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Teaching Approach of Primary Survey in Trauma Patients

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Abstract

Background: The primary survey is the initial assessment and management of a trauma patient. With a systematic method to the immediate assessment and treatment of critically ill or injured patients by following to ABCDE approach.

Targeted Population: All trauma patients who are requiring urgent management in the ED, with Emergency Physicians for teaching protocol.

Aim of the Study: Appropriate assessment and priorities for trauma cases by knowledge and training protocol to Emergency Physicians. Based on patients' injuries, vital signs, and the injury mechanisms.

Conclusion: Appropriate knowledge and training for practitioners uses a primary survey to quickly assess, identify, and treat any life-threatening injuries is essential skills and knowledge to increase incidence of survival. Which should be applied according to the ATLS guidelines and throughout each step.

Keywords: Trauma; Emergency physicians; ABCDE approach

Introduction

The primary survey is the process of dealing and approaching of a shock victim. It is done to distinguish and treat impending life-threatening conditions and prevent consequences of these injuries. The chief purpose of it is to evaluate, and priorities which is established, based on victims' injuries, vital signs, and the mechanism of injury. The primary survey comprises of the ABCDE method used in traumatic patient care and a systematic approach to the abrupt assessment and treating of critically ill or injured victims by following to this approach:

- Airway maintenance with restriction of cervical spine motion
- Breathing & ventilation
- Circulation & hemorrhage control
- Disability (including neurologic assessment)
- Exposure & environmental control

The ABCDE method is relevant in all emergency scenarios for rapid assessment and treatment. This method is globally accepted by specialists in EM (emergency medicine departments) and it is expected to improve the outcome by helping medical professionals to concentrate on the most dangerous clinical problems [1].

Indications

The primary survey is obligated to be performed on whole trauma victims. If the victim is hostile for the primary survey to be finalized (frequently because of terror or intoxication) the victim should be sedated and intubated so that an actual primary survey may be achieved.

However, the ABCDE method is appropriate for all victims, for all age groups (all of them will have similar symptoms) [2,3].

Contraindications

No contraindications of the primary survey. Even victims who look very firm but have a trauma injury. So that no injuries will be missed by physicians [2].

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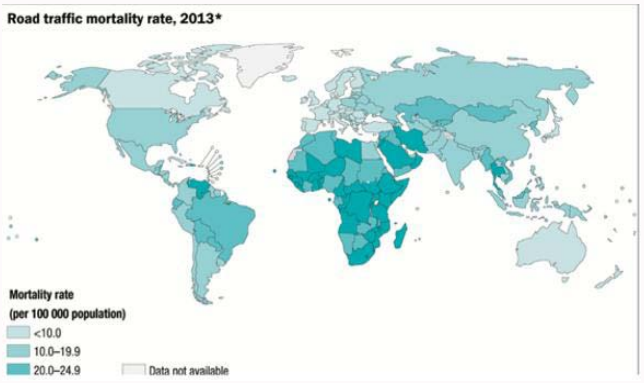

Figure 1: Road traffic mortality rate, 2013. Reproduced with permission from Global Health Observatory Map Gallery. Geneva: World Health Organization department of injuries and violence prevention; 2016.

Incidences

Trauma is one of the chief causes of death worldwide. Universally, RTA (road traffic accident) is the foremost reason of death between ages of eighteen and twenty-nine, whereas in the US, trauma is the leading cause of death in young adults and reports for 10% of all deaths for all genders.

Even so, World Health Organization indicated that numbers of occurrences are estimated to be higher in the third and second world countries as indicated in Figure 1.

More than 45 million persons universally sustain moderate to severe disability yearly as a result of trauma and reports for around 30% of ICU admissions [1,2,4,5].

Rational to This Research Topic and Why This Study is Necessary?

As detailed earlier trauma is world-wide burden is great and pricey (e.g. costs of treatment and disabilities). As stated earlier and explained with Figure 2, that the burden is considered to be higher between the Arab countries. Furthermore, affording to the WHO, road traffic injuries accounted for 1.25 million deaths in 2014, and trauma is expected to escalate to the 3rd leading cause of disability globally by 2030.

