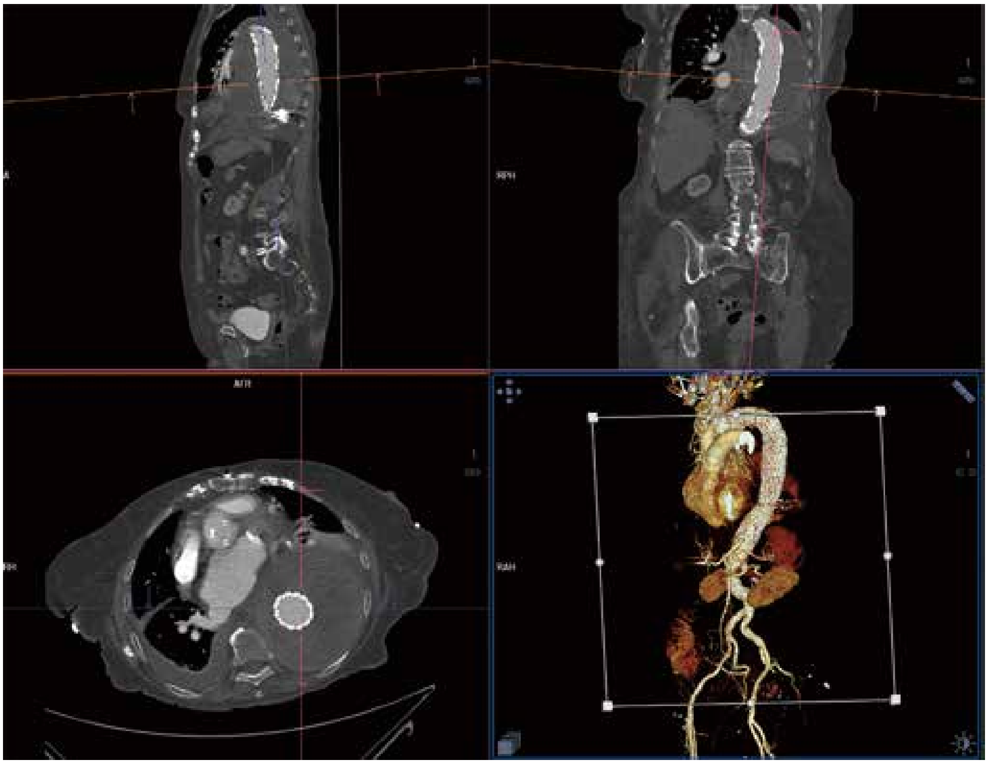


Figure 2 Images show 3-D reconstruction at the level of the aneurysm sac at the time of admission.

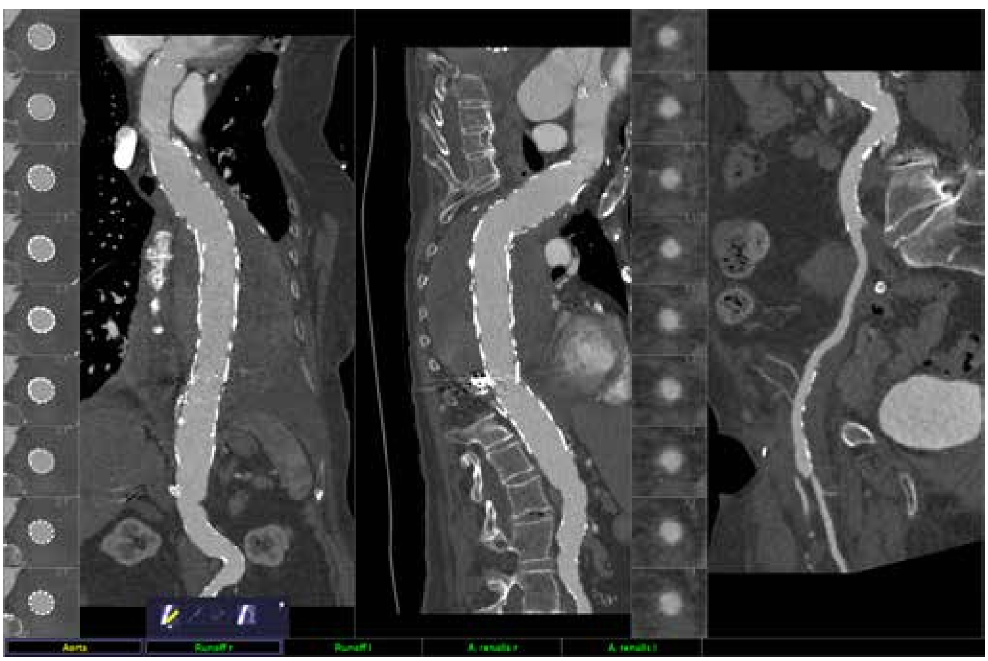
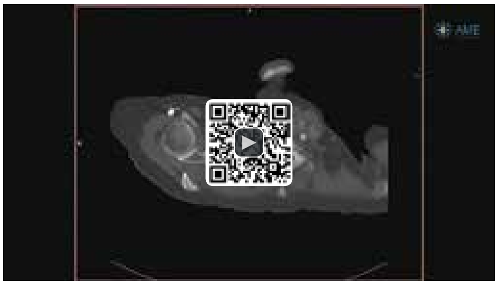


Figure 3 Images show centerline reconstruction of the aorta (2 left panels) and the right iliac arteries (right panel).



Video 1 Images 2 years prior to admission show the stented descending aorta with large aneurysm sac and endoleak above the diaphragm.
Available online: http://www.asvide.com/article/view/23797

Video 2 Images at the time of admission, show significant interval increase in size of the aneurysm sac. Also seen is evidence of prior coil embolization of the area of endoleak. There is residual endoleak with distal type 1B endoleak.
Available online: http://www.asvide.com/article/view/23798

Diagnosis

Symptomatic enlarging TAA; prior endovascular stent repair

Management

Urgent endovascular repair.

Emergent/urgent surgery

Anesthesia
General.

Operation
Aortography, coil embolization of distal type 1B endoleak.

Remote surgery

(I) Two years prior to current admission: placement of Heli-FX using six anchors at the distal thoracic device.
(II) Three years prior to current admission: covered thoracic endograft with bare metal springs.
(III) Four years prior to current admission: replacement of the aortic valve, ascending aorta, the aortic arch, and proximal descending aorta.
(IV) Five years prior to current admission: emergent endovascular exclusion of thoracic aortic aneurysm with suspected leak.

Outcome

Discharged home with hospice care.

❖ Following surgical procedure, a persistent endoleak demonstrated on postop CTA. The patient decided against further intervention.

4.4 Thoracoabdominal aortic aneurysm

H&P

A 73-year-old male with PMH of thoracoabdominal aortic aneurysm (s/p open infrarenal repair 15 years prior, open repair 7 years prior, TEVAR 6 and 3 years prior).

He presented to OSH with 1 day history of acute on chronic worsening of abdominal and back pain. Pain described as 7/10, present in both abdomen and back. CTA abdomen was ordered, which showed interval increase in maximal diameter of AAA.

He was started on i.v. blood pressure medications and subsequently transferred to CCF for further management.

CT

- ❖ Stable, focal pseudoaneurysm of the distal arch just proximal to the endostent (between the origins of the left common carotid and left subclavian arteries).
- ❖ Interval increase in aneurysmal dilation of the native aorta superior to surgical graft repair, measuring up to 7 cm × 5.6 cm at the supramesenteric segment (previously 6.5 cm × 5.2 cm), including left posterolateral bulge which is increased since prior test.

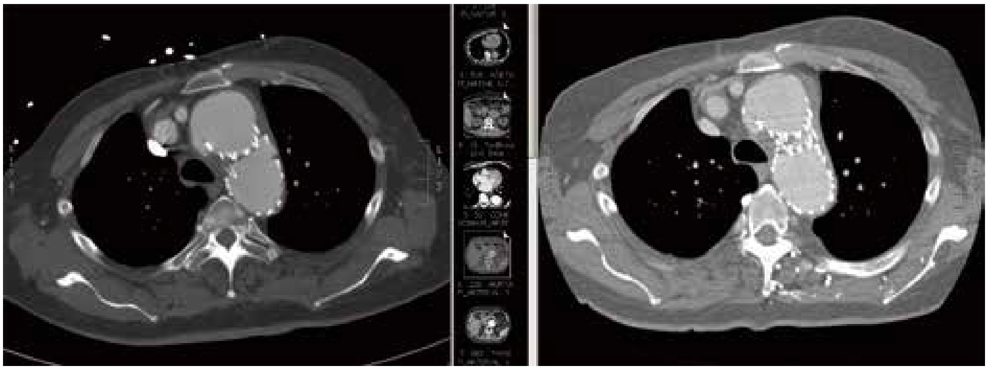


Figure 1 The images show the pseudoaneurysm at the distal arch at admission (left panel) and 1 year prior (right panel).

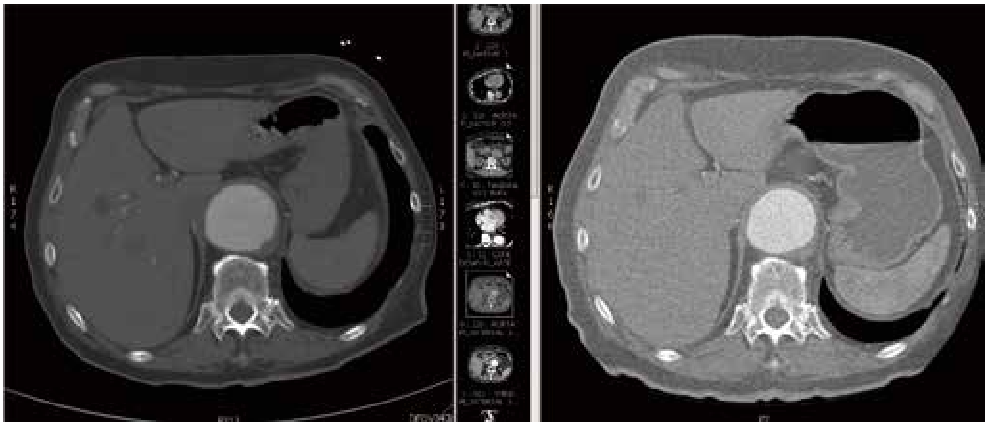
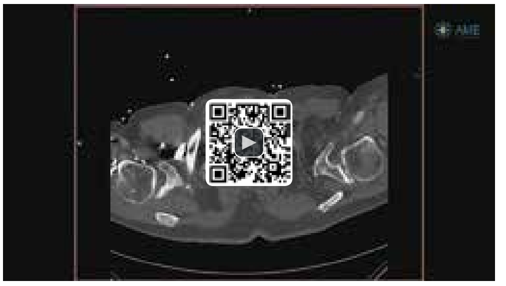


Figure 2 Shows aneurysm at the level of the diaphragm at admission (left panel) and 1 year prior (right panel).



Video 1 Pseudoaneurysm at the distal arch, the stent of the descending aorta, and the aneurysm at the level of the diaphragm, followed by the surgical graft of the infrarenal abdominal aorta.
Available online: http://www.asvide.com/article/view/23799

Diagnosis

TAA with interval increase in size.

Management

Medical management with careful BP control and close follow up for possible high-risk open repair.

Prior/remote surgery

Two years prior to admission: thoracic endograft with a 42-162-TX2 device for component separation of thoracic endograft.

Six years prior to admission: thoracic endovascular repair with a single proximal subclavian, single device proximal extension covering the left subclavian with embolization of subclavian, left carotid-subclavian bypass.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.5 TAA: type I endoleak

H&P

An 80-year-old white male with history of thoracoabdominal aortic aneurysmal disease.

- ❖ Surgical repair of abdominal aortic aneurysm (AAA) 9 years prior to admission;
- ❖ TEVAR 6 months prior to admission.

Now presented to OSH with hemoptysis/melena, and repeat CT showed type-1B endoleak.

CT

Endovascular stent graft descending thoracic aorta with type-1B endoleak at the level of the diaphragm.
Stable surgical graft of the infrarenal abdominal aorta.

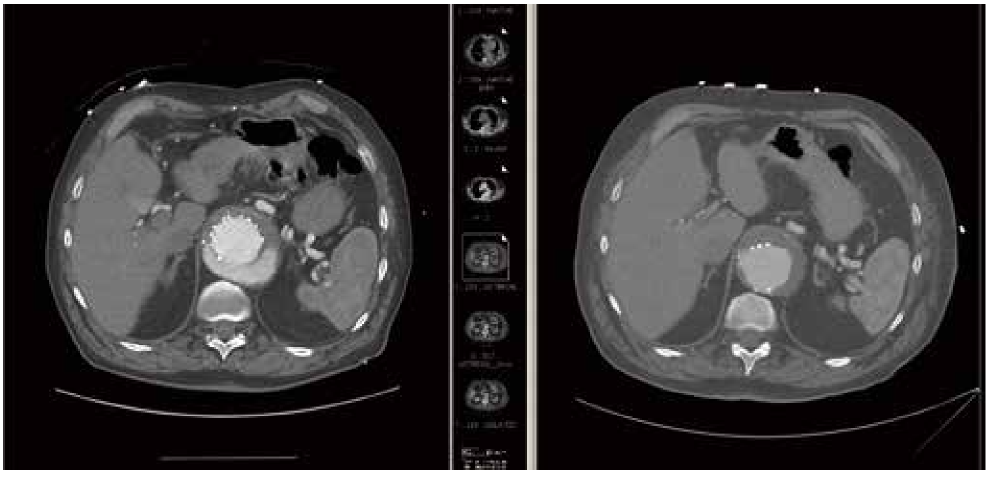
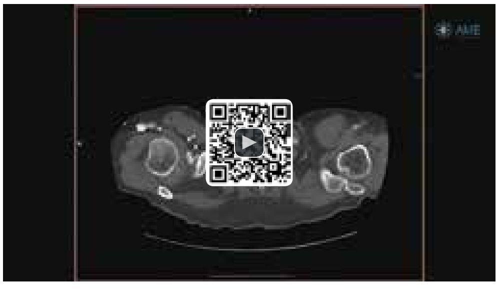


Figure 1 Images at admission (left panel) and 6 months prior (right panel). Images at admission show type I endoleak at the distal end of the stent.



Video 1 Images at admission show type I endoleak at the distal end of the stent.
Available online: http://www.asvide.com/article/view/23800

Video 2 Images 6 months prior to admission after placement of the initial stent.
Available online: http://www.asvide.com/article/view/23801

Video 3 Images 6 months after current admission following placement of the fenestrated and bifurcated stent of the abdominal aorta. Available online: http://www.asvide.com/article/view/23802

Diagnosis

Type-1B endoleak, s/p post TEVAR.

Management

- ❖ Pulmonary consult, potential bronchoscopy.
- ❖ GI consult: EGD, colonoscopy.
- ❖ Endovascular repair.

Emergent/urgent surgery

Anesthesia
General.

Operation
Repair with 4-vessel branched aortic endograft, proximal thoracic extension and distal bifurcated component.

Prior/remote surgery (6 months prior to admission)

Anesthesia
General.

Operation
Left carotid subclavian bypass, left vertebral artery transposition to left common carotid artery, TEVAR of thoracic aortic aneurysm.

Subsequent/non-urgent surgery (6 months post admission)

Anesthesia
General.

Operation
Placement of a 6×22 iCAST balloon expandable stent within the right renal artery with flaring proximally with a 10×2 balloon.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.6 Enlarging descending thoracic aortic aneurysm—Takayasu's arteritis

H&P

A 43-year-old male with h/o of Takayasu's arteritis. s/p prior AVR, ascending aortic replacement. Known residual aneurysm of the descending aorta with diameter of 5.5 cm.

He presented to OSH ED with 1 day h/o chest pain. A CT of the chest showed largest descending aortic diameter increased to 6 cm.

Upon transfer complains about mild pain over the left chest, unchanged from onset.

CT

TAA with increased maximum diameter of now 6 cm.

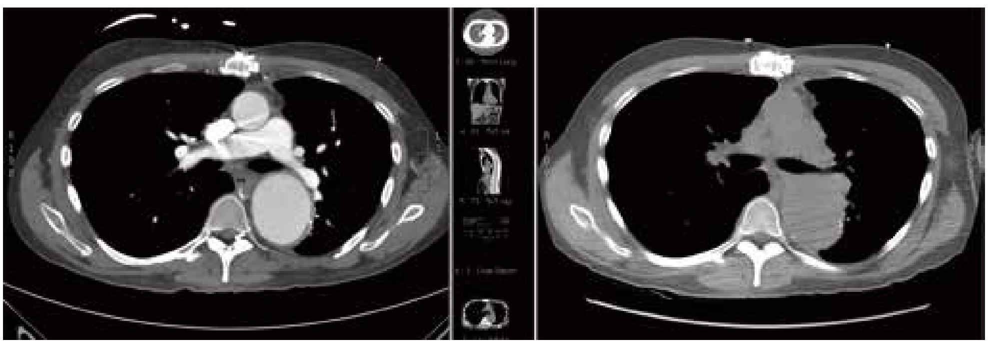


Figure 1 Right and left panel show descending thoracic aneurysm 6 months prior (right panel, non-contrast) and at admission (left panel). There was >5 mm interval increase in maximum diameter.

