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SURGICAL TECHNIQUE

Cephalic vein portacath placement technique

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Indications for placement of an implantable portacath include the administration of an intravenous treatment that may be toxic to the superficial veins such as chemotherapy, or parenteral nutrition, or in order to preserve the venous capital. This procedure involves insertion of a catheter in the superior vena cava that is connected to a subcutaneous access port. Several techniques can be used; either by direct venipuncture of the internal jugular vein [1], or the subclavian vein [2], or by a surgical approach to the cephalic vein. The latter technique is simple, effective and widely used [3]. The cephalic vein can be approached on either the right or left side. When choosing the placement site, the patient's history and wishes should be taken into consideration (hunter, history of previous catheterization, axillary dissection, lymphedema, radiation skin damage...). There are no specific complications related to the technique. Reported complications are common to all the different approaches (displacement or inversion of the port, catheter disconnection or leakage, venous thrombosis, infection, cutaneous necrosis). On the other hand, the reported failure rate is relatively high (7 to 20%), due mainly to insufficient caliber or inconsistent presence of the vein [4]. The surgeon must therefore be master of several approaches. Removal of the port and catheter (in case of complications or when the port is no longer needed) must be done in the operating room under local anesthesia. If there is a suspicion of infection, the material should be sent for bacteriological analysis and the skin closed with interrupted sutures. Here, we describe the technique of portacath insertion through the right cephalic vein.

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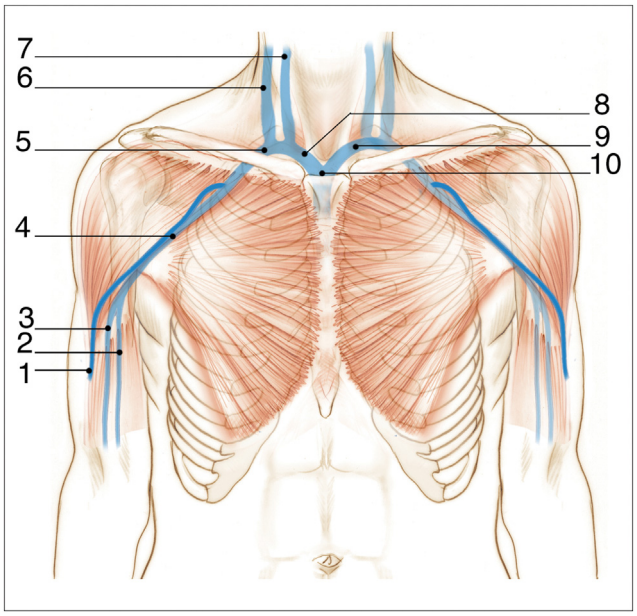
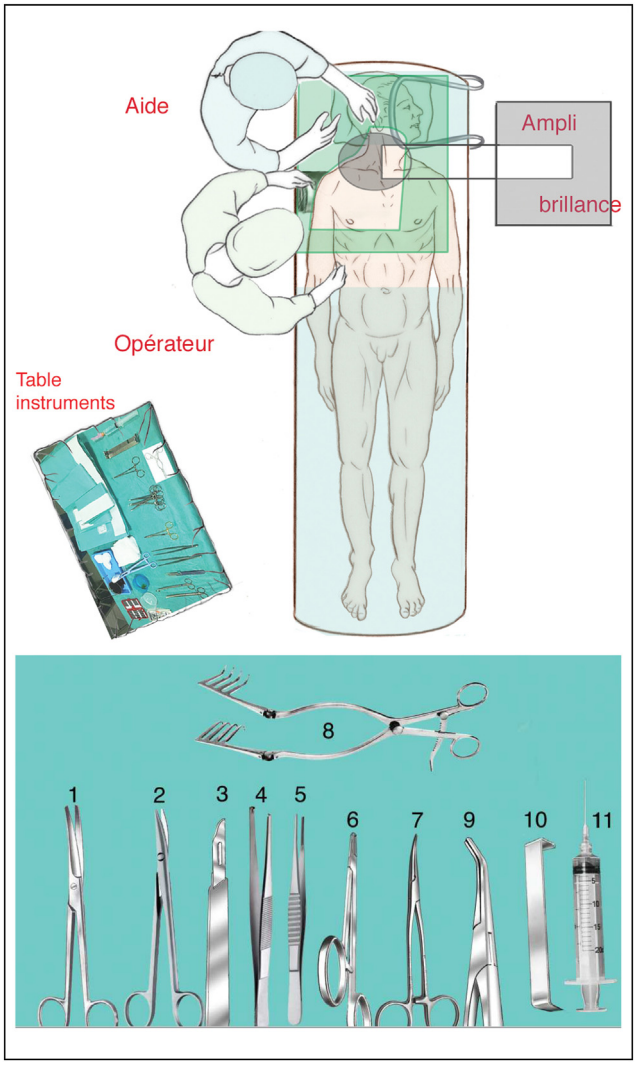
1 First step

