SCIENTIFIC ARTICLE

Evaluation of Early Postoperative Pain and the Effectiveness of Perifracture Site Injections Following Volar Plating for Distal Radius Fractures

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Purpose Few studies have investigated the effectiveness of early postoperative pain control regimens after volar plating for distal radius fractures. This study evaluated postoperative levels of pain after volar plating of distal radius fractures under axillary nerve block in patients with and without injections of local anesthetics, narcotics, and epinephrine around the fracture site.

Methods Perioperative pain levels were prospectively assessed in 44 consecutive patients who had had volar plating for a distal radius fracture under axillary nerve block at a mean time of 2.8 days after trauma. Intravenous, patient-controlled analgesia and prescheduled analgesic medications were administered to all patients. In addition, patients were randomly allocated to 2 groups: perifracture site injection (PI; n = 22) and no perifracture site injection (no-PI; n = 22). At the end of surgery, PI group patients were administered perifracture site injections and blocks of the superficial radial and interosseous nerves with a local anesthetic mixture consisting of ropivacaine, morphine, and epinephrine. During the first 48 hours after surgery, pain visual analog scale (VAS) scores (0 to 100), total amount of narcotic consumption, incidences of additional narcotic requirement, and opioid-related side effects were assessed.

Results The overall mean pain VAS scores among all 44 study subjects were 29 before surgery, and 58, 47, 40, and 27 at 4, 8, 24, and 48 hours after surgery, respectively. Thirteen patients needed additional pain rescue despite the multimodal analgesic approach used. No intergroup differences were observed between the PI and no-PI groups in terms of VAS pain scores, total narcotic consumption, adjuvant pain rescue incidence, and opioid-related side effects.

Conclusions Postoperative mean pain VAS scores after volar plating of distal radius fractures were found to be 58 at 4 hours and 47 at 8 hours. Perifracture site injections were not found to provide any additional pain control benefit. *(J Hand Surg 2010;35A:1787–1794. Copyright © 2010 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Therapeutic II.

Key words Distal radius fracture, volar plating, postoperative pain, pain control.

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DISTAL RADIUS FRACTURE is the most common fracture encountered in the upper extremity, and it represents a public health concern, particularly in the elderly.[1] Recently, volar plating has become a popular treatment because this procedure makes it easier to obtain and maintain fracture reduction, and it enables the patients to resume activities of daily living earlier than those treated nonsurgically.[1,2] Volar plating provides stable fixation and enables motion exercises to be undertaken early after surgery, which might be beneficial for early functional recovery. On the other hand, postoperative pain can discourage the early initiation of exercise, decrease patient satisfaction, and result in poor clinical outcome due to delayed rehabilitation.[3,4] Although increasing numbers of volar plating surgery after distal radius fracture have been performed, few studies have assessed the management of pain in the early postoperative period.[5]

Various methods are used to manage pain after orthopedic surgery. These methods include conventional nonsteroidal anti-inflammatory drugs or opioids,[6] regional or peripheral nerve block techniques,[7] and the administration of wound infiltrating and intra-articular local anesthetics.[8,9] Although opioids still play a major role, their use during the postoperative period might increase the risk of adverse effects such as nausea and vomiting, respiratory depression, sedation, pruritus, urinary retention, and sleep disturbances.[10-12] To reduce opioid-related side effects and improve analgesia by using synergisms between analgesics, a multimodal analgesia technique was introduced and has since been reported to shorten hospitalization times, improve functional recovery, and decrease health care costs after orthopedic surgery.[8,10] In particular, periarticular or intra-articular injections after arthroplasty or arthroscopy have been shown to control postoperative pain effectively and are easily administered with low side-effect rates.[9,13-15]

Although several studies have addressed postoperative pain control after orthopedic procedures, including total joint arthroplasty, few studies have been conducted on pain levels or pain control after the volar plating of distal radius fractures. In this study, we evaluated early postoperative pain levels after the volar plating of distal radius fractures performed under regional anesthesia and determined whether local injections of ropivacaine, morphine, and epinephrine into the joint, ligament, periosteum, subcutaneous tissue, and skin, and around interosseous and superficial radial nerves (as an additional sensory nerve block) provide additional pain management benefits. We hypothesized that local perifracture site injection and an additional sensory block with long-acting anesthetic might provide additional pain management benefits without impairing the important protective sensory functions and motor functions to start finger motion exercises after surgery.

TABLE 1. Patient Data

	Both Groups	No-PI Group	PI Group	p Value
Number	44	22	22	
Gender (M/F)	13/31	7/15	6/16	.52
Age (y)	59 ± 12	61 ± 14	57 ± 10	.86
Time to surgery (d)	2.8 ± 1.6	2.6 ± 1.7	2.9 ± 1.6	.73
Surgery time (min)	44 ± 7	43 ± 9	46 ± 6	.90
Fracture type				
A2	11	5	6	.73
A3	9	5	4	>.99
B3	2	1	1	>.99
C1	11	6	5	.73
C2	5	2	3	>.99
C3	7	3	4	>.99

PATIENTS AND METHODS

Patients

After obtaining approval from our institutional review board, informed consent was obtained from 44 consecutive patients who had volar plating for a distal radius fracture between March 2008 and April 2009. There were 13 men and 31 women with an average age of 59 years (range, 16–89 y) (Table 1). We included patients with a distal radius fracture without a styloid fracture or with a styloid fracture not requiring surgery. The surgical criteria were as follows (only one criterion was needed): (1) radial shortening more than 5 mm, (2) dorsal angulation more than 10° or volar angulation more than 20°, (3) radial inclination less than 10°, and (4) articular stepoff more than 2 mm, after closed reduction at the emergency room or when the patient was followed up at the outpatient clinic 1 to 2 days after trauma. We excluded those with multiple injuries, neurovascular injuries, a combined distal radioulnar joint instability, associated carpal instability or a large ulnar styloid fragment requiring fixation, those who regularly used narcotics, those with a psychiatric illness or a known allergy or contraindication to opiates or local anesthetics, and those whose surgery occurred after one week. The average time from onset of trauma to date of