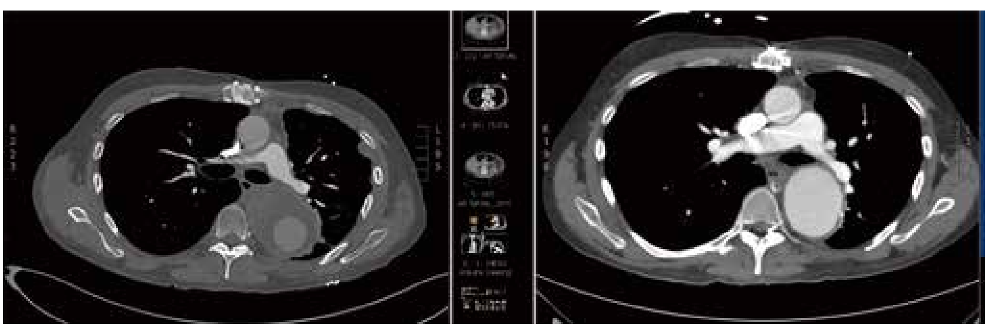


Figure 2 Right and left panel show descending thoracic at admission (right panel), and after placement of surgical graft (left panel). The graft is wrapped in the excluded aneurysm sac.

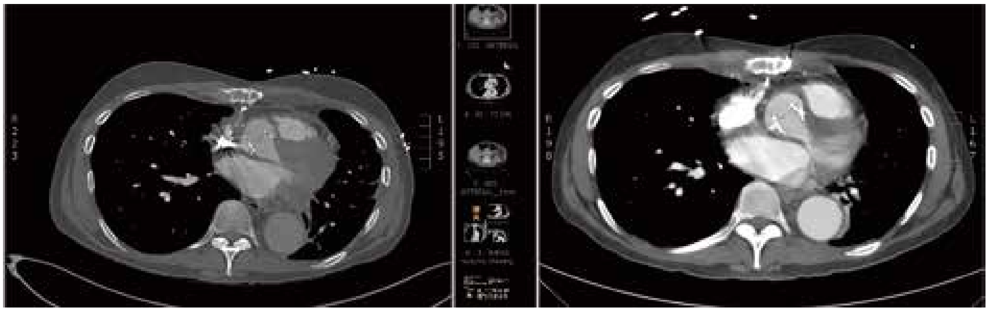


Figure 3 Images at the aortic root before (right) and after (left panel) show the pre-existing bioprosthetic aortic valve prosthesis

Video 1 Images on admission show the bioprosthetic aortic valve, native root, surgical graft of the ascending aorta and aneurysm of the descending aorta.
Available online: http://www.asvide.com/article/view/23803

Video 2 Images at follow-up show the graft of the descending thoracic aorta, which is wrapped in the excluded aneurysm sac.
Available online: http://www.asvide.com/article/view/23805

Diagnosis

Enlarging descending thoracic aortic aneurysm. Takayasu's arteritis.

Management

Descending aortic aneurysm repair.

Emergent/urgent surgery

Anesthesia
General endotracheal anesthesia with spinal drain.

Operation
Left posterolateral thoracotomy, replacement of the proximal descending thoracic aorta utilizing a 28-mm Gelweave graft, deep hypothermic circulatory arrest, antegrade cerebral perfusion, exposure of the left common femoral artery and common femoral vein, cannulation of the left common femoral artery with an 8-mm Gelweave graft, extensive dissection of left pleural adhesions.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.7 Type III thoracic abdominal aneurysm with contained rupture

H&P

A 59-year-old male patient with a 1 month history of back pain, worsening in the week prior to admission with associated chills. AT admission has mild back pain BP in 160 s. Low grade temperature.

Abdomen soft, no epigastric pain in midline.

Also unclear etiology of significant weight loss.

CT

An 8 cm periceliac aneurysm with associated celiac stenosis, SMA occlusion and accessory right renal artery near bifurcation. Peripheral segment of aneurysm with increased density (HU) and not clearly circumscribed.

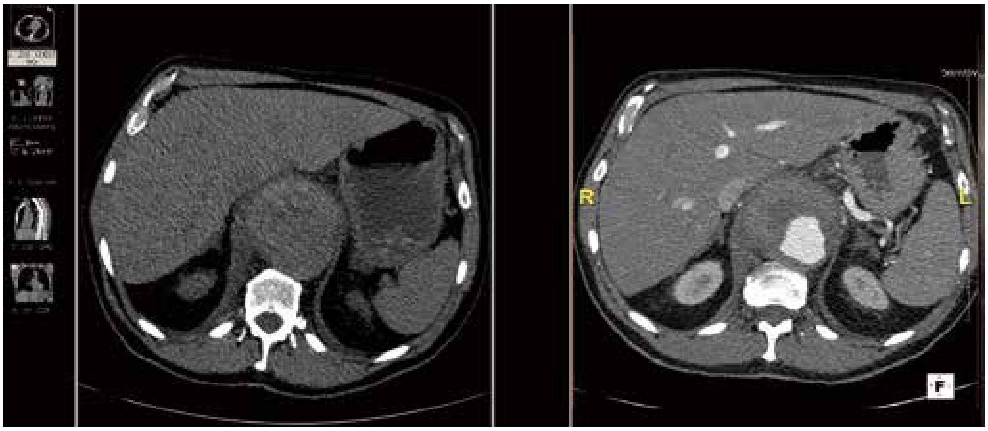


Figure 1 Right and left panel show contrast-enhance and non-contrast enhanced CT scan at the level of the aneurysm (maximum diameter). The increased density (HU) in the peripheral segment of aneurysm is seen in the non-contrast image.

Video 1 Non-contrast enhanced CT scan at the time of admission. The increased density (HU) in the peripheral segment of aneurysm is seen in the non-contrast image.
Available online: http://www.asvide.com/article/view/23806

Video 2 Contrast enhanced CT scan 1-year after admission. The bifurcated surgical graft of the abdominal aorta with visceral side-grafts is seen.
Available online: http://www.asvide.com/article/view/23807

Diagnosis

Symptomatic thoracic-abdominal aneurysm with contained rupture, suspected mycotic etiology.

Management

Plan for anticipated complex repair with concern for infection given WBC and presentation.
BP control—pain may have improved with current control.

Urgent surgery

Anesthesia
General.

Procedure
Open TAAA repair.

Findings
Contained rupture no evidence of active infection.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.8 Ruptured thoracoabdominal aneurysm

H&P

A 73-year-old male with PMH of ESRD on HD who presents with suspected ruptured TAA. He started having right flank pain night before admission. The morning of admission, the pain increased and he went to ED. There CT scans demonstrated a ruptured TAA and he was transferred.

CT

Contained ruptured aneurysm. Aneurysmal segment starting just above the diaphragm. Rupture appears to be below the renal arteries.

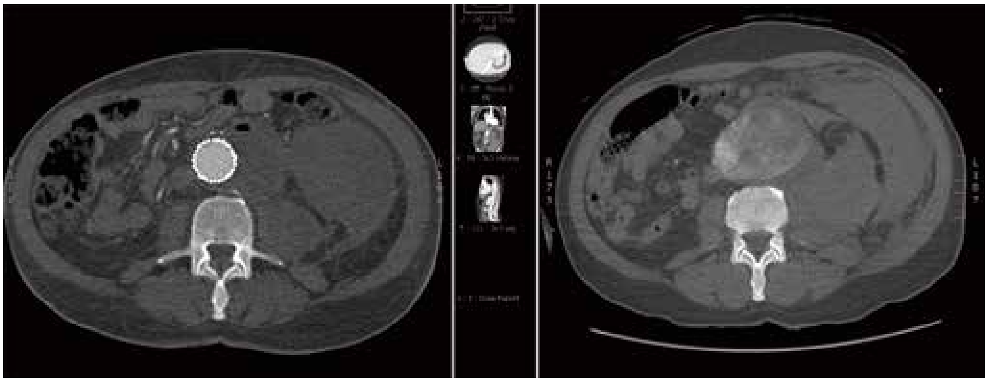


Figure 1 The right and left panel show the ruptured TAA before and after stent placement. Note small amount of air in the excluded aneurysm sac after the procedure.

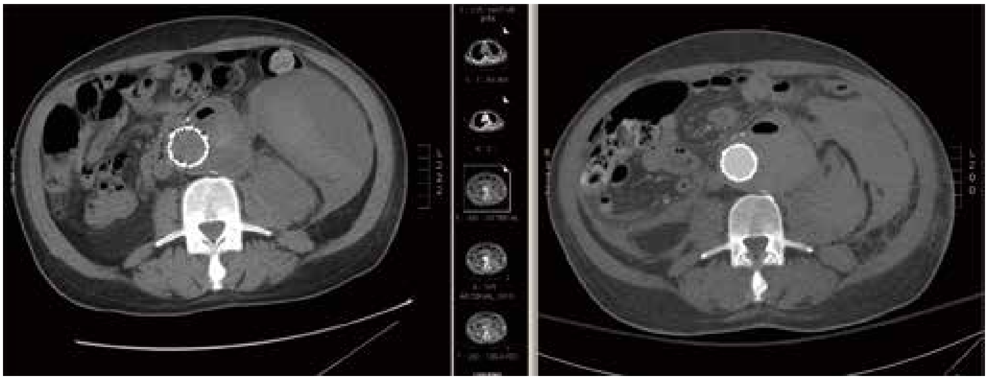
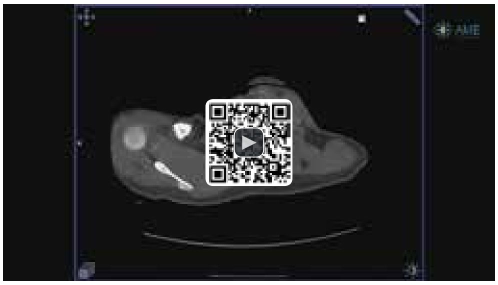
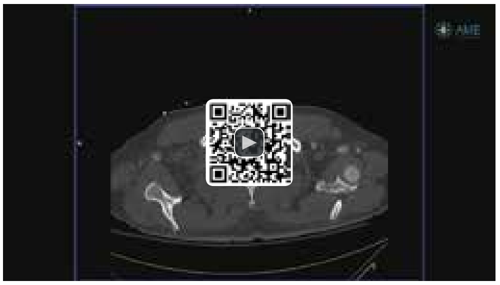


Figure 2 The right and left panel show a non-contrast phase (left) and the arterial phase (right) images. Note the small amount of air and high-density residual blood products +/– contrast in the aneurysm sac. Adjacent to the aneurysm, there is evidence of large amount of left retroperitoneal blood products.



Video 1 Images on admission show ruptured TAA with large amounts of blood products in the retroperitoneum.
Available online: http://www.asvide.com/article/view/23808



Video 2 Images 1 day post endovascular stent placement show the excluded aneurysm sac with findings as discussed in *Video 2* (2.3.1) and large amounts of blood products in the retroperitoneum.
Available online: http://www.asvide.com/article/view/23809

Video 3 Images at 6 months follow-up show reduced size of the excluded aneurysm sac and resolution of the retroperitoneal blood products.
Available online: http://www.asvide.com/article/view/23810

Diagnosis

Ruptured thoracoabdominal aneurysm.

Management

Surgery.

Current emergent/urgent surgery

Anesthesia
Local with monitored anesthesia care.

Operation
Repair of ruptured aneurysm with Endologix 28 mm × 80 mm × 40 mm bifurcated unibody abdominal aortic aneurysm (AAA) stent graft with a Cook TX2 TBE 42–80 thoracic stent graft, bilateral common iliac stenting with 10×39 Genesis stents.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.9 Ruptured thoracic aortic aneurysm

H&P

A 74-year-old female with a history of hypertension, aortic valve disease, and extensive thoracoabdominal aortic aneurysmal disease.

- ❖ s/p remote AVR with bioprosthetic valve and ascending aorta repair;
- ❖ First stage of a planned 3-staged elephant trunk procedure 4 months prior to admission, which included surgical TAAA repair with 'elephant graft';
- ❖ Plans for TEVAR as second stage procedure.

A week prior to planned intervention, she started having severe epigastric pain radiating to her back, CTA was performed which showed ruptured TAA, actively extravasating with mass effect in the mediastinum. She was life flighted to tertiary care hospital.

Patient arrived intubated, sedated, had obtained transfusion with 6U PRBCs prior to admission, along with fluid resuscitation. Initial A line pressures were 60 systolic. CTS and vascular surgery were emergently consulted. After evaluating patient and CT scans, it was deemed that patient was not a surgical candidate. At that point, goals of care discussion were had with the family and patient was made DNR-CC. Subsequently, patient passed away in the CICU.

CT

No imaging at time of current admission available.

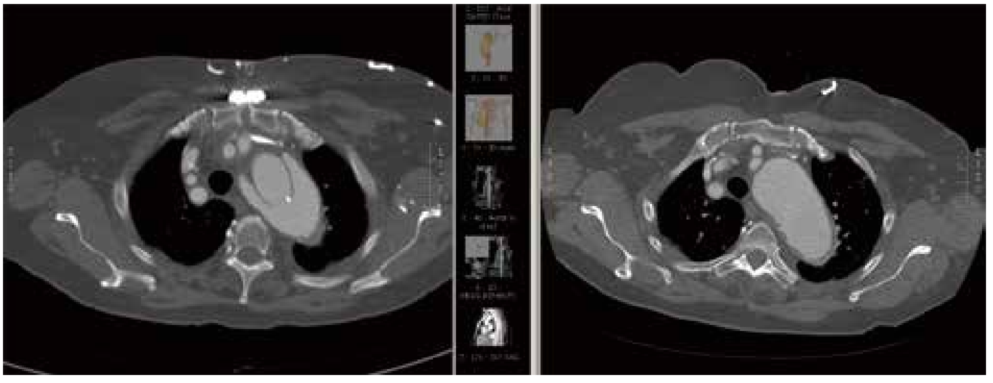


Figure 1 Images of the aortic arch before and after placement of surgical graft arch and descending aorta ('elephant trunk'). The distal end of the graft hands in the proximal descending aorta.

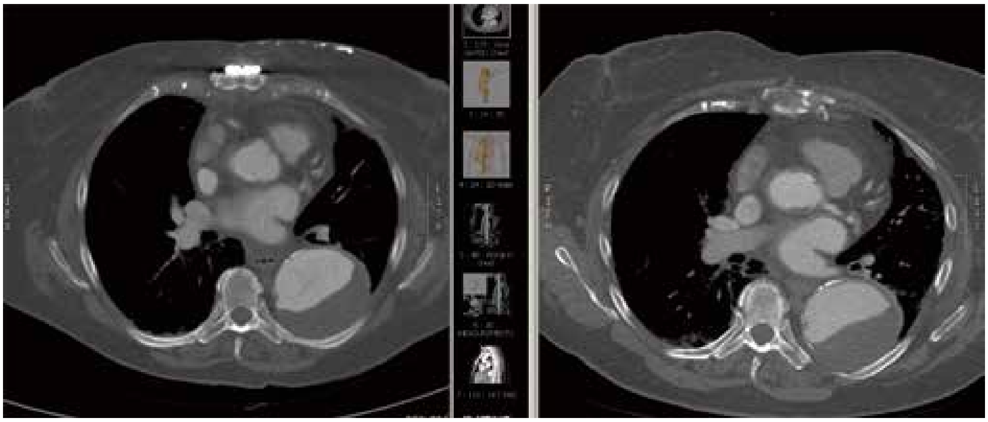


Figure 2 Beyond the graft, there is residual aneurysmal dilatation of the descending thoracic and abdominal aorta. Over 6 months prior to admission there was no significant change in size.

Video 1 Images of the aorta before placement of 'elephant trunk' graft shows extensive thoracoabdominal aneurysm.
Available online: http://www.asvide.com/article/view/23812

Video 2 Images of the aorta after placement of surgical graft of the arch and descending aorta ('elephant trunk'). The distal end of the graft hands in the proximal descending aorta.
Available online: http://www.asvide.com/article/view/23813

Diagnosis

Ruptured thoracic aortic aneurysm.

Management

Palliative care.

Outcome

Exitus Letalis.

4.10 Ruptured thoracic aneurysm

H&P

A 76-year-old female with PMH of HTN and tobacco abuse transferred from OSH. Patient presented with acute severe onset right flank/shoulder blade and mid-thoracic back pain when walking up steps. At OSH, tachycardia 135 bpm, BP 80/50. Received 1,500 cc IVF. CTA showed type B aortic dissection and she was transferred for further management. En route received another 500 cc IVF and 15 mg IV metoprolol with improvement in HR to 70. SBPs 80–90 s en route.

CT

Ruptured thoracic aneurysm.

