

Wide-Awake Local Anesthesia for a Proximal Humerus Fracture: A Case Report

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Learning Point of the Article:

In resource-limited environments, wide-awake local anesthesia surgery is a viable option for treating peri-implant humerus fractures.

Abstract

Introduction: Over the past two decades, wide-awake local anesthesia no-tourniquet (WALANT) surgery has gained substantial popularity, challenging conventional assumptions regarding the safety of epinephrine. This report investigates the unprecedented expansion of the wide-awake local anesthesia technique beyond hand surgeries. It meticulously documents its successful application in a peri-implant proximal humerus fracture, presenting a fresh perspective on its safety and viability for managing intricate orthopedic injuries.

Case Report: The subject of this study is a 61-year-old HIV-positive male with a history of recurrent falls, seeking treatment for a peri-implant proximal humerus fracture. Electing the wide-awake local anesthesia option due to financial constraints, the patient underwent a successful surgery. The technique employed involved precise administration of local anesthetic, facilitating fracture reduction, and plate replacement. Notably, the emphasis was placed on active patient participation during intraoperative assessment.

Conclusion: This report extends the recognized utility of WALANT surgery beyond hand surgeries, demonstrating its versatility and potential transformative impact on health-care delivery. The study underscores the pivotal role played by wide-awake local anesthesia surgery in addressing challenges related to health-care accessibility. It presents a promising avenue for future orthopedic interventions and positions itself as a safe and viable option for patients in underserved areas globally.

Keywords: Humerus, open reduction internal fixation, Wide-awake local anesthesia no tourniquet

Introduction

Wide-awake local anesthesia no-tourniquet (WALANT) surgery has been increasingly popular over the last two decades. The rise in popularity coincided with a publication [1] that failed to corroborate the long-standing dogma that epinephrine, when used in fingers and toes, would result in digital necrosis. A 2005 multicenter prospective study demonstrated the safety of epinephrine after presenting more than 3000 elective hand cases with no reported vasoconstriction complications [2]. Most published literature on WALANT concerns elective hand and

upper extremity surgery. In a prospective study [3], over 1500 carpal tunnels were performed under WALANT using minimal sterility or field sterility across multiple centers, and only six superficial infections were reported that resolved with oral antibiotics. A randomized control trial assessing patient discomfort in WALANT carpal tunnel surgery versus local anesthetic with a tourniquet (LAWT) demonstrated patients experienced significantly more discomfort with a tourniquet than without [4]. In Addition, Gunasagaran et al. [5] reported patients treated with WALANT experienced less discomfort

Author's Photo Gallery



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Figure 1: Radiograph of a left humerus with previous orthopedic hardware demonstrating a peri-implant fracture.



Figure 2: Clinical photograph demonstrating a healed.

fractures [16-18]. However, no reports have reported its use in proximal humerus surgery. Therefore, we present this report to demonstrate the usefulness and effectiveness of this technique for treating a peri-implant proximal humerus fracture.

Case Report

A 61-year-old male with a history of recurrent falls and a previous left proximal humerus ORIF procedure in January 2022 following a fall on December 26, 2021, presented to an external hospital in June 2023 after experiencing a ground-level fall. On arrival, the patient was unable to raise his left arm due to severe pain. He was promptly splinted and referred for a higher level of care. The patient underwent an evaluation 3 days later, and radiographs were taken, revealing a peri-implant fracture located below the previously implanted plate at the level of the proximal humerus (Fig. 1).

On clinical examination, the patient remained incapable of actively using his arm. However, he exhibited intact neurovascular function, showed no signs of infection, and displayed well-healed wound sites from the previous ORIF procedure. The patient's pertinent medical history includes being HIV-positive, actively receiving antiretroviral therapy, former tobacco use, and reportedly abstaining from alcohol consumption for the past 2 years.

The patient was thoroughly informed about the available treatment options, associated risks, and benefits. He expressed a preference for wide-awake local anesthesia surgery over non-operative management and GA. The patient desired surgery but wished to avoid hospital admission, thus opting for wide-awake local anesthesia to prevent the need for GA. The patient admittedly also wanted a more affordable surgery. The patient was consented and booked for surgery.

Wide Awake Local Anesthesia Humerus Technique.

The patient was positioned supine with their arm well-supported, and manipulation was avoided until the patient received adequate anesthetic. First, to manage pain, 15 mg of ketorolac was initially administered intramuscularly. Next, the surgical assistant prepared the local anesthetic solution by combining 25 mL of lidocaine with adrenaline and 10 ml of bicarbonate, diluting the mixture to 200 mL with normal saline. The solution was then gently administered systematically, with an initial entry point in the upper arm anteriorly, followed by circumferential injections around the upper arm, along the planned anterolateral incision line (taking into account any previous scars), and into deep subcutaneous tissues approximately 8–10 cm above and below the fracture site. The periosteum and bone around the fracture site and incision line

than those treated with LAWT. Post-operative pain control after WALANT versus other anesthetic approaches has also been widely researched in hand and upper extremity surgery. A growing body of literature has shown patients experience similar or even less post-operative pain after WALANT surgery compared to general anesthesia (GA) or LAWT with or without sedation [6-8]. For hand and upper extremity operations, WALANT surgery is a viable and safe option for eliminating unnecessary sedation, no longer subjugating patients to the pain and discomfort of a tourniquet, and is found to be equivalent in post-operative narcotic consumption.

The potential to expand the scope of WALANT surgery beyond minor hand procedures holds significant promise for enhancing access to healthcare, particularly in underdeveloped countries, more so than in developed ones. A 2022, publication reiterated this, highlighting

the need for more access in Brazil for elective procedures due to overall cost and lack of staff, specifically anesthesiologists [9]. Due to the widespread adoption of WALANT surgery in Brazil, patients can now receive treatment for a wide range of conditions, from minor hand procedures to olecranon fractures.

