Venepuncture and Cannulation

Louise Smith
Clinical Nurse Specialist
Outcomes

By the end of this session you will be aware of:

– Basic anatomy
– Preparation procedures including patient identification
– Equipment required
– Preferred venous access sites (and alternatives!!)
– Patient care
– Safety and infection control
– Top tips!!
After this session

This is only the beginning!

– All personnel who carry out venepuncture and cannulation must have received training, supervision and be deemed competent by a named mentor having been observed performing venepuncture and cannulation on several (?5) occasions
Arteries and Veins

- Cephalic vein
- Basilic vein
- Median cubital vein
- Ulnar artery
- Radial artery
- Deep palmar arch
## Palpation of Veins

<table>
<thead>
<tr>
<th>Suitable</th>
<th>Unsuitable</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Round</td>
<td>– Pulse</td>
</tr>
<tr>
<td>– Firm</td>
<td>– Hard</td>
</tr>
<tr>
<td>– Elastic</td>
<td>– Small</td>
</tr>
<tr>
<td>– Refill when depressed</td>
<td>– Knotty</td>
</tr>
<tr>
<td>NB Go by touch and not sight!</td>
<td>– Fibrosed</td>
</tr>
<tr>
<td></td>
<td>– Bumby</td>
</tr>
<tr>
<td></td>
<td>– Valves</td>
</tr>
</tbody>
</table>
Equipment

(Venepuncture)

- Disposable gloves (check for latex allergy)
- Tourniquet
- Alcohol wipes/Gauze swabs
- Plaster
- Venepuncture needle and set/Syringe
- Appropriate blood bottles
- Specimen forms and transport bags
- Sharps bin
Patient Preparation

• Check identity and compare with request form
  – Full name, DoB
• Explanation of procedure allowing time for questions and withdrawal of consent
• Check environment and patient position
  – Do they need to lay down
  – Privacy
• Assemble equipment prior to commencing procedure
<table>
<thead>
<tr>
<th>Catalogue Number</th>
<th>Colour Code</th>
<th>Tube Type</th>
<th>Determinations</th>
<th>Special Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draw Volume 3ml per bottle</td>
<td></td>
<td>Blood Culture</td>
<td>Aerobic followed by Anaerobic  - if insufficient blood for both culture bottles, please use aerobic bottle only.</td>
<td></td>
</tr>
<tr>
<td>KFK119</td>
<td>Light Blue</td>
<td>Sodium Citrate</td>
<td>Coagulation Studies, INR, KCT, D-Dimer</td>
<td>Tube must be full</td>
</tr>
<tr>
<td>Draw Volume 2.7ml</td>
<td></td>
<td>Sodium Citrate</td>
<td>ESR</td>
<td>Tube must be full</td>
</tr>
<tr>
<td>KFK168</td>
<td>Red</td>
<td>Serum/Plastic</td>
<td>Bacteriology and Viral Serology, Selenium, Zinc, 170HP, DNA/Screen, Androgens, Androstenedione, cTSH/FSH, DNA, GH, Vit D, Insulin, C peptide Antibiotic Assays, Cryoglobulin (2 Red + EDTA)</td>
<td>Immunology requests except C3D</td>
</tr>
<tr>
<td>Draw Volume 6ml</td>
<td></td>
<td>SST\textsuperscript{II}</td>
<td>Aldosterone, B12, Ferritin and S. Folate and all routine Biochemistry profiles except those mentioned elsewhere.</td>
<td>Please contact handbook for specialized tests</td>
</tr>
<tr>
<td>KFK114</td>
<td>Gold</td>
<td>Lithium Heparin</td>
<td>Carboxyhaemoglobin Methaemoglobin, Cytogenetics.</td>
<td></td>
</tr>
<tr>
<td>Draw Volume 6ml</td>
<td></td>
<td>Lithium Heparin</td>
<td>FBC, Platelets, Sickle Test, Malaria, HbA1c, Hb Electrophoresis. The following tests require a separate tube and need to be sent to the laboratory straight away: Tarrytits, Mycoplasma, Viscosity, Cyclosporin, lead, CRP, Ammonia, ACTH Chromosomes, Benin, Cryoglobulin (4 Red)</td>
<td></td>
</tr>
<tr>
<td>KFK099</td>
<td>Green</td>
<td>Lithium Heparin</td>
<td>Carboxyhaemoglobin Methaemoglobin, Cytogenetics.</td>
<td></td>
</tr>
<tr>
<td>Draw Volume 6ml</td>
<td></td>
<td>Lithium Heparin</td>
<td>FBC, Platelets, Sickle Test, Malaria, HbA1c, Hb Electrophoresis. The following tests require a separate tube and need to be sent to the laboratory straight away: Tarrytits, Mycoplasma, Viscosity, Cyclosporin, lead, CRP, Ammonia, ACTH Chromosomes, Benin, Cryoglobulin (4 Red)</td>
<td></td>
</tr>
<tr>
<td>KFK171</td>
<td>Lavender</td>
<td>EDTA</td>
<td>Blood Group, Cross Matching</td>
<td>Tube must have four patient identifiers and be signed</td>
</tr>
<tr>
<td>Draw Volume 4ml</td>
<td></td>
<td>EDTA</td>
<td>Blood Group, Cross Matching</td>
<td>Tube must have four patient identifiers and be signed</td>
</tr>
<tr>
<td>KFK277</td>
<td>Red</td>
<td>Cross Match</td>
<td>Blood Group, Cross Matching</td>
<td>Tube must have four patient identifiers and be signed</td>
</tr>
</tbody>
</table>