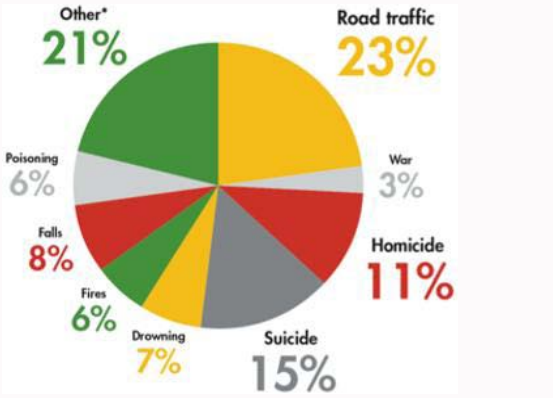

Figure 2: Distribution of global injury mortality by cause. "Other" category includes smothering, asphyxiation, choking, animal and venomous bites, hypothermia, and hyperthermia as well as natural disasters. Data from Global Burfen of Disease, 2004.Reproduced with permission from Injuries and Violence: The Facts. Geneva: World Health Organization department of injuries and Violence prevention; 2010.

Figure 3: Literature reports.

Table 1: Evaluate injuries and start life protective therapy.

PITFALL	PREVENTION
Equipment failure	Test equipment regularly.
	Ensure spare equipment and batteries are readily available.
Unsuccessful intubation	Identify patients with difficult and airway anatomy.
	Identify the most experienced/skilled airway manager on your team.
	Ensure appropriate equipment is available to rescue the failed airway attempt.
	Be prepared to perform a surgical airway.
Progressive airway loss	Recognize the dynamic status of the airway
	Recognize the injuries that can result in progressive airway loss
	Frequently reassess the patient for signs of deterioration of the airway.

Which needs from us to address this problem with the unsurpassed and safest method, which is giving the importance of the primary survey.

Literature reports the advanced evolution of mortality for shock as shown in Figure 3.

Those facts lead the father of trauma medicine R Adams Cowley to create of "The Golden Hour" concept, stating "There is a golden hour between life and death. If you are critically injured you have less than 60 min to survive. You might not die right then; it may be three days or two weeks later -- but something has happened in your body that is irreparable".

Accordingly, "golden hour" concept, which accentuated the great risk of death and the need for quick intervention during the first hour of care following major trauma (Table 1).

Therefore, good exercise and skilled approach of the primary survey (mainly ABCDE approach) decrease in injury mortality, caused by minor details in the approach missed e.g. the repetition of the primary and secondary surveys, or some other pitfall that may cost patients life as indicated in Figure 4.

By treating injured victims, rapidly evaluate injuries and start life protective therapy as fast as possible (ABCD takes 10-second assessment) [1,2,4-6].

Methodology Used in Research, Hypothesis and Aims

This research topic has been the first step in the methodology used in this paper, where ATLS protocol have been review, which

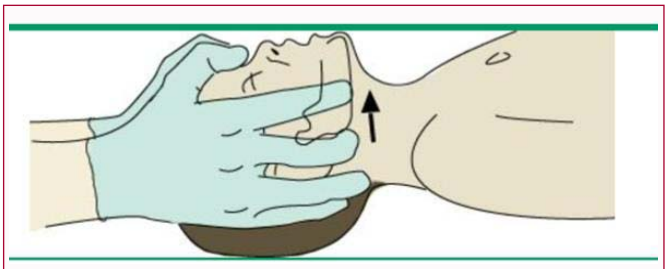

Figure 4: Jaw thrust maneuver.
The rescuer uses two or three fingers of each hand to lift the jaw upward and outward so that the lower central incisors are anterior to the upper central incisors. In children with traumatic injuries, the cervical spine must be maintained in a neutral position during this maneuver.

Figure 5: Jaw thrust maneuver.
The rescuer uses two or three fingers of each hand to lift the jaw upward and outward so that the lower central incisors are anterior to the upper central incisors. In children with traumatic injuries, the cervical spine must be maintained in a neutral position during this maneuver.

gave the bases to search different articles on the internet, searching for quantitative and qualitative data. This research has been created and developed using different literature as its milestone and reviewing different aspects about the topic and developed the aims and hypothesis of this research paper.

Followed the series searches on selectively vague concepts and ideas to have a clearer picture about the selected topic.

Reflecting on a series of hypothesis came in mind while researching of the selected topic which raised a question on how to reduce this unwanted impact on victim, and health system in general. And the first step to achieve this goal is by insuring the correct practice.

