Great Western Hospitals NHS
NHS Foundation Trust

2014

VENEPUNCTURE PRE-COURSE WORKBOOK

Name …….

Job Role…. …….

Department …….

Course Date …….

Our Values
Service Teamwork Ambition Respect

Contents

Aim

This workbook aims to assist the learner to understand the requirements in the following areas relating to venepuncture:

- Accountability
- Legal Responsibility
- Negligence
- Vicarious Liability
- Reasonable Care
- Valid Consent
- Local policies and procedures
- Implications for the practitioner

- All healthcare practitioners must be aware of the professional issues related to performing a new skill such as venepuncture. This ensures a safe and effective procedure for all parties concerned.
- As professionals, healthcare practitioners are accountable for their actions and must adhere to the stated principles of their professional bodies.

Learning made easy....

Step 1

- Follow and complete the pre-course workbook
- Submit it for marking prior to the study day to :

Clinical Skills Team, The Academy, GWH.

Step 2 - Support from your manager/mentor

- Prior to applying, ensure that your manager/mentor would like you to learn and practice this/these skill(s).
- It is hoped that during your appraisal you have reflected upon those existing skills and experiences you have acquired within your current role, and have now secured support for your further development from your clinical manager.
- On completion of this workbook, your clinical manager is required to sign the relevant section of the competency. This demonstrates their continued support for your role development regarding venepuncture.
- Please ensure that you send a copy of your completed Competency to The Academy to ensure you are entered onto ESR.

Step 3 - Getting help to learn

- Identify a practice supervisor/assessor to help you achieve competency.
- You should contact a suitable practice supervisor/assessor within your work area, who will be able to guide and support you as you develop your knowledge and skills.
- The person(s) you choose must themselves be an expert and active practitioner in venepuncture and be have a current venepuncture competency.
- Formal contact with this person should be negotiated, allowing you to plan your development, review your progress, discuss and resolve any area of difficulty or uncertainty.

Step 4 - Ensuring compliance with local guidelines and professional practice

- Ensure you have accessed, read and understood your health care organisation guidelines/policies relating to venepuncture and any national guidelines that have been adapted for use in your clinical area

Step 5 – Maintaining Competence

- This competency needs to be updated every two years with the current competency available on the intranet, you will need to:
    - Read through updated competency and the relevant policies and guidelines.
    - Perform the procedure for venepuncture observed by a competent practitioner.
    - Print off the competency, complete the 3.1 Competency Standard Form and keep the original for your own records, photocopy two and send one to the Academy and give one to your Manager.
- Complete the e-learning module on training tracker.

Objectives

- State key aspects of relevant policies and procedures and protocols in relation to venepuncture.
- Understand the legal and professional issues which apply to venepuncture.
- Explore the different blood tests required throughout the Trust.
- Identify the correct procedure for venepuncture taking into consideration infection prevention and control.

Legal and professional issues

- You must be a Registered Practitioner (all disciplines), an Emergency Department Assistant or band 4 Assistant Practitioner, or an NVQ candidate qualified to NVQ Level 3.
- You must work within The Trust's Scope for Enhancing the Scope of Professional Practice.
- The NMC code of conduct / HCPC Code must be applied
- You must gain the competency so that you are covered under the Trust's vicarious liability.
- You main informed consent and seek assistance if patient is not able to give consent.
- You must use all products correctly and according to manufacturer's instructions
- Adherence to trust policies and procedures is vital
- Documentation in nursing notes must be accurate and timely.

Accountability

There are four areas of accountability:

1. Criminal Law (for example manslaughter by gross negligence)
2. Civil Liability (e.g. action for negligence)
3. Professional Liability
4. Accountability to Employer

Nursing and Midwifery practitioners should refer to the Nursing and Midwifery Council (NMC)'s: The code Standards of conduct, performance and ethics for Nurses and midwives (2008).

Other health care professionals have an equal code of conduct which will provide clear and robust guidelines.

Duty of care

- Healthcare practitioners owe a legal duty of care to their patients.
- The duty of care is a legal status which is held by registered practitioners when they are involved in planning, delivering and evaluating care.
- The duty of care is passed from one shift to another, one department to another so that someone is accountable for the patient or client at all times.
- The duty of care is only relinquished if the patient is handed over, transferred out, discharged home or if they die.
- The Standard of Care which applies is that of a responsible body of practitioners in the relevant speciality. Two practitioners who are level in rank should display and possess similar levels of skills and knowledge. If they do not, it must be addressed.
- Responsible means just that, it is not equal to accountability. It does not necessarily mean the 'majority' and it will be measured by the knowledge at the time the event took place.
- Non-registered practitioners can assume responsibility as they are aware of their actions and limitations.
- If a practitioner breaches their duty of care and in doing so causes actual harm to a patient, the patient may be entitled to compensation.

Negligence

Negligence requires three conditions to be satisfied:

1. The practitioner owed the patient a duty of care
2. A breach of that duty has occurred
3. As a result of this breach, harm has been caused to the claimant.

Vicarious Liability

- An employer will bear vicarious responsibility for the acts and omissions of its employees unless they are on a 'frolic of their own'. i.e acting outside the normal course of their duties. It would be extremely unusual for an employer of a healthcare practitioner to avoid vicarious responsibility for the acts of the practitioner done in the course of his or her duties.

- All NHS clinical and nursing practitioners are subject to NHS indemnity. Under this the NHS takes responsibility for legal proceedings brought against an employee arising from their NHS activities.
- An employer can also be held to be directly liable where the standard of care owed by the Trust to the patient has been breached. For example by failing to supply sufficient or properly qualified staff.
- It is recommended that all staff also have personal insurance via a professional body e.g. RCN, RCM, BMA, HPC

Reasonable Care

The Standards of Care:

- Healthcare practitioners must attain the standard of a responsible body of practitioners professing the particular speciality under scrutiny (This is known as the Bolam Test). What amounts to a "responsible body" must withstand logical analysis.
- This can be measured using the Bolam Principle which is a legal template for measuring ability of medical / clinical practitioners. This was based on a case from 1957 where Mr Bolam, a psychiatric patient was injured due to one doctor's inexperience (look it up on the internet!).

The same standard of care applies to an emergency situation.

Example:
A nurse witnessing a road traffic accident will be required to stop and offer help to the standard of a responsible practitioner trained in this procedure, whether or not she is experienced in doing so.

Inexperience

In law the same standard of care is expected of an inexperienced practitioner as of an experienced practitioner. A student nurse, for example, will be required to attain the same standard as an experienced nurse if she undertakes the procedure.

Orders

Where a healthcare practitioner receives an order regarding treatment and carries it out without due consideration they may be breaching the duty of care. It is rarely a defence to claim to be merely following orders. The practitioner must show that the action was reasonable having regard to approved practice to be expected from a practitioner trained in the procedure.

Consent

Adult, mentally competent, patients have an absolute right to decide whether to accept or refuse treatment.

Elements of Consent

For valid consent the following elements must be satisfied:

- **Capacity**: Ensure that the patient/client is capable of giving consent. Adults are always assumed to be competent unless demonstrated otherwise.
- **Voluntary**: An individual must be free to choose. Consent must be given without coercion.
- **Informed**: Patients are entitled to receive sufficient information in a way they can understand about the proposed treatment, the possible alternatives, and any substantial risks so they can make a balanced judgment
- **Specific**: The consent given must be specific to the situation
- **Current**: Giving and obtaining consent is usually a process, not a one off event. Patients can change their minds and withdraw consent at any time. If there is any doubt, you should double check with the patient what their current wishes are.

Information to be provided before consent

- Before consent is provided a patient should receive some explanation of the treatment to be undertaken. The explanation should be in line with that which would be provided by a responsible body of practitioners. Where a patient asks questions they should be answered fully. How much detail should be given depends on the particular circumstances.

- For venepuncture it is recommended that, before consent can be given, an individual should be aware of the reason for having a blood test, the procedure of doing this, what is involved and long it will take.

Forms of Consent

- Consent can be given verbally, can be in writing or can be implied through conduct.
- In venepuncture, a patient offering their arm for insertion can imply consent provided that the elements of consent are satisfied.
- Verbal consent should be recorded in the patient's notes and should be limited to those procedures where there is little risk.

Who may provide consent?

- Consent cannot be given by proxy. Where an adult patient is mentally incapable of giving his consent, no one (including the court) can give consent on his/her behalf. Treatment in such a case may lawfully be provided by a healthcare practitioner where the treatment is in the best interests of the patient.

- Those with parental responsibility for a child will usually have the legal power to give or withhold consent for the child's treatment unless they conflict with the interpretation of those providing care about the child's best interests

- Consent by children under 16 years of age depends upon the child's ability to understand the nature and the implications of the treatment. The ability to understand has to be determined by the medical practitioner or the relevant health professional.

- As a result of the Mental Capacity Act 2005, practitioners are obliged to assess the capacity of all patients whom they believe do not have capacity to consent to or refuse treatment. Having established a patient lacks capacity the practitioner will be obliged to act in that patient's best interest.

Who should request consent?

- Consent must be gained by a practitioner who is both capable of performing the procedure and is able to explain the risks and benefits.

Local Policies and Procedures

- Local policy and procedures may be found to support venepuncture in every area or on the intranet
- The policies may have variances but should be followed. They will include information on training, needle selection, skin preparation and aftercare pertaining to the local environment.
- It is the responsibility of the practitioner to follow local policy and procedure guidelines, or discuss any deviations with the author of such guidelines.
- Standards for competence will also be issued by each Trust. These must be followed to ensure completion and confirmation of competence.
- It is recommended that where a policy is not followed, the practitioner records what was done and why the circumstances justified a modification from usual practice.

Implications for the practitioner

In practice these issues mean that a practitioner should:

- Check that he/she has the training and supervision identified by local policy before carrying out the procedure.
- Feel competent to carry out the procedure. Justifying competence can be achieved by keeping a log of supervised practice and training. Ensuring reflective practice and critical analysis.
- Carry out the procedure in accordance with the local policy.
- Keep up to date with changes in practice and use his/her skill regularly.
- Never attempt phlebotomy unless he/she is confident with all aspects required to be considered, before, during and after the procedure.
- Always refer to an experienced colleague before venepuncture procedure if he/she is unsure.
- Follow the NMC guidance and recommendations.

- Registered Nurses must comply with the NMC's Code of Professional Conduct (2010). This Code has been designed to provide a clear framework for logical development of practice. The code emphasises the need for application of knowledge and the exercise of professional judgement and skill (see section 6). Responsibility and accountability are placed on the individual. The Code also advises nurses to acknowledge personal skill and take steps to remedy any deficits.

