





Venepuncture Training

Version 7 (October 2011)







Section 1 Objectives and Definition

After completing this section you will:

- Know the objectives
- Be able to identify what venepuncture is









Objectives

- Define venepuncture
- Identify suitable veins for venepuncture
- Explore the problems in identifying suitable veins for venepuncture
- Identify complications and actions i.e. faint, anxiety, haematoma arterial puncture
- Demonstrate health and safety awareness issues related to venepuncture e.g. hand washing, needlestick injury, infection risk, and sharp disposal.









What is Venepuncture?

Venepuncture may be defined as puncturing of a vein.

It is performed either:

- to withdraw blood for diagnostic purposes
- > to monitor levels of blood components or drugs









Section 2 Policies relating to Venepuncture

After completing this section you will:

- Know how to access venepuncture related policies and procedures
- Be aware of the policies and procedures pertinent to venepuncture





























Section 3 Anatomy and Physiology

After completing this section you should be able to understand:

- The anatomy and physiology of the arm
- The role of veins and arteries
- Vein structure
- And be able to name common veins



















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The Role of Veins and Arteries

Veins and Arteries are blood vessels that carry blood to and from the heart

- ARTERIES carry oxygenated blood away from the heart
- VEINS carry de-oxygenated blood to the heart









The Structure of the Veins

Veins and arteries consist of three layers:

- Tunica adventitia
- Tunica media
- Tunica intima











Click on the circled labels above to get more information









TUNICA ADVENTITIA

- Strong composed of connective tissue, collagen and elastic fibres
- Allows stretch
- It attaches the vein to whatever other tissue it runs through i.e. the skin









TUNICA MEDIA

- Middle layer consisting of smooth muscle and elastic fibres
- Provides strength, elasticity and contractile abilities in the blood vessel walls
- Supports constriction and dilation of the veins to alter the blood flow









TUNICA INTIMA

- Very thin layer made up of endothelium
- > Only one cell thick
- > Also makes up valves inside vein









MOST COMMON VEINS USED IN VENEPUNCTURE

- Basilic
- > Cephalic
- Median Cubital
- All located in Anticubital Fossa (ACF)



















Hand Anatomy

- Metacarpal veins located on the dorsal side of the hand can be used for venepuncture by experienced practitioners only
- ➢ Used if venous access to the ACF is poor or difficult
- Different equipment is required for this method of sample retrieval
- Refer to a more experienced colleague if this method is required until you are more proficient









Section 4 Choosing Sites for Venepuncture

After completing this section you will be able to:

- Identify good veins
- Avoid bad veins
- Choose a suitable site
- Identify influencing factors
- Improve access to veins









Most frequently used veins are:

- ➤ median basilic
- median cubital
- \succ median cephalic veins in the ante cubital fossa.
- Veins on the dorsum of the hand may be used if the forearm and elbow veins are difficult to identify, but it should be noted that these thin walled easily moveable superficial veins are often more difficult to puncture than the larger, less mobile but palpable veins around the elbow.









You must avoid

- Veins in lower extremities
- Areas of joint flexion
- Veins close to arteries and deeper lying vessels
- > Veins that may be irritated from previous use









- Distal veins should be used first with subsequent venepuncture proximal to previous sites.
- Healthy veins are easily detected by palpation. These veins feel soft and bouncy and will refill when depressed.
- Always allow adequate time for inspection and palpation of the patients arm and hand to select a site.
- In difficult cases, ensure maximum venous dilation before inspection e.g. warming. Use veins in non dominant side if possible.
- > If in doubt, consult a more experienced colleague









CONDITION AND ACCESSIBILITY

- Veins may be tortuous, sclerosed, fibrosed, or thrombosed, inflamed or fragile and unable to accommodate the device used.
- If the patient complains of pain or soreness over a particular site, this should be avoided as should areas that are bruised.








