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Evaluation of Prehospital Care Delivered to Adult Poly-traumatized Patients in Suez Canal University Hospital

Mohamed Saleh Mostafa[1], Hany Abbas ELLouly[1], Ghada Said Fouda[1]*, Mahmoud Abdel Naser Abdel Hady[1], Osama Moustafa Zayed[1] and Mohamed ElSayed ElShinawi[2]

[1]*Department of Emergency, Faculty of Medicine, Suez Canal University Hospital, Egypt*

[2]*General Surgery Department , Faculty of Medicine, Ain Shams University, Egypt*

[*]**Corresponding author:** Ghada Said Fouda, Department of Emergency, faculty of Medicine, Suez Canal University Hospital, Egypt, Tel: (+2064)3223007; E-mail: ghadafouda79@gmail.com

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Abstract

Introduction: Advanced prehospital Trauma Life Support is the standard of care for trauma patients, and it is for rapid approach to the most immediate life-threatening conditions which should be quickly identified and addressed in the order of their risk potential.

Aim of work: evaluating the effectiveness of pre hospital assessment and management of the adult poly traumatized patients to improve the outcomes in Suez Canal university hospitals.

Patients and methods: This is a descriptive study conducted at Emergency department at Suez Canal University hospital for 12 months from October 2014 to October 2015 to evaluate the pre hospital care delivered to poly trauma patients aiming to improve the effectiveness of pre hospital care conducted to poly trauma patients in the pre hospital phase.

Results: In this study, the mean age was 32.6+6.2 years, 53% of them between 31-40 years with male to female ratio 2:1 and the difference between rural and urban 30%.This study showed that delay in arrival is strongly related with percent of mortality, as it was 14.3% with time arrival > 2 hours. This study showed that mortality rate increased in patients with hypotension as 6.15% mortality between cases presented with systolic BP < 80 mm hg versus 1.25% mortality between patients with systolic >80 mm hg.

Conclusion: There was a relation between number of mortality and absence, ineffective or delayed pre hospital care for adult poly trauma patients.

Keywords: Prehospital care; Adult poly-trauma; Mortality; Cardiovascular collapse

Introduction

Mortality can be classified into immediate, early, and late deaths. Immediate deaths are due to a fatal injury of lungs, heart, or neurologic system [1]. Early deaths may occur from minutes to hours after injury at scene; these patients arrive to the hospital before death, which usually occurs because of hemorrhage and cardiovascular collapse [2]. Late trauma mortality due to sepsis and multiple organ failure.

Organized systems for trauma care are interested in the salvage of a patient from early trauma mortality to decrease late mortality [2,3].

Recognition of these patterns led to the development of: prehospital trauma care, prehospital care is commonly provided by well-trained persons, once trained personnel arrive, the injured person is assessed and treated at the scene and may receive one or more of first aid interventions associated with advanced prehospital trauma care, such as endotracheal intubation, intravenous fluids and needle decompression or cricothyroidotomy [4].

Importance of Field Triage

Triage is the process of classifying patients according to severity of their injuries to determine the urgency and prioritization of care needed [5].

Over-triage

Over-triage occurs when non-critical patients are taking interest and care they do not need; thus expends resources [6].

Under-triage

Under-triage occurs when critically injured patients are sent to facilities that are not properly equipped to meet their needs; this can result in increased morbidity and mortality among patients [7,8].

Aim of Work

Evaluating the effectiveness of pre hospital assessment and management of the adult poly traumatized patients to improve the outcomes in Suez Canal university hospitals.

