

Deadly dozen – “scoop and run” or “stay and play” in thoracic trauma?



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ABSTRACT

The term "deadly dozen" has been known for years as a list of chest injuries that pose a potential threat to life. In pre-hospital conditions, each of twelve injuries should be considered, but making a decision to implement medical procedures before a patient transport may be a challenge for emergency services. The authors point to six types of chest injuries for which there are possible benefits linked to transport delays, in order to perform the necessary actions to stop the dying process. Endotracheal intubation, mechanical ventilation, chest puncture, oxygen therapy, and occlusive dressings are available in most pre-hospital care systems all over the world. Thanks to these measures, optimal patient protection during transfer to the hospital is possible in selected situations.

KEY WORDS: Deadly dozen, injury, obstruction, haemothorax, tamponade, emergency medicine

INTRODUCTION

Thoracic injuries are life threatening especially because their early diagnosis can be difficult, which can lead to damage of internal organs and critical conditions. The main point of the rescue procedure is to carry out a thorough trauma examination in accordance with the ITLS (International Trauma Life Support) standard.[1] On this basis, one can recognize the majority of injuries being so-called "Deadly Dozen". The list of chest injuries was divided in a way, which takes into account the possible ALS (Advanced Life Support) pre-hospital treatment carried out without a doctor. The study can be the basis to implement activities according to the patient's classification in the "stay and play" or "scoop and run" category by the paramedics .[2] A longer stay at the scene of an incident may be justified only if the procedures performed interrupt directly the dying process.

STAY AND PLAY TREATMENT

Airway obstruction - if the blood or vomit is present in the airways, suction is necessary. It is also necessary to remove foreign bodies, eg dentures, manually. The patient should be ventilated with 100% oxygen at a 12-15 L / min flow rate . Too long suction may lead to hypoxia and in this mechanism may further stimulate the vagus nerve. The suction should last a maximum of 20 seconds. The most beneficial, but difficult to perform and demanding experience is endotracheal intubation, preferentially performed by the mouth.[3] This method protects the respiratory tract from aspiration of stomach contents, allows 100% oxygen ventilation, and a comfortable breathing.

Tension pneumothorax - occurs when air enters the pleura through a lung or bronchial rupture. Pneumothorax reduces blood return to the heart by causing intra-venous clamping of large venous vessels. Evacuation of the air from the pleural cavity by chest puncture may bring immediate improvement. The puncture shall be performed with\at least 4.5 cm length cannula in the mid-clavicular line, in the second intercostal space just above the third rib.[4]

Open pneumothorax - a penetrating thoracic injury causes the air to enter the pleural cavity, which leads to the lungs collapse. In this case, the airways shall be cleared as soon as possible and the open chest wound shall be closed. A tight wound dressing may result in a heavy thrombosis, which is why a

valve dressing is recommended.[5] If there is no access to valve dressing, the foil is sealed on three sides with a plaster, thus leaving the air out of the chest.

Massive haemothorax – as a result of a penetrating or blunt trauma, a large volume of the blood may collect in the pleural cavity, (the volume exceeding even 1500 ml). On the bleeding side, the lung is compressed, the mediastinum is shifted to the healthy side, pressing against the healthy lung and the superior and lower main vein. In a consequence that leads to both: ventilation disorders and severe haemodynamic disturbances which result in hypovolemic shock. The key measures include instrumental airway clearance and oxygen therapy. Torakoscopy allows pleural cavity assessment, [6] but in pre-hospital conditions, puncture itself can be effective to evacuate the blood.

Pulmonary contusion - coexists in 65% of all chest injuries and can be the result of penetrating or blunt trauma caused by direct chest wall compression.[7] As a result of the trauma, in addition to interstitial haemorrhage, air obstructions and vesiculo-capillary membrane damage may occur. The most obvious consequence of lung injury is respiratory impairment and hypoxia, which gets worse over time. To prevent the sudden deterioration, the patient shall be intubated with PPV (positive pressure ventilation).

Flail chest - Due to the mechanism and direction of injury, one can distinguish between the lateral type (fracture of the ribs) or the front (breaking of the sternum) of the flaccid chest. During the breath the fragment of detached broken bone moves in the opposite direction in relation to the rest of the chest (paradoxical breath). Emergency procedure at the place of the event is to girdle or wrap the balancing window and implement mechanical ventilation, which may reduce the risk of acute respiratory failure in more than half of all cases. [8]

SCOOP AND RUN TREATMENT

Pericardial tamponade – Diagnosing the condition is challenging, due to the sensitivity of Beck's triad which amounts to only a dozen or so percent.[9] Decongesting tamponade requires pericardial sacs with a special needle preferentially under the ultrasound guidance, which currently is not available in most pre-hospital systems in the world.

Blunt myocardial injury – Electrocardiogram and entimetric serum tests are unreliable, which is why pre-hospital diagnosis is very limited.[10] What's more, the low ejection fraction of the heart is resistant to pharmacological treatment and most often requires cardiac surgery.

Thoracic aortic disruption – Mortality at the scene is up to 90%.[11] If the patient survives transfer, he requires urgent vascular surgery, which also carries a high risk of failure. This, however, gives one a better chance than delayed transport from the accident scene.

Tracheobronchial injuries – This trauma is relatively rare, but impossible to supply on the spot. Locating tracheal-gill injuries usually requires bronchoscopy. Most blunt injuries occur in the distal trachea and right main bronchus, which requires right-sided posterolateral thoracotomy. [12]

Diaphragmatic injuries – Although mortality in this case is mainly associated with accompanying injuries, a high rate of incidence (up to 15% of thoracoabdominal injuries) and diagnostic difficulties may contribute to life-threatening complications.[13]

Oesophageal injury – There is a high mortality rate due to delays in surgical intervention. [14] Fast patient transport in order to perform diagnostics and surgical treatment of esophageal injuries shall be a priority for prehospital care.

CONCLUSION

The severity of a thoracic injury depends on the strength, duration of action and the vector at which the stroke occurred. Therefore, in addition to the physical examination of the injured, a visual inspection of the incident site shall be carried out. There are injuries that require immediate surgical intervention. Delaying transport to a hospital in these cases may result in an increased likelihood of death. The authors indicate six out of twelve chest injuries, which should be pre-supplied at the scene of the event. This can return a better patient protection during the transport as well as increase survivability.

Disclosure statement

No potential conflict of interest was reported by the author's.

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