- ensure that the procedure is fully documented in the records

- NMC (2010) states that:

  - Documentation should provide clear evidence of the care planned, the care delivered and the information shared

  - Good record keeping is a mark of a skilled and safe practitioner

  - Good record keeping helps to protect the welfare of patients and clients.

Positive Patient Identification

Between February 2006 and January 2007 the National Patient Safety Agency (NPSA) received nearly 25,000 reports of patients being mismatched to their care. Ensuring that patients receive the right care is essential if their treatment successful and timely, it also reduces the risk that a patient will be harmed as a result of receiving the wrong treatment.

To positively identify a patient, staff should check the patient for 4 identifiers:

- First name;
- Surname
- Date of birth;
- Hospital number

For staff working in the community the address would need to be checked and for residential homes it would be important to check the patient's identity verbally and with the residential home staff.

Phlebotomy

- Phlebotomy refers to the taking of a venous sample for laboratory analysis. Also called venepuncture.

- "Phleb" = vein "otomy" = opening, division or incision
  (from Latin and Greek)

- This is a common and frequent procedure to assist in the diagnosis and treatment of medical conditions.

- A safe procedure and good technique reduces discomfort and potential complications for the individual having blood taken and allow for accurate and suitable sample to be delivered to the laboratory for analysis.

- This is not the same as vene-section which means the letting of blood for medical purposes.

Blood

Blood is a specialised bodily fluid that delivers necessary substances to the body's cells– such as nutrients and oxygen – and transports waste products away from those same cells.

In vertebrates, blood is composed of blood cells suspended in a liquid called blood plasma. Plasma, constitutes 55% of blood fluid, is mostly water (92% by volume), and contains dissipated proteins, glucose, mineral ions, hormones, carbon dioxide (plasma being the main medium for excretory product transportation), platelets and blood cells themselves. The blood cells present in blood are red blood cells (also called RBCs or erythrocytes) and white blood cells, including leukocytes and platelets.

The most abundant cells in vertebrate blood are red blood cells. These contain haemoglobin, an iron-containing protein, which facilitates transportation of oxygen by reversibly binding to this respiratory gas and greatly increasing its solubility in blood. In contrast, carbon dioxide is almost entirely transported extracellular dissolved in plasma as bicarbonate ion.

Vertebrate blood is bright red when its haemoglobin is oxygenated.

Jawed vertebrates have an adaptive immune system, based largely on white blood cells. White blood cells help to resist infections and parasites.

Platelets are important in the clotting of blood.

Blood is circulated around the body through blood vessels by the pumping action of the heart. In animals with lungs, arterial blood carries oxygen from inhaled air to the tissues

of the body, and venous blood carries carbon dioxide, a waste product of metabolism produced by cells, from the tissues to the lungs to be exhaled.

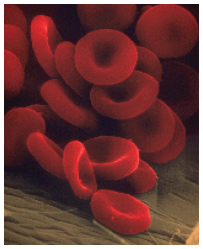
Medical terms related to blood often begin with ***hemo-*** or ***hemato-*** (also spelled ***haemo-*** and ***haemato-***) from the Ancient Greek word αἷμα (*haima*) for "blood". In terms of anatomy and histology, blood is considered a specialized form of connective tissue, given its origin in the bones and the presence of potential molecular fibres in the form of fibrinogen.

Red blood cells

Red blood cells are the most common cells found in blood. There are about 5 million red blood cells in each cubic millimetre of blood or approximately 250 million red blood cells in every drop of blood. This number varies with individuals in accordance to heredity, gender and state of health. These cells are produced by the bone marrow and have a lifespan of 3-4 months. When they die, they are destroyed by macrophages in the liver and spleen. This process releases iron to be stored in the liver and bile pigments to be excreted.

Structure of a Red Blood Cell

Red blood cells have a bi-concave shape with a flattened centre. It has a diameter less than 0.01 millimetres and do not have a nucleus. Red blood cells contain a protein chemical known as haemoglobin, which gives it the red colour. Haemoglobin contains iron, which can easily transport gases such as oxygen and carbon dioxide. Red blood cells are highly elastic, rendering it able to squeeze through capillary walls bigger than itself.



Functions of red blood cells

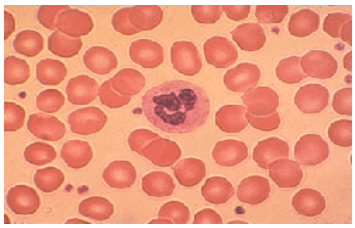
Red blood cells are important in the process of respiration. Gases involved in respiration are carried around the body through these cells. Oxygen readily combines with haemoglobin to form oxy-haemoglobin in the lungs where there is high concentration of oxygen. However, oxy-haemoglobin is an unstable compound and will break down to release oxygen when there is low concentration of oxygen in the surroundings. Hence there will be an even distribution of oxygen to all parts of the body. Red blood cells also carry part of the carbon dioxide waste from the cells through most is transmitted through plasma as soluble carbonates.

White Blood cells (Leucocytes)

White blood cells are responsible for the defence system in the body. There are approximately 6,000 white blood cells per millimetre of blood or ½ a million white blood cells in every drop of human blood. White blood cells fight infections and protect our body from foreign particles, which includes harmful germs and bacteria. White blood cells, like the red blood cells are formed from the stem cell of the bone marrow. It has a life-span of a couple of days. When they die, they are destroyed by surrounding white blood cells and replaced with new ones.

Structure of White Blood Cells

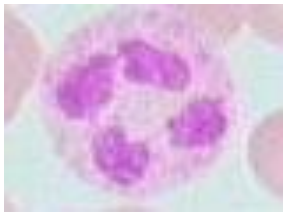
White blood cells are colourless without haemoglobin. They contain a nucleus and have an irregular shape. Though there are fewer white blood cells than red blood cells, they are much bigger in size. They can change their shape easily and this allows them to squeeze through walls of the blood vessels into the inter-cellular spaces.



Types

Unlike the Red blood cells or platelets, there are 5 different types of white blood cells, each serving a different purpose in our body's immune system.

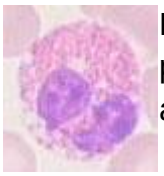
- Neutrophils
- Eosinophils
- Basophils
- Monocytes
- Lymphocytes



Neutrophils

Neutrophils make up 55%-70% of the total white blood count in the bloodstream. They have a segmented nuclei and it is said to be 'C' shaped. Neutrophils can be most commonly found near sites of infection or injury where they will stick to the walls of the blood vessels and engulf any foreign particles that try to enter the bloodstream. They can also be found in the pus of wounds.

Eosinophils



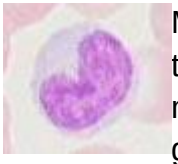
Eosinophils make up 2%-5% of the total white cell count and mainly attacks parasites and any antigen complexes. These cells are also responsible for allergic response within the blood.

Basophils

Basophils make up less than 1% of the total white blood count. They secrete anti-coagulant and antibodies, which mediate hypersensitivity reactions within the blood. They are known to have phagocytory features though they are more often related to immediate immune reaction against external germs and diseases.

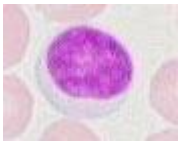
Phagiocytosis is where Their name comes from the Greek *phagein*, 'to eat or devour', and *kutos*, 'hollow vessel'. When there is an infection, phagocytes move to the bacteria by sensing chemicals. These chemicals may come from bacteria or from other phagocytes that are already there. The phagocytes move by a way called chemotaxis. When bacteria touch a phagocyte, they bind to the receptors on the phagocyte and are consumed (phagocytosed). When bacteria enter some phagocytes, the phagocytes use oxidants and nitric oxide to kill the pathogen.

Monocytes

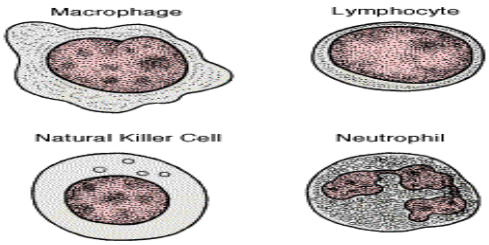


Monocytes, though having only 5%-8% in the total white blood count, are the largest of the 5 types of white blood cells. They act as tissue macrophages and remove foreign particles and prevent the invasion of germs which cannot be effectively dealt with by the neutrophils. They have been known to have phagocytic functions.

Lymphocytes



Lymphocytes produce anti-bodies against toxins secreted by bacteria and infecting germs. These antibodies will be excreted into the plasma to kill bacteria in the blood as well as act as anti-toxins. These anti-bodies will cause the foreign particles to cluster together, rendering them easily engulfed by the phagocytes. However, the nature of lymphocytes is highly specific and they can only recognize certain antigens.



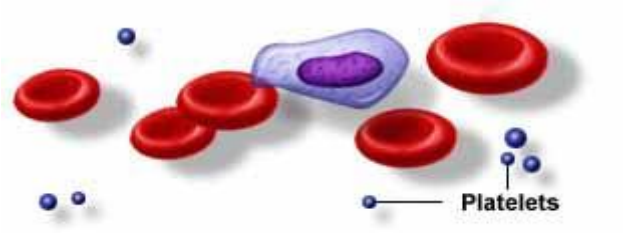
Platelets

Structure

Blood Platelets are granular non-nucleated fragments of cytoplasm in the form of oval discs. A platelet consists of two parts, a clear outer ground substance occupying the greater part of the platelet and a central part that contains granules.

Functions of Platelets

They secrete a hormone called serotonin which constricts torn blood vessels. They also have a major role in accumulating at sites of injury sticking together to plug gaps in broken blood vessels. They are rich in a certain activator that activates some proteins found in plasma. These proteins are thrown out in the form of fibres as a network. This network traps the escaping Red Blood Cells and forms a clot that will seal the cut blood vessels and so bleeding is stopped.



Plasma

Plasma is a pale yellowish fluid with a total volume of 2-3 litres in a normal adult.

Its contents are :

Water	90.0%
Protein	8.0%
Inorganic Ions	0.9%
Organic Substances	1.1%

Plasma proteins

Plasma proteins are made up of 4 main types.

- Serum Albumin
- Serum Globulin
- Fibrinogen
- Prothrombin

Most of the proteins are produced by the liver apart from the Serum Globulin which is produced by the body's immune system. Serum Albumin composed of 60% of the total plasma protein. It is the smallest of the 4 plasma proteins and can pass through capillary walls. Hence this will usually lead to a small leakage into the intestinal fluid. Nonetheless, this has been exploited by medical science to be an effective medium of testing for abnormalities in the body and damaged organs or diseases. Serum Globulins make up 36% of the total plasma protein. This can be further split into 3 fragments, the alpha, beta and gamma. Globulins aid in the inflammatory response of the body. Fibrinogen and prothrombin are important in the clotting process of blood.