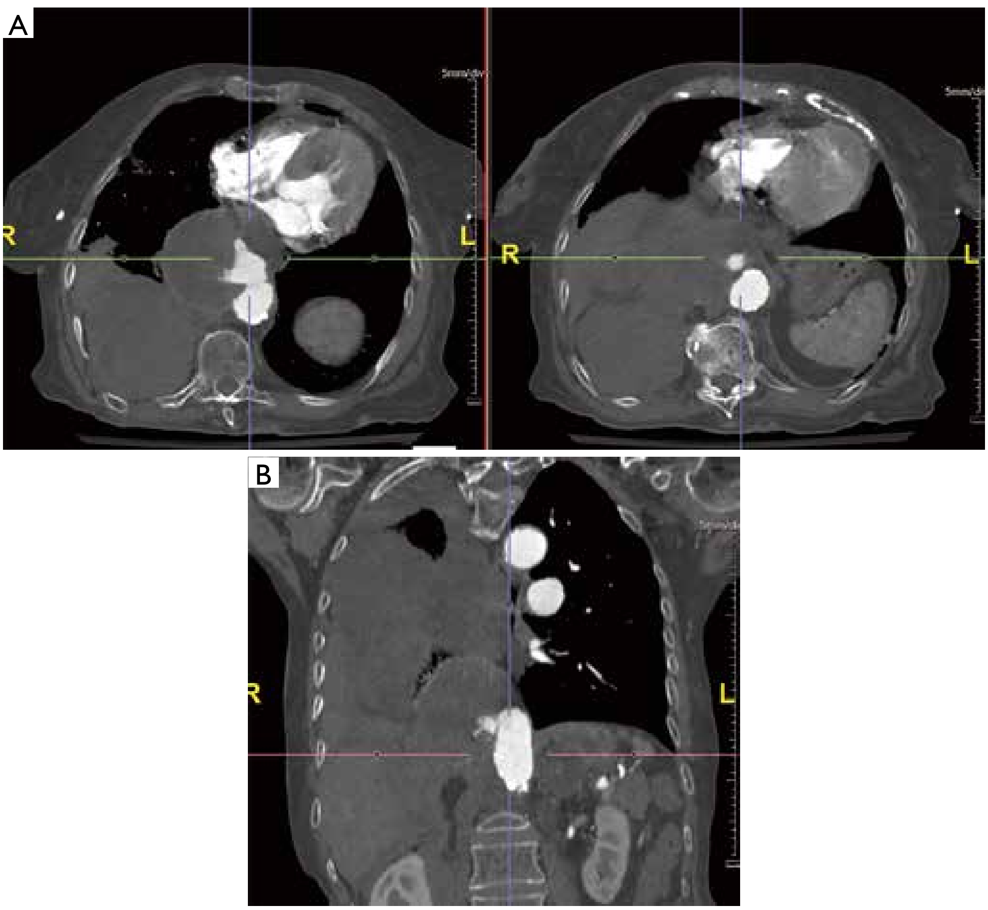


Figure 1 (A,B) Axial and frontal MPR images of the ruptured descending thoracic segment.

Video 1 The images on admission show the large ruptured aneurysm just above the diaphragm, the hemothorax, and the retroperitoneal blood products.
Available online: http://www.asvide.com/article/view/23814

Video 2 The images at 2 months follow-up show the endovascular stent graft, excluding the aneurysm sac. The hemothorax, and the retroperitoneal blood products have mostly resolved.
Available online: http://www.asvide.com/article/view/23815

Diagnosis

Ruptured thoracic aneurysm.

Management

Impulse control: clevidipine, metoprolol.

Urgent surgery.

Emergent/urgent surgery

Anesthesia
General.

Procedure
TEVAR with 30 mm × 80 mm TX2 device.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.11 Extensive thoracoabdominal aneurysmal disease, with evidence of rupture

H&P

A 72-year man with HTN. Recent transfer to nursing home. Recent respiratory infection. Admitted on day of admission with severe acute onset chest pain.

CT angiogram showed extensive descending thoracic and abdominal aneurysm with evidence of rupture.

He was deemed not a surgical candidate at OSH and transferred for second opinion.

Review of data confirmed that patient is not a candidate for endovascular surgical repair. Following his previously stated direction, his family made patient DNR.

CT

Extensive thoracoabdominal aneurysmal disease. Evidence of rupture around level of diaphracm.

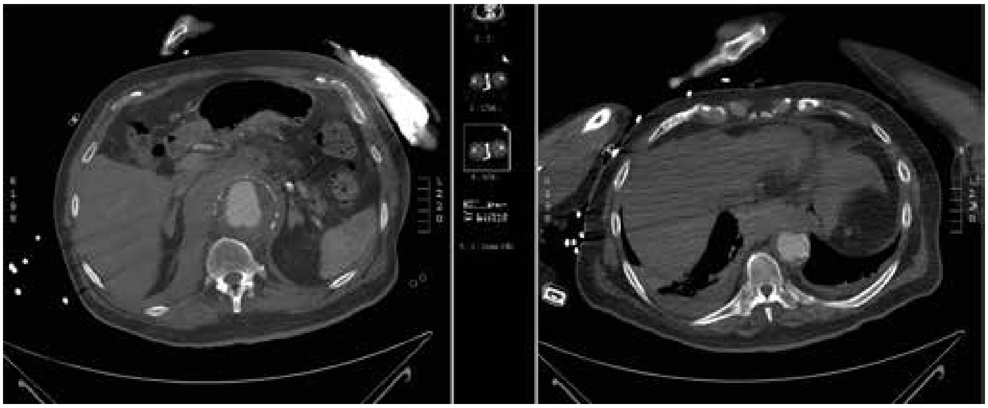


Figure 1 Images show extensive thoracoabdominal aneurysmal disease with evidence of rupture at the level surrounding the diaphragm. There are right retroperitonal blood products.

Video 1 Images show extensive thoracoabdominal aneurysmal disease with evidence of rupture at the level surrounding the diaphragm. There are blood products anterior the aorta in the retrocardiac segment and right retroperitonal blood products.
Available online: http://www.asvide.com/article/view/24588

Diagnosis

Extensive thoracoabdominal aneurysmal disease.

Management

Medical management.

Outcome

Discharge to Nursing home with plans for follow-up with primary care physician.

4.12 Ruptured mycotic thoracic aortic aneurysm

H&P

A 72-year-old male patient with h/o CAD and aortic valve disease, s/p AVR/CABG. HTN and CKD.

Presented to OSH one week prior to transfer with SOB, productive cough, fever, and left sided chest pain. There was MSSA bacteremia. The patient was treated for pneumonia.

Three days prior to transfer the patient was intubated for respiratory failure. A repeat CXR showed new left pleural effusion. A left-sided chest tube was placed and drained 1 liter of blood.

On the day of transfer a CT chest without IV contrast performed at the OSH showed a 4- cm outpouching at the proximal arch, and hemorrhagic left pleural effusion.

He was transferred to the tertiary care center with suspected ruptured ascending/arch aneurysm.

CT

Findings most c/w large ruptured pseudoaneurysm at the distal ascending aorta/proximal arch.

- ❖ Originates from left anterior aspect of distal ascending aorta/level of innominate artery;
- ❖ Size about 5 cm; including aorta 6.5×5 cm.

Findings suggesting rupture:

- ❖ Left hemothorax with drain;
- ❖ Stranding in mediastinum.

Prior CABG, with SBG graft to RCA immediately behind sternum.

- ❖ LITA graft?

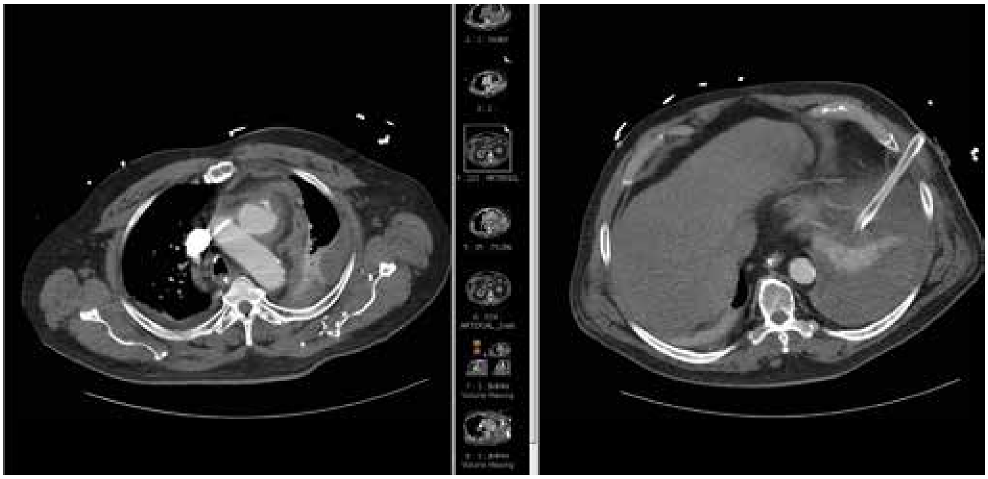


Figure 1 Images show the pseudoaneurysm at the proximal arch, with surrounding blood products (left panel). The right panel shows the left hemothorax with chest tube in place.

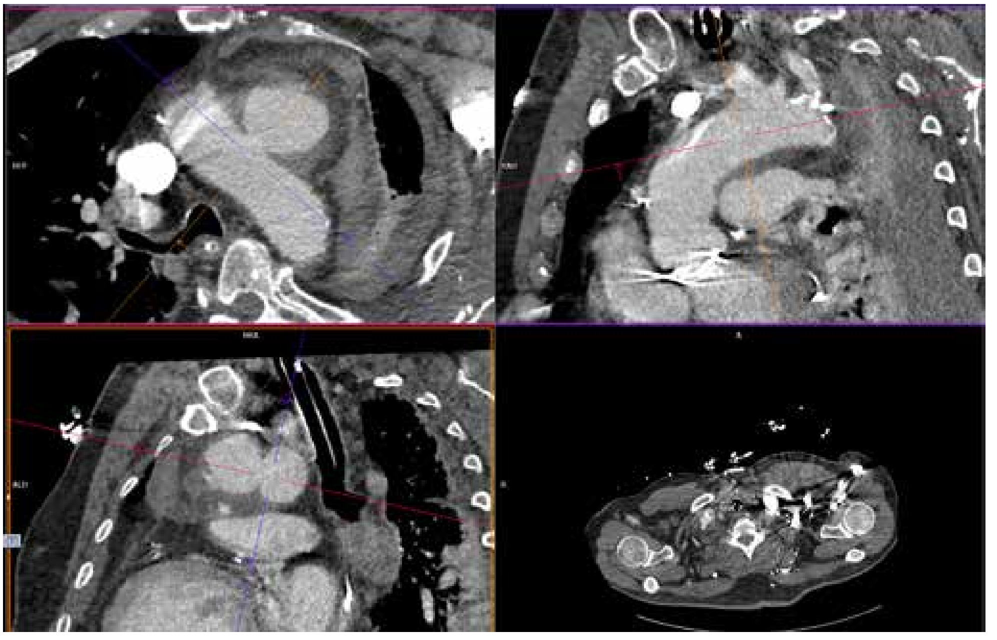


Figure 2 3D reconstructed images demonstrate the location of the pseudoaneurysm at the level of the innominate artery origin.

Video 1 Images at the time of admission show the pseudoaneurysm at the proximal arch, with surrounding blood products and the left hemothorax with chest tube in place.
Available online: http://www.asvide.com/article/view/24590

Video 2 Images after surgery with surgical changes at the arch.
Available online: http://www.asvide.com/article/view/24675

Diagnosis

Ruptured mycotic? pseudoaneurysm at the distal ascending aorta/proximal arch.

Management

- Sepsis work up and management;
- Surgical repair.

Urgent surgery

Anesthesia
General endotracheal.

Operations

Redo median sternotomy, right axillary artery cannulation with a 10-mm Dacron graft, debridement of mediastinal infection, excision and repair of aortic arch pseudoaneurysm with a bovine pericardial patch, drainage of left hemothorax and empyema, and hypothermic circulatory arrest.

Anesthesia (5 days later)

General endotracheal.

Operations (5 days later)

- ❖ Left VATS evacuation of hemothorax;
- ❖ Marcaine chest wall block.

Prior/remote surgery

s/p remote AVR/CABG.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.13 Acute aortic rupture

H&P

An 89-year-old male patient presented to OSH with left-sided back pain that radiated towards the front. Patient underwent an initial abdominal CT scan. The CT technologist identified pathology in the lower descending thoracic aorta and an additional chest CT was acquired.

Evidence of aortic rupture was identified and the patient was transferred to the tertiary center.

Shortly after arrival, the patient had a cardiopulmonary arrest. Based on previously established DNR status of the patient and the family request resuscitation was not performed.

CT

Aneurysmal dilatation of the distal descending aorta surrounded by massive amount of blood products and evidence of contrast extravasation in the posterior aspect. Findings c/w aortic rupture.

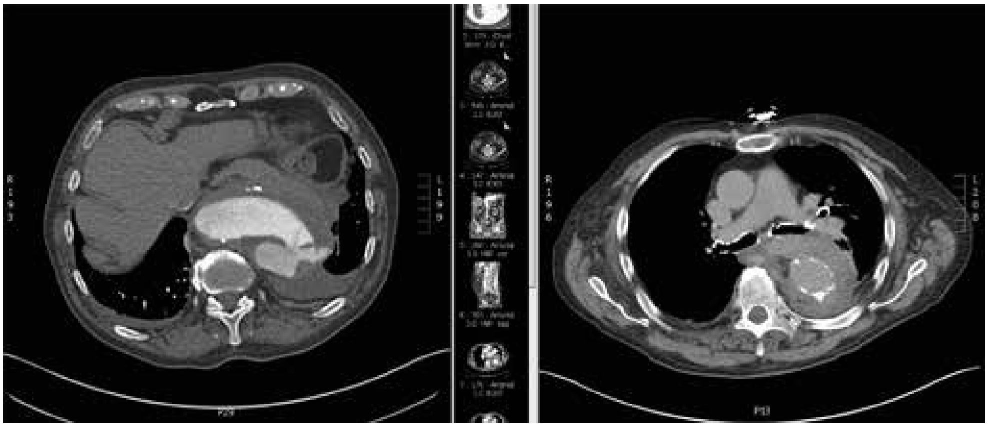
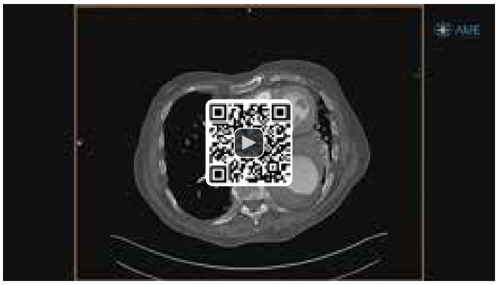
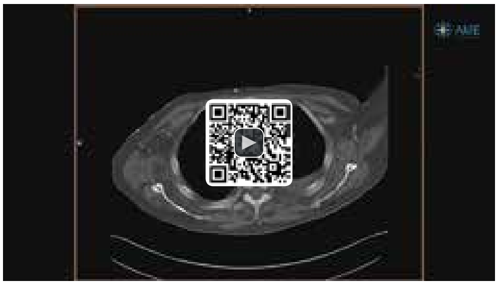


Figure 2 Limited images of the lower descending thoracic aorta acquired on abdominal CT scan identified findings c/w aortic rupture.



Video 1 The abdominal CTA shows aneurysmal dilatation of the descending thoracic aorta, surrounded by massive amount of blood products and evidence of contrast extravasation in the posterior aspect. Findings c/w aortic rupture.
Available online: http://www.asvide.com/article/view/24591



Video 2 Subsequent images of the chest shows blood products tracking along the proximal descending aorta.
Available online: http://www.asvide.com/article/view/24592

Diagnosis

Acute aortic rupture.

Management

Preparation of Emergency surgery.

Outcome

Shortly after arrival, the patient had a cardiopulmonary arrest. Based on previously established DNR status of the patient and the family request resuscitation was not performed.

4.14 Symptomatic aortic arch pseudoaneurysm, s/p TEVAR

H&P

An 88-year-old white male with known Type-B aortic dissection. S/p L carotid SCL bypass and TEVAR 5 years prior to admission. Subsequent esophageal perforation during TEE with mediastinitis and infection of aortic graft. Sternotomy with removal of infected pacemaker 1 year prior to admission. Maintained on i.v. antibiotics for one year, and was converted to oral antibiotics 10 days prior to admission.

Has been followed for type-1a endoleak, with prior CTA showing 7 cm pseudoaneurysm proximal to thoracic stent graft. He was already scheduled for surgery, but presented to OSH with hemoptysis.

Radiology

Pseudoaneurysm aortic arch proximal to thoracic stent graft.

