

UAB Blunt Cardiac Injury Evaluation Protocol: To Avoid the Myocardial Confusion
Updated November 2022

Purpose:

- 1) To establish screening criteria for blunt cardiac injury
- 2) To establish criteria for echocardiogram to evaluate for blunt cardiac injury

Blunt cardiac injury is difficult to define and thusly the incidence is not clear. Blunt cardiac injury (BCI) represents a spectrum of disease from clinically silent to cardiac wall rupture. The most common form is a contusion to the myocardium. Clinically relevant pathology in BCI include arrhythmias, wall motion abnormalities, valvular rupture, or wall rupture. Blunt coronary artery injury generally presents as MI/ventricular failure/ventricular rupture. Similarly, valve injuries generally present as ventricular failure and cardiogenic shock. Significant force is required to cause a blunt cardiac injury, and is most commonly associated with other thoracic injuries. The Eastern Association of Trauma Practice Management Guideline (published in 2012) recommends screening patients with “any significant blunt trauma to the anterior chest” (1). A study of the National Trauma Data Bank showed that hemopneumothorax was the strongest predictor of BCI (2). Other high-risk features included esophageal injury and thoracic aortic injury. Several studies have evaluated the relationship of sternal fractures to BCI and found that sternal fractures are not a marker for BCI (3,4). Patients should not be screened for BCI in the setting of isolated sternal fractures.

Indications for screening include: chest wall instability due to multiple rib fractures, hemopneumothorax, severe pulmonary contusions, traumatic aortic injury, esophageal injury, positive cardiac portion of the FAST exam (on an otherwise hemodynamically stable patient). This does not include isolated sternal fractures. Additionally, Retrosternal hematoma is not an indication for echo. In a study that assessed cardiovascular injury associated with sternal fracture, the authors found that sternal fracture either with or without a retrosternal hematoma was not a marker for BCI (10). Screening should include an admission electrocardiogram and a single troponin. If both are normal, BCI is essentially ruled out with a NPV 100% (5,6). If EKG reveals a new abnormality (compared to baseline if available) these patients should be admitted for 23-hour continuous telemetry monitoring. If troponin is elevated, patient should be admitted in a monitored setting and troponin measured q6 hours serially until down trending.

The American College of Radiology list chest CT as an appropriate study for the patient with suspicion of cardiac injury because the excellent spatial resolution and three-dimensional reconstructions can reveal anatomic disruptions and cardiovascular pathology (7). CT can identify cardiac rupture, pericardial rupture, hemopericardium, post-traumatic coronary pseudoaneurysm/fistula, and post-traumatic VSD (8,9). However, the imaging modality of choice for evaluating valvular trauma and functional assessment of the heart is echocardiogram (TEE>TTE).

