

CIRA Case of the Month

Case Courtesy of Drs. Andrew Brown, Dhruvin
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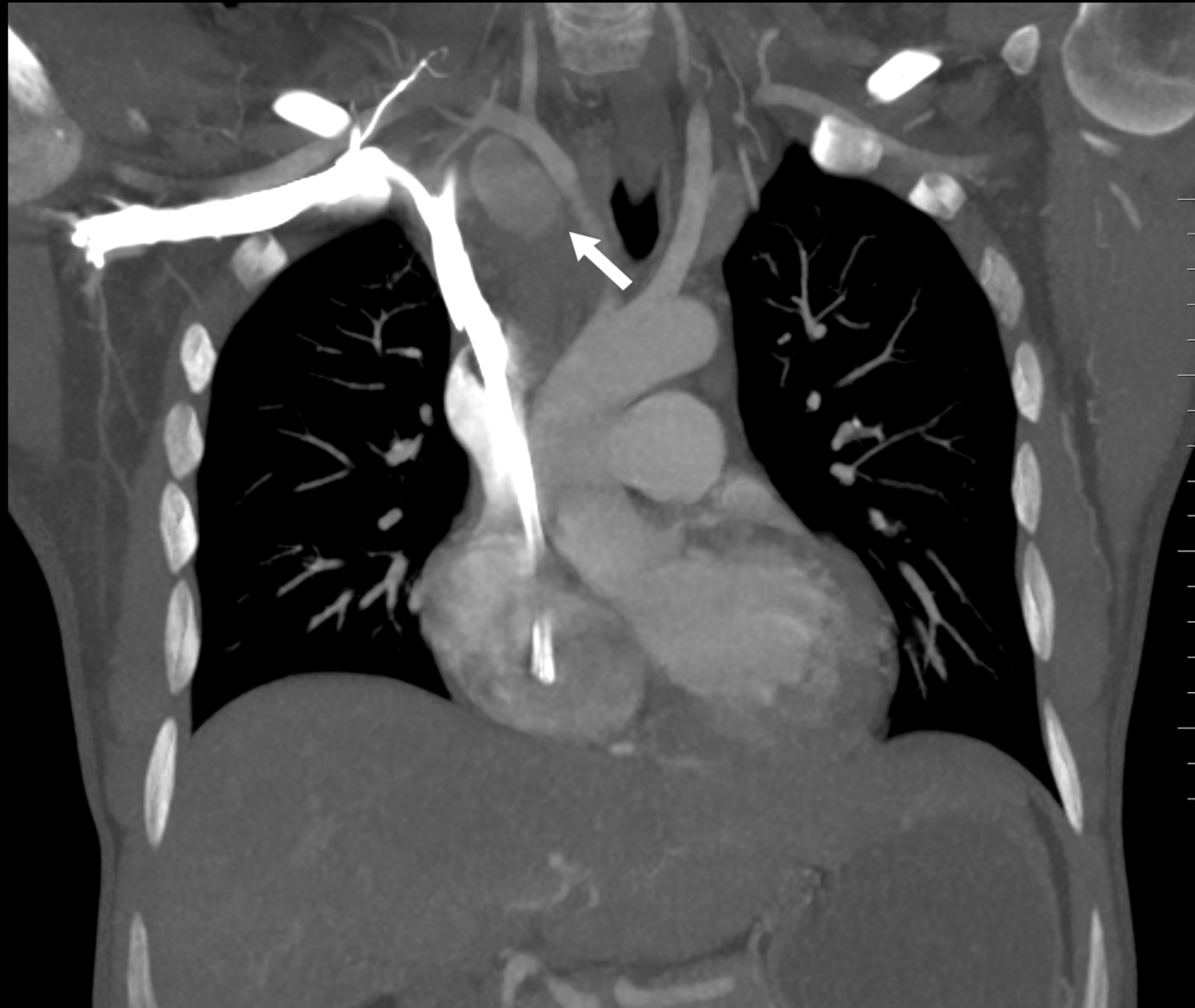
Case Report

- 36-year-old man with lupus nephritis
- Paired exchange renal transplant and stem cell transplant in India 1 month prior
- Presented to our institution with antibody mediated rejection
- The patient underwent graft nephrectomy
- A right internal jugular central venous catheter was placed part of his perioperative care
- Vessel access was obtained with standard Seldinger technique