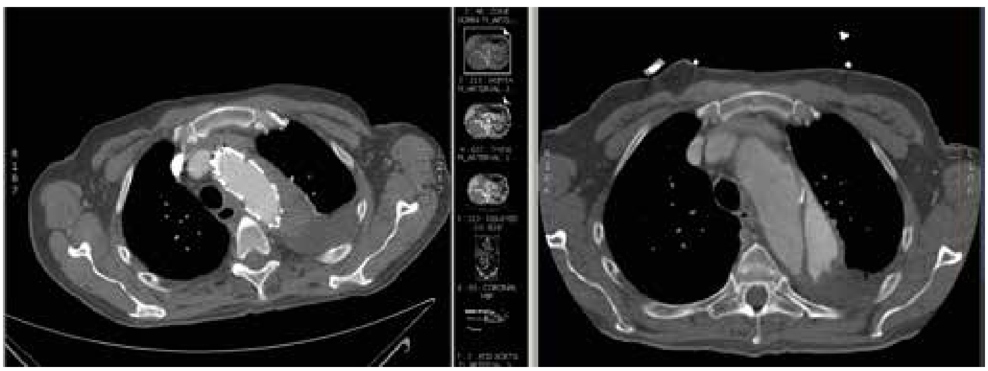


Figure 1 Five years prior to current admission: images prior to (right) and following (left) placement of endovascular stent graft for type-B aortic dissection.

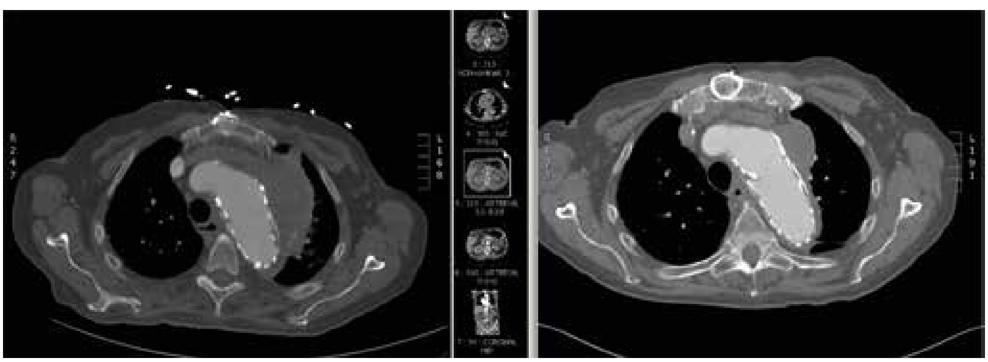


Figure 2 One month prior (right) and at time admission: images show increased size of arch aneurysm.

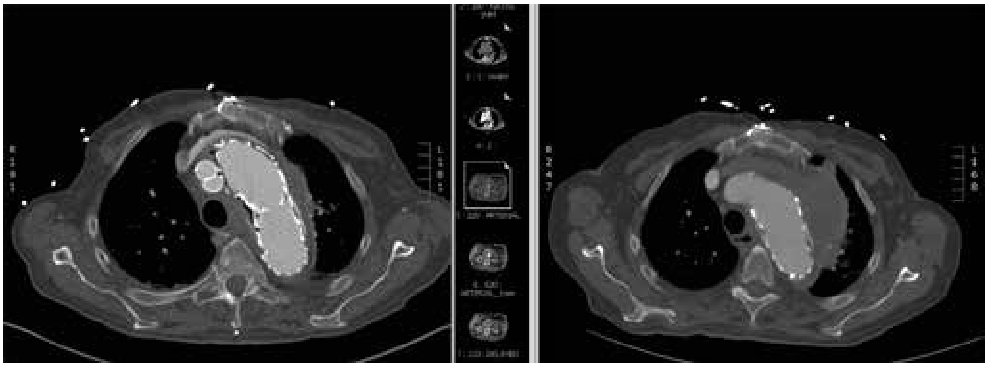


Figure 3 Admission (right) and 3 months after endovascular stent placement: images show evidence of interval stent placement in arch and arch branch vessels.

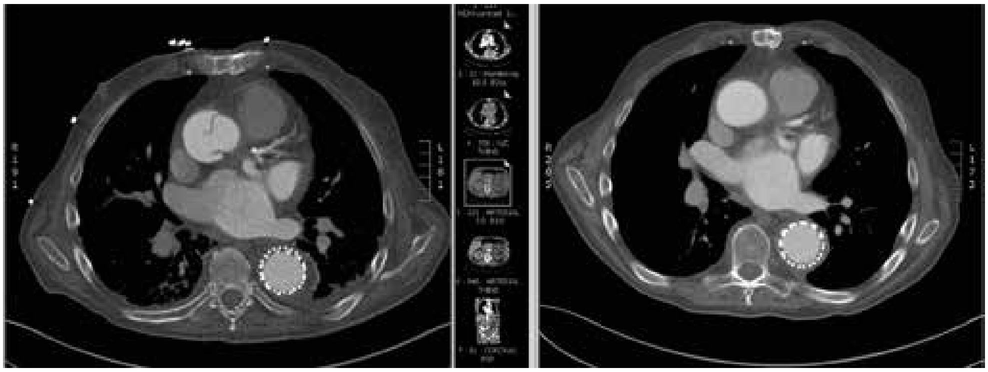


Figure 4 Three month (right) and 6months (left) after admission: images 6 months after admission (left) demonstrate now type-A with flap proximal to stent graft.

Video 1 Initial non-contrast scan at time of admission shows large pseudoaneurysm at the arch proximal to stent graft.
Available online: http://www.asvide.com/article/view/24594

Video 2 Repeat contrast enhanced CT scan shows the type-A endoleak at the proximal end of the stent.
Available online: http://www.asvide.com/article/view/24595

Video 3 Images of CT scan 5 years prior to admission show type-B dissection.
Available online: http://www.asvide.com/article/view/24596

Video 4 Images 1 month prior to admission show type-1 endoleak and pseudoaneurysm at proximal end of stent.
Available online: http://www.asvide.com/article/view/24597

Video 5 Images 3 months after current surgery show proximal extension of stent and air at distal and proximal descending segment.
Available online: http://www.asvide.com/article/view/24598

Video 6 Images 6 months after surgery show interval ascending dissection proximal to stent.
Available online: http://www.asvide.com/article/view/24599

Diagnosis

Aortic arch pseudoaneurysm, symptomatic with hemoptysis, s/p TEVAR with ineffective seal from thoracic endograft.

Management

Urgent surgical repair.

Current emergent/urgent surgery

Anesthesia
General endotracheal.

Operation
Exclusion of arch and descending thoracic aortic aneurysm with arch TEVAR and parallel grafts into the innominate and left common carotid artery.

Prior/remote surgery

One year prior to admission
Operations: median sternotomy, open heart, removal and recovery of pacemaker as a lead removal and implantation, right ventricle and left ventricle epicardial lead placement as a bipolar lead as well as placement of permanent pacemaker in the abdominal wall.

Five years prior to admission

- ❖ Operations: repair of thoracoabdominal aortic dissection with Zenith T×2 graft with proximal cuff 36×202 and distal cuff 36×202, left brachial and right common femoral artery access with a redo procedure in both groins, embolization of left subclavian artery distal to subclavian artery bypass.
- ❖ Operation: left carotid subclavian bypass graft with 8-mm Propaten PTFE.

Outcome

Discharge home with plans for follow-up and regularly scheduled tomographic aortic imaging. Exitus letalis 6 months after discharge.

4.15 Left subclavian artery rupture *vs.* dissection

H&P

A 69-year-old White female with CAD (remote RCA stent, prior CABG), s/p L Renal stent placement, for renal artery stenosis.

Admitted to CICU a few days earlier with peri-procedural NSTEMI (completion proctocolectomy, stomal hernia repair and creation of loop end ileostomy). Successful PCI to the SVG-RCA with plans to have a staged procedure to the subclavian and possibly the SVG-Diagonal. During attempted left subclavian artery stenting developed severe chest and back pain and angiography showed localized dissection from subclavian into the aorta.

#CT

Post attempted angioplasty left subclavian stenosis/occlusion.

CTA shows significant blood products/stranding around arch with wall thickening arch wall likely tracking blood products and small hemorrhagic left pleural effusion.

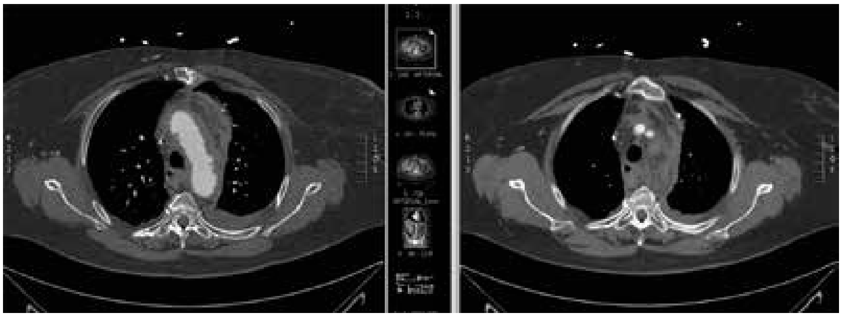


Figure 1 Images or the aortic arch prior to admission (right panel) and after unsuccessful left subclavian artery stenting (left panel). The images prior to the procedure (right panel) show a penetrating ulceration at the arch. Following the procedure, there are significant blood products/stranding around arch with wall thickening arch wall.

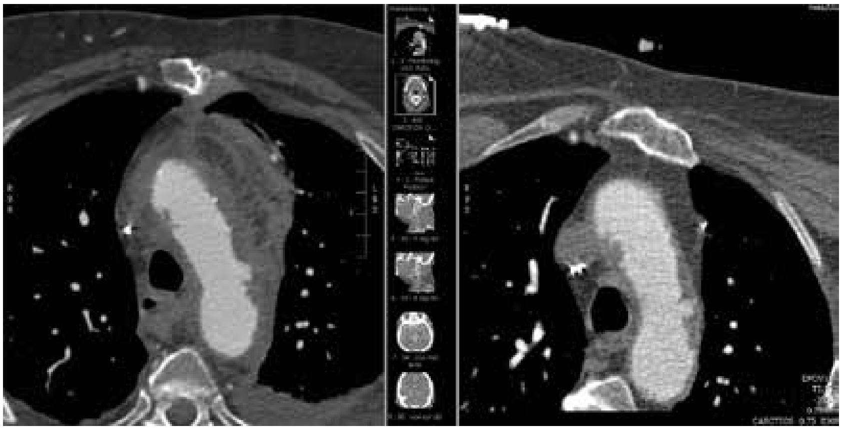


Figure 2 Images after unsuccessful left subclavian artery stenting show significant blood products/stranding around arch (left panel) and the occluded left subclavian artery (right panel).

Video 1 Images after unsuccessful left subclavian artery stenting show significant blood products/stranding around arch with wall thickening arch wall likely tracking blood products and small hemorrhagic left pleural effusion.
Available online: http://www.asvide.com/article/view/24600

Diagnosis

Iatrogenic left subclavian artery rupture *vs.* dissection and origin occlusion: peri-aortic hematoma.

Management

Conservative management

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.16 Graft infection; s/p supra-coronary graft for Type-A dissection

H&P

A 72-year-old female with history of Type A aortic dissection s/p surgical repair on 2 months prior with supra-coronary conduit. Post-operative course complicated by post-op respiratory failure, pseudomonas bacteremia, C. diff infection, chronic h/o lung CA s/p RLL resection, colon CA s/p resection 1 month prior to current admission she was re-admitted to OSH due to persistent leukocytosis, blood cultures were drawn and were positive for pseudomonas. Subsequent blood cultures and bronchial wash respiratory culture revealed growth of pseudomonas aeruginosa. Hospital course was also complicated by hypoxemia, hypotension, and AMS requiring mechanical ventilation and fluid resuscitation.

CT

Supra-coronary surgical graft ascending aorta: normal size.

- ❖ Surrounded by moderate amount of likely residual? post-operative changes. More anterior distribution. Previously demonstrated small amounts of air is resolved;
- ❖ Interval development of luminal filling defect in the area of medial fold of the surgical graft.

CT appearance could be consistent with vegetation/thrombus.

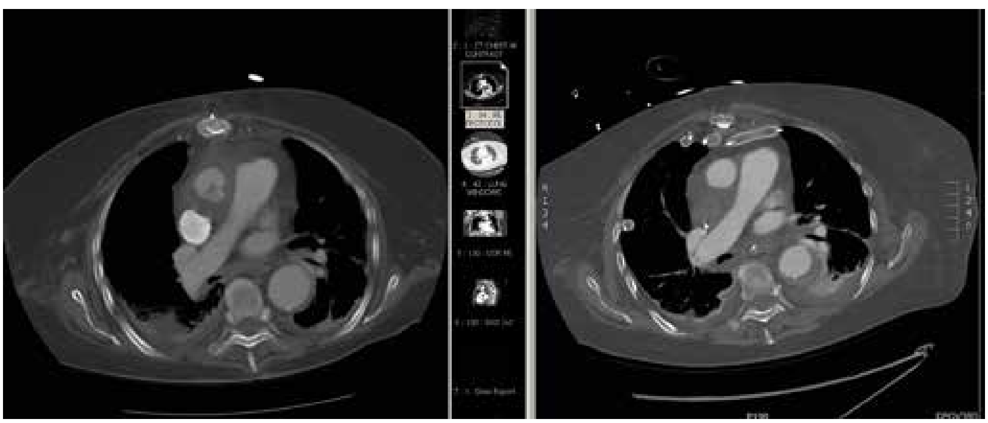


Figure 1 Images at the time of admission (left panel) and 2 months prior (right panel). There are intra luminal filling defects.

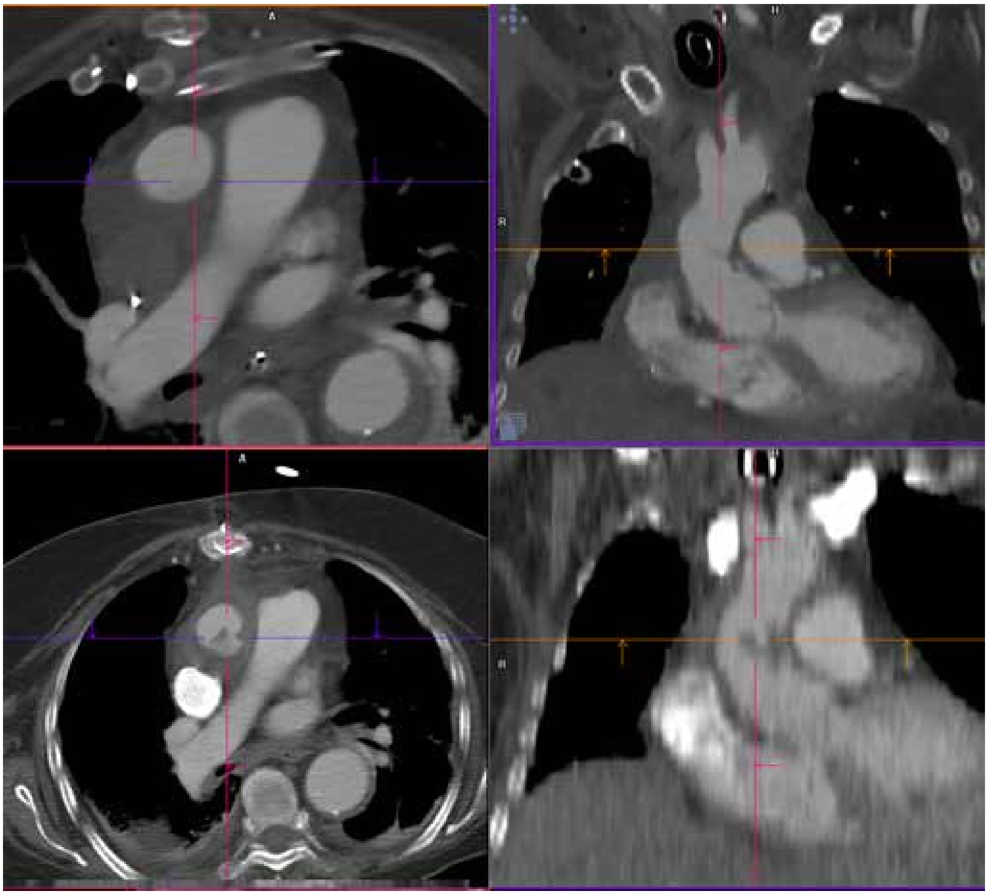
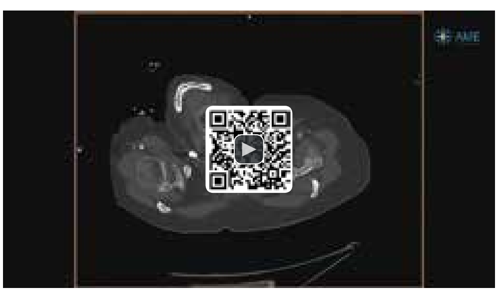


Figure 2 Images at the time of admission (lower panels) and 2 months prior (upper panel). There are intra luminal filling defects.



