Cannulation and Venepuncture

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Learning outcomes

That the clinician can:
- Consider legal and professional implications relating to cannulation & venepuncture
- Revise anatomy in order to complete the skills
- Understand and follow infection control procedures
- Be able to perform cannulation and venepuncture

Legal/professional issues

Before cannulation and/or venepuncture is performed, the clinician should consider the following:
- Development of competence in the skills…… how many supervised practices are required before the skills can be performed autonomously? Check the local Trust policy!
- Are there any exclusions to performing the skills on specific patient groups? Check the local Trust policy!
- When attempting cannulation and/or venepuncture, has the patient given informed consent for the procedure?
- Where and how should these procedures be documented? Check the local Trust policy.
Remember to sign and date your entry and print your name legibly.

Anatomy/Physiology

Veins: 3 layers
- Tunica intima (elastic endothelial lining)
- Valve
- Tunica media (muscle & elastic tissue, sympathetic control)
- Tunica adventitia – connective, supportive tissue

NB! Arteries pulsate and are usually much deeper than veins!
Cannulation and Venepuncture

Choosing a vein: position

Metacarpal (used for cannulation)

Cephalic (used for cannulation)

Basilic (used for cannulation)

Median cubital, cephalic and basilic (veins in the antecubital fossa are used for venepuncture)

Types of cannula

Types of blood bottles

Choosing a correct cannula size

<table>
<thead>
<tr>
<th>Colour</th>
<th>Common Applications</th>
<th>Size</th>
<th>Crystalloid</th>
<th>Plasma</th>
<th>Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>Used in theatres or emergency for rapid transfusion of blood or intravenous fluids</td>
<td>14G</td>
<td>16.2</td>
<td>13.5</td>
<td>10.3</td>
</tr>
<tr>
<td>Grey</td>
<td>Used in theatres or emergency for rapid transfusion of blood or intravenous fluids</td>
<td>16G</td>
<td>10.8</td>
<td>9.4</td>
<td>7.1</td>
</tr>
<tr>
<td>Green</td>
<td>Blood transfusions, parenteral nutrition, stem cell harvesting and cell separation, large volumes of fluids</td>
<td>18G</td>
<td>4.8</td>
<td>4.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Pink</td>
<td>Blood transfusions, intravenous infusions</td>
<td>20G</td>
<td>3.2</td>
<td>2.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Blue</td>
<td>For small veins or used in children for most medications and fluids</td>
<td>22G</td>
<td>1.9</td>
<td>1.7</td>
<td>1.1</td>
</tr>
</tbody>
</table>
Cannulation and Venepuncture

Infection control

Both procedures cause a breach of the skin – 3 areas of possible contamination to consider:

• Protection from skin flora of the practitioner (wash hands and wear gloves)
• Protection from patients own bacteria (cleanse the skin properly)
• Inoculation/exposure prone procedure (avoidance of needle stick injuries and blood spillages)

Hand washing – before and after palpation

Wearing gloves

Clean the skin with a chlorhexidine and alcohol based solution for 30 seconds

Leave the skin to dry thoroughly

Do not re-palpate after cleansing!

Local anaesthesia

Topical anaesthetic can be used to minimise pain for children and needle phobic patients

Ametop – can be used for venepuncture after 30 minutes, cannulation after 45 minutes

Emla – can be used for cannulation and venepuncture after 1 hour

Possible complications of the procedures

Fear/phobia/pain may cause the patient to move

Haematoma formation – ensure that pressure is applied for 2-3 minutes after withdrawing the needle

Puncturing an artery rather than a vein – withdraw the needle and press firmly for 5 minutes

Thrombophlebitis/infection – ensure that infection control procedures are followed rigorously

Extravasation – the cannula enters the tissue rather than the vein – flushing will be difficult and swelling/pain may be noted. Remove the cannula immediately
Prior to cannulation consider the following:

Informed consent from the patient

Ensure patient comfort

Collect and prepare the equipment – which size cannula should be inserted? See page 2

**Equipment**

- Sharps bin
- Cannulas
- Sterile container
- Tourniquet
- Cleansing wipes
- Clean gauze/sterile dressing
- Patient ID, patient notes
- Wear gloves

**Procedure**

Apply the tourniquet 5-10cm above the cannulation site

For cannulation skin must be cleaned with a 2% chlorhexadine and 70% alcohol solution (such as Chloraprep). Following cleaning the skin must be left to dry thoroughly
Cannulation

Whilst skin is drying prepare the equipment

Check cannula size and date of expiry

Open the “wings” of the cannula

Ensure that the bevel (the eye) of the needle is pointing upwards
Cannulation

Hand position: middle finger on the right wing, index finger on the injection port, thumb at the end of the cannula

Alternative hand position: middle and index fingers over both wings, thumb at the end of the cannula

Insert cannula directly into the vein at approximately 30 - 40 degrees

Advance the cannula slowly until.....

A flashback is seen at the base of the cannula
**Cannulation**

Holding the needle still, gently advance the plastic cannula into the vein.

Slowly advance the cannula, NOT the needle. If resistance is felt, stop and withdraw the needle and cannula.

Advance the cannula until the ‘hub’ meets the skin.

Gauze may help to absorb any leakage during removal of the needle.
Cannulation

Remove the tourniquet prior to removing the needle

Press over the end of the cannula (within the vein) to minimise blood loss, whilst removing the needle

Dispose of the needle into a sharps bin (whilst continuing to press over the vein with the other hand)

Remember to keep the bung!
Cannulation

Insert the bung into the end of the cannula

Apply the dressing

Firmly secure the dressing

Current evidence suggests that cannula insertion sites should preferably be covered with a sterile, transparent semi-permeable polyurethane dressing (2)
Cannulation

The cannula should be flushed to ensure correct position within the vein. Check the expiry date of the flush solution (normal saline usually)

Infuse 5 mls of flush solution, noting any resistance, swelling or reports of pain from the patient which may indicate extravasation

Document the procedure in the patients notes
Prior to venepuncture consider the following:

- Informed consent from the patient
- Ensure patient comfort
- Collect and prepare the equipment – which blood bottles are needed? Check the request forms.

**Equipment**

![Image showing venepuncture equipment]

- Needle
- Vacutainer
- Cleaning wipes
- Sharps bin
- Blood bottles
- Tourniquet

**Procedure**

Apply the tourniquet 5-10cm above the cannulation site. Clean the skin with chlorhexidine and alcohol, starting in the centre, working outwards in concentric circles (see images on page 4)

Carefully twist the vacutainer needle seal open

Remove the white plastic cover. Be very careful! There is a sharp needle beneath the grey plastic end that is now exposed
Venepuncture

Carefully insert the grey end into the vacutainer device.

Twist tightly to ensure that the connection is secure.

Remove the green plastic cover, this will expose the needle.

With the bevel of the needle pointing upwards, insert the needle into the vein at approximately 40 degrees.
The vacuum within the bottle should cause blood to immediately flow into the bottle. If blood does not flow then the needle is not correctly inserted into the vein and should be removed.

The blood flow will stop when the correct amount has entered the bottle. Remember to keep the hand holding the vacutainer and needle very still whilst removing the bottle from the device. The procedure shown in the three previous slides can be repeated if further blood bottles are needed.
Venepuncture

Put the filled blood bottles into a secure container

Prior to removing the needle, remove the tourniquet

Using a piece of gauze, gently press over the venepuncture site whilst removing the needle

Press firmly to avoid blood loss and haematoma formation
Dispose of sharps carefully

Apply a dressing or plaster over the venepuncture site

Gently rotate the bottle to mix the blood and possible additives

Label the bottle with the patients details, checking the form carefully. Send to the laboratory as per Trust policy
References

