Antonio Cesar Marson[1], Cintia Magalhães Carvalho Grion[2], Olavo Franco Ferreira Filho[2], João Carlos Thomson[1]

Preventable deaths in trauma patients associated with non adherence to management guidelines

Mortes evitáveis em pacientes de trauma associadas a não adesão às diretrizes de atendimento

1. MD, PhD, Physician of the Department of Surgery of the Universidade Estadual de Londrina – UEL – Londrina (PR), Brazil.
2. MD, PhD, Physician of the Department of Internal Medicine of the Universidade Estadual de Londrina – UEL – Londrina (PR), Brazil.

This study was developed at the Hospital Universitário da Universidade Estadual de Londrina - UEL - Londrina (PR), Brazil.

Author for correspondence:
Cintia Magalhães Carvalho Grion
Avenida Robert Koch 60 - Divisão de Terapia Intensiva Adulto - Vila Operária
Zip Code: 860380-350 - Londrina (PR), Brazil.
Phone: 55 (43) 3371-2284 / 55 (43) 9994-5090 / Fax: 55 (43) 3371-2466
E-mail: cintiagrion@sercomtel.com.br

ABSTRACT

Objectives: To evaluate patients treated for traumatic injuries and to identify adherence to guidelines recommendations of treatment and association with death. The recommendations adopted were defined by the committee on trauma of the American College of Surgeons in advanced trauma life support.

Methods: Retrospective cohort study conducted at a teaching hospital. The study population was victims of trauma ≥ 12 years of age with injury severity scores ≥ 16 who were treated between January 1997 and December 2001. Data collection was divided into three phases: pre-hospital, in-hospital, and post-mortem. The data collected were analyzed using EPI INFO.

Results: We analyzed 207 patients, 147 blunt trauma victims (71%) and 60 (29%) penetrating trauma victims. Trauma victims had a 40.1% mortality rate. We identified 221 non adherence events that occurred in 137 patients. We found a mean of 1.61 non adherence per patient, and it occurred less frequently in survivors (1.4) than in non-survivors (1.9; p=0.033). According to the trauma score and injury severity score methodology, 54.2% of deaths were considered potentially preventable. Non adherence occurred 1.77 times more frequently in those considered potentially preventable deaths compared to other non-survivors (95% CI: 1.12–2.77; p=0.012), and 92.9% of the multiple non adherence occurred in the first group (p=0.029).

Conclusions: Non adherence occurred more frequently in patients with potentially preventable deaths. Non adherence to guidelines recommendations can be considered a contributing factor to death in trauma victims and can lead to an increase in the number of potentially preventable deaths.

Keywords: Trauma centers; Trauma severity indices; Mortality; Outcome assessment (Health Care); Cause of death; Risk factors

INTRODUCTION

The care of trauma patients demands specific attitudes and procedures. Due to the acute presentation and associated multiple organ dysfunction of trauma patients, patients' injuries should be identified as quickly as possible, and therapeutic measures should be promptly initiated. [1] The existing evidence that some trauma victims die due to treatment-related errors rather than the severity of their injuries led to the concept of "preventable deaths".[2] The rate of preventable deaths can be determined by medical au-

dits that are based on clinical and autopsy data or by the calculation of survival probability using the TRISS methodology.[3-14]

The mean rate of potentially preventable deaths in the United States is 19%.[6, 9,15] In Europe, the rates vary from 25% to 33%.[7,8] Only a few articles have discussed how treatment errors contribute to the occurrence of potentially preventable deaths.[2,7,16] These errors may occur due to a lack of professional training, a lack of equipment, or specific factors associated with a patient's trauma or accident. An analysis of the incidence of preventable deaths can be used to evaluate the quality of health care systems or to determine which treatment areas have associated errors and need to be improved.[17-19]

The objective of this study was to evaluate trauma-related deaths in patients who were treated at a teaching hospital and who were referred by the pre-hospital trauma care team to analyze adherence to guidelines recommendations during their treatment.

METHODS

This was a retrospective cohort study that was conducted at a teaching hospital and was approved by the local ethics committee. Informed consent was not required.

