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## Wide-awake local anesthesia for clavicle fracture fixation: A case report

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## ABSTRACT

**INTRODUCTION:** The wide-awake local anesthesia no tourniquet (WALANT) technique has been used in many orthopedic surgeries. The benefits of this technique are the avoidance of the adverse effects of general anesthesia (GA) and the overall reduction of the cost of surgery. However, a literature search revealed no published report on performing the WALANT technique for clavicular fracture surgery.

**PRESENTATION OF CASE:** We report a case of mid-shaft clavicular fracture that was treated with plate osteosynthesis using the WALANT technique in a patient with uncontrolled atrial fibrillation. During the operation, the patient did not experience any pain, and the procedure could be performed easily due to minimal bleeding in the operative field. The operation was completed successfully without any complications, and the patient was discharged from the hospital the day after surgery. Follow-up radiographs after three months showed union of the clavicle at the fracture site, and the patient could use his arm normally.

**DISCUSSION:** Clavicular fracture is routinely treated with plate osteosynthesis under general anesthesia. In some patients with high morbidity and other risk factors for whom GA is unsuitable, the WALANT technique can prove to be an effective alternative.

**CONCLUSION:** Clavicular fixation can be performed successfully and without any complication under WALANT technique.

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## 1. Introduction

Clavicular fracture is one of the most common injuries in patients presenting with trauma. The incidence of clavicular fracture is approximately 2.6% of all fractures, and the most common type of fracture of the clavicle is mid-shaft fracture [1]. Currently, open reduction and internal fixation (ORIF) with plates and screws is the standard treatment for patients with mid-shaft clavicular fractures because of quicker functional recovery compared to non-operative treatment.

Wide-awake local anesthesia no tourniquet (WALANT) has been widely used in orthopedic surgery [2–5]. However, there have been no reports of its use in clavicular surgery. Therefore, we present this report to demonstrate the usefulness and effectiveness of this technique in a mid-shaft clavicular fracture. This work has been reported in line with the SCARE criteria [6].

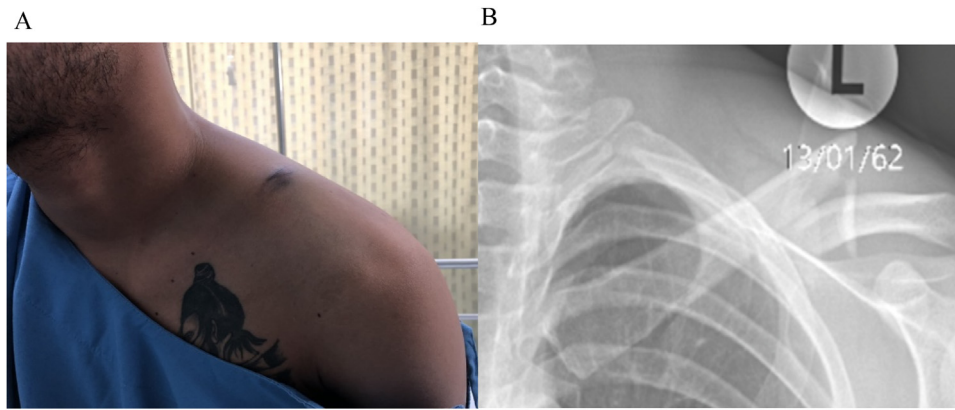
## 2. Presentation of case

A 28-year-old man with uncontrolled atrial fibrillation presented to our hospital after a motorcycle accident. He complained of pain around his left shoulder. He had good consciousness and able to walk to the emergency department himself. On the physical examination, revealed marked deformity, swelling, and bruising in the left clavicular area. A small contusion and tenting of the skin were observed (Fig. 1A). All nerves and arteries were intact. Radiographs showed a comminuted fracture and shortening at the mid-shaft region of the clavicle (Fig. 1B). The physical examination and radiography findings showing a displaced fracture of the clavicle and skin tenting were indications for surgery. The evaluation of the patient's medical condition indicated that general anesthesia was unsuitable for him due to the atrial fibrillation. The patient was informed about the various treatment options, risks, and benefits. The patient selected the WALANT technique, and after the consent form was completed, the patient was prepared for surgery.

The injection technique and preparation of the WALANT anesthetic agents were decided on after reviewing an earlier study [7]. We used a solution which consisted of 50 ml 1% lidocaine (with-

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**Fig. 1.** A: Physical examination shows contusion and skin tenting at the left clavicular area. B: A plain radiograph of comminuted fracture midshaft of the left clavicle with shortening deformity.



**Fig. 2.** Before surgery, we injected anesthetic solution into the soft tissue around the fracture site until it swelled up.

out adrenaline), 5 ml 7.5% sodium bicarbonate solution, and 1 ml adrenaline and then added normal saline solution up to 200 ml. The preparation of anesthetic solution and injection was performed by Sunyarn Niempoog who have been practicing trauma surgery for more than 30 years. The solution was injected directly into the fracture site and into the subcutaneous and subperiosteal tissue surrounding the fracture area and along the incision line. As in the tumescent anesthesia technique, we injected the anesthetic solution until the soft tissue around the fracture site was swollen (Fig. 2).

