29. Venepuncture

Two of the tasks you may be called upon to perform are to bleed patients for haematological, biochemical or immunological testing or to place intravenous cannulae to be used to deliver parenteral fluids or medication.

Taking a Blood Sample

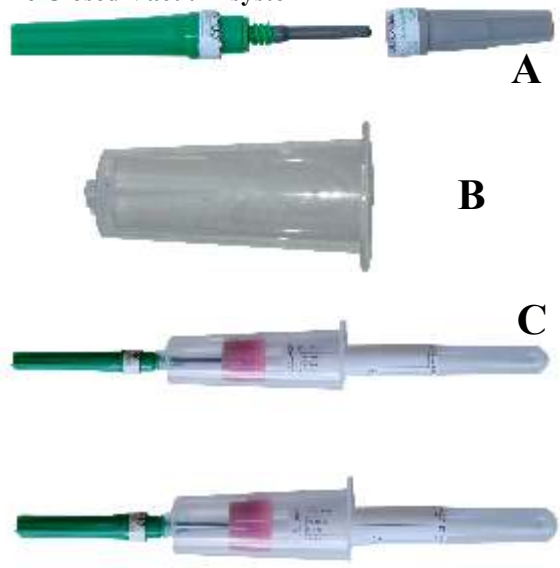
The need for you to bleed patients will depend upon the availability of phlebotomists. In some hospitals they carry out this task not only for outpatients who need investigations but do a round of the wards each morning. To avail yourself of this service you will need to make an on-line request or write a request card the night before or early in the morning before they arrive. Similarly intravenous catheters may be placed by clinical support workers but this may not be the case in many establishments so if there are none, or they are not around, the task will fall on you.

Venepuncture will be a useful skill to learn if you are ever going to work in a situation where you will be giving intravenous sedation. Your hospital appointment will give you ample opportunity to learn and become practised.

Before you start you should prepare yourself by learning what equipment you need, how to use it and how to select suitable veins. You should be organised and practise on a manikin before starting on patients. The operating theatre is an ideal place to get practice as the anaesthetist will be putting an IV cannula into every patient who is having an anaesthetic and most will be happy to teach and supervise you.

Practise on a manikin before starting on patients.

The Closed Vacuum system



Here is a 21 gauge needle with a valve (A), a hollow plastic tube that the needle screws onto (B), and a vacuumed blood sample bottle (C). This has a rubber bung on the end which is inserted into the tube after the needle has been inserted into the vein. Blood flows into the tube, encouraged by the vacuum. The vacuum is such that flow stops when there is sufficient blood. The valve allows the bottle to be removed while the needle is still in the vein without spillage so that another tube can be attached for a different test.

There are several commercially available closed systems for taking blood. They have several advantages over using a hypodermic syringe and needle. The main one is that the blood goes straight into the collecting bottle without the need to decant it, leading to less risk of spillage and injury from the needle.

Hypodermic needles and syringe for venepuncture

All equipment for intravenous access is colour coded. A green needle (21 gauge) is the smallest that can be used to take blood samples. A smaller needle will cause the blood to haemolyse (damage to the cell walls leading to release of their contents into the plasma). This will give inaccurate results, particularly for haemoglobin or potassium.

A hypodermic needle and syringe may still be the easiest way of bleeding a patient if they have small or otherwise difficult veins, such as might be the case if they have been damaged by a drug abuse habit.

When using a syringe to take blood you should be careful to withdraw the plunger only very gently and not squirt the blood out quickly through the needle which will also cause haemolysis. The smaller needles (blue 23 gauge and orange 25 gauge) should only be used for injecting medication; they are too small for taking blood. The larger the gauge number the smaller is the outside diameter of the needle.

Choosing a vein

When finding a vein to take blood from, the arm should be compressed by a tourniquet, a blood pressure cuff or by an assistant. The pressure applied should be between systolic and diastolic blood pressure so that arterial blood will flow into the arm but venous flow out is occluded. The vein will be encouraged to stand out if it is warm, if the hand is repeatedly made into a fist to pump the blood and if the vein is tapped gently with your hand.

First choose a vein that can be seen and can be felt. If there are none your second choice is one that can be felt but not seen. A vein that can be seen but not felt should be your last choice but it will be difficult. An elderly person may have veins that can be easily felt but are nevertheless difficult to cannulate and withdraw blood.