Protein Functions Include:

- Transportation of insoluble substances around the body by allowing them to bind to protein molecules.
- Protein reserve for the body
- Blood clotting
- Responses in accordance to disease (inflammatory response)
- Protection from infection the gamma globulins function

- Striking balance for the pH of the blood

Inorganic ions

Inorganic ions play a very important role in the blood.

ION	SYMBOL	CONCENTRATION (mmol/l)
Sodium	Na+	135-146
Potassium	K+	3.5-5.2
Calcium	Ca++	2.1-2.7
Chloride	Cl-	98-108
Hydrogen Carbonate	HCO3-	23-31
Phosphate	PO4--	0.7-1.4

Without sodium, the body will lack extracellular fluid and might affect the blood pressure, leading to insufficient circulation of oxygen causing drowsiness, nausea etc. Lack of potassium will result in muscle abnormalities and weakness, leading to vomiting and diarrhoea.

Organic substances

Blood plasma carries organic substances such as nutrients. They may include digested food substances like glucose, sucrose and amino acids. Other nutrients in transit in the plasma include glycerol, triglycerides, cholesterol and vitamins. Waste products of the body are also transmitted in the blood plasma. They include urea and cellular waste that will be excreted out of the body. Hormones, such as cortisol and thyroxine are also transported around the body in plasma attached to plasma proteins. Medicine and drugs also circulate within the plasma.

Clotting

Blood vessels become damaged, you bleed (which washes out debris) and blood fills the wound, the blood vessels constrict & blood flow slows down.Platelets in the blood stick to collagen fibres that make up the vessel wall and this acts as a plug.

From this point on enzymes (proteins called clotting factors) trigger a chain of events takes place to form a clot:

Prothrombin converts to thrombin (calcium is required for this)

Thrombin - this acts as an enzyme causing the plasma protein fibrinogen which forms long threads called fibrin.

Fibrin threads - wrap around the platelet plug forming a mesh template for a clot.

Clot - the mesh structure traps red blood cells and forms a clot.

The red blood cells that are trapped on the outside of the clot dry out (the air oxidises the iron), they turn brownish red and a scab forms.

Underneath the scab, blood vessels regenerate and repair and cells - fibroblasts in the dermis create new cells. Scars provide extra strength to the skin that was deeply wounded - made of interwoven collagen fibres without hair follicles, nails or glands; feeling my have been lost because nerves have been damaged.

Rationale for Taking Blood

Blood samples are performed for two reasons:

- To monitor levels of blood components
- For diagnostic purposes

(Marsden Manual of Clinical Nursing Procedures 2011).

There are twelve common blood tests:
(Please not that the turn around time can vary depending on time of collection and whether the sample is taken in a community or acute setting)

1. Full Blood Count (FBC)

- Haemoglobin (M 13.4 - 17.0 g/L F 11.5 - 15.0 g/L)
- White Blood cells (4.0 – 11.0 x 109/L)
- Platelets (150 - 400 x 109/L)
- Anaemia, infection, polycythaemia, platelet problems
- Can also look at red blood cells and differential WBCs
- Turn around time: Same day
- Purple topped tube 3.5ml

2. Group and Save / Cross match

- Identifying / matching people's blood groups.
- A, B O and AB
- Rhesus factor also to be taken into account. Either positive or negative factor. Cannot be mixed.
- Universal blood donor is O negative and universal recipient is AB positive.
- Sample may be kept in case blood is needed or actually processed and units of blood matched to it.
- A full cross match will take about 40 minutes but if the blood is needed more urgently, a group specific unit (A, B, O group or resus group) can be issued within 10 minutes.
- Pink tube 6mls (must be full sample)

3. Urea and Electrolytes

- Routine monitoring , renal failure
- Turn around time : 48 hours
- Looks at:
  - Sodium (135-145mmol/l)
  - Potassium (3.5-5.0mmol/l)
  - Urea (2.5–7.5mmol/l)
  - Creatinine (62-124umol/l)
- Yellow topped tube 3.5mls

4. ESR -Erythrocyte Sedimentation Rate

- Inflammatory response to tissue injury includes alteration in serum proteins
- These changes during acute infection, active phases of chronic inflammation and following injury.
- Measurement is helpful in showing presence and extent of inflammation or tissue damage and response to treatment.
- Turnaround time : 2 hours
- **Black long tube 5.0mls**

5. C Reactive Protein (CRP)

- An acute phase protein used predominantly in the investigation of infection
- Can be stored for several days
- Turn around time : 24 hours
- Range is < 6mg/l
- Yellow topped tube (SST) 3.5mls

6. Liver function test (LFT)

- Diagnoses and monitors liver function.
- Test for Aspartate Transaminase (AST), Gamma Glutamyl Transferase (GGT), Bilirubin, Alkalione Phosphotase (ALP), Total Protein and Albumin.
- Normal ranges are
- AST 7 to 35 iu
- GGT 5 to 50 iu
- Bili 1 to 17 umol /l
- ALT 30 to 105
- Total Protein 68 to 80 g/L
- Albumin 35 to 50g /L
- Yellow topped tube

7. Coagulation studies

- Used as the first line testing for any suspected bleeding tendancy.
- Tests performed are Prothrombin Time (PT) and Activated Partial Thromoboplastin Time (APTT)
- Reference range PT 9.3 to 11 seconds
- Reference range APTT 21.0 to 28.6 seconds
- Blue topped tube 3.5mls

8. INR - International normalised ratio

- Monitoring of patients receiving Warfarin treatment
- Range is dependent on treatment protocol and condition for which treatment is being given.
- Turnaround time : 2 hours
- Blue topped tube (Citrate) for adults 3.5mls
- Red form – warfarin use must be noted in clinical detail box

9. Troponin

- Further investigation and risk stratification of patients with chest pain of undiagnosed origin.
- Troponin is a complex of three regulatory proteins that is integral to muscle contraction in skeletal and cardiac muscle, but not smooth muscle.
- First sample must be taken at least 6 hours after onset of clearly defined chest pain. If the first sample is negative a repeat should be taken 12 hours after admission.
- Turnaround Time: Same Day
- Green top (Heparin) tube 2 ml
- Reference Range: A cut-off level of 0.1 ng/L (nanograms per litre) is used. Providing the sample has been taken at the appropriate time, patients with levels below this have undetectable cardiac damage and are identified as low risk.
- Renal patients may present with a higher level of troponin but this is not indicative of cardiac problems.
- It is now possible to identify Troponin levels in much smaller quantities

10. Calcium

- Hypercalcaemia is often discovered incidentally. No specific clinical features but possible abdominal pain, calculi, bone pain, thirst.
- Hypocalcaemia can cause parathesia, muscle cramps and spasm.
- Turnaround time: same day
- Haemostasis during venepuncture can cause false elevated results **so tourniquet is not used for this sample**
- Normal level is 2.15 to 2.55 mmol/l
- Yellow tube 4mls

11. Glucose

- Routine or monitoring of diabetes
- If DM suspected, a FASTING glucose is needed with patient NBM for 12 hours (water allowed)
- Turnaround time : 4 hours
- Range: 3.3 – 6.0 mmol/l (fasting)
- Yellow tube (SST) 3.5mls for sample<2 hours
- Grey tube(Fluoride) 3.5mls for sample >2 hours

12. Cholesterol

- Screening for Coronary Heart Risk
- Fasting lipids (with Trigylcerides and HDL – Cholesterol)
- Patient must fast from Midnight prior to sample.
- Turnaround time: 24 hours
- Recommended range is < 5mmol/l
- Yellow topped tube (SST) 3.5mls

Haemolysis

Haemolysis is the rupturing of erythrocytes (red blood cells) and the release of their contents into the surrounding fluid (*e.g.*, blood plasma). Haemolysis may occur *in vivo* or *in vitro* (inside or outside the body).

Main causes are:

- Poor Collection Techniques
- Improper handling and processing and/or transport
- Improper choice of blood collection equipment components

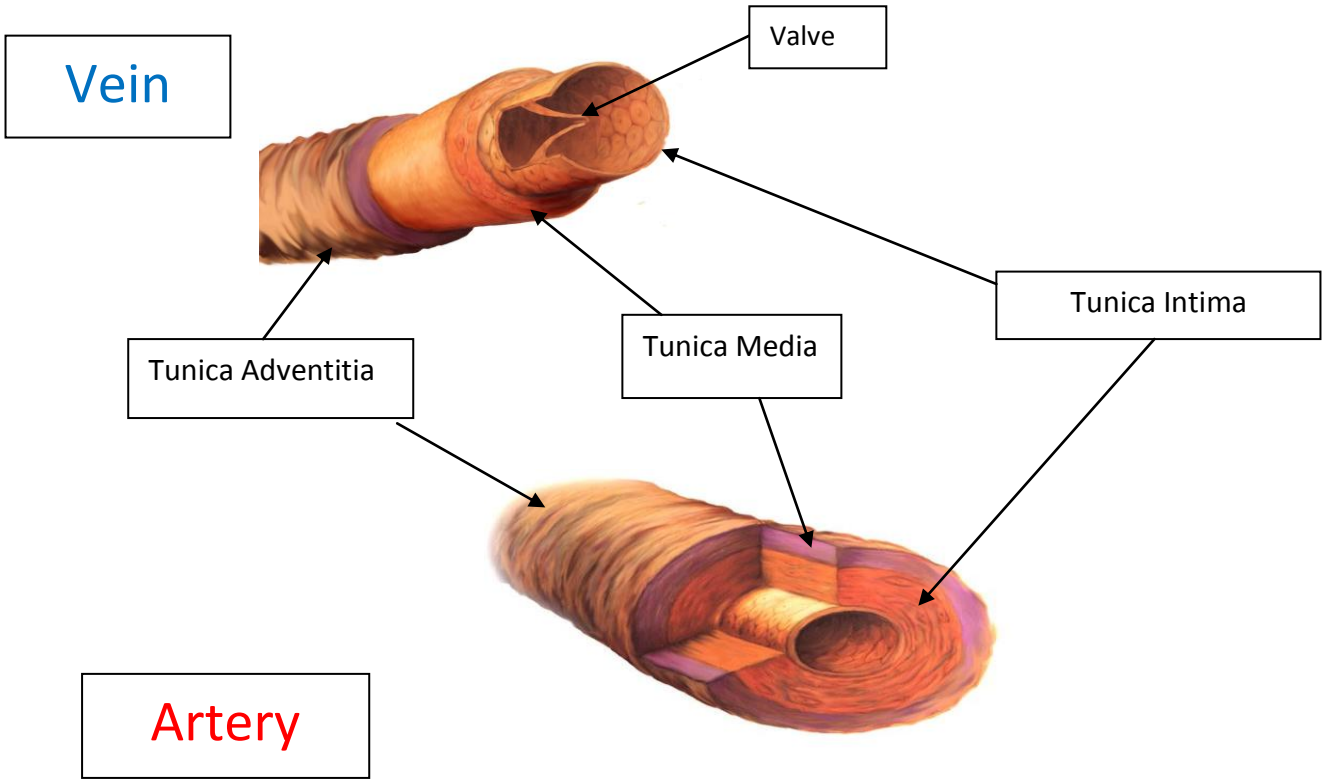
Steps taken to reduce haemolysis:

- Remember that when transporting samples, they are preserved longer in cold temperatures
- Avoid exposing samples to light
- Maintain tubes in a vertical position
- Rapid transport and short storage times improve the reliability of lab results

Anatomy and Physiology

When performing venepuncture, a sound knowledge of anatomy and physiology increases success and prevents complications.

