Venepuncture in Paediatrics

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Key Amendments

Date	Amendment	Approved by
19th Nov 2020	Document extended for 1 year	Dr J West/Paediatric QIM
26th March 2021	Approved with no amendments	Paediatric QIM
26th Sept 2023	Addition of administration protocols Addition of draw order	
9th February 2024	Document approved	Paediatric QIM

Introduction

Developing skills in performing venepuncture can facilitate holistic care and timely treatment. For nurses working with children and young people this is usually regarded as an expanded role (RCN 2005).

It is expected that all individuals performing venepuncture should follow this policy when working within the Worcestershire Acute NHS Trust.

In order to do this safely the practitioner must have a basic knowledge of the following:

1. The relevant anatomy and physiology of the suitable sites for venepuncture.
2. The criteria for choosing both the vein/site and device to use.
3. The potential problems which may be encountered, how to prevent them and necessary interventions.
4. The health and safety/risk management of the procedure, as well as the correct disposal of equipment. Refer to needle stick policy.
5. The practitioner should also demonstrate correct usage of the blood collecting systems and the knowledge of the correct labelling of bottles and forms.

The circulatory system is a closed sterile system and venepuncture, however quickly completed is a breach of this system providing a method of entry for bacteria. Aseptic principles must therefore be adhered to throughout the procedure.

The practitioner must be aware of the physical and psychological comfort of the child and to appreciate the value of adequate explanation and procedures to reduce anxiety and fear.

Competencies Required & Patients Covered

Competencies Required

The Royal College of Nursing (2005) advise that there are considerable differences between children of varying ages, and they recommend that practitioners develop competence within specific age bands according to their area of practice. They describe the age band as 0 to 1 years, 1 to 5 years and 5 years and above. All non medical practitioners must also complete a 3 yearly update with a single competency assessment

Those undertaking the skill of venepuncture should complete the following:

1. Theory relating to venepuncture via a course recognised by the trust
   And
2. Minimum of 5 supervised successful venepunctures
   Or
3. If evidence of previous competency can be shown, a minimum of 1 supervised successful venepuncture per age range

NOTE: If the nurse intends to achieve competency across the three age ranges then they must evidence a minimum of 10 successful venepunctures with a minimum of one from each age range.

It is expected that medically qualified practitioners will have achieved and developed the requisite knowledge and skill of venepuncture of paediatric patients as part of their core medical training and development.

Patients Covered

All children requiring venepuncture

Reducing Anxiety Pain & Discomfort

Willock et al (2004) explains that an important role of the children's nurse is to help children cope with procedures and reduce any adverse effects and distress caused. They explain that these children may need their parents and the health care professionals help to cope by providing distraction and comfort, as well as topical pain relief.
Prior to venepuncture the nurse should:

- Assess the child or young person's perception of pain
- Create a safe, comfortable, calm and child focused environment
- Be empathetic rather than directive
- Consider the use of play and distraction techniques
- Consider using play specialist and psychologist to prepare child for procedure
- Consider the use of local anaesthetic preparations, e.g. EMLA, LMX4, Ametop, Ethyl Chloride spray, as per administration protocols (Appendices 1-4).

For venepuncture using butterfly and syringe
Equipment

- Clinically clean plastic tray or receiver with sharps bin
- Tourniquet if indicated
- butterfly
- Appropriate specimen bottles and specimen forms
- Chlorhexidine 2% in 70% alcohol solution
- Sterile adhesive plaster
- Non-sterile surgical gloves *(Gloves **must** be worn when carrying out venepuncture procedures)*
- Eye protection should be worn if there is a risk of blood splash
- Sterile gauze swab
- Adhesive dressing

Selecting a Site

Always examine all potential sites to ensure that the best vein is obtained. Common sites used for venepuncture are the back of the hand and antecubital fossa. However the feet may also be used.