The Hospital Universitário de Londrina is a public teaching hospital, which is part of Londrina State University. It is a general hospital that provides health services to the city of Londrina and the north region of Parana state. It is considered to be a regional trauma care center, which has specific rooms to assist trauma patients within emergency department, access to computerized tomography and ultrasonography in the hospital and prompt access to neurosurgery, vascular and thoracic surgery, and specific rooms to orthopedic procedures.

The pre-hospital system is a public health service financed by the government. It is composed of a central system of regulation and dispatch of human resources and ambulances equipped to assist trauma patients and perform the procedures necessary in the field. The ambulance staff includes nurses, paramedics and a motorist. Because in Brazil nurses are not allowed to perform all procedures in these patients, i.e., endotracheal intubation and thoracic drainage, a physician may be a part of the staff group in selected calls, depending on the anticipation of the need to perform medical procedures. The pre-hospital central dispatch receives the calls and decides what kind of staff group is going to the scene (with or without a physician) according to a triage al-

gorithm. They also determine to which hospital to send the victim. There are three hospitals in Londrina that receive trauma patients assisted by the pre-hospital system: two of them are part of beneficent institutions and one of them is the University Hospital. The previous notification of patient transfer to the hospital is made by the staff in the ambulance. There is no helicopter transportation available in the system.

Medical triage and treatment at the scene are provided by health care professionals who are trained in pre-hospital trauma life support (PHTLS) and ATLS, and tertiary hospital care is provided by attending surgeons trained in ATLS.

Patients in this study consisted of trauma victims aged >12 years who had an injury severity score (ISS)[20] of >16 and who were referred by the pre-hospital trauma care team between January 1997 and December 2001 to the Hospital Universitário de Londrina. The exclusion criteria were as follows: 1) burn victims; 2) patients transferred from outside hospitals; 3) patients who were in cardiac arrest at the time of arrival to the emergency department who never experienced return of spontaneous circulation.

Data collection was divided into three phases: pre-hospital, during hospitalization and post-mortem. Pre-hospital data collection was carried out by analyzing the pre-hospital trauma care team's records. The following variables were analyzed: 1) epidemiological data (i.e., sex, age, mechanism of injury, time at which the accident occurred, and clinical descriptions of the patients' injuries); 2) clinical data (i.e., diaphoresis, tachycardia, pallor, Glasgow coma scale (GCS) score, systolic arterial pressure, and respiratory rate), assessment of injury severity by anatomic site according to the abbreviated injury scale (AIS;1985 revision); and 3) patient management data: (i.e., the use of oxygenation, the acquisition of a definitive airway, ventilation assistance, thoracentesis, pleural drainage, volume resuscitation, and injury stabilization).[21,22]

Data regarding patient management during hospitalization were collected from the patients' medical records according to the location at which the treatment was administered. From the emergency department, we collected the following information: 1) clinical data (i.e., admission time, clinical signs, GCS score, systolic arterial pressure, respiratory rate, anatomic injury severity according to the AIS-85, diagnostic data, and mortality) and 2) resuscitation data (i.e., definitive airway placement, mechanical ventilation, thoracocentesis, pericardiocentesis, pleural drainage, hemorrhage control, crystalloid infusion, colloid infusion, gastric

drain placement, urethral drain placement, fracture immobilization, laboratory data, and the types of specialists that were consulted). From the operating room, we collected data regarding the length of surgery, the anatomic lesions that patients were found to have, the surgical procedures that were performed, and mortality. From the intensive care unit or floors, we collected data on admission time and mortality.

Collection of post-mortem data was carried out by compiling information provided by the Legal Medicine Institute, which is where all autopsies were performed. All patients who died during hospitalization due to trauma were submitted to an autopsy. We collected information regarding the time of the accident, the mechanism of injury, the time of death, anatomic lesion severity according to the AIS-85, and cause of death. Data from autopsy were used to identify missed diagnoses, and to calculate the AIS-85 and ISS scores.

