

VENOUS CUTDOWN AND INTRAOSSEOUS INFUSION

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Gaining intravenous access is a common procedure but may be difficult in hypovolaemic patients or those with difficult veins. When direct cannulation of a vein cannot be performed or is taking too long, a venous cutdown or intraosseous infusion are alternative methods of access to the circulation. These two techniques are described below. In this article "proximal" means the part of the vein or bone closer to the chest, and the word "distal" the part of the vein or bone furthest from the chest.

Venous cutdown

This procedure exposes the vein surgically and then a cannula is inserted into the vein under direct vision. If no cannulae are available the sterile end of the drip

tubing may be used in adults after cutting off the Luer (cannula) connection. The procedure must be performed under sterile conditions to avoid sepsis developing which will not only shorten the life of the infusion but may have serious consequences for the patient.

During the procedure 2 ligatures (sutures) are placed around the vein. The distal ligature is used to tie off the vein distally and the proximal ligature holds the cannula in the vein. While the vein is incised the ligatures help to hold it.

Equipment

1. Sterile gloves
2. Swabs and sterile drapes
3. Skin disinfectant
4. Local anaesthetic (5ml of 0.5% lignocaine is sufficient)
5. Scalpel
6. Two small curved artery forceps
7. Sharp pointed scissors (use scalpel if scissors blunt/unavailable)

8. Ligatures (2/0 catgut / vicryl are best, but silk is adequate)
9. Skin closing sutures
10. Cannula

Sites. In adults use the upper limb at the medial aspect of the antecubital fossa. Try to avoid the leg veins as they are thicker and more prone to thrombosis, phlebitis and infection. In children a cutdown may be performed using either the brachial or long saphenous veins.

Technique. Clean the skin and use the drapes to create a sterile area around the chosen vein.

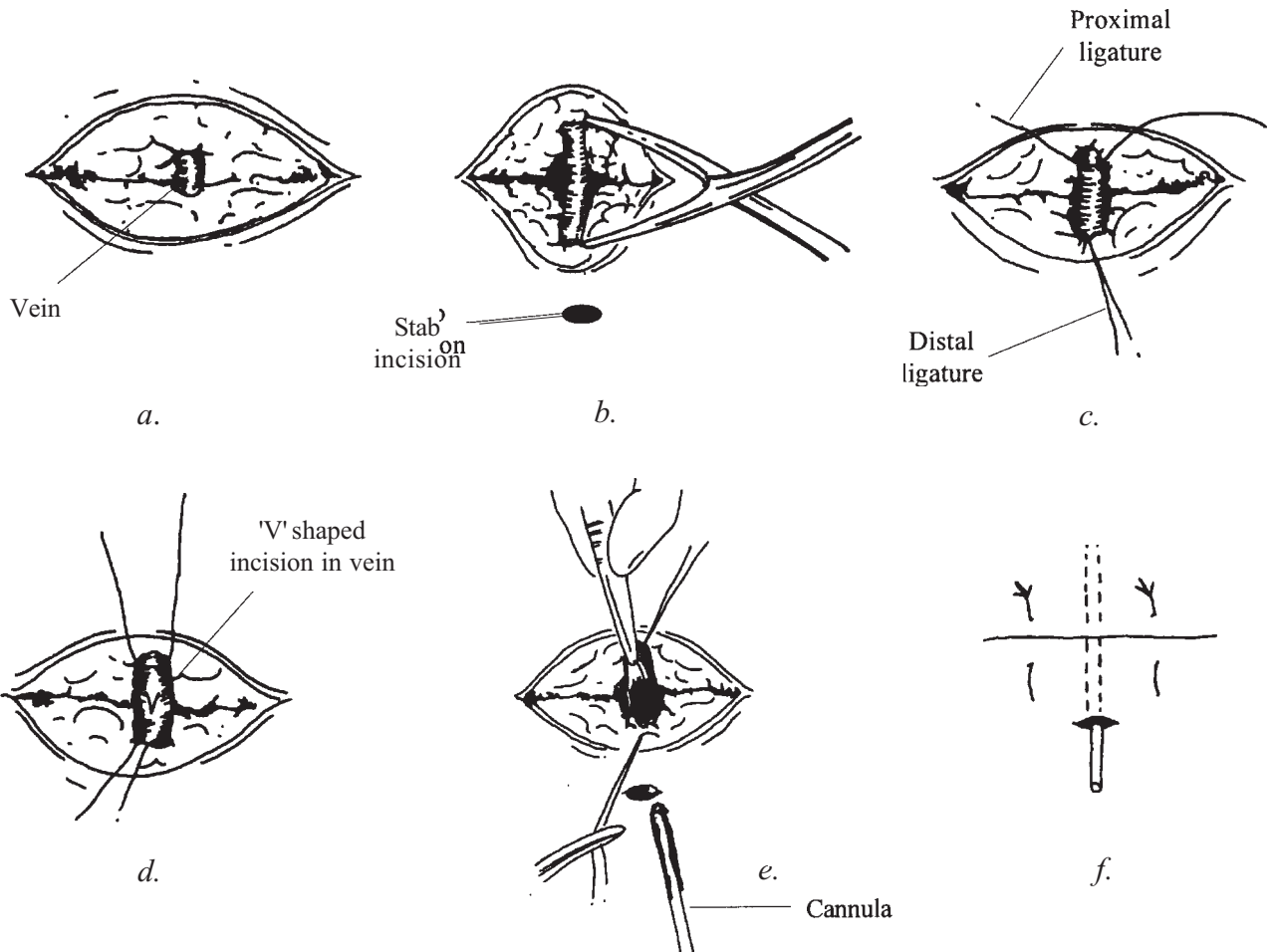
1. Infiltrate the skin with local anaesthetic.
2. Make a 1.5 - 2cm transverse incision over the vein (a).
3. Bluntly dissect out the vein by opening the forceps in the line of the vein (b).

