

Original Research Article

Assessment of management of polytrauma patients in the emergency department in Suez Canal University hospital

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ABSTRACT

Background: Trauma is a serious global health problem, it is the fifth leading cause of significant disability and is still the most frequent cause of death in the first four decades of life, accounting for approximately one in 10 deaths worldwide.

Methods: This study is cross sectional prospective study was conducted to evaluate assessment of management of patients according to the advanced trauma life support guideline in Emergency Department at Suez Canal University Hospital. All patients (n=103) were subjected to baseline assessment by history, clinical examination and investigations. The patients were followed up and recorded till the full assessment was done and the decision was made and the fate of the patient was recorded.

Results: The majority of the studied patient had motor car crash (55.30%), while motor cycle crash was the second mechanism of trauma (21.40%), run over was the third mechanism (14.60%). Airway management was done (95.1%), cervical spine kept immobilized only in (71.8%). Blood pressure was measured in (97.1%) and 2ry survey assessment, head to toe examination (78.6%), while AMPLE history was taken in minority of cases percentage (33%). Finally majority of patients was admitted in ICU (44.70%), followed by 18.40% of the studied patient died and less than (2%) discharged from the ER.

Conclusions: ATLS protocols provide a common framework and organized approach during polytrauma patient's management. Also, it has been shown to improve outcomes so we should enhance its application in our hospital.

Keywords: ATLS, Polytrauma

INTRODUCTION

Trauma is an injury to the body that occurs when an uncontrolled force or acute source of energy comes with direct contact with the body and the body cannot tolerate it.¹ Trauma considered the sixth leading cause of death worldwide, globally around 5.8 million people deaths were estimated from injuries in 2004. These deaths accounted for 10% of the world's mortality. About half of trauma deaths are in people aged between 15 and 45 years and is the leading cause of death in this age group.

It is the fifth leading cause of significant, disability.¹ It is a growing public health problem worldwide. More than 90% of the world's injury deaths occur in low and middle income countries.² On Egypt trauma is a hidden epidemic and its related death misclassified due to lack of accurate national data.³ Injury deaths in Egypt accounted for 8% and the eighth leading cause of death in 2010. Injury in Egypt is higher several times due to under-reporting and misclassification.¹ The Egyptian Ministry of Health estimated that 24,222 deaths, 127,216 hospitalizations and 847,912 disability-adjusted life years occurred due to

injuries in 1999.³ Polytrauma defined as clinical state following injuries to body leading to profound physiometabolic changes involving multisystem or patients with any of the following combination injuries:

- Two major system injury + one significant limb injury;
- One major system injury + two major limb injury;
- One major system injury + one open grade 3 Skeletal injury
- unstable pelvic fracture with associated viscera.^{1,4}

The incidence and prevalence of poly trauma varies from region to region. The most common causes are road traffic accidents, fall from heights, bullet injuries, etc. In civilian life, poly trauma is often associated with motor vehicle accidents. It may also result from blast injuries sustained by improvised explosive devices.⁵

Polytrauma always involves young, productive individuals and represents a substantial burden on the society, from both financial view and human Perspectives. The presence of multiple injuries leading to significant disability with decreased chance of a return to work and thus significant effect on economic state.⁵

Improvement in the organization of trauma services should be achievable in almost every setting and may represent a cost effective way of improving patient outcomes.¹ Efforts to improve care of the injured are essential. Trauma care represents a major challenge to the clinician, no matter what his or her background.⁵

However, many lives can be saved through inexpensive modifications in education, organization and availability of simple pieces of equipment. Such changes greatly simplify decisions and actions.⁴ Poly trauma patients represent the ultimate challenge to trauma care and the optimization of their care is a major focus of clinical research. The heaviest toll of traumatic deaths occurs within the first hour following trauma, often defined as "the golden hour of trauma".⁶ Advanced Trauma Life Support (ATLS) treatment paradigm was established to improve the management of trauma patients during the initial resuscitation phase.⁷

ATLS protocols provide a common framework and organized approach during these situations, and have been shown to improve outcomes. Unfortunately, attrition rate of ATLS knowledge and low compliance rate are issues even in major trauma centers.⁸ Deviations from ATLS protocols are common, ranging from 23% to 53%. Compliance rate can affect patient outcome and can serve as a surrogate marker for quality assessment of a trauma system.⁹

Currently, in Emergency Department of Suez Canal University Hospital, there is no unified policy adopted for management of polytrauma patients. In this study, we

seek for evidence based management as ATLS guidelines.