Video 1 Images 2 months prior to current admission early after surgical repair of type-A aortic dissection. The supra-coronary graft of the ascending aorta is surrounded by expected post-operative blood products. A small kink is seen in the medial aspect of the graft at the level of the mid-ascending segment.
Available online: http://www.asvide.com/article/view/24601

Video 2 Images at the time of admission show interval development of intra luminal filling defects.
Available online: http://www.asvide.com/article/view/24636

Diagnosis

Supra-coronary graft infection.

Management

Conservative treatment with antibiotics.

Outcome

Discharge home with plans for follow-up with infectious disease and aortic center. Regularly scheduled tomographic aortic imaging.

4.17 Incidental finding of large abdominal aortic aneurysm

H&P

A 73-year-old male with COPD, s/p left lobectomy for lung cancer, CVA, s/p PPM, who presents with abdominal pain and high grade proximal SBO.

Incidentally finding of abdominal aortic aneurysm (AAA) 6×7.8 on CT scan.

CT

Large AAA.

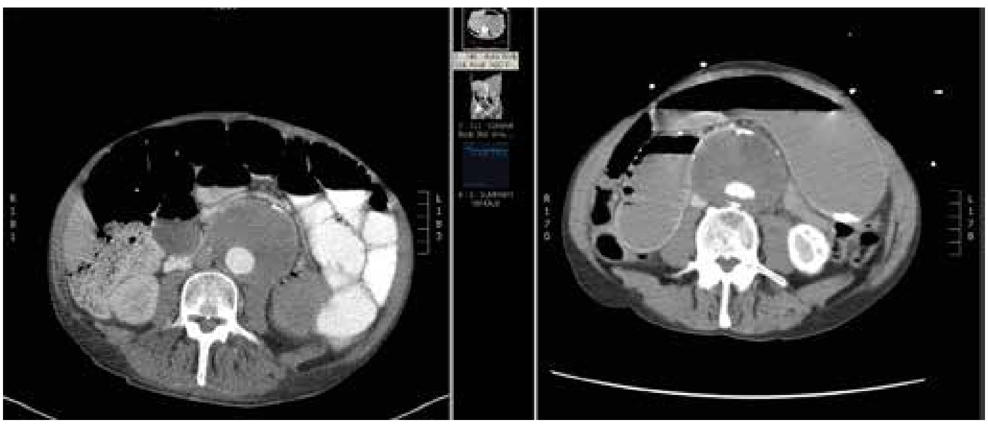


Figure 1 Stable AAA.

Video 1 AAA and dilated bowel loops. Available online: http://www.asvide.com/article/view/24637

Diagnosis

SBO, AAA, NSTEMI.

Management

SBO—initial conservative treatment per Gen Surgery. IV resuscitation.

AAA—evaluated by vascular surgery. Plans for elective repair.

NSTEMI—due to Demand ischemia. no need for any cath at this time. conservative management.

Current emergent/urgent surgery

None.

Subsequent/ non-urgent surgery: (during admission)

Operation

Exploratory laparotomy with lysis of adhesions.

4.18 Juxtarenal adominal aneurysm

H&P

An 82-year-old white female nursing home resident with Parkinson disease, wheelchair bound, presenting with 5 days history of lower abdominal pain. States she has had similar pain for a very long time but became acutely worse prompting ER visit.

Known history of juxtarenal abdominal aortic aneurysm (AAA), previously states poor candidate for open or endo repair. CT scan at OSH described concerning for possible rupture. Transferred for further management. PMH significant for CAD s/p CABG.

CT

Repeat CT stable without evidence of acute aortic pathology.

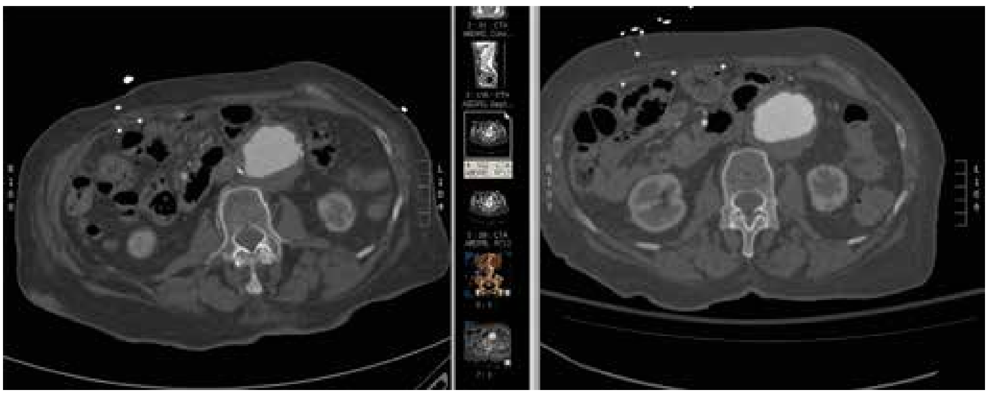


Figure 1 Images show moderate size infrarenal AAA.

Video 1 Images show moderate size infrarenal AAA. Available online: http://www.asvide.com/article/view/24638

Diagnosis

Juxtarenal abdominal aneurysm.

Management

Medical management.

Patient high risk for either open or endovascular intervention.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.19 Infrarenal abdominal aortic aneurysm (AAA)

H&P

A 50-year-old male presented to OSH with acute onset right-sided lower back pain, which started about 3 hours prior to presentation. He has never had pain like this before; and reports that earlier that day he had lifted a freezer. On presentation to the ED, vital signs included HR 77, BP 173/107 mmHg. A CT scan showed a large infrarenal abdominal aortic aneurysm (AAA) with some soft tissue prominence anterior, concern for sub-acute extravasation. He was transferred to transferred to tertiary center.

CT

Large, 10 cm infrarenal abdominal aneurysm: focal irregular luminal surface anterior wall with adjacent thin rim of soft tissue-density changes, most consistent with contained rupture.

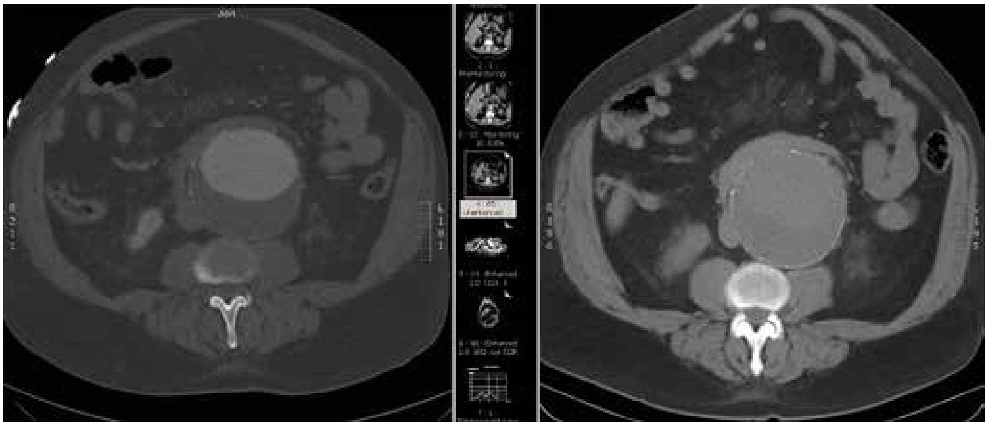


Figure 1 Non-contrast (right panel) and contrast enhanced (left panel) images show large infrarenal AAA with anterior rim of soft tissue, most c/w contained rupture.

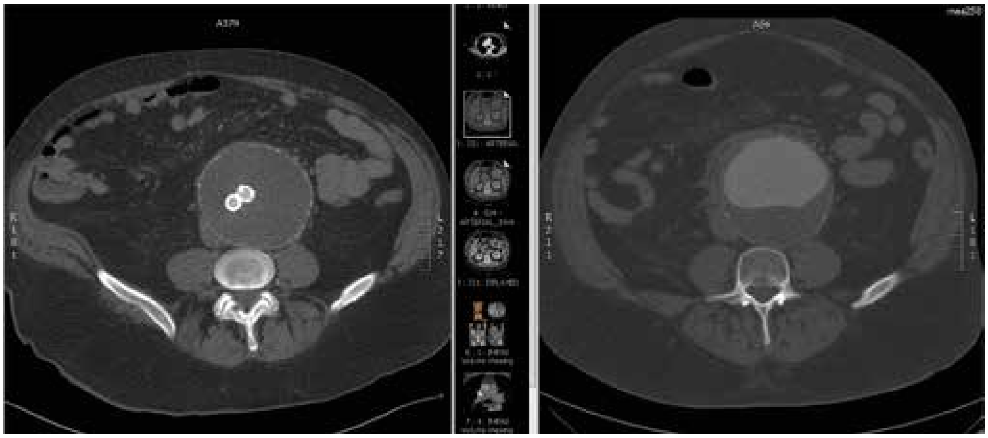


Figure 2 Right and left panel show images before and after stent placement.

Video 1 This movies show pre-operative images in the arterial phase. Movies show large infrarenal AAA with anterior rim of soft tissue, most c/w contained rupture.
Available online: http://www.asvide.com/article/view/24639

Video 2 This movies show pre-operative images in the non-contrast phase. Movies show large infrarenal AAA with anterior rim of soft tissue, most c/w contained rupture.
Available online: http://www.asvide.com/article/view/24640

Video 3 This movie shows images after endovascular stent placement. Available online: http://www.asvide.com/article/view/24641

Diagnosis

Symptomatic 11 cm infrarenal AAA.

Management

Urgent surgical repair.

Current emergent/urgent surgery

Anesthesia
General.

Procedure
Percutaneous EVAR with Zenith 26×111 mm main body, 20×90 mm right iliac, 20×74 mm left iliac.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.20 Symptomatic abdominal aortic aneurysm, with increase in size

H&P

A 71-year-old male presented to ED with abdominal pain and diarrhea, which started the night before admission. ETOH abuse known h/o abdominal aortic aneurysm (AAA). Also h/o CAD, carotid artery stenosis, and CKD (baseline Cr 2.0-2.1).

Pain is described as central radiation to left and right; severity 10/10. Associated feeling of fecal urgency with small amounts of diarrhea ×5, non-bloody. Morning of admission, the abdominal pain was much worse and subsequently presented to ED.

In ED, pain was controlled with Dilaudid. Lipase was checked and was elevated at 512. A CT abdomen without contrast (due to elevated Cr) was obtained, which showed increase in size of AAA. He was transferred for further management.

On arrival, he noted continued 7/10 abdominal, centralized, radiating out to L and R sides. No nausea. Denied chest pain, back pain.

CT

Infrarenal abdominal aortic aneurysm.

- ❖ Adherent wall thrombus and wall calcification;
- ❖ Inhomogeneous layering within the thrombus in the anterior aspect of the aneurysm sac, most consistent with peripheral calcification;
- ❖ No evidence of leakage.

Maximum diameter: 5.4×5 cm.

- ❖ Minimal Interval increase in size since 2014: 5×4.8 cm.

No definitive evidence of acute aortic pathology.

Pancreas: multiple calcification in the head of the pancreas, with mild prominence of the pancreatic head. Findings consistent with pancreatitis. Clinical correlation is recommended.

Extensive filling defects in the gallbladder, most consistent with gallstones.

- ❖ Dilated extrahepatic biliary duct clinical correlation is recommended.

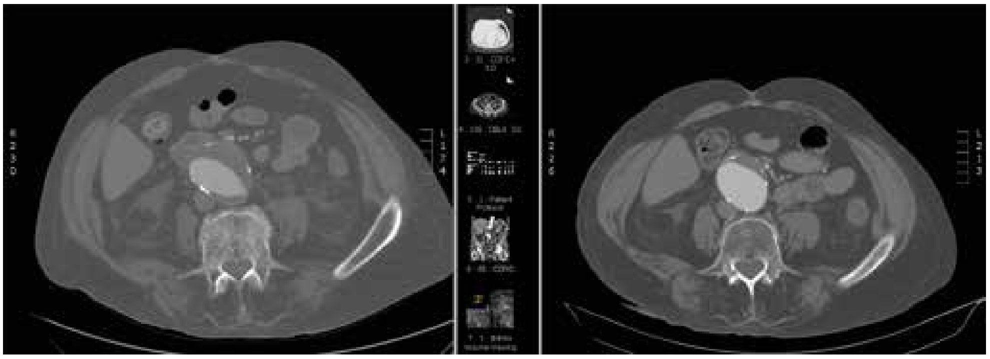


Figure 1 Images show AAA at the time of admission (left panel) and one year prior (right panel). Mild interval increases in size without evidence of acute changes.

Video 1 Images show AAA at the time of admission. Also gallstones/sludge in the gallbladder.
Available online: http://www.asvide.com/article/view/24642

Diagnosis

(I) Acute pancreatitis—long standing ETOH abuse.
(II) AAA—unchanged on CT this am; abdominal pain likely unrelated.

Current surgery: (during admission)

Operation
Laparoscopic converted to open cholecystectomy, for gallstone pancreatitis.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.21 Large infrarenal abdominal aortic aneurysm

H&P

A 59-year-old female presented to OSH with sudden onset LLQ pain radiating to L flank, described as sharp aching pain associated with nausea/dry heaves. No hx of urinary symptoms, fever, constipation, diarrhea or sob. A non-contrast CT performed to r/o nephrolithiasis, revealed 10cm infrarenal abdominal aortic aneurysm (AAA) with suspected hemorrhage. Patient was life flighted to tertiary center and Vascular surgery was consulted. Repeat CTA with contrast revealed stable AAA with no acute pathology; no evidence of hemorrhage.

CT

About 11 cm infrarenal abdominal aortic aneurysm without evidence of rupture.

Mild pelvocaliectasis of the left kidney.

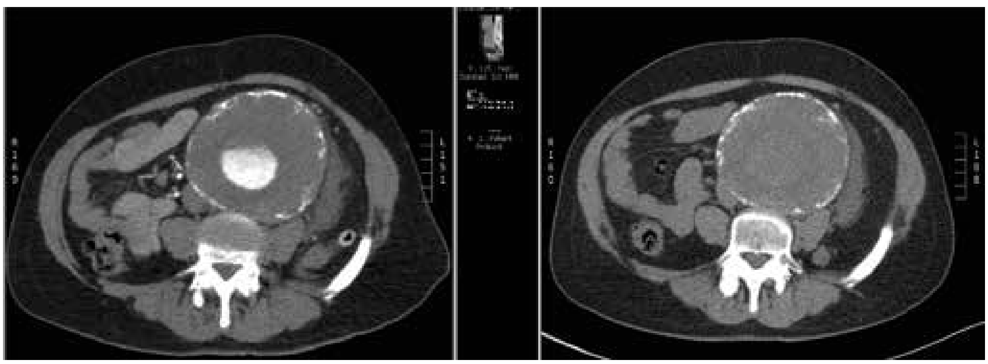
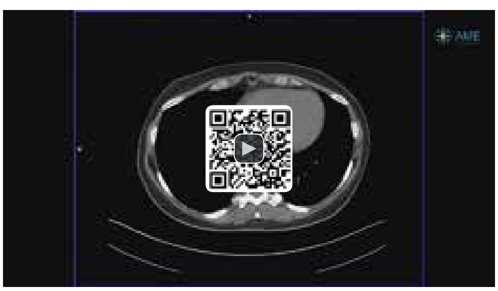


Figure 1 The large infrarenal aneurysm is shown in the non-contrast phase (right panel) and arterial phase (left panel). There it thrombosis of the aneurysm sac with wall calcification. No evidence of rupture.



Video 1 Non-contrast phase images of the large infrarenal aneurysm are shown.

Available online: http://www.asvide.com/article/view/24643

Video 2 Arterial phase images of the large infrarenal aneurysm are shown.

Available online: http://www.asvide.com/article/view/24645

Video 3 Non-contrast phase images of the large infrarenal aneurysm are shown.
Available online: http://www.asvide.com/article/view/24646

Management

Impulse control with IV metoprolol, nitroprusside and subsequently clevidipine.

Current emergent/urgent surgery: (next day)

Anesthesis
General.

Operation
Repair of Symptomatic type 4 thoracoabdominal aneurysm with left renal artery endarterectomy and reimplantation.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.22 Ruptured abdominal aortic aneurysm—initial episode of unresponsiveness

H&P

A 73-year-old female with sudden onset abdominal pain night before admission.

- Found unresponsive, but breathing morning of admission;
- Brought to OSH, intubated on arrival, hypotensive;
- After transfer initially unresponsive other than eye opening, minimal spontaneous movement without sedation. Subsequently became responsive, moving all extremities, following commands, and responding by head signs.

CT

Non-contrast CT from OSH shows large right retroperitoneal hematoma.

