Correspondence

Ultrasound-guided supracondylar radial nerve block for Colles Fractures in the ED☆

Distal radius fracture is one of the commonest traumatic complaints and is associated with significant pain. As shown in a previous cadaver study [1], most innervation to the dorsal distal radius originates from the posterior intersosseus nerve. To the best of our knowledge, our cases are the largest series in the English literature that screened the effectiveness of the ultrasound (USG)-guided supracondylar radial nerve block on closed reduction of the distal radius fractures.

The institutional review board approved the procedural protocol. All adult patients referred to the emergency department (ED) with distal radius fractures were asked to provide informed consent for participation in the study when the performer of USG-guided nerve block was on duty. Fifteen patients who gave written informed consent for USG-guided nerve block are enrolled to study.

Fifteen patients with fractured radii were screened during the study, and visual analog scale (VAS) scores were recorded before, during, and after closed reduction of fracture. A single emergency physician (EP), experienced in bedside ultrasound using the M7 model ultrasound machine with 5- to 12-MHz high-frequency linear transducer (Mindray Bio-Medical Electronics Co, Shenzhen, China), performed USG-guided supracondylar nerve block with an average of 10 mL 2% lidocaine for each patient; this procedure required 5.5 minutes on average when he is on duty. With the patient maintaining the sitting position holding his or her affected arm in a flexed position, the performer stood facing the lateral aspect of the affected arm. The radial nerve was located on the lateral aspect of the humerus, approximately 2 cm above the lateral epicondyle, with a high-frequency linear transducer (Fig. 1). In this location, the oval-shaped hypoechoic brachialis and brachioradialis muscle lies, facilitating its rapid identification. The nerve was then identified before the bifurcation into deep and superficial branches. The area was prepared in a sterile fashion with a chlorhexidine solution. A sterile Tegaderm (3M, St Paul, MN) was placed over the ultrasound probe, and sterile surgical lubricant was spread on the intended injection side. The EP used the in-plane technique to instill an average of 2% lidocaine with an Exelint Spinal Needle (20G*3 1/2 [0.90 × 90 mm]) around the supracondylar radial nerve, beginning from above and then below the nerve in a circumferential manner under direct USG guidance (Fig. 2 and Video 1 in the online version at http://dx.doi.org/10.1016/j.ajem.2016.06.007). Patients reported no discomfort during the injection process. Thirty minutes postinjection, patients reported their wrist dropping because of paralysis of the extensors of the forearm with the radial nerve block. This transient complication was reversed in all patients after 8 hours of the procedure. After confirmatory radiographs showed adequate reduction, the patients were placed in a splint and discharged home. Screened patients were followed up 12 hours after USG-guided nerve block and followed in the orthopedic wards in 2-3 days. Another EP collected the other variables; they were blinded to each other. Ranked variables are reported as the medians with ranges and 95% confidence intervals, and Friedman analysis of variance test was used to compare differences in VAS scores across the pre-reduction, reduction, and postreduction period. The maximum type 1 error was 0.05, and the level of significance was accepted as P < .05. SPSS version 15.0 (SPSS, Inc, Chicago, IL) was used for statistical computing.

The Friedman test was conducted to evaluate differences in medians among the VAS scores within cases for preprocedure (median = 8), for procedure (median = 4), and for postprocedure (median = 3). The test was significant and indicated fairly strong differences among the 3 concerns (P < .01). VAS scores during procedure are significantly different than VAS (pre) and VAS (post) (P values are given in Table 1). There were no complications related to the regional block of radial nerve.

Procedural sedation involves prolonged fasting; multiple providers; a monitored bed in the ED; time for preparation, sedation, and recovery; and risks of deep sedation. In addition, certain conditions such as head injury, hypotension, or underlying comorbid diseases may make the use of procedural sedation unacceptable for some patients with high American Society of Anesthesiologist scores [2–4]. Many of these elderly patients with Colles fractures may carry the risks of adverse effects of procedural sedation in the ED and may also need monitoring for this, which causes a prolonged time to patient discharge [3]. As seen in our cases, USG-guided supracondylar radial nerve block facilitates motor and sensory blockade of the radial side of the distal forearm of the upper extremity; requires no additional staff, monitoring, or other ED resources; and can be performed without the risks of procedural sedation and any complication. The rate of block success is increased from 85% using a landmark technique to 95% using ultrasound guidance [5]. Further studies must be conducted with multiple performers compared with the other procedural sedation techniques to see the effectiveness of the technique.

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.ajem.2016.06.007.

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**Fig. 1.** A, The ultrasonographic visualization of radial nerve with bedside ultrasound. B, Distal humerus (big arrow) and radial nerve (small arrow) are marked.

**Fig. 2.** Radial nerve and local anesthetic agent as a hypoechoic halo around the nerve are seen with bedside ultrasound.

Table 1

<table>
<thead>
<tr>
<th>Cases (N = 15)</th>
<th>Range</th>
<th>Mean ± SD (95% CI)</th>
<th>Median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS (preprocedure)</td>
<td>7-10</td>
<td>8.20 ± 1.08 (7.60, 8.80)</td>
<td>8 (7, 9)</td>
</tr>
<tr>
<td>VAS (procedure)</td>
<td>1-5</td>
<td>3.47 ± 1.19 (2.81, 4.12)</td>
<td>4 (3, 4)</td>
</tr>
<tr>
<td>VAS (postprocedure)</td>
<td>1-4</td>
<td>3.53 ± 2.16 (2.73, 4.34)</td>
<td>3 (2, 5)</td>
</tr>
</tbody>
</table>

Within-subjects comparison (Friedman)

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**References**


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