# Why is surgery for AV access-related Venous Thoracic Outlet Syndrome so Rarely Considered?


Karl A. Illig, MD

CACVS Paris

February 2019

rmc Dialysis Access Institute at the Regional Medical Center

# *Surgery for AV-VTOS:* CONFLICTS OF INTEREST

- None

# *Surgery for AV-VTOS:*
# THE QUESTION

- Why is surgery so rarely considered?

# *Surgery for AV-VTOS:* THE ANSWER

- Why is surgery so rarely considered?

- Because so few providers treat both AV access and thoracic outlet syndrome.
  - AV access surgeons don't know about this
  - TOS surgeons never see someone with AV access

# *Surgery for AV-VTOS:*
# THE ANSWER: A LITTLE MORE DETAIL

- Lack of recognition of the entity
- Lack of continuity – no sense of the recurrence rate of this lesion
- Lack of familiarity with the thoracic outlet
  - Perceived "difficulty" of decompression
  - Perceived morbidity (and mortality) of decompression

# *Surgery for AV-VTOS:*
# THE ISSUE

# *Surgery for AV-VTOS:*
# THE ISSUE

# *Surgery for AV-VTOS:*
# THE ISSUE



rmc Dialysis Access Institute
at the Regional Medical Center

# *Surgery for AV-VTOS:*
# THE ISSUE

Courtesy Wallace Foster, MD
(Brisbane, AU)

Abundant collaterals

# *Surgery for AV-VTOS:*
# THE ISSUE

- Pathophysiology:
  - Classic outflow stenosis: High venous pressure, swelling, post-decanulation bleeding, etc

# *Surgery for AV-VTOS:*
# THE ISSUE

- Pathophysiology:
  - Classic outflow stenosis: High venous pressure, swelling, post-decanulation bleeding, etc

  - RESISTANT TO VENOPLASTY
  - STENTING DOOMED TO FAILURE

# *Surgery for AV-VTOS:*
# WHAT DATA DO WE HAVE?

- VTOS literature:
  - Several decades (almost half a century) of experience clearly documents that this problem will NOT go away unless the extrinsic bony compression has been removed.
  - In addition, extensive literature showing a high failure rate (fragmentation) for conventional stents in this area.

# *Surgery for AV-VTOS:*
# WHAT DATA DO WE HAVE?

- HOWEVER:
  - These are different patients with different physiology.
  - Potentially sicker – risks of operation
  - But much higher flows – vicious cycle of stenosis leading to turbulence leading to more stenosis…

# *Surgery for AV-VTOS:*
# WHAT DATA DO WE HAVE?

- Illig 2015
  - 24 patients (U. South Florida)
  - 21 highly symptomatic, 3 in conjunction with AVF

  - 85% fistula salvage rate
  - Very happy patients and nephrologists

Ann VS 2015;29:698

# *Surgery for AV-VTOS:*
# WHAT DATA DO WE HAVE?

- Wooster 2019 (in press)
  - 54 patients with high-grade CCJ lesions
  - 34 with AV access-associated VTOS
    - All underwent thoracic outlet decompression
    - 33% surgical reconstruction; 67 endo only

J Vasc Surg, in press

# *Surgery for AV-VTOS:*
# WHAT DATA DO WE HAVE?

- Wooster 2019 (in press)
  - AVF- vs conventional VTOS:
    - Lower complication rate
    - Lower acute reocclusion rate
    - Higher long-term restenosis rate
  - 90% access salvage
  - 81% symptom-free access salvage

J Vasc Surg, in press

# *Surgery for AV-VTOS:*
# WHAT DATA DO WE HAVE?

- Edwards (2019, in press)
  - 14 patients with total occlusion undergoing thoracic outlet decompression and bypass
    - 5 with AV access-associated VTOS
    - 100% patency at one year followup

