

Retrograde Intravenous Injection for Modified Bier's Block

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Commentary

Modified Bier's block, which was introduced by Russo et al. in 1978 [1], is a simple, safe and fast anesthetic block with a lower incidence of local toxicity. This technique of intravenous regional anesthesia is useful for soft tissue surgeries, closed bone manipulations of the limbs [2,3] and botulinum toxin treatment of palmar and plantar hyperhidrosis in a painless situation for office use, as reported by Solomon in 2007 [4].

However, it is occasionally very hard to secure an Intravenous (IV) line on the dorsum of the hand/foot of some patients for modified Bier's block that has a sufficient anesthetic result. We report our experience of solving this problem by retrograde intravenous injection.

The detailed technical process of modified Bier's block was described in a published paper [4]. In brief: a small-gauge IV catheter is inserted into the dorsal peripheral vein of the hand/foot. After flushing with saline using a 1 ml syringe to prevent blood clots, the IV catheter is closed with a heparin lock cap. A simple elastic bandage and 12 inch-long tourniquet connected to pneumatic pressure devices is loosely wrapped just above the wrist/ankle. An Esmark bandage is then firmly and carefully wrapped from the end of the limb to the pneumatic cuff to squeeze the blood of the hand/foot while protecting the IV catheter so it is not displaced. Sometimes the heparin lock cap causes pain in the dorsum of the hand/foot by the tightening of the rubber bandage. A piece of alcohol-soaked sponge under the heparin lock cap is needed to avoid such pain. Then pneumatic pressure is raised to 250 (hand)/300 torr (foot). Pulsation of the radial/posterior tibial artery and nail bed refilling is checked to confirm appropriate blocking of arterial blood flow after releasing the rubber bandage. Preservative-free 0.5% lidocaine is injected into the IV line through the heparin lockcap. Depending on the patient's hand/foot size, 20~24 cc (100-120 mg) is usually administered (Figures 1, 2).

Because this anesthetic block permits immediate effects and full recovery within a very short time, it is easy, reliable and proper to use in an office setting. However, this useful technique has

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Figure 1: A: Conventional, classic way of catheter insertion with heparin loc cap, B: Retrograde intravenous catheter placement with heparin loc cap, C: Multiple failure of intravenous catheter insertion and D: Pneumatic cuff on both legs.



Figure 2: A: Retrograde intravenous catheter placement with heparin loc cap and B: Pneumatic cuff on right arm.

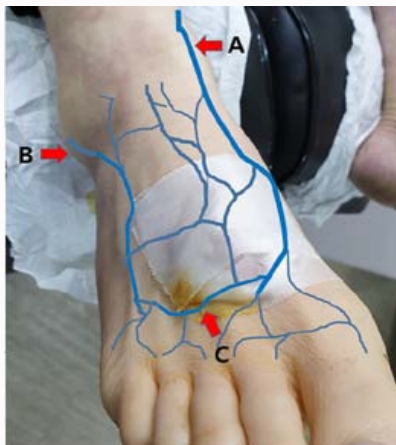


Figure 3: A: Greater saphenous vein, B: Lesser saphenous vein and C: Dorsal venous arch.

drawbacks as pointed out in Solomon's report [4]. Sometimes it is difficult to find a peripheral vein in limbs or the peripheral veins are too small for inserting a catheter, especially in female patients, and veins shrink due to sweating of the hand/foot causing cool skin in hyperhidrosis patients (Figure 1C). In these uncommon cases, warming and tapping of candidate veins on the dorsum of the hand/foot is useful. If this simple method does not work, larger veins have to be accessed to place the venous catheter or the anesthetic method has to be changed to perform a nerve block. The cephalic (hand)/greater saphenous (foot) vein is large enough and a good candidate to insert a small catheter with ease (Figures 3, 4-point A). Nevertheless, the normal way of insertion with an injection of lidocaine in the proximal direction was not acceptable to completely anesthetize

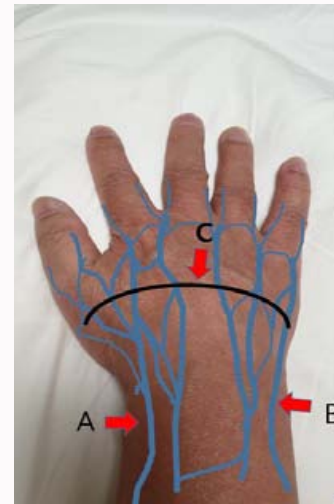


Figure 4: A: Cephalic vein, B: Basilic vein and C: Venous arch.

distal limbs in spite of waiting for a long time with these large veins. The suspected causes are the spreading of lidocaine to a limited region or leaking to the interosseous venous plexus [2,5]. For that reason, we tried retrograde insertion of a catheter and injected lidocaine in the distal direction of the region (Figures 1B, 2A point). The favorable anesthetic effects of lidocaine appeared immediately without any side effects. Bending the needle is one way to inject lidocaine with ease because the pneumatic cuff is sometimes an obstacle to injection. Considering the insufficiency of classic techniques for administering a series of anesthetic solutions to larger veins due to the limitations of adequate anesthetic effects, retrograde intravenous injection for modified Bier's block will help to overcome the difficulty of getting an IV line and provide a new way to achieve the goal of having complete anesthetic effects.

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