

4. THORACIC INJURY
E. Management of Blunt Cardiac Injuries

OBJECTIVE: To define the diagnosis and management of blunt cardiac injury.

Definition:

Blunt cardiac injury (BCI) includes a spectrum of injuries, including asymptomatic myocardial muscle contusion, significant arrhythmia, acute heart failure, valvular injury, or cardiac rupture.

AAST Injury Scale (limited to blunt cardiac injury)

Grade I

Blunt cardiac injury with minor EKG abnormality; no specific ST wave changes, PACs, PVCs, or persistent sinus tachycardia.

Grade II

Heart block or ischemic changes without cardiac failure.

Grade III

1. Sustained or multifocal PVCs
2. Septal rupture, pulmonary or tricuspid valve incompetence, papillary muscle dysfunction, or distal coronary artery occlusion without cardiac failure
3. Blunt pericardial laceration with cardiac herniation
4. Cardiac failure

Grade IV

1. Septal fracture, pulmonary or tricuspid valve incompetence, papillary muscle dysfunction, or distal coronary artery occlusion causing cardiac failure
2. Aortic or mitral incompetence
3. Injury to the right ventricle, right or left atrium

Grade V

1. Proximal coronary artery occlusion
2. Left ventricular perforation
3. Stellate injuries, less than 50% loss of the right ventricle, right atrium or left atrium

Grade VI

1. Avulsion of the heart

Guidelines:

The most common complication of blunt injury to the myocardium is the presence of arrhythmia in the form of sinus tachycardia, premature atrial contractions, atrial fibrillation, and premature ventricular contractions. Rarely, a right bundle branch block or ST elevation and T-wave flattening can be seen.

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Diagnosis:

Risk factors for possible BCI include chest impact at a speed greater than 15 mph, marked precordial tenderness with ecchymosis or contusion, the presence of sternal fractures, the presence of multiple anterior rib fractures, presence of seatbelt contusion across the anterior chest wall, and the presence of severe bilateral pulmonary contusions.

1. **Sinus tachycardia** is the most common rate abnormality seen with the BCI. In patients with a normal EKG and normal troponin I level, BCI is ruled out (Level 2). Furthermore, the presence of a sternal fracture is not correlated with the presence of BCI (Level 2)
2. An admission **12-lead EKG with troponin I** level is the most sensitive screening test for the diagnosis of BCI; it should be obtained in all patients where there is a suspicion of BCI (Level 1).

The addition of troponin I to the EKG increases the negative predictive value from 95% to 100%. In view of the very low cost of adding troponin levels to the EKG, it is appropriate for us to use troponin I in addition to a 12-lead EKG in patients with suspected BCI. CPK with isoenzymes analysis is not useful in predicting which patients have or will have complications related to BCI, therefore, it should not be obtained (Level 2).

Treatment:

1. All patients with suspected diagnosis of BCI should be admitted for observation on telemetry for a period of 24 hours (Level 2).
2. Patients with normal EKG and abnormal Troponin should be admitted for telemetry.
3. Patients with ST or T wave abnormalities, new arrhythmia, and hemodynamic instability should be evaluated with a transthoracic or transesophageal echo.
4. Patients with ischemic changes on the EKG and elevated cardiac enzymes are treated similarly to patients with acute MI.
5. Cardiology should be consulted at the discretion of the attending trauma surgeon.

References

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