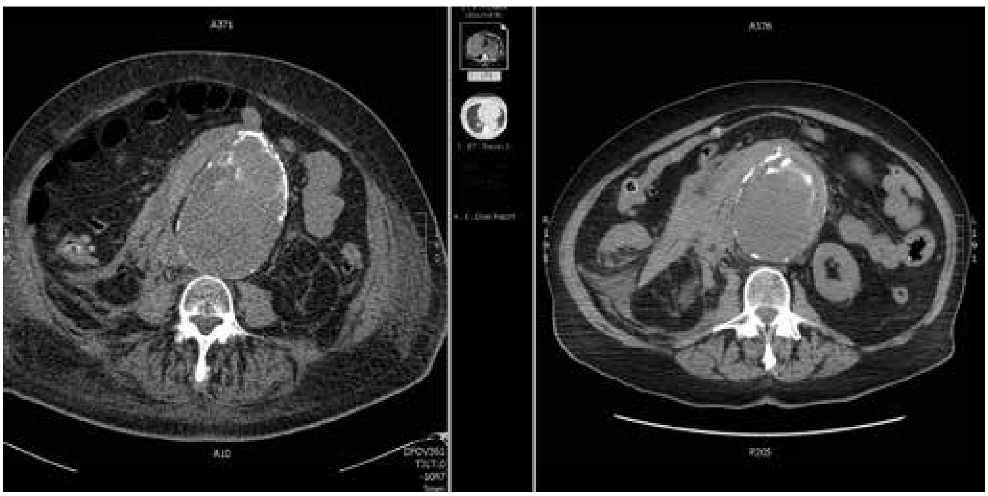


Figure 1 (I) Non-contrast enhanced CT; (II) two axial images at different level of infrarenal abdominal aorta; (III) large AAA with layered wall calcification; (IV) surrounding blood products on the right, c/w retroperitoneal hematoma.

Video 1 Images demonstrate large aneurysm with surrounding retroperitoneal hematoma.
Available online: http://www.asvide.com/article/view/24647

Diagnosis

Ruptured abdominal aneurysm.

Management

- ❖ Not considered not a candidate for endovascular stent for anatomic reasons;
- ❖ Not considered a surgical candidate because of extremely high risk of perioperative morbidity and mortality;
- ❖ Conservative management/comfort care.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.23 Symptomatic abdominal aortic aneurysm (AAA)

H&P

An 81-year-old female with PMH significant for abdominal aortic aneurysm (AAA) who presented to the emergency room at OSH the morning of admission complaining of abdominal pain and diarrhea. She first noted some abdominal pain and diarrhea after going out to lunch the day before admission, but the pain went away. However, the morning of admission the pain returned and the patient went to the ED. A CT scan which showed that her aneurysm had expanded to 6.5 cm. Because of the enlarging size, and the abdominal pain she was transferred for further management.

On admission the patient stated she was pain free.

CT

AAA with increase size to 6.5 cm.

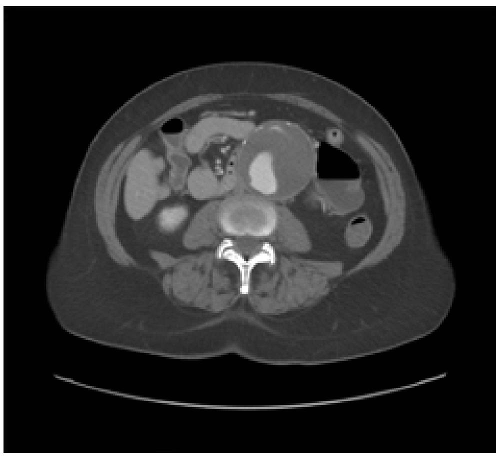


Figure 1 Images show AAA without evidence of rupture.

Video 1 Images show AAA without evidence of rupture. Available online: http://www.asvide.com/article/view/24648

Diagnosis

Abdominal pain and enlarging AAA.

Management

Urgent surgical repair.

Urgent surgery

Anesthesia
General.

Operation
Direct repair of abdominal aortic aneurysm involving renal artery.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.24 Type-I endoleak of stented juxtarenal aortic aneurysm with evidence of rupture

H&P

An 88-year-old female with a history of infrarenal aortic aneurysm repair 15 years prior to admission. Remotely treated for type II endoleak from IMA, which was treated with embolization. 5 years prior to admission growth of the aneurysm sac was noted with initial concern for migration.

She now presented with acute abdominal and back pain.

CT

The 10-cm aneurysm with evidence of type I endoleak with left retroperitoneal hematoma, c/w rupture.

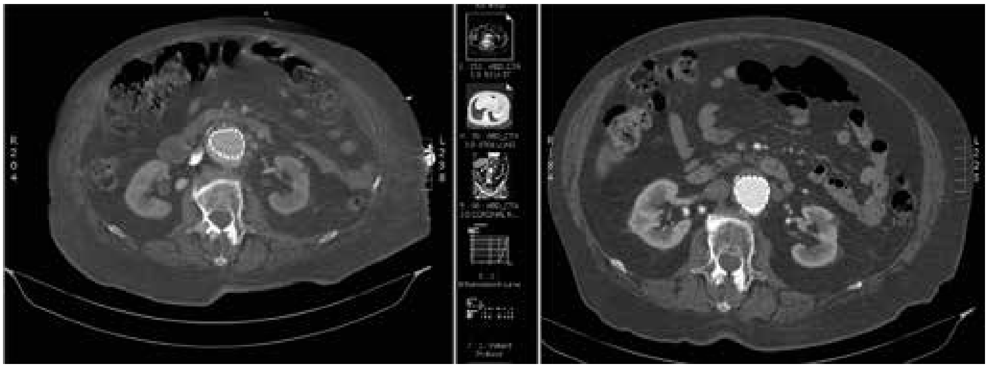


Figure 1 Right and left panel show proximal aneurysm neck several years prior (right) and at the time of admission (left). Type-I endoleak with communication posterior to the stent is seen at the time of admission.

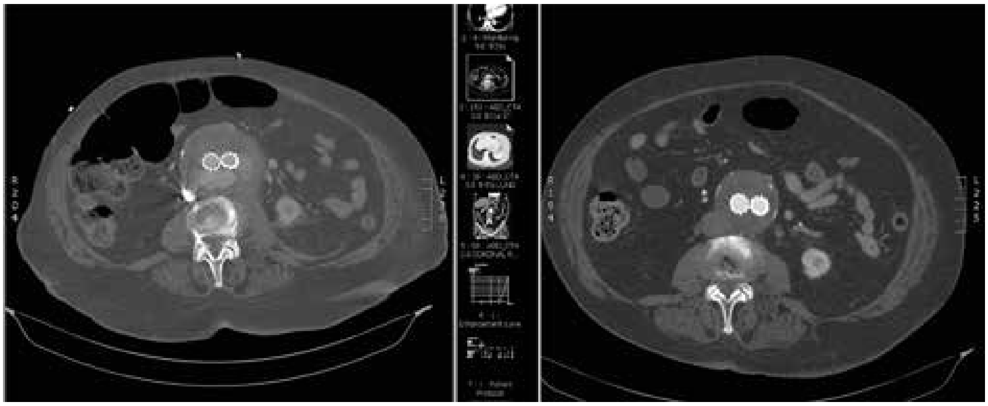


Figure 2 Right and left panel show maximum diameter of aneurysm sac several years prior (right) and at the time of admission (left). The endoleak and left retroperitoneal hematoma is seen at the time of admission.

Video 1 Images 4 years prior to admission show the bifurcated endovascular stent graft, excluding the abdominal aortic aneurysm.
Available online: http://www.asvide.com/article/view/24649

Video 2 Images at the time of admission show the type-I endoleak and the left reptroperitoneal hematoma.
Available online: http://www.asvide.com/article/view/24650

Diagnosis

Type-I endoleak of stented juxtarenal aortic aneurysm with evidence of rupture.

Management

Emergent repair.

Current emergent/urgent surgery

Anesthesia
General endotracheal anesthesia.

Procedure
Repair of ruptured juxtarenal aortic aneurysm with type I endoleak and partial explant of AneuRx device, aortoiliac reconstruction using a 20×10 Hemashield platinum dacron graft.

Prior/remote surgery

(I) 10 years prior (for type-II endoleak with aneurysm sac enlargement)
Abdominal aortogram, selective SMA arteriogram, selective IMA arteriogram with glue embolization of the aneurysm sac and the IMA origin.
(II) 11 years prior (for abdominal aortic aneurysm)
Endovascular exclusion of abdominal aortic aneurysm with an AneuRx endovascular graft.
Preoperative diagnosis.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.25 Ruptured abdominal aortic aneurysm

H&P

A 69-year-old male presented to local hospital with abdominal pain.

- ❖ Found to have an 11-cm abdominal aortic aneurysm with rupture and was transferred;
- ❖ Intubated after arrival.

CT

Ruptured abdominal aortic aneurysm.

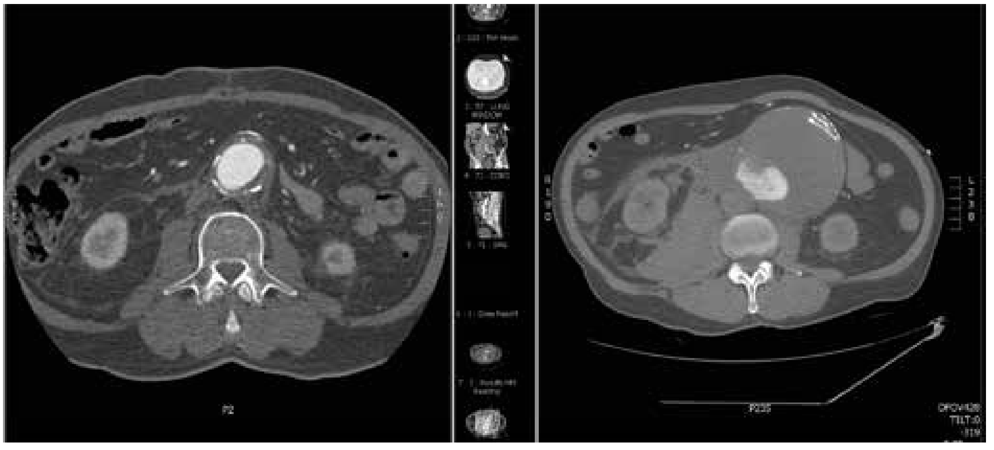


Figure 1 Right panel AAA with blood in right retroperitoneum; left panel surgical graft post-op.

Video 1 Images prior to surgery.
Available online: http://www.asvide.com/article/view/24651

Video 2 Images after surgery.
Available online: http://www.asvide.com/article/view/24652

Diagnosis

Ruptured abdominal aortic aneurysm.

Management

Surgery.

Emergent/urgent surgery

Anesthesia
General.

Operation
Repair of ruptured abdominal aortic aneurysm with tube graft (22 mm Gelsoft).

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.26 Ruptured juxta-renal aortic aneurysm

H&P

A 71-year-old female with h/o hypertension developed sudden lower abdominal pain on evening of admission. Associated nausea and vomiting. In ED became diaphoretic, then hypotensive with blood pressure 66/40 mmHg. Successful fluid resuscitation.

CT

Large (10×8 cm) ruptured abdominal aortic aneurysm (AAA) juxtarenal aneurysm.

Figure 1 Non-contrast CT with AAA and surrounding blood product, c/w rupture.

Video 1 Non-contrast CT with AAA and surrounding blood product, c/w rupture.
Available online: http://www.asvide.com/article/view/24653

Diagnosis

Ruptured AAA juxtarenal aneurysm.

Management

Emergency surgery.

Emergent/urgent surgery

Anesthesia
General.

Procedure
Repair with aortoiliac bypass using a Dacron 18×9 graft.

Subsequent/non-urgent surgery

Procedure
The 2 months post emergent AAA surgery: left leg access, aortic angiogram angioplasty and stenting of the left limb of the aortoiliac graft and postdilated to 10 mm proximally and 6 mm distally. Stent using a 10×60, 8×60 and 8×2 self-expanding Medtronic stents.

Indication: left lower extremity lifestyle limiting claudication and numbness.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.27 Ruptured abdominal aortic aneurysm—known history of TAA

H&P

An 85-year-old White female transferred emergently from OSH with CT showing ruptured abdominal aortic aneurysm (AAA) and large retroperitoneal bleed.

Known history of TAA. Pain began in the afternoon of day of admission.

CT

Ruptured AAA with retroperitoneal bleed.

Maximum diameter of infrarenal segment of 8 cm.

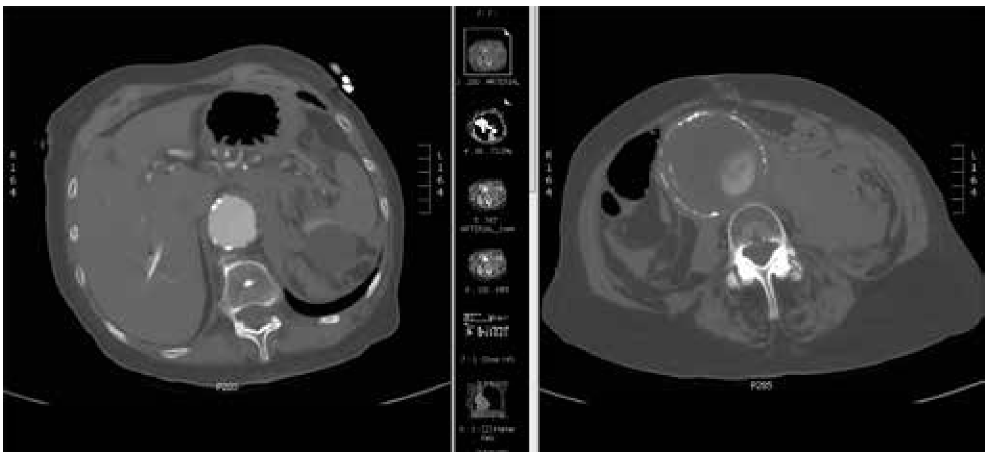


Figure 1 CT on admission shows AAA (right panel) with extensive retroperitoneal blood products.

Video 1 Images show diffuse aneurysmal disease of the thoracoabdominal aorta with rupture in the infrarenal segment.
Available online: http://www.asvide.com/article/view/24654

Diagnosis

Known AAA, now with rupture and retroperitoneal bleed.

Emergent/urgent surgery

Procedure
Open repair of ruptured AAA with 20 mm Dacron graft via RP approach.

Outcome

Exitus letalis 4 days after surgery: developed respiratory failure requiring intubation, and patient/family subsequently opted for comfort care only.

4.28 Ruptured abdominal aortic aneurysm—remote endovascular repair

H&P

A 67-year-old male with h/o abdominal aortic aneurysm (AAA), s/p remote endovascular repair.

He presented on two occasions to an OSH ED with left groin pain. CT was obtained both times. On the day of admission, the patient presented to OSH ED with worsening left groin pain, now radiating across the abdomen and to the back. He was transferred after acquisition of CT for further management.

CT

Expansion of fluid collection along the anterior aspect of the left psoas muscle extending into the left pelvis; c/w contained hematoma/rupture.

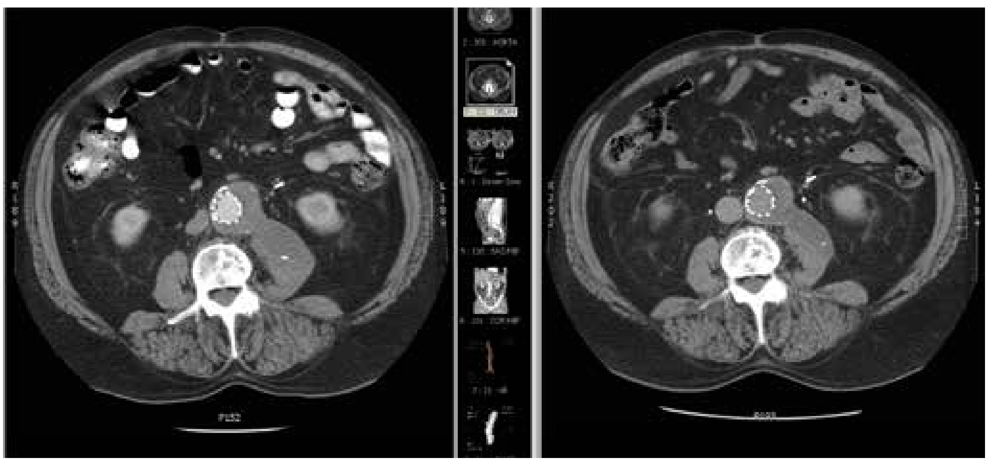


Figure 1 Comparison of images 1 month prior and at the time of admission show expansion of fluid collection along the anterior aspect of the left psoas muscle extending into the left pelvis; c/w contained hematoma/rupture.

Video 1 Comparison of images 1 month prior and at the time of admission show expansion of fluid collection along the anterior aspect of the left psoas muscle extending into the left pelvis; c/w contained hematoma/rupture.
Available online: http://www.asvide.com/article/view/24655

Video 2 Images after surgery show the bifurcated surgical graft.
Available online: http://www.asvide.com/article/view/24656

Diagnosis

Suspected ruptured AAA.

