

EMERGENCY VENOUS CUTDOWN

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Emergency venous access is a technique of rapid “dirty” surgical exposure of a superficial vein to allow rapid catheterization. This procedure is used following failed attempts at percutaneous catheterization or in animals with such severe circulatory collapse that attempts at percutaneous catheterization are deemed futile. For most patients in need of immediate vascular access, you should set a short defined time limit (< 5 minutes) on any attempt at percutaneous catheterization. If vascular access is not achieved within that time limit, you should proceed directly to an emergency cutdown. For most clinicians, this technique is faster and more reliable than intramedullary (bone marrow) needle placement. The major exception to this is in young cats and dogs with soft bones and very small veins.

Materials:

- 1 - Scalpel with a #11 Bard-Parker blade
- 1 - 4” curved mosquito forceps (make sure the jaw tips have no rough edges)
- 1 - Vein catheter introducer
- 1 - Large gauge over-the-needle style IV catheter (dogs) or 22 ga catheter (cats)



Procedure for dogs:

Because it is relatively large and lies under thin skin, the lateral saphenous vein is strongly preferred. If time permits, clip the hair from the area and prepare the skin. Because this procedure is routinely done in a crisis situation, there is almost never enough time available to prepare the skin fully.



Hold a scalpel handle fitted with the #11 B-P blade *upside-down*. Incise the skin 1-2 cm proximal to where the vein crosses the tibia at the far end of the vein, directly over the lateral aspect of the tibia. Do not incise the skin directly over the vein! Pierce the skin with the blade and advance it up the limb, keeping parallel to the vein. By simultaneously advancing the blade and lifting it away from the limb, the skin is cut through with minimal risk to underlying structures. The cut should extend to the anterior border of the Achilles tendon.



Once the incision is made, retract the skin at the distal wound margin ventrally (distally) to expose the vein.



Close the jaws of the mosquito forceps and position the tip directly over the vein, with the concave jaw surface facing the foot.



While pushing the tips down directly on the vein, spread the jaws open to strip away perivascular fascia. It helps to use the index finger of the other hand to push the vein up from underneath, into the jaws of the forceps. *Push and spread vigorously!* You should need to do this no more than 6 times to completely free up the vein from its fascia.



Once the fascia has been adequately stripped away, pass the curved hemostats under the vein. *Direct the tip of the forceps toward the foot, so that the handle remains proximal to the vein.*



Slide the forceps under the vein so that it is stretched out over the two handle shafts. Note that by directing the tip distally (keeping the finger holes proximal to the vein), the weight of the tip keeps the instrument from sliding out after it is released. The vein is now exteriorized, free from fascia, and occluded at top and bottom by the pressure from the handles. This will prevent bleeding during the venotomy.



Once again hold the scalpel blade upside down, and make a small venotomy incision at the distal aspect of the vein, directly over the distal hemostat handle. Penetrate the vein lumen and advance the blade proximally to make an incision slightly larger than the diameter of the catheter. Making the incision directly over the forceps handle stabilizes the vessel and gives you greater control over the depth of the wound. This will help minimize the risk of accidentally cutting through the deep aspect of the vein. If that happens, don't worry – you can still get the vein catheterized.



Advance the catheter introducer into the venotomy incision. If you successfully entered the vein lumen with the blade, the introducer will readily and easily advance all the way to its elbow. If you screwed up and only incised perivascular fascia, you can still advance the introducer into the incised fascia, but it is noticeably more difficult and you will not be able to visualize an obvious vessel lumen. If you accidentally cut through the deep wall of the vein, you'll have to take care to direct the introducer into the lumen instead of through the bottom incision.



Retract the catheter needle slightly out of the catheter, to pull the sharp tip within the plastic catheter. Elevate the catheter introducer straight up, away from the wound, to hold the venotomy incision open. The catheter tip is then advanced into the venotomy.



As soon as you obtain a secure purchase within the vein lumen, remove the catheter introducer and advance the catheter to the level of the proximal handle. You can now see why it is important that the needle tip is retracted into the catheter – you want it in there as a stylet, but you don't want it sticking out to lacerate the vein!