After waiting for half an hour to obtain the maximal effect of adrenaline, adequate pain control was achieved, and we could prepare and position the patient for surgery easily as he was still conscious and could cooperate with us. We used the anterosuperior approach to expose the clavicle. The clavicular fracture was reduced and fixed with plate and screws (Fig. 3). The operation proceeded smoothly without any complications.

During surgery, the patient could cooperate and interact with the surgeons at any time. After the surgery, the patient was able to get up from the operating table (Fig. 4) immediately and was moved safely and comfortably to an orthopedic ward. Postoperative radiographs showed good bony alignment and stable fixation. The patient was then discharged a day after surgery when he did not feel severe pain and so did not require further intravenous anesthetics.

The patient was administered naproxen 250 mg and paracetamol 500 mg for pain control at home. A follow-up appointment was made for one day later. The patient reported a visual analogue score of 1–2 and was satisfied with the overall outcome of the surgery. Six months after surgery, follow-up radiographs showed union of the bones at the fracture site and the patient could use his arm normally (Fig. 5).



**Fig. 3.** Plating fixation was done under WALANT technique and less bleeding was observed during surgery.

### 3. Discussion

General anesthesia (GA) is the most commonly used anesthetic method for clavicular fixation. However, the adverse effects of general anesthesia such as myocardial infarction, aspiration pneumonia, and others can lead to high morbidity and mortality among patients [8,9]. General anesthesia also requires more time for preparation of the patient preoperatively, and the cost is higher than that for the WALANT technique [10]. Moreover, the WALANT technique can be used in patients who are at a risk of adverse effects from general anesthesia. This technique has been used in various



Fig. 4. The patient could immediately get up from the operative bed.

operations in orthopedic surgery, such as distal radius fracture, ulnar shaft fracture, and olecranon fracture [2–5]. However, its use has not yet been reported in a mid-shaft clavicular fracture.

In our surgery using the WALANT technique, we used the combination of lidocaine without adrenaline, sodium bicarbonate solution, and normal saline solution as previously mentioned. We added 1 ml of adrenaline for its vasopressor effects and to prolong the effect of lidocaine. Normally, in clavicular surgery, it is impossible to apply a tourniquet to control the bleeding. The vasoconstrictive effect of adrenaline is thus very useful in minimizing bleeding during surgery, and this facilitates visualization of the surgical field.

There are many benefits of the WALANT technique compared to general anesthesia, such as reduction of operative time, shorter duration of hospital stay, and lower overall costs [11]. It is especially safe for the patient because it removes the risks of the adverse effects with general anesthesia. In this case, the patient had a serious medical condition; therefore, this anesthetic technique was the most appropriate.

In our institution, the cost of general anesthesia depends on the duration of the surgery. The cost for the first hour is 1500 bahts (THB) and that for the next hour is 1000 bahts (THB). For the WALANT technique, the total cost is only 180 bahts (THB).

Although a previous study indicated that the use of the WALANT technique can reduce the time at the hospital because it is not necessary to stay in hospital during recovery [11], we kept our patient in hospital for a day for pain control and observation. The patient was then discharged the next day when he stated that there was no pain and we decided that there was no further need for intravenous anesthesia.

However, the WALANT technique does have some disadvantages. One of them is that the patient may experience pain while receiving the injection or during the surgery if they receive inadequate anesthesia. However, this can easily be prevented by palpating the fracture site and asking the patient for any sensation of pain before initiating the procedure. However, if there is still pain, this can be managed by increasing the dose of the anesthetic agents to the affected area.

In this case, we employed an anterosuperior approach to the clavicle (Fig. 4) and used the tumescent anesthesia technique by injecting the anesthetic solution around the fracture site (Fig. 3). When we incised the subcutaneous and myofascial layers to approach the fracture site, the patient did not experience any pain, as in the case of patients under GA. However, we could perform surgery more easily than while using GA because of less bleeding in the operative field and cooperation from the patient.

#### 4. Conclusion

In this case, we performed ORIF with plates and screws under the WALANT technique. Adequate pain control and minimal bleeding were observed during surgery under the effect of lidocaine and adrenaline. The operation was performed successfully without any complications. Postoperative radiographs showed good fixation and fracture union at 3 months after the operation. In conclusion, we believe that clavicular fixation can be performed under local anesthesia.

#### Declaration of Competing Interest

No conflicts of interest.

#### Funding

No funding was involved regarding this case report.



Fig. 5. Union of the clavicular fracture 6 months postoperatively.

### Ethical approval

The present study was performed at Department of Orthopaedic Surgery, Thammasat University, Thailand, and was exempt from the institute.

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Author's contribution

All authors performed the intervention, contributed and agreed with the manuscript. Sunyarn Niempoog is the surgeon who take full responsibility for the work and/or the conduct of the study.

### Registration of research studies

researchregistry6379.

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