

Point-of-care ultrasound: a sideline “game-changer”

Ultrasound for diagnosis of occult radial head
fracture in a football athlete

A Case Study by:
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“Hand-held ultrasound is an indispensable tool for a Sports Medicine physician during athlete evaluation on the sideline due to its ease of use, cost-effectiveness, and lack of radiation exposure”

Introduction

As a Primary Care Sports Medicine physician, I have found hand-held ultrasound to be incredibly helpful during sideline evaluation of injured athletes. Given the high rate of musculoskeletal injuries in American football ^(1, 2), a sports medicine physician must rapidly determine whether an athlete can safely return to play. Traditionally, a physical exam is the primary modality used to determine if advanced imaging is needed prior to return to play. While NCAA Division 1 universities and professional teams often have on site X-Ray capability, the same is not true for high schools. As an alternative, Butterfly iQ+ can be utilized by Sports Medicine physicians to aid in the accurate diagnosis of musculoskeletal injuries.

“I use point-of-care ultrasound to help me determine if an athlete can safely return to play”

Case History

While providing medical coverage at a high school football game, I was on sideline-watch as an 18-year-old wide receiver was tackled by another player. He fell directly onto an extended elbow, suffering a FOOSH (fall onto outstretched hand) injury. He had immediate onset of severe elbow pain and was brought to the sideline by the school's athletic trainer. His point tenderness over the radial head as well as limited range of motion in all directions raised concern for a fracture. Knowing that his mechanism of injury could result in a radial head or neck fracture, which are notoriously difficult to diagnose on x-ray, I reached for my Butterfly iQ+. My sideline evaluation revealed evidence of an intra-articular effusion and a minimally displaced cortical irregularity within the radial head, suggestive of a fracture. I discussed the likely diagnosis with the player and his parents within minutes of his injury. We applied ice and placed his arm in a sling. Radial head and neck fractures often heal well with conservative management in the form of immobilization followed by progressive range of motion⁽³⁾. Instead of going to an Emergency Room on a Friday night, we were able to promptly and accurately diagnose his injury, as well as initiate the appropriate treatment and follow-up.

Sample Imaging Exam

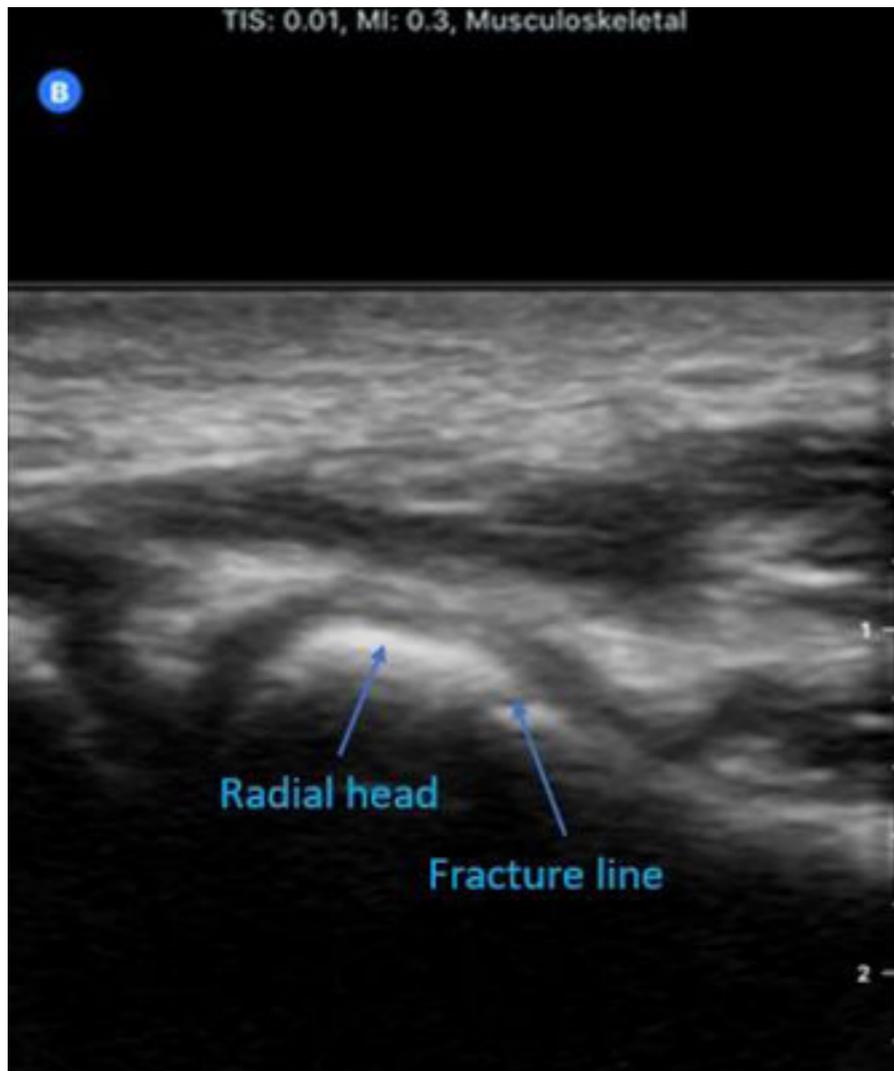


Fig 1. Butterfly iQ+ on MSK setting demonstrating radial head with cortical irregularity and periosteal fluid (hematoma) suggestive of fracture (left is medial, right is lateral)