At this time, because the vein dips back into the leg at almost a 90° angle to the catheter, you will need to use your other hand to grasp the hemostat tip and pull the vein distally, to straighten out this bend.



This view demonstrates the 'straight shot' up the vein created by pulling it towards the foot.



At this point, the catheter is advanced OFF OF THE NEEDLE and up the vein. This is a bit tricky – as you hold the needle stationary, use your index finger to 'flick' the catheter off the needle and advance it a little ways up the vein. As soon as you think you don't need to hold the forceps any longer, release it and use both hands to finish advancing the catheter completely as demonstrated here.



At this point, connect a primed IV fluid line to the catheter. If fluid administration is indicated, start it flowing immediately. Remove the forceps from under the vein.



Appose the wound margins over the catheter, and wrap the entire wound area snugly with waterproof white tape.



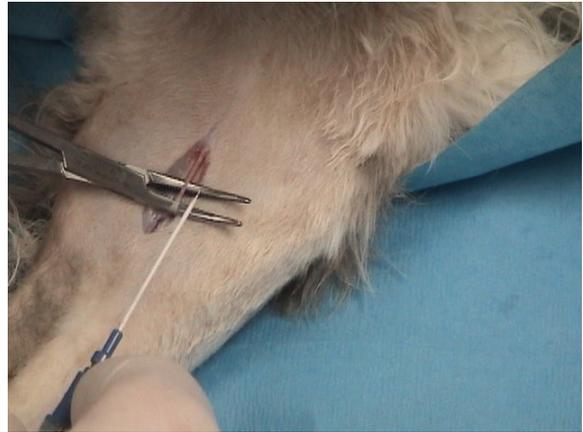
If rapid fluid administration is indicated and you do not have a large gauge IV catheter (at least 16 ga), an 8- or 10 French red rubber tube may be used as an IV catheter. The syringe end of the catheter will need to be cut down to fit on the male Luer end of the IV set snugly.



Procedure for cats

The small peripheral veins and thick skin over the jugular vein make cats more challenging. Useful techniques for cats include catheterization of the medial cutaneous saphenous vein with a 22 – 25 ga winged needle catheter and a cutdown approach to the same vein. The extremely thin skin over this vein increases the chances that it can be punctured successfully with a small winged needle catheter by direct visualization of the vein, and often allows the clinician to quickly administer a bolus of fluids or blood to a dangerously hypovolemic animal.

If a cutdown approach is used, the medial thigh is clipped (and prepped if time permits), the vein identified by visualization through the thin skin, and a 2-3 cm incision is made in the skin parallel to and just cranial to the vein. The skin is retracted and the vein is freed up using the forceps technique described above. Once the vein is lifted from the wound, it is catheterized directly with a small catheter with the needle left exposed:



The best place to perform the venipuncture is at the distal jaw of the forceps – this provides the best stabilization of the vein:



Penetration of the vein is determined by direct visualization, and the needle is advanced into the vein until the catheter as penetrated the vein as well. At that point the catheter is advanced off of the needle & up the vein.



Once the catheter is in place a fluid line is connected and the catheter hub is sutured to the skin. The skin wound should be temporarily closed with 00 or 000 suture.



Catheters inserted by cutdown are ALWAYS contaminated and must be removed as soon as possible, certainly within a few hours. Once the patient has been stabilized, the tape is removed and the wound is cleaned as you would a fresh laceration. Clip any hair away (if not done prior to the procedure), and flush the wound liberally while the catheter is still in place.



Next, compress the insertion site with sterile 4x4's and remove the catheter. Holding constant gentle pressure on the wound for several minutes after removal often allows for effective clot formation to prevent further hemorrhage. Carefully lift off the 4x4's and watch for hemorrhage from the venotomy. If none is observed, carefully flush the wound and continue to clean it some more after the catheter is withdrawn, and close the proximal 2/3 of the incision with 00 or 000 monofilament nylon suture. Leave the distal 1/3 of the wound open to drain, and cover it with a sterile bandage. This dressing will need to be changed 2-3x/day to remove drainage and prevent secondary infection. Bandaging should not be necessary for more than a few days.

If the venotomy wound was too large or a coagulopathy is present, the vessel may need to be repaired or ligated to control hemorrhage after catheter removal.