Use of Wide-awake Local Anesthesia No Tourniquet in Hand and Wrist Surgery

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KEYWORDS

• Local anesthesia • Hand surgery • Epinephrine • Outcomes • Complications

KEY POINTS

- Local anesthesia is used for most surgical procedures in the hand and wrist, but generally requires the use of a tourniquet to obtain a "bloodless field."
- The addition of epinephrine in the WALANT (wide-awake local anesthesia no tourniquet) technique achieves acceptable vision without the use of a tourniquet.
- Epinephrine has been proven safe for use in hand and digits.
- Patient satisfaction is high, and savings in time and costs are substantial.

Local and regional anesthesia techniques have been used for hand surgeries for many years, with general anesthesia typically reserved for extensive and prolonged hand operations, especially in young children. There are well-known risks associated with general and regional anesthesia, such as allergic reactions and systemic toxic effects, and some patients have comorbidities that are contraindications to general or regional anesthesia.[1] Because of these issues, local infiltration of anesthetic agents is commonly used for many surgical procedures of the hand and wrist. A newer technique currently being used by more and more hand surgeons is THE "wide-awake local anesthesia no tourniquet" (WALANT).[2,3]

THE EPINEPHRINE MYTH

WALANT uses a combination of a local anesthetic such as lidocaine or bupivacaine and epinephrine to induce anesthesia and hemostasis in the area of the surgical procedure. For many years, epinephrine was thought to cause devastating complications, including necrosis and gangrene, when used for hand or foot surgery. More recently, however, several studies and reviews of older literature have shown that this is not the case.[4] A multicenter prospective study of 3110 consecutive patients who had epinephrine injections into the hands or fingers found that none produced any skin necrosis or digital tissue loss of any kind.[5] Three literature reviews[6–8] found no valid evidence to support the concept that lidocaine with epinephrine is not safe for injection into the fingers; the authors found no reports of digital infarction. Several early series also reported the safe use of epinephrine injections in the hand and wrist. Johnson[9] reported no ill effects with the injection of epinephrine in 421 hands and fingers; Denkler[10] described fasciectomies in 60 consecutive digits using lidocaine with epinephrine and no tourniquet with no resulting ischemia, and Wilhelmi and colleagues[11] reported no complications in 30 procedures done with lidocaine and epinephrine. Further supporting the safety of epinephrine injection is the study by

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Fitzcharles-Bowe and colleagues,[7] in which they described 59 instances of high-dose (1:1000) digital epinephrine injection. This concentration is 100 times larger than that used for WALANT, and none of the digits had necrosis or tissue loss.

ADVANTAGES OF WIDE-AWAKE LOCAL ANESTHESIA NO TOURNIQUET FOR PATIENTS

WALANT has several advantages for use in the hand and fingers (Box 1). The primary advantage is the avoidance of the use of a tourniquet, which reduces patient discomfort and avoids the risk of temporary or permanent nerve and skin injury from the tourniquet. No overnight fasting, preoperative testing, or anesthesia consult is required; no intravenous catheter is needed, and minimal draping and instrumentation are required. Because the awake patient can actively move his or her hand or wrist, the function and stability of repairs and reconstructions can be evaluated intraoperatively and any necessary adjustments can be made. Recovery time is minimized, and, because side effects that are common with anesthesia (eg, nausea, grogginess) are avoided, most procedures done with WALANT can be done as outpatient procedures. Patient satisfaction is high with this anesthesia method.[12] Rhee and colleagues[13] reported that 62 (94%) of 66 patients surveyed would choose it for any future hand surgeries, and Davison and colleagues[14] reported similar results in 100 patients who had carpal tunnel release (93% would prefer WALANT over intravenous or general anesthesia). In a comparison of sedated and wide-awake patients who had carpal tunnel releases, most were satisfied with whichever method of anesthesia they received, but sedated patients were in the hospital longer, required more preoperative testing, and reported more preoperative anxiety.[14] Postoperative narcotics were used by 5% of wide-awake patients and by 67% of sedated patients. A recent study by Hustedt and colleagues[15] compared 4614 patients who had hand surgery with local/regional anesthesia without sedation, 3527 who had local/regional anesthesia with sedation, and 18,900 who had general anesthesia. Overall, both local and regional anesthesia with and without sedation had fewer postoperative complications than general anesthesia. In patients older than 65 years, there was the added benefit of avoiding all forms of sedation and decreasing the odds of postoperative complications. Data from this large nationwide study suggest that using local/regional anesthesia without sedation instead of general anesthesia reduces the odds of sustaining a postoperative complication after hand surgery by 1.5 times in patients of all ages and by 3.5 times in patients older than 65 years.

Box 1
Advantages of wide-awake local anesthesia no tourniquet for patients

- No sedation or general anesthesia
  - No side effects, such as nausea, vomiting, grogginess
- No anesthesiologist
  - Lower cost, less time
- No overnight fasting
  - Especially important for diabetic patients
- No presurgery testing
  - Saves times and money
- No intravenous line
- No tourniquet
  - Less pain
- Faster recovery
  - Outpatient procedure in clinic or surgery center
- Fewer complications

ADMINISTRATION OF WIDE-AWAKE LOCAL ANESTHESIA NO TOURNIQUET

Depending on the site at which dissection will occur, approximately 2 mL of 1% lidocaine with epinephrine 1:100,000 is injected into the palmar and dorsal subcutaneous tissues (Fig. 1). If hemostasis is not required and only a sensory block is needed, a single subcutaneous injection in the midline of the proximal phalanx with lidocaine and epinephrine (SIMPLE technique) is sufficient (see Fig. 1A). For procedures in the distal phalanx, Lalonde and Wong[16] recommend no more than 1 mL (Box 2).

Although some literature supports the safe use of 35 mg/kg of lidocaine with epinephrine,[17] the generally accepted maximal dose is 7 mg/kg,[16] meaning that an approximately 150-pound patient can safely receive 50 mL, which is well over the amount recommended for common hand and wrist procedures (Table 1).

Bupivacaine is preferred over lidocaine by some because of its longer duration of action, although the pain block provided by