

Successful Shoulder Disarticulation under Local Anesthesia in the COVID-19 Era

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Summary: The use of the wide-awake local anesthesia no tourniquet, a tumescent local anesthetic technique in recent years, emerged as a powerful tool primarily in hand surgery. It has been adopted in many low- and middle-income countries where it was applied to an increasingly broad group of procedures. We report the case of an older patient with an arm liposarcoma for which surgery under general or regional anesthesia was deemed unsafe, but was successfully managed with a curative right shoulder disarticulation using tumescent local anesthesia. (*Plast Reconstr Surg Glob Open* 2023; 11:e5266; doi: [10.1097/GOX.0000000000005266](https://doi.org/10.1097/GOX.0000000000005266); Published online 13 September 2023.)

An 80-year-old African man presented to our plastic surgery outpatient clinic during the peak of the COVID-19 pandemic with a recurrent right arm mass for the previous 20 years. During this period, he had undergone eight excisions in different institutions, histologically reported as a liposarcoma.

He reported recent onset numbness and pain of his hand that interfered with sleep. He was a known hypertensive on treatment, with no history of smoking or use of alcohol. He had no chest or respiratory complaints. On examination, he was bradycardic, with a blood pressure of 145/60 mm Hg, and a normal respiratory rate. He had a large, near-circumferential, right arm mass (Fig. 1). A magnetic resonance imaging scan showed an anterior arm compartment hyperintense tumor, with no muscle or bone involvement (Fig. 2A, B). A staging computed tomography scan of the chest and abdomen did not show any metastases. An electrocardiogram revealed sinus bradycardia with a third-degree heart block, diagnosed as sick sinus syndrome, for which a permanent pacemaker was prescribed. The echocardiogram was reported as showing hypertensive heart disease. The family could not afford the pacemaker.

In view of the high anesthetic risk, a multidisciplinary conference was held with the family to determine his management. By this time, the tumor had increased in size and

was fungating and bleeding, with increased pain. After an exhaustive discussion, the patient was offered either pain palliation or surgical intervention. He elected to undergo shoulder disarticulation under tumescent local anesthesia. It was agreed that a single-attempt supraclavicular block would be made to provide a single-attempt-supraclavicular block anesthesia, should the local anesthetic not suffice. In the event that both techniques failed to provide adequate anesthesia, the surgery would be canceled.

WIDE-AWAKE LOCAL ANESTHESIA NO TOURNIQUET (TUMESCENT ANESTHETIC) SOLUTION PREPARATION AND STORAGE

We mix 395 mL of normal saline with 50 mL of 2% lidocaine, 5 mg epinephrine, and 50 mL of 8.4% sodium bicarbonate, to create local tumescent solution [wide-awake local anesthesia no tourniquet (WALANT)]. This solution is stored in a refrigerator at between 4° and 8° centigrade for up to 2 weeks and is carefully examined before each use for changes in color (clear to straw-colored solution) or consistency (crystallization), and discarded if any changes are noted.

SURGICAL PROCEDURE

With the patient in supine position, the right shoulder was supported on a shoulder roll, and the most comfortable position was maintained as guided by the patient, allowing him to turn as needed after informing the surgical team.

Before surgical skin preparation, 40 mL of tumescent local anesthetic was infiltrated subcutaneously along surgical incision markings. After surgical skin preparation and draping, additional tumescent solution was infiltrated into deeper layers of the surgical field.

Throughout the procedure, the surgical team conversed with the patient to ensure his comfort; additional

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Received for publication May 13, 2023; accepted July 27, 2023.

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DOI: [10.1097/GOX.0000000000005266](https://doi.org/10.1097/GOX.0000000000005266)

Disclosure statements are at the end of this article, following the correspondence information.



Fig. 1. Photograph of arm tumor before fungating; at the time, it was thought that upper limb salvage would have been possible, hence the proposed surgical markings during the initial consenting process.

anesthetic was infiltrated into areas where he felt pain. We administered a total of 280 mL of tumescent local anesthetic for the 4-hour procedure. The patient gave a pain score of three of 10 on the visual analog scale. Postoperatively, he was admitted overnight for observation, and discharged the next day on analgesics.