The goal of this study was to improve the quality of management of polytrauma patients in the Emergency Department of Suez Canal University Hospital by enhanced application of ATLS guidelines (ATLS-2017) guideline.

Aim of the study to improve the quality of management process of patients presenting with polytrauma in the Emergency Department of Suez Canal University Hospital by enhanced application of ATLS guidelines.

METHODS

After obtaining approval by the Hospital Ethics Committee, and written informed patient consent with an explanation regarding the purpose, methods. This study is cross sectional prospective study, conducted to evaluate Assessment of management of patients according to the advanced Trauma life support (ATLS-2017) guideline in Emergency Department at Suez Canal University Hospital.

Inclusion criteria

- All ages.
- Both sexes.
- Patients with polytrauma criteria.
 - Two major system injury + one significant limb injury;
 - One major system injury + two major limb injury;
 - One major system injury + one open grade 3 skeletal injury
 - Unstable pelvic fracture with associated viscera.
- Patients with injuries that occurred <24 hours prior to presentation

Exclusion criteria

- Patients don't met criteria of polytrauma patients
- Patients transferred from other hospitals after performing any medical or surgical procedure.
- Patient discharged on his demand, transferred to other hospital or escaped.
- Patients with injuries that occurred >24 hours prior to presentation

On 103 polytrauma patients with in the Emergency room at Suez Canal University Hospital. The data was collected from October 2017 to January 2018. All patients were subjected to baseline assessment by history, clinical examination and investigations. The patients were followed up and recorded till the full assessment was done and the decision was made and the fate of the patient was recorded (Inward admission – ICU admission – Died – surgery – discharged).

Statistical analysis

Data was collected throughout history, clinical examination and laboratory investigations will be coded, entered and analyzed using Microsoft Excel software. Gathered data was imported into SPSS (Statistical Package for Social Sciences) software program version 13.0 for analysis. According to the type of data, the following tests used to test differences for significance; Chi square, T test, and one way ANOVA with least significance difference. Chi square test and non-parametric tests used to compare categorical variables. P value was set at <0.05 for significant results.

Data was presented in the form of graphs, numeric presentations and tubular presentations.

RESULTS

This study targets the Assessment of management of patients according to the advanced Trauma life support (ATLS-2017) guidelines in Emergency Department at Suez Canal University Hospital.

This study was conducted on 103 polytrauma patients with in the Emergency room at Suez Canal University Hospital. The data was collected from October 2017 to January 2018.

The study showed that the age of the majority of patient range between 20-<40 years (72.8%) with the mean of age 33.8 ± 15.6 years.

The majority of patients were males (80.60%) of the studied patients while females were (19.40%) of them (Table 1).

Table 1: Profile of the patients with poly trauma attending emergency department of Suez Canal university hospital.

Variables	Number (N)	Percentage (%)
Age (in years)		
0-20	18	17.5
20-40	64	62.1
40≤	21	20.4
Gender		
Male	83	80.6
Female	20	19.4
Mechanism of trauma		
Motor car crash	57	55.3
Motor cycle	22	21.4
Run over	15	14.6
Fall from height	9	8.7

The majority of the studied patient had motor car crash (55.30%), while motor cycle crash was the second mechanism of trauma (21.40%), run over was the third

mechanism (14.60%) and falling from the height was minority of patient (8.70%) (Table 1).

