Peripheral Vascular Disease and Management

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The Circulation

• Heart (boiler and hot water pump)
  – High pressure / flow
    • Wear and tear – narrow (atherosclerosis)
    • Block suddenly (gunk ! embolus)
    • Dilate and burst (aneurysms)

• Arteries (hot water pipes)
  – High pressure / flow
    • Wear and tear – narrow (atherosclerosis)
    • Block suddenly (gunk ! embolus)
    • Dilate and burst (aneurysms)

• Tissues (radiators)
  – Brain
  – Guts
  – Kidneys
  – Arms and legs

• Veins (cold water pipes)
  – Low pressure / low flow / valves
    • Block (deep vein thrombosis)
    • Blood flows the wrong way (VV)

Vascular Surgeon at Work!
(regular maintenance)
How do Vascular Surgeons work?

Take referrals from primary (GP, nurses) and secondary care (A&E, specialists) (letter, fax, e-mail, telephone)

Elective (planned) ↔ Urgent (semi-planned) ↔ Emergency (unplanned)

History and Examination

- Communication and Documentation
- Investigations
  - Diagnosis
  - MDT
  - Treatment
    - Medical (e.g. aspirin, statins)
    - Interventional (e.g. angioplasty, stent)
- Timeliness
  - Targets
  - Expectations
- Surgery (e.g. bypass)

After and continuing care
(back to GP, onward specialist referral, limited follow-up and surveillance)
What do Vascular Surgeons do?

Take referrals from primary (GP, nurses) and secondary care (A&E, specialists) (letter, fax, e-mail, telephone)

Emergency (unplanned)

Urgent (semi-planned)

Elective (planned)

Medical (e.g. aspirin, stains)

Interventional (e.g. angioplasty, stent)

Surgery (e.g. bypass)

Aftercare (back to GP, onward specialist referral, limited follow-up and surveillance)

Communications and Documentation

Timeliness

Targets

Expectations
What do Vascular Surgeons do?

Arteries
- Carotid (stroke)
- Arms (atherosclerosis, embolus)
- Aorta (aneurysm, dissection, trauma)
  - Thoracic
  - Abdominal
- Kidneys (dialysis access)
- Intestines (ischaemic bowel)
- **Legs** (10X > arms)
  - Atherosclerosis (smoking)
  - **Diabetes** (+ neuropathy)
  - Trauma (bleeding, compartment syndrome)

Veins
- Varicose veins, leg ulcers
- **DVT/PE**
Control of bleeding service – anywhere, anytime!

Trauma
Post-partum haemorrhage
Legs – all shapes and sizes

Just looking tells you a lot about their owners!
Legs – all shapes and sizes!
Legs - anatomy

Bipedal: pros – and cons

• “Outgrown” blood supply (10:1)
• Pressure “too high”

Arterial segments

• Aorto-iliac (abdomen and pelvis)
• Femoro-popliteal (thigh and knee)
• Infra-popliteal (below knee)

Smaller and so harder to treat as you go down the leg
Risk factors for peripheral arterial disease (PAD)

- Smoking (pack years)
- Diabetes (type 2 > type 1)
- High cholesterol
- High blood pressure
- Obesity (poor diet and sedentary life-style)
- Alcohol
- Old age
- (Genes, ethnicity?)

Usually multi-factorial
Psychological factors
Socio-economic factors
Diabetes

High blood sugar
High blood fats
Nephropathy (kidneys)
Retinopathy (eyes)
Neuropathy (nerves, longest first)
Arteriopathy (blood vessels)
  Heart
  Legs
  Brain

Type 1
  Adolescent
  Insulin
  Genes

Type 2
  Middle age
  +/- Insulin
  Obesity
PAD: classification and frequency (65y)

No significant disease (80%)

Disease but no symptoms (15%)*

Intermittent Claudication (IC) (4%)*

- Pain (in calf) on walking

Critical (Severe) Limb Ischaemia (CLI/SLI)***

- Pain (in foot) all the time – worse at night
- Tissue loss (ulcers, gangrene) – “2/52 rule”

*Peripheral Arterial Disease (PAD) is a powerful marker of ↑↑ overall cardiovascular (CV) risk (+/- symptoms)
Intermittent Claudication

(relatively uncommon cause of litigation in my experience)

Arteries become narrowed and blood flow decreases in arteriosclerosis

Build up of fatty substances in the wall of the artery

Diseased arteries

Collateral circulation

Pain in muscles
Critical (severe) limb ischaemia (CLI/SLI)
(without intervention the limb will likely be lost)
Critical (severe) limb ischaemia (CLI/SLI)

The largest single subject of my ML reports

- Especially in diabetes

Breach of duty – failure to:

- Examine
- Diagnose
- Refer
- Intervene
- Consent appropriately
- Complications

Causation – but for the failure:

- Pain and suffering
- Minor and major amputation
- Death

Primary care
- GP / DN / PN / podiatry / chiropody

Secondary care
- Consent appropriately

[Image of a clinical guideline on Type 2 diabetes]

Type 2 diabetes
Prevention and management of foot problems

* Update of the guidelines entitled Clinical Guidelines and Evidence Based for Type 2 Diabetes Prevention and Management of Foot Problems published by the Royal College of General Practitioners in 2000.
The “diabetic foot”

Ischaemia
- lack of blood supply

Neuropathy (Charcot’s)
- sensory, motor and autonomic

Neuro-ischaemia - both

Contributory negligence?
- Smoking, non-compliance with treatment

Poor prognosis anyway
- Clinical negligence or natural history?