Two trauma indices were calculated. The revised trauma score (RTS) was calculated using data obtained in the emergency department according to the formula: RTS=(0.9368 x GCS) + (0.7326 x SBP) + (0.2908 x RR), where SBP=systemic blood pressure and RR=respiratory rate.[23] The ISS was obtained based on the anatomic lesions that were described in patients' medical records during pre-hospital treatment, in the emergency department, in the operating room, and at the Legal Medical Institute and were classified according to the AIS-85. The ISS was calculated by determining the sum of squares of the three worst indices. However, if one of the indices was assigned a score of 6, the patient was assigned an overall score of 75.

A potentially preventable death was defined as death that occurred in a trauma victim with a probability of survival greater than 0.5 according to their trauma score and injury severity score (TRISS) score.[24] Deaths occurring in victims with a survival probability >50% and survival occurring in victims with a survival probability <50% were defined as unexpected outcomes.

Adherence was evaluated according to advanced trauma life support (ATLS) recommendations.[25] Non adherence to guidelines recommendations during management of the trauma patient was classified as follows, according to reviewers' interpretation:

1) delay to hospital admission: more than one hour after the trauma;

2) airway management: failure to oxygenate properly or fail to intubate patient when indicated. The following conditions were considered indications for orotracheal intubation: GCS less than 8, severe maxillary or facial fractures, bronchoaspiration risk, airway obstruction risk, apnea, and incapacity to maintain oxygenation;

3) ventilation management: failure to perform thoracentesis or thoracic drainage when indicated (pneumothorax or hemothorax); failure or delay to provide mechanical ventilation when necessary;

4) volume resuscitation: failure to compensate for signs of hypovolemia during volume resuscitation; inadequate bleeding control; delay to perform surgical procedures to control bleeding;

5) neurological management: failure to oxygenate or ventilate properly; delay to neurosurgeon evaluation; delay to perform neurosurgical procedures; delay to ICU admission;

6) others: diagnostic or therapeutic decisions considered inappropriate and not included in the previous items;

7) diagnostic procedures: failure to perform diagnostic procedures when necessary or unnecessary diagnostic procedures resulting in delays of initial patient management;

8) diagnose: relevant injuries not identified during initial evaluation; and

9) late injury diagnosis: injuries not diagnosed on time for optimal management.

Non adherence was determined based on the consensus agreement of three physicians with ATLS training and field experience who examined the clinical data of all the patients included in the study. Two of these physicians are authors of the present paper (Thomson, JC and Marson, AC) and another one was invited to participate as a consultant without authorship. None of them was involved in the treatment of the trauma patients included in this study.

Collected data were entered into an Excel® spreadsheet and then analyzed using EPI INFO, version 3.2.2, CDC, USA. Our descriptive statistical analyses involved the calculation of mean values and standard deviation for continuous numeric data, the calculation of median values for discrete data, and the calculation of percentages and frequencies for categorical data. The results were presented as tables and graphs. We examined the correlation of numeric clinical variables with patient outcomes via univariate analysis with Student's t-test when the distribution of the data was Gaussian and the Mann-Whitney test when the distribution of the data was not Gaussian. Univariate analysis of the association between categorical clinical variables and patient outcome was carried out using the chi-squared test or Fisher's exact test when the expected frequency of one cell in the two-by-two table was less than

five. Comparison between the observed mortality rate and the mortality rate estimated by the major trauma outcome study (MTOS) was carried out using Z statistics calculus, as previously described.[26,27] The severity of the injuries of the trauma victims in our study and the severity of the injuries observed in MTOS was compared using the M-statistic, as previously described.[24,26] Logistic regression analysis using stepwise variable selection, with a variable exit threshold set at $p < 0.05$, was applied to identify factors associated with mortality. All p-values <0.05 were considered to be statistically significant.

