Dorsal Tangential View: A Useful Tool for Assessment of Dorsal Screw Penetration in Distal Radius Fracture Fixation?

Devin Ganesh, MD[1]*; Ben Service, MD*[2]*; Brian Zirgibel, MD*[3]*; Kenneth Koval, MD*[4]*;*
[1]Orlando Health, Gulfstream, Florida, USA; [2]Orlando Health, Orlando, Florida, USA;
[3]Orlando Health, Green Lake, Wisconsin, USA; [4]Orlando Health, Belle Isle, Florida, USA

Background/Purpose: The dorsal tangential view (DTV) provides unique perspective to the topography of the dorsal cortex of the distal radius. It is taken with the wrist hyperflexed and the fluoroscopic beam aimed tangential to the dorsal surface of the radius. Although studies have reported the utility of this view as an adjunct to traditional fluoroscopy, no studies have evaluated its value in detecting dorsal screw penetration compared to CT scan. This study was performed to assess the DTV utility in detecting intraoperative dorsal screw penetration in distal radius fractures treated with volar plating, compared to CT scan.

Methods: We prospectively collected data on 30 consecutive distal radius fractures in 25 patients treated with volar locked plating. Intraoperative AP, lateral, and 20° tilted lateral and dorsal tangential views were obtained via fluoroscopy in all wrists. A postoperative CT scan was obtained prior to patient discharge to assess fracture and implant position. We recorded the number and location of screws with dorsal penetration identified by each radiographic view and CT scan. Metaphyseal dorsal screw penetration was recorded as >1 mm of penetration. Statistical analyses were performed to assess the utility of the DTV in identifying dorsal screw penetration, compared to CT scan.

Results: 175 metaphyseal screws were assessed. Eight patients out of twenty-five (32.0%) had prominent screws evident on the DTV but not seen on standard fluoroscopic analysis; seven of eight patients underwent screw exchange for a shorter screw. The radial styloid screw was the most common position exchanged. CT scan identified five additional screws with >1 mm dorsal penetration not identified by the DTV. All but one of these were in the second dorsal wrist compartment. The DTV was 66.7% sensitive with a negative predictive value of 97.0% for screws >1 mm of dorsal cortex penetration. The DTV was least sensitive in detecting dorsal penetration in the second dorsal compartment, failing to detect four screws in this compartment. The DTV failed to detect one prominent screw placed in the fourth dorsal compartment as well.

Conclusion: The dorsal tangential view is an economic alternative to CT scan to ensure proper screw depth, reducing the risk of extensor tendon irritation and possible tendon rupture in most wrist compartments. We advocate the routine use of this view to help prevent prominent dorsal screws with volar locked plating of the distal radius and suggest caution when using this view to verify acceptable placement of screws in proximity to the second dorsal compartment.