

Practical Procedures in Clinical Medicine

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Foreword by

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Foreword

Non-invasive investigations have burgeoned in recent years. This has re-emphasised the need for meticulous care when invasive procedures are mandatory. The latter have also increased in range and complexity in relationship not only to investigation but also to management. Every competent hospital doctor nowadays must be able to enter veins, arteries and diverse cavities and organs efficiently, with the least possible risk to the patient. It is not easy to obtain guidance about such manoeuvres. It will not be found in most comprehensive textbooks of medicine or clinical examination, and rightly so, because it would be so much more conveniently placed in a separate, readily accessible handbook. Doctors Ford and Munro have done just this by translating their extensive practical expertise into direct, concise language embellished by clear, simple drawings, to guide the clinician about the indications, execution and hazards of those practical procedures which are essential components of the practice of modern medicine.

Edinburgh, 1980

John Macleod

Preface

This book is designed to assist senior medical students, house officers and registrars in performing practical procedures safely with the minimum discomfort to their patients. It should be regarded as no more than a handbook to be read before a procedure is undertaken and, if the operator is inexperienced, should never replace close medical supervision. Indeed, it is essential that any medical students should always be supervised by a fully registered doctor while performing a potentially hazardous procedure.

Before embarking on any procedure, the necessary equipment should be checked carefully and, if assistance is required, details of the procedure explained to everyone concerned. The patient should be informed as to why the test is necessary and how it will be performed, and his full cooperation should be sought. If time and circumstances permit, it is desirable to obtain written consent from or on behalf of the patient when the procedure to be undertaken carries with it an appreciable risk.

If premedication with diazepam is required, this is best achieved orally one hour beforehand. Where deemed appropriate the laboratory staff should be informed and their help enlisted. Due deference to the importance of sterility is vital. Some procedures require only that the operator should wash his hands carefully before proceeding further. Most demand that a cap, mask and gloves be worn and that the area under attention is screened with sterile drapes.

Local anaesthesia is often required and 5 to 20 ml of 1 per cent lignocaine plain can be given with comparative safety. Always check that the local anaesthetic provided does not contain adrenaline.

Finally, following any procedure, details of the after-care and nursing observations required must be clearly explained both to the patient and the senior nurse. If problems arise, the doctor must be contacted and, if necessary, further assistance sought. Blood loss and infection are much the commonest complications and should always be borne in mind when patients fail to improve or deteriorate following invasive procedures. For this reason, the indications for any procedure should be carefully assessed in the light of the expected information or response to be gained.

Edinburgh, 1980

M.J.F.
J.F.M.

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1. Venous blood sampling

INDICATIONS

To obtain venous blood for laboratory analysis, cross-matching etc.

PRECAUTIONS

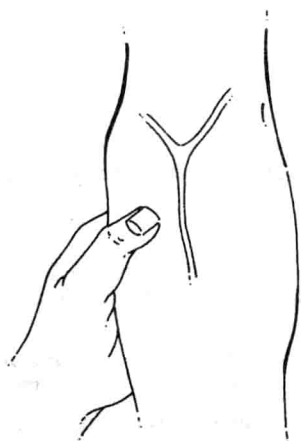
Avoid venesection through flexural eczema or areas of skin sepsis. Ensure that everything required is at hand including a tourniquet, needle, syringe, tubes, antiseptic solution and dry swabs.

Patients with coagulation disorders require special care.

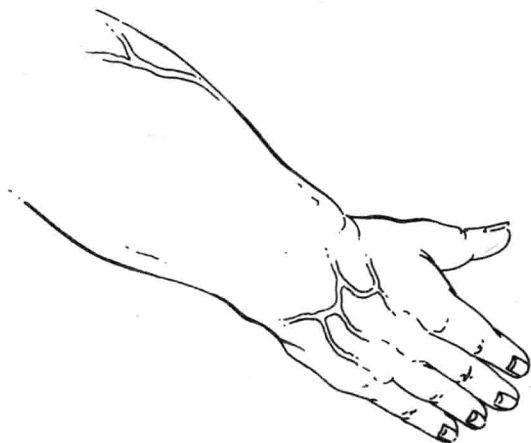
The operator should wash his hands.

SITES

Antecubital fossa: the routine site

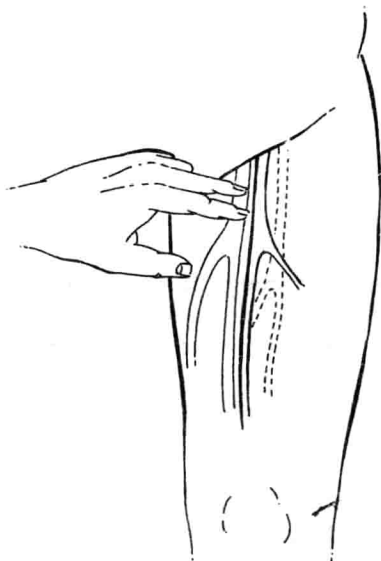


Dorsum of the hand: in difficult situations



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Femoral vein: the last resort



TECHNIQUE

- Apply a tourniquet well proximal to the chosen site and carefully locate the vein by palpation if necessary.
- Cleanse the skin with antiseptic solution.
- Select a suitably sized syringe and needle. When more than 20 ml of blood is required a 19 s.w.g. needle is advisable. Otherwise, a 21 s.w.g. needle is suitable.
- Insert the needle, bevel upmost, along the line of the vein at an angle of about 20° through the skin depending upon the depth of the vein. The needle enters the vein with a characteristic 'give'. Some find that during prolonged aspiration, the procedure is facilitated by bending the needle at its hilt to about 20° so that it lies in contact with the skin.

