Some Surgical aspects of Vascular Access

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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
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 unpredicatable!
- 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