Quantum
- Effect of disability, QoL, life expectancy
Care of people with foot care emergencies and foot ulcers

- Foot care emergency (new ulceration, swelling, discolouration)
  - Refer to multidisciplinary foot care team within 24 hours.

- Expect that team, as a minimum, to:
  - investigate and treat vascular insufficiency
  - initiate and supervise wound management
    - use dressings and debridement as indicated
    - use systemic antibiotic therapy for cellulitis or bone infection as indicated
  - ensure an effective means of distributing foot pressures, including specialist footwear, orthotics and casts
  - try to achieve optimal glucose levels and control of risk factors for cardiovascular disease.

The “24 hour” rule
Reality or aspirational?

Consent – a surgeon’s perspective

Process not an event: but not always very much time

Capacity: yes, but limited by being unwell, in pain, ‘muddled’, educational and intellectual status, communication barriers (hearing, language)

Family: not present, not contactable, ‘dysfunctional’

Doctor knows best: “You’re the expert, doc!”

Humanity: unwell, needs the operation and reluctant to increase suffering with unpleasant possibilities – if you tell them they will probably consent anyway(?) (“Don’t want to know”)

“Serious or frequent” risks: how defined (1%)?

Limited recall: write it all down, takes time, dictate a note

Quantification of risks: Literature? Unit? Personal? One-offs?
Treatment options

Medical (drugs and dressings)
Interventional (angioplasty, stent)
Surgery (bypass)
End of life care (DNAR, LCP)


Who decides?

Evidence and data?
Politics and ego?
Post-code and reality?

Aftercare (limited opportunity for follow-up and surveillance)
Angioplasty / stenting
Bypass operation

Proximal anastomosis

Femoro-popliteal block

Distal anastomosis
# Complications

All surgeons get complications (even “experts”)

Half of all hospitals and surgeons are, by definition, “below average”

When does a complication represent negligence (severity, frequency)?
When does a “side-effect” of surgery become a “complication”?

<table>
<thead>
<tr>
<th>Surgical bypass</th>
<th>Immediate/ early (0-30 days)</th>
<th>Intermediate (30days – 12 months)</th>
<th>Late (&gt; 12 months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General (can happen after many / most operations) (Anaesthetic)</td>
<td>Bleeding Wound infection DVT/PE Pneumonia Heart attack</td>
<td>Poor wound healing</td>
<td>‘Keloid’ scar (cosmetic)</td>
</tr>
<tr>
<td>Specific (more or less) to particular operation</td>
<td>Blocked graft Bleeding graft</td>
<td>Graft stenosis</td>
<td>Graft occlusion and failure (leading to amputation)</td>
</tr>
</tbody>
</table>
Poor Prognosis of CLI

Multicentre randomised controlled trial of the clinical and cost-effectiveness of a bypass-surgery-first versus a balloon-angioplasty-first revascularisation strategy for severe limb ischaemia due to infrainguinal disease. The Bypass versus Angioplasty in Severe Ischaemia of the Leg (BASIL) trial

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Up to
1. 50% of people with CLI may be ‘untreatable’ (amputation, end of life care)
2. 20% of treatments (angioplasty, bypass) fail (within 30 days)
3. 50% of people with CLI who have initially successful treatment may lose their leg and/or die within 5 years
4. 30% will develop SLI in the other leg

Breach with causation vs. natural history of the condition (quantum)
Compartment syndrome – what is it?

Ischaemia and death of tissues due to obstruction of microvascular blood flow secondary to increased tissue pressure within a confined fascial space.

Powerful muscles

Leaky! (especially when damaged)

Tightly bound in fascia (silverside)

100mmHg

25mmHg

10mmHg
CS – how does it happen?

Trauma (bleeding)

Reperfusion (embolism)

“Trapped” (immobility, ↓blood flow, fixed pressure on muscles)
Clinical diagnosis (index of suspicion)

- Severe (unresponsive) pain
- Pain on passive movement of toes
- Pain on squeezing calf
- Calf tense
- Loss of pulses – **TOO LATE!**

Pressure measurements

- Can be helpful(?)
- **BUT** if you have thought about doing a fasciotomy …. do a fasciotomy!

Fasciotomy
What is a negligent operation?

- ‘Reckless’ (very rare)
- Dishonest (cover up, also rare)
- Foolhardy (it was never going to work!)
- Careless / bad day (only human?)
- Unlucky (TBFTGOG go I!)
- Not negligent (but settled) (increasing?)
- Negligent (but no, or not enough, causation)
- Negligent (but successfully defended)
Clinical Negligence: final thoughts

- Factors of production (people, ‘stuff’, time)
- **Communication** (shift working, EWTD)
- Documentation (EPR)
- Unrealistic expectations *(not just patients)*
- Wrong treatment
- Wrong time, place and person
- Wrong (poor) technique *(training, EWTD)*
- Failure to recognise / treat complications
- Failure of team working and to ask for help
Thank you