The ante-cubital fossa is the best site for taking blood from adults.

Ask the patient to repeatedly make a fist which encourages blood flow so that the vein stands out more.

Tapping the vein with your finger will also encourage it to be prominent.

Equipment needed for taking blood

Trolley
Sharps bin
A high sided tray for equipment
A paper towel or pad to absorb any spilt blood
PPE (gloves and apron) x 2
Hand sanitizer
Chlorhexidine wipes for trolley and tray
Disposable tourniquet
Chlorhexidine wipe for skin
Blood bottles and request form as appropriate
Cotton wool swab and tape to secure it to skin

Venepuncture Preparation (away from patient)

1. Decontaminate Hands

3. Clean trolley with alcohol wipe

5. Equipment collected in tray on trolley ready to take to patient

2. Put on PPE

4. Clean inside of tray

Venepuncture procedure

Approach the patient with a cool confident air and appear calm even though you may not be. Taking blood from a conscious patient for the first few times is the best opportunity for a new house surgeon to demonstrate his or her inexperience and make a fool of themselves. It is worse than giving your first ID block as the patient will be able to see every move you make.

Then follow this procedure;

1. Introduce yourself

2. Identify patient by name, date of birth and hospital number

3. On the patient check any in-patient identity band against hospital records.

4. Explain what you intend to do and why.

5. Explain side-effects (bruising bleeding discomfort etc).

6. Ask about any medical history possible complications e.g. bleeding problem, latex allergy.

7. Ask if they have has samples taken before, enquire about any preferred veins for sampling.

8. Make patient comfortable supporting arm.

9. Apply tourniquet and identify vein.

10. Clean the skin over the vein with a disposable alcohol wipe.

11. Screw the needle onto the hub.

12. Apply traction to skin below and to side of vein to immobilize the vein.

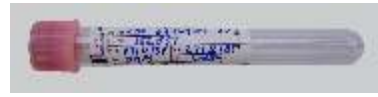
13. Advance needle through skin and into vein bevel up at about 30 degrees.

14. Release traction when needle is in the vein, push the vacuumed specimen tube into the hub so that it engages with the needle valve; the required amount of blood will flow into the bottle.

15. If you need another sample for a different test remove the bottle and replace it with another.

16. Remove the last bottle, release the tourniquet then remove the needle while applying pressure with cotton wool, tape the cotton wool down.

17. Place the needle in the sharps box and clean up the equipment, remove gloves and de-contaminate hands.



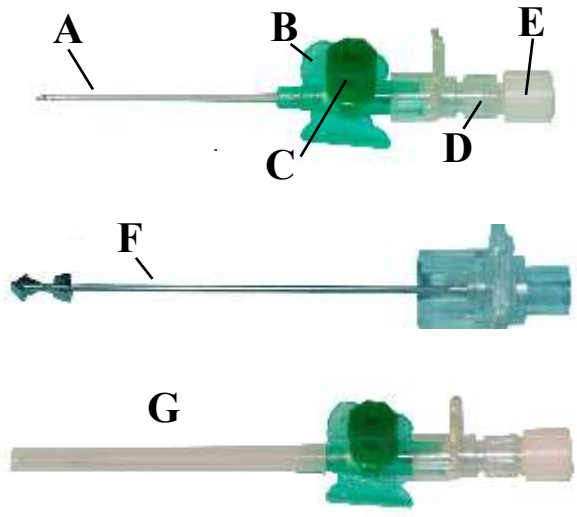
18. Fill in request form and label the bottle or make request on-line through patient records system as appropriate for your hospital. If your hospital used electronic requests you may have to print a bar code to stick on the specimen bottle. Always print patient's full name on requests and bottles. Document in patients notes. Place specimens in transport bag to go to laboratory.

Failure

If, after two attempts, you have failed to get blood from the patient you should withdraw from the field of battle and retire to regroup. If the patient is in pain, passed out, or worse still taking the piss, if he is covered with blood or there is a pile of blood stained swabs or blood in the bed sheets then it is time to give up and ask someone else to do it.

However, if you have maintained your dignity without causing a mess then blame the patient's awkward veins and consider your options. Tidy up, throw away the used sharps and swabs and, if you consider you have a reasonable chance of success, permit yourself one (but only one) further attempt before asking someone else to do it.