Bevel edge uppermost



- Confirm entry by aspiration of blood. If no blood is obtained, withdraw the needle very slowly while applying suction to the syringe as the needle may have transixed the vein.
- Withdraw the required volume of blood slowly into the syringe to avoid haemolysis.
- Release the tourniquet and remove the needle after applying a dry swab over the puncture site.
- Elevate the arm with the patient applying pressure to the puncture site to minimise bruising.
- To avoid haemolysis, remove the needle before emptying the syringe into the sample tube. (If the blood was taken for blood culture, change the needle before inserting the blood into the appropriate bottles.)

SPECIAL SITUATIONS

1. Prolonged venous stasis will alter the values of the proteins, calcium, potassium and the haematocrit. In these circumstances a tourniquet is best avoided but if used, should be removed once the needle has entered the vein.
2. If it is difficult to see or palpate veins in the antecubital fossae (e.g. in the very obese) try the veins at the wrist and dorsum of the hand which may be easier to locate. If necessary, immerse the arm in warm water to facilitate venesection. If two attempts are unsuccessful, stop and ask a colleague for assistance.

The wrist is a useful alternative



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3. In thin, elderly patients, immobilise the vein by skin traction proximally using the left hand. Insert the needle 1 cm distal to the proposed site of entry into the vein, preferably at a Y junction.

Immobilise the vein by traction



FEMORAL VEIN PUNCTURE

The femoral vein lies at the mid-inguinal point medial to the femoral artery.

Proceed to a femoral vein stab only if all else fails.

After cleansing the skin at the mid-inguinal point, insert the needle vertically just medial to the femoral artery to the depth of the needle.

Aspirate and if blood is not forthcoming, slowly withdraw the needle while applying suction.

When blood is obtained, withdraw the required amount and remove the needle, applying a dry swab to the puncture site with a firm pressure for at least three minutes.

2. Peripheral venous cannulation

INDICATIONS

Blood transfusion, hypovolaemia, septicaemia, electrolyte depletion, i.v. drug infusions.

PRECAUTIONS

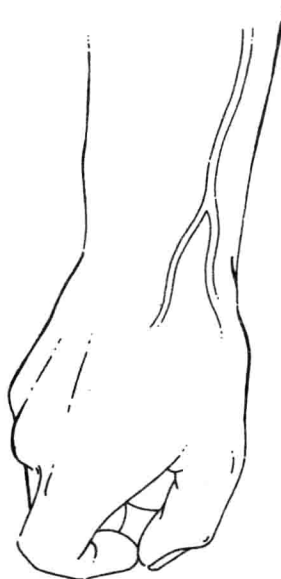
Fluid overload, cardiac failure, renal failure. Before commencing check that the necessary equipment is available and that the infusion has been run through the giving set. Avoid areas of skin sepsis, eczema or burns.

The operator should wash his hands thoroughly.

TECHNIQUE

- Using a tourniquet, select a vein in the non-dominant forearm proximal to the wrist joint but avoiding the antecubital fossae where possible.

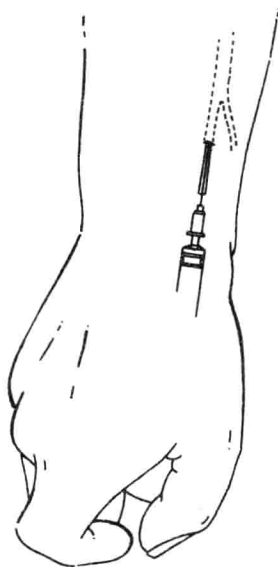
Locate a suitable vein



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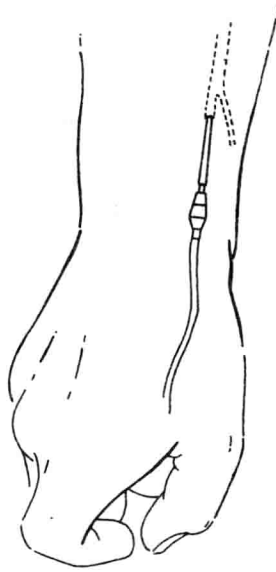
- If a suitable vein cannot be found, warm the limb in warm water. If necessary, the chosen vein can be made more prominent by gentle tapping or rubbing.
- Prepare the skin by shaving where necessary and cleanse with an antiseptic solution.
- In the nervous patient, inject a small bleb of 1 per cent lignocaine plain just distal to the proposed point of entry.
- Choose a suitably-sized cannula. An 18 s.w.g. needle and cannula is adequate for crystalloid solutions, e.g. N saline or 5 per cent dextrose but a 14 or 16 s.w.g. cannula is required for blood.
- Stretch the skin distally with one hand and, without touching the needle or cannula, introduce the assembly through the skin into the vein.