During postoperative reviews at 3 and 5 weeks, the patient made good progress, with no pain, and sound sleep through the night. Histopathological examination reported a myxoid liposarcoma with tumor-free margins; a multidisciplinary tumor board recommended routine follow-up.

At 1-year follow-up, we found a nodule on his chest wall, just below the incision line (Fig. 3), and a computed tomography scan of his neck, chest, and abdomen did not show any metastases. The mass was excised and reported as a lipoma histologically. His review at 2 years was similarly uneventful.

DISCUSSION

Surgeons operating in low- and middle-income countries (LMICs) often need to find creative ways of providing safe care to patients with advanced or neglected disease. This “outside-the-box” creative thinking also requires careful utilization of limited resources. The WALANT technique, popularized by Dr. Lalonde, is an example of an innovation that when applied appropriately, affords numerous advantages for both the patient and the surgical team.^{1,2} An attractive core property of this tumescent solution is the minimal resource requirement, using products that are widely available in LMIC settings.³ Field sterility with adequate lighting removes the need for an operating room,^{4,5} leaving operating rooms free for lifesaving procedures such as cesarean sections. WALANT, therefore, increases the ability of the surgical team to manage a large number of procedures safely in LMICs, with concomitant cost savings.⁶⁻¹²

Although originally described for use in the hand, the WALANT technique has been adopted for use in most of the upper extremity, including both soft tissue and orthopedic procedures.^{6,13} WALANT has been shown to be safe,^{3,6} with no arrhythmogenicity when used within recommended dosing guidelines, making it safe for use in patients with limited physiological reserve.¹⁴

Dr. Lalonde ran a 2-day WALANT workshop, following which, P.M.N. and J.D. introduced WALANT procedures at the authors’ unit.¹⁵ Although most of our procedures were performed around the wrist and hand, one patient presented a particular challenge and demonstrated the versatility and potential for this tumescent anesthetic.

We report a case in which tumescent local anesthetic was successfully used to provide anesthesia for major surgery in an older patient with an arm liposarcoma and severe cardiac disease, at the height of the COVID-19 pandemic. Local anesthesia administration in this patient avoided the

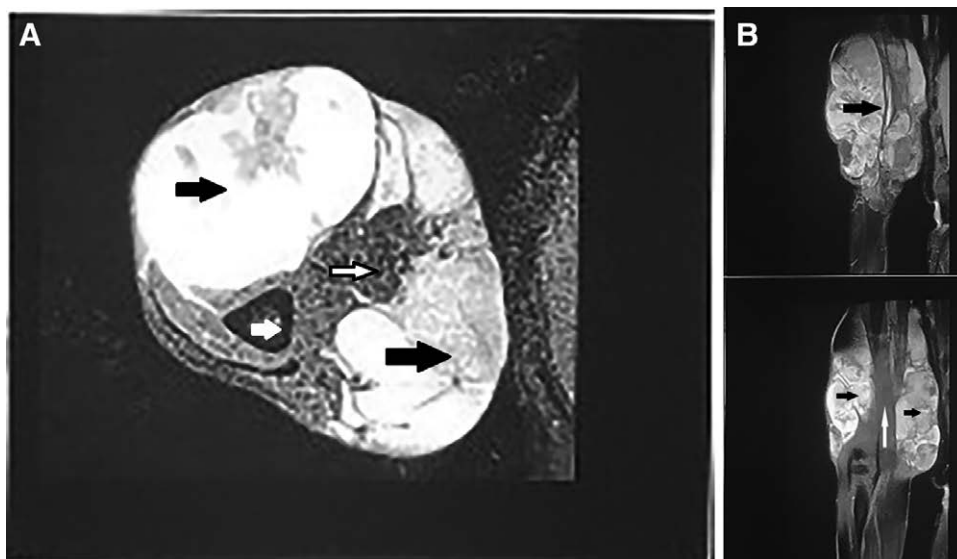


Fig. 2. A, Coronal MRI of the arm. Arrows show the humerus (white) and tumor (black). White arrow with black outline is normal muscle compressed by tumor. B, Sagittal cuts through humerus. Arrows show the humerus (white), and tumor (black).



