

# [Episode 87: Aortic Dissection](#)

On this episode: Dr. Jed Wolpaw and [Dr. Tom Metkus](#)

In this episode, episode 87, I welcome Dr. Tom Metkus to the show. Dr. Metkus is a cardiologist and intensivist and we discuss the etiology, presentation, management and outcomes of acute aortic dissections.

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## What is aortic dissection (AD)?

- Emergent, very sick, lots of residual care
- Catastrophic event with tear of aorta, blood flowing into true and false lumen, with re-entry tear downstream
- **Type A:** Proximal to subclavian, involving the ascending aorta
  - o Surgical emergency
  - o Absolute ↑ in mortality for every hour delayed from diagnosis to repair (1% in one study)
  - o Presentation: chest pain, back pain, stroke, acute aortic insufficiency, coronary ischemia, etc.
- **Type B:** Distal to subclavian
- **Cousins:**
  - o Intramural hematoma – rupture of vasa vasorum → big clot
  - o Penetrating atherosclerotic ulcer – active clot burrow into wall causing rupture or pseudoaneurysm
- Rapid expansion of weakened aortic wall leading to aneurysm or rupture. Can cause end-organ malperfusion
- Data: International Registry of Aortic Dissections ([IRAD](#))
  - o Mean age: 60s
  - o 65% male
  - o 95% presents with pain (5% no pain = longer time to dissection → worse outcome)
- Thunderclap chest pain. 20% migrate from shoulder to lower back. Proximal intimal tear → shoulder pain. Lower back → belly pain. Imagine anatomy of aorta.
- 10% syncope, 1/20 stroke, up to 40% w neuro complaints
- “chest pain plus “ heuristics
- Widened mediastinum (relative likelihood of 2 for ruling in AD) and aortic insufficiency has poor sensitivity. Need advanced imaging.

## Chest pain and anticoagulation

- Typically, chest pain concerning for ACS, so anticoagulation started. This would complicate AD
- If possible dissection, work it up then proceed to AC
- US and European Guidelines advocate approach based on pre-test probability
- If medium or high pretest probability, use adjunct imaging
- Bottom line: accurate diagnosis is essential

## Role of EKG

- Left ventricular hypertrophy due to underlying hypertension
- IRAD: LVH likelihood ratio 2-3 for dissection in patients with chest pain
- EKG helpful for ruling out other obvious causes, like PE or MI

## Etiology of AD

- 75% have history of HTN
  - 5% have diagnosis of Marfan’s or connective tissue disease
  - 1% have bicuspid valves
  - Autosomal Dominant AD syndrome
  - 16% have history of cardiac surgery
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## Surgical intervention?

- **Type A:** surgery > medical. 75-80% mortality if medical only
  - o Age alone not contraindication because mortality rate so high
- **Type B:** open surgery very morbid – high rates of paraplegia due to injury of spinal cord
- **Complicated Type B:** high risk of bad outcomes, especially **impending rupture** such as periaortic hematoma or outpouching on CT, **malperfusion** to gut, poor urine output, bowel ischemia, visceral malperfusion, **refractory pain** to BP control (pain despite BP 110/60), **refractory HTN** despite BP meds. Should go to intervention, choice of TEVAR

## What is TEVAR?

- Thoracic Endovascular Aortic Repair
- Cut down vessel, insert covered sheath to obliterate flow through false lumen
- Rates of paraplegia not as high. Depends on extent of cover
- Some centers put in **spinal drain to decrease CSF pressure and mitigate risks of paraplegia**

## What is the medical management?

- 'bedside disease' – need serial assessment
- HR control
  - o Rate of pressure rise (dP/dT) ~ shear stress ~ risk of dissection progression
  - o Nitroprusside will drop MAP but cause reflex tachycardia causing ↑ dP/dT
  - o **US guidelines: HR < 60**
- BP control
  - o **European guidelines: SBP < 100-120; MAP 60-75**
- Recognize that people have different autoregulatory mechanisms: Lifelong hypertensive vs 20-year-old healthy with Marfan's
- First lines:
  - o Esmolol: short-acting, easily titratable, but huge volume load
  - o Labetalol
  - o Blunt reflex tachycardia if using vasodilators

## Surgical indications

- Urgent surgery scenarios:
  - o Type A hypotensive and tachycardic due to tamponade.
  - o Acute aortic insufficiency with tachycardia: blunting HR will cause more backflow and worsen..
- Type A
- Aortic root involvement?
  - o No: can use tube graft
  - o Yes: need root and ascending grafts. Coronaries must be reimplanted into graft
- Type B: Mostly endovascular
- During surgery
  - o may put patient into circulatory arrest = cool patient down to 22 or 25. Pack head in ice, give big dose of steroids.
  - o May utilize **anterograde cerebral perfusion** = cannulate carotids or branch vessels to perfuse brain..
- Residual descending dissection. If urgently fixing **Type B, aorta is friable** so ↑ risk of retrograde dissection or worsening tear. ↑ risk of acute iatrogenic events. Intervene again

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after this hyperacute phase (2 weeks). Practice dependent. Fix when dilated (5cm or widening)

- Residual characteristics are important. Thrombosed lumen not bad. Free flow into false lumen not great. Partial flow is worst.

## Morbidity and Mortality

- Type A, without surgical intervention = 80% mortality
- Successful Type A repair to ICU
  - o 10-15% rebleeding risk
  - o 5-10% delayed sternal closure
  - o 15-30% AKI
  - o 10-20% need dialysis
  - o 5-10% trached
  - o 10-30% in-hospital death rate
- These are high risk patients!

## 10 commandments of AD

- Consider the diagnosis especially in undifferentiated patients. Cognitive heuristics: thunderclap chest pain, migratory CP, “CP plus” syndromes, Marfanoid.
- Examine: pulse deficits. HTN controlled?
- Good imaging: CT angio > TEE
- Type A = surgical emergency
- Type B = complicated or not (refractory HTN or pain, impending rupture)
- Good medical therapy: HR < 60, SBP < 120
- Serial imaging if residual dissection to determine when to come back
- Good med therapy: BB, ARB
- Cousins of AD: intramural hematoma, penetrating ulcers – treat like AD
- Bed side assessment! Good collaboration.

*“Life’s tragedies are usually arterial”*

*“There is no disease more conducive to clinical humility than aneurysm of the aorta”*

- Sir William Osler

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## Review Questions

Link jumps to appropriate section

[What are some “cousins” of aortic dissections?](#)

[What role does the EKG play in managing aortic dissection?](#)

[Patient’s with AD commonly have a history of?](#)

[What are some examples of complicated Type B aortic dissection?](#)

[What is the noted risk of TEVAR, and what has been done to mitigate this?](#)

[What are the SBP and HR goals for medical management?](#)

[How is antegrade cerebral perfusion performed?](#)

[Why are residual descending dissections not fixed immediately?](#)

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Notes by [Brian Park](#)