And according ABCD approach in 1 year survey, airway assessment and management was done (95.1%), cervical spine kept immobilized only in (71.8%), keeping airway patent (95.1%), endotracheal intubation wasn't needed in majority of patients (60.1%), while done successfully in (35%), and resident failed to do in (4.9%) (Table 2).

Table 2: Airway assessment among the studied patients (A).

		Number (N)	Percentage (%)
Airway assessment	Yes	98	95.1
	No	5	4.9
Cervical spine fixation	Yes	74	71.8
	No	29	28.2

Breathing assessment as second step in primary survey shows that chest inspection was done in (63.1%) of patients, chest palpation in (77.7%), and for majority of cases chest auscultation were done (95.1%) (Table 3).

Table 3: Shows breathing assessment among studied patients (B).

		Number (N)	Percentage (%)
Chest inspection	Yes	65	63.1
	No	38	36.9
Chest palpation	Yes	80	77.7
	No	23	22.3
Chest auscultation	Yes	98	95.1
	No	5	4.9

According circulation assessment, blood pressure was measured in majority of patient's percentage (97.1%), while fluid resuscitation was the lowest with percentage (71.8%), although monitoring was done in 87.4% and catheterization 86.4%, and pulse with 74.8% (Table 4).

Table 4: Shows circulation assessment (C).

		Number (N)	Percentage (%)
Pulse	Yes	77	74.8
	No	26	25.2
Blood pressure	Yes	100	97.1
	No	3	2.9
Fluid resuscitation	Yes	74	71.8
	No	29	28.2
2 cannula's	Yes	75	72.8
	No	28	27.2
Monitoring	Yes	90	87.4
	No	13	12.6

Disability shows RBS wasn't assessed in majority of cases (80.6%) while GCS assessed in majority of cases (98.1%) (Table 5).

Table 5: Disability assessment.

		Number	Percentage (%)
RBS	Yes	20	19.4
	No	83	80.6
GCS	Yes	101	98.1
	No	2	1.9
Spinal cord inj.	Yes	62	60.2
	No	41	39.8

According 2 years survey assessment, majority of cases head to toe examination was done (78.6%), while AMPLE history was taken in minority of cases (33%) (Table 6).

Table 6: Secondary survey assessment.

		Number (N)	Percentage (%)
Head to toe exam	Yes	81	78.6
	No	22	21.4
Ample	Yes	34	33
	No	69	67

Finally majority of patients was admitted in ICU (44.70%), followed by 18.40% of the studied patient died and less than (2%) discharged from the ER (Figure 1).

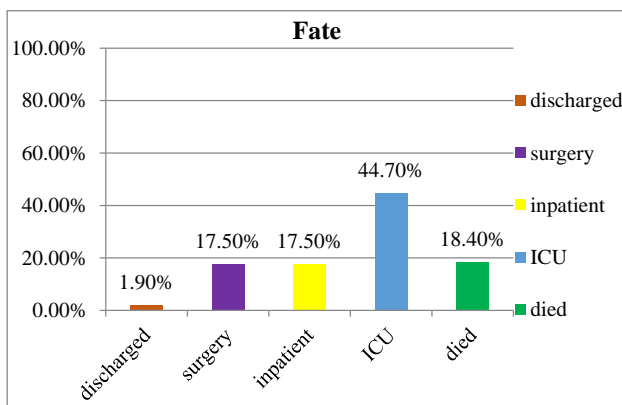


Figure 1: Showing the fate of the patients (n=103).

DISCUSSION

Trauma is the most cause of death in the last ten years, and it still a major health problem in all countries, in spite of the level of the socioeconomic state. Each year about 12,000 Egyptians lost lives due to different mechanism and types of trauma.¹⁰

Advanced trauma life support (ATLS) treatment paradigm was established to improve the management of trauma patients during the initial resuscitation phase.⁷

ATLS protocols provide a common framework and organized approach during these situations, and have been shown to improve outcomes. Unfortunately, attrition rate of ATLS knowledge and low compliance rate are issues even in major trauma centers.⁸

Studies have demonstrated the effectiveness of ATLS training on improving the quality of diagnostic and therapeutic procedures and decreasing mortality rate.⁸

So, the aim of the present study was to Assessment of management of patients with polytrauma in the Emergency Department of Suez Canal University Hospital using the advanced Trauma life support (ATLS-2017) guidelines.

