

Retained Foreign Body in the Hand

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A 43-year-old man presented to the emergency department (ED) with swelling of the dorsal aspect of his left hand. He had climbed a tree 4 months prior and had felt something enter the hand at that time. He had been evaluated at an outside ED, where radiographs and local wound exploration had yielded no significant findings. He had been discharged on a regimen of cephalexin.

Three months later, the man presented again for continued pain in the hand, with repeated radiographs again showing no foreign body. He eloped prior to further evaluation at that visit.

The patient presented to our ED approximately 1.5 months later with increasing pain and swelling, with a tree thorn being expressed from the dorsal aspect of his hand on the day of presentation (**Figures 1 and 2**).



Figure 1. The patient's left hand with a foreign object extruding from the dorsal surface.



Figure 2. *The patient's left hand with a foreign object extruding from the dorsal surface.*

We evaluated the patient with radiographs (**Figure 3**) and ultrasonography (US) (**Figure 4**) to determine the extent of the injury and presence of any infectious process.

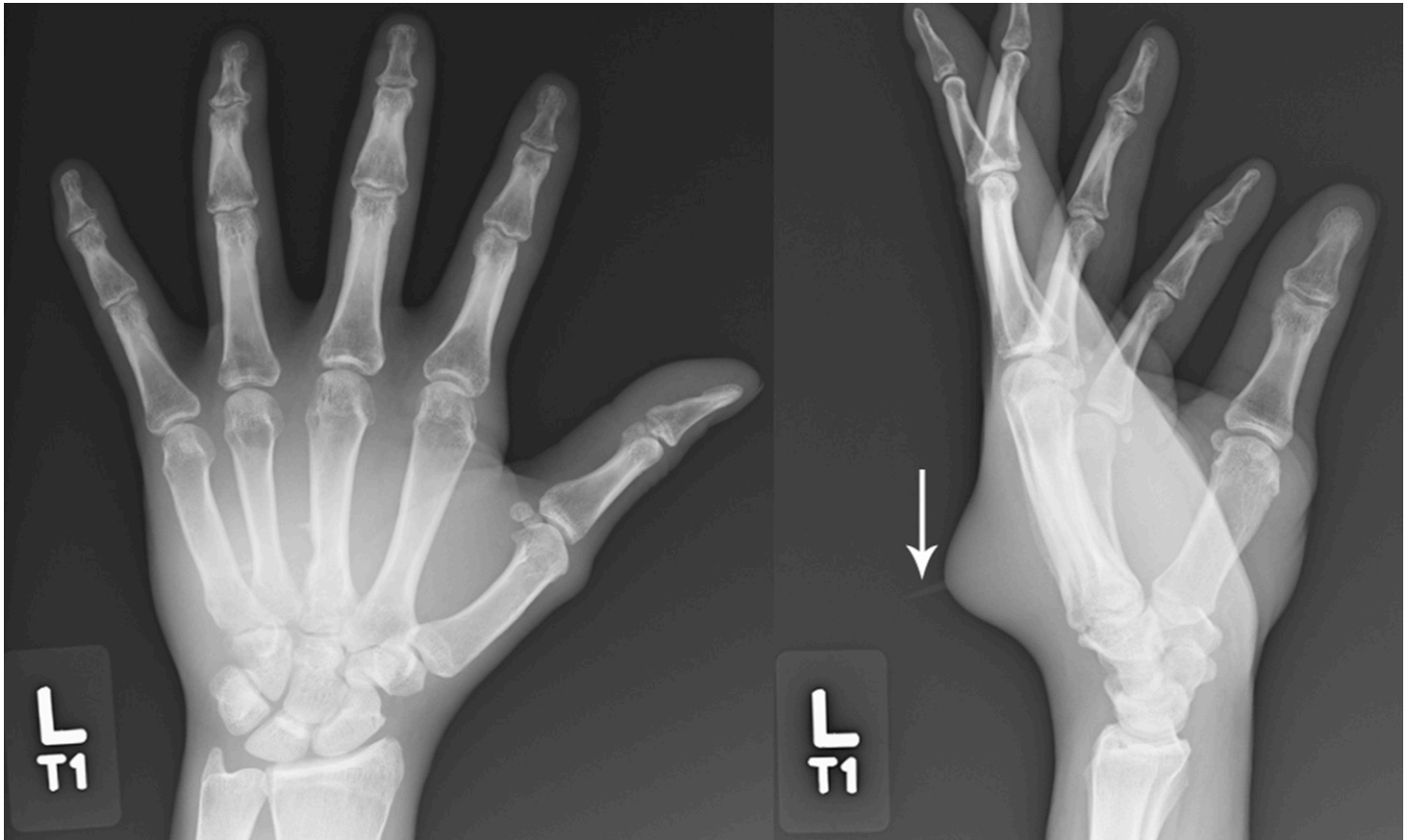


Figure 3. Anteroposterior and lateral radiographs of the patient's left hand with the foreign object visible outside the hand (arrow).

