

Below-knee Amputation with Minimally Painful Injection of Tumescence Local Anesthesia

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Summary: We successfully performed minimally painful injection of tumescent local anesthesia to eliminate the need for the tourniquet and sedation for a below-knee amputation in a frail patient with multiple medical comorbidities in Mombasa, Kenya. Minimal pain injection of WALANT (wide awake local anesthesia no tourniquet) pure local anesthesia can be a good alternative for lower limb amputation in frail patients when safe sedation services are unavailable or unaffordable in many countries. (*Plast Reconstr Surg Glob Open* 2023; 11:e5164; doi: 10.1097/GOX.0000000000005164; Published online 25 July 2023.)

A 70-year-old man with diabetes presented in sepsis with a necrotic, foul-smelling left foot and a 10×15 cm soft tissue defect over the heel. He was a person with uncontrolled diabetes with a blood sugar of more than 33 mmol/L, a potassium of 7.6, and a creatinine of 231. He was stabilized with IV fluid, insulin, and antibiotics. We then performed a below-knee amputation, using the wide awake local anesthesia no tourniquet (WALANT) technique.

A tumescent solution of 200 mL of 0.25% lignocaine (lidocaine) with one in 400,000 adrenaline was alkalized with 5 mL of 8.4% sodium bicarbonate. We injected 180 mL of the local anesthesia with a minimally painful technique,^{1,2} so the patient mostly only felt the first sting of the first small needle insertion.

We tumesced the amputation skin incisions with a large volume of local anesthesia, so it was visibly and palpably swollen at least 2 cm proximal to all areas of dissection. We then infiltrated the periosteum circumferentially 4 cm proximal to the osteotomy sites of the tibia and fibula as described for WALANT tibial fracture plating.³ Muscle tumescence is not required.

We waited 30 minutes after injection for effective anesthesia and skin vasoconstriction. We incised through skin

down to neurovascular bundles. The large nerve epineurium was tumesced, as shown in [Figures 1 and 2](#).

After epineural injection of the large nerves, the muscles and bones were divided. By this time, the large nerves were completely numb and divided last. The total blood loss was estimated to be 200 mL. The patient remained comfortably awake, unседated, pain free, and comfortable throughout the procedure. ([See Video \[online\]](#), which displays the comfort of the wide-awake, pain-free patient as he lifts his leg before skin closure.) The wound was covered with a posterior skin flap ([Fig. 3](#)).

DISCUSSION

Many countries have a lack of readily available and affordable sedation services for general or regional spinal anesthesia. We present an alternative to sedation and proximal blocks with minimally painful injection of WALANT tumescent pure local anesthesia delivered to the below-knee amputation site in a sick patient. Tumescence means enough visible or palpable local anesthesia that the subcutaneous fat, nerves, and periosteum are completely bathed at least 2 cm beyond anywhere dissection will occur. WALANT epinephrine vasoconstriction removes the need for the tourniquet. Eliminating the unnecessary tourniquet and the needless pain of local anesthesia injection avoids costly or unavailable sedation and general anesthesia.⁴

Our literature search revealed an abundance of general, spinal, or epidural local anesthesia with sedation for below-knee amputation. We could only find one article with pure local anesthesia for below-knee amputation.⁵ Our report emphasizes the importance of minimally painful injection of tumescent local anesthesia without tourniquet to provide a good patient experience without sedation.

Abdullah published the use of minimally painful injection WALANT anesthesia for forearm amputation.⁶ It may be possible to extend WALANT to above-knee amputation, but we have not performed it. Although a localized

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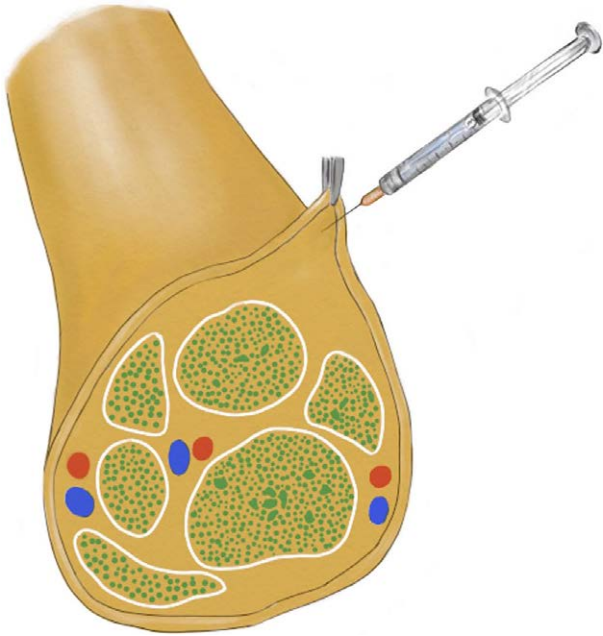


Fig. 1. Posterior tibial nerve before injection. A fine needle is inserted just under elevated loose epineurium tissue without painful poking of the fascicles.