J. Vasc Surg, in press

# *Surgery for AV-VTOS:*
# WHAT DATA DO WE HAVE?

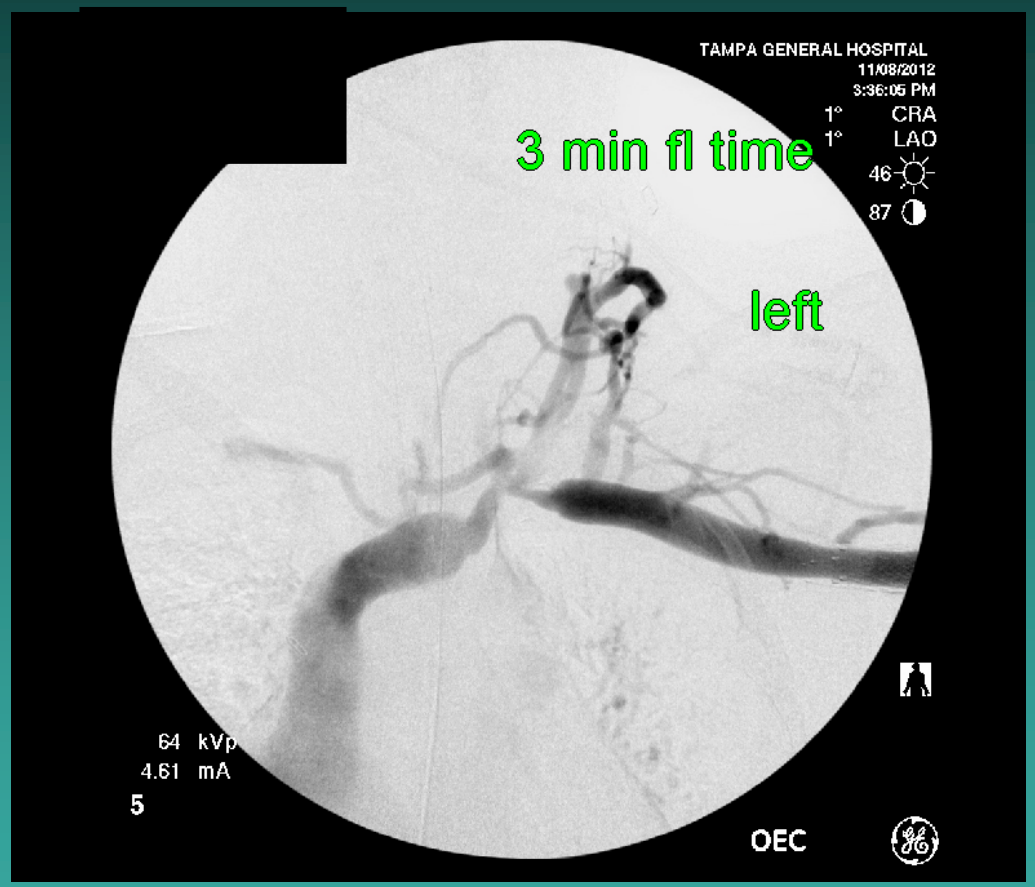
- Peden (personal communication)
  - 25 patients with AV access-associated VTOS decompressed by means of CLAVICULECTOMY
  - 71% symptom-free salvage

# *Surgery for AV-VTOS:*
# WHAT DATA DO WE HAVE?

- Overall update (Roc, USF, DAI):
  - 107 patients have been operated upon
    - One mortality (infection)
  - 4 patients so far at DAI; all have done very well