Non-elective procedures such as distal radius fractures [10] and spaghetti wrist [11] have been performed under WALANT with similar success. Moreover, WALANT surgery for lower extremity operations such as foot and ankle injuries has been successfully reported [12-15]. Multiple publications have demonstrated wide-awake local anesthesia as a safe option for open reduction and internal fixation (ORIF) of clavicle



Figure 3: Radiograph of a left humerus 4-week post-operative demonstrating intact orthopedic hardware.

were also adequately anesthetized. The surgeon waited for 20 min between the initial injection and the first incision to allow the local anesthetic sufficient time to take effect. During the initial incision, the patient was monitored by asking for feedback, and they reported not feeling the incision. The patient's comfort and anesthesia adequacy were actively monitored throughout the

procedure, with additional local anesthetic administered as needed.

An incision was made through the patient's previous scar. Meticulously, the soft-tissue envelope was exposed and retracted until the plate and fracture were adequately visualized. The previous plate and hardware were then removed, and the fracture was reduced using a new plate and screws. Since no intraoperative imaging is presently available at the hospital, the reduction and internal fixation were carried out solely under direct visualization, depending on the expertise of the surgeon.

The incision was then closed, and the patient's neurovascular status was assessed by having the patient flex and extend his elbow as well as his wrist and digits. The total duration of the procedure was 85 min though from incision to close was only 65 min accounting for the 20-min window for the anesthetic to take effect. The patient received appropriate care and instructions postoperatively, ensuring a successful and pain-free surgical experience. The patient followed up in the clinic 4 weeks later, having no issues with a well-healed wound (Fig. 2). Radiographs were also obtained at that time (Fig. 3). The patient was instructed to begin physical therapy at that time. The patient was seen in the clinic at 8 weeks and 12 weeks postoperatively and was once again found to have no issues, he was progressing appropriately with his physical therapy.

Discussion

The main finding from our case is the successful implantation of the wide-awake local anesthesia surgical technique for proximal humerus fracture or, more specifically, a peri-implant proximal humerus fracture. Far and away, hand surgeons have mostly implemented and accepted the WALANT surgical technique over the last decade. The benefits of the technique for standard hand procedures are well-defined. First, it allows patients to participate in intraoperative assessment, for example, during flexor tendon repairs or transfers, thus allowing physicians to assess the tension on the tendon [2]. Second, patients can avoid the risks and costs of pre-operative testing associated with undergoing GA [19]. In addition, local anesthesia administration does not require the expertise of an anesthesiologist, unlike the administration of a well-placed regional block. The WALANT technique, though mainly incorporated for typical hand procedures, has been described for distal radius fractures [10], ankle fractures [13], and clavicle fractures [17].

However, the use of WALANT in a peri-implant proximal humerus fracture has yet to be documented in the literature. In our case, the patient admittedly wanted his arm surgically fixed while incurring the least expenses. The charges for undergoing surgery with GA, plus a hospital stay, without any additional medications, is 10 times the cost of a WALANT or a wide-awake local anesthesia-only procedure in this facility. Being able to accommodate patients who are financially unable to afford GA is just one advantage of wide-awake local anesthesia surgery compared to standard GA, the most significant advantage of this technique is the increased patient care access. Far-Riera et al. [20] described being able to operate on an average of three more patients a day by implementing the WALANT technique for routine hand procedures in their hospital. Cutting the time from signing up for surgery to having surgery for standard hand procedures by half of what it was before the implementation of the technique. Specifically, though, in Dr. Aluvaala's facility, the average number of cases daily has doubled from four to eight since implementing a full-time WALANT room. Since the publication of Lalonde et al.'s findings in 2005, WALANT surgery has empowered surgeons to explore novel frontiers [2]. This procedure enables surgeons with limited resources to achieve more and offers a viable alternative to the expensive and constrained GA. Perhaps most significantly, it is helping alleviate some of the challenges associated with accessing surgical care. Our case highlights these core benefits of wide-awake local anesthesia surgery.

There are some absolute limitations to our experience that should be emphasized before applying our technique to other proximal humerus fractures. The patient must be aware of the

procedure and its consequences, including the drilling background noise and the discomfort of being motionless while lying supine for a long period of time. Patient cooperation is vital, and patients should be selected carefully.

Conclusion

Most commonly, surgeons employ the WALANT surgical technique for minor hand procedures. This case study is the first to describe applying the wide-awake local anesthesia technique for a proximal humerus fracture, specifically a peri-implant proximal humerus fracture. Our case highlights the feasibility and success of wide-awake local anesthesia surgery in addressing more complex orthopedic scenarios, providing a cost-effective alternative for patients with financial constraints, and safely increasing accessibility to surgical care. The presented case not only underscores the economic advantages of WALANT over traditional GA but also emphasizes its role in addressing health-care disparities by enhancing access to surgical interventions, particularly in resource-limited settings.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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The technique's ability to streamline surgical processes, as demonstrated by increased daily case volumes in the facility, further reinforces its potential to optimize health-care delivery. While WALANT has been previously reported for various fractures, including distal radius, ankle, and clavicle, this case represents a novel application for proximal humerus fractures, highlighting the versatility of the WALANT, or wide-awake local anesthesia-only surgical technique.

Clinical Message

This article demonstrates the successful application of the wide-awake local anesthesia surgical technique for treating a peri-implant proximal humerus fracture. The case emphasizes the feasibility and success of using wide-awake local anesthesia in more complex orthopedic scenarios in resource-limited regions. It highlights its cost-effectiveness potential to address health-care disparities and streamline surgical processes, thereby enhancing access to surgical interventions in resource-limited settings.



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