

# Surgical Options for revascularisation



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# The goal



- Treat pain
- Heal ulcer
- Preserve limb
- Preserve life

# The options



- Conservative
- Endovascular
- Surgical bypass
- Primary amputation

# Decision making



- Severity of CLI – symptoms and extent of tissue loss
- Fitness of patient for intervention
- Ambulatory status
- Likely life expectancy
- Arterial anatomy – intervention options

# CLI and risk of CV events



- *CLI as an indication of extensive atherosclerotic load*
- *10-40 % risk of secondary events post intervention (CV events, death, major amputation)*

# PREVENT<sub>111</sub>



- *Randomised, prospective (EF2 v surgical bypass) of CLI*
- *64% diabetic ; 75% tissue loss*
- *Early failure 5%; 1 year patency 51%; secondary patency 82%; limb salvage 88% and survival 84%*
- *Predictors for poor outcome*
  - *Vein < 3mm*
  - *Non single vein conduit*
  - *Afro-american*

# Challenges of distal bypass



# Surgical treatment of the diabetic foot

- prompt incision, drainage, and débridement
- including partial open toe, ray, or forefoot amputation.
- Even in the presence of foot infection, pedal bypass can be performed safely ***as long as invasive sepsis is controlled before surgery***



# The conduit – pre op preparation



- Use of ultrasound to evaluate calibre of vein – tourniquet; stand patient
  - Internal diameter
  - Compressibility
  - Sclerosis or varicose segments
- Select *best* autogenous conduit
- Map *and mark* the conduit – placement of incision for vein harvest to minimise undermining of the skin

# The conduit – intraoperative



- Gentle handling during harvesting
  - Endothelial damage and natural loss
  - Ischemic time
- Careful distension of conduit
  - Heparinised saline
  - papaverine
- Tunnelling without kink or distortion of conduit

# The conduit – post implantation



- **Completion angiography**
  - Confirms graft patency
  - Identifies stenosis
  - Confirms run-off arterial bed
- **Intra operative duplex evaluation**
  - More sensitive
  - Predictive of early graft failure PSV  $<45$  cm/s; ratio  $> 2$

# The conduit –post operative management



- **Peroneal run-off?**
  - Use of perfusion pressure assessment
  - Duplex to confirm patency of graft
- **Anticoagulation ?**
- **Anti-platelet therapy**

# Conduit options



- Contralateral GSV
- Arm vein bypass – single segment or spliced
- Prosthetic with modification e.g. Miller cuff



**R.L. VARCOE, W. CHEE, P. SUBRAMANIAM, D.  
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EFFORT” EUROPEAN JOURNAL OF VASCULAR  
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33(6):737-741**

# Anastomosis



- **Distal versus proximal as the first anastomosis to perform**
  - Length of conduit
  - Twisting of conduit
- **Vessel control**
  - Tourniquet
  - Balloon or dilator occlusion
  - Atraumatic clamps
- **Tunnelling**
  - Anatomic versus superficial
- **Parachuting**
- **Endarterectomy**
  - Target vessel
  - Visualising the lumen

# Surgical strategies

## Length of bypass



- Shorter grafts have better patency
- Improve inflow by pre-bypass angioplasty or stenting
- Use distal SFA or popliteal as take-off site for graft



# Post operative care



- **Keep the graft flowing**
  - Early graft surveillance
  - Vein graft surveillance programme
- **Treat the foot**
  - Continued foot and ulcer care
  - Use of negative pressure dressings
- **Keep the patient alive**
  - Statin (increases 1 year survival rates\*)
  - Anti platelet agents
  - Treatment of hypertension and diabetes# to target goals

# Conclusion – Technical Aspects



- Selection of autogenous conduit
- Appropriate inflow – out flow target vessels
- Careful dissection and tunnelling
- Wound closure under zero tension



- diabetes is *not a risk factor for vein graft failure*;
- diabetes is associated with increased risk for both *long-term mortality* and *limb loss* in the patient with CLI.

# Achieving success



- Aggressive revascularization to tibial/pedal targets
- Multidisciplinary wound and foot care
- long-term surveillance in management of the patient with diabetes with a dysvascular limb

# Conclusion – non technical



- Experienced clinical judgement
- Technical precision
- Fastidious post-operative care
- Surveillance programme