RESULTS

During the study period, the pre-hospital trauma care system treated 30,087 patients. Of those patients, 27,508 (91.4%) were trauma victims and 5,766 (21.0%) were referred to the Londrina State University Hospital. Of these, 207 (3.6%) patients met the inclusion criteria for our study. Reasons for exclusion were age less than 12 years-old (n=496), ISS less than 16 (n=5,189), burn victims (n=10), transference from outside hospitals (n=52), cardiac arrest at the time of arrival to the emergency department (n=19). The mean age of included patients was 34,0 ± 14.4 years, and the majority of patients were males (91.8%). The most common mechanisms of injury of the included trauma patients were motorcycle or bicycle accidents (n=68, 32.9%), stabbings or gunshot wounds (n=58, 28.0%) and traffic accidents (n=57, 27.5%). These resulted in 147 (71%) blunt trauma patients and 60 (29%) penetrating trauma patients. The description of the population characteristics is depicted in table 1.

Of the 207 patients included in the study, 83 (40.1%) died. The majority of deaths were due to traumatic brain injury (51.8%), followed by hypovolemia (19.3%) and a combination of traumatic brain injury and hypovolemia (15.4%). A higher survival rate was observed in penetrating trauma victims than in blunt trauma victims (88.3% versus 48.3%; p<0.001). The mean ISS was lower among survivors than non-survivors (23.3 ± 6.5 versus 30.6 ± 11.4; p<0.001).

We identified 221 non adherence events during management of trauma patients, 135 (61.0%) of which occurred during the pre-hospital treatment phase and 86 (39.0%) of which occurred during the hospital treatment phase. Non adherence events occurred in the management of 137 patients (66.2%) resulting in a mean of 1.61 non adherences per patient. There was no difference in the distribution of non adherences according to age or sex. Overall, more non adherences events occurred in the management of patients who survived, but there were more of these events per patient among non-survivors (Table 2). The mean number of non adherence events that occurred per patient was 1.4 among survivors and 1.9 among non-survivors (p=0.03). There were no differences observed regarding the distribution of non adherence based on the mechanism of injury (p=0.16).

Most non adherence events occurred during the pre-hospital management phase and were mostly comprised of delays in referral (59.8%) and airway management (16.8%). The delay in hospital arrival could have been due to distance or difficulties in patient extrication. The most frequent types of in-hospital phase non adherence events that occurred were during resuscitation (13.9%) and management of brain injuries (13.9%). Non ad-

Table 1 – Baseline characteristics of patients

Patient characteristics	Survivors (N=124)	Non-survivors (N= 83)	p value
Male sex	113 (91.1)	77 (92.8)	0.67
Age (years)	32.5 ± 11.9	37.2 ± 17.2	0.02
Blunt trauma	71(48.3)	76 (51.7)	<0.001
Penetrating trauma	53 (88.3)	7(11.7)	
Mechanism of injury			
Motorcycle/bicycle accident	12 (75.0)	4 (25.0)	
Stabbing/gunshot wounds	51 (87.9)	7 (12.1)	
Car/pedestrian accidents	13 (44.8)	16 (55.2)	
Automobile accidents	34 (42.5)	46 (57.5)	<0.001
Falls	10 (62.5)	6 (37.5)	
Aggressions	4 (50.0)	4 (50.0)	
ISS	23.3 (6.5)	30.6 (11.4)	>0.001

ISS – Injury Severity Score. Results are expressed as number (percentage) or mean ± standard deviation.

Table 2 - Analysis of non adherence events according to outcome

	Survivors		Non-Survivors		Relative risk	95% Confidence interval	p value
	N	%	N	%			
Non adherence (N=207)							
Absent	40	57.1	30	42.9	0.93	0.73-1.19	0.56
Present	84	61.3	53	38.7			
Non adherence per patient (N=137)							
One	57	66.3	29	33.7			0.01
Two	20	66.7	10	33.3			
Three or more	7	33.3	14	66.7			
Phase of management of non adherence (N=137)							
Pre-hospital	52	65.0	28	35.0			0.47
In-hospital	18	60.0	12	40.0			
Both	14	51.9	13	48.1			

herence in the management of hypovolemia occurred frequently (21.2%) and were the most frequent non adherence event occurring in both phases of treatment in the same patient (2.2%) (Figure 1).

The mean length of hospital stay among survivors was 18.7 days, whereas it was 6.9 days among non-survivors. Thus, patients who survived presented with longer length of stay, since most deaths occurred before the sixth day of hospitalization.