Each individual's anatomy is unique and a positive approach reduces stress for the individual having a blood test.



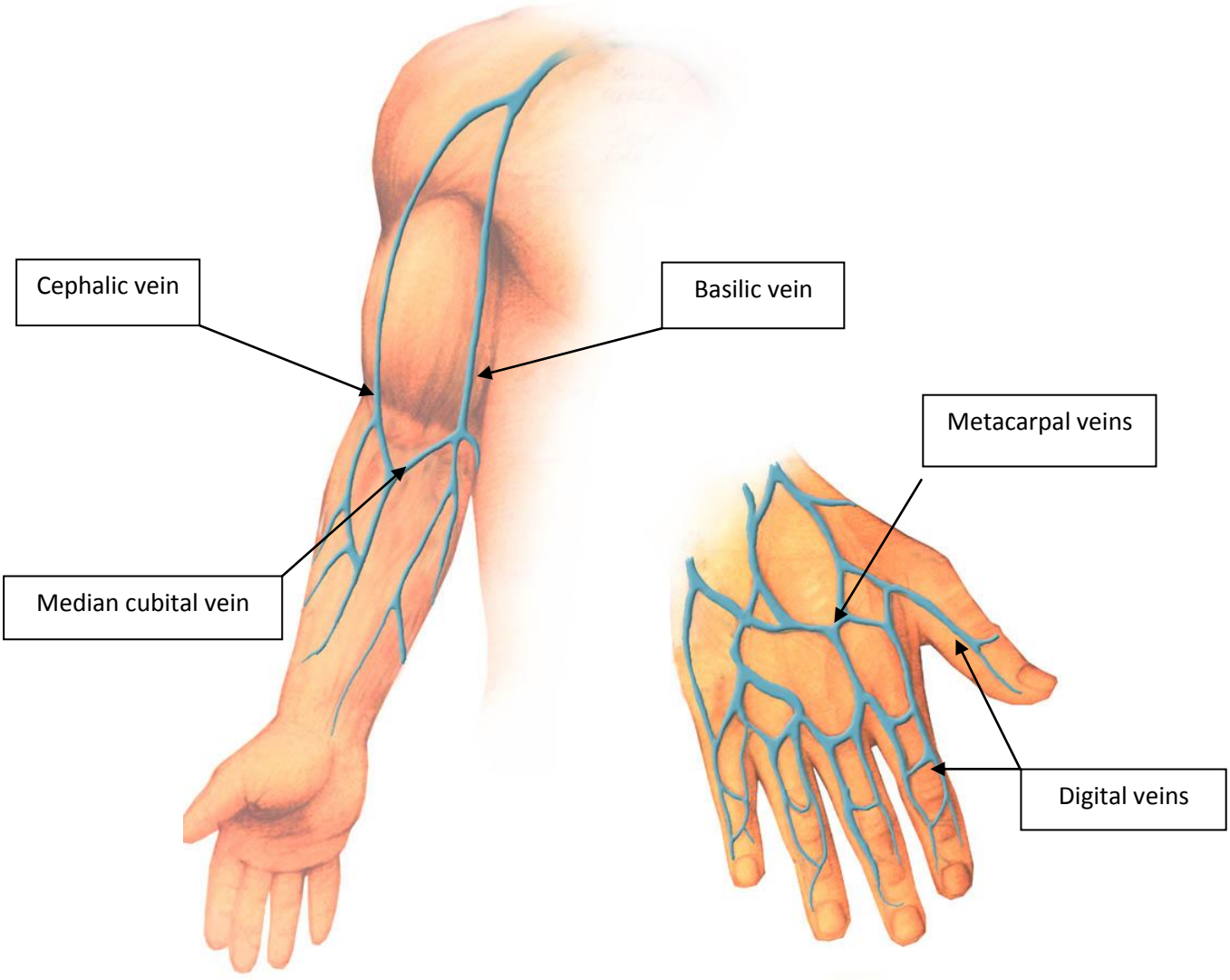
The Structure of Veins and Arteries:

Veins

Veins consist of three layers:

- The ***tunica intima*** is made up of endothelial cells lining the lumen of the vein, these are fragile and sensitive.
- The ***tunica media*** is a smooth and elastic muscle layer, controlling the vein through constriction and dilation. This layer is supplied by nerve endings from both sympathetic and parasympathetic nervous system.
- The final layer is the ***tunica adventitia*** **which is** a thick fibrous layer acting as protection and contains the ***vasavasorum;*** these are tiny arteries and veins that supply the walls of blood vessels.

Veins contain ***valves***, pouch like folds made up of the tunica intima layer of vein. They open towards the heart, prevent pooling and ensure venous return to the heart. Valves may be seen as bumps along the course of the vein and at bifurcations. There are no valves in the veins of the head and neck or in arteries.



Passing up the front of the forearm, the cephalic vein runs between the deltoid and pectoralis major muscles.
At the elbow the median cubital vein branches to the median side and joins the basilic vein. The basilic vein runs up the medial side of the arm.
The metacarpal veins run along the back of the hand and join the cephalic vein at the wrist.
The digital veins run from each finger and the thumb and join the metacarpal veins.

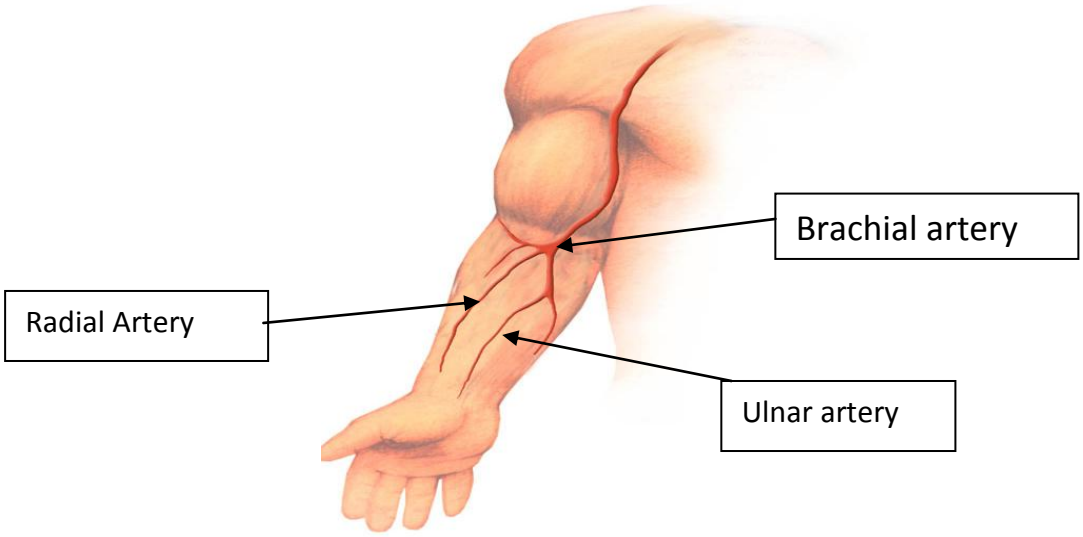
Arteries

Arteries are made up of the same three layers as the vein, the notable differences are:

- a thicker muscle layer because of the high pressure within these vessels.
- an absence of valves

An artery is readily identifiable by the presence of a pulse.

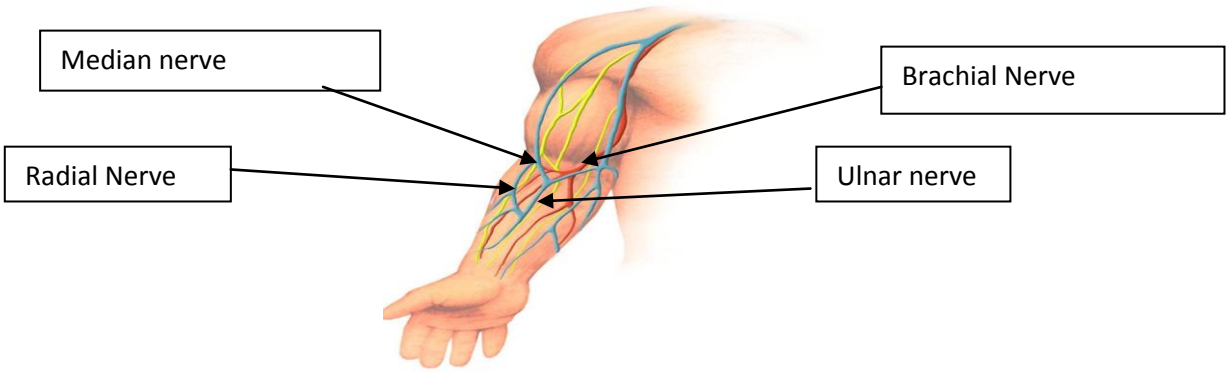
Arteries are deeper, more rounded in shape and firm under palpation. They do not collapse.



The Brachial Artery runs from the axilla to the elbow (cubital fossa). This then divides into radial and ulnar arteries.

The radial artery follows the lateral bone of the forearm. The first part of the artery is covered in muscle; just above the wrist it becomes superficial. This is where a pulse may be taken by pressing the artery against the radial bone.
The ulnar artery runs down the medial side of the forearm.

Nerves



The ulnar nerve runs with the brachial artery passing behind the medial epicondyle to the ulnar side of the forearm.