Patients and Methods

This is a descriptive study that was conducted at Emergency department at Suez Canal University Hospital for 12 months (from October 2014 to October 2015); Inclusion criteria were poly-

traumatized adults, with more than one of the body systems injured, both sex, (18-45 years). Exclusion criteria were patients with medical conditions, patients who were transferred from other hospitals, patients who were not transferred by ambulance. A total of 300 patients matching the inclusion criteria were enrolled in this study. All the injured adults transferred by paramedics were subjected to immediate assessment: history (from the paramedic) including: patient's file number, Personal data (age, name, sex), Mechanism and type of injury & associated co-morbidity e.g. diabetes, infection, sepsis and errors of metabolism. Clinical examination evaluation of the parameters delivered to the patient at the pre-hospital phase from the scene of trauma to the time of arrival to the hospital (oxygen mask, neck collar, hard board, wide bore cannula, splinted fractures, air way, endotracheal tube, suction device, assisted ventilation, bag & mask). Patients assessment according to ABC approach, vital signs: pulse, blood pressure, respiratory rate, Patient's mental status (CNS assessment), Presence of fractures, wound. Laboratory measurements and imaging (was done in Suez Canal University lab), blood samples and cross matching, Complete blood count, arterial blood gases, chest X-ray, Pelvi-abdominal Ultra Sonography. Type of management (operative or conservative). Patient's status on discharge and if mortality was our outcome predictor. Following up patients after admission to discharge or mortality.

Results

In this study, the mean age was 32.6+6.2 years, the difference between rural and urban 30%. Mean arrival time to hospital, it was 39.7+10.4 min. 25% of the patients had an obstructed airway, 33.3% had external bleeding all of them managed in the field with direct external compression. 56.7% with suspected limb fracture. Regarding the patient's outcome 44.7% of the patients admitted to the inpatient ward and 3.33% died at the ER. Delay in arrival was strongly related to percent of mortality as it was 14.3% with time arrival > 2 hours. Mortality rate increased in patients with hypotension (Tables 1 and 2).

			Mortality				P-value
			No		Yes		
			Number	Percent	Number	Percent	
Simple adjuncts (oral or nasal airway)	Not needed		200	69%	0	0.00%	<0.05*
	Needed	Done	64	22%	2	3.12%	
		Not done	26	9%	8	30.70%	
Total			290	100%	10		

Table 1: Relation between usage of simple adjuncts and mortality.

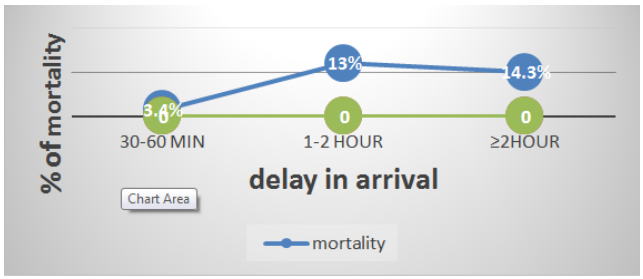
		Mortality				P-value
		Number	Percent	Number	Percent	
Collar	Not using collar	31	39%	7	22.50%	<0.05*
	Supported by collar	49	61%	3	6.12%	
Total		80	100%	10		

Table 2: Relation between suspected cervical injury with collar usage and mortality.

