CHAPTER **53**

# HEMATOMA BLOCK FOR THE CLOSED REDUCTION OF FRACTURES

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## INTRODUCTION

Ankle injuries account for approximately 10% of all Emergency Department visits annually. Only 15% of these are fractures, which equates to roughly 187 ankle fractures in 100,000 person-years.[1] Many ankle fractures may be treated successfully with cast immobilization if there is no significant malalignment or disruption of the ankle mortise. When there is displacement of the fracture fragments or if the ankle mortise is disrupted, then the fracture may be treated with open reduction and internal fixation, closed reduction with percutaneous fixation or closed reduction with cast immobilization.[1,2] Even if the fracture will be surgically treated, closed reduction of the fracture will allow for patient comfort, decreased edema and/or decreased risk of vascular or cutaneous compromise.[2] In order to achieve an acceptable result from closed reduction of a fracture, adequate anesthesia and/or patient relaxation must be achieved. In the past, this has been accomplished with techniques such as general anesthesia and conscious sedation. While these techniques are invaluable in some circumstances, they carry the risk of aspiration if the patient has eaten, respiratory depression, are expensive, and require skilled monitoring.[3-7] The use of a hematoma block has been shown to be faster, and less expensive with a shorter recovery time.[3]

The hematoma block has been utilized for many years for the reduction of closed wrist fractures; Colle's fractures in particular.[3-7] More recently the technique has been described by Alioto for the reduction of closed ankle fractures.[5] The hematoma block involves inserting a needle into the fracture site, aspirating hematoma to confirm position and infiltrating the fracture site with local anesthetic. The following technique is utilized at our institution for the closed reduction of most displaced ankle fractures, regardless if they will undergo open reduction internal fixation (ORIF) in the future.

## TECHNIQUE

First, verbal informed consent to the hematoma block is obtained from the patient or the patient's guardian (if the patient is a minor). The patient is then given a small dose of an opioid analgesic, such as morphine. Next, the ankle is prepped in a sterile manner with either betadine paint or chlorhexidine (Figure 1). Ten milliliters of 1% plain lidocaine is then drawn into a syringe with a 22 gauge needle. Due to the mechanism of most ankle fractures, the medial gutter is readily identified by observation and/or palpation. The needle is inserted quickly through the skin directly into the ankle joint (Figure 2). Care must be taken not to damage the articular surface of the talus or the ankle

Figure 1. The affected ankle is prepped in a sterile manner.

Figure 2. The needle is introduced into the medial ankle gutter.

mortise. This may be readily accomplished by entering just proximal and lateral to the distal aspect of the medial malleolus. Especially in displaced SER and PER type fractures, this space will be widened. The needle is then stabilized and the hematoma is aspirated (Figure 3). Half of the local anesthetic is then infiltrated into the fracture hematoma and the needle is withdrawn (Figure 4). Next, the lateral ankle gutter is identified by palpation (Figure 5). The needle is inserted in the lateral gutter of the ankle joint in a manner analogous to the medial gutter (Fig 6). The fracture hematoma is again aspirated and the local is infiltrated (Figure 7, 8). The block is given approximately 10 minutes to set and the closed reduction is performed. A Jones compressive dressing is placed on the patient to control edema and the patient is maintained in a strict nonweight-bearing fashion.

Figure 3. The hematoma is aspirated.

Figure 4. Local anesthetic is infiltrated into the fracture hematoma.

Figure 5. Identify the lateral ankle gutter.

Figure 6. Insert the needle into the lateral ankle gutter.

Figure 7. Aspirate the fracture hematoma.

Figure 8. Inject the remaining volume of local anesthetic into the lateral hematoma.

## COMPLICATIONS

The risk of complications with the use of a hematoma block is low. However, there have been documented reports of local anesthetic toxicity, osteomyelitis, and diminished efficacy.[8,9] The risk of toxicity may be diminished by utilizing 1% lidocaine, ensuring that the needle does not lie in the intravascular space and infiltrating no more than 7mg/kg of body weight. Because the needle is entering a hematoma that is in direct communication with the cancellous bone of the tibia, strict adherence to aseptic technique must be followed. Proper localization of the fracture site and the hematoma is key for the efficacy of the block, if the needle does not lie within the hematoma, then the block has a low probability of being effective. One major disadvantage of the hematoma block technique is that it does not directly provide muscle relaxation to the affected extremity. It is therefore vital that the patient voluntarily relax and not resist or try to aid the reduction. The patient will also remember the reduction. To aid in relaxation a small dose of an anxiolytic, such as versed, may be administered. If the patient is extremely anxious or combative, then other anesthetic techniques, such as conscious sedation, are indicated.

The hematoma block can be extremely effective technique for anesthesia or as an adjunct to anesthesia for the closed reduction of ankle fractures. Care must be taken to ensure strict aseptic technique and accurate needle placement to achieve the full efficacy with a minimal risk of complications.

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