Management

Emergent AAA repair.

Emergent/urgent surgery

Anesthesia
General.

Operation
Thoracoabdominal incision, explantation of EVAR device, juxtarenal repair with 24×12 graft to infrarenal segment and left common iliac and right common iliac, placement of a 10-mm × 80-mm self-expanding stent in left external iliac.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.29 Ruptured abdominal aortic aneurysm—PAD

H&P

A 80-year-old white female with known h/o abdominal aortic aneurysm (AAA) (repair declined 4 years prior to admission), ileofemoral occlusive disease s/p bilateral CFA endarterectomies and left CIA stent, CAD s/p CABG.

Presented to ED with 10/10 abdominal pain for a few hours. In ED pain acutely worsened during CT scan. Patient developed PEA arrest on return from scanner. Unable to return spontaneous circulation after prolonged CPR.

CT

Ruptured AAA.

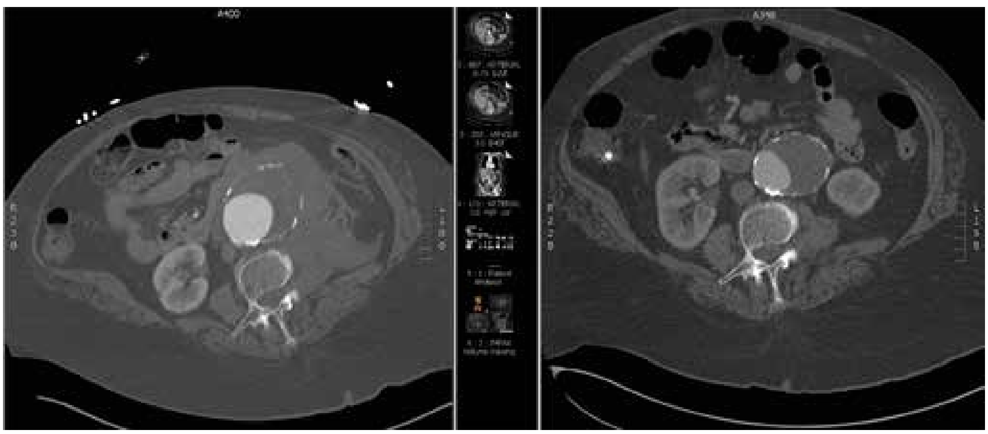


Figure 1 Images show AAA 1 year prior to admission (right panel) and at time of admission (left panel). The CT on admission shows large amount of blood products surrounding AAA, c/w rupture.

Video 1 Images show AAA 1 year prior to admission.
Available online: http://www.asvide.com/article/view/24657

Video 2 The CT on admission shows large amount of blood products surrounding AAA, c/w rupture.
Available online: http://www.asvide.com/article/view/24658

Diagnosis

Ruptured AAA.

Management

CPR.

Outcome

Exitus letalis.

4.30 Repaired Type-A aortic dissection—now with suspected ruptured mycotic aneurysm in the dissected infrarenal abdominal aorta

H&P

A 59-year-old male with h/o repaired type-A aortic dissection (2 years prior), transferred from OSH for suspected ruptured mycotic aneurysm of the abdominal aorta.

- 1 month prior to current admission presented to OSH with progressively worsening bilateral groin and leg and back pain, fevers/chills/sweats. Was found to have MSSA bacteremia and treated with antibiotics for suspected surgical graft infection;
- Prior to transfer a CTA showed stable residual dissection of the descending aorta, but suspected ruptured mycotic? aneurysm of the infrarenal abdominal aorta right retroperitoneal hematoma compressing the IVC;
- Patient was transferred to the tertiary center. On arrival, the patient was hypertensive and still complaining of groin and back pain bilaterally

CT

Aneurysmal dilatation of the dissected infrarenal abdominal aorta with suspected rupture.

- Evidence of right posterior contrast extravasation and surrounding retroperitoneal hematoma in the area of the right psoas muscle;
- Dimensions including extravasation and hematoma: 9×5 cm. Stable, changes of repaired type-A dissection, including;
- Dilated native aortic root (4.8×4.5 cm);
- Residual focal dissection flap in non-coronary cusp;
- Intact supra-coronary surgical graft ascending aorta;
- Residual dissection arch, descending thoracic, and abdominal aorta; aneurysmal degeneration descending aorta, max. diameter: (proximal descending level): 4.9×4.5 cm.

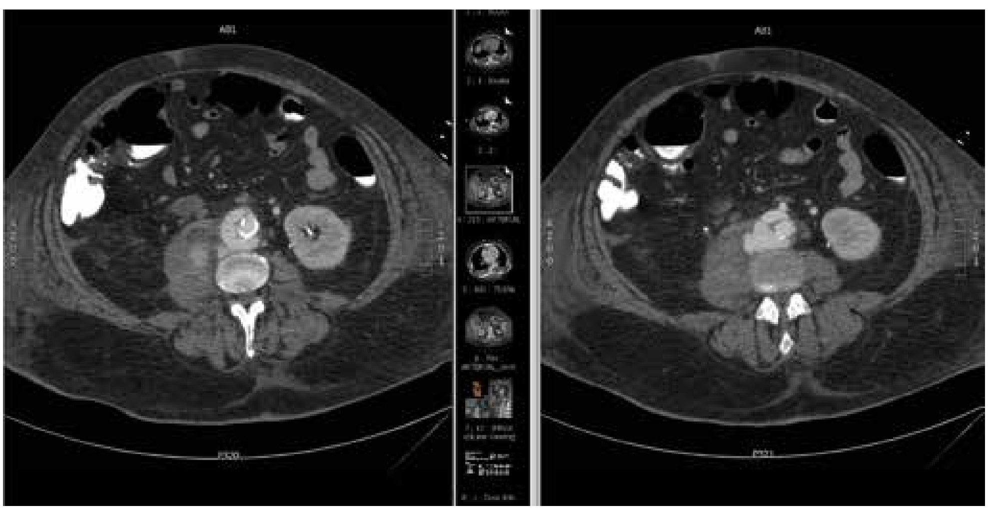


Figure 1 Images show residual dissection of the infrarenal abdominal aorta, with suspected contrast extravasation and accumulation of blood products to the right of the aorta. Findings most consistent with ruptured mycotic aneurysm.

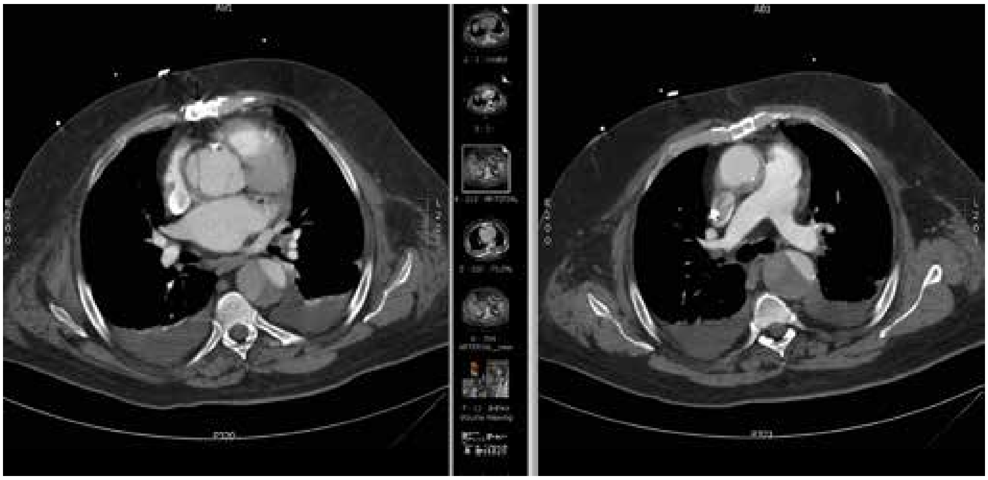


Figure 2 Images show small residual flap in the non-coronary cusp of the native root, surgical graft ascending aorta (right panel), and residual dissection of the descending aorta.

Video 1 Images show small residual flap in the non-coronary cusp of the native root, surgical graft ascending aorta, and residual dissection of the descending aorta. Adjacent to the dissected infrarenal abdominal aorta is an accumulation of blood products. Findings most consistent with ruptured mycotic aneurysm.
Available online: http://www.asvide.com/article/view/24659

Diagnosis

Suspected ruptured mycotic aneurysm in infrarenal abdominal aorta with known residual dissection.

Management

Open surgical repair.

Emergent/urgent surgery

Procedure
Open repair of mycotic/dissected/ruptured infrarenal abdominal aortic aneurysm (AAA) with 20 mm tube graft: operative findings: purulent retroperitoneal collection by ruptured aorta on right posterolateral wall.

Anesthesia
General.

Prior/remote surgery: (2 years prior)

Type A aortic dissection s/p emergent repair with aortic graft insertion November 2013.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.31 Acute SMA embolus—h/o endovascular abdominal aortic aneurysm (AAA) repair

H&P:

A 65-year-old female with history of known abdominal aortic aneurysm s/p EVAR, s/p IMA embolization for type 2 endo leak.

H/o CAD, s/p stents and atrial fibrillation (on anticoagulation).

Transfer from OSH after developing severe abdominal pain associated with nausea. The pain is tearing in nature. A CT of the abdomen was performed at the OSH and raised concern for type B aortic dissection.

On admission she complained of abdominal pain with moderate severity. No other symptoms.

The exam was concerning for peritonitis.

CT

SMA embolus.

Acute mesenteric ischemia.

Abdominal aortic aneurysm (AAA) with type II endoleak without significant sac change.

Figure 1 3D oblique MPR reconstructions of the SMA at the time of admission show abrupt filling defect, c/w thrombus. Relatively poor contrast enhancement of the aorta.

Figure 2 Images comparing findings in the SMA 5 months prior (right panel) and at the time of admission (left panel).

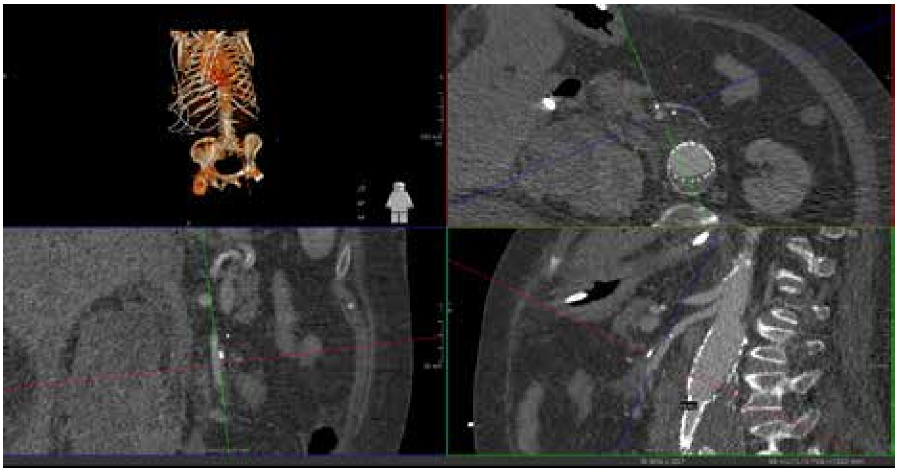


Figure 3 3D oblique MPR reconstructions of the SMA 1 month after admission show recanalization of the S < A.

Video 1 Images at the time of admission show abrupt filling defect of the SMA, c/w thrombus. Relatively poor contrast enhancement of the aorta. Also seen is the known type-II endoleak in the stented infrarenal abdominal aorta.
Available online: http://www.asvide.com/article/view/24660

Video 2 Images at 1 month after admission show recanalization of the SMA and persistent endoleak.
Available online: http://www.asvide.com/article/view/24661

Diagnosis

SMA embolus with mesenteric ischemia.

Management

Heparin drip.

Emergency surgery/embolectomy.

Current emergent/urgent surgery

Anesthesia

General.

Operation

Abdominal exploration conformed SMA clot and necrotic colon: superior mesenteric artery embolectomy, and right hemicolectomy was performed.

Prior/remote surgery

3 years prior to admission.

- Angiography, selected SMA and IMA;
- IMA coil embolization.

Subsequent/non-urgent surgery

Four days after colectomy.

Operation

Exploratory laparotomy washout, diverting loop end ileostomy.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.32 Large asymptomatic but expanding juxtarenal abdominal aortic aneurysm (AAA), recent necrotizing pancreatitis with pancreatic pseudocyst

H&P

A 56-year-old female with h/o of DM and pancreatitis transferred from OSH for abdominal aortic aneurysm (AAA).

Two weeks prior to admission felt a sudden sharp chest pain. At an OSH an ACS was ruled out, and she was eventually diagnosed with necrotizing pancreatitis with pseudocyst which was managed with abscess aspiration and drain placement.

An AAA was incidentally found, measuring 7.5 cm. During follow-up a CT was interpreted as significant interval increase in size of the AAA. She was therefore admissted and transferred for further management.

CT

The 8 cm juxtarenal AAA, bilateral iliac aneurysms, pancreatic pseudocyst and extensive peripancreatic fluid collection.

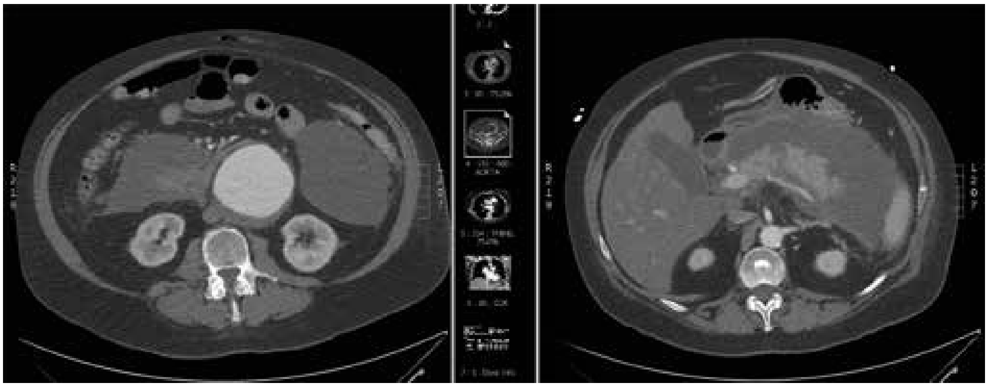


Figure 1 CT on admission shows large AAA (left panel) and large amount of residual fluid accumulation surrounding the pancreas (right panel).

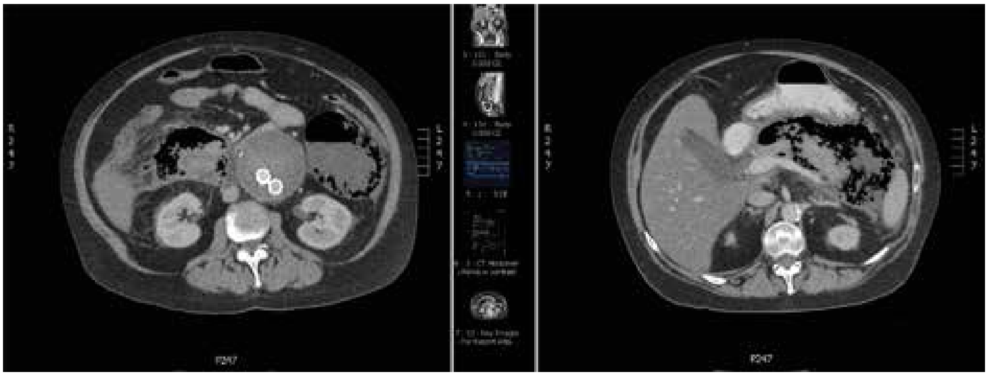


Figure 2 Images after stent repair show stent in the abdominal aorta (left panel) and residual air surrounding the pancreas (post drainage of fluid).

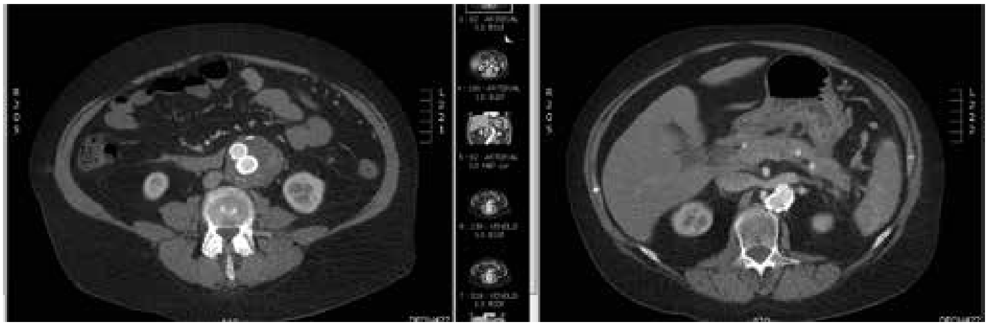


Figure 3 Images at 6 months follow-up show intact stent and resolved changes of the pancreas.