Fig. 3. Postresection at 1 year, a mass was noted on the edge of the incision (blue arrow). An excisional biopsy reported it as a lipoma.

risks posed by general or regional anesthetic. He experienced minimal pain and discomfort throughout the procedure and was able to communicate with the surgical team, enabling the anesthetic to be tailored to his specific needs. The fact that the tumescent local anesthetic was safely used in managing this complex case is testimony to the ease of use and safety of the WALANT solution.

However, although we report the successful of tumescent anesthesia in a patient with multiple morbidities, we recognize that in the best of circumstances, he should have undergone a pacemaker placement to safely perform the shoulder amputation.

CONCLUSIONS

WALANT/tumescent local anesthesia is a viable and cost-effective technique that can be adopted for major extremity surgery, as it has minimal or no physiologic and anesthetic complications, when used appropriately. It is an attractive addition to the innovations available to the LMIC surgeon, because it is safe and effective over an expanding range of applications.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

REFERENCES

- Lalonde D. Wide awake local anaesthesia no tourniquet technique (WALANT). *BMC Proceedings*. 2015;9:A81.
- Thompson Orfield NJ, Badger AE, Tegge AN, et al. Modeled wide-awake, local-anesthetic, no-tourniquet surgical procedures do not impair driving fitness: an experimental on-road noninferiority study. *J Bone Joint Surg Am*. 2020;102:1616–1622.
- Lalonde D, Martin A. Epinephrine in local anesthesia in finger and hand surgery: the case for wide-awake anesthesia. *J Am Acad Orthop Surg*. 2013;21:443–447.
- Lalonde DH, Tang JB. How the wide awake tourniquet-free approach is changing hand surgery in most countries of the world. *Hand Clin*. 2019;35:xiii–xxiv.
- Yu J, Ji TA, Craig M, et al. Evidence-based sterility: the evolving role of field sterility in skin and minor hand surgery. *Plast Reconstr Surg Global open*. 2019;7:e2481.
- Kurtzman JS, Etcheson JI, Koehler SM. Wide-awake local anesthesia with no tourniquet: an updated review. *Plast Reconstr Surg Global open*. 2021;9:e3507.
- Holoyda KA, Farhat B, Lalonde DH, et al. Creating an outpatient, local anesthetic hand operating room in a resource-constrained Ghanaian hospital builds surgical capacity and financial stability. *Ann Plast Surg*. 2020;84:385–389.
- Pires Neto PJ, Ribak S, Sardenberg T. Wide awake hand surgery under local anesthesia no tourniquet in South America. *Hand Clin*. 2019;35:51–58.
- Lalonde DH. Latest Advances in wide awake hand surgery. *Hand Clin*. 2019;35:1–6.
- Tang JB, Gong KT, Xing SG, et al. Wide-awake hand surgery in two centers in China: experience in Nantong and Tianjin with 12,000 patients. *Hand Clin*. 2019;35:7–12.
- Mohammed AK, Lalonde DH. Wide awake tendon transfers in leprosy patients in India. *Hand Clin*. 2019;35:67–84.
- Bravo D, Townsend CB, Tulipan J, et al. Economic and environmental impacts of the wide-awake, local anesthesia, no tourniquet (WALANT) technique in hand surgery: a review of the literature. *J Hand Surg Glob Online*. 2022;4:456–463.
- Ahmad AA, Ubaidah Mustapa Kamal MA, Ruslan SR, et al. Plating of clavicle fracture using the wide-awake technique. *J Shoulder Elbow Surg*. 2020;29:2319–2325.
- Farkash U, Herman A, Kalimian T, et al. Keeping the finger on the pulse: cardiac arrhythmias in hand surgery using local anesthesia with adrenaline. *Plast Reconstr Surg*. 2020;146:54e–60e.
- Lalonde D. The touching hands/IFSSH Hand Surgery Workshop at Mount Kenya University. January 24–25, 2020. *ifssh ezine*. 2020;Vol 10. 38 ed: IFSSH;2.