According to the TRISS methodology, 45 out of 83 deaths (54.2%) were considered potentially preventable. The mean probability of survival was 79.7% for patients classified as potentially preventable deaths and 25.1% in the other non survivors patients (p<0.001). Patients classified as preventable deaths presented with similar age and frequency of male gender, but had longer mean length of stay (10.2 ± 21.4 days) compared to other non survivals (2.9 ± 6.3 days, p = 0.02). The

presence of non adherence was 1.77 times higher in patients with potentially preventable deaths compared to other non survivors (95% CI: 1.12 – 2.77; p=0.01), and 92.9% of multiple non adherence events (three or more) occurred in the group of patients classified as potentially preventable deaths (p=0.02) (Table 3). Among patients with penetrating trauma, there were no potentially preventable deaths (p=0.002).

In the group of patients classified as potentially preventable deaths, 20.0% patients died in the first 24 hours, 42.2% patients died between the first and third day of hospitalization, 8.9% patients died between the fourth and sixth day of hospitalization, and 28.9% patients died after seven or more days of hospitalization. There was higher frequency of early deaths in the others non survivors patients; 52.6% of deaths occurred in the first 24 hours, 26.3% occurred between the first and third day of hospitalization, 5.3% occurred between the fourth and sixth day of hospitalization, and 15.8% occurred after seven or more days of hospitalization.

The logistic regression analysis included age, sex, type of trauma, number of non adherence events and severity reflected by the probability of survival with the TRISS methodology. This analysis showed that penetrating trauma and number of non adherence events remained in the model as risk factors for death, and probability of survival > 0.5 by the TRISS methodology was a protective factor (Table 4).

In our study population, we observed a higher mortality rate than predicted by the MTOS (Z-statistic for death=6.69 and Z-statistic for survival=-6.69). Additionally, the injury severity of the patients in our study was statistically different than that of patients included in the MTOS (M-statistic=0.44).
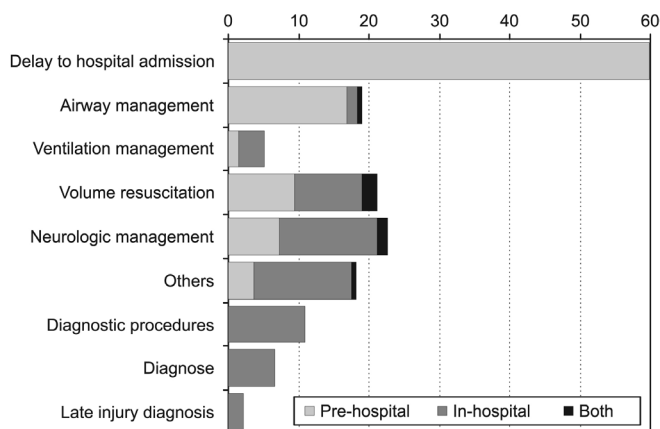

Figure 1- Frequency of non adherence according to management phase.

Table 3 - Distribution of potentially preventable deaths according to type of trauma and the occurrence of non adherence

	Potentially preventable deaths				Relative risk	95% Confidence interval	p value
	No		Yes				
	N	%	N	%			
Type of trauma (N=83)							
Blunt	31	40.8	45	59.2	2.45	1.26-3.21	0.002
Penetrating	7	100	0	0			
Presence of non adherence (N=83)							
No	19	63.3	11	36.7	1.77	1.12-2.77	0.01
Yes	19	35.8	34	64.2			
Non adherence per patient (N=53)							
One	14	48.3	15	51.7			0.02
Two	4	40.0	6	60.0			
Three or more	1	7.1	13	92.9			
Phase of management of non adherence (N=53)							
Pre-hospital	2	15.4	11	84.6			0.06
In-hospital	3	25.0	9	75.0			
Both	14	50.0	14	50.0			

Table 4 - Regression analysis of contributing factors to death

	Multivariate*		
Variable	OR	CI 95%	p value[†]
Trauma (penetrating)	10.36	3.62 – 29.66	< 0.001
Probabily of survival > 0.5[‡]	0.04	0.01 – 0.13	< 0.001
Number of non adherence events	1.47	1.05 – 2.05	0.02

*Multiple Logistic regression. [†] Wald Chi-Square Test. [‡] Probability of survival by TRISS methodology.