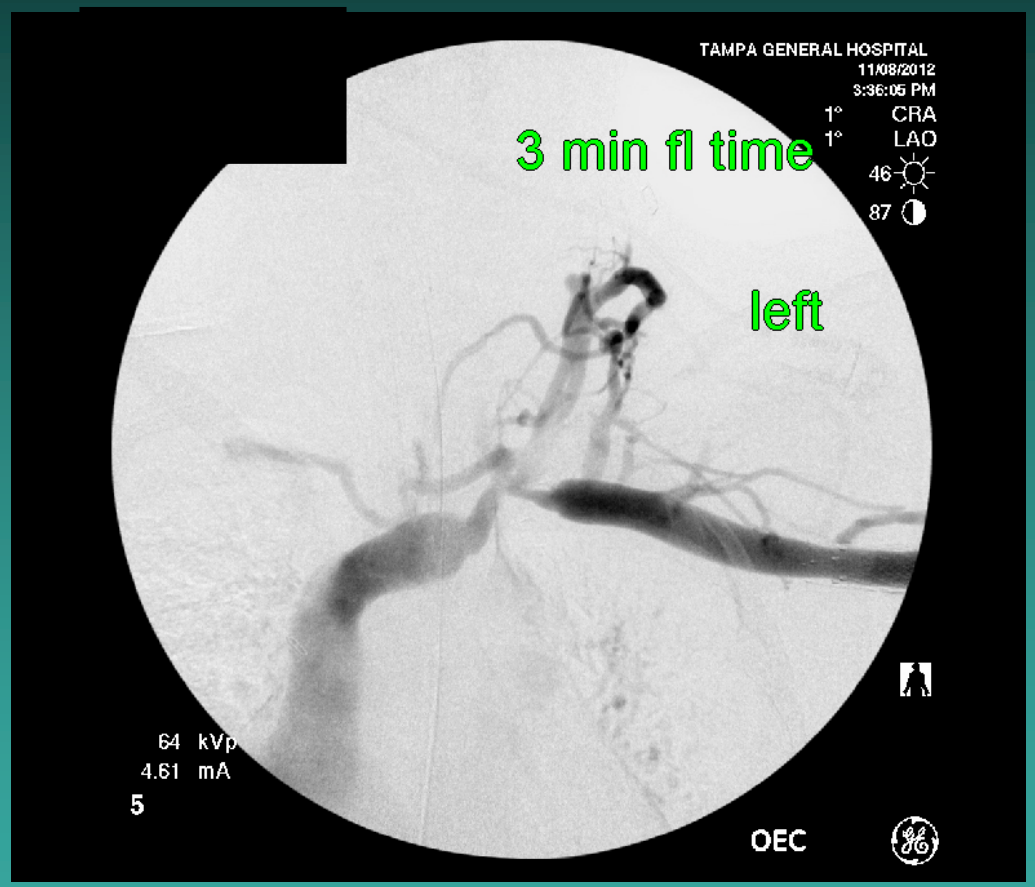
  - Full review of this beginning…

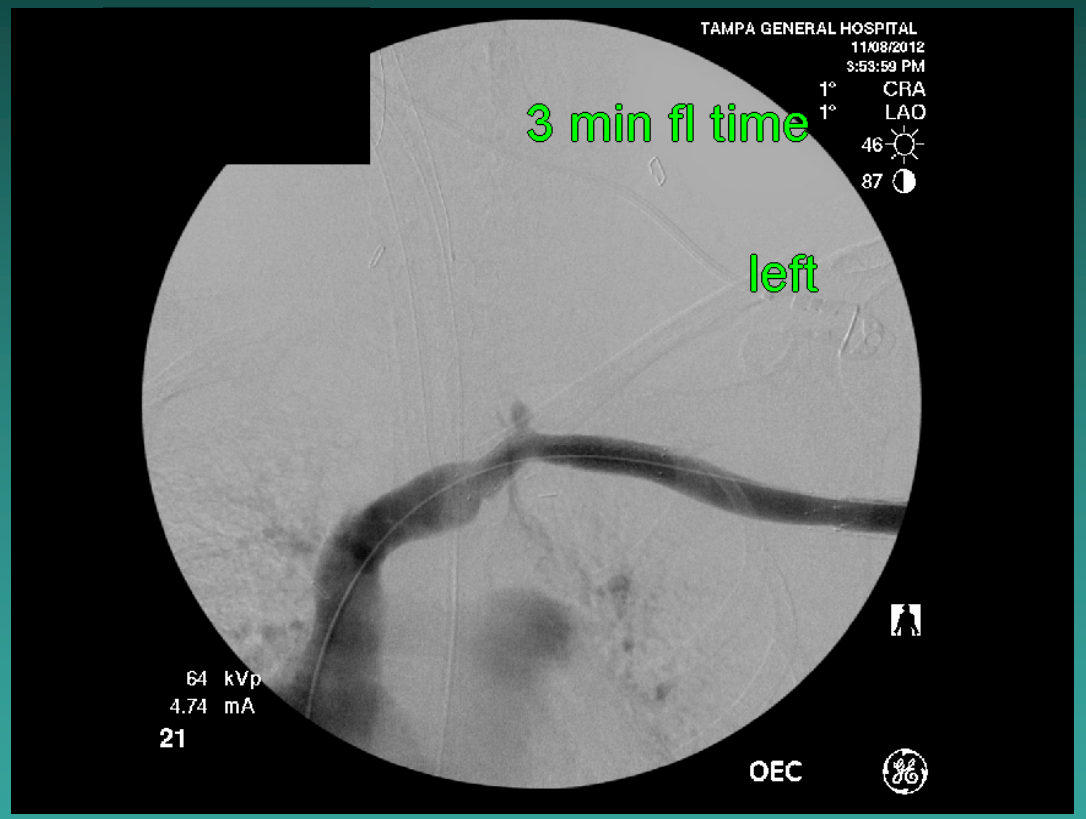
# *Surgery for AV-VTOS:*
# SHORT-TERM RESULTS ARE GREAT