Insert the needle and cannula



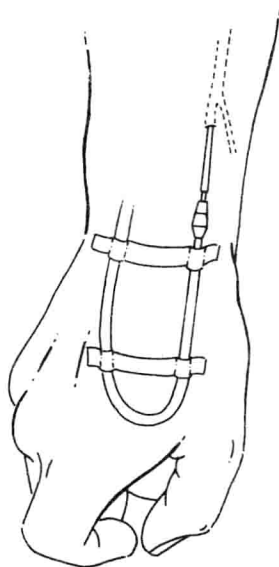
- Draw the blood back into the syringe and remove the tourniquet.
- Withdraw the needle, compressing the tip of the cannula within the vein digitally, and attach to the infusion set.
- Advance the cannula further while checking the infusion is running satisfactorily.
- Avoid contamination of the point of entry by covering the skin with a sterile dressing.

Attach the giving set



- Fix the cannula with adhesive tape avoiding the junction of the giving set and cannula since this does not prevent accidental disconnection, hampers reconnection or changes in giving set and prevents the injection of drugs into the rubber bung.

Secure with the connection exposed



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—If the cannula lies close to a joint, immobilise by splinting.

AFTER-CARE AND COMPLICATIONS

Venous inflammation, thrombosis and sepsis are common and relate to the aseptic technique, the irritant potential and the duration of the infusion. To minimise these complications, change the cannula at the earliest sign of redness or pain and never use the same vein for longer than three days.

3. Venous cut-down

INDICATIONS

When no other intravenous sites are available for the insertion of percutaneous cannulae and the operator is not experienced in central vein cannulation.

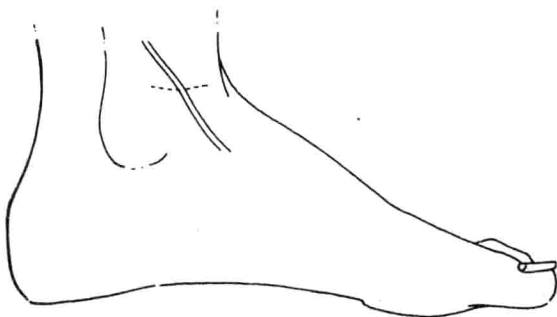
PRECAUTIONS

Before commencing, check that the necessary equipment is available. Most hospitals have pre-packed cutdown packs which include curved artery forceps, dissecting forceps, scissors, scalpel and needle holder.

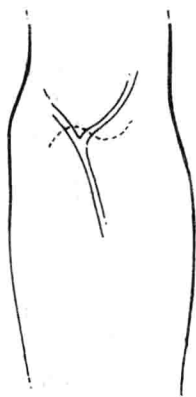
SITES

Medial malleolus: the long saphenous vein lies just anterior to the medial malleolus.

The ankle

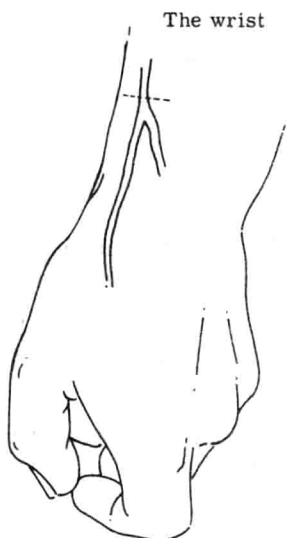


The ante-cubital fossa



Antecubital fossa: use either the median cubital vein or the cephalic vein.

Wrist: the cephalic vein as it crosses the radio-carpal joint in the anatomical snuff box.



TECHNIQUE

- Shave the area, cleanse the skin with an antiseptic solution and apply a tourniquet proximally.
- Using a strict aseptic technique (mask and gloves) infiltrate the area using 1 per cent lignocaine plain and make a 2 to 3 cm transverse incision over the expected site of the vein.
- Dissect the vein clear from surrounding tissue taking care to separate the saphenous nerve at the ankle.
- Pass a loop of 3/0 chromic catgut beneath the vein and divide it into two strands.
- Firmly tie one ligature around the vein distally. Loosely tie the other proximally and hold with forceps to provide traction and control bleeding.
- Make a small V-cut in the wall of the vein with sharp-pointed scissors.
- Introduce a 30 cm 14 or 16 s.w.g. needle and cannula through a separate skin stab just distal to the incision. Withdraw the needle and insert the cannula tip into the V-cut in the vein as the proximal ligature is relaxed.