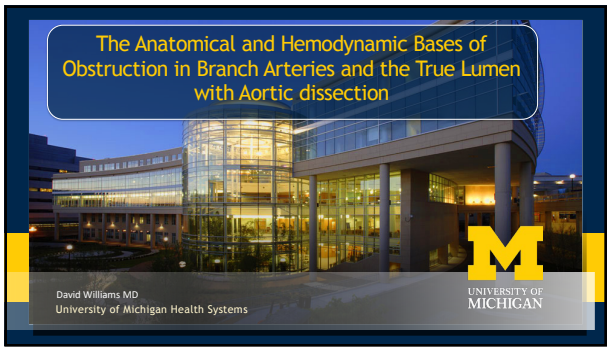

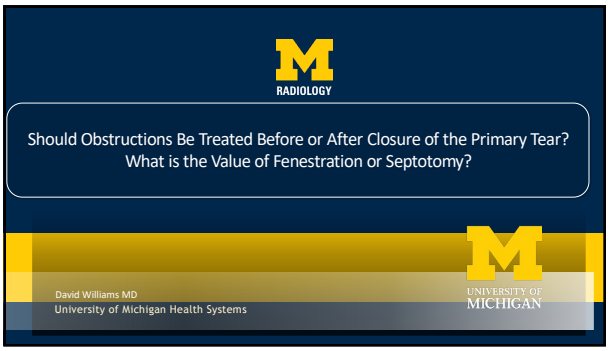

Disclosure

No disclosures

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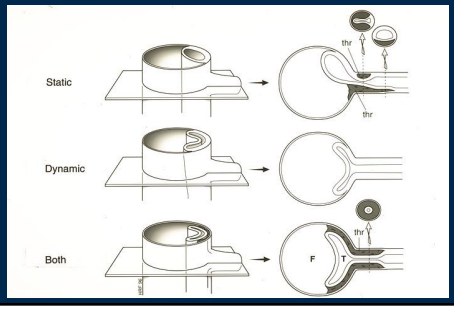
N Dasika, M Khaja, W Sherk, A Liles
GM Deeb, H Patel, B Yang , S Fukuhara, K Kim

MALPERFUSION (-15 mm Hg)
VS
MALPERFUSION SYNDROME
=
PERFUSION DEFICIT
VS
DEFICIT + ORGAN DAMAGE

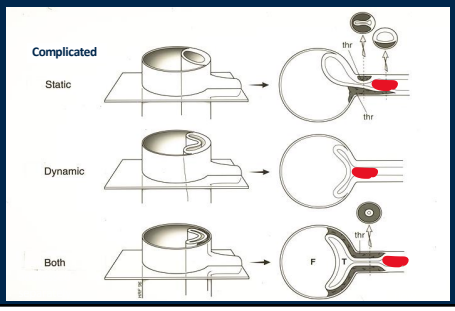
Obstruction in aortic dissection

- Static: dissection flap enters vessel and obstructs (depending on presence / size of reentry tear or false lumen thrombosis)
- Dynamic: flap covers vessel origin, with complex relation between blood pressure, branch artery flow, and caliber of true lumen
  - Fixed, transient, or intermittent
- Complicated dynamic or static:
  - True lumen thrombus in regions of stasis

MALPERFUSION – MICHIGAN CLASSIFICATION



MALPERFUSION – MICHIGAN CLASSIFICATION



Treatment Priority for Acute Type A AD

	Ascending Aorta	Ischemic Organ
Uncomplicated	✓	
Cardiovascular Cx (Unstable)	✓	
wide open AI		
tamponade		
coronary artery dissection		
neurovascular compromise		
Malperfusion, no organ damage	✓	
Malperfusion, yes organ damage		✓
	↓ TS, then IR	↓ IR, fix gut, leg, then TS after enzymes peak

Treatment Priority for Acute Type B AD

	Mesenteric	Ischemic Organ
Bowel Rupture Malperfusion with or without tissue damage	✓	✓
	↓ GS, then IR	↓ IR

Note: IR identifies and treats malperfusion, whatever its anatomy, allowing general or vascular surgeon to identify reliable perfusion margins, adjust treatment accordingly, and maximize surgical success.

