

**Story from the front lines:**

An elderly woman with history of hypertension presented to the emergency department. Vital signs were normal, but she was uncomfortable appearing, reported abdominal pain through an interpreting family member, and underwent abdominal CT scan. This demonstrated no acute intra-abdominal pathology, but did reveal fractures of the right posterior sixth rib as well as sixth vertebral compression fracture. Upon admission and further discussion with the patient with the assistance of a formal interpreter, she specifically indicated localized pain in the right mid-back, directly over the area of fracture. She reported that three days prior to her presentation, she had loaded particularly heavy groceries onto her walker; when she tried to push the device, she felt a “pop” on her right side, followed by acute onset of the pain that ultimately led to her presentation. She denied fever, abdominal pain, nausea, or vomiting, or any changes in stool, and reported that she had been eating and drinking well. Unfortunately, the CT contrast was administered through an IV placed in her left hand, and this infiltrated, with the extravasation of contrast resulting in painful skin blistering by the time of admission.

**Teachable Moment:**

Contrast extravasation is thought to occur in 0.5-1% of patients - in one large retrospective study, extravasation occurred in 475 of 69,657 patients, for an incidence of 0.7%. Typically, this results in minor injury limited to pain and swelling, however tissue necrosis and even compartment syndrome can occur. Of note, advanced age has been associated with increased risk of extravasation; additionally, injuries of greater severity are associated with dorsal hand IV placement (as compared with e.g. antecubital location).<sup>i</sup>

Our team wondered whether this was a preventable injury in our patient, associated with a potentially avoidable abdominal CT. While CT is frequently performed in elderly patients with abdominal complaints, both because of the increased serious pathologies and potential to present without typically associated signs such as fever, leukocytosis, or tachycardia, this patient did not actually have an abdominal complaint, instead reporting focal pain in the right posterior chest wall.

The American College of Radiology Appropriateness Criteria for suspected rib fracture recommends chest x-ray as the initial imaging modality, including for suspected stress or pathologic fracture. CT is noted to be more sensitive than radiograph in detection of fractures; in one study, fractures were identified on CT in 11% of patients with suspected fracture not detected on x-ray. However, as management did not change as a result of the increased detection, CT is not recommended as initial imaging modality in the absence of concern for other associated chest trauma.<sup>ii</sup>

Non-English speaking patients face numerous challenges in interacting with the healthcare system, from lower rates of insurance coverage to the frustrations posed by communication barriers. A 1997/1998 study performed in a county hospital evaluated care of 172 English speaking and 152 non-English speaking patients presenting with complaint of abdominal pain. Though conclusions are limited by small sample size, statistically significant difference was found in rates of ordering several studies; specifically, rates of abdominal CT differed between English speaking and non-English speaking patients at 4 (5.1%) vs. 11 (15.9%) respectively.<sup>iii</sup> Unfortunately, our patient seemed to have suffered a complication of language barrier; this case reemphasizes the importance of the history in guiding appropriate evaluation, and in utilizing appropriate interpreter services when necessary.

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- <sup>i</sup> Tonolini, Massimo, MD, Alessandro Campari, MD, and Roberto Bianco, MD. “Extravasation of Radiographic Contrast Media: Prevention, Diagnosis, and Treatment.” *Current Problems in Diagnostic Radiology*. March/April 2012: 52-55.
- <sup>ii</sup> Henry, Travis S. MD. et. al. “Rib Fractures.” ACR Appropriateness Criteria. Originally published 1995, last reviewed 2014.
- <sup>iii</sup> Waxman, Matthew A., AB and M. Andrew Levitt DO. “Are Diagnostic Testing and Admission Rates Higher in Non– English-Speaking Versus English-Speaking Patients in the Emergency Department?” *Annals of Emergency Medicine*. November 2000: 456-461.