Abstract—Background: Hematoma blocks of the radius can provide excellent analgesia for simple distal radius fractures. However, the landmark-based approach can be difficult, and ultrasound guidance may improve success of the block and analgesia during reduction. There is limited literature describing the ultrasound-guided approach, and prior case descriptions have not involved comminuted fractures or concomitant ulnar styloid fractures. Objectives: This report reviews the technique of the ultrasound-guided hematoma block for distal radius fractures and introduces a second step, which can be used in the case of concomitant distal ulna fractures. Discussion: The use of the ultrasound-guided hematoma block allows for direct visualization of needle advancement, as well as a simple approach to anesthetizing most distal radial and ulnar fractures. Conclusion: The ultrasound-guided hematoma block may be helpful in improving anesthesia of complicated distal radial and ulnar fractures, especially when landmark-based localization is difficult. © 2015 Elsevier Inc.

Keywords—ultrasonography; hematoma; radius fractures; ulna fractures; hematoma block

INTRODUCTION

Distal radius fractures account for 1–2.5% of all emergency department visits and have been increasing in incidence across all age groups (1). Although Colles’ fractures remain the most frequently encountered, there are various other fracture types, which can prove particularly difficult to anesthetize with the landmark-based hematoma block (2). In the case of impacted and comminuted distal radius fractures, a blind approach can be very challenging due to obscuration of the typical “bony step-off” palpated during the landmark-based approach. Additionally, body habitus and soft tissue swelling can further limit the localization of bony landmarks. Finally, a concomitant ulnar styloid fracture can interfere with reduction attempts secondary to incomplete anesthesia of the ulnar styloid fracture site. Thus, we present a review of the technique of the ultrasound-guided hematoma block for distal radius fractures and introduce a second step, which can be used in the case of concomitant ulna fractures.

PROCEDURE

Using a 7.5-MHz linear transducer, the emergency physician can easily identify the fracture site by tracing the bone in a longitudinal direction and noting the interruption in the bony cortex (Figure 1). The first injection is performed by tracing the radius along the dorsal forearm until the fracture site is located. After locating the fracture site, the skin should be prepped with chlorhexidine. A 20- or 22-gauge needle is inserted in-plane in the direction that allows easiest insertion into the fracture site (typically, a proximal-to-distal direction). The needle is followed real-time into the fracture space (Figure 2). A small amount of blood is aspirated and 5–10 mL of 1% lidocaine is injected.
If a concomitant ulnar styloid fracture is present, a second injection may be performed by tracing the ulna along the ulnar aspect of the wrist until the fracture site is located. A 20- or 22-gauge needle is again inserted in-plane in the direction that allows easiest insertion into the fracture site (typically, a distal-to-proximal direction for ulnar styloid fractures). The needle is again followed real-time into the fracture space (Figure 3). A small amount of blood is aspirated and 5 mL of 1% lidocaine is injected.

**DISCUSSION**

The hematoma block is an effective and safe method of providing analgesia prior to fracture reduction (3–6). Although it is a relatively simple procedure to perform, it may be complicated by soft tissue swelling, body habitus, and comminution of fracture fragments, interfering with locating the correct site, as well as concomitant ulnar fractures, which can result in inadequate analgesia for the reduction if not properly anesthetized. There have been four prior case reports of utilizing ultrasound to facilitate hematoma block (7–10). Two prior papers have addressed the use of ultrasound-guided hematoma blocks in Colles’ fractures (7,8). However, in both papers, the patients had significantly displaced simple Colles’ fractures (7,8). This paper briefly reviews the technique for ultrasound-guided hematoma blocks, as well as discusses their significance for comminuted fracture patterns and concomitant ulna fractures.

In the case of impacted and comminuted distal radius fractures, a blind approach can be very challenging due to obscuration of the typical “bony step-off” palpated during the landmark-based approach. Body habitus and soft tissue swelling can further limit fracture site localization. Use of ultrasound guidance can allow direct visualization of the fracture site, as well as real-time guidance into the site, thereby maximizing injection of the anesthetic into the fracture site itself, as well as reducing the risk of inadvertent intravascular injection (11).

Concomitant ulnar styloid fracture may also complicate proper anesthesia during distal radius fracture reductions. A properly placed distal radius hematoma block should anesthetize the radius. However, the ulnar styloid is unlikely to be adequately anesthetized, thereby resulting in continued pain with the possible need for parenteral agents. Using ultrasound to perform a targeted ulnar...
styloid hematoma block removes this obstacle and can allow for more complete anesthesia of the wrist.

Although many patients will eventually require operative management, providing appropriate anesthesia will allow for improved alignment, which has been shown to decrease joint swelling, patient discomfort, and the risk of neurovascular compromise (12). Moreover, as many elderly patients may not tolerate surgery, this may be the only attempt at fracture reduction and alignment.

CONCLUSION

This paper briefly reviews the technique for ultrasound-guided hematoma blocks, as well as discusses their significance for comminuted fracture patterns and concomitant ulna fractures. In our experience, we have had excellent success with this approach, requiring little or no parenteral agents, while maintaining excellent patient satisfaction.

REFERENCES