The median nerve runs close to the brachial artery and down the front of the forearm. There are an increased number of nerve fibres present in the antecubital fossa and around the wrist joint.

Q & A

Q. How would you know if you had punctured a nerve?

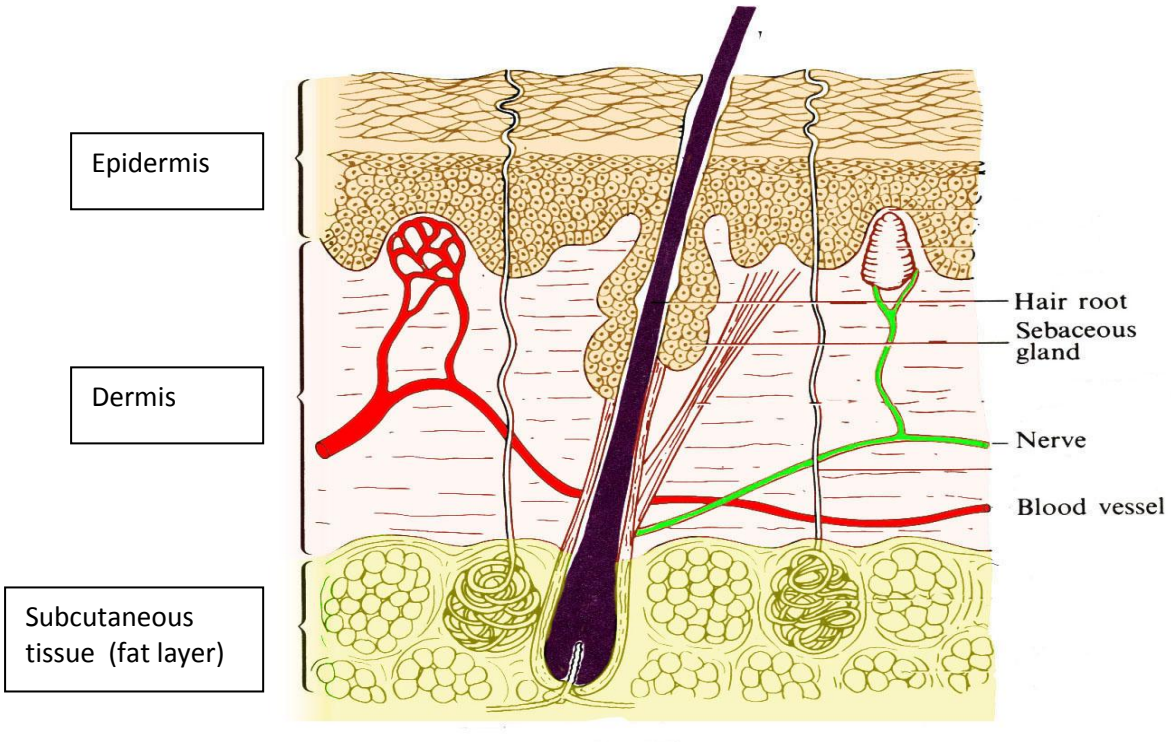
A. Extreme pain and parathesia in the limb.

Remove the needle immediately. Apply gentle pressure and reassure the patient. Inform a doctor if symptoms persist or worsen. Monitor the site.

Document in Patient's notes

Complete an Incident Report form

The layers and function of the skin



Skin is made of two layers. The epidermis is the outer protective covering for the dermis which is the sensitive and vascular underlayer.

The epidermis thickness varies over the body, is thickest on palms of hands and soles of feet, and is thinnest on the inner surface of limbs. The epidermis also varies in thickness according to different racial origins. Research shows that a patient of black origin will have an epidermis which may be up to 4 times thicker than a patient of white origin.

Skin thickness can be affected by drugs (eg.steroids) which can make the skin thinner and weaker. Age also alters the texture generally making it less elastic, thinner and more prone to damage.

The dermis contains capillaries and nerves, making some areas of body skin more sensitive than others. The inner wrist can be very sensitive and should be avoided.

The thickness of the fat layer is important as the fat affords some anchorage of blood vessels. If there is a lot of fat, the veins may be deeper and less easy to see. If the fat layer is very thin, the veins are easily visible but may move around more due to less anchorage so need to be manually supported during venepuncture.

In the elderly, the epidermis may be so thin on the dorsum of the hand it will not adequately support the vein for venepuncture.

How venepuncture affects physiology

The anticipation of phlebotomy may cause a sympathetic nervous response. Good explanation and reassurance may help to reduce this. Individuals must be managed in a safe environment in case of sudden collapse as the blood pressure drops.

Vasoconstriction may be caused by external or internal factors, making venepuncture difficult. Whatever the cause this will make it much more difficult for the practitioner to gain venous access through narrowing and constriction of the venous wall. Peripheral shutdown affects distal veins first and so the practitioner will have to work higher up the vein to gain access in larger vessels.
Causes of vasoconstriction are as follows:

- Temperature from cold to hypothermia.
- Shock - Hypovolaemic, cardiogenic, anaphylactic, septic, spinal, toxic and insulin all have the effect of vasodilation and are known as **vasogenic shock**).
- Drugs
- Stress and anxiety.

When trying to perform any kind of venepuncture it is easy to stimulate the sympathetic nervous system, causing vasoconstriction.

As the needle enters the tunica intima of the vein the parasympathetic nervous system can be stimulated.

SYMPATHETIC NERVOUS RESPONSE

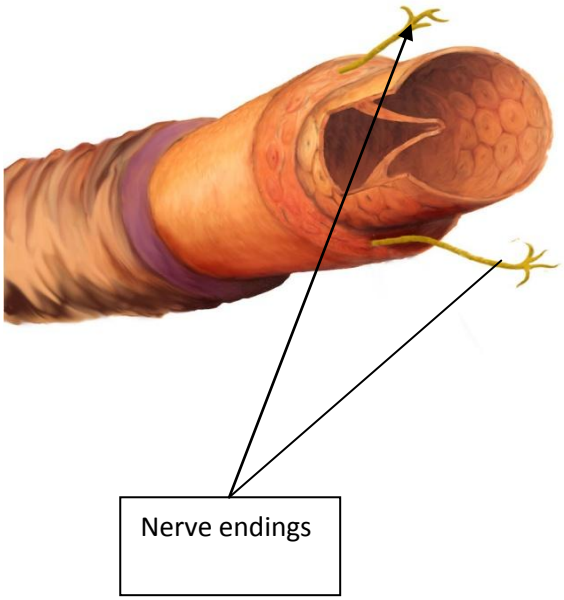
Tachycardia

Hypertension

Hyperventilation

Sweating

Vasoconstriction



PARASYMPATHETIC NERVOUS RESPONSE

Bradycardia

Hypotension

Pale

Clammy

Nausea/vomiting

Vasodilation

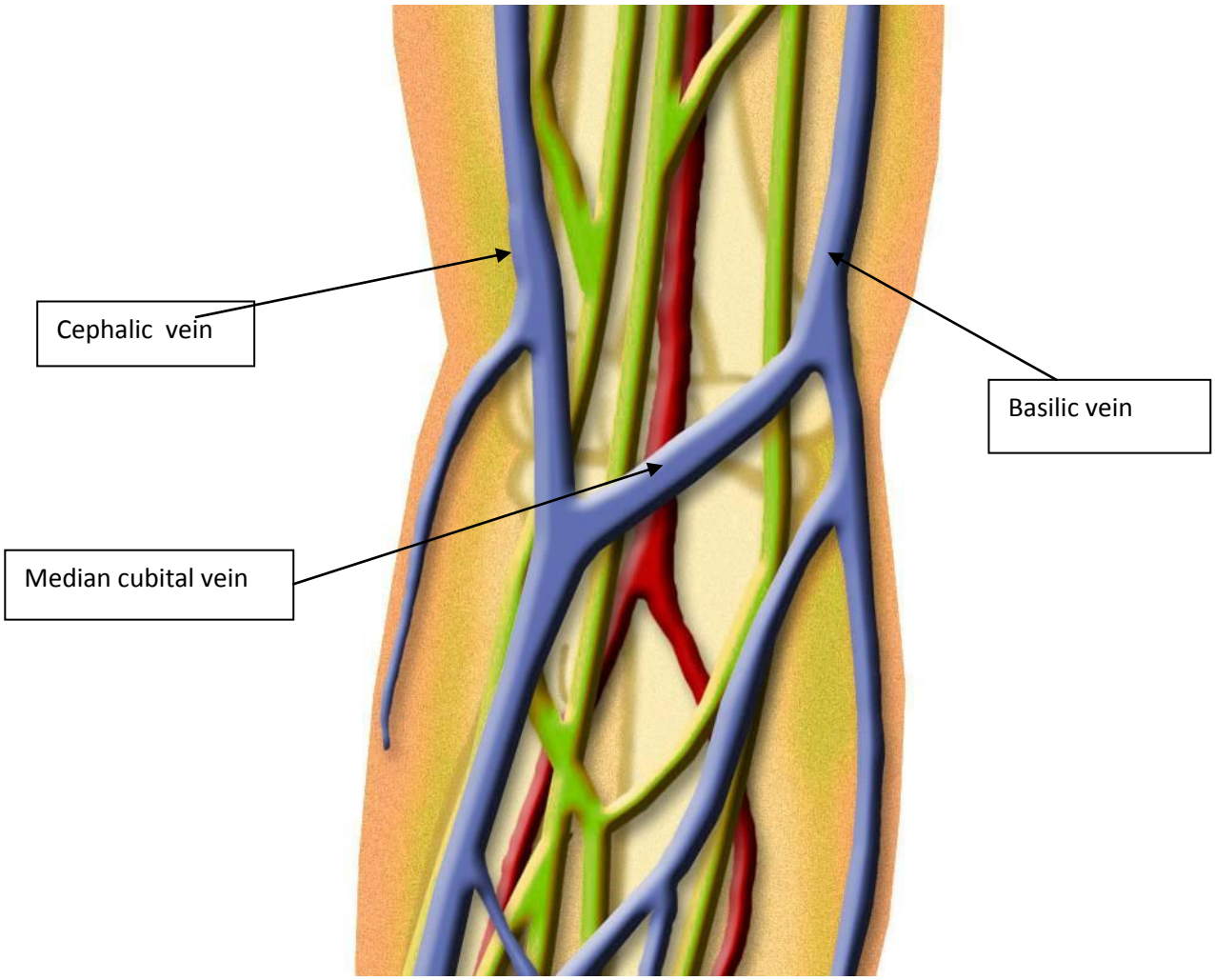
Venepuncture may cause diverse symptoms for the individual. A sound knowledge base ensures prompt and effective care, preventing further potential complications.