The cephalic vein belongs to the superficial network of upper limb veins. Three forearm veins (radial, ulnar and medial) divide in the vicinity of the antecubital fossa into a V whose branches anastomose with the two others to form the basilic and cephalic veins. The cephalic vein remains superficial to the delto-pectoral groove up to its apex where it penetrates the fascia and joins the axillary vein formed by the junction of the basilic vein and the brachial vein, at the summit of the axilla.1: right cephalic vein; 2: right basilic vein; 3: right brachial vein; 4: right axillary vein; 5: right subclavian vein; 6: right external jugular vein; 7: right internal jugular vein; 8: right brachiocephalic vein; 9: left brachiocephalic vein; 10: superior vena cava.



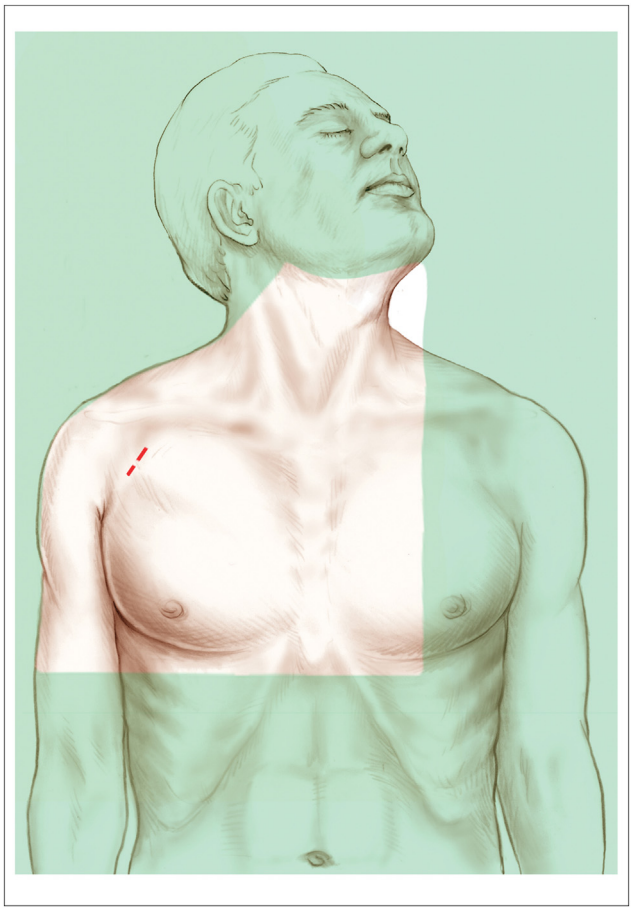
2 Second step

For an approach of the right cephalic vein, the patient is positioned supine, with the arms alongside the body and the head rotated to the left. The operative field must be widely prepped and draped including the neck so that, in case of failure, an approach of the external jugular vein or a direct puncture of the internal or subclavian jugular vein is possible. The operator stands to the patient's right, with a possible assistant to his left. A C-arm fluoroscopy unit is placed on the opposite side.