Characteristics of Good Veins

- Bouncy
- Soft
- Refills when depressed
- ➢ Has a large lumen
- > Straight
- ➢ Visible
- Is well supported









AVOID

veins that are:

- Bruised
- Infected (phlebitis)
- Oedematous limbs
- Hard, fibrosed veins
- Areas of previous venepuncture
- Veins adjacent to infection
- Near bone









DO NOT

take blood from affected limb if :

- Patient has infusion devices insitu
- Patient has Fistulas / shunts
- Patient has lymphoedema









INFLUENCING FACTORS

- > Temperature of the environment
- Patient anxiety
- Medication
- > Age and weight of patient
- Position of patient
- > Injury
- Privacy/dignity

SOURCE: MALLETT & BAILEY 2001









IMPROVING ACCESS / VEIN PROMINENCE

- > Tourniquet
- Open and close of fist
- Lower arm below heart level
- Stroke vein in distal direction
- > Heat









Section 5 Blood Collection Devices

After completing this section you will be able to:

- > Choose a device
- > Complete the form
- Understand the order of the draw
- Recognise symptoms and prevention of Haemolysis









Choosing the Device

- The intravenous device for blood sampling in Shropshire is the VACUETTE system. Optimum gauge is 21 swg (standard wire gauge). This allows blood to be withdrawn:
 - at a reasonable speed
 - without discomfort to the patient
 - without damage to the sample.
- Choose the device dependent on the condition and accessibility of the individual patients' veins.
- Alternatives are; smaller gauge needle (22swg black needle)
- Winged infusion device (23 swg)









Specimen Request Form (being replaced by patient specific pre-printed request forms)

Area in green must be completed, coloured squares denote vacutainer bottle to be used

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| . 222120 | ORREC | | | | | | | СРА | Forename | | Hospita | & Ward | 1 |
| T NO | NC | N R | | | STR | | ACC | REDITED | Date of Birth | Sex | Consult | ant / G.F | 2 |
| PATEN | ECIME | ROC | ER | | HEMI | | LABO | RATORIES | GP Address and Code | | | | |
| | S | KP | RR | | BIOC | Information you wish returned on report: PLEASE PRINT CLEARL | Y IN BOXES | | PP Billing Address | | | | |
| | | LEA | CA | | CAL | | | | Patient Postcode | | NHS | PP | Cat II |
| MH | | A | N | | CLINI | Sample Type Sample collection da (Use start date for timed u | te rine collectio | ns) | 1 1 | and ti | me | ; | hrs |
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| 1 | H | | JB-16 | | V | SIGNATURE OF REQUESTING DOCTOR | PLEASE | PRINT SURNAME | | BLE | EP NUMB | ER | |
| | | | | | | • | • | | | | | | |









Order of Draw

- ➢ Red
- Light Blue
- > Gold
- Lavender
- > Pink
- Dark Green
- Light Green
- > Grey
- Dark Blue









Vacuette Tube Guide

| ltem Number | Volume | Cap Colour | Cap Ring Colour | Tube Contents | Tests | Special Instructions |
|-------------------|----------|---------------|--------------------|---|---|---|
| 456092 | 6ml | Red | Black | Clotting Accelerator | All microbiology and virology tests, Intrinsic Factor Ab., ANF, Progesterone, All drug levels (except Lithium, Paracetamol, Salicylate), Allergens. | |
| | | Red | Yellow | Clotting Accelerator and Separation Gel | | |
| 454228 | 4ml | Ochre | Ochre | Clotting Accelerator and Separation Gel | All routine biochemistry including Lithium, Paracetamol, Salicylate, Vitamin B12/Folate/Ferritin. EXCEPTIONS: Other drugs, Progesterone, HbA1c, Trace metals, Allergens, Glucose | |
| 454327 | 3.5ml | Blue | Black | Trisodium Citrate | Coagulation screen, Warfarin and Heparin control, Thrombotest, Fibrinogen, Cryofibrinogen (keep at 37°C), D-Dimers, Contact Haematology for other coagulation tests | MIX GENTLY AND THOROUGHLY |
| 454023 | 4ml | Lavender | Black | EDTA | FBC, Reticulocytes, ESR (Shrewsbury Lab only), Sickle cell, IM screen, Malaria screen, Haemoglobinopathy, GoPD, Viscosity, DCT, Kleihauer Betke test, HbA1c, Lead, PTH, CoHb, Methb, Cyclosporin A, Tacrolimus, RA Screen, Red Cell Folate | MIX GENTLY AND THOROUGHLY |
| 456084 | 6ml | Green | Black | Li Heparin | Chromosome studies, Ammonia | |
| | | Green | Yellow | Li Heparin and Separation Gel | | |
| 454091 | 4m1 | Grey | Black | NaF/EDTA | Glucose (only necessary if sample will not reach lab within 90 mintues of taking blood sample), Alcohol, Lactate. | |
| 729090 | 2.9ml | Black | Black | Trisodium Citrate for ESR | ESR (special tube, Telford and Oswestry Labs only) DO NOT AFFIX ID LABELS. Fill in label at base of the tube with full patient details. | MIX GENTLY AND THOROUGHLY |
| 456052 /456097 | 6ml | Pink | Black | Serum/EDTA for Crossmatch | Blood group, Save serum. Crossmatch, Antibody screen, Cord blood investigation, Cryoglobins/Cold agglutinins (keep at 37°C), Antenatal Serology | MIX GENTLY AND THOROUGHLY |
| 456080 | 6ml | Royal Blue | Black | Sodium Heparin Trace Elements | Trace metals - Copper, Zinc, Aluminium. | Contact Biochemistry for supply of tube |
| Recomme | nded ord | er of draw | - serum, o | coagulation | 🔿 Paediatric 🔿 Gel 🌈 | Standard |

