

Ultrasound in Emergency Medicine



BEDSIDE ULTRASOUND AIDS IDENTIFICATION AND REMOVAL OF CUTANEOUS FOREIGN BODIES: A CASE SERIES

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Abstract—Background: Soft tissue injury with a retained foreign body (FB) is a common emergency department (ED) complaint. Detection and precise localization of these foreign bodies is often difficult with traditional plain radiographic imaging or computed tomography (CT). **Case Report:** We present three cases in which bedside ultrasound was used to identify and guide management of retained soft tissue foreign bodies. Comparison of ultrasound vs. plain radiography and CT, as well as techniques for FB identification and removal, are discussed. Why should an emergency physician be aware of this?: Bedside ultrasound is an invaluable tool in the localization of foreign bodies in relation to other anatomic structures, and aids in the decision to remove them in the ED. © 2014 Elsevier Inc.

Keywords—ultrasound; foreign body; imaging

INTRODUCTION

A variety of imaging modalities are available to the emergency physician in the evaluation of patients with cutaneous foreign bodies (FBs). Plain radiography is quick and inexpensive, but does not reliably identify certain types of FBs and gives no information about location relative to anatomic structures other than bone. Computed

tomography (CT) may further define the anatomy, but is costly, often impractical, and exposes the patient to radiation. Magnetic resonance imaging is also costly and is not available for this purpose in most emergency departments (EDs). In this setting, bedside ultrasound offers high-definition imaging, and is inexpensive, easy, and does not expose the patient to radiation.

The following cases demonstrate the utility of ultrasound in identifying soft tissue foreign bodies, as well as the decision-making process regarding bedside surgical retrieval in the ED.

CASE REPORT

Case 1

A 12-year-old girl presented to the ED 2 h after a wooden FB became lodged in her third left digit while running her hand down a wooden railing. Her family attempted to remove the splinter prior to coming to the ED, but the patient still complained of a FB sensation.

Upon arrival, the patient was extremely anxious and had two small puncture wounds on either side of her left third digit, just proximal to the distal interphalangeal (DIP) joint. She demonstrated full range of motion, normal sensation, and intact distal capillary refill. She did, however, report pain with range of motion. The physician was unable to palpate a FB. Plain radiography of the hand did not demonstrate a FB, though the patient felt confident that there was retained material in her finger.

Streaming videos: Two brief real-time video clips that accompany this article are available in streaming video at www.journals.elsevierhealth.com/periodicals/jem. Click on Video Clips 1 and 2.

RECEIVED: 20 November 2013;

ACCEPTED: 31 January 2014

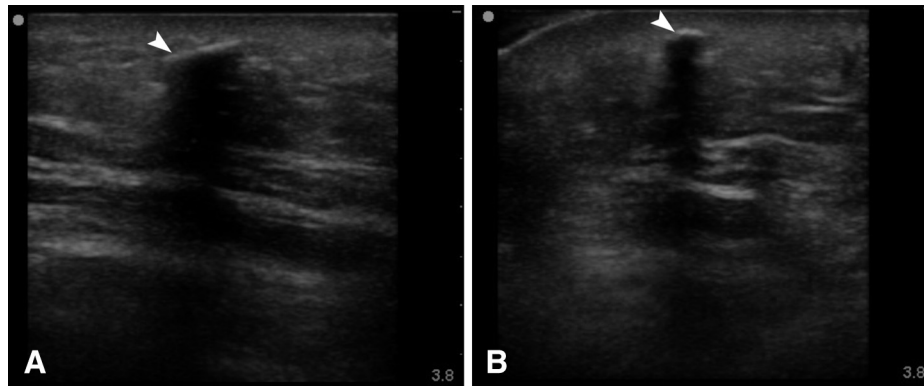


Figure 1. The wooden foreign body appears as a bright, hyperechoic line (white arrow) with a dark posterior shadow in a longitudinal (A) and transverse (B) plane.

Next, the physician performed a sonographic evaluation of her hand using a high-frequency linear transducer and a waterbath technique. A 1-cm FB was localized in the patient's area of discomfort proximal to the DIP joint and superficial to the flexor tendon. After the FB was identified, the patient was visibly relieved and less anxious.

On ultrasound, the FB is seen as a hyperechoic line with a dark posterior shadow in a longitudinal plane (Figure 1A), and as a hyperechoic dot in an axial plane (Figure 1B). The physician, after noting the FB's position in relation to the flexor tendon, deemed removal to be safe. The finger was anesthetized with a digital block, the location marked with a skin marker, and an incision made superficial to the wooden FB. The FB, a long wooden splinter, was extracted without complication. The wound was irrigated and the edges loosely approximated. A dressing was placed and the patient discharged home. On a follow-up call, the wound was healing well without complications.

Case 2

A 21-year-old man presented to the ED about an hour after accidentally shooting himself in the left hand with a BB gun while trying to load it. Per his description, the BB pellet had entered through the palm of his hand and seemed to be lodged mid-palm. He reported no restriction in movement of the fingers, although he did have discomfort in his palm with these movements.

On examination, he appeared comfortable, but had a small wound in the center of his hand that was oozing blood (Figure 2). No FB was easily palpable and he was able to actively flex and extend all of the joints in his fingers. Sensation and capillary refill were normal. Plain radiography identified a radiopaque FB overlying the palmar aspect of the hand at the level of the mid-body of the third metacarpal (Figure 3).

Next, the physician used bedside ultrasound to localize the position of the FB in relation to the tendons. Figure 4 and Video 1 show the BB pellet to be located

deep to the palmar aponeurosis. Given this location, the physician decided not to attempt retrieval of the FB in the ED. A dressing was placed, the patient was prescribed prophylactic antibiotics and referred to hand surgery for outpatient removal. It was successfully removed a week later in their clinic and the patient suffered no lasting complications.

Case 3

A 20-year-old man presented to the ED about 2 h after shooting himself in the right hand with a BB gun. He had a small circular wound on the palm of his left hand (Figure 5) but was able to move all of his fingers without difficulty and denied any numbness or tingling. He was



Figure 2. Wound resulting from a BB gun injury to the volar surface of the hand.

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