Vascular Access for Patients affected by non Renal Disorders

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Disclosures

- Gore
- Covidien
- Maquet
- Proteon Therapeutics
INTRODUCTION I

First fistula in 1966: Brescia and Cimino, radio-cephalic, side to side anastomosis meant for HD but since…
AVFs have been used successfully for:
- Plasmapheresis
- TPN
- Sickle cell disease management
The Evidence

- Only 12 articles identified in Pubmed for TPN only (106 cases)
- Nothing for plasmapheresis or Sickle cell disease.
Personal Experience

- Between 2005 and 2016 we have in St George’s performed 10 cases for patients not affected by renal diseases
  - 3 for short gut syndromes in need of daily TPN
  - 1 for Ehlers danlos syndrome also in need of daily TPN
  - 4 for sickle cell disease patients in need of constant pain management
  - 2 for homozygote family hypercholesterolemia in need of plasmapheresis (2 sisters)
Type of accesses

- All patients were referred late once their central veins were very diseased
- 4 leg fistulas (2 SFV transpositions and 2 SFA to Pop vein bypass using GSVs)
- 2 necklace grafts (sickle cell)
- 4 BC and BBAVF (2 sisters)
Choice of access

- Central vein patency
- Type of treatment needed:
  - For sickle cell patients, they need urgent pain management by any nurse anytime so the access should be very easy to cannulate hence the choice of necklaces
Choice of access

- TPN: body image problems need to be taken into account, fem pop rather than SFV transposition on younger women
- For plasmapheresis the 2 cases suffered severe steal syndrome and had already had multiple procedures on their legs: Rescue of their arm AVFs plus DRIL procedures
Our results

- Excellent patency rates: only one occlusion after 4 years (necklace graft)
- No infection
- Several revision for aneurysmal dilation (sisters)
- Better results because the AvFs performed are high inflow and far less often and less aggressively used than when it is for dialysis.
The literature

- 106 Cases published
- 81 natives, 11 bovine grafts, 4 PTFEs and 10 autologous grafts
- Much better results than catheters with regards to infection but a slightly higher occlusion rate than for some tunneled catheters
AVFs should be considered for the above indications.

Referrals should come much earlier so the choice of access is better.

That necessitates communicating to Gastro-enterologists or haematologists as some are still very reluctant to consider referring.

"That's the skip-forward button. Great for jumping to conclusions."
ESRD:

- It should account for age, RF, life expectancy, ethnic background
- Patient choice, refusal rate
- It should avoid CVCs
- Bespoke
Natives only if

- Vein is >2.5mm
- Age <80
- Palpable pulses
- Life expectancy is >2 years
- No diabetes or without vascular complications
- Vein is not deeper than 9mm
- We cannulate before 2 weeks: US guided, reduced pump speed, 17 Gauge needle
If not, when upper limb options are available

- Admit night before, dialyze and CVC out
- Early cannulation graft
- Usually straight brachio-axillary
- Small incisions, quick intervention short arterial anastomosis but long venous.
- Heparin subcut. for 24 hrs then antiplatelet or warfarin according to underlying condition
New grafts are now available

- Early cannulation: Less CVCs
- Semibiological or biological: better patency - less infection
- Spiral flow pattern technology: better patency
- Nano technology: less infection better cannulability
- Hybrid grafts: easier handling so more indications?
- HeRO catheter to push some boundaries further
- Cutting edge technology?
When all upper limb options are exhausted

- The SVC is open and even if one innominate is occluded
- Necklace straight or loop graft
- Axilary artery to axilary vein graft
- Remove CVC before surgery
- Use an early cannulation graft

Result: Early cannulation necklaces between 2008-10: 16 cases, no CVC used before first cannulation; PP and SP at 6 weeks and 1 year: 92.9%-65.7% and 92.9%-83.5% (Semin Dial 2011;24: 456-9)

Moreover very few infections: Out of a total of 37 grafts until 2014 only 2!
So here is the protocol:

- All upper extremity options are exhausted
- Bilateral innominate or SVC occlusion
- HeRO catheter is indicated before a LEAVG
- Hybrid between a PTFE graft and a CVC
- The evidence shows similar results for both technique (Ann Vasc Surg, JVS, EJVES largest series 164 pts)
- So why not spare the lower limb for when the HeRO fails and all upper extremity options are REALLY exhausted?
There is no case that we will not consider even for very complex rescues or operations. We have achieved excellent patency rate and out of hospital management on this cohort of patients 77% secondary patency (Semin in Dial 2006, 19: 246-50)
Complex procedures

- Superficial femoral vein transposition is an excellent native access for complete SVC thrombosis
- If patient obese or diabetic then Axillary artery to popliteal vein bypass graft
- Even one case of a bypass to the heart (NDT, 2007, 22: 970-1)
Occluded accesses

Never abandon the access without trying to rescue it
Surgery or endovascular according to what is available easily locally
Fogarty catheters or clot busters allow to rescue weeks after the event
Access rescued ready for immediate use