rmc Dialysis Access Institute at the Regional Medical Center

# *Surgery for AV-VTOS:*
# SHORT-TERM RESULTS ARE GREAT




rmc Dialysis Access Institute at the Regional Medical Center

# *Surgery for AV-VTOS:*
# PUTTING THIS ALL TOGETHER

- Thoracic outlet decompression and treatment for AV access-related VTOS:

# *Surgery for AV-VTOS:*
# PUTTING THIS ALL TOGETHER

- Thoracic outlet decompression and treatment for AV access-related VTOS:
  - SAFE – surprisingly well tolerated, even in these patients

# *Surgery for AV-VTOS:*
# PUTTING THIS ALL TOGETHER

- Thoracic outlet decompression and treatment for AV access-related VTOS:
  - SAFE – surprisingly well tolerated, even in these patients
  - RELATIVELY EFFECTIVE – Symptom-free salvage ranges between 70 and 80%; perhaps another 10% salvaged but with residual swelling

# *Surgery for AV-VTOS:*
# PUTTING THIS ALL TOGETHER

- Thoracic outlet decompression and treatment for AV access-related VTOS:
  - Patency tends to be durable in the short-term, but restenosis is fairly common (40-50%)
  - I suspect both of these findings are due to the high flow in this system

# *Surgery for AV-VTOS:* WHAT IS NEEDED

- Case control
  - We have approximately 40 patients (although relatively randomly collected) who have not undergone this procedure despite appropriate anatomy. How do they do over time?

# *Surgery for AV-VTOS:* WHAT IS NEEDED

- Case control
  - We have approximately 40 patients (although relatively randomly collected) who have not undergone this procedure despite appropriate anatomy. How do they do over time?
- Prospective randomized trial to follow.

# *Surgery for AV-VTOS:* CONCLUSIONS

- Patients with AV access and stenosis at the costoclavicular junction seem to represent a subtype of venous TOS

# *Surgery for AV-VTOS:* CONCLUSIONS

- Patients with AV access and stenosis at the costoclavicular junction seem to represent a subtype of venous TOS
- Decompression is well-tolerated, and seems to yield good AV access salvage rates in patients without other good options.

# *Surgery for AV-VTOS:* CONCLUSIONS

- Why is this surgery so rarely considered? Lack of comfort by non-TOS surgeons, and lack of familiarity by TOS surgeons.
- Answers:
  - Cross-pollination…
  - Experience and publications

# *Surgery for AV-VTOS:*
# *A* HAPPY PATIENT…