ED / Clinical Evaluation

Clinical history: pain, consciousness, weakness, numbness

Physical Exam: tenderness, sensory deficit

CT

- identifies dissection type and aortic complication
- identifies organ involvement

IR confirm, document, and treat malperfusion, using intravascular ultrasound, manometry, and branch arteriography, except when ATAAD has CV complications

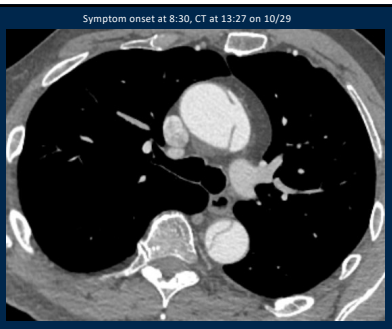
Reperfusion priorities

- Common femoral or Iliac artery: treat TL thrombus to obtain clean access
- SMA (TL thrombus) to rescue gut and prevent embolization
- Treat entry tear by endograft or fenestration, and document relief of dynamic obstruction
- Treat static obstruction: SMA if gradient >15 mm Hg persists, Celiac artery if liver enzymes are elevated. Usually, the celiac takes care of itself
- Confirm or secure 1 good kidney
- Legs (femoral arteries: lysis if TL thrombus, but consider vascular surgery assistance for infrainguinal thrombus)
- Legs (Iliac artery dynamic, static): establish normal perfusion pressure to the common femorals
- More compromised kidney if it appears salvageable

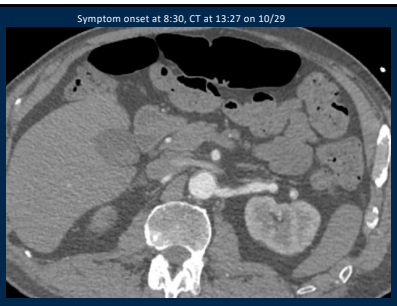
Clinical case early chronology

- 66-year-old man with onset of pain approximately 08:30 on 10/29, when complained to his son about the onset of pain in both legs and abdomen during a walk.
- 10/29
- 08:30 approximate time of symptom onset
- 12:25 BP 141/63 at ED of outside hospital in MI
- 12:42 BP 122/89
- 12:43 bilateral DP pulses weak
- 12:52 creatinine 1.12, AST 20, lactate 5.1
- 13:27 CT of chest abdomen and pelvis
- 13:45 BP 188/74, Esmolol started

Symptom onset at 8:30, CT at 13:27 on 10/29

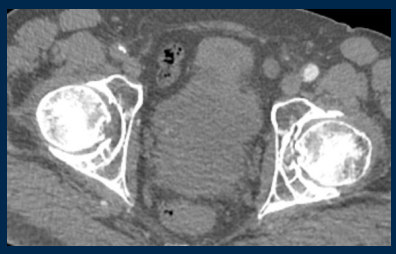


Symptom onset at 8:30, CT at 13:27 on 10/29



Aortic root 111/57 (77), SMA 36/27 (30) despite contrast material in SMA, measured 5 hrs after CT at 18:06

Presentation



Because of the elevated lactate and prolonged pulseless legs, repair of the aortic root was deferred

- 66-year-old man with onset of pain approximately 08:30 on 10/29, when complained to his son about the onset of pain in both legs and abdomen during a walk.
- 10/29
- 08:30 approximate time of symptom onset
- 12:25 BP 141/63 at ED of Henry Ford health system, Jackson MI
- 12:43 bilateral DP pulses weak
- 12:52 creatinine 1.12, AST 20, lactate 5.1
- 12:42 BP 122/89
- 13:27 CT of chest abdomen and pelvis
- 13:45 BP 188/74, Esmolol started
- 13:48 BP 181/75
- 14:02 BP 155/70
- 15:15 BP 115/56
- 15:21 arrived at Michigan Medicine, BP 119/59 (85). Legs pulseless, cold LLE
- 17:56 start of IR procedure
- 19:47 finished IR procedure, followed by vascular surgery exploration of his left leg with thrombectomy and 4-compartment fasciotomies then by general surgery performing laparotomy and total colectomy.

