AORTIC DISSECTION/ANEURISM RUPTURE

(Last updated 08/07/2019; Reviewed by: Svetlana Herasevich, MD)

PRESENTING COMPLAINT: Severe chest pain with back or abdominal radiation

FINDINGS

- A Normal
- B ↑ RR, shortness of breath
- C ↓ BP, peripheral pulse deficit, inter-arm variation in pulse/BP (>20mmHg)
- D Variable altered
- E Pale skin, increased sweating, syncope, abdominal (pulsatile) mass.
- L<sub>PC</sub> CBC-↓Hb, type and crossmatch, lactate, PT/APTT, cocaine screen, creatine kinase, troponin, D-dimer
- U<sub>PC</sub> Pulsatile mass

*V (verbal), P (pain), U (unconsciousness), D (delirious)

U<sub>PC</sub> (point of care ultrasound)  L<sub>PC</sub> (point of care labs)

OTHER HISTORY

- Predisposing Conditions
  - History of hypertension, atherosclerosis, age >60, preexisting aortic aneurysm, vasculitis, collagen disease, family history of aortic disease, aortic surgery, cardiac catheterization, intense resistance training, cocaine, trauma

- Symptoms
  - Severe chest pain with back or abdominal radiation; peripheral pulse deficit, inter-arm variation in pulse/BP (>20mmHg); hypotension/shock
  - Potential extension to coronary/branch vessels, aortic valve and pericardial space: syncope, cerebral/myocardial/splanchnic/limb ischemia, heart failure, aortic regurgitation, tamponade or continued hemorrhage into pleural or retroperitoneal space, left vagus/left recurrent nerve; distal embolism due to aneurysmal thrombus
  - Abdominal (pulsatile) mass/distension (physical exam/bedside ultrasound)

DIFFERENTIAL DIAGNOSIS

Other etiologies of chest pain (MI, PE, pneumothorax) and/or shock

OTHER INVESTIGATIONS

- Monitoring
○ **ECG**: ST-T changes if associated myocardial ischemia, close blood pressure monitoring - consider arterial line, monitor peripheral pulses

- **Imaging**
  - **CXR**: Wide mediastinum or aorta, pleural effusion (hemothorax), tracheal displacement
  - **ECHO (transesophageal > transthoracic and/or CT chest (or cardiac MRI))**: Location, size and extension/rupture of dissection (Stanford classification: types A/B) or aneurysm (-risk if diameter >4cm); +/- cardiac complications
  - **Abdominal CT/ultrasound**

**THERAPEUTIC INTERVENTIONS**

- **Immediate treatment**
  - **Shock or airway compromise**
    - Intubation, fluids/transfusion of blood products +/- vasopressors
    - Investigate for hemorrhage (fistula or rupture), valvular or left ventricular dysfunction
  - **Emergent intervention (surgical or endovascular stent-graft)**: if acute ascending AD and/or progressive descending AD with complications or symptomatic AAA with rapid expansion/rupture
  - **Medical treatment**: if hemodynamically stable descending AD or asymptomatic AAA (<5cm diameter)
    - **Lower blood pressure and decrease LV contraction velocity**: IV beta blockers (if contraindicated: calcium channel blockers); Goal: SBP = 100-120 mmHg & HR ≤60 bpm; add nitroprusside if needed. Consider arterial line placement

- **Analgesia**: opioids
- **Consults**: cardiothoracic/vascular surgery

**ONGOING TREATMENT**

- **Serial imaging (US/CT)**: assess eventual progression/expansion
- **Treatment**
  - Delayed surgical/endovascular intervention: if complication or expansion of descending aorta dissection or aneurysm, severe uncontrolled hypertension or pain, Marfan syndrome association
  - Continuous medical treatment if uncomplicated descending aorta dissection: transition to oral beta blocker when HR is controlled

**CAUTION**
Diagnosis: If history of chest trauma (e.g. acute deceleration), rule out aortic isthmus rupture

Treatment
- Consider associated stroke as relative contraindication to urgent surgical intervention due to a risk for hemorrhagic cerebral infarction
- Risk of mesenteric ischemia or ischemic colitis in the post-operative period
- Monitor renal function in AAA
- Repeat neurological examination, abdominal examination and renal function assessment in AD to monitor the potential extension of the dissection to main branches of the aorta
- Risk of sudden death by aorta rupture or acute aortic regurgitation
- Worse prognosis when acute onset, shock, > 70 yo, associated complications, renal failure

REFERENCES & ACKNOWLEDGMENTS
Acknowledgement: Benjamin Bonneton, MD; Venu Vegalapudi, MD; Guillaume Thiery, MD
- Antman EM, Anbe DT, Armstrong PW, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction