Some Surgical aspects of Vascular Access

Chris Russell
Timing of referral and placement

- Ideal time is 3-6 months prior to starting dialysis!
- 6 weeks probably min time for maturity – dilation of vein but also arterialisation of wall
- Always ‘soft’ on first needling, often ‘blow’

- ? Is this any different if AVF left for longer
Timing of referral and placement

ANZDATA 2009 –
- Aus - 38% start with adequate access
- NZ - 23% start with adequate access

KP today - unit variation 25 to 80 % start with CVC
- surgeons not the problem
Does late access matter?

- 5924 incident haemodialysis patients
- Early access creation (≥ 4 months before dialysis)
- Lower risk of death, with a relative risk of 0.76 (95% CI 0.58 – 1.00)
- Lower risk of sepsis 0.57 (95% CI 0.41 – 0.79)

Oliver et al JASN 2004
Lorenzo V et al  A J K D 2004

- Of 281 planned patients, 73% initiated therapy with an AVF
- Of 257 unplanned patients, 70% initiated therapy with a catheter \((P < 0.001)\)
- At 12 months, the number of deaths was 3 times higher in both the unplanned versus planned groups and catheter versus AVF groups.
- The joint effect of unplanned dialysis initiation and catheter use had an additive impact on mortality \((HR, 2.89)\)
- Combined influence of both variables was associated with greater morbidity and mortality than either variable alone
Problems associated with too early placement

- Primary patency rate variably reported
- Patient may never use access
  - Waste of theatre time
  - Waste of venous site
Problems associated with too early placement

- Development of neo-intimal hyperplasia
- Occurs at sites of curve, valves, junctions etc
- No surveillance of access if not on dialysis
- Pts not often aware they have stopped and _ - unsalvageable fistula

??? PD catheter and AVF
'CAPD first' and not 'fistula first'
Problems associated with too late placement

- Fistula not ready at time patient needs to start dialysis
- Cannulation of access before it is matured can damage the access
Problems associated with too late placement

- Usually try R-C or B-C first – but be prepared to try any combination
  - 'synthetic VAG last'
- Failure to mature due to stenosis, small vessels
- May be undiagnosed arterial inflow problems which need fixing prior to surgery
Timing of placement

- Patients unpredictable!
- Creat 450 for 4 years!
- Creat slow creep to 300, then sudden deterioration to 650
- Early referral good, so veins can be saved
Timing of referral

- Waiting time for surgical OPD
- Waiting time to theatre
- Likelihood of requiring multiple procedures
- Likelihood of patients turning up!

Make allowance for local factors rather using them as an excuse
Upper arm AVF or graft

- Brachiocephalic best
  - Simpler procedure
  - Basilic vein can be saved for later
- primary patency for brachio-cephalic and brachio-basilic fistulas are fairly high
  - 87% and 81% for brachio-cephalic fistulas at 1 and 3 years
  - 86% and 73% for brachio-basilic fistulas at 1 and 3 years

BB AVF - allow 4 to 6 months before initial use
Brachio-basilic AVF
Common site of stenosis
Brachio-basilic AVF v forearm loop graft

- Randomised trial of transposed brachio-basilic v loop graft.
- Patients suitable for both
- Brachio-basilic AVF group had 1.6 complications per patient-year and 1.7 interventions per patient-year
- Loop graft group had 2.7 complications and 2.7 interventions per patient-year
When should access be placed

- UK – eGFR <20mls/min
- Canada 15-20 mls/min
- EBPG <30mls/min

- review by surgeon at least 6 months before anticipated need
Clinical examination with ‘shirt off’
Patients likely to have difficult access

- Female
- Peripheral vascular disease
- Obese
- > 65yrs old – ‘mobile veins’
- Fragile skin
Pre-op mapping

- Previous central/PICC lines
- Evidence of collateral veins
- Fat arms
- no obvious, or small veins
- Previous access
- Arterial – older patients, diabetics, arterial lines
Colour doppler ultrasound

- **Veins**
  - With torniquet
  - Size and depth of veins,
  - Continuity
  - Falsely low estimate of size

- **Arterial**
  - Size, stenosis
  - Degree of calcification

*Operator dependant*
Other Modalities of mapping

- **Venography**
  - Better for central veins
  - Contrast load in pre-dialysis patients
- **CT venography**
  - Can look at both sides
- **MR venography**
- **Arteriography**
Multidisciplinary dialysis access clinic

1. Dialysis access nurse co-ordinator
2. Ultrasound machine or same day service
3. Surgeon
4. Interventional nephrologist
5. Access to interventional radiology suite
6. Prospective collection of data