CI – confidence interval; OR – *odds ratio*.

DISCUSSION

The current study evaluated trauma patients who were managed according to international guidelines during the pre-hospital phase until hospital discharge, and we looked for non adherence during management to correlate its presence with the occurrence of deaths.

We found that 54.2% of the deaths that occurred were potentially preventable and that they occurred more frequently in blunt trauma victims. Based on TRISS calculations, 65% of patients had a higher than 50% probability of survival. Other authors have reported lower rates of preventable deaths and have found that these types of deaths occurred more frequently during the in-hospital phase of treatment.[28,29]

Our results revealed that a large proportion of patients (66.2%) had non adherence events during their treatment and that more non adherence per patient occurred among non-survivors than survivors. Multiple non adherence events (i.e., >3 per patient) were more likely to occur in the non-survivor group. Therefore, we concluded that the presence of multiple non adherence events could have increased the probability of death in this cohort. It can be speculated that because non-survivors presented with more severe injuries, they required complex treatments, which could possibly have led to a higher probability of the occurrence of non adherence to protocols guidelines. Regression analysis adjusted to severity and case mix demonstrated that non adherence independently contributed to death in our patients.

Among non-survivors, non adherence occurred more frequently in the group of patients classified as potentially preventable deaths (64.2%). Additionally, the majority of patients with multiple non adherence events (92.9%) were also in this group. These findings support the existing evidence that non adherence to guidelines recommendations can be considered a risk factor for mortality in trauma patients and increase the number of potentially preventable deaths.[13,17-19]

The occurrence of non adherence was more frequent during the pre-hospital phase. During the in-hospital phase, non adherence occurred most frequently during resuscitation and management of brain injuries. We must consider two important aspects when interpreting these findings. First, 60% of non adherence that occurred in the pre-hospital phase was due to delays in patient referral. This likely impacted the survival rate of those patients because the time that elapses between trauma and definitive treatment has prognostic value.[30] It has been proven that

during wars, a delay in treatment influences survival. During World War II, the mortality rate of 5.8% was associated with a transportation time between 12 and 15 hours. During the Korean War, the mortality rate was 2.4%, and the transportation time was between 4 and 6 hours. During the Vietnam War, the mortality rate was 1.7%, and the transportation time was between 1 and 4 hours. Thus, a clear pattern can be observed between transportation time and mortality rate.[31] The second aspect to be considered is the fact that 14% of the in-hospital non adherence were due to management of brain injuries and that most of the deaths that occurred in our patients were caused by brain injuries.

It is important to be cautious when interpreting findings regarding potentially preventable deaths. A high incidence of preventable deaths generally points to a low quality of the health care system. However, to better verify the efficiency and efficacy of health care systems, additional data regarding survivors of severe injuries, the mechanism of injury of trauma patients, the location at which the traumatic event occurred, and intrinsic conditions of the trauma are necessary.[12]

By comparing our mortality findings with those of the MTOS using Z statistics, we found a significant difference between our mortality rate and that of the MTOS (Z-statistic=6.69). This result in Z statistics shows that the number of deaths found in our patients was higher than expected compared to the patients in the MTOS cohort. The value of Z-statistics can be affected by differences in terms of injury severity between our patients and those from MTOS. The M-statistic can be used to evaluate similarities in the severity of injuries among groups. Values of M vary from zero to one. If the result of M statistics is one, it means that the severity of injury is identical in the two groups. Therefore, closer a value of M is to one, more similar is the severity of injuries among groups. Values below 0.88 indicate significant differences between groups.[24] In our study, the M-statistic value was 0.44, indicating that there was a significant difference in injury severity in our patients compared to the patients in the MTOS cohort.[26]

Another aspect that must be considered when evaluating the potential causes of our high mortality rate is the setting of the present study. Londrina State University Hospital is classified as a teaching and general hospital, and it has been reported that trauma victims who are managed in general hospitals may have a worse prognosis than those that are treated in specialized centers.[5]