Being as the first step before further assessment of tools that may improve the prognosis and outcome in the ATLS protocol and the primary survey to be more specific.

Research Question

My primary point of focus on the Arab nation if all institute and staff participating in the primary survey do it in accordance with the ATLS protocol to the smallest details (e.g. repetition of the primary survey, 10 sec assessment on the ABCDE protocol).

Moreover, if the normal population of none medical background had simplified ABCDE approach will in the outcome of acute victims since they are the first to be found in the initial area victims.

Description and Discussion on the Steps of Technique

Generally, physician's self-protection and own safety comes in the first place. Then, an overall impression is gained by looking at the victim (skin color, sweating, and surroundings). Even though this is treasured, the critical clinical condition is commonly complex and the systematic method will support in construction it, in simplified segments (ABCDE).

A: Airway with cervical spine precautions or protection

- Begin by asking the victim a question e.g. "are you alright?"
- Look for Fractures, foreign bodies
- Opens and assesses airway

Cervical spine guards, then proceed to airway management is clearing the airway, suctioning, controlling oxygen, and opening and secure the airway.

This charge is of the patency of the victim's airway. It is evaluated by asking a question. If the victim can speak, victims insure patency of airway.

Airway block can be partial or complete. Indications of partial obstruction of the airway include a changed voice, noisy breathing (e.g. stridor), and an increased breathing effort. Nonetheless, complete airway block where there is no breathing in spite of great effort. Deterioration of awareness level is a common cause of airway block whether it is partially or completely obstructed.

If airway obstruction untreated it will lead to cardiac arrest. Perform either a chin lift or jaw thrust if airway obstruction is recognized; even though, jaw thrust is favored if cervical spine injury is suspected.

Chin lift by place hand on forehead of the victim and gently tilt his head back. At the same time, place fingertip(s) under the point of the chin, lift the chin (do not push on the soft tissues under the chin as this may block the airway).

Jaw thrust by placing the long fingers behind the angle of the mandible and pushing anteriorly and superiorly.

Foreign bodies, secretions, facial fractures, or airway lacerations are also must be in mind. If there is a foreign body, it should be detached. To aware victims with foreign body block give five back blows alternating with five abdominal thrusts until the obstruction is relieved. Start BLS protocol if victim becomes unconscious. Establish intubation or creation of a surgical airway such as cricothyroidotomy if there are other reasons of block. Throughout these charges and possible intervene, make ensure that the cervical spine is immobilized and maintained in-line. The cervical spine should be stabilized by manually maintaining the neck in a neutral position, in alignment with the body. In this procedure, a two-person spinal stabilization technique is preferred. This means one provider maintains the in-line immobilization, and the other manages the airway. Victim neck should be secured with a cervical collar once the victim is stabilized.

Furthermore, victims with severe head injuries who have an altered level of consciousness or a Glasgow Coma Scale (GCS) score of 8 or lower usually require the placement of a definitive airway (i.e. cuffed, secured tube in the trachea).

Be couscous about the excessive movement of the cervical spine, during the period of assessing and managing a victim airway (as indicated in Figure 5).

Many trauma victims are required airway protection. Victims with airway block needs immediate intervention and it is advisable to reassess the airway.

Table 2: Glasgow coma scale.

Response	Scale	Score
Eye Opening Response	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Points
Verbal Response	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, word discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Points
Motor Response	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decorticate posture	2 Points
	No motor response	1 Points

Minor Brain Injury = 13 points to 15 points; Moderate Brain Injury = 9 points to 12 points; Severe Brain Injury = 3 points to 8 points

B: Breathing and ventilation

Airway route patency without anyone else doesn't ensure adequate ventilation. Sufficient gas exchange is required to boost oxygenation and carbon dioxide disposal. Ventilation requires adequate job of the lungs, chest divider, and stomach. Uncover the casualty's neck and chest for adequately appraisal of jugular venous expansion, position of the trachea, and chest divider.

Assessment is performed by inspecting, by looking for tracheal deviation, an open pneumothorax or significant chest wounds, flail chest, paradoxical chest movement, or asymmetric chest wall.