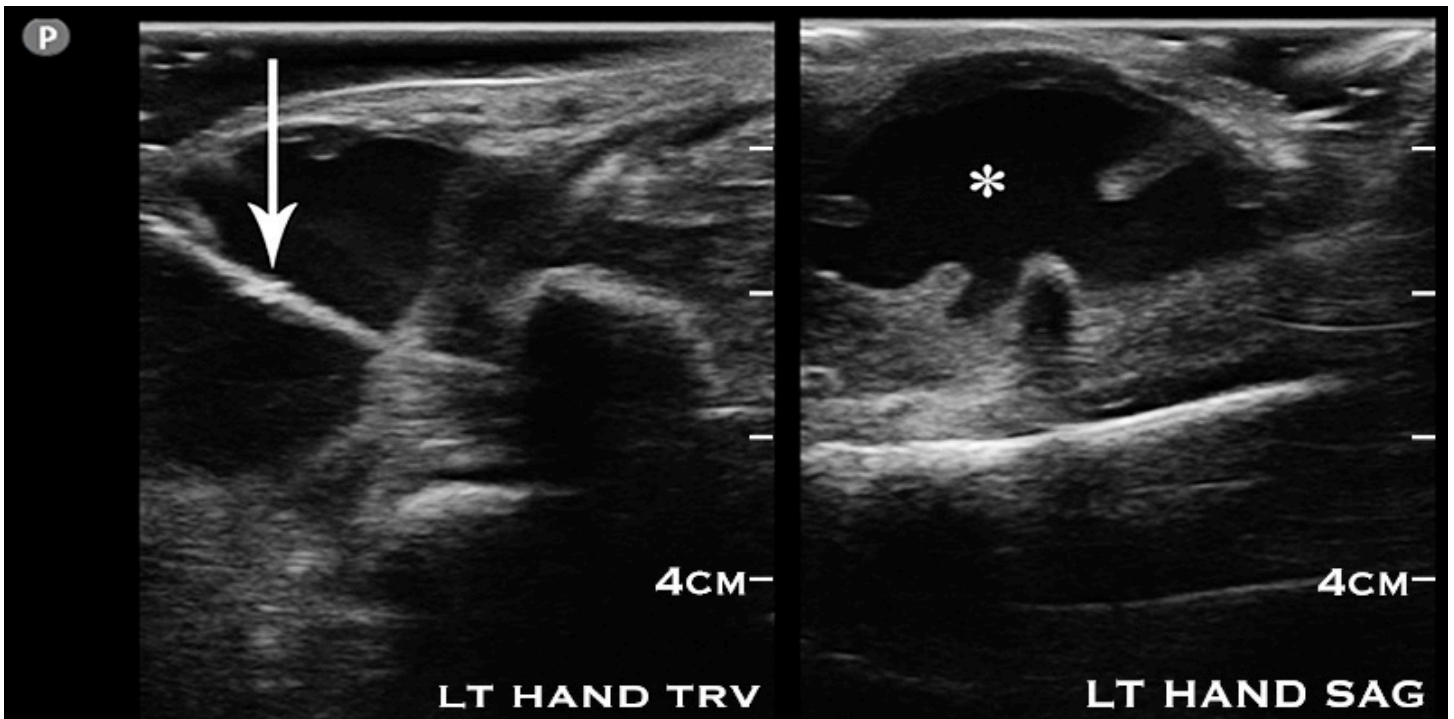


Figure 4. Transverse and sagittal US images of the area of concern with the foreign object (arrow) and fluid-filled pocket (star) visualized.

Because of the prolonged presence of this foreign body and the possibility that surgical exploration was needed, a plastic surgeon was consulted; the surgeon subsequently performed a bedside incision and drainage with removal of the tree thorn and expression of 10 mL of cloudy fluid. Recommendations were for oral cephalexin for 1 week and follow-up in the outpatient clinic.

The patient was discharged from the ED. He did not follow up with his scheduled visit, and he has not returned to our system since.

Discussion

Foreign bodies are commonly encountered in the ED. If not removed, they can cause inflammation, infection, and functional morbidity. Radiolucent objects such as wood can be particularly difficult to visualize, with one study finding that 85% of wooden foreign bodies in the hand were not visible on radiographs.¹ In such cases, other imaging modalities such as US or magnetic resonance imaging (MRI) can help determine whether a foreign object is present.² Davis and colleagues performed a meta-analysis of 17 studies and found an overall sensitivity of 72% and specificity of 92% for detection of soft-tissue foreign bodies by US.³ Additionally, Hiremath and colleagues performed a prospective study with 46 patients undergoing radiography, US, then surgical exploration for suspected wooden foreign bodies, finding a sensitivity of 100% for US.⁴

Radiographs are a reasonable first screening test for determining the presence of a foreign object after a puncture wound injury. If the results are negative, and strong concern or suspicion exists for a foreign object, additional means should be used to further assess for their presence. MRI can be cumbersome to arrange and costly for the patient, and surgical exploration creates the risk of further neurovascular injury. Therefore, US is an excellent choice for attempting to confirm or rule out the presence of a foreign body given the good specificity and sensitivity it has for this purpose.

Risk factors for infection after a puncture wound include increased depth of the wound, contamination of the puncturing object or wound, injury with organic material, and immunodeficiency including diabetes mellitus. Some of the bacteria most commonly isolated from these types of wounds include *Staphylococcus aureus* and β -hemolytic streptococci due to their normal presence on the skin. Other bacteria should be suspected based on the injury mechanism and the environment in which the injury was sustained. For example, *Pseudomonas aeruginosa* should be considered in puncture wounds through a shoe,⁵ *Vibrio* or *Aeromonas* species in the setting of water exposure,^{6,7} and *Pasteurella* for animal bites.⁸

Wound cultures in our patient's case grew normal skin flora. This finding may have been a result of the first course of antibiotics having successfully treated any infectious process and

resulting only in inflammatory fluid around the foreign body, or it may have been due to a poor specimen sample.

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