

# Skip the Angio Suite: Characterize Blunt and Penetrating Vascular Injuries in the Extremities with Computed Tomography Alone

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Arterial injuries associated with blunt or penetrating trauma can have dire consequences if not diagnosed acutely. Uncontrolled bleeding, end organ ischemia, and delayed pseudoaneurysm formation with subsequent rupture are all critical complications of arterial injury. The spectrum of causes includes complete and partial arterial transection, intimal dissection, and spasm. In the setting of blunt trauma to the extremities, associated musculoskeletal injury most notably bone fractures are associated with arterial injuries. In the rush to triage the victim of polytrauma, arterial injuries particularly in the setting of extensive orthopedic injuries may not be diagnosed prior to embarking on stabilization or repair.

Traditionally, arterial injuries in the extremities have been diagnosed using conventional angiography. With the advent and subsequent improvement in multidetector-row computed tomography (MDCT), primary diagnosis and characterization of arterial injuries in the extremities is easily accomplished without a time-consuming and resource intensive conventional angiographic procedure. Most polytrauma patients go directly to a CT scanner to image their head and/or abdomen and pelvis prior to the operating room. It is a relatively simple matter to modify standard acquisition protocols to include angiographic images through the extremities or torso to assess for coexistent arterial injury.

In an abstract presented at the American Association for the Surgery of Trauma, we reported the following. Between 1999 and 2004, 2,251 patients were identified at Stanford University Medical Center with extremity trauma. Of these, 76 had arterial injuries. Of the 76, 38 patients underwent CT angiography with 17 abnormal scans: 9 were managed operatively, 3 embolized percutaneously, and 5 observed. On follow-up there were no false negative or missed injuries. Fourteen of the 76 patients had conventional arteriograms with 13 abnormal studies: 7 were managed operatively, 2 embolized percutaneously and 4 observed. The remaining 24 patients were taken directly to the operating room. These data have led to our current policy which states that primary imaging of all arterial injuries on the trauma service are to be performed with CT angiography.

This presentation will illustrate the spectrum of abnormalities encountered when performing CT angiography of the extremities for the assessment of arterial injuries owing to blunt and penetrating trauma. Emphasis will be placed on the value of coexistent visualization of superficial anatomic features as well as associated skeletal abnormalities.