To make sure that the gas flow in the lungs make auscultation. Auscultation of both lungs should be conducted to identify decreased or asymmetric lung sounds. One of signs pneumothorax or hemothorax is reduced lung sounds. This, combined with either tracheal deviation or hemodynamic compromise, can be a sign of a tension pneumothorax that should be treated with needle decompression followed by a thoracotomy tube placement. Open chest wounds should be covered immediately with a bandage taped on three sides to prevent the entry of atmospheric air into the chest. If the bandage is taped on all four sides it may create a tension pneumothorax. If a flail chest is present and results in respiratory compromise, positive pressure ventilation should be provided. A flail chest may indicate an underlying pulmonary contusion.

Percussion of the chest can likewise distinguish variations from the norm, where chest pressure should be possible to check if there were splitting commotions demonstrating a break, procedure because of the boisterous revival rooms.

Each victim must get supplemental oxygen. On the off chance that the casualty isn't intubated, oxygen must be provided by a cover repository gadget to accomplish ideal oxygenation. Utilizing a heartbeat oximeter to screen ampleness of hemoglobin oxygen immersion.

C: Circulation with hemorrhage control

Blood volume, cardiac output, and bleeding are major circulatory issues to be addressed in C. Recognizing, rapidly controlling hemorrhage, and initiating resuscitation are therefore crucial steps in assessing and managing such victims. Once tension pneumothorax has been excluded as a cause of shock, consider that hypotension following injury is due to blood loss until proven otherwise.

Fast judgment instrument which will take a second to give an image on the hemodynamic status and circulatory functions assessed by the degree of responsiveness, apparent hemorrhage, color of the skin, and pulse (presence, quality, and rate).

- Level of Consciousness: impaired or altered level of consciousness
- Skin Perfusion: victim with hypovolemia will have pale, gray facial skin and pale extremities
- Pulse: A rapid, thread like pulse is typically a sign of hypovolemia. Assessment of a central pulse (e.g. femoral or carotid artery pulses) bilaterally for quality, rate, and regularity. In situation of absent pulses implies immediate resuscitative action

Any observable hemorrhage should be controlled during the primary survey, by applying a direct pressure on hemorrhagic site.

Tourniquet is an effective in massive bleeding but have a risk of ischemic injury to the affected site. Utilize a tourniquet just when direct weight is not viable and the casualty's life is compromised.

The significant territories of inner drain are the chest, midsection, retroperitoneum, pelvis, and long bones. The wellspring of draining is normally recognized by physical assessment and imaging (e.g. chest X-ray, pelvic X-ray, FAST, or DPL). Critical administration may incorporate chest decompression, and use of a pelvic settling gadget as well as limit braces.

Ordinarily, two large bore intra venous catheters are put to direct liquid, blood, and plasma. Blood tests for pattern hematologic examinations are acquired, including a pregnancy test for all females of childbearing age and blood classification and cross coordinating. To survey level of shock, blood gases and additionally lactate level are acquired. In case of peripheral sites cannot be accessed, IO, central venous maybe used instead.

Moreover, in this stage as mentioned earlier attachment of two large bore IV cannula will be placed, and nasogastric tube if indicated. Nonetheless, placement of Foley's catheter which will give more elaborated information about the victims' circulatory functions.

In injury, hypovolemia is tended to first with 1 L crystalloids arrangement, however it should then be trailed by blood items whenever demonstrated (shock type I and II – types III and IV crystalloid and colloid arrangement). All IV arrangements ought to be warmed either by capacity in a warm domain (39^{o}C is the prescribed temperature in ED so as to forestall hypothermia) or directed through liquid warming gadgets.

Capillary refill time can be used to assess the adequacy of tissue perfusion. A capillary refill time of more than 2 seconds may indicate poor perfusion unless an extremity is cold.

Electrocardiography checking and circulatory strain estimations ought to likewise be proceeded at the earliest opportunity.

D: Disability (assessing neurologic status)

A fast evaluation of the casualty's neurologic status is fundamental

Table 3: Environmental Control.

PITFALL	PREVENTION
Hypothermia can be present on admission.	Ensure a warm environment.
	Use warm blankets.
	Warm fluids before administering.
Hypothermia may develop after admission.	Control hemorrhage rapidly.
	Warm fluids before administering.
	Ensure a warm environment.
	Use warm blankets.

on appearance in the emergency department. This ought to incorporate the casualty's cognizant state and neurological signs. This is evaluated by the casualty's Glasgow Coma Scale (GCS), understudy size and response, and lateralizing signs. In the event that the GCS is lessened under 8, this is an indication that the casualty may have diminished aviation route reflexes making them unfit to secure their aviation routes; under these conditions, a complete aviation route is required (endotracheal intubation) (Table 2).