Inserting an Intravenous Cannula



The Venflon winged intravenous cannula

The venflon consists of a plastic cannula (A), with wings, (B), to facilitate attachment to the skin. There is a side port (C) for attachment of a syringe to administer intravenous medication. The cannula has a port at the end (D) which can be capped (E) or used to attach an intravenous giving set. The catheter is mounted on a needle (F) which protrudes from the end of the plastic cannula for Venepuncture. When the needle is removed from the plastic cannula a safety device attached to the sharp end is activated. The assembled venflon (G) comes mounted within a protective plastic sheath.

Colour Coding for Cannulae

Cannulae are coding according to gauge size. The larger the size of the catheter the more easily fluid can pass through it. The minimum size for giving fluids would be a 22 gauge (colour coded blue). The minimum size for giving blood products would be an 18 (colour green). A larger gauge 16 (coloured grey) is more reliable & a 14 (coloured orange) would be best. The most commonly used sizes in adults are 20 (pink) and 18 (green).

Colour	Gauge size	Used for
Blue	22G	Crystalloid
Pink	20G	Crystalloid & Colloid
Green	18G	Crystalloid, colloid & blood
Grey	16G	Crystalloid, colloid & blood
Orange	14G	Crystalloid, colloid & blood

Choosing a vein

Veins on the lateral side of the wrist are very suitable for IV drips (use the non-dependent arm). It can be painful but a small bleb of local anaesthetic (without vasoconstrictor) adjacent to the vein will be helpful.

However, the back of the hand is used more often for cannulae used for medication.

Equipment needed for cannulation

Cannula pack (see illustration) and correct size cannula
Disposable tourniquet
Sharps bin
Tray
5 to 10 mls of 0.9% saline flush
smallest cannula needed for the task (giving IV fluids or medication).

In addition you may like to use some 2% plain lignocaine (not with vasoconstrictor) drawn into a syringe with a small gauge needle. This may be placed into the skin adjacent to the vein to make the process more comfortable for the patient.

Cannulation Pack

Typical contents of IV Cannulation Pack:-

A: venflon bivalve cannula B: VIP score card (Visual Infusion Phlebitis: a score of 2 indicates the cannula should be replaced i.e. 2 of pain, swelling or erythema.) C: placement record label D: alcohol wipe E: sterile swabs F: day review labels G: dressing H: sterile drape

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Procedure

1. Clean hands, put on gloves, place sterile towel beneath patient's hand to create a sterile field.

2. Introduce yourself, identify patient, explain and get verbal consent as for venepuncture

3. Position patient comfortably

4. Find suitable vein.

5. Apply tourniquet 10 cms above.

6. Palpate straight rebounding vein.

7. Release tourniquet.

8. Open cannula pack onto the tray.

9. Ensure clinical waste bin or bag is available.

10. Activate the flush.

11. Clean skin with alcohol or chlorhexidine wipe for 30 seconds and allow to dry.

12. Straighten the cannula wings.

13. Remove the bung and place along with cannula on sterile towel.

14. Remove the needle cover from the cannula, stabilize the vein by stretching the skin over the vessel with your thumb. Insert the needle through the skin and into the vein with the bevel up at an angle of 15 to 30 degrees.

15. As soon as the first flash back is seen lower the cannula so that it is parallel to the arm. Advance further 1 to 2 mms.

16. Withdraw the needle 2 to 3 mms and observe a second flashback long the length of the cannula. Release the tourniquet and advance the cannula fully into the vein.

17. Apply pressure to the vein above the insertion site with your forefinger.

18. Secure the cannula with your thumb and remove and dispose of the needle into the sharps bin.

19. Attach the white bung to the cannula.

20. Flush with 5 mls saline and ask patient to report any discomfort and observe for any resistance, these would indicate that the cannula is misplaced. Dispose of the flush.

21. Secure the cannula using 2 sterile strips.

22. Apply dressing.

23. Apply label to dressing with initials of person siting the cannula and date and time of insertion.

24. Dispose of gloves and apron.

25. Clean hands.

26. Fill in IV form and apply cannula produce sticker if available, record the date time site and name and status of person siting the cannula.

27. Document in patient's notes.