This study was a cross sectional, prospective study was conducted to evaluate Assessment of management of patients, according to the advanced Trauma life support (ATLS-2017) guideline in the Emergency Department at Suez Canal University Hospital. Of 103 polytrauma patients with attending the Emergency Department (ED) at the Suez Canal university Hospital and fulfilling our inclusion and exclusion criteria.

This study showed that the age of the majority of patient range between 20-<40 years (62.1%) with the mean of age 33.8±15.6 (Table 1).

These results agree with the results of a study conducted by Tsang et al, in which the age of the studied mean age was 39.7±17.6.¹¹

The reason why the adult youth (age 20-40 years old) are involved in accidents explained by the fact that in this age group majorities are involved in productive activities that need from them to move fast enough from one place to another and this predisposes to risks of being exposed to road traffic accidents or crashes, which resulted in a serious economic burden to the country and family. Similar studies were also made by others authors.^{15,16}

The present study showed that the majority of patients were males (80.60%) of the studied patients while females were 19.40% of them (Table 1).

These results were similar to the results of a study by Tsang et al, in which (73.8%) of the studied patients were males and (27.2%) were females.¹¹

Trauma was commonest between young males because they always participate in high-risk activities, with high-speed driving and also drive without wearing any protective tools.¹⁸

Regarding to the mechanism of injury, this study showed that the majority of the studied patient had motor car crash (55.30%), while motor cycle crash was the second mechanism of trauma (21.40%), run over was the third

mechanism (14.60%) and falling from the height was minority of patient (8.70%) (Table 1).

This agrees with several studies conducted on trauma epidemiology, where the majority of cases were due to road side collisions. Payal et al had found that 72% (n=150) were due to road side accidents, followed by fall from height 15% (n=31).⁵ Another study, conducted by Singh et al, had found that road traffic collisions were the most common cause of trauma (72%).¹²

Our study showed that for (95.1%) of our patients Airway assessment and patency was done as a first step of primary survey. These results were similar to the results of a study by Tsang et al, on airway assessment was done for (99.4%) of the studied patients.¹¹

And only in (71.8%) cervical spine was kept immobilized, as a complementary point to first step of primary survey (Table 2). Our results agree also with Tsang, et al, in which cervical spine kept immobilized in (84.4%).¹¹ Another study, conducted by Spanjersberg et al, had found that cervical immobilization was (86%).⁹

According to second step of 1 year survey of ATLS guidelines, this study showed that chest auscultation was done in majority of patients (95.1%), followed by chest palpation in (77.7%) and the lowest percentage for chest inspection (63.1%) (Table 3).

Our results agree with Tsang et al, in which chest auscultation resemble the highest percentage (98.2%) followed by chest palpation (58.1%).¹¹ And differ partially from Spanjersberg et al, in which chest auscultation also took the highest percentage (95%), but followed by chest inspection (34%) and the lowest was chest palpation (19%).⁹

According to circulation assessment as a 3rd step of 1st survey, our study showed that. Blood pressure was measured in majority of patient's percentage (97.1%), while fluid resuscitation policy was the lowest with percentage (71.8%), although monitoring was done in 87.4%, catheterization 86.4%, pulse with (74.8%) and insertion of two wide IV cannula (72.8%). Finally compression on external HGE was needed in 54.4% of patients and done only in 51.5% (Table 4).

Our results agree in some points and differ in others with Spanjersberg et al, had a higher percentage in pulse (77.8%), two wide cannula (78%). While lower percentage in blood pressure measurement (55%) and fluid resuscitation policy (24%).⁹

According to disability assessment as 4th step of 1st survey, our study showed that RBS wasn't assessed in majority of cases (80.6%) while Glasgow coma scale assessed in majority of cases (98.1%) (Table 5).