Clinical Course

- After the central venous catheter insertion
 - Developed persistent hoarseness
 - No focal neurologic deficits or hemodynamic instability
- Seen by ENT service who documented a right recurrent laryngeal nerve palsy
- A CT scan of the chest was performed

CE-CT Scan



CT Findings

- Confirmed a 1.9 x 2.6 x 3.0 cm (AP x ML x CC) false aneurysm of the proximal right subclavian artery with surrounding hematoma and exerting mass effect on the adjacent trachea
- Neck of the pseudoaneurysm was within 5 mm of the origin of the right vertebral artery
 - Both vertebral arteries were co-dominant
- Decision made to attempt endovascular treatment

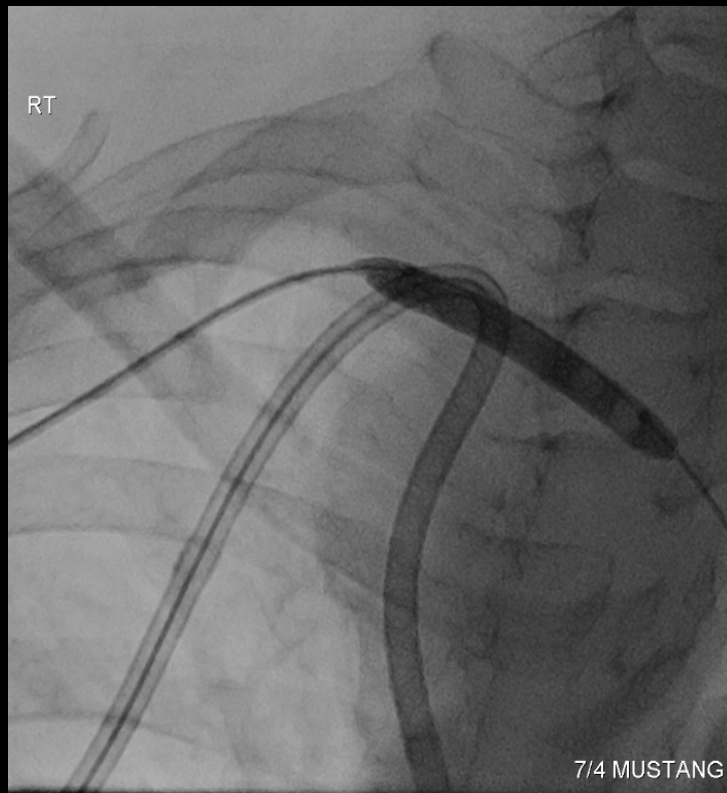
Arteriography



Angiographic Findings

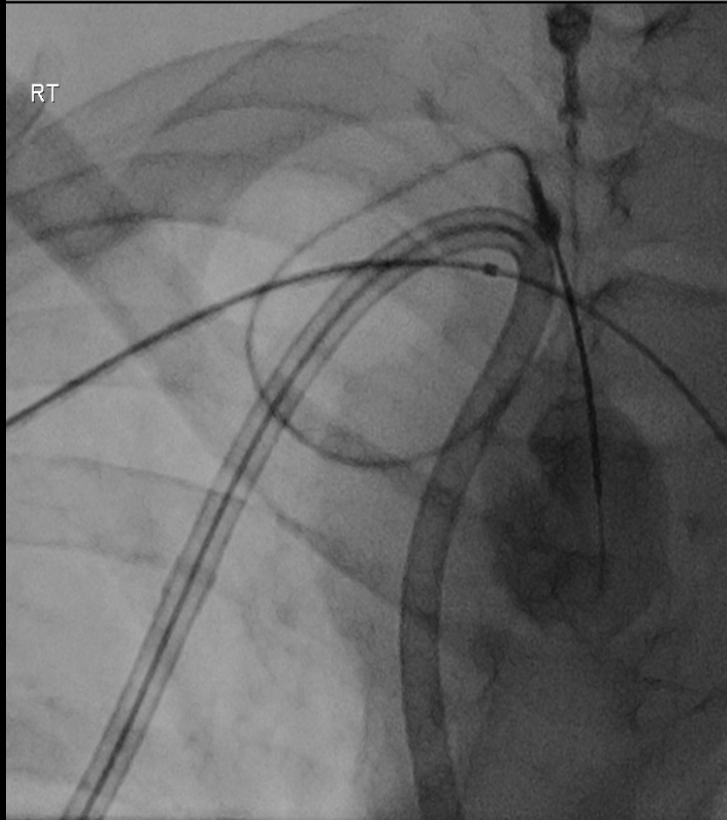
- Arteriography performed through a transradial 65 cm 5F catheter
- Showed a short neck right subclavian artery pseudoaneurysm

