

Evidence Discussion (CH 21.1)

- Chest x-ray, in combination with physical exam, is the appropriate initial diagnostic modality in those with suspected rib or sternal fracture after chest trauma. Although chest x-ray has low sensitivity (approximately 50%) for detection of rib fracture¹ it has the benefit of being widely and readily available and able to detect complications that may require additional imaging such as pneumo- or hemothorax and pulmonary contusions^{1,2}. In addition, failure to detect rib fractures in uncomplicated cases does not significantly alter the patient management or outcomes. A study by Bansidhar *et al.* showed no difference in treatment in patient with minor chest trauma who did and did not have rib fractures diagnosed either clinically or radiographically¹. Therefore in uncomplicated cases additional advanced imaging is not indicated. Rodriguez *et al.* demonstrated that yield for CT of thoracic injury with major clinical significance after a normal chest x-ray is 1.5%³ and would only detect one major injury for every 67 studies⁴.
- In cases where complications are identified clinically or by other imaging, additional imaging with CT chest is merited. CT does have higher sensitivity for detection of rib fractures¹ and in the detection and extent of pulmonary injuries². It also may be useful in differentiating blunt cardiac injury from acute myocardial infarction⁵. However, CT does carry with it the risk of contrast related renal injury and allergic reactions⁴. It also exposes the patient to a greater amount of ionizing radiation than a chest x-ray and subsequent increased risk of induced cancers⁴. It is estimated that undergoing chest CT will result in one radiation induced cancer per every 720 40-year-old females and 1,538 40-year-old males⁴.
- If a pathological rib fracture is suspected imaging with either a CT chest or Tc-99m bone scan is warranted. CT may be helpful in differentiating primary tumor from metastasis and may aid in detection of the primary malignancy¹. Tc-99mm bone scan has low specificity but high sensitivity (>95%) for detection of pathologic rib fractures¹.
- Medial clavicular fractures are rare (<5% of cases)⁶ and may necessitate additional imaging with CT or MRI for evaluation. Midshaft and distal clavicular fractures are usually sufficiently evaluated by x-ray^{6,7}.
- Chest x-ray has poor sensitivity for identification of sternoclavicular dislocations. Given the risk for complications such as pneumothorax in posterior displacement advanced imaging may be required. CT is advantageous as it has superior image resolution. It also allows for 3D reconstruction to determine exact position of the sternoclavicular joint. MRI can also be utilized but it has poorer resolution than CT. However, it may be advantageous for evaluation of soft tissue conditions or ligamentous injury⁸.
- Isolated chest injury without signs or symptoms of abdominal or pelvic injury does not support advanced imaging of the abdomen or pelvis. If abdominal or pelvic injury is suspected imaging is as dictated elsewhere in these guidelines.

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