There are several limitations to the present study that must be considered. This is a retrospective study that was performed as a baseline analysis while further studies in our trauma care system are still ongoing. We, therefore, applied the AIS-85 because it was in use during the observation period of the present study. Due to the retrospective design of the research, and because it depended on medical records, information about patient management may have been missed, and the non adherence events reported in this study may have been overestimated. To minimize this possibility, patients' medical records were compared with nursing records and with the registries of other teams who also cared for the patients. The fact that two of the reviewer physicians that searched for adherence to guidelines recommendations are authors of this study may have introduced bias in their decisions. To minimize this possibility, we blinded the reviewers about information on death, TRISS and probability of survival. Furthermore, some of the non adherence criteria adopted, such as, delays in bleeding control, neurological evaluation, neurosurgical procedure and ICU admission, were judged according to reviewers' opinions and this may have also introduced bias in the study. These criteria are not objective in the literature, since the timing to perform these therapeutic procedures depends on the evaluation of each case by the emergency physician, taking into account many variables, such as severity of injuries, presence of comorbidities and age.

The adoption of the TRISS methodology to find out the preventable deaths could also be seen as a limitation of this study, since there are alternative methods described in the literature, such as a clinical review of the patient's chart and autopsy data, using judge reviewers to decide whether a death was preventable or not. These alternative methods are not free from limitation either; notably, in the most severe cases where the complexity of injuries involving more than one organ has to be taken into account, the difference in the clinical expression of these injuries for different age groups and previous clinical condition of victims is problematic. All these variables make it difficult to analyze which deaths are supposed to be considered preventable, reflecting the quality of the system where it occurred.

Furthermore, when adopting the TRISS methodology, we have to consider that our population has very severe injuries and does not perfectly match the major trauma outcome study (MTOS) population, as seen by the finding of M statistics of 0.44. The positive Z statistics of our study may also imply that the TRISS methodology may have underestimated mortality for our patients.

Since our results suggest non adherence is associated with increase in mortality, strategies to reduce non ad-

herence events must be addressed. The first step we propose is identification of specific categories of non adherence that is most common, as we could determine in the present study. The second step would be through technical training, and ensuring that professionals performing the tasks are technically competent and appropriately credentialed. Attention to detail, checklists, and supervision can be effective in reducing non adherence. Finally, implementing evidence-based institutional protocols is effective in reducing the possibility of deviations from recommendations. The ATLS protocols for early management of severe trauma are an excellent example of effective guidelines, and implemented as an institutional protocol that promotes changes in staffing, training, equipment and supervision would affect performance and probably reduce mortality.

CONCLUSIONS

This study revealed that our trauma victims have severe injuries and do not match perfectly the MTOS population database. Our results showed that a higher number of deaths than expected occurred in this cohort as compared to the MTOS cohort.

Non adherence to guidelines recommendations was common during the management of trauma patients in the present study, and more frequently in the pre-hospital management phase. The presence of multiple non adherence events was most commonly identified in the non-survivor group. Deaths were considered to be potentially preventable in approximately half of non-survivors patients, and the number of non adherence events was independently associated with death.

RESUMO

Objetivos: Avaliar pacientes tratados por lesões traumáticas e identificar a adesão às recomendações de diretrizes de tratamento e sua associação com óbito. As recomendações adotadas foram as definidas pelo comitê de Trauma do *American College of Surgeons* para suporte avançado de vida no trauma.

Métodos: Este foi um estudo de coorte retrospectivo realizado em um hospital de ensino. A população do estudo foi constituída por vítimas de traumatismo com idade igual ou superior a 12 anos e com escores de gravidade da lesão ≥ 16 tratados entre janeiro de 1997 e dezembro de 2001. A coleta de dados foi dividida em três fases: pré-hospitalar, intra-hospitalar e post-mortem. Os dados colhidos foram analisados com o software EPI INFO.

Resultados: Analisamos 207 pacientes, 147 vítimas de traumatismo fechado (71%) e 60 (29%) vítimas de traumatismo penetrante. As vítimas de traumatismo tiveram uma taxa de mortalidade de 40,1%. Identificamos 221 eventos de