IMPORTANT: Do not use addressograph labels on blood tubes.

SPECIAL TUBES: Gut Hormones
Phone Laboratory: DRI 2855 / DCGH (7) 89400
Procedure

• Wash hands
• Seat patient in a chair/bed/couch with the arm supported in an area where there is privacy and enough room to move freely around the patient
• Apply tourniquet
• Select the most appropriate vein (palpate well to distinguish difference between nerves, arteries and tendons)
• Put on gloves
• It is not necessary to swab clean skin (RCN and RCGP 2005) If using alcohol swab for dirty areas allow to dry for 30 seconds
Procedure
(Venepuncture)

- Stretch skin over vein using thumb of one hand
- Insert the needle, bevel side up, at a 30-45 degree angle approximately 1mm into vein
- (Watch for flashback)
- Stabilise needle and blood bottle with one hand using the other to change bottles
- Once all samples collected release tourniquet
- Cover needle with gauze, DO NOT apply pressure until needle withdrawn. Invert bottles
- Apply firm pressure for approx 30 seconds
- Apply plaster and dispose of sharps safely
*RECOMMENDED ORDER OF DRAW:
1. Blood culture bottles
2. COAGULATION Tubes
3. Tubes with NO ADDITIVES
4. OTHER Tubes with ADDITIVES
Inversions

<table>
<thead>
<tr>
<th>Colour Code</th>
<th>Tube Type</th>
<th>Inversions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Blue</td>
<td>Sodium Citrate</td>
<td>3-4 Times</td>
</tr>
<tr>
<td>Black</td>
<td>Sodium Citrate ESR</td>
<td>8-10 Times</td>
</tr>
<tr>
<td>Red</td>
<td>Serum/Plastic</td>
<td>5-6 Times</td>
</tr>
<tr>
<td>Gold</td>
<td>SST™ II</td>
<td>5-6 Times</td>
</tr>
<tr>
<td>Green</td>
<td>Heparin &amp; PST™ II</td>
<td>8-10 Times</td>
</tr>
<tr>
<td>Lavender</td>
<td>EDTA</td>
<td>8-10 Times</td>
</tr>
<tr>
<td>Pink</td>
<td>Cross Match</td>
<td>8-10 Times</td>
</tr>
<tr>
<td>Grey</td>
<td>Fluoride Oxalate</td>
<td>8-10 Times</td>
</tr>
</tbody>
</table>