4. Make a small stab skin incision 1cm distal to the incision in the line of the vein. Pass two ligatures around the vein. Tie the distal one, but leave the ends uncut. Hold the ends of the ligatures with the artery forceps (c).

5. Whilst holding the ligatures tight, make a "V" shaped incision in the anterior surface of the vein with the scissors or scalpel (d & e).

6. Pass the cannula through the inferior stab incision and the through the "V" shaped incision into the vein. Tie the proximal ligature tightly over the cannulated vein and, if there is no bleeding, now cut the ends of the ligatures. If bleeding occurs place a further ligature around the vein. Connect the cannula to the giving set and commence the infusion.

7. Close the skin with sutures (f).



After the infusion is finished the cannula can be removed by a firm steady pull followed by direct pressure over the site of the incision for 5 minutes.

Intraosseous infusion

The marrow cavity can be used for the administration of fluids as it is in continuity with the venous circulation. Blood can be taken for crossmatch and electrolyte estimation and fluid or drugs may be given provided they are gently syringed in. The procedure must be performed under sterile conditions to avoid causing osteomyelitis. The infusion is best limited to a few hours until intravenous access is achieved.

Indication: The technique is used for vascular access in life threatening situations in babies, infants and children. It is indicated when other attempts at venous access fail.

Equipment

1. Skin disinfectant
2. Intraosseous or bone marrow needle
3. Local anaesthetic
4. 5ml syringe
5. 50ml syringe

Site. Use either the anterior aspect of the tibia or femur. Avoid bones with osteomyelitis or fractures and do not use the tibia if the femur is fractured on the same side.

Technique

1. Clean the skin and inject a small amount of local anaesthetic in the skin and continue to infiltrate down to the periosteum

2. Insert the intraosseous needle at 90 degrees to the skin (perpendicular).

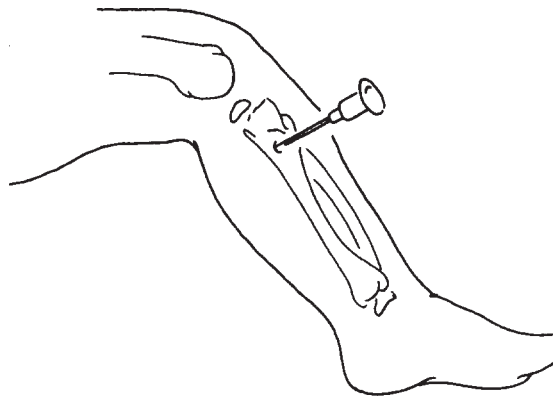


Figure 2. Tibial technique for intraosseous infusion

3. Advance the needle until a “give” is felt; this occurs when the needle penetrates the cortex of the bone.
4. Remove the trochar. Confirm correct position by aspirating blood using the 5ml syringe.
5. Secure the needle in place with sterile gauze and strapping.
6. Give boluses of fluid (infusion volume depends on clinical situation) using the 50ml syringe to push the fluid in gently.
7. The intraosseous route should be replaced as soon as a normal vein can be cannulated. The longer the period of use the greater the risk of sepsis.