

A Supplementary View to Management of Cardiac Traumas

Askin Ender Topal*

Cardiovascular Surgery, Dicle University Medicine Faculty, Turkey

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Management of cardiac trauma begins in crime scene as soon as first aid workers reach the victim. Approach to the patient with suspected cardiac injury does not vary from standard Advanced Trauma Life Support protocols. Primarily adequate oxygenation and intravenous access should be established to ensure airway patency and circulation. If patient is hypotensive, crystalloid and/or blood products and if hypoxic, O₂ should be administered.

Upon admission to the hospital, in the emergency unit, auscultation of patient gives clues about pleural and pericardial effusions. Once there is suspicion, pleural and/or pericardial puncture aids to the diagnosis. If patient is stable, pleural and/or pericardial effusions are demonstrated via chest X-Ray, echocardiography and also computerized tomography. Then tube thoracostomy in the presence of hemothorax and pericardiocentesis in the presence of cardiac tamponade should be performed. In the case of disturbed hemodynamic state due to continuing bleeding from chest, chest tube should be clamped. Pericardiocentesis with needle should be preferred to pericardial window performed via subxiphoid approach because of the probability of failing to control catastrophic hemorrhage in the case of heart wall injuries and waste of valuable resuscitative time [1].

Cardiac injuries may be subdivided depending on the mechanism of the injury, most common categories are blunt and penetrating traumas. To avoid missed diagnosis, ECG and troponin I are screening tools for blunt cardiac injury while echocardiogram should only be reserved for patients with hypotension and arrhythmia [2]. Treatment of blunt cardiac injury is variable because of a wide spectrum of disease states. Management of septal rupture, large coronary artery injury, valve injury and papillary muscle rupture requires cardiopulmonary bypass. On the other hand, contusion does not generally lead to surgery in acute period, medical treatment of arrhythmia is good enough with the caveat in cautious using of anticoagulants in trauma patients.

Penetrating cardiac injuries are among the most dramatic and lethal injuries with a very low percentage of reaching to hospital alive [3]. Clinical presentation of patients reaching to hospital varies from hemodynamically stable condition to profound shock, but stable patients may get worse in a few minutes. So primary priority is early diagnosis and prompt management. Since delayed treatment is far more harmful than a negative surgical exploration [4], immediate exploration should be performed in the case of instability; even patients with profound shock upon presentation to the hospital should be treated with emergency room resuscitative thoracotomy.

Although studies have reported many risk factors such as gunshot wounds, multi-chamber damage, left ventricle wound and concomitant abdominal organ injuries related with mortality, actually physiological condition of the patient upon admission predicts the outcome [1,5]. The resuscitative measures including rapid fluid administration and oxygen supplementation solely are not satisfactory to keep alive the patient. The blood gases should be examined as soon as possible in the emergency room and if pH shifted to acidosis, it should be corrected immediately as well as electrolyte imbalance [6]. Hemorrhage and anaerobic metabolism due to hypovolemia and also hypoxia deepens the acidosis creating a vicious circle by the way of capillary vasodilatation leading to more blood loss. Furthermore natriuretic peptide secretions

increase and hyperreninemic hypoaldosteronism syndrome develops which will cause hyponatremia and metabolic acidosis [6]. So, on the one hand physiological condition is corrected, cardiac injury should be repaired with interrupted sutures utilizing pledgets and performed in a horizontal mattress fashion immediately.

Approach to cardiac injury is almost similar worldwide, theoretically. On the other hand, because of its rarity, many institutions do not have enough experience in this issue. I suggest to use scoring systems, especially Apache II, in patients with cardiac injuries, thus institutions may check its own outcomes and compare with other institutions reliably to alert about the deficiencies of own institution in management. Apache II scoring system include parameters such as age, hematocrit, white blood count, mean arterial pressure, heart rate, body temperature, respiratory rate, oxygenation, arterial pH, serum sodium, serum potassium, serum creatinine and Glasgow Coma Scores (best eye response, best verbal response and best motor response) on admission. Previously, I reported the significant relationship between Apache II scoring system and outcome of penetrating cardiac traumas through a study including sixty-four patients which is one of the largest sample size of one institution moreover in only six-year period [6].

According to common approach, if pericardial fluid does not accumulate after pericardiocentesis, there is no need for any further intervention. Because of this wrong approach; there is pitfall regarding serious lacerations of cardiac wall up to but not through endocardium, or serious lacerations but not rupture of great vessels in the pericardium; and/or small sized perforations of heart or great vessels with a soft clot formation at the injured site. These injuries may not cause serious bleeding in the acute period and misdiagnosed as insignificant lacerations but they carry high threat for survival in the subsequent time. Serious lacerations generally lead to wall rupture and even a light chest trauma or excessive rise in blood pressure may cause soft clot dislodgement. So there is necessity of proper investigation. As present diagnostic tools are incapable of diagnosing; new modalities such as endoscopic instruments may be favorable. I think technical researches should be directed to this issue.

As a conclusion; I want to attract attention to the importance of firstly immediate blood gases test for treatment, secondly using the Apache scoring system for self-control and lastly endoscopic instruments for diagnosis in patients with cardiac trauma.

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*Corresponding author: Askin Ender Topal, Cardiovascular Surgery, Dicle University Medicine Faculty, Turkey, Tel: +90-412-2488001; E-mail: aendertopal61@hotmail.com

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