A diminishing in a casualty's degree of cognizance may demonstrate diminished cerebral oxygenation and additionally perfusion or it might be brought about by direct cerebral injury. A modified degree of cognizance shows the need to quickly reexamine the casualty's oxygenation, ventilation, and perfusion status. Hypoglycemia, liquor, opiates, and different medications can likewise modify a casualty's degree of cognizance.

E: Exposure and environmental control

The casualty ought to be totally stripped and uncovered (by

Table 4: ABCDE Checklist.

	Possible points	Points awarded		
		Not done	Done with mistakes	Done
		0	1	2
A:				
Begin by asking the victim a question e.g. "are you alright?"	1 point			
Look for Fractures, foreign bodies, ongoing bleeding	1 point			
Opens and assesses airway	1 point			
Cervical spine protection	1 point			
B:				
Expose chest and neck	1 point			
Assess breathing:				
Inspect tracheal deviation, symmetric chest rises, depth and rate of respirations	1 point			
Auscultate	1 point			
Palpate for Crepitus, fracture and deformity	1 point			
Percussion	1 point			
Assures adequate ventilation / pulse oximetry application	1 point			
Initiates appropriate oxygen therapy	1 point			
C:				
Checks pulse	1 point			
Assess skin (either skin colour, temperature, or condition)	1 point			
Assess level of consciousness	1 point			
Assesses for and controls major bleeding if present (capillary refill, DRE)	1 point			
Application of NG tube, 2 large bore IV cannula, Foley's catheter	1 point			
Initiates shock management	1 point			
D:				
Assess:				
Mental status (GCS)	1 point			
Pupillary response	1 point			
lateralizing signs	1 point			
Altered conscious level reevaluate oxygenation, ventilation, and perfusion status. Hypoglycemia, alcohol, narcotics testing	1 point			
E:				
Expose the victim	1 point			
Inspect missed injuries or signs of trauma, bleeding, skin reactions (rashes), needle mark	1 point			
Roll, look for injuries if indicated	1 point			
Cover victim with warm blanket	1 point			

removing their pieces of clothing to encourage a careful assessment and appraisal), to guarantee that no wounds are missed or indications of injury, dying, skin responses (rashes), needle marks, and so on., must be watched.

Bearing the respect of the casualty as a primary concern, attire ought to be evacuated to permit an intensive physical assessment to be performed (Table 3).

Subsequent to finishing the evaluation, spread the casualty with warm covers or an outside warming gadget to keep that person from creating hypothermia in the injury getting zone. Which is possibly deadly intricacy in harmed casualties, take forceful measures to forestall the loss of body warm and reestablish internal heat level to typical.

Adjuncts to the Primary Survey

After the ABCDEs of the primary survey, several adjuncts assist in the evaluation of other life-threatening processes (Table 4):

- ECG
- Urinary Catheters can help in the evaluation of fluid status. However, care must be taken if a contraindication exists, such as blood at the meatus, perineal ecchymosis, or high-riding prostate
- Gastric catheters can decompress the stomach, reducing the risk of aspiration and limiting pressure on the thorax that a distended stomach can create. Care must be taken to avoid nasal insertion in the presence of facial trauma or concern for a basilar skull fracture
- Chest X-ray is obtained to evaluate for pneumothorax, hemothorax or suspicion of an aortic injury
- Pelvic X-ray is obtained to evaluate for pelvic fractures. If an open book fracture is found, a pelvic binder is indicated, to limit pelvic bleeding
- FAST/eFAST which will be discussed in detail during the second part of this research [1-10].

Conclusion

Advanced trauma life-support care has been developed to standardize the evaluation and management of trauma victims since time is critical in trauma evaluation. The golden hour starts at the time of injury. This is the time period at which timely and appropriate interventions can save the life of a victim that would otherwise die. A practitioner uses a primary survey to quickly assess, identify, and treat any life-threatening injuries if they exist. Which should be applied according to the ATLS guidelines and throughout each step.

Nonetheless, a simplified protocol for non-medical expertise makes a great impact on the critically ill in trauma victims. In accordance to the golden hour concept since civilians are the first people in site of accidents.

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