Procedure

1. Check patient identification (using identification band) and explain the procedure to the patient and/or legal parent/guardian as indicated and gain verbal consent. Ascertain any previous problems that the patient may have had and any allergies. Allow for time to answer questions and discuss problem, which may have previously arisen.
2. Gather equipment necessary for venepuncture on a clean tray or receiver and carry to the patient. Place sharps bin on your dominant side and blood bottles on non-dominant side.
3. Thoroughly wash and dry hands and put on gloves.
4. Survey both arms and select site and using the aforementioned criteria.
5. Depending on age of patient gently use manual application or apply a paediatric sized tourniquet to an area 5 - 10 cm above venepuncture site, tightly enough to obstruct venous return but not arterial blood flow. If it is necessary to keep the tourniquet on for a long time in order to find a suitable vein, it must be removed for a few minutes and re-applied just before venepuncture is carried out [NCCLS Guidelines procedure for the Collection of Diagnostic Blood Specimens by Venepuncture; Fourth Edition H3 A4 Vol. 18, No 7].

   NB Only equipment specifically designed, as tourniquets should be used. Rubber gloves are NOT to be used as tourniquets as they can cause extensive bruising to the patient.
6. Clean the skin carefully at the selected site with Chlorhexidine 2% in 70% alcohol solution for a minimum of 30 seconds and allow to air dry. ***Do not re-palpate the vein or touch the skin.***
7. Anchor the vein by applying manual traction on the skin a few centimetres below the proposed insertion site with the non-dominant hand.
8. Using your dominant hand hold the butterfly by pinching the wings together and insert the needle smoothly, with the bevel end uppermost at an approximately 15 degree angle for 1 - 2 millimetres, then reduce the angle and insert a further 1 - 2 millimetres. Secure the wings of the device to the skin with micropore avoiding the insertion site.
9. Withdraw the required amount of blood using the appropriate syringe and release the manual pressure/tourniquet. Insert blood into suitable specimen bottle and invert bottle gently for recommended times for specimen.
10. Recommended tube guide and sampling order (Appendix 5)
11. After sampling is complete remove butterfly and discard in sharps bin immediately. Apply pressure immediately to puncture site using gauze NOT cotton wool. *(Do not apply pressure until the needle has been fully removed).*
    - Pressure should be applied until the bleeding has ceased, approximately 2 - 3 minutes. Longer may be required if current disease or treatment interferes with clotting mechanisms.
    - If indicated, the patient or attending adult may be asked to apply pressure with one finger but should be discouraged from bending the child's arm if a vein in the antecubital fossa is used.
12. Apply sterile adhesive waterproof dressing when bleeding has stopped.
13. Label bottles immediately at patient's bedside *(ensure that the outside of specimen bottle is free of contamination).* Ensure all details are entered on the forms.
14. Place bottles in plastic sleeve attached to the specimen form and seal.
15. Despatch specimens to appropriate pathology department without delay.
16. Wash and dry hands.

17. Practitioners should only make two attempts at venepuncture. If both attempts fail the procedure should be referred to another practitioner competent in venepuncture.

For Venepuncture using a butterfly and vacutainer system (as with butterfly and syringe except point 8 and 9 – see below)

Procedure

8. Using your dominant hand hold the blood collection set by pinching the wings together and insert the needle smoothly, with the bevel end uppermost at an approximately 15 degree angle for 1 - 2 millimetres, then reduce the angle and insert a further 1 - 2 millimetres. Secure the wings of the device to the skin with micropore avoiding the insertion site.

9. Withdraw the required amount of blood using the appropriate Vacutainer bottle(s). Insert bottle into attached vacutainer sleeve and push gently to pierce top, release the tourniquet and allow vacuum to let required amount of blood flow in to bottle. Remove bottle and invert gently for recommended times for specimen.

If using a Safety-Lok blood collection set, grasp the yellow shield between thumb and forefinger while using your remaining fingers to hold the tubing against the palm of your hand. With the tubing held taut, advance your thumb and forefinger to slide the safety shield forward until an audible click is heard. The click confirms the shield is locked into place, covering the needle. The device can then be disposed of in the sharps receptacle.

When using the vacutainer system Ensure the recommended order of draw is followed if several samples need to be taken. Information on standard order of draw is available in every clinical area. If in doubt contact appropriate pathology department for advice. The recommended order of draw is: - Blood cultures, plain tubes (non additives), coagulation, all other tubes with additives. *If Practitioner does not use the correct order of draw test error due to cross contamination from tube additives may occur.*

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Royal College of Nursing Guidance for Nurses Giving Intravenous therapy

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Sandwell and West Birmingham Hospitals NHS Trust (2003) National Vocational Qualifications Unit B3 Accreditation in Obtaining Venous Blood Samples Using Invasive Techniques ; Training Programme