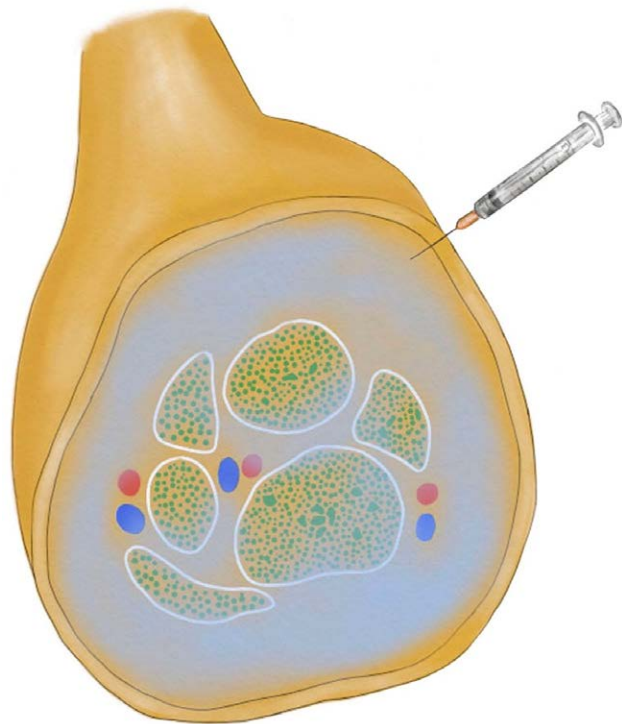


Fig. 2. Posterior tibial nerve after epineural injection. The local anesthesia (depicted in blue) inflates the loose areolar tissue of the epineurium for a distance of 2 cm proximal to where the nerve will be severed. The nerve local anesthesia gets time to work while bony and muscle work is accomplished.

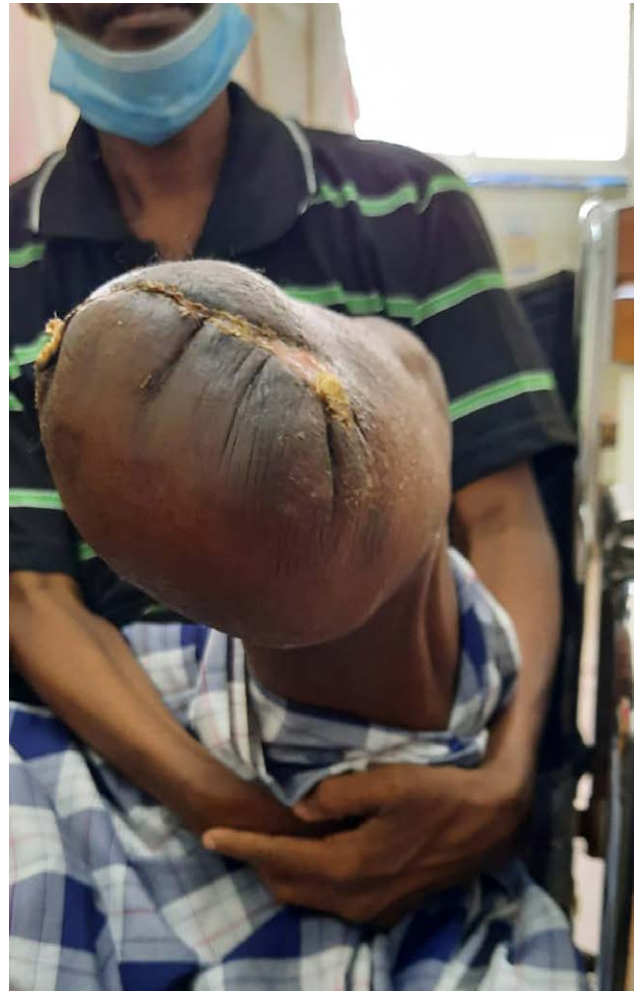


Fig. 3. Postoperative wound at 2 weeks after surgery.

infection like the one in this case is amenable to WALANT management, it seems unlikely that at this time WALANT would be useful for more extensive infections such as necrotizing fasciitis.

WALANT has been popularized as a means of anesthesia in many procedures, such as plate fixation of fractures⁷ and ankle surgery.^{8,9} The coronavirus 2019 pandemic helped WALANT spread rapidly because of its many benefits.¹⁰ Pure local anesthesia without sedation can be a safer option in patients with multiple medical comorbidities, or where general or spinal anesthesia may not be advisable or available.

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DISCLOSURES

Dr. Lalonde is the editor of the two editions (2016 and 2021) of the Wide Awake Hand Surgery book published by Thieme, New York. All royalties from the book sales go to support the lean and green effort of decreasing unnecessary cost and unnecessary solid

waste production in hand surgery. All the other authors have no financial interest to declare in relation to the content of this article.

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