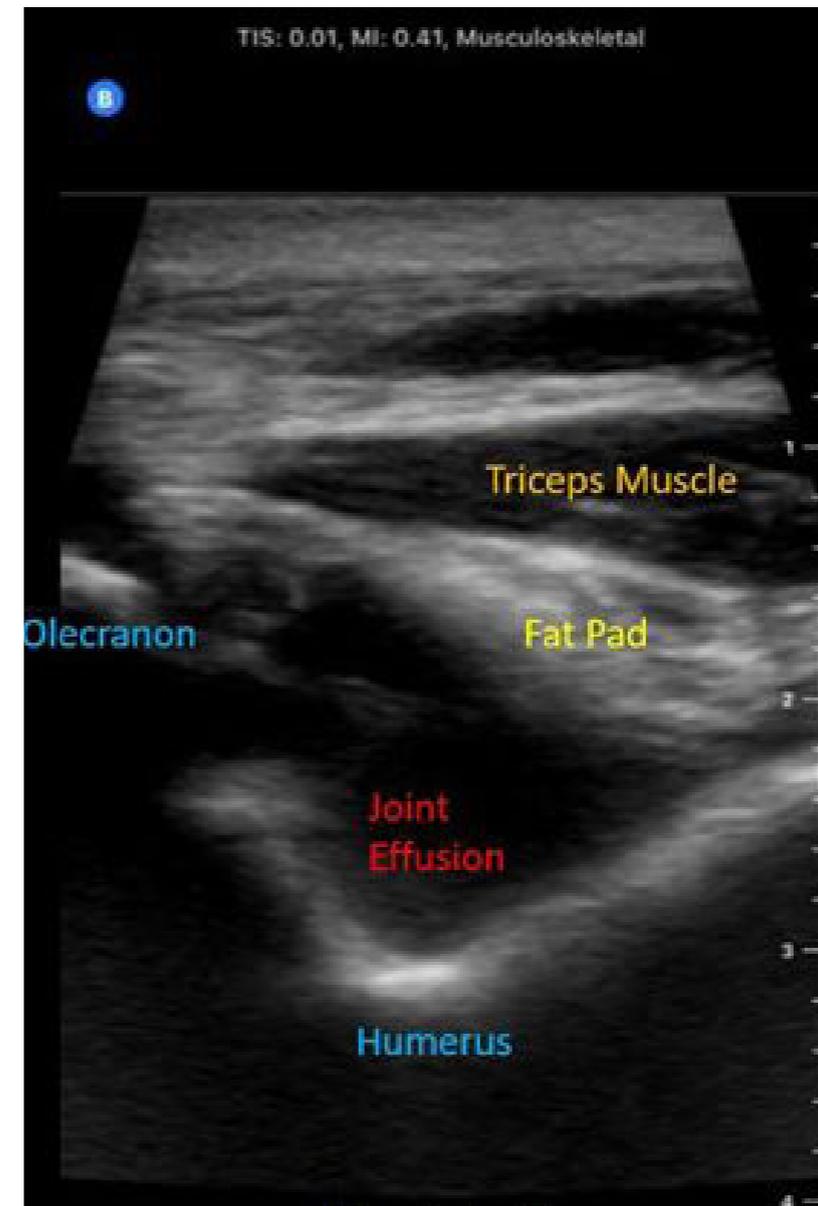


Fig 2. Butterfly iQ+ on MSK setting, posterior elbow with joint effusion (left is lateral, right is medial)

What Does This Teach Us?

Ultrasound is a clinically useful alternative to x-ray in the diagnosis of fractures. One can quickly identify an irregularity or “step-off” of the hyper-echoic cortical line as well as surrounding periosteal fluid with increased doppler flow, both of which are hallmarks of bony fracture on ultrasound ⁽⁴⁾. Ultrasound is both sensitive and specific for the diagnosis of elbow fractures. In one study, 193 patients with acute elbow trauma were evaluated with both ultrasound and plain films. Ultrasound detected a joint effusion in 100% of patients with radial head or neck fracture, and cortical discontinuity was seen in 82% of those patients ⁽⁵⁾. In another study, ultrasound had 83% sensitivity and 60% specificity for detection of occult radial head fractures when compared to CT. Periosteal effusion surrounding the radial neck was found to be the most sensitive sign of a radial head fracture ⁽⁶⁾.

Point-of-care ultrasound is cost-effective, easy to learn, and can be rapidly performed by a physician on the sideline. It is also one of the only imaging modalities that is readily available without exposing the athlete to radiation, making it an indispensable tool in the pediatric population. In conjunction with the physical exam, the Butterfly iQ+ is an asset in the diagnostic triage of athletes — helping accurately determine who can be managed conservatively versus those who require further evaluation with advanced imaging. In the case of our athlete, it allowed the rapid diagnosis of a radial neck fracture and prompt initiation of appropriate treatment, a win-win for both the athlete and the sports medicine team.

References

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