Anatomy of Potential Sites

The superficial veins of the arm and hand are most suitable for blood taking. Veins in the antecubital fossa, the hollow inside aspect of the elbow, allow easy access.

Veins in the antecubital fossa have usually been reserved for blood sampling. Understanding the location of the anatomical structures will avoid potential complications.

The antecubital fossa contains the median nerves, brachial artery and cephalic vein, the first choice for taking venous blood. The metacarpal veins run along the back of the hand and joins the cephalic vein at the wrist and may also be used for blood taking. The cephalic vein runs along the inside edge of the elbow brachial artery and median nerve towards the outside edge.



Q&A

Q. How would you know if you had accidentally punctured an artery instead of a vein?

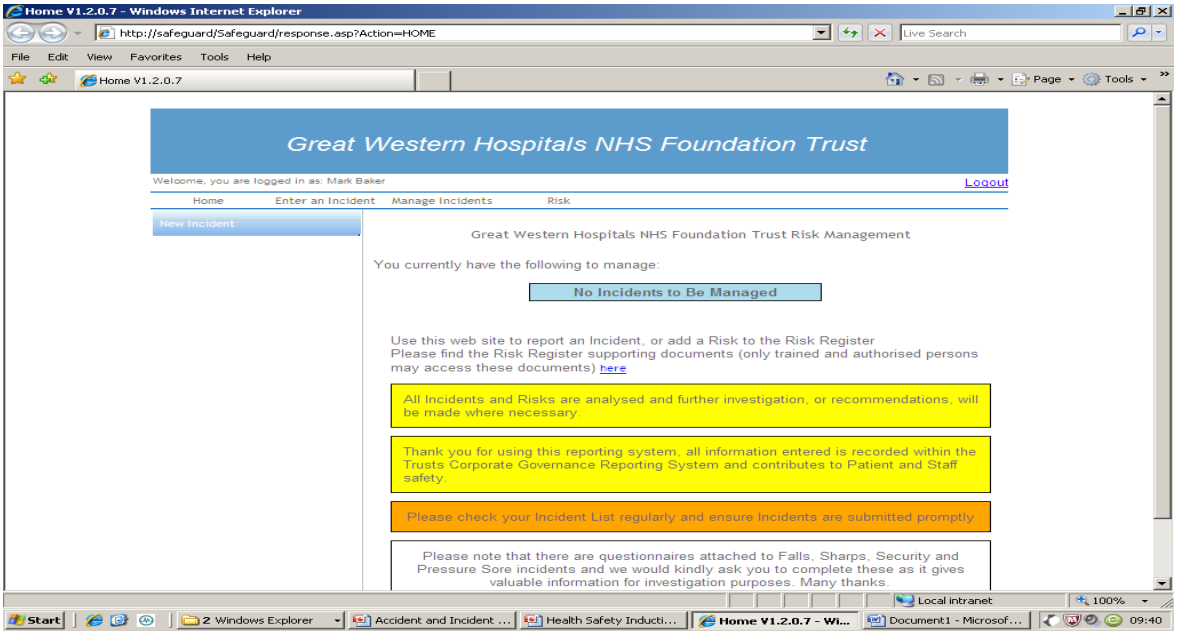
A. The presence of bright red pulsating blood.

Q. When would this **not** be the case?

A. *If the patient was very hypoxic, the blood may be very dark and the pulse difficult to see*

Arteries are intentionally used to take arterial blood samples. If the artery is entered accidentally, the action is the same.

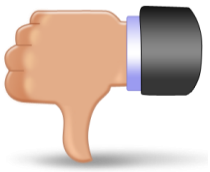
- Once the needle has been removed, firm pressure must be applied until the bleeding has completely stopped.
- Pressure must be applied for a minimum of 5 minutes continuously (Marsden Manual of Clinical Nursing Procedures 2011).
- The dressing must be reviewed
- Documentation via accident / incident reporting (IR1) if it was not intended.



Site Selection

Sites to use

- Easily palpable veins
- Good capillary refill which can be checked by pushing blood out of the vein with your finger and seeing if it fills back up
- Vein feels spongy and bounces under your fingers
- The direction of the vein can be seen and / or felt so that you can aim to follow it



Sites to Avoid

- **Limbs effected by clinical conditions**
- Mastectomy patients may experience poor venous return in the arm on the side of surgery therefore increasing the possibility of failure to access a vein. By using this arm, you may to start or worsen lymphoedema
- Stroke patients often have an arm that has poor circulation, has limited sensation and a degree of swelling. It is not good practice to access this arm.

- **Areas of oedema**
- Oedematous areas make the visualisation and palpation of a vein more difficult
- This skin is very fragile. If you pierce this skin, you may well create a leakage problem which is very miserable for the patient.

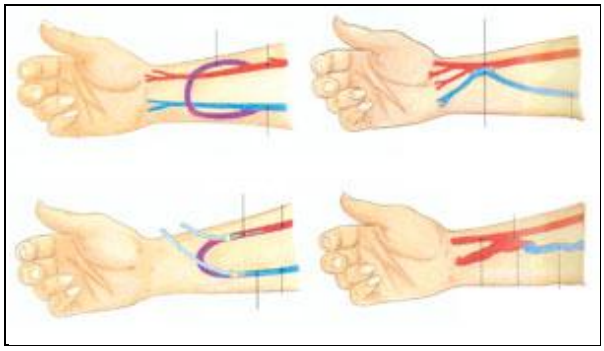
- **Arm in which a transfusion/infusion is in progress.**

- The blood will be diluted and affected by the infusate. If you have to use this arm, turn the infusion off, wait 2 minutes, take blood and then re-commence infusion, having flushed the cannula.
- If a blood sample is taken from a vein in the same arm as a transfusion is being carried out this may effect the results of the blood tests

- **Scarred areas.**
- Scarred skin has no hair, no sweat glands, is taut and the vision of veins below is not very easy. There are some patient groups where there is so much scar tissue that there is no choice, but avoid if you can.

Areas of broken skin or scarred areas increase the potential for contamination and spread of infection, which may result in bacteraemia or septicaemia.

- **Arms with fistulas or vascular grafts**
- Limbs affected by arterio-venous shunts or fistulas, should be avoided to minimise potential complications. These should be accessed by specialist fistula needles and by a practitioner who is trained to do this.



- **Sites above an IV cannula**
- Puncturing a vein above the site of an existing transfusion will not only affect the blood sample taken, but may also lead to the infusate leaking into the tissues at the site of the venepuncture.

Use sites in a descending order:

1. Antecubital fossa
2. Forearm
3. Back of the hand

- This is opposite to the order recommended for cannula insertion and is good practice for preserving veins and maintaining comfort.

- Allow previous sites to rest and recover – do not repeatedly use the same site or segment of vein.

Rest Rotate Recover

Site Preparation

All methods of venous filling must be in accordance with local policy.

- Lowering the limb below heart level increases blood supply to the veins.

- Applying a warm compress or immersing the limb into a bowl of warm water for 5-10minutes causes dilation of the veins.

- Applying a soft quick release tourniquet impedes venous but not arterial flow. If a pulse cannot be felt or the limb is cool and dark in colour the tourniquet is on too tight and must be removed immediately.

- Light tapping must only be used with caution so as not to cause pain or distress. Slapping or flicking are definitely forbidden as they are excessive and produce a pain response. The above are first choices to be used to encourage venous filling.

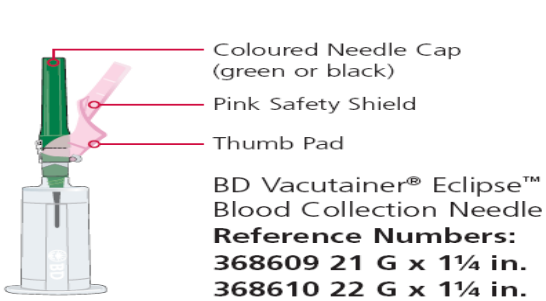
- Rubbing and stroking may be considered as they encourage endorphin release.

- There should be minimal exercise only prior to sampling as it has been shown that constriction of the forearm muscles causes an increase in serum potassium concentration. This includes asking the patient to pump their fist which is not recommended.

- Skin preparation must be performed in accordance with local policy, for example swabbing with 70% isopropanol alcohol + 2% chlorhexidine for a minimum of 30 seconds using a cross hatch technique and left to dry. Micro-organisms are killed by the drying action of alcohol.

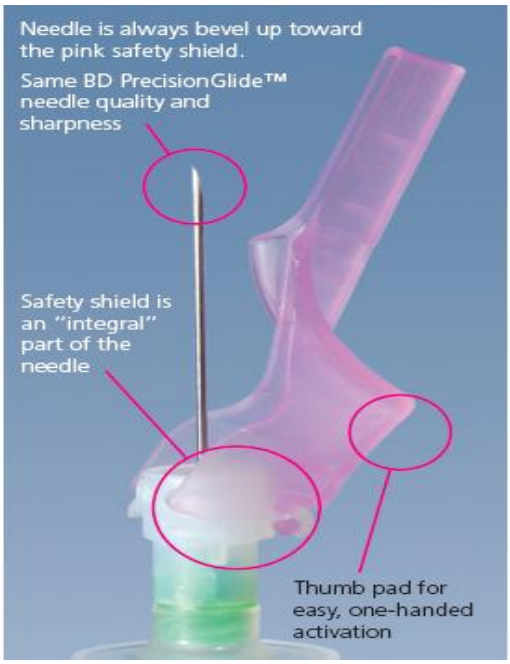
Understanding How to Use the Equipment

The BD Vacutainer™ system is commonly used.



- It is cleaner and safer because blood flows directly from the vein into closed tubes.
- This eliminates the need to transfer blood from a syringe to blood bottles.
- This reduces the potential risk of needle stick injuries, blood spillage and haemolysis of the sample.
- The BD Vacutainer™ system ensures immediate contact between blood and the additive in the tube, which gives the laboratory a better sample and provides an accurate test result for the clinician and the patient.
- The system is comprised of a double ended needle, needle holder and closed evacuated tubes.