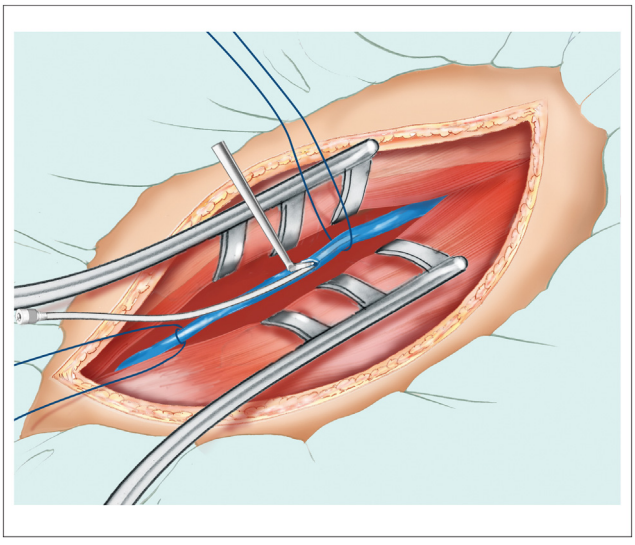
3 Third step

Local anesthesia is obtained by cutaneous and subcutaneous infiltration (lidocaine with rapid onset/short half-life, and ropivacaine with a longer duration of action). A 5 cm-long skin incision is made over the delto-pectoral groove or along the perpendicular fold in obese patients. The upper end of the incision overlaps the clavicle by 1—2 fingerbreadths. The incision should be marked with ink before infiltration of anesthetic to avoid losing the landmarks after infiltration. The subcutaneous fat is incised down to the delto-pectoral groove.



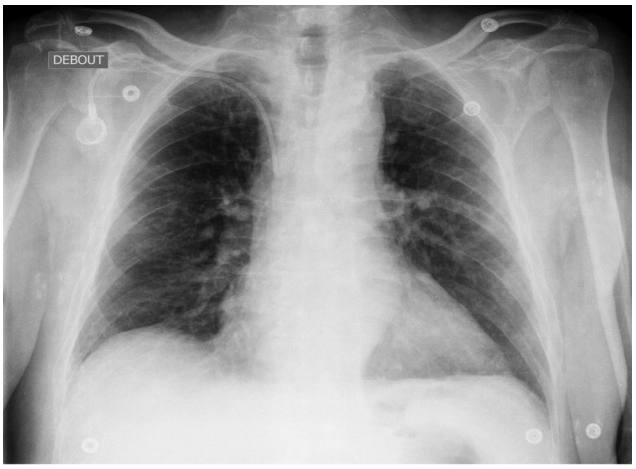
4 Fourth step

The vein is dissected over a length of 2 cm and two slowly resorbable guide sutures (2-0 Vicryl®) are passed around the vein without being knotted. Placing the patient in the Trendelenburg position to increase venous pressure may help to increase the size of the vein. A venotomy is made with metzenbaum scissors between the two guide sutures. The catheter is introduced into the vein with the aid of a vein pick provided in the kit. In case of difficulty in threading the catheter, it may be helpful to lower the patient's shoulder or use a Terumo® guide wire; this should be handled with care to avoid tearing the vein.