Video 1 Chest: CT on admission shows large AAA and large amount of residual fluid accumulation surrounding the pancreas.
Available online: http://www.asvide.com/article/view/24662

Video 2 Abdomen: CT on admission shows large AAA and large amount of residual fluid accumulation surrounding the pancreas.
Available online: http://www.asvide.com/article/view/24663

Video 3 Images at 1 month follow-up show the intact stent and residual air surrounding the pancreas with drains in place.
Available online: http://www.asvide.com/article/view/24664

Video 4 Images at 6 months follow-up show intact stent and resolved changes of the pancreas.
Available online: http://www.asvide.com/article/view/24665

Diagnosis

Large asymptomatic but expanding juxtarenal AAA, recent hospitalization for pancreatitis with pancreatic pseudocyst.

Management

initial medical management with semi-elective surgery during hospital stay.

Semi-elective surgery

Anesthesia
General.

Operation
Percutaneous endovascular aneurysm repair of abdominal aortic aneurysm, and bilateral common femoral artery access with placement of bifurcated bimodular endoprosthesis, with bilateral iliac.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.33 Abdominal aortic aneurysm (AAA) and metastatic bone lesions

Initial admission

H&P

A 72-year-old male patient transferred from OSH for management of abdominal aortic aneurysm (AAA) chronic h/o back pain for 4–5 months, associated with 20 pounds weight loss. His back pain was worse the day before admission. Pain is described as subscapular, better with rest and use of a heating pad. On examination he is mildly tender along upper para-spinal segment.

CT

CTA demonstrates AAA without evidence of rupture.

Multiple bony lytic lesions, consistent with metastatic disease.

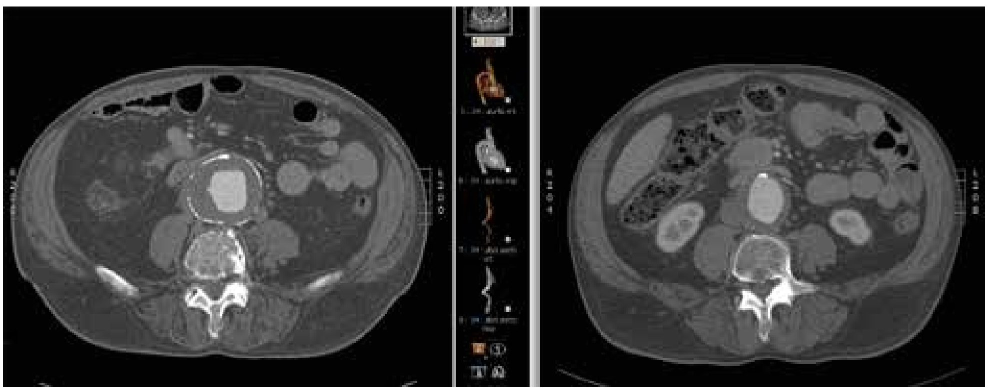


Figure 1 Images show infrarenal AAA at the time of the first admission (left panel) and 6 years earlier (right panel). The AAA has increased in size but shows no signs of instability.

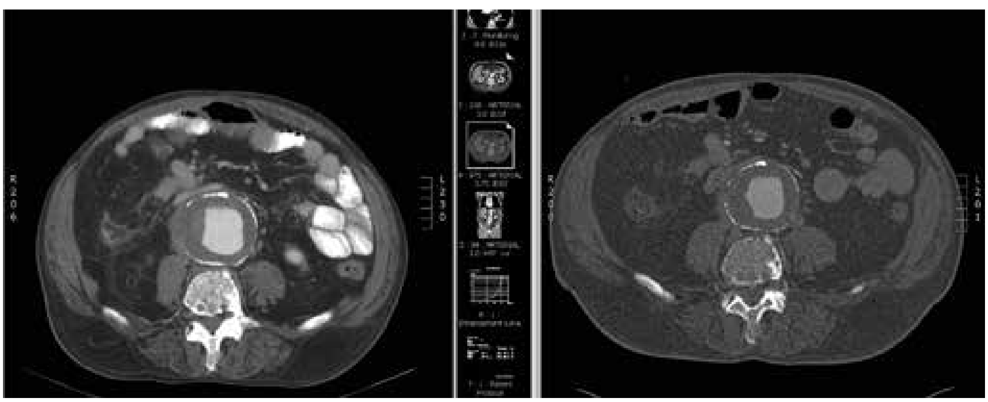


Figure 2 Images at 6 months follow-up (left panel) show interval increase in size of the AAA compared to initial admission (right panel).

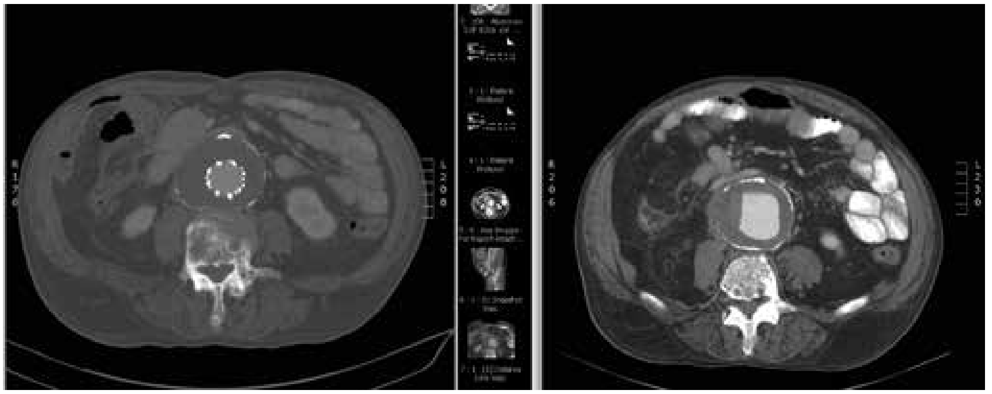


Figure 3 Images before (right panel) and after endovascular stent placement (right panel).

Video 1 Images show infrarenal AAA at the time of the first admission.
Available online: http://www.asvide.com/article/view/24666

Video 2 IImages show infrarenal AAA 6 years prior to admission.
Available online: http://www.asvide.com/article/view/24667

Video 3 Images at 6 months follow-up (second admission) show interval increase in size of the AAA compared to initial admission.
Available online: http://www.asvide.com/article/view/24668

Video 4 Images after endovascular stent placement.
Available online: http://www.asvide.com/article/view/24669

Management

Consult with vascular surgery was obtained. Surgical opinion was that pain is likely not related to the AAA and that there is no need for urgent AAA repair.

A workup for etiology of bone lesions was initiated and identified metastatic prostate cancer. Patient was discharged for further treatment.

Re-admission, 4-month later

The patient had continued abdominal pain and developed diarrhea. A repeat CT abdomen showed interval increase in size in AAA (diameter from 6.8 to 7.7 cm). Also large hypervascular liver metastasis and thickening of the terminal ileum concerning for metastatic carcinoid.

CT

Increased size of AAA, now 7.7 cm.

- ❖ Hypervascular liver lesions, most c/w metastasis; terminal ileal thickening, suggesting metastatic carcinoid;
- ❖ Extensive bone metastases.

Management

EVAR.

Urgent surgery: (time of second admission)
Anesthesia
General.
Operation
Endovascular repair of abdominal aortic aneurysm, PEVAR approach using AFX device, 28×80 mm in length main body, 34 suprarenal, cuff, 80 mm in length, placement of a 20-mm × 13-mm left iliac extension, this is supplemented with a placement of two 13 mm diameter ×50 mm in length Viabahn from the left common to the left external iliac, coil embolization of left hypogastric using 14×12 Nester coils ×4, placement of a right common iliac to external iliac 12-mm × 40 self-expanding stent and a 10-mm × 40 self-expanding stent in the mid right external iliac, and selective catheterization of bilateral renal arteries.

Prior/remote surgery
Seven years prior to current admission.
Operation
Median sternotomy, coronary artery bypass grafting ×3 with in situ left internal thoracic artery to the LAD and reverse saphenous vein graft to the posterior descending coronary artery and reverse saphenous vein graft to the lateral circumflex coronary artery, replacement of the ascending aorta with a 30-mm Hemashield graft, endo vein harvest.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

4.34 Aortic dissection beginning in proximal arch, mesenteric ischemia

H&P

A 30-year-old male with no significant medical history presented 5 days prior to admission to OSH with sudden onset, 10/10 epigastric pain radiating to lower abdomen and about 1-month h/o diarrhea. Initially suspicion of GI source of abdominal pain; in hospital had a bloody BM.

An echocardiogram showed a 5.4-cm aneurysm in proximal ascending aorta. TEE raised suspicion of dissection involving descending thoracic aorta. CTA confirmed dissection and the patient was transferred to tertiary care center for further management.

CT

Dissection aortic arch and descending aorta.

Dissection flap beginning at level of the innominate artery extending to the iliac arteries.

The superior mesenteric artery is occluded.

Suspected bowel ischemia.

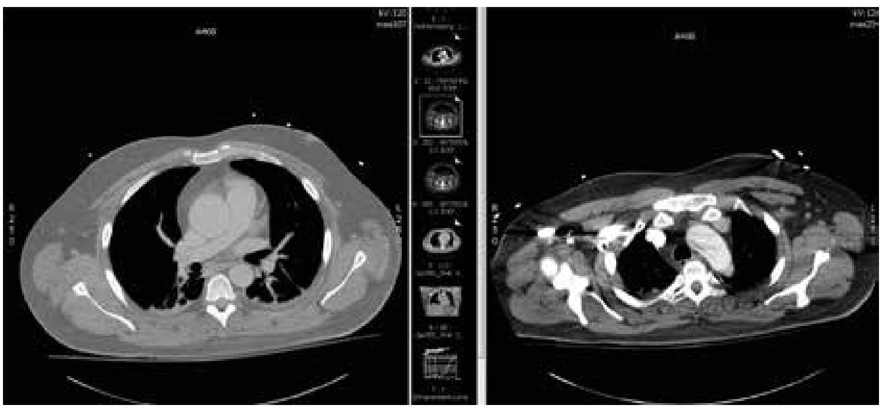


Figure 1 Images of the thoracic aorta show dilated ascending aorta (left panel), and dissection flap in the aortic arch (right panel).

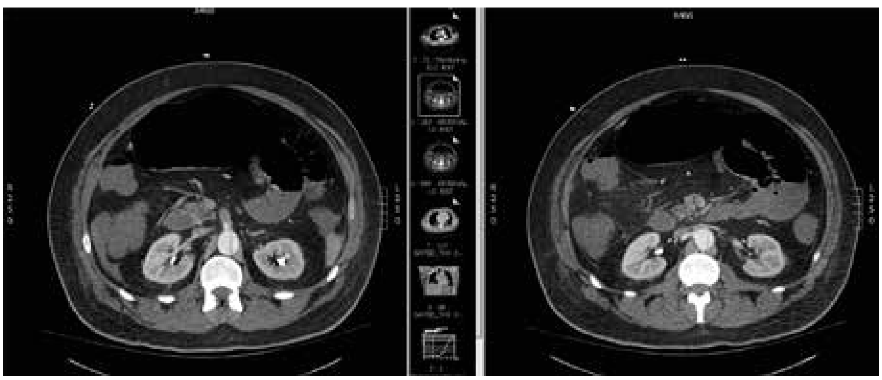


Figure 2 Images of the abdominal aorta show dissected, occluded SMA.

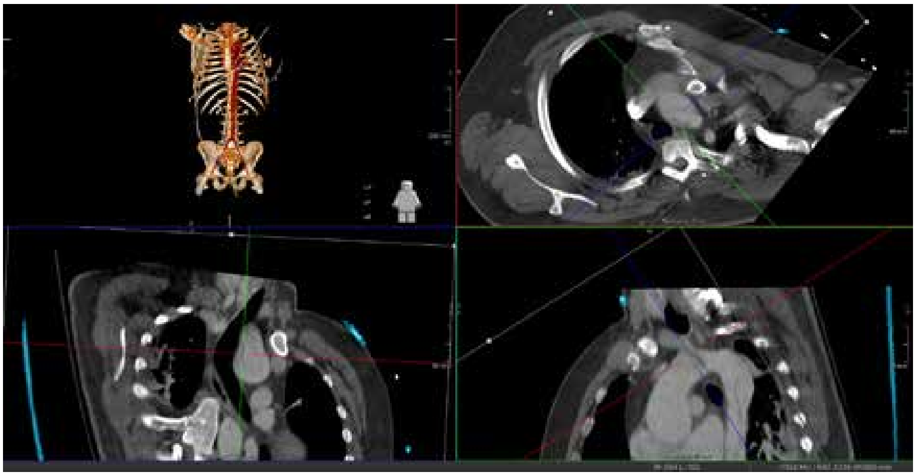


Figure 3 3D reconstruction to demonstrate origin of the dissection flap at the level of the innominate artery.

Figure 4 3D reconstruction at the level of the mid-ascending aorta, with maximum diameter of 5.5×5 cm.

Video 1 Images show dilated ascending aorta, the dissection flap beginning in the aortic arch and extending to the iliac arteries. Also seen is occlusion of the SMA.
Available online: http://www.asvide.com/article/view/24670

Diagnosis

Aortic arch and descending thoracic dissection with evidence of visceral malperfusion.

Management

Emergent operative exploration of abdomen with potential vascular surgical intervention (SMA).

Eventually will require repair of the ascending aorta/arch/descending aorta.

Current emergent/urgent surgery

Anesthesia

General.

Procedure

Exploratory laparotomy.

SMA cutdown thrombectomy, patch angioplasty.

Subsequent/ non-urgent surgery: (2 days later)

Anesthesia

General.

Small bowel resection; right hemicolectomy.

Outcome

Discharged with plans for follow-up examination and regularly scheduled tomographic aortic imaging.

Abbreviations

3-D = 3-dimensional
AMS = altered mental status
AAA = abdominal aortic aneurysm
AAS = acute aortic syndrome
ACLS = advance cardiac life support
ACS = acute coronary syndrome
AI = aortic insufficiency
AV = aortic valve
AVR = aortic valve replacement
BP = blood pressure
CABG = coronary artery bypass graft
CAD = coronary artery disease
CFA = common femoral aneurysm
CIA = common iliac artery
CICU = cardiovascular intensive care unit
CKD = chronic kidney disease
COPD = chronic obstructive pulmonary disease
CP = chest pain
CPR = cardio-pulmonary resuscitation
CSF = cerebrospinal fluid
CTA = computed tomographic angiography
CTS = cardiothoracic surgery
CVA = cerebro-vascular accident
CXR = chest x-ray
DES = drug eluting stent
DM = diabetes mellitus
DNR = do not resuscitate
DNI = do not intubate
DOE = dyspnoe on extertion
DVT = deep venous thrombosis
ECG = electrocardiogram
ECMO = Extracorporeal membrane oxygenation
ED = emergency department
EGD = esophagogastroduodenoscopy
EIA = external iliac artery
EKG = electrocardiogram
EMS = emergency medical services
ESRD = end-stage renal disease
ETOH = alcohol
EVAR = endovascular aneurysm repair
FFP = fresh frozen plasma
F/U = follow-up
GPC = gram-positive cocci
HD = hemodialysis
HR = heart rate
H/o = history of
HTN = hypertension
HU = Hounsfield Unit
HR = heart rate
IABP = intra-aortic balloon pump
ICM = ichemic cardiomyopathy
ICU = intensive care unit
IMA = inferior mesenteric artery
IMH = intramural hematoma
INR = international normalized ratio
IVC = inferior vena cava
LAD = left anterior descending coronary artery
LCX = left circumflex coronary artery
LHC = left heart catheterization
LITA = left internal thoracic artery
LLQ = left lower quadrant
LMT = left main trunk
LSCA = left subclavian artery
LV = left ventricle
LVEF = left ventricular ejection fraction
MI = myocardial infarction
MPR = multi-planar reconstruction
MR = mitral regurgitation
MV = mitral valve
NSTEMI = non-ST elevation myocardial infarction
NTG = nitroglycerin
OR = operating room
OSH = outside hospital
PA = pulmonary artery
PAU = penetrating atherosclerotic ulceration
PCC = prothrombin complex concentrate
PCI = percutaneous coronary intervention
PE = pulmonary embolism
PEA = pulsless electrical activity
PMH = past medical history
PPM = permanent pace maker
PTCA = percutaneous coronary angioplasty
PTFE = polytetrafluoroethylene
RLQ = right lower quadrant
RV = right ventricle
SAH = subarachnoid hemorrhage
SBP = systolic blood pressure
SFA = superficial femoral artery
SMA =superior mesenteric artery
SOB = shortness of breath
STEMI = ST-elevation myocardial infarction
STJ = sino-tubular junction
SVG = saphenous vein graft
TAA = thoracic aortic aneurysm
TEVAR = thoracic endovascular aortic repair
TIA = transient ichemic attack
TTE = transthoracic echocardiography
TEE = trans-esophageal echocardiography
VRI = volume rendered imaging
WBC = white blood count