followed by all the other tubes with additives









Haemolysis

- Haemolysis results from damage or destruction of red blood cells and liberation of haemoglobin. When the cells are ruptured it causes discolouration of the serum (plasma), staining it pink or slightly red.
- Haemolysis elevates potassium, LDH, AST, ALT, phosphorate, magnesium and ammonia levels and decreases levels of red blood cells.
- Haemolysis can occur as a result of a medical condition such as a patient with fragile cells, but frequently occurs as a result of how the sample of blood is collected, handled and stored.









Haemolysis

Causes of Haemolysis:

- The vigorous shaking of bottles
- > Too much time taken to draw and collect the blood
- Too small needle for the volume of blood taken
- Frothing as drawing up
- > Drawing from a vein that has a haematoma
- Storing samples too close to the freezer compartment in a refrigerator









Haemolysis

PREVENTION

Use correct size needle

Gently invert tubes DO NOT SHAKE

Obtain correct amount of blood for each tube









Section 6 Collection of Venous Blood Samples

After completing this section you will be able to:

- List the equipment needed
- Prepare the area/patient
- > Work through the process









Equipment Required

- Clean field
- > Tourniquet
- Vacuette Holder
- ➢ Needle
- Alcohol swab
- Non-woven gauze or equivalent

- > Micropore
- Blood specimen bottles
- Specimen request form
- > Gloves
- Plastic apron
- Sharps bin









Skin Preparation

- Cleanliness is vital when performing venepuncture as the skin is breached and an alien device introduced into a sterile circulatory system. The major sources of contamination are:
 - cross infection from practitioner to patient
 - skin flora of the patient
- Good hand washing and drying techniques/use of alcohol handrub are essential on the part of the nurse
- Firm and prolonged cleansing with an alcohol swab to the site of venepuncture is essential. Allow this area to dry before commencing procedure. Do not fan or blow on area after cleaning.









ACTION

- Approach the patient confidently
- Identify patient through confirmation of name and date of birth
- Allow patient to ask questions and discuss any problems which have arisen previously
- Wash hands and dry carefully
- Check hands for visibly broken skin and cover with plaster
- Prepare equipment required onto a clean field

- A relaxed patient will have relaxed veins
- To ensure that correct patient identified
- To obtain the patient consent and co-operation
- > To minimise the risk of infection









ACTION

- Check adequate lighting, good ventilation, privacy and correct patient position
- Consult the patient to any preferences and problems previously encountered
- Place arm in dependant position, ask patient to clench unclench fist if necessary.
- If these measures are unsuccessful, remove tourniquet and apply moist heat.
- Select the vein and the device to be used

- To ensure patient and nurse comfort and adequate light source available
- To involve the patient in treatment and take patient history which may influence vein choice
- To dilate the veins by obstructing the venous return
- To promote blood flow and therefore distend vein
- To maintain cleanliness









ACTION

- Use bactericidal alcohol hand rub
- Put on gloves
- Clean the patients skin using alcohol swab.
- Inspect the device carefully
- Support the chosen limb and apply tourniquet just above site of venepuncture (1 min max).
- Anchor the veins by a few centimetres below the proposed insertion site.
- Insert the needle smoothly at an angle of approx.. 30 degrees with bevel up.

To adhere to universal safe

RATIONALE

> To reduce cross infection risk

standards

- To fully cleanse skin prior to insertion of needle directly into a vein
- To detect faulty equipment
- To ensure patient comfort and reduce possibility of haemolysis of sample
- To immobilise the vein
- The bevel edge provides the cutting edge to aid insertion









ACTION

- Do not exert any pressure on the needle
- Slide blood bottle into the vacuette holder and fill blood bottle to the marked fill line
- Release the tourniquet as the last blood bottle is almost filled. In some instances this may be requested at the beginning of sampling (i.e. for blood calcium, as the tourniquet may damage cells)
- Place non-woven gauze or equivalent over puncture point.
- Remove needle and discard immediately into sharps box, apply digital pressure to puncture site

- To prevent a through puncture occurring or cutting from bevel of needle
- To ensure required amount of blood sample is obtained
- To decrease pressure within the vein
- To reduce the amount of static blood in the vein and the likelihood of leakage
- To stop leakage and haematoma formation
- To ensure safe disposal and prevent needle stick injury









ACTION

- Apply pressure until bleeding has ceased (about one minute). Longer may be required if clotting mechanisms are influenced by disease or treatment i.e. warfarin
- Invert sample 4-6 times
- Label the bottles and complete required details on the specimen request form
- Inspect the site
- Ascertain whether the patient is allergic to plaster
- Apply plaster or alternative

- To prevent leakage or haematoma formation
- To ensure that the blood is mixed with any additive present
- To ensure the specimen is from the right patient, the right tests are performed and results reported to their GP
- To check the puncture point has sealed
- To prevent allergic reaction
- To cover the puncture and prevent leakage or bacteria contamination









ACTION

- Ensure patient is comfortable
- Discard waste
- Follow procedure for collection and transportation of samples

- To ascertain patient condition
- Safe disposal of waste
- To make sure specimens reach lab within the specified time









Sharps disposal

Yellow Lid/Label Container Only All infectious 'Sharps' Waste except those contaminated with cytotoxic or cytostatic medicines





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Section 7 Trouble Shooting

After completing this section you will be able to:

- Identify potential problems
- Understand the causes
- Take action to rectify problems









Trouble Shooting

| PROBLEM | CAUSE | SUGGESTED ACTION | | | |
|--------------------------|--|--|--|--|--|
| Excessive Pain | Anxiety, Fear, Low pain threshold | Confident, unhurried approach. Use all methods including heat to dilate veins. Use of local anaesthetic cream. Avoid hesitancy and skin tickling. | | | |
| | Frequently used vein | Avoid this site, if possible | | | |
| | Nerve touched | Remove needle immediately and proceed to different site | | | |
| Infection | Poor cleaning technique | Practice good hand washing and skin cleansing | | | |
| Limited Venous Access | Repeated use Phlebitis | Confident unhurried approach Use a needle of 22 or 23 swg. Only proceed if sure of a successful first attempt Consider referral to more experienced colleague | | | |
| | Bruising due: fragile veins in the elderly Anticoagulation therapy or low platelet levels | As above plus apply tourniquet gently or do not use. Ensure adequate pressure to puncture site to prevent further damage | | | |
| | Peripheral Shutdown | Use all methods to dilate veins. A sphygmomanometer cuff (no higher than 120 mmtlg) may be more effective in restricting venous return. Work quickly if patient in collapsed state. Pull blood back into veins by massaging above the venepuncture site. | | | |









Trouble Shooting

| PROBLEM | CAUSE | SUGGESTED ACTION | | |
|-------------------------|--|---|--|--|
| Missed Vein | Inadequate Anchoring Wrong positioning Poor Lighting Less than 100% concentration | Withdraw needle almost to the bevel and manoeuvre gently to realign needle and vein. Re-advance but stop if becomes painful. | | |
| Spurt of blood on entry | Bevel of needle entering before entire bevel is under skin, due to vein being superficial (ensure tourniquet is not overly tight | Ignore. Reassure patient Slacken tourniquet if over tight | | |
| Blood flow stops | Overshooting vein or advancing needle while withdrawing blood. Vein collapse due to contact with valve or vein wall collapse Poor blood flow | Gently ease needle back and continue. Manoeuvre gently. Release and retighten tourniquet and continue As above and massage above the needle tip to pull blood into the vein. | | |
| Haematoma | Perforation of opposite wall of vein Forgetting to remove tourniquet before removing needle Inadequate pressure on puncture site | Insert needle at correct angle. Do not advance needle during procedure Remember next time to slacken off the tourniquet prior to removing final blood sample bottle Apply adequate pressure on needle removal . Supervise the patient doing the same | | |









Trouble Shooting

| PROBLEM | CAUSE | SUGGESTED ACTION | | |
|---|--|--|--|--|
| Hardening of the veins due to scarring and thrombosis | Prolonged use of one site | Alternative venepuncture sites to prevent this. Do not use hard veins as this is often not successful and can cause pain | | |
| Mechanical Problems | Faulty Equipment | Check carefully before use and discard | | |
| Transmittable diseases | Viruses pose the major risk causing hep B, cytomegalovirus, AIDS | All blood should be handled with care and caution. Gloves must be worn when taking blood and handling samples | | |
| Needlestick | Lack of caution Overfilling of sharps containers | Dispose of equipment safely to prevent needlestick injuries. If it does occur follow needle stick injury procedure | | |
| Very anxious patient | Previous trauma Needle phobia | Confident unhurried approach Ensure patient comfort and maybe lying down. Use of all methods to dilate veins. | | |









Section 8 First Aid and Needlestick Injury

After completing this section you will be able to:

- Deal with Needlestick Injury
- Identify causes, symptoms and treatment for fainting and haemorrhage









Needlestick Injury First Aid

Wash area well under running water and encourage site to bleed ...









Needlestick Injury

Key Responsibilities

- Staff member report to line manager. Complete datix incident form. Seek advice from Occ Health, A&E department or GP
- **Reporting to Occupational Health** Staff member injured or manager
- Informed consent and obtaining patient specimens clinician responsible for sources patient care
- Hep B Vaccination Occupational Health /A&E Dept/GP
- Risk Assessment Staff member involved. Clinician caring for patient. Occupational Health. Microbiologist
- Counselling and follow up Occupational Health/GP
- Specialist HIV counselling GU medicine, HIV specialist nurse









First Aid ➤ Fainting > Haemorrhage









Fainting

- > **Definition**: Temporary reduction of blood flow to the brain
- Causes: Pain or fright and emotional stress due to venepuncture, fasting
- Signs and symptoms: Hypotension, slow pulse, pale clammy skin, loss of consciousness, nausea, lightheadedness, with rapid recovery
- Treatment: Check Airway Breathing Circulation, lie patient flat with legs raised, reassure patient

IF PATIENT DOES NOT RECOVER SEEK FURTHER HELP AND DIAL 999









Haemorrhage

- > **Definition**: Prolonged loss of blood from blood vessel
- Causes: Arterial puncture, blood clotting disorders, thrombocytopenia, patients on wafarin/aspirin/drugs affecting clotting
- Signs and symptoms: Bleeding from venepuncture site that appears prolonged patient may feel faint
- Treatment: Wear gloves and apply direct pressure to venepuncture site with clean dressing or pad, elevate and support limb above level of heart, if feeling faint lie patient flat and raise legs, add further dressings over the top of first dressing.
- If necessary, seek further help









Section 9 Knowledge Quiz & Learner Contract Forms

Print off the Knowledge Quiz and Learning Contract Complete both documents and bring to the Practical Workshop Session.

You will not be able to attend the workshop if you do not bring the above completed documents











Section 10

Competency Framework









Competency Framework for Assessing Venepuncture

At the taught session you will receive a competency booklet that must be completed and signed off by yourself and your assigned mentor/assessor

This completed document should be kept in your personal development folder and used as evidence of development at your KSF review








We hope you enjoyed this training experience. Feedback is important as it helps us to improve our Service delivery.

If you have any comments about the programme please contact the OD/HR Training Dept on 01743 277590 email us at Training@shropcom.nhs.uk