Our results differ from Spanjersberg et al, in which GCS was assessed, only in (51%) and random blood sugar in (49%).⁹

While agree with Carter et al, in which GCS assessed (72.6%).¹³

Random blood sugar measurement in polytrauma patient was missed in most of studies or had low application percentage. Although, It is have a high importance in prognosis and easy rapid biochemical predictors of mortality in patients with polytrauma.¹⁴ Our study showed that that pelvic stability assessed in (65%) of cases which agree with Spanjersberg et al in which pelvic stability assessed in (64.8%) and Tsang et al, (65.6%).^{9,11}

And about 2 years survey, our study showed that for majority of cases head to toe examination was done percentage (78.6%), while AMPLE history was taken in minority of cases percentage (33%) (Table 6).

But Tsang et al, differ in AMPLE history which was taken in majority of cases (91.7%) and agree in head to toe examination (72.4%).¹¹

Our study showed that lab investigations were done for majority of cases (98.1 %) and ABG was done only in 66% of patients.

Our results agree with Tsang et al, in which ABG was done in (70.3%).¹¹ And differ from Spanjersberg et al, in which lab investigation was done only in (49%) and ABG was done in (43%).⁹

According to imaging, our study showed that FAST was done in majority of cases (98.1%) while chest and pelvic X-ray were done at the same percentage 97.1%.

High percentage of imaging in our study indicate our appreciation of imaging techniques importance in diagnosis and management of polytrauma patient.

Our study agree with Spanjersberg et al, in which FAST was done in (89.1%) while chest and pelvic X-ray were done at the same percentage (91.8%).⁹

In our study, we notice the incidence of injury in different body region as follow, extremities injury had the highest prevalence (89.3%) followed by abdominal injury with percentage (52.4%), head injury (50.5%), chest injury (34%), spine injury (19.4%) and the lowest prevalence was for pelvic injury (10.7%).

Our study differ from Rau et al, in which head injury had the highest percentage (74.6%) followed by chest trauma (30%), then extremity (15.2%) and the lowest for abdominal injury (10.8%).¹⁵

This difference may be due to the definition used in our study for polytrauma patient which mainly involve extremities injury.

Regarding the outcome of patients in the Our study showed (18.4%) mortality rate (Figure 1) which higher than Pfeifer et al, in which mortality rate in polytrauma patients (6.4%) and also higher than Mica et al, in which mortality rate was (9.6%) and in Dijkink et al study mortality rate (10%).^{1,16-18} Higher mortality rate of our study maybe due to we compare with specialized trauma center which highly prepared and about ICU admission, our study showed (44.7%) (Figure 1) which agree with Dijkink et al, in which ICU admission percentage (47.3%).¹⁸

The study demonstrated a need to improve overall ATLS compliance at our institution.

Deviation from ATLS guidelines affect the end outcome and increase our mortality rate compared with other specialized centers.

As the polytrauma patient outcome is multifactorial depend on a lot of items as: age of patient, type of trauma, mechanism of trauma, comorbidity, and time of arrival and finally the management of the patient.

The major modifiable item is our management to the victim, which may improve outcome and mortality rate.

One of major absent points in our hospital is an absence of trauma team which significantly improved compliance with many aspects of ATLS, and increased the efficiency of trauma resuscitations by decreasing mean time to diagnostic imaging.¹¹

CONCLUSION

Trauma is recognized as one of the leading causes of death and disability worldwide. This is the third leading cause of death over all ages and is the leading cause of death in patients aged <35 years. Disability in 1st survey and ample history are common missed steps in Patient assessment. A high index of suspicion is required when dealing with all poly-traumatized patient primarily unconscious patients during primary and secondary surveys. Application of polytrauma assessment sheet for all poly-traumatized patients is recommended.

A tertiary survey to detect missed injuries should be performed within 24 hours of admission as part of routine evaluation of all poly-traumatized patients. ATLS protocols provide a common framework and organized approach during these situations, and have been shown to improve outcomes so we should enhance its application in hospitals.

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