Discussion

The mean age was 32.6+6.2 years, 53% of them between 31-40 years with male to female ratio 2:1.These results match the study by Sukumaran et al. in which the mean age was 48.51+5.3 years, 60% of them were males [9]. Also with the study by Wisborg et al. the mean age was 26.4 years and 61% of them were males [10]. Road traffic accidents were responsible for 45% of injuries followed by falling from heights which responsible for 32% of injuries which agree with the results Sukumaran et al. in which RTA were responsible for 48% of injuries [9]. Mean arrival time to hospital, it was 39.7 + 10.4 min and 90% of the patients arrived to the hospital within 30-60 minutes after the trauma event. This agrees with Ozgur et al. in which the median time to hospital arrival was 45 minutes [11] and with Sukumaran et al. in which the mean time to hospital arrival was 47 min [9]. 25% of the patients had an obstructed airway, 33.3% of them needed simple adjuncts only 22% done to them and 21.6% with bag and mask while none of the patients had an advanced airway such as endotracheal intubation or cricothyrodotomy. These results don't match with Husum et al. who found that adjuncts had been used in 58% of the patients [12] and also don't match the results of Cuthbertson in which 3% had endo-tracheal intubation [13] and Sukumaran et al. 1% of the patients were intubated at scene [9]. This may be due to the presence of training programs and skills for the paramedics. 70% of the patients were self-breather while 30% had assistant breathing with oxygen mask and 18.3% of the patients with three ways dressing due to chest injuries while none of them had thoracostomy or chest tube insertion. These results don't match with Husum et al, 65% of their patients had assisted ventilation and received O2 [12] nor Massarutti et al. who found that 55 trauma patient underwent pre-hospital thoracostomy and it was safe and effective [14]. Our study revealed that 40% of the patients were tachycardiac while 43.3% had systolic blood pressure below 80 mmhg and it showed that just 33.3% of the patients only who had external bleeding all of them managed in the field with direct external compression, unlike Wisborg et al. who found that external compression applied to 55% of the patients, 81% with gauze packing of the wounds and 10% with tourniquet. This may be due to the availability of different resources [10]. 56.7% of the patients with suspected limb fracture 16.7% of them only splinted while 46.7% of cases with suspected spine injury 16.7% of them put on hard board only. Unlike Wisborg et al, 80% of their patients with suspected fracture had been splinted and 74% of patients with suspected spine injury were put on hard board [10]. 41.7% of the patients had extremities injuries, 23.3% with head & neck injuries, 26% with chest injuries, 18.7% with back injuries and 34% combined injuries. Our results agree with Ersoy et al., extremities injuries were the same 41.7% of the patient, 25.9% of them with head & neck injuries, 20.4% with thoracic trauma and 24% with combined injuries, but the spine injuries were the most common as they caused 44.4% of all injuries [15]. Regarding the patient's outcome 44.7% of the patients were admitted to the inpatient ward and 3.33% died at the ER. These results match with Sukumaran et al. who found that 5% of the patient died at the ER except that only 19.6% of them admitted to the inpatient ward [9]. Delay in arrival was strongly related to percent of mortality as it was 14.3% with time arrival > 2 hours, these results match with Singh et al,

who estimated that time delay between the injury and the start of definitive treatment is vital to the outcome, they found that there was a proportionate increase in mortality with increase in delay in arrival as out of 1000 patients, 383 arrived within 4 hours of trauma of whom 21 patients died as the overall mortality was 41 patients [16]. Delayed use of simple adjuncts such as oro-nasopharyngeal airways was associated with increased mortality as 30.7% of patients who had not supplied with simple adjuncts when needed died in comparison with 3.12% who had supplied with it when needed, these results agree with both Cuthbertson et al, who found that 21% of the patients died due to delay use of simple adjuncts such as oro/nasopharyngeal airways [13] and Stiell et al. who found that survival rate was 60.1% by the use of basic life support [17]. Mortality rate increased in patients with hypotension as 6.15% mortality between cases presented with systolic BP < 80 mmhg versus 1.25% mortality between patients with systolic >80 mmhg. This also agrees with both Shapiro et al. with a mortality rate of 26% in hypotensive patients compared to 4% in normotensive patients, [18] and Bilello et al. in which patients with hypotension in comparison to normotensive had greater mortality (24% vs. 5%, p< 0.003) [19] (Graph 1).



Graph 1: Relation between delay in arrival and percent of mortality.

Conclusion

- There was a relation between number of mortality and absence, ineffective or delayed pre hospital care for adult poly trauma patients.

Obstructed airway, unsupported cervical spine injury, hemodynamically unstable patients need appropriate and urgent pre hospital care to improve the rates of mortality in patients with poly trauma.

- Deficiency in the skills of the paramedics was a great cause in the defect or the gap between the paramedic and poly trauma patients.

Limitations of the Study

The results couldn't be applied to other hospitals of Ismailia city due to lack of efficient registry and cooperation of the healthcare providers in other hospitals.

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