Procedure



- A 6 mm x 40 mm balloon was positioned across the neck of the pseudoaneurysm over a wire
- A test occlusion produced no neurological symptoms

Procedure



- The right subclavian pseudoaneurysm was directly punctured under US guidance from the neck
- Contrast was injected to demonstrate adequate positioning in the pseudoaneurysm

Procedure



- The balloon was inflated across the pseudoaneurysm neck and 500 IU of thrombin was injected
- After a 2 minute period, the balloon was deflated

Post Procedure Angiogram



Angiographic Findings

- Post procedure angiogram demonstrates no filling of the pseudoaneurysm

Post Procedure Ultrasound

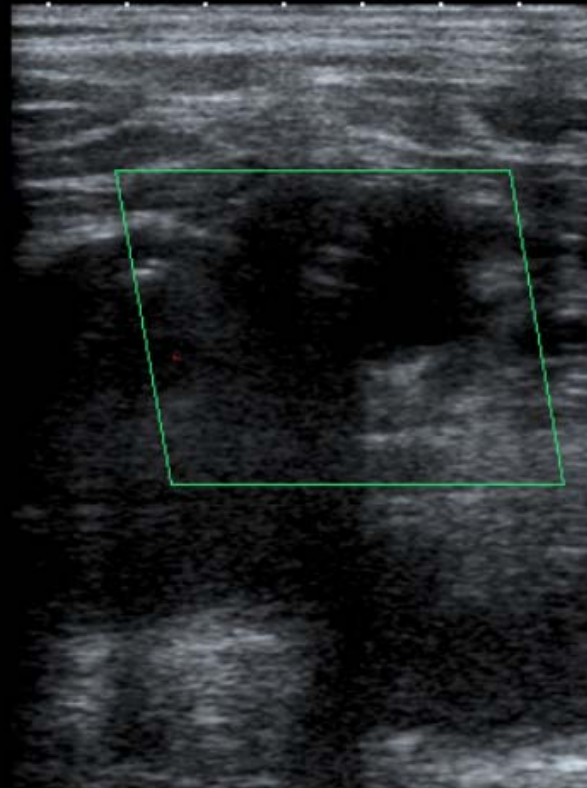
8.8
8.8
cm/s

0

2

4

14LX7
diffT13.0
CF 5.3
6 fps

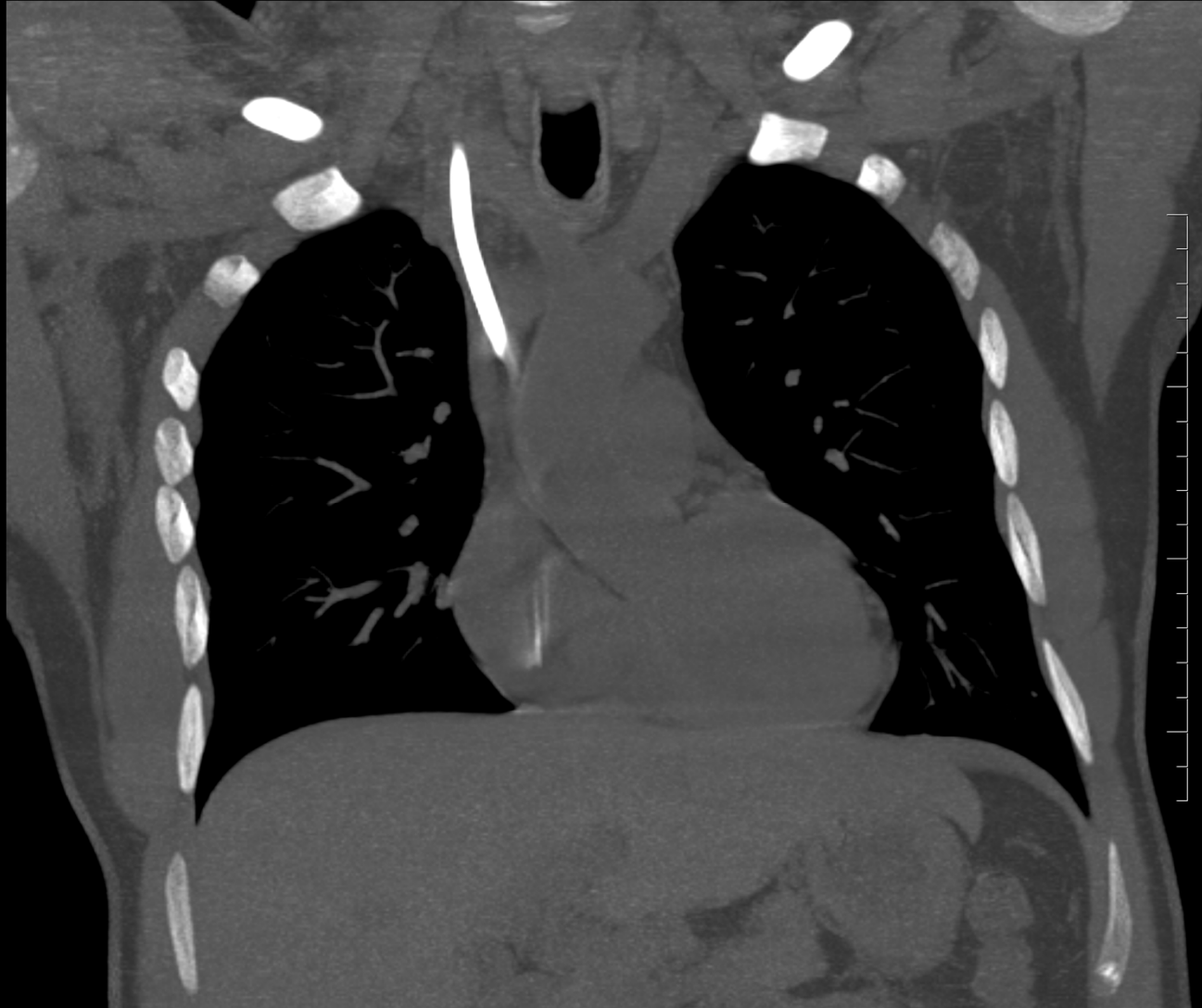


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Ultrasound Findings

- US examination revealed echogenic material within the pseudoaneurysm sac consistent with fresh thrombus formation

F/U NCE-CT Scan



CT Findings

- CT performed 7 months later showed complete resolution of the pseudoaneurysm
- Clinically the patient's voice returned to normal

Discussion

- Central venous cannulation is a common procedure
- An uncommon complication is the development of a subclavian artery pseudoaneurysm (SAP) after accidental puncture of the artery
- Progression of the false aneurysm can lead to rupture and potentially life-threatening hemorrhage

Discussion - Diagnosis

- Contrast-enhanced CT: useful in diagnosis and in assessing mass effect on surrounding neurovascular structures
- Angiography: used to establish a diagnosis and utilized in endovascular treatment options