Insufficient mixing can result in inaccurate test results and the need to re-draw.
Cannulation

- Administer IVs (medication, fluids blood etc)
- Just in case (collapse etc)
- Monitoring of a patients condition
- Nutritional support
Sites for Cannulation

- Subclavian Vein
- Axillary Vein
- Basilic Vein
- Median Basilic Vein
- Median Cephalic Vein
- Radial Vein
- Ulnar Vein

Superficial veins of the right upper limb
4 Common sites

- Basilic vein
- Median basilic vein
- Median cephalic vein
- Cephalic vein

All are large with thick walls and wide lumens
Veins of the hand
Sites to avoid

• Fibrosed areas
• Bruised areas
• Sites close to infection
• Lymphoedema
• Affected side post mastectomy or CVA
• Sites where cytotoxic chemotherapy is being administered
Equipment (Cannulation)

- Disposable gloves (check for latex allergy)
- Tourniquet
- Alcohol wipes/Gauze swabs
- Dressing
- Appropriate size cannula
- Flush/IV fluids/stopper
- Sharps bin
Does size matter?

- Age and medical history of patient
- Length of use
- Need for insertion

- 14g Brown (Emergency e.g. cardiac arrest)
- 16g Grey (Trauma)
- 18g Green (Rapid infusions e.g. fluid/blood)
- 20g Pink (Routine infusions/blood, post op)
- 22g Blue (small veins, short term infusions)
- 24g Yellow (small veins, children, older people)
Procedure
(Cannulation)

• Stretch skin over vein using thumb of one hand
• Insert the needle, bevel side up, at a 30-45 degree angle approximately 1mm into vein
• Watch for flashback
• Lower angle of cannula to almost skin level
• Advance the cannula slightly
• Pull back the introducer (2-5mm) and continue to advance the cannula (should be no resistance) in one movement
• Release tourniquet
• Apply pressure to distal tip of cannula whilst fully removing introducer
• Close system using stopper or IV and flush with normal saline
• Secure with appropriate dressing
Safety and Infection Control
(Venepuncture and Cannulation)

• Skin - cuts and abrasions should be covered with a waterproof dressing
• Gloves – disposable gloves seamless latex or vinyl should be worn
• Hand washing
• Aprons should be worn if possibility of splashing
• Eyes protected if there is a danger of flying debris (not only from the procedure)
Sharps

Appropriate sharps box

– Never over fill

– Never re sheath a needle

– Needle stick injury
Spillages

- Gloves
- Soak up excess with disposable towels
- Clean area with hypochlorite solution as per local policy
Troubleshooting

• Blood stops flowing
  – ? Vein collapsed – try reapplying the tourniquet
  – Change position of the needle. Move it forward or back
  – Adjust angle of the needle (bevel may be against the vein wall)
  – Loosen tourniquet as may be obstructing blood flow
  – Vacuum may have gone on blood tube

• Haematoma forms during collection
  – Release tourniquet, apply gauze swab and remove needle, apply pressure for > 30 seconds

• Arterial hit
  – Bright red blood, remove needle and apply pressure for > 5 mins
Points to remember

• If taking hormone or fasting bloods note time last food drink or hormonal medication taken etc
• If tourniquet has been applied for > 2 mins before venepuncture, release and re apply (abnormal results)
• If patient experiences sudden acute pain discontinue immediately
• Don’t keep going!! Refer on
• Observe for signs of dizziness or fainting. Fainting sitting up will result in a fit
Top tips

• Keep veins warm
• Soak in water/heat pads
• Gentle stroking, rubbing with swab
• Anxiety
• 2 attempts and move on
Play time!!!!!
Central Venous Access Devices