IR findings

Hemodynamically stable acute type A dissection with

- left renal artery supplied by false lumen
- dynamic obstruction of the celiac, SMA, right renal, IMA, and right common iliac arteries
- dynamic + static obstruction of left common iliac artery, with
- additional dynamic + static obstruction of left superficial femoral artery + true lumen thrombus.

Procedures

IR (from 17:56 to 19:47): goal is restore perfusion

- Thrombolysis in left iliac and superficial femoral arteries (TEE monitoring)
- Supraceliac fenestration and supramesenteric aorta TL stenting
- Infrarenal aorta fenestration and aortoiliac TL stenting, with unresolved obstruction of left SFA

Vascular Surgery

- Left SFA embolectomy
- Left leg 4 compartment fasciotomy

General Surgery

- Laparotomy
- Subtotal colectomy

Nephrology

- Hemodialysis for 10 days

Chronology

- 10/29
- IR procedure, left leg embolectomy and 4-compartment fasciotomy, subtotal colectomy
- 11/13
- Intermittent bacteremia with fluid collection in pelvis
- 11/14
- US-guided tube placement, complicated by through and through injury to small bowel.
- 11/16
- 17:03 CT abdomen and pelvis
- 20:50 laparotomy and bowel repair
- 12/1 now s/p IR fenestration, total colectomy, 4-compartment LLE fasciotomies, L leg revascularization via cutdown on 10/30 and AKI requiring CRRT (10/29-11/9)
- 12/5 fasciotomy sites healing well
- 7/6 no change in aorta diameter, no A.I. Fasciotomy sites have healed. Decubitus ulcer continues slow healing. Biliary drain present 7/6 but removed later. Because of all his co-morbidities, his aorta has not yet been repaired, now 2 years later

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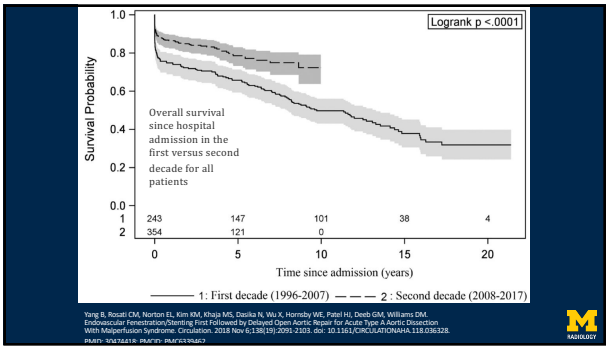

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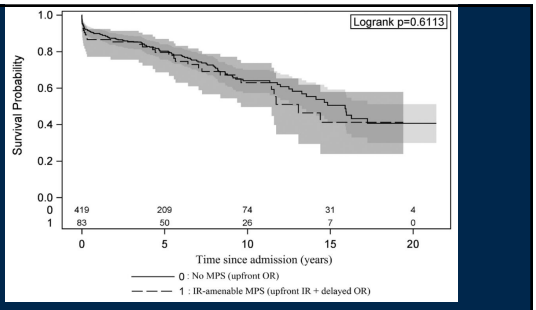

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Conclusion

When ATAAD is accompanied by cardiovascular complications or when malperfusion is not associated with tissue damage, then root repair takes precedence over organ re-perfusion.

Note that this standard of care risks embolization of coexisting TL thrombus in SMA, renal, and iliofemoral arteries, which is masked as post-operative complication and should be kept in mind by treatment team.

In uncomplicated ATAAD accompanied by malperfusion syndrome (organ perfusion deficit with organ damage) or ATBAD with malperfusion, patient survival improves in a program of aggressive IR-first management of critical arterial obstruction with directed treatment of damaged organs followed by root repair if indicated, when clinical status and blood markers permit.

THANK YOU FOR YOUR ATTENTION

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