- Adequate imaging requires intravascular contrast agents, which can be nephrotoxic in patients with acute renal injury, especially in our patient with pre-existing renal dysfunction
- Renal complications can be limited with adequate hydration, use of low doses of contrast agent, and choosing less toxic alternatives

Discussion - Treatment Options

- Ultrasound-guided compression
 - Usually unsuitable for SAPs because close proximity of the clavicle, makes it difficult to compress the subclavian artery
- Open sternotomy and suture repair
 - Our patient was high risk for open surgical exploration, in light of his renal dysfunction and protracted medical history
- Endovascular repair
 - Placement of a covered subclavian artery stent would have necessitated covering the right vertebral artery
 - Additionally, there was a risk of subsequent systemic sepsis secondary to stent infection in this immunocompromised host

Discussion - Treatment Options

- Percutaneous ultrasound-guided thrombin injection
 - Safe and effective alternative in hemodynamically stable patients
- Risks
 - Arterial thrombosis and embolization, particularly cerebral ischemia
- Use of balloon assistance
 - Reduce the risk of systemic clot formation
 - Maintain high concentration of thrombin in the pseudoaneurysm sac

Key Takeaways

- An uncommon, yet possibly fatal, complication associated with central line insertion is the development of a subclavian artery pseudoaneurysm after accidental puncture of the artery
- Percutaneous ultrasound-guided thrombin injection is an acceptable alternative to open or endovascular repair of iatrogenic pseudoaneurysms of the subclavian artery