The Multi sample Needle



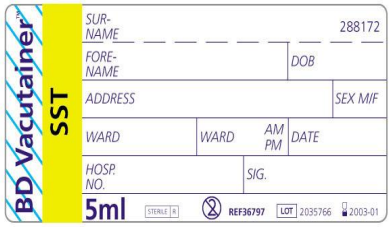
- Two gauge sizes of needle are available; 21 gauge are green and 22 gauge black and both offer a choice of 1" or 1.5" length.
- This is a double ended needle, one end to insert into the vein and the second end which pierces the tops of the tubes.
- **TAKE CARE ON ASSEMBLY AS YOU ARE DEALING WITH A DOUBLE ENDED SHARP.**
- The paper seal around the needle cover must be checked, it is intact as proof of sterility. The Lot number and expiry date (2 years) should be checked also, they can be found printed on the shield.
- The needle is screwed into the needle holder leaving the coloured shield on the needle, until the practitioner is ready to perform the procedure.

Needle holder

- These are made of polypropylene and are supplied in bags of 500.
- They are very inexpensive and have a shelf life of 25 years as they are not sterile, only clinically clean.
- They are marked on the sides " single use only " and " do not re-use" so once needle and holder are assembled, they should remain as one unit and should never be disassembled and disposed of into a sharps bin.
- They have shoulders at their opening where you can rest your fingers, which makes the insertion of the tubes easier.
- Once the tubes are in place during blood evacuation, the combination of the needle holder and needle ensures that the tubes does not pop off, it will remain in place until the operator is ready to take it off. An audible click is heard when the tubes engage which lets you know that the tube is secure. The tube will not pop off unless they are not fully engaged.

Vacuum tubes

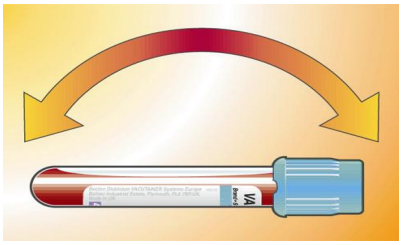
- The pre-measured vacuum ensures the correct amount of blood is taken for analysis. This amount is always noted on the label in mls.



- Each tube is made of plastic.
- Each BD Vacutainer tube has a coloured top denoting the additive in the tube.
- Each tube has an expiry date; these vary between 1 and 2 years so it important to check this and stock rotate effectively.
- To prevent contamination of samples there is an order of draw if more than one sample is to be taken.
- It is very important to follow the Order of Draw as it is vital that any additives within the tubes are not mixed inadvertently, causing them to be altered or de-activated, leading to possible inaccurate blood results.

Please note that different hospitals have differing orders of draw. Please ensure that you use the correct order of draw relevant to the hospital where blood samples are analysed.

It is equally important to mix the blood sample by inverting it to 180 degrees and back for the recommended number of times to ensure the blood is mixed with any additives properly.



Gloves and Hand Hygiene

- If you are likely to come across any blood or body fluid you should wear gloves.
- You should put gloves onto decontaminated hands immediately before the procedure requiring their use and you should remove them immediately after the procedure.
- You must then decontaminate your hands before touching anything else.

Why Wash Your Hands?

It's important to wash your hands after glove removal because:

- you can contaminate your hands while removing the gloves
- some gloves leak and hands can become contaminated as a result

When to wear an Apron

- Correct use of plastic aprons is also important in protecting yourself and preventing cross infection.
- Aprons are single use and must be changed between patients.
- You must use an apron to protect your uniform and clothing from body fluids and micro organisms.
- You can easily change an apron but you are unlikely to have a change of uniform or clothes available.
- Your apron will also protect patients from any micro organisms you may have picked up on your uniform.
- Use an apron when:
    - there is a risk that your uniform or clothes may be contaminated with blood or body fluids
    - your uniform is in close contact with patients or patient care equipment

Needle stick and sharps injury management

- A sharps injury (including needle stick) is anything that causes a break in the skin.
- Take immediate action – encourage bleeding, wash and cover
- Report immediately to Manager or nurse in charge
- Complete an IR1 form
- Report for assistance as quickly as possible – do not wait until the end of your shift or fail to report it at all.
- Other sharps injuries need to be reported too, including glass, bone, teeth (if bitten), scalpels etc.
- Clean sharps injuries should also be reported as this may help to identify devices which are difficult to use and, therefore, could be are a risk.

Seeking assistance in the event of sustaining a needle stick injury:

Report all injuries via the Contamination Hotline (Occupational Health and Wellbeing): 01793 60 4472

Out of hours Emergency Department : 01793 60 4104

Gather your equipment

Ensure the POUDS (point of use disposal of sharps system) tray is cleaned inside and out using Green Clinell wipes

- Needle
- Needle holder
- Blood tubes
- Skin disinfectant swab
- POUDS tray (in hospital only)
- Dressing or plaster
- Gloves
- Sharps container
- Tourniquet
- Check all expiry dates

Site preparation

- Use s swab impregnated with : 70% isopropyl alcohol and 2% chlorhexidine
- Prepare site by wiping for 30 seconds
- Use a cross hatch technique
- Allow to air dry for 30 seconds or until area is visibly dry
- Do not re-palpate vein

How to take a blood sample

Obtaining a blood sample is an aseptic technique and universal precautions for infection control must also be implemented.

- A well-lit, safe and comfortable environment must be used. Seating should be available for both parties.
- Identity must be checked using open questions and confirmed with patient along with request forms.
- Identity checks four point positive patient identification.
- For inpatients, use of PBARS system (Portable Blood Audit and Release System) to ensure positive ID.

Full Name Date of Birth

Address Hospital Number

- Some GP surgeries will provide printed labels to affix to blood bottles. The referral or request for the blood test is given verbally from the GP or electronically and the practitioner will then accurately complete the request form with patient details and bloods requested.

- Preparation is essential to ensure a safe and accurate blood sample. Informed consent must be obtained and clearly written, signed and dated on request forms or orders.

- Gather all equipment needed. Wash hands and cleanse site according to local policy.

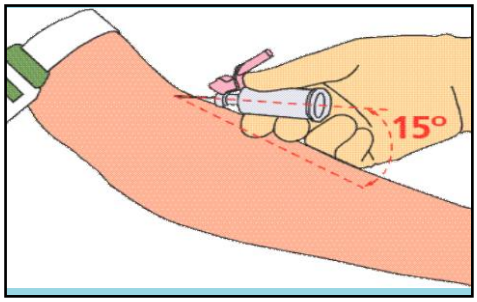
- Break seal and remove white cover only.

- Screw needle into holder.

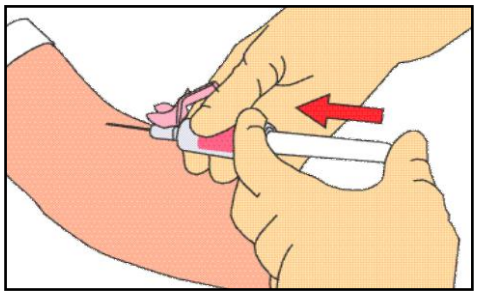
- Apply tourniquet. Aim for 7.5 to 10cm above intended insertion site.

- Tourniquet usage should not exceed 1 minute

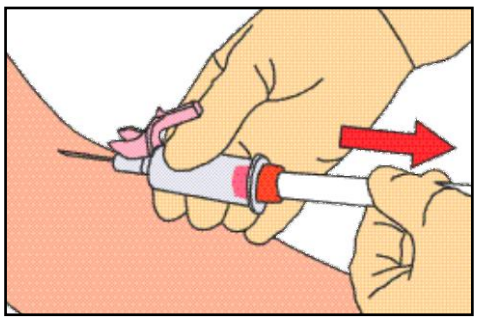
- Insert needle with bevel up to allow easy access into the vein at an angle of 15-degrees approximately, adjusting degree to vein depth. Aim for approx 1cm of needle to be beneath skin level



- When introducing tube into holder. Grip the holder firmly and push the tube onto end needle puncturing the diaphragm of the stopper. Release tourniquet as blood begins to flow into tube.

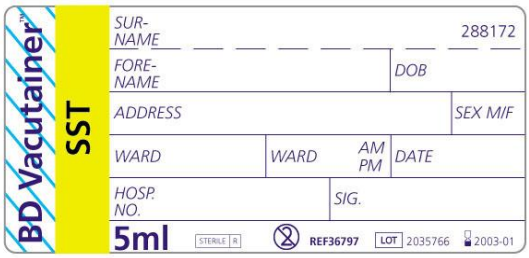


- When vacuum is exhausted and flow ceases remove tube and repeat process for more samples. While blood flows into succeeding tubes gently invert previously filled additives tubes.



- Remove last tube before removing needle from vein. Apply gentle pressure over site and dispose of needle and holder immediately into sharps container.

- Label tubes, whilst still at the patient's side, place in bag with request forms and transfer to laboratory.



- Document procedure.

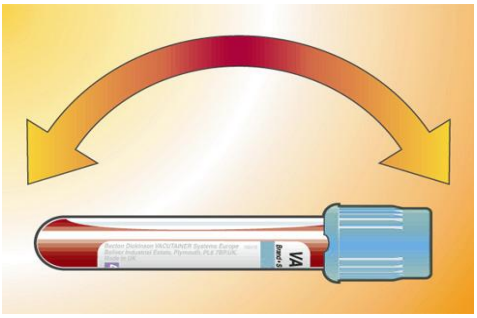
Please note:

- Collecting the correct amount of blood is essential, especially for clotting results (PT and APTT). If less blood is collected the concentration of anticoagulant increases affecting the APTT value.

- Tubes should not be overfilled as this can affect the results. A bubble should remain at the top for mixing the specimen on rocker type mixing devices. This is more likely to occur with a needle and syringe where the blood is injected in and the pre-set vacuum amount is over-ridden

- Samples should be **gently inverted** the correct amount of times to ensure adequate mixing of the blood with the additive as soon as possible. Inversion should be at 180°

- Do not shake tubes, as this is likely to cause haemolysis (damage and break down of red blood cells)



- Complete label with details of the patient by them to avoid any mislabelling, remembering to put date and time of sample.

Labelling of blood samples using the Scanner (GWH staff only)

DCS & Labelling Worldwide

PRINT A BLOOD TUBE LABEL

1 SCAN PATIENT NAME BAND

1. Press **PW** on the scanner to switch it on.
2. Press **1** to select Phlebotomy Mode.
3. Press **1** again to COLLECT DATA.
4. Hold the scanner over the 2D code on the name-band and press either of the orange buttons on the side of the scanner.
5. The patient identity will be displayed on the scanner screen for a few seconds.

2 DOWNLOAD TO PRINTER

6. If the label printer is not already switched on, switch it on by pressing on the front of the printer.
7. Hold the scanner close to the label printer, ensuring "line of sight" between the black oval window on the side of the scanner and the rectangular window on the front of the printer.
8. Press **2** to SEND DATA to the printer.
9. After a short delay one label with the patients details should print out automatically.
10. For every additional label, repeat from step 8. above within 30 seconds.