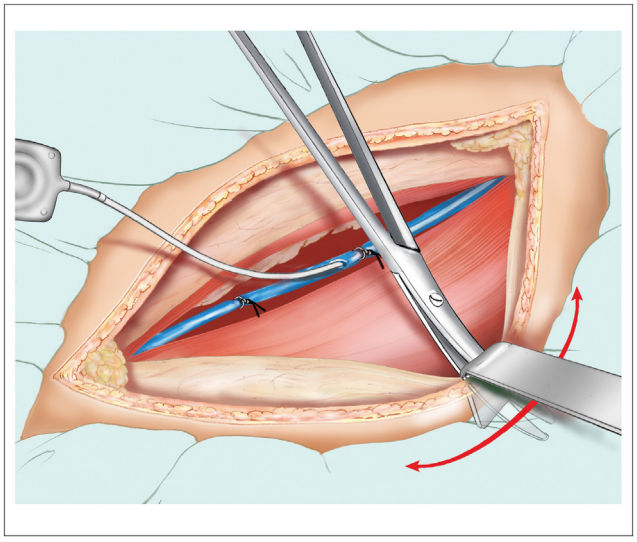
5 Fifth step

Positioning of the catheter tip requires visualization by intra-operative fluoroscopy. The tip of the catheter should be positioned in the superior vena cava at its junction with the right atrium, which corresponds to the level of the carina. The length marker on the catheter must be noted in case of accidental displacement (between 15 and 20 cm on the right and 20 to 25 cm on the left). The guide sutures are now tied upstream and downstream of the venotomy to secure the catheter in place. Sutures should be tied down carefully to avoid catheter occlusion and the permeability of the catheter must be verified by flushing.



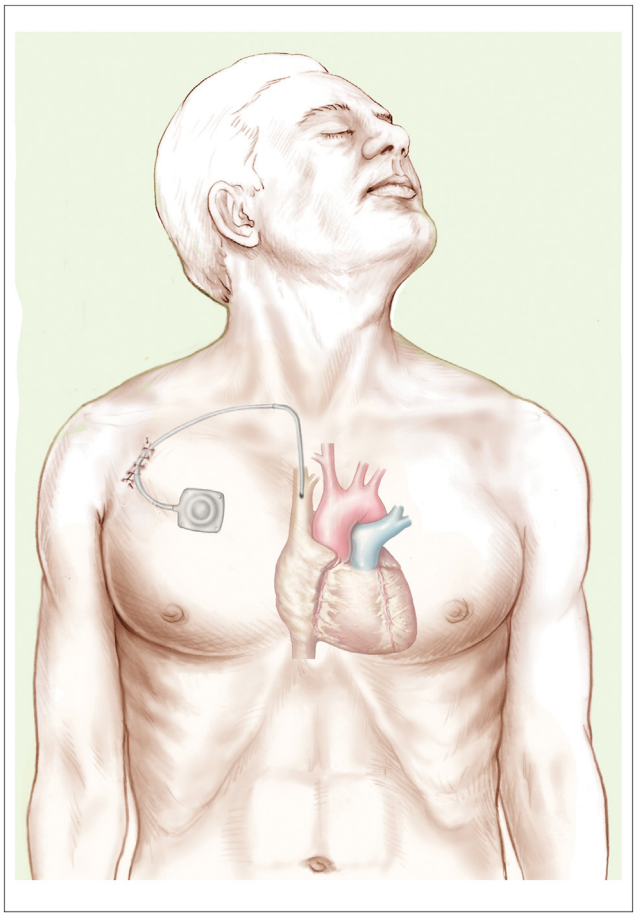
6 Sixth step

The port is connected to the catheter, making sure to avoid the introduction of air bubbles by pre-flushing with saline solution. The chamber is then positioned subcutaneously, lying on the pectoralis major fascia in a dissected pocket, taking care to avoid trauma to subcutaneous fat and to avoid any risk of cutaneous necrosis. It is fixed to the pectoral fascia by three non-absorbable sutures. This is an essential step because the dissection space may be large enough to allow rotation of the port within the pocket if only a single fixation suture is used. The course of the catheter should be visually checked to be sure that there is no kinking along its subcutaneous course.



7 Seventh step

A two-layer subcutaneous and skin closure is performed with resorbable sutures. The proper functioning of the system is tested by transcutaneous puncture to access the port and verify free backflow of blood and instillation of saline solution. A postoperative frontal X-ray should be performed to verify the correct positioning of the catheter and kept in the patient's record.



Disclosure of interest

The authors declare that they have no competing interest.

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