Paula Wilkins
Nursing Director
Aims

• Identify the different types of lines and why they would be used
• Understand the principles behind insertion
• Understand the care of the different line types
• Troubleshooting
<table>
<thead>
<tr>
<th>Catheter type</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-tunneled catheters</td>
<td>Choice of sites</td>
<td>Short-term use</td>
</tr>
<tr>
<td></td>
<td>Easy to insert and remove</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multiple lumina available</td>
<td></td>
</tr>
<tr>
<td>Non-tunneled skin-tunnel catheters</td>
<td>Lower infection rates than non-tunneled catheters</td>
<td>More complex insertion and removal</td>
</tr>
<tr>
<td></td>
<td>Long-term use</td>
<td></td>
</tr>
<tr>
<td>Ports</td>
<td>No external catheter</td>
<td>Surgical insertion and removal</td>
</tr>
<tr>
<td></td>
<td>Cosmetically attractive</td>
<td>Less suitable for frequent repeated access</td>
</tr>
<tr>
<td></td>
<td>Patient can swim/bathe as normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low maintenance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long-term use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lower infection rates than skin-tunneled catheters</td>
<td></td>
</tr>
<tr>
<td>Apheresis/dialysis catheters</td>
<td>Permit high blood flow rates</td>
<td>Large bore</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Require flushing with concentrated heparin (for example 5,000u/ml, according to manufacturer guidelines) solution to maintain patency. Flush solution must be withdrawn prior to use Short-term use</td>
</tr>
<tr>
<td>Non-tunneled (e.g. Vascath™ Kimai)</td>
<td>Easier to insert and remove</td>
<td>Complex insertion and removal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Best inserted via internal jugular or femoral routes</td>
</tr>
<tr>
<td>Skin-tunneled</td>
<td>Lower infection rates than non-tunneled devices</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Long-term use</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Good for patients with poor peripheral access who require both PBSC harvest and transplant procedure</td>
<td></td>
</tr>
<tr>
<td>PICCs</td>
<td>Easy to insert and remove</td>
<td>Higher thrombosis rate particularly with polyurethane variety</td>
</tr>
<tr>
<td></td>
<td>Do not require platelet support or correction of clotting prior to insertion/removal</td>
<td>Infuse blood/platelets because have greater internal diameter than silicone variety</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Slower flow rates particularly in silicone/valved varieties</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Catheter longevity lower than with skin-tunneled devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incidence of malposition greater than in other types of CVC</td>
</tr>
</tbody>
</table>
Short term use

• Non tunnelled catheters
  – When peripheral venous catheters are impractical
Mid term use

• PICC
  – Peripherally Inserted Central Catheter
  • Should be avoided in in patient use because of limited longevity and increased incidence of complications
Long term use

• Skin Tunnelled Central Lines
  – Repeated administration

• Implantable ports
  – More suitable for children
Single, double, triple

• Kept to a minimum to reduce risk of complications
  – Thrombosis
  – Infection
“Hickman” Lines
Groshong Lines
Ports

• Intravenous
• Epidural
Care of the line

• Post insertion
  – Signs of infection or bleeding
  – Dressing left in place for 24 hrs
  – Immediate use? Not in intravenous port a cath

• Dressing
  – Opsite iv3000/Mepore if oozing/skin fix/neck bag
  – Nothing ??

• Flushing
  – Heplok/Hepsal / Normal saline
  – Possitive pressure (never smaller than 10ml syringe)
    Weekly or more frequently depending on clinical situation
How to access the line

• Sterile or non sterile gloves
  – Open or closed access
  – Cleaning solution
    • Alcohol degrades the line

• IV sets changed 24-48hrly if transfusing blood products 72-96 hrs otherwise
Taking blood

• Prepare patient and equipment
• Clean “bung” using appropriate solution
• Attach syringe (not smaller than 10ml)
• Remove dead space blood and discard unless taking for blood cultures
• Take blood samples
• Flush (all lumen)
Living with the line

• Bathing
  – Shower rather than bath
  – No swimming

• Contact HCP
  – Leaking
  – Infection
  – Swollen arm/Prominent veins on chest wall
  – SoB