3 PRINT & TEAR OFF LABEL

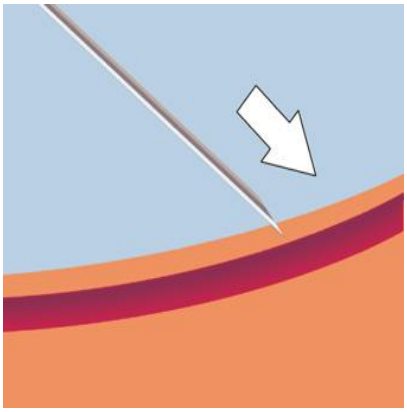
11. Tear off the label from the printer.

4 FIX LABEL TO BLOOD TUBE

12. Fix the label to the patient blood sample over the existing tube label.

Blood collection problems

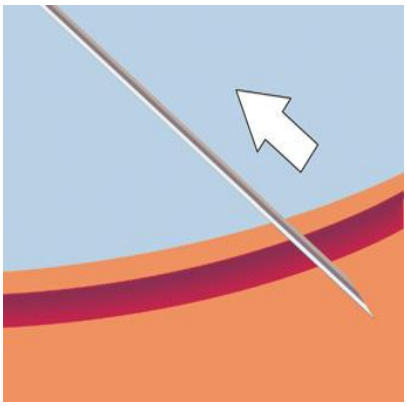
- Needle not sufficiently inserted



No flow of blood as needle has not been inserted far enough into vein.

Simply push the needle a little further in, with tube in place, and when the needle enters the lumen, blood will flow.

- Vein transfixed

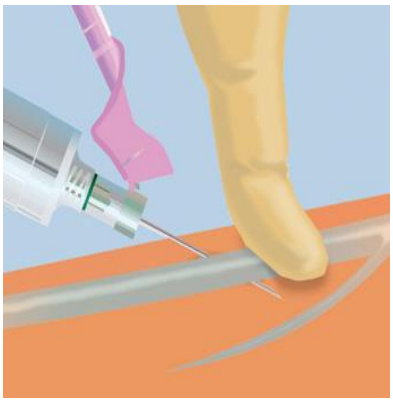


The needle has gone completely through the vein

This is indicated by a brief spray of blood into the tube which then stops.

Withdraw the needle slightly until blood flow restarts. If there is still no blood flow then remove the tube and withdraw the needle from the arm.

- Vein rolls or is missed

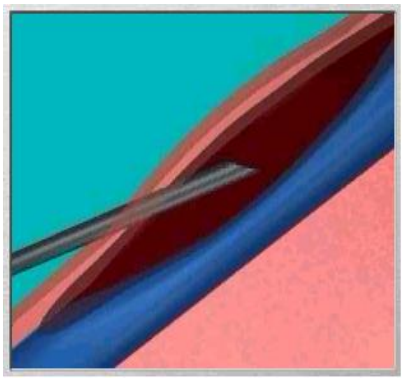


No blood flow into the tube means it is likely the needle has missed the vein. This could be as a result of the vein rolling to one side as the needle is inserted.

Ensure the vein is properly anchored, withdraw the needle slightly, making sure the bevel of the needle does not breach the skin surface (or the tube's vacuum will be lost).

Reposition the needle to enter the vein. The tube will fill once the needle is inserted into the lumen of the vein.

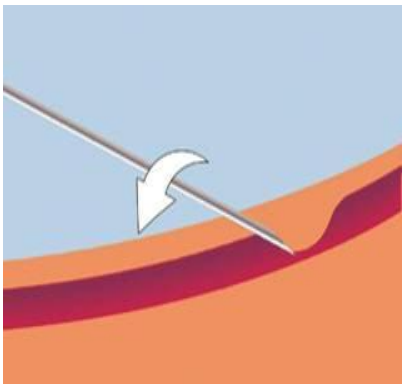
- Partial needle insertion causing haematoma



If the needle tip is not inserted into the vein completely the initial blood flow will slow, then stop and a haematoma will start to develop.

Immediately remove the tube, then the needle, apply pressure to the site until bleeding stops

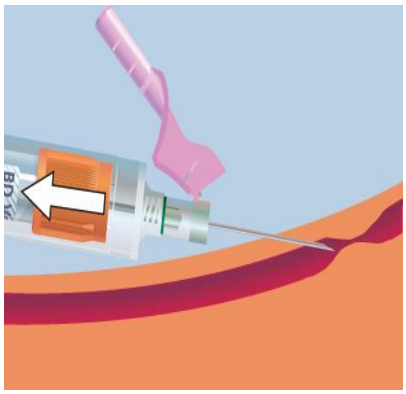
- Needle tip blockage



The wall of the vein can block the needle tip, generally indicated by some initial drops of blood into the tube which then stops filling.

Pull back the tube from the holder just enough to disconnect from the valve end of the needle. Then reposition the needle tip very slightly within the vein before re-introducing the tube into the holder and completing the sample collection.

- Collapsed vein



Blood flow slows and stops due to the vein collapsing.

Remove the blood tube and wait for the vein to recover before re-applying the tube. Also consider lowering the arm and/or reapplying the tourniquet.

An alternative site may need to be considered.

Post venepuncture

- Put pressure on the site
- Do not ask your patient to bend their arm
- Raise arm above level of head if bleeding is slow to stop.
- Check site after 2 minutes
- Check that patient does not feel unwell or faint and is able to stand up
- Apply a plaster or dressing
- Ask patient to leave dressing on for 4 hours. If patient is in their own home advise who to contact if they have any concerns before leaving.

Blood cultures **(For Hospital based staff only)**

The culture of micro-organisms from blood is an essential laboratory test for the diagnosis of bacteraemia. Early positive results provide information on which appropriate treatment can commence.

Previously there has been little consistent or definitive advice to registered providers on how and when to take blood cultures and how best to avoid sample contamination. Variation in practice has contributed to a significant level of false positive readings. Blood culture contamination can complicate the level of patient care and artificially raise the incidence rate of MRSA bacteraemia.

Practitioners need to ensure the following:

- Cultures are taken for the correct indications
- Taken at the correct time; (i.e. not as part of resuscitation or emergency call out procedures) and;
- Using correct technique in order to prevent contamination of the sample and minimise risk to patients and staff.

False positive

A false positive is defined as growth of bacteria in the blood culture bottle that were not present in the patient's bloodstream and were introduced during sample collection. Contamination can come from a number of sources: the patient's skin, the equipment used to take the sample and transfer it to the culture bottle, the hands of the person taking the blood sample, or the general environment.

Competence

Blood cultures should only be collected by members of staff (medical, nursing, healthcare assistants, phlebotomists or technicians) who has been trained in the blood culture collection procedure and whose competence in blood culture collection has been assessed and maintained.

Only take blood cultures when there is a clinical need to do so and not as routine

Blood cultures are taken to identify patients with bacteraemia. There are many signs and symptoms which may suggest bacteraemia and clinical judgement is required.

The following indicators should be taken into account when assessing a patient for signs of bacteraemia or sepsis:

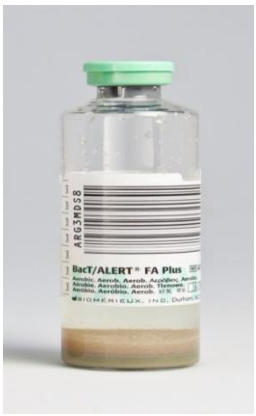
- Pyrexia >38°C
- Focal signs of infection
- Abnormal heart rate (raised), blood pressure (low or raised) or respiratory rate (raised)
- Chills or rigor
- Raised or very low white cell count
- New or worsening confusion

N.B. Signs of sepsis may be minimal or absent in the young and the elderly, the immuno-compromised and patients on steroids.

Blood cultures should be taken after identification of possible bacteraemia or sepsis and before the administration of antibiotics. If a patient is already taking antibiotics, blood cultures should ideally be taken immediately before the next dose (with the exception of paediatric patients).

From the **May 2013** the Microbiology Department will be moving to a new version of Blood culture bottle. The new bottles contain gold beads in place of the activated charcoal which made the media black in some of the bottle types.

NB – *Blood culture packs are available from the microbiology department*



Adult blood culture bottles (green and purple top) have a maximum fill of 10ml, but no minimum fill (5-10ml best).

Paediatric bottles (yellow top) have a maximum fill of 4 ml, with no minimum fill.

To take blood cultures always make a fresh stab. Do not use existing peripheral lines or sites immediately above peripheral lines.

1. **Clean hands with soap and water then dry, and put on clean examination gloves.**

2. Prepare a sterile field, ie clean tray with green clinell wipes, and gather equipment.

3. Clean tops of culture bottles with 2% chlorhexidine in 70% isopropyl alcohol impregnated swab (a separate swab for each bottle must be used), allow to dry.

4. Assemble the blue adaptor cap using aseptic non-touch technique.

5. Apply tourniquet and palpate to identify vein.

6. Clean skin with 2% chlorhexidine in 70% isopropyl alcohol impregnated swab, allow to dry.

7. **Clean hands again with soap and water then dry, or apply hand gel, and put on clean examination gloves.**

8. **DO NOT PALPATE VEIN AGAIN AFTER CLEANING**, if this is necessary, return to step 6 and continue.

9. Insert Butterfly needle into prepared vein site.

10. Starting with the aerobic bottle (green top), place **BLUE** adapter cap onto **upright** bottle to pierce the septum. Hold bottle upright and use graduation lines marked on bottle to accurately gauge sample volume and collect sample. Continue to fill the anaerobic bottle (purple top) similarly. If using a needle and syringe to take the culture, inoculate the aerobic bottle (green top) first.

11. If blood is being collected for other tests, **always** collect the blood culture first.

12. Activate sharp safe device and dispose of into the prepared sharps bin as a single unit.

13. Cover the puncture site with an appropriate dressing.

14. Wash hands after removing gloves.

Blood cultures bottles must be labelled at the patient bed side using the ID information from the patients ID wrist band.

15. All blood cultures must be documented in the patient's notes, including date, time, site and indications. This data should also be documented on the pathology form accompanying the specimens to the laboratory. The name of the person collecting the samples must also be clearly placed in the relevant section of the pathology form.

Relevant policies

- Royal Marsden Manual of clinical nursing procedures (8th edition)(2011)
- Framework for Enhancing the Scope of Professional Practice
- Infection control policies
- Record keeping guidelines
- Mental Capacity Act (2005 & 2010)
- Epic3 guidelines (2014)
- ANTT Policy (hospital intranet)

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