Willock J, Richardson J, Brazier A, Powell C, Mitchell, E (2004) Peripheral venepuncture in infants and children *Nursing Standard March 17/vol18/no27/2004*

Worcestershire Acute Hospital NHS Trust (2005) Policy for Consent to Examination or Treatment
Worcestershire Acute Hospitals NHS Trust (2005) Protocol for Venepuncture Procedure

Appendix 1

Administration protocol for General Sales List (GSL), Pharmacy Only (P) Medicines, and Medical Devices

Lidocaine 2.5% with Prilocaine 2.5% (EMLA)

Medicines Information

Name/forms of Medicine *(document which form is administered to the patient)*	**Lidocaine 2.5% with Prilocaine 2.5%** (EMLA 5%)
Indication *(when it can be used)*	Topical Local anaesthesia before venepuncture or venous cannulation
Route	Topical to the skin
Dose	Term newborn to below 3 months: Apply up to 1g for a maximum of 1 hour prior to procedure. Maximum of 1 single dose in any 24-hour period. Child 3-11 months: Apply up to 2g for a maximum of 1 hour prior to procedure. Maximum of 2 doses, separated by at least 12 hours within any 24-hour period. Child 1-17years: Apply a thick layer 1-5 hours prior to procedure. Maximum of 2 doses, separated by at least 12 hours within any 24-hour period
Frequency	Apply to site of venepuncture or venous cannulation and cover with occlusive dressing;
Maximum dose in <u>24 hours</u>	As above
Maximum duration of treatment	As required
Do NOT give in these circumstances	Should not be applied to damaged skin. Children with atopic dermatitis a shorter application time of 15-30 minutes is recommended.
Warnings/Adverse reactions (see product information for full details)	Hypersensitivity Can cause skin reactions.

Appendix 2

Administration protocol for General Sales List (GSL), Pharmacy Only (P) Medicines, and Medical Devices

Lidocaine 4% (LMX4)

Medicines Information

Name/forms of Medicine *(document which form is administered to the patient)*	**Lidocaine 4%** (LMX4)
Indication *(when it can be used)*	Topical Local anaesthesia before venepuncture or venous cannulation
Route	Topical to the skin
Dose	Child 1- 2 months: Apply up to 1g at least 30 minutes before the procedure. Maximum application time 60 minutes and perform procedure approximately 5 minutes after removing the cream. Child 3-11 months: Apply up to 1g at least 30 minutes before the procedure. Maximum application time 4 hours and perform procedure approximately 5 minutes after removing the cream. Child 1-17years: Apply 1-2.5g at least 30 minutes before the procedure. Maximum application time 5 hours and perform procedure approximately 5 minutes after removing the cream
Frequency	Apply to site of venepuncture or venous cannulation and cover with occlusive dressing;
Maximum dose in 24 hours	As above
Maximum duration of treatment	As required
Do NOT give in these circumstances	Should not be applied to damaged skin.
Warnings/Adverse reactions (see product information for full details)	Licensed in children from 1 month Hypersensitivity

Appendix 3

Administration protocol for General Sales List (GSL), Pharmacy Only (P) Medicines, and Medical Devices

Tetracaine Gel (Ametop)

Medicines Information

Name/forms of Medicine *(document which form is administered to the patient)*	**Tetracaine Gel** (Ametop)
Indication *(when it can be used)*	Topical Local anaesthesia before venepuncture or venous cannulation
Route	Topical to the skin
Dose	Child 1 month – 4 years: Apply the contents of up to 1 tube (can be applied at separate sites, at a single time or appropriate proportion). Maximum cumulative dose in a 24-hour period should not exceed 2 tubes. Child 5-17 years: Apply contents of 5 tubes (can be applied at separate sites, at a single time or appropriate proportion). Maximum cumulative dose in a 24-hour period should not exceed 7 tubes.
Frequency	Apply to site of venepuncture or venous cannulation and cover with occlusive dressing; remove gel and dressing after 30 minutes for venepuncture and after 45 minutes for venous cannulation.
Maximum dose in <u>24 hours</u>	See above
Maximum duration of treatment	As required
Do NOT give in these circumstances	Not licensed for use in neonates. Should not be applied to damaged skin. Previous hypersensitivity reaction to tetracaine
Warnings/Adverse reactions (see product information for full details)	Can cause Oedema; skin reactions. Hypersensitivity The systemic toxicity of local anaesthetics mainly involves the central nervous system; systemic side effects unlikely as minimal absorption following topical application.

