

Computed Tomography Provides Effective Detection of Traumatic Arthrotomies of the Elbow

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Purpose: Failure to identify a traumatic arthrotomy of the elbow (TAE) can lead to septic arthritis and devastating complications. Despite being a common injury with potential for irreparable damage, the gold standard for TAE detection remains controversial and evidence is limited. While multiple clinical and cadaveric studies have validated the use of CT to detect traumatic arthrotomies about the knee, other studies have called into question whether the use of CT to detect traumatic arthrotomy is applicable to the elbow. A prior cadaveric study utilizing a direct posterior (transtendon) traumatic arthrotomy model failed to detect traumatic arthrotomy via CT in 100% of cases (Kupchick et al, 2020). However, in clinical practice, many traumatic lacerations about the elbow are typically lateral or posterolateral. The aim of this study was to determine the sensitivity and specificity for detecting TAE with CT, utilizing a more commonly encountered lateral traumatic arthrotomy model.

Methods: Ten fresh-frozen upper extremity transhumeral cadaveric specimens were utilized. Only specimens with an intact elbow joint and no known elbow surgery or injury were included. Specimens were thawed. CT scans were performed to screen for intra-articular air prior to arthrotomy. The olecranon process, radial head, lateral epicondyle, and soft spot were palpated. A full-thickness 1-cm incision was consistently performed over the soft spot, just distal to the lateral epicondyle. The blade was then pulled back approximately 1 mm and rotated 180° clockwise and then counterclockwise. The elbow was then taken through full range of motion in flexion and extension, as well as forearm pronation and supination 10 times. CT scans were then repeated and screened for the presence of intra-articular air.

Results: No CT scan (0/10) obtained before arthrotomy demonstrated intra-articular air, and all (10/10) CT scans after the arthrotomy were positive for intra-articular air in the elbow joint. CT scan for intra-articular air in the elbow joint following a simulated posterolateral traumatic laceration had a 100% sensitivity and 100% specificity for detection of TAE.

Conclusion: In this cadaveric study utilizing a more commonly observed posterolateral traumatic laceration, all (100%) CT scans were positive for intra-articular air in the elbow joint. CT scans can be used effectively to diagnose TAE commonly seen in practice.