Haemodialysis Access

S.C TSOTETSI

- As medical management of patients has improved, patients are surviving longer, thereby requiring multiple accesses throughout their remaining lifetime
- More patients are exhausting traditional upper extremity access and thus new solutions are needed

- **A. AV accesses are placed as far distally in the upper extremity as possible to preserve proximal sites for**
- **future accesses**
- **B. When possible, autogenous AV accesses should be considered before prosthetic arteriovenous accesses**

are placed.

These autogenous access configuration should include, in order of preference, the use of direct AV anastomosis, venous transpositions, and translocations

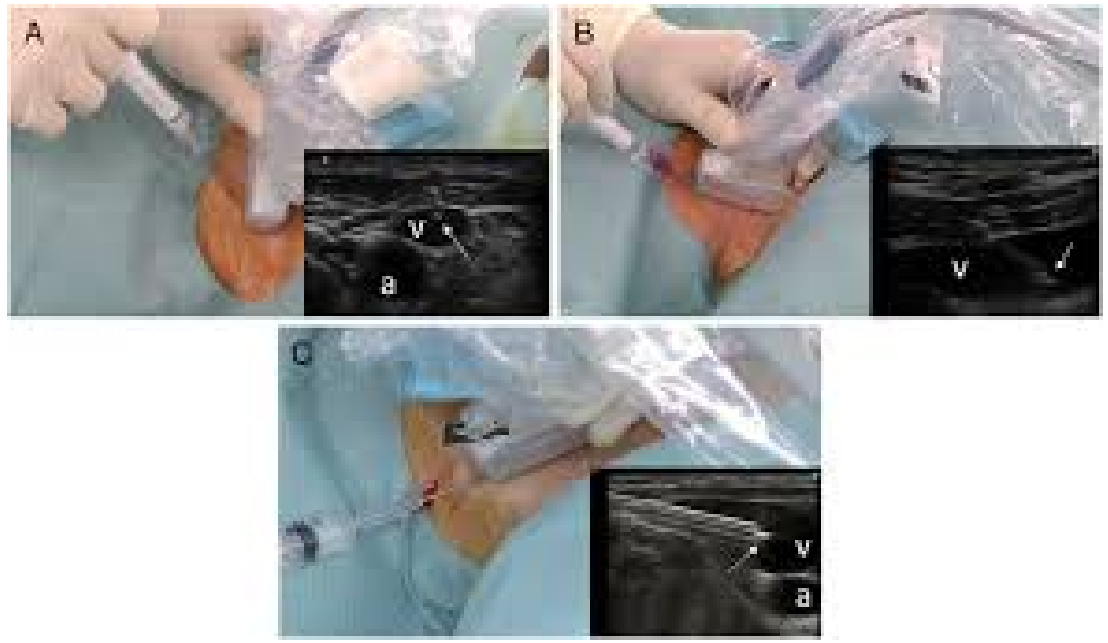
- **C. Upper extremity access sites are used first, with the non-dominant arm given preference over the dominant arm only when access opportunities are equal in both extremities**
- **D. Lower extremity and body wall access sites are used only after all upper extremity access sites have been exhausted**

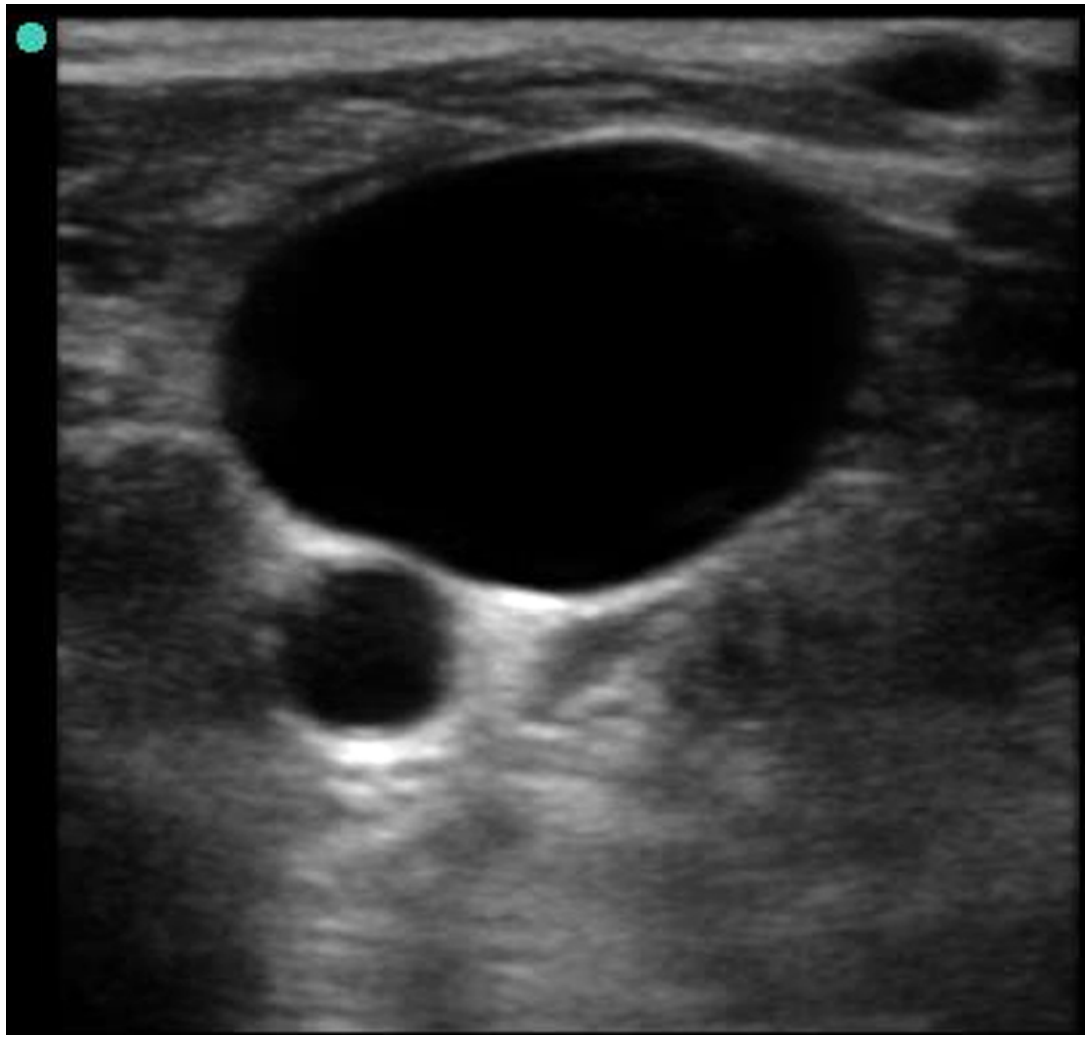
Differences in AV fistulae vs grafts

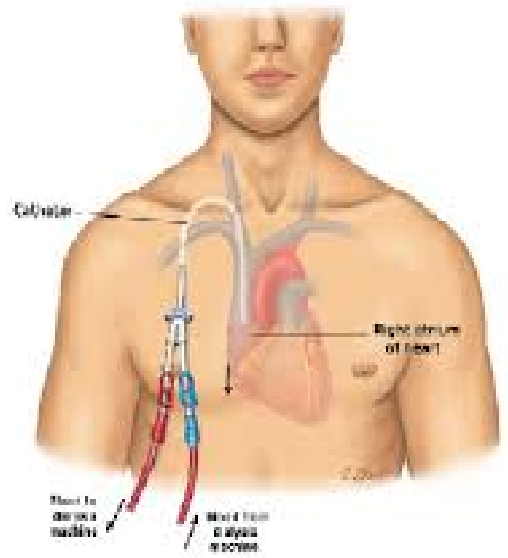
	AV fistulae	AV grafts
Cost	More cost effective	Cost 5-fold higher than AV fistulae
"Primary" failure	Higher	Lower
Patency or morbidity or "secondary" failure	Higher patency rates, lower associated morbidity and mortality	3.8 times more likely to require thrombecto 3 times more likely to require access interve
Infection rate	Average 5% or less over period of use	Average 10% over period of use
Treatment of infection	Likely respond to antibiotic	May require surgical excision and removal
Aneurysm formation	Uncomplicated—1.24% Complicated—5.2%	Uncomplicated—5.7% Complicated—5.7%
Peripheral ischemia	Radiocephalic fistula, 1%-2% Brachiocephalic or basilic fistulae and grafts, 5%-15%	Brachiocephalic or basilic fistulae and grafts,

Temporary catheters

- Ultrasound guidance has been shown to decrease the number of attempts at vein puncture and increase successful central vein cannulation to 100%.
- **Short term catheters**: These are placed on patients who require acute dialysis access and should be used for less than 3 weeks' duration. The subclavian vein should be avoided
- **Long-term catheters**: Owing to higher blood flow and lower complication rates, access through the right internal jugular vein with the distal catheter tip in the right atrium is preferred


A
v
a
B
v
C
v
a





Complications

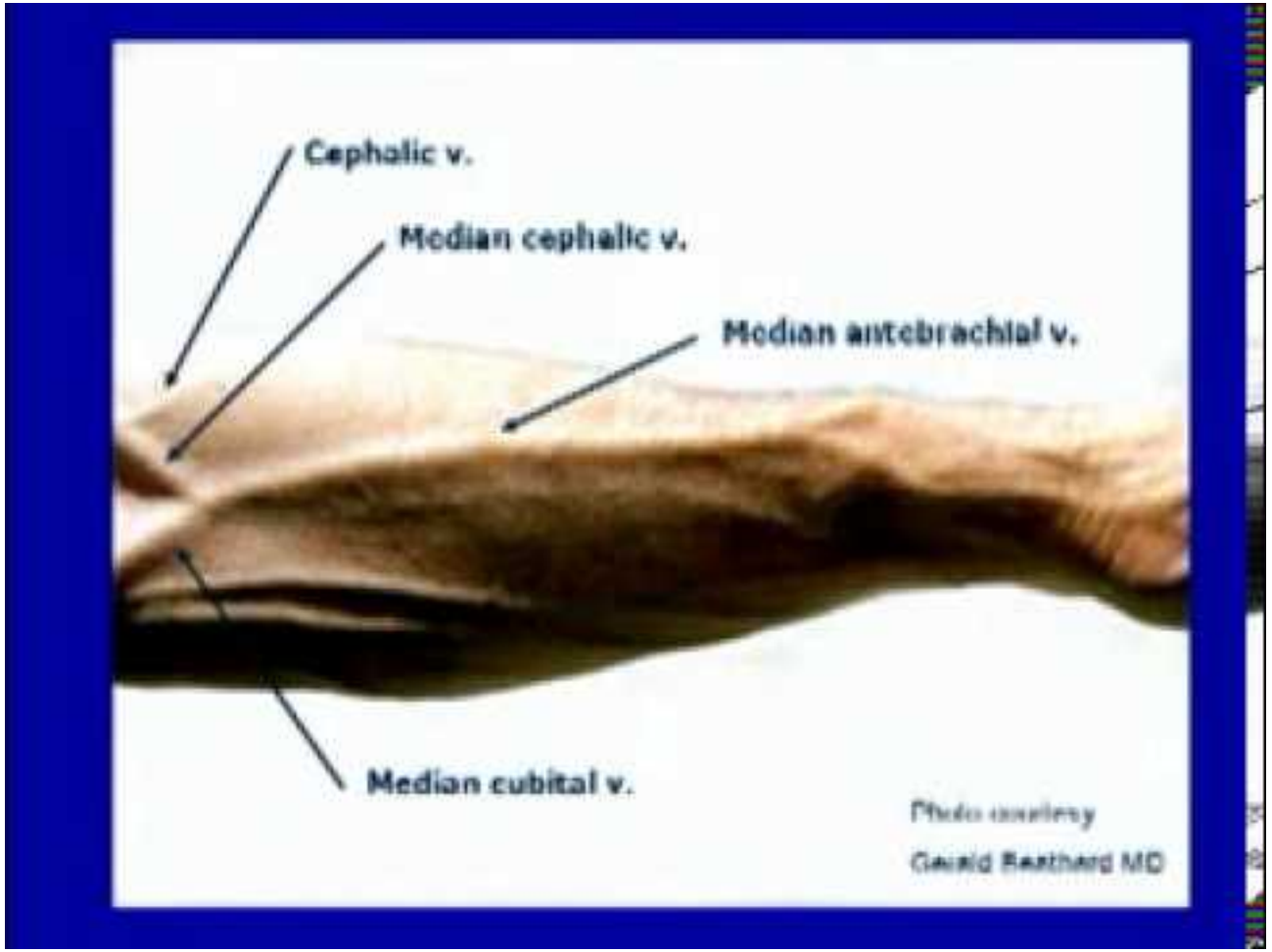
- **Central vein stenosis** is seen in up to 50% of patients with subclavian catheters in place for less than 6 weeks
- **Catheter thrombosis** is seen in up to 25% of patients being dialysed through long-term dialysis catheters
- **Infections** are higher with short-term catheters than long-term catheters and treatment constitutes catheter removal and antibiotics

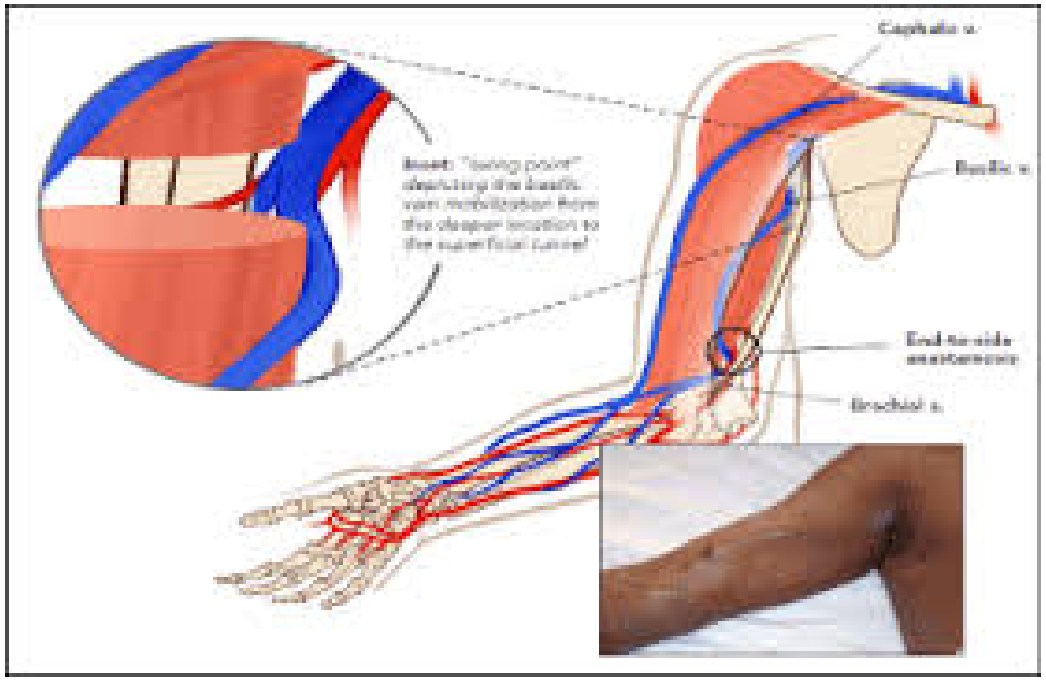
A-V FISTULA

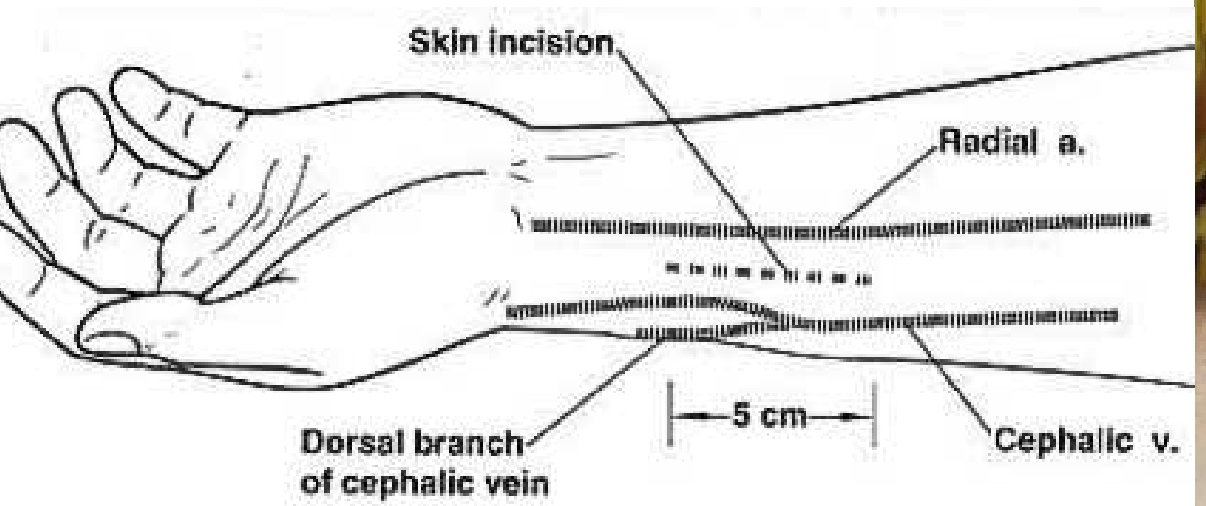
Autogenous access should ideally be created 6 months before the anticipated need for dialysis. Prosthetic access should be delayed until 3 to 6 weeks before the initiation

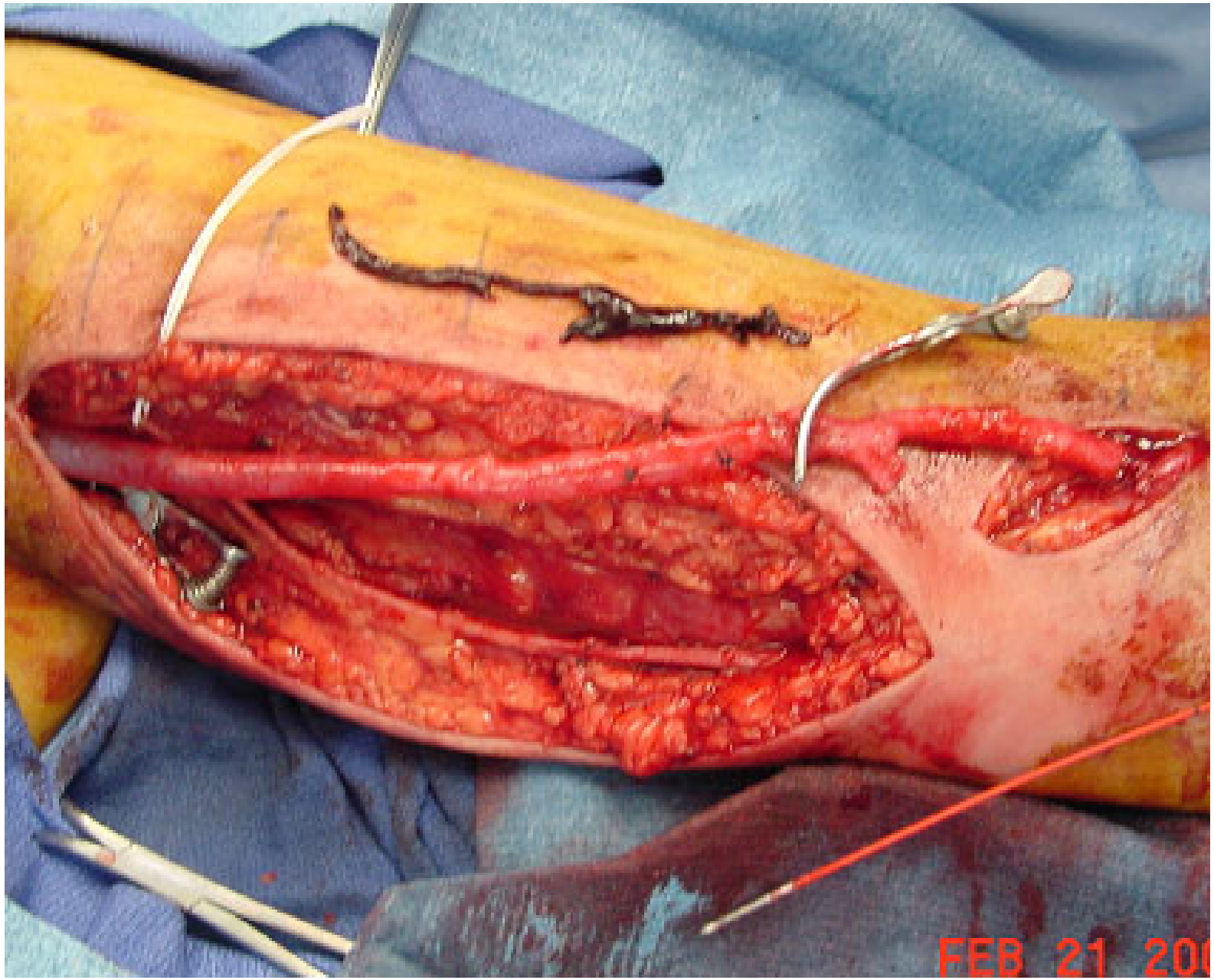
Artery and vein: pre-op evaluation - **SIZE**

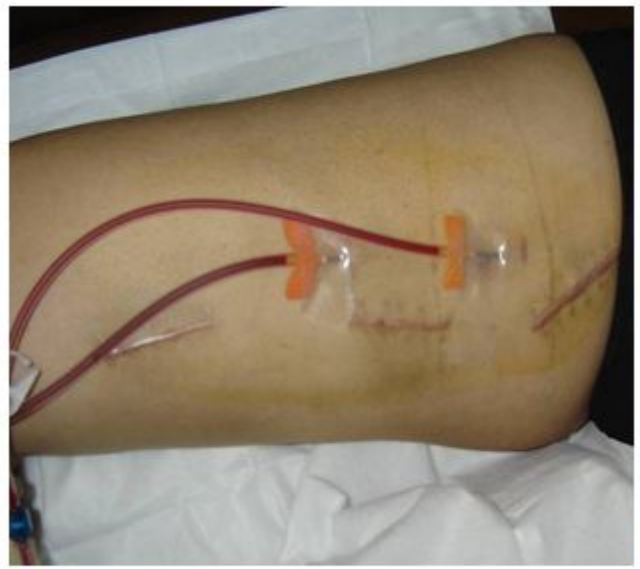
Graft if there are no suitable veins


Cephalic v.
Median cephalic v.
Median antebrachial v.
Median cubital v.


Cephalic v.
Basilic v.
Brachial v.


Skin incision
Radial a.
5 cm
Dorsal branch
of cephalic vein
Cephalic v.


FEB 21 20



A

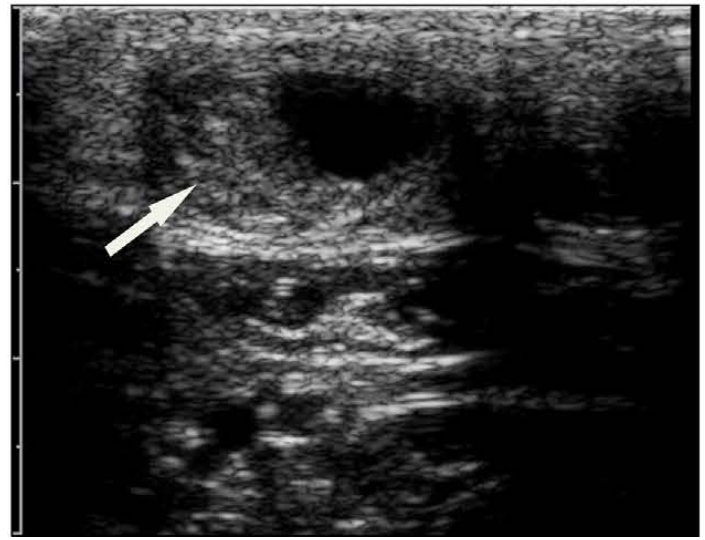
B

Graft Thrombosis

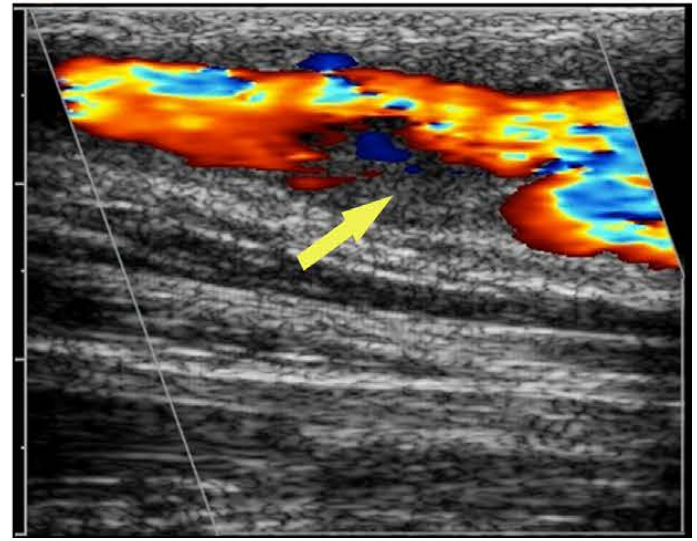
- The most common complication leading to graft failure is graft thrombosis.
- In greater than 80% of thrombosed grafts, thrombosis is the consequence of stenosis at the venous anastomosis or draining veins.
- Management: thrombectomy or thorombolysis with adjuctive PTA +- stenting

A

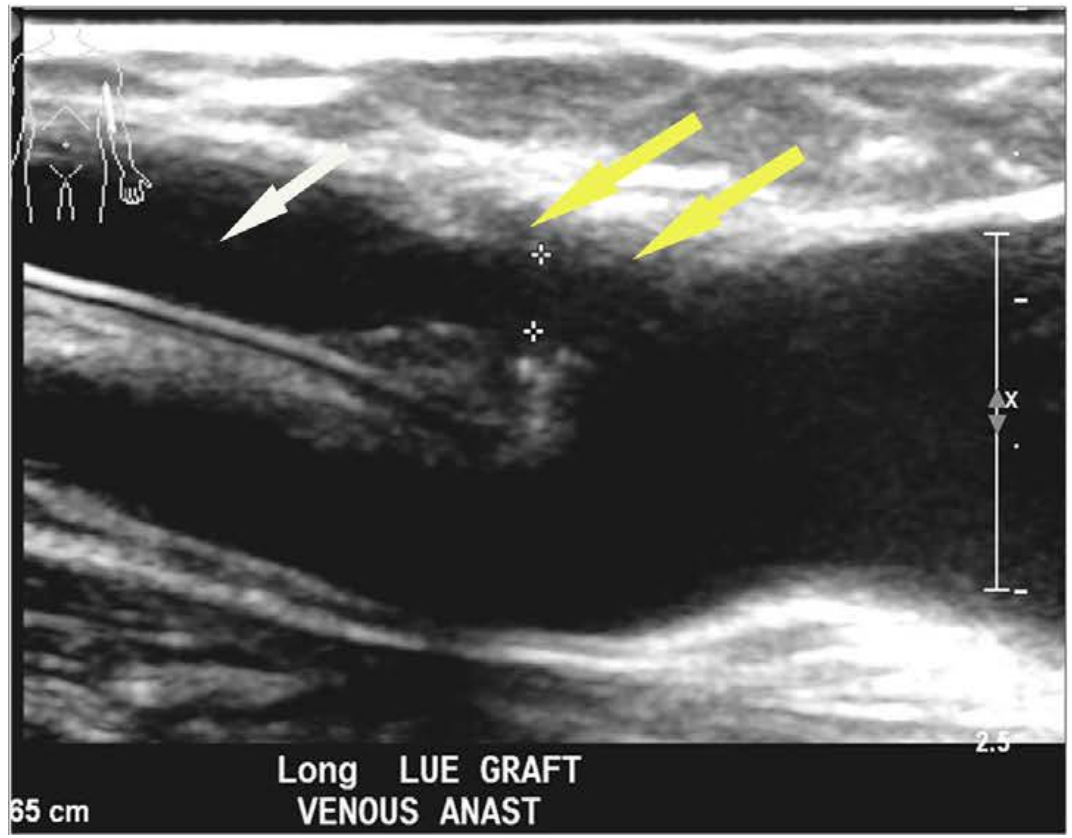
B



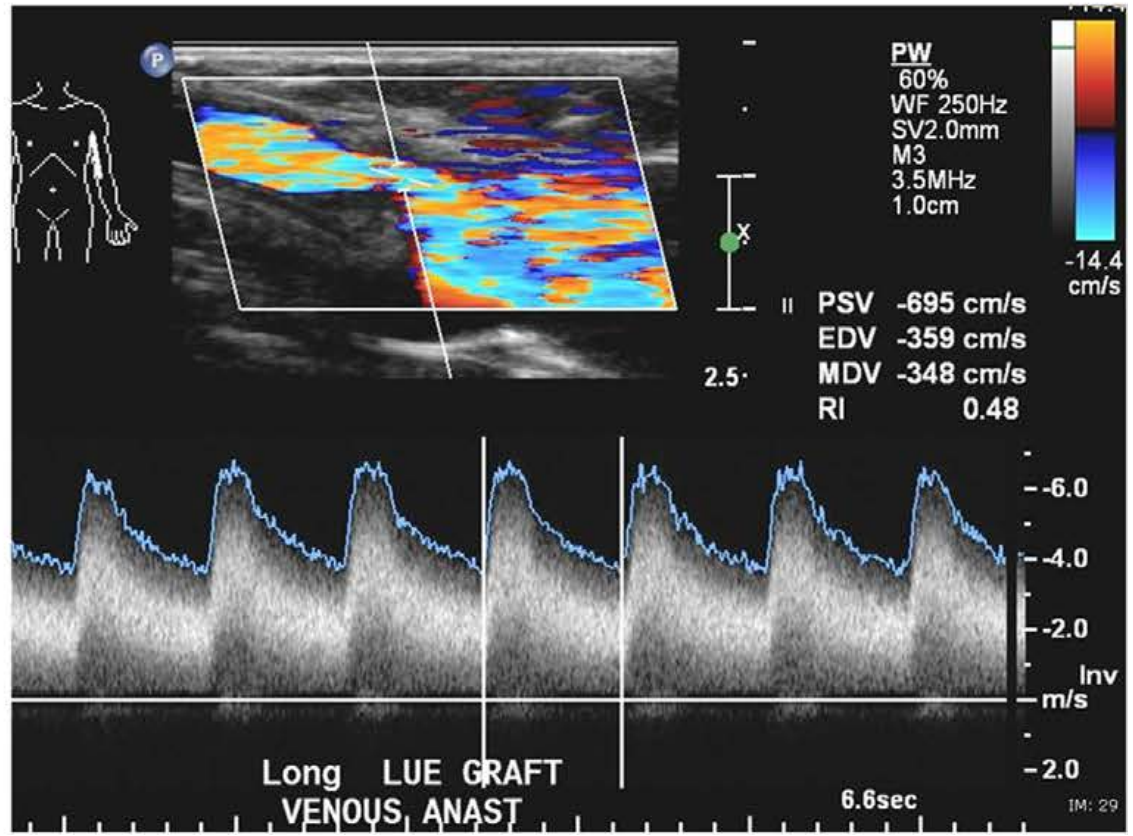
C



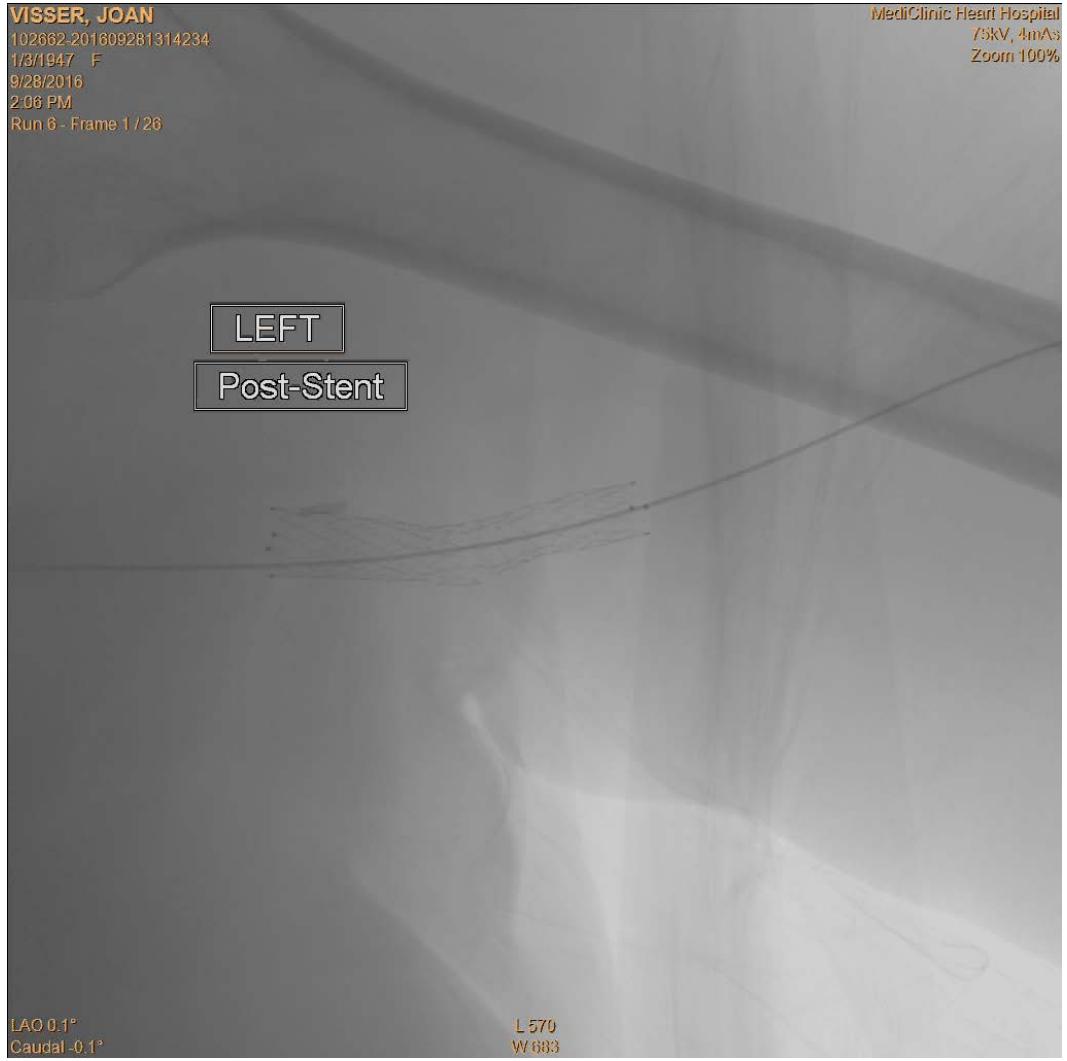
A


Long LUE GRAFT
VENOUS ANAST
65 cm
2.5

B


PW
60%
WF 250Hz
SV2.0mm
M3
3.5MHz
1.0cm
-14.4
cm/s
PSV -695 cm/s
EDV -359 cm/s
MDV -348 cm/s
RI 0.48
2.5
-6.0
-4.0
-2.0
Inv
m/s
-2.0
Long LUE GRAFT
VENOUS ANAST
6.6sec
IM: 29


VISSER, JOAN
102662-201609281314234
1/3/1947 F
9/28/2016
1:44 PM
Run 1 - Frame 1 / 19
MediClinic Heart Hospital
80kV, 5mAs
Zoom 100%
LEFT
Pre-stent
LAO 9.1°
Caudal 0.1°
L 509
W 683


VISSER, JOAN
102662-201609281314234
1/3/1947 F
9/28/2016
2:06 PM
Run 6 - Frame 1 / 26
MediClinic Heart Hospital
76kV, 4mAs
Zoom 100%
LEFT
Post-Stent
LAO 0.1°
Caudal -0.1°
L 570
W 683

Central vein obstruction

Pathology

- **Fibrosis and intimal hyperplasia**
- **Non-elastic – responds well to venoplasty**
- **Elastic – immediate recoil**

Presentation

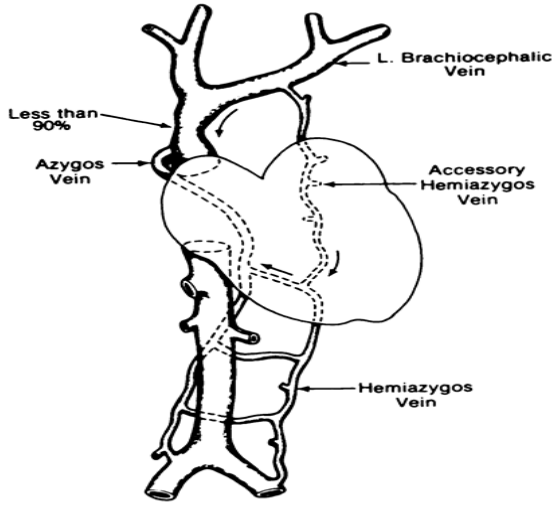
- Asymtomatic
- Oedema – arm, face or upper body
- Distended collateral vessels
- Access complications: Lines and fistulas
- Bleeding fistula
- Access recirculation – prolonged HD sessions
- SVC syndrome - rare

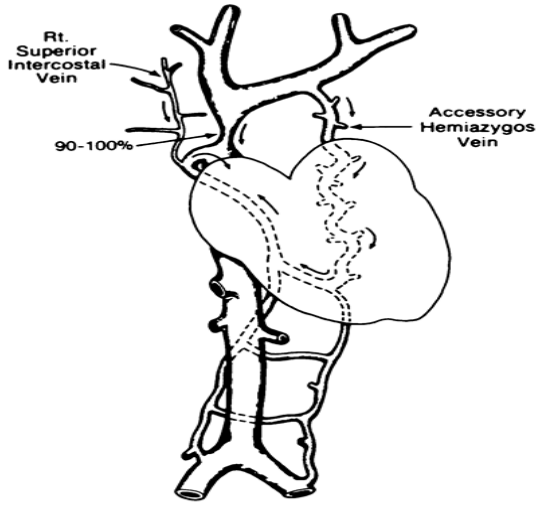
Investigations

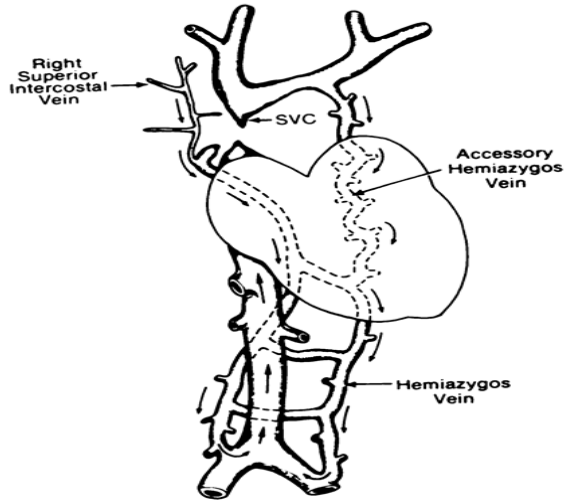
- Duplex ultrasound – inadequate for more central lesions (collateral formation)

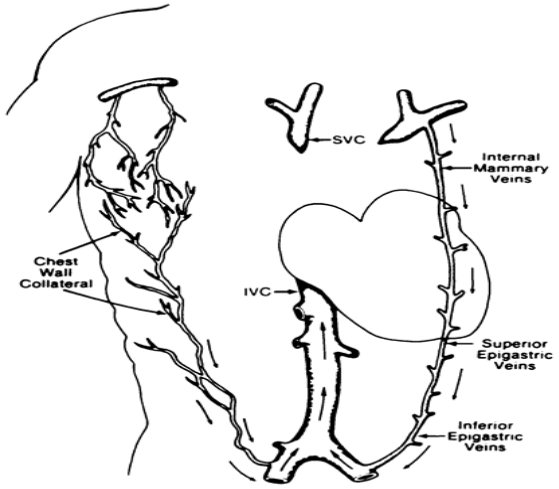
  diagnostic: loss of normal variation in respiratory flow
- NKF-KDOQI guidelines – venography before permanent access creation in patients with prior subclavian access – ipsilateral
- Patients with prolonged use of “Permanent catheter”

Venographic classification









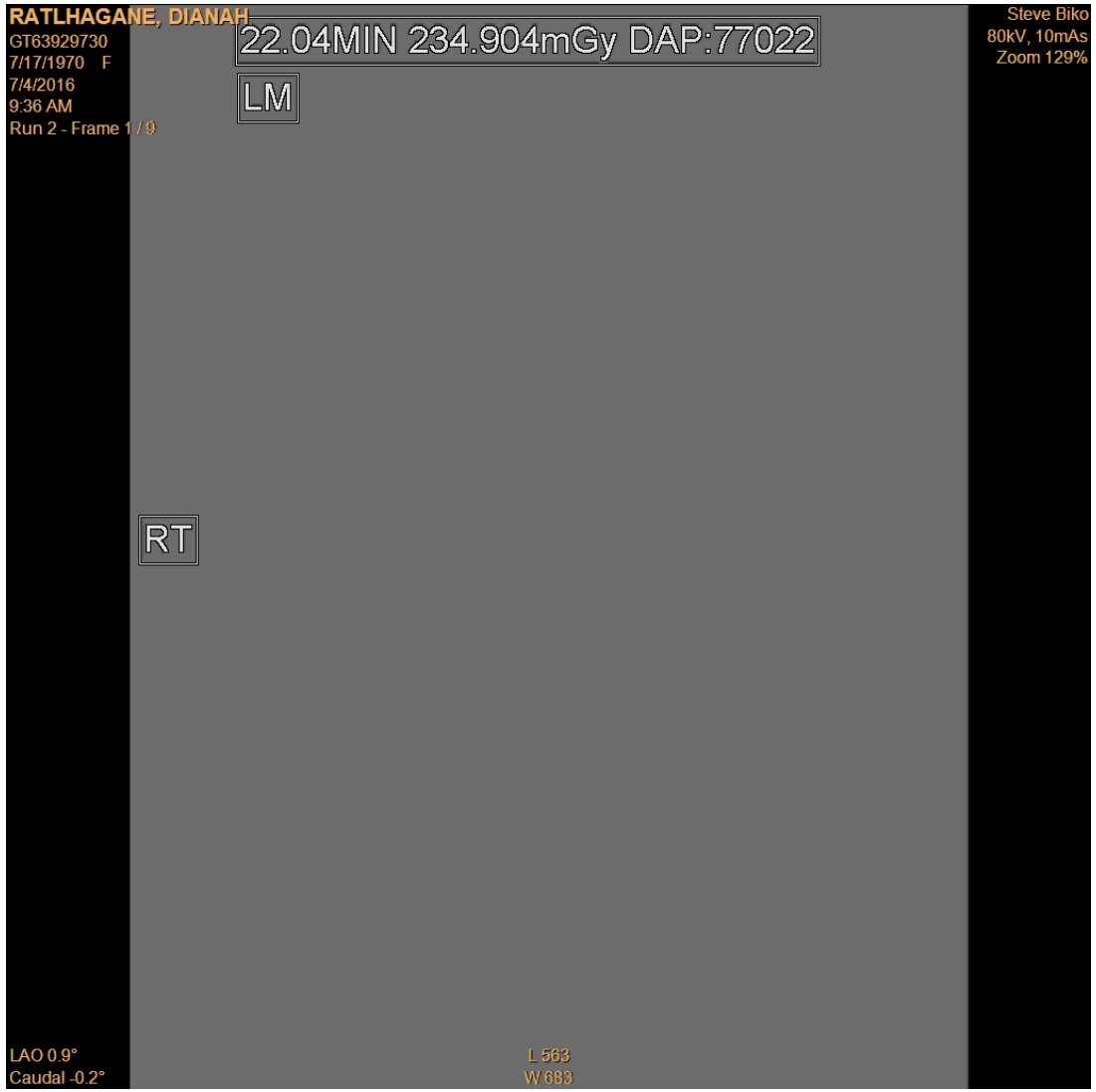
Recommended Treatment

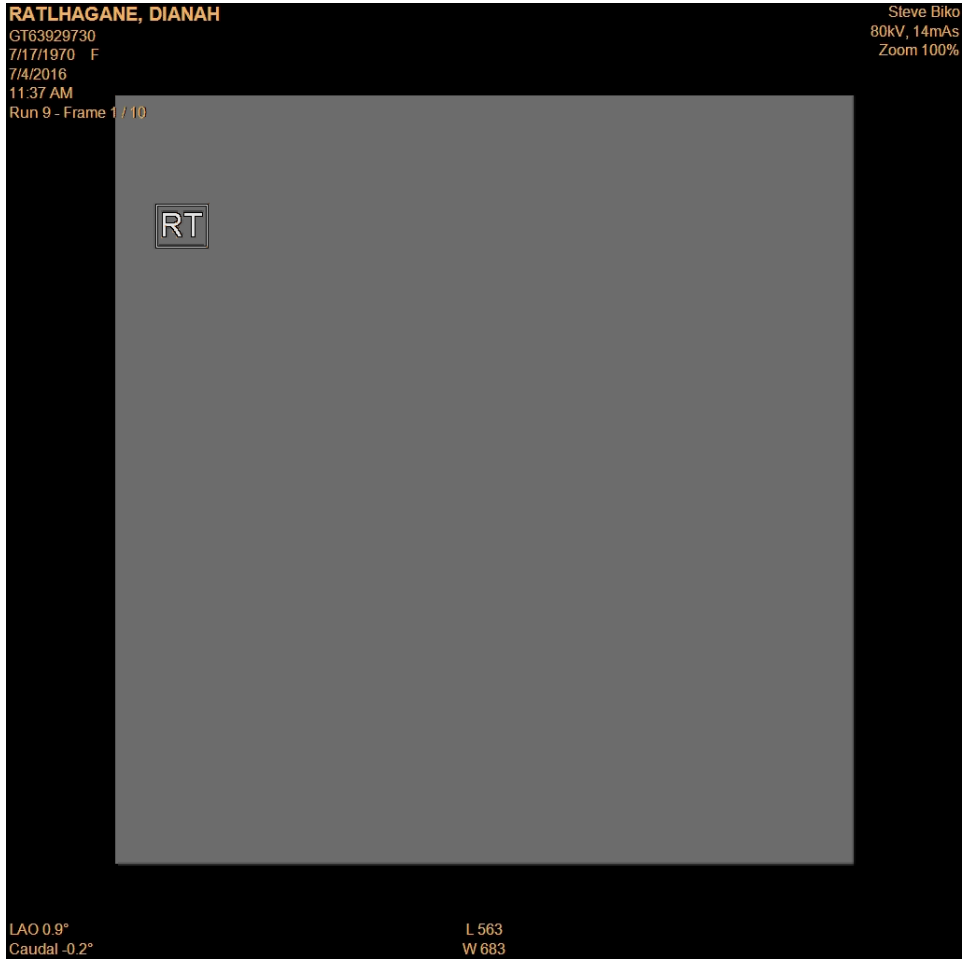
- Subclavian vein: PTA +- stent
- Superior Vena Cava – angioplasty with selective stenting

Surgical treatment

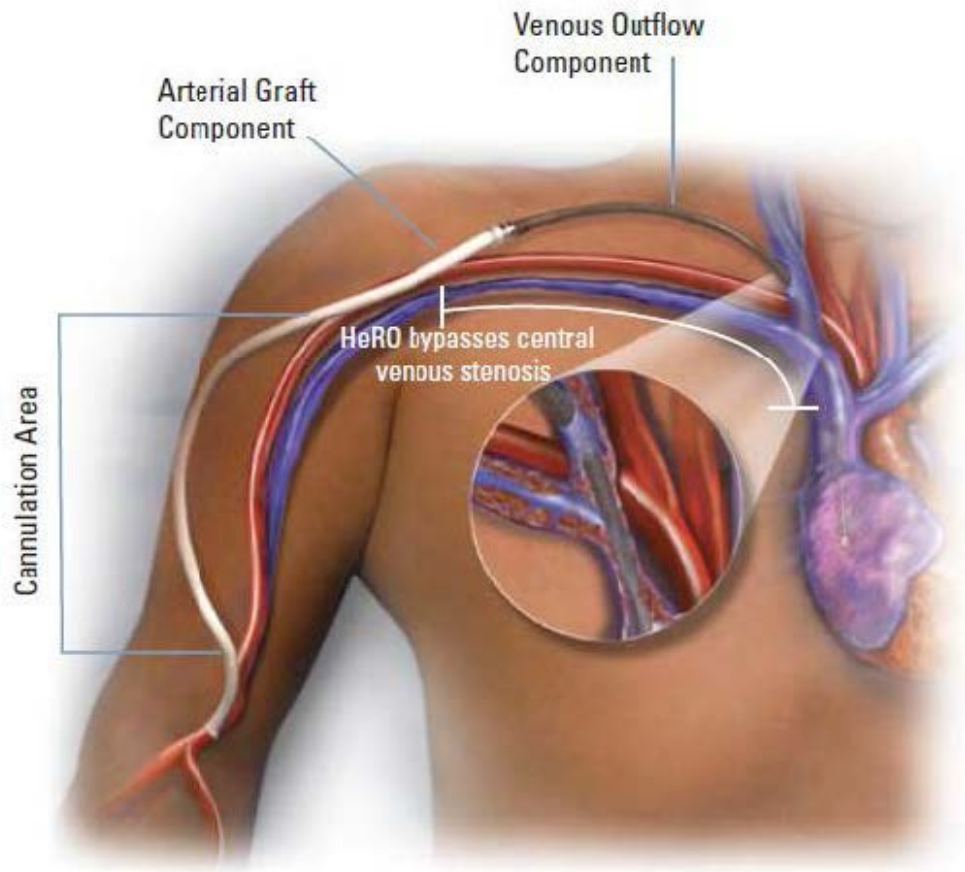
- Indication - failed endovascular therapy
- Graft materials – autologus vein (GSC,FV,SP)

  PTFE, Allograft/Cryopreserved homograft
- Surgical technique – Median sternotomy, bypass to Atrial appendage
- Results – **high morbidity and mortality**

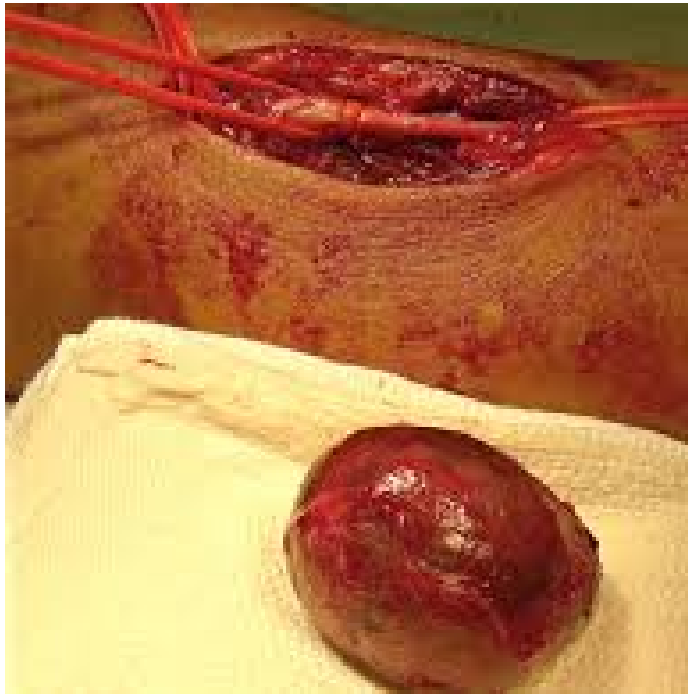

RATLHAGANE, DIANAH
GT63929730
7/17/1970 F
7/4/2016
9:36 AM
Run 2 - Frame 1 / 9
22.04MIN 234.904mGy DAP:77022
LM
RT
Steve Biko
80kV, 10mAs
Zoom 129%
LAO 0.9°
Caudal -0.2°
L 563
W 683

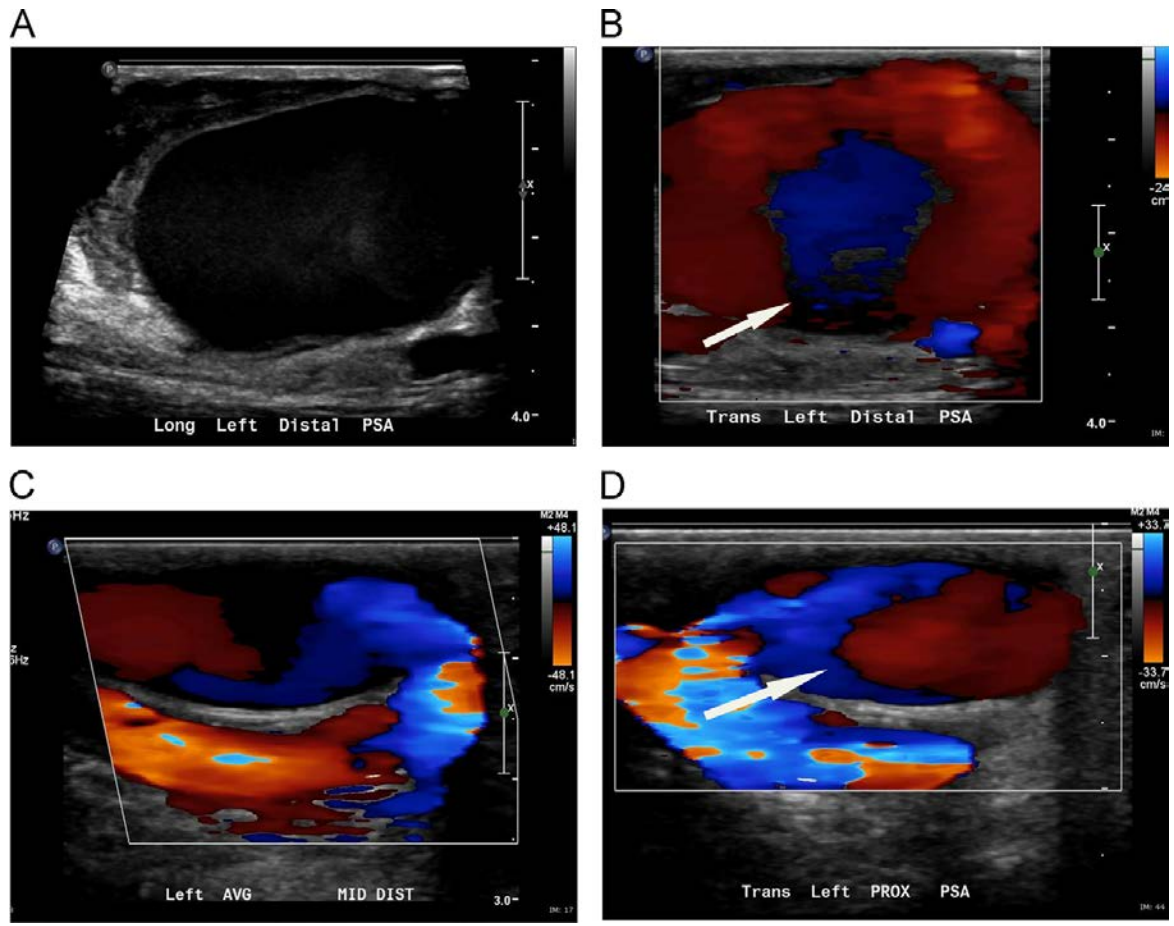

RATLHAGANE, DIANAH
GT63929730
7/17/1970 F
7/4/2016
11:37 AM
Run 9 - Frame 1 / 10
Steve Biko
80kV, 14mAs
Zoom 100%
RT
LAO 0.9°
Caudal -0.2°
L 563
W 683

Hemodialysis Reliable Outflow (HeRO) Graft

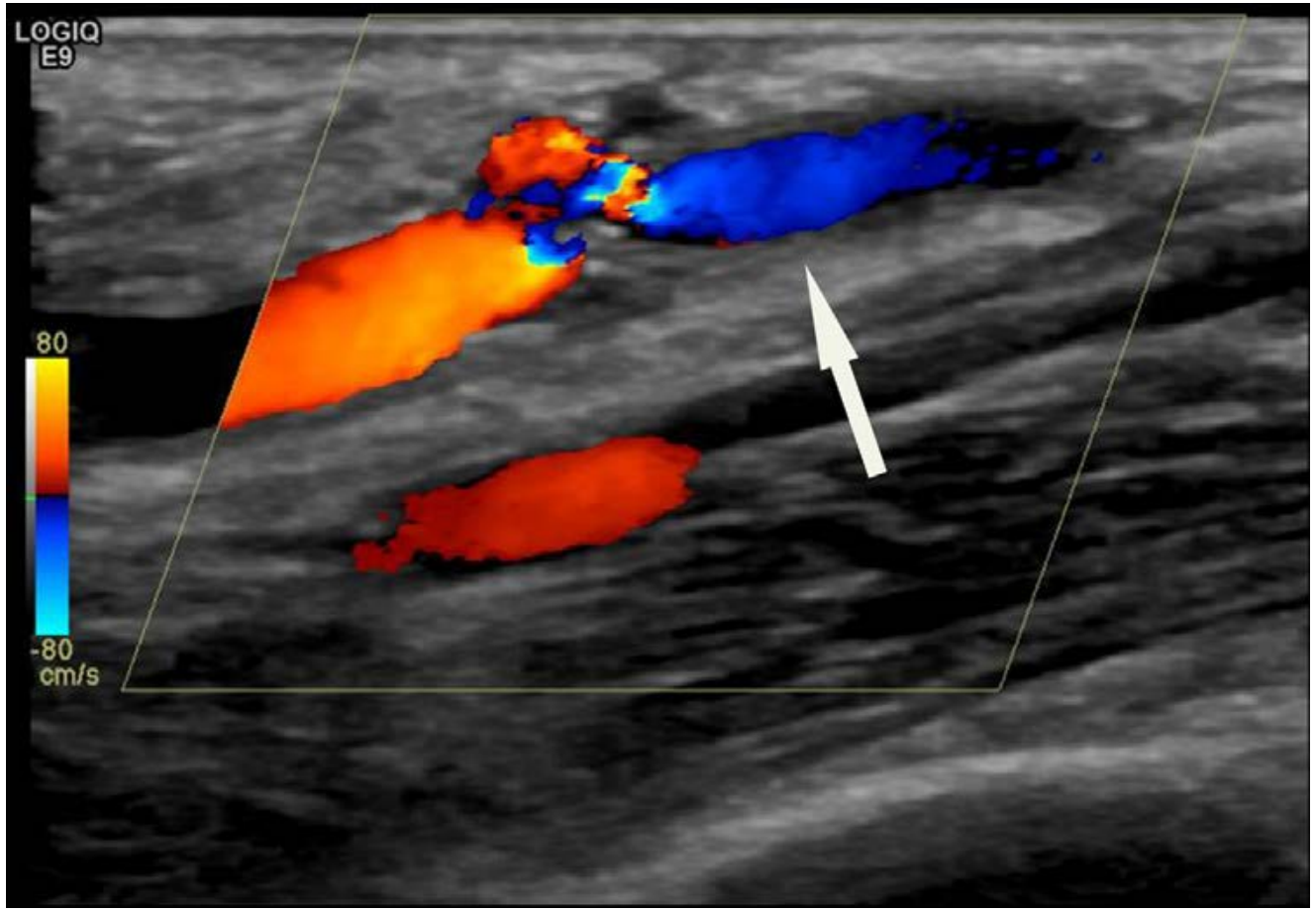


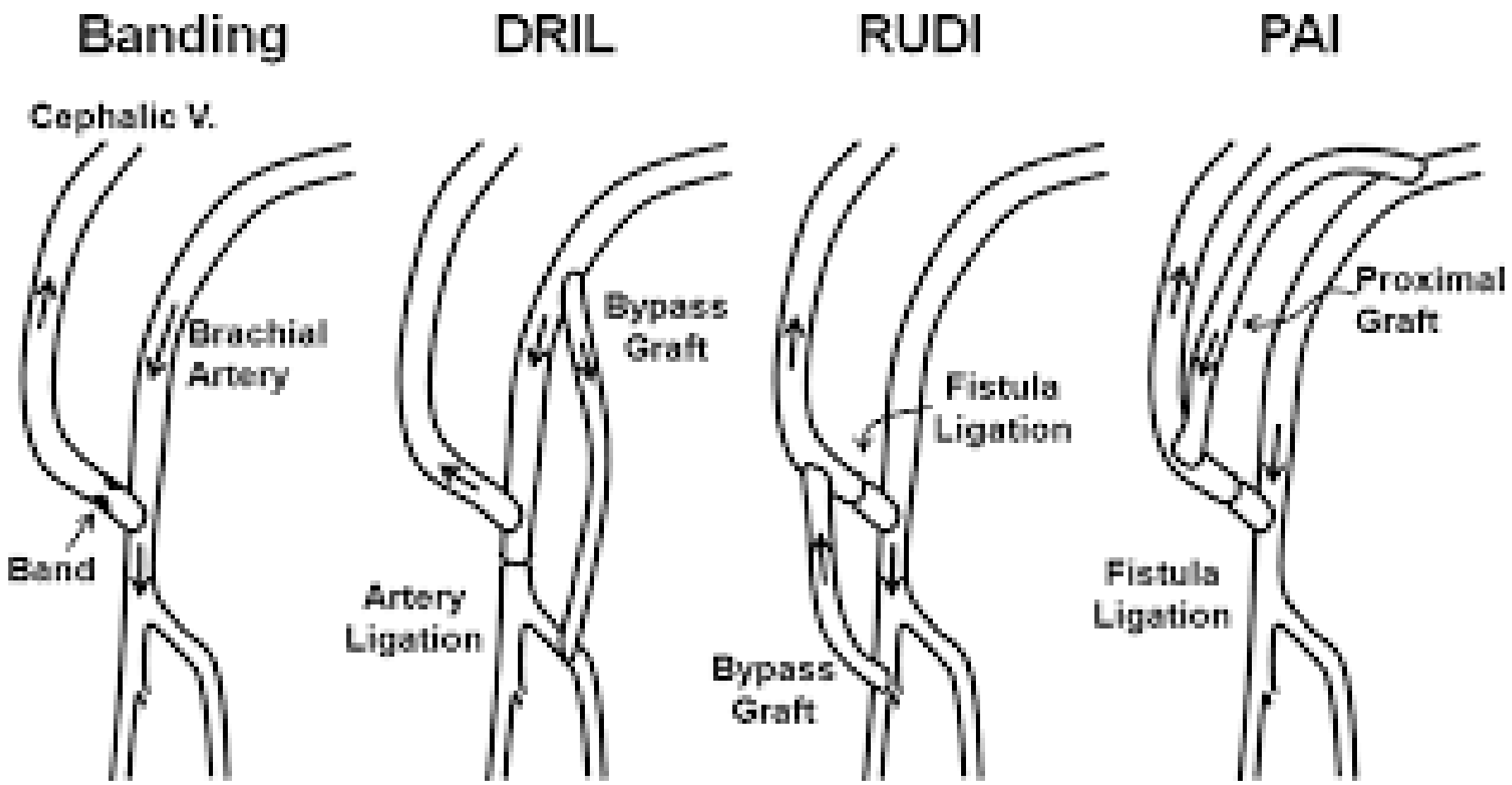
ANEURYSMS



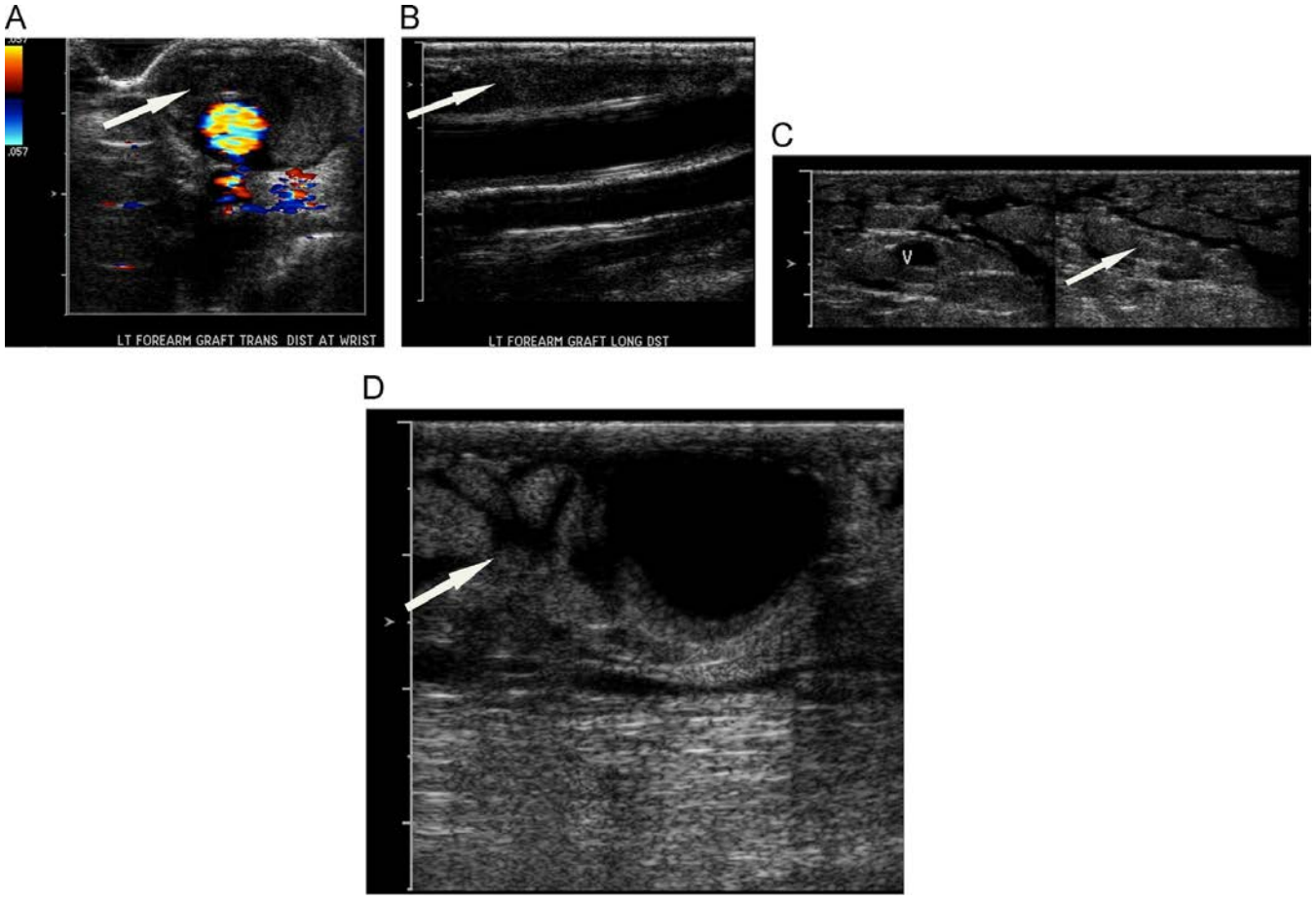

A
Long Left Distal PSA
4.0
B
Trans Left Distal PSA
4.0
C
Left AVG MID DIST
3.0
D
Trans Left PROX PSA

ARTERIAL STEAL SYNDROME


LOGIQ
E9
80
-80
cm/s


Banding
DRIL
RUDI
PAI
Cephalic V.
Brachial Artery
Band
Bypass Graft
Artery Ligation
Fistula Ligation
Bypass Graft
Proximal Graft
Fistula Ligation

Infection


A
B
C
D
LT FOREARM GRAFT TRANS DIST AT WRIST
LT FOREARM GRAFT LONG DST
V


Don't take your organs to heaven...
Heaven knows we need them here!