Appendix 4

Administration protocol for General Sales List (GSL), Pharmacy Only (P) Medicines, and Medical Devices

Ethyl Chloride Spray (Medical Device)

Medicines Information

Name/forms of Medicine *(document which form is administered to the patient)*	**Ethyl Chloride Spray (Medical Device)**
Indication *(when it can be used)*	Topical Local anaesthesia before venepuncture or venous cannulation. Use only as supplied in aerosol cans (do not use glass vials)
Route	Topical to the skin
Dose	Use test dose, some patients find the intensely cold feeling intolerable Hold the spray 6-8 inches from the skin and spray for maximum of 15 seconds. Stop if skin turns white or if snowy coating appears (risk of frostbite with over exposure). Injection should be performed immediately after application (within 10 seconds)
Frequency	Maximum single exposure 15 seconds, less if skin turns white or snowy coating appears. Repeated applications not advised in a single episode.
Maximum dose in 24 hours	See above
Maximum duration of treatment	As above
Do NOT give in these circumstances	Not to be used on areas of inflamed or broken skin or on patients who have previously had an allergic or adverse reaction to ethyl chloride.
Warnings/Adverse reactions (see product information for full details)	Use in a well ventilated area. Ensure skin is intact and has returned to normal temperature and colour following the procedure. Avoid any kind of ignition source Do not mix with water or any other liquids Cautions as per aerosols Avoid contact with eyes

Appendix 5

BD Life Sciences - Preanalytical Systems

Tube Guide & Recommended Order of Draw*

*Clinical and Laboratory Standards Institute (CLSI) Guidelines GP41-Ed7 (formerly H3-A6, 6th Edition)

Worcestershire Hospitals NHS Trust

Blood samples should be taken in the following order:

Cap Colour	Cat. No.	Tube Type	Determinations	Special instructions
	Cat. No. Draw Volume	Blood Cultures	Aerobic followed by anaerobic - if insufficient blood for both culture bottles, use aerobic bottle only.	Mix 5-6 Times
	Cat. No. Draw Volume	Sodium Citrate	Coagulation Studies, D-Dimer, Factor Assays, Thrombophilia Screen (4 tubes), Lupus Screen (2 tubes), MAC Cultures for AAFB (Virology).	MUST be filled to the line. Mix 3-4 Times
	Cat. No. Draw Volume	SST™ II Advance	U + E, LFT, Bone Profile, Magnesium, Lithium, TDM, Hormones, Tumour Markers, Trop T, Most Biochemistry Tests, Immunology and Serology.	Not to be used for copper, zinc and PTH. Mix 6 Times
	Cat. No. Draw Volume	Heparin & PST™ II	CCU Specimens for U + E. Cell Markers, Cytogenetics, T Spot/IGRA Test	Tubes available from Biochemistry. Mix 8-10 Times
	Cat. No. Draw Volume	EDTA	FBC Profile, DCT, Malaria Screen, ESR, Hb Electrophoresis, CD4, HbA1c, Blood Ammonia, Hep C PCR, Viral Loads and Genotyping, Meningo PCR, PTH, HIV, HBV, HCV Viral Loads. each	Mix 8-10 Times
	Cat. No. Draw Volume	Crossmatch (Non-BD)	Crossmatch, Group.	Samples MUST be labelled by hand and have 3 identifiers. Mix 8-10 Times
	Cat. No. Draw Volume	Fluoride Oxalate	Blood Glucose and Lactate, CSF Glucose and Lactate, Fluid Glucose.	Mix 8-10 Times
	Cat. No. Draw Volume	Trace Element	Zinc and Copper.	Tubes available from Biochemistry. Mix 8-10 Times

Determinations and Special Instructions contained within this guide have been provided by the above named institute and are not BD recommendations or instructions for the BD products described. Please consult your organisation's guidelines or contact BD should you have any questions.

IMPORTANT MIXING GUIDELINES

All BD Vacutainer® tubes require immediate mixing following collection. Insufficient mixing can result in inaccurate test results and the need to re-draw. Correct mixing technique is to gently invert (180° and back) each tube the recommended number of times shown on the right hand side of the table.

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