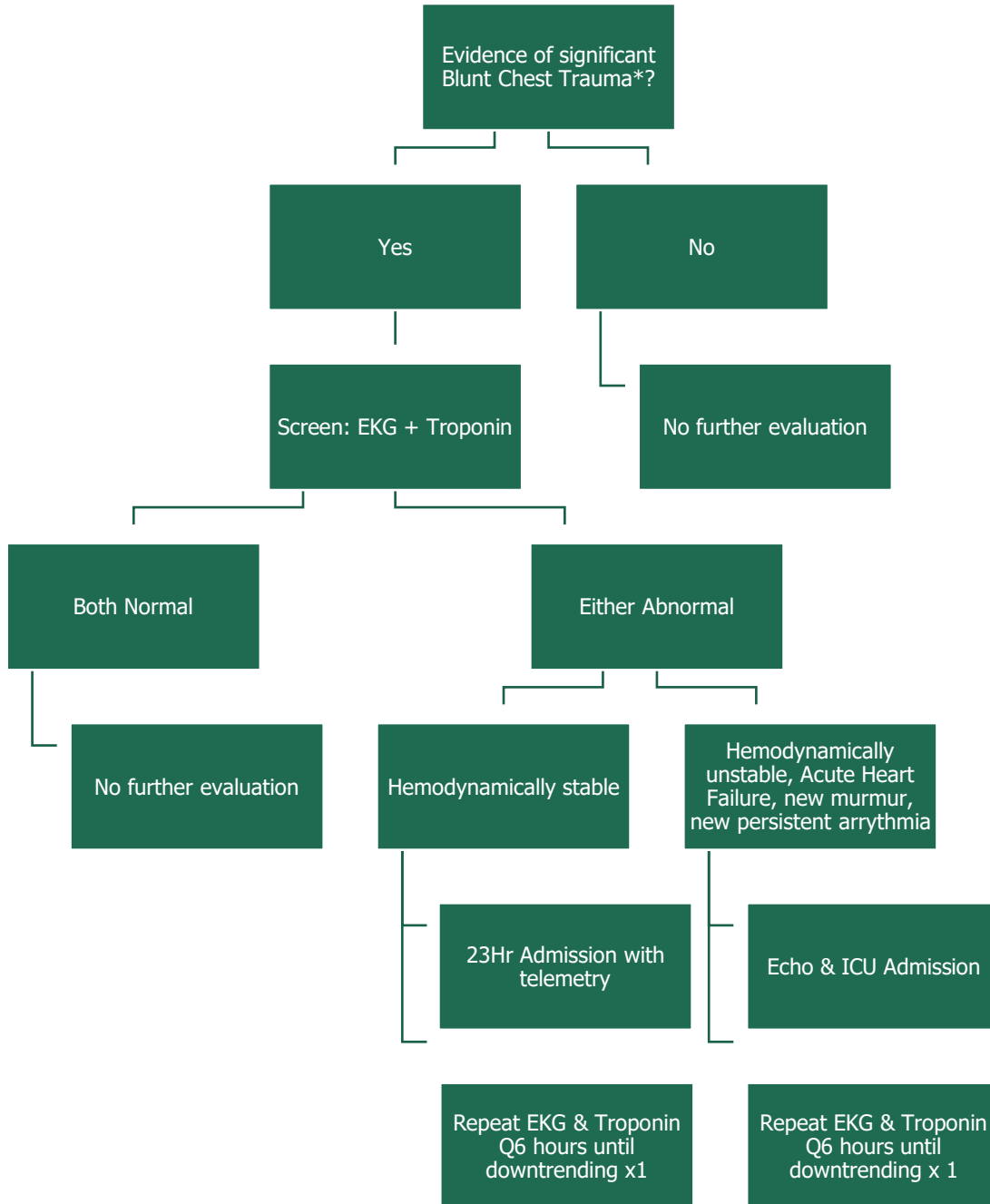
Multiple studies have shown that routine echocardiogram is not useful as a primary screening modality, but rather as a diagnostic test. Unless there is a concern for clinically significant wall motion abnormality, valvular rupture, or cardiogenic shock echocardiogram should not be obtained. Echocardiogram should be reserved only for symptomatic patients, even in the setting of significant mechanism of injury. Echocardiogram should be obtained for patients with symptoms of refractory hemodynamic instability, persistent new arrhythmia, new murmur, or acute heart failure.

If BCI is diagnosed, management should proceed according to pathology encountered.

Note: patients with a history suggestive of a cardiac etiology of event (ie syncope), signs/symptoms concerning for MI do not fall into this algorithm and should undergo appropriate evaluation for these pathologies.

Figure 1: Screening for blunt cardiac injury.

*Significant blunt chest trauma includes: chest wall instability due to multiple rib fractures, hemopneumothorax, severe pulmonary contusions, traumatic aortic injury, esophageal injury, positive cardiac portion of the FAST exam (on an otherwise hemodynamically stable patient). This does not include isolated sternal fractures.



Note: patients with a history suggestive of a cardiac etiology of event (ie syncope), signs/symptoms concerning for MI do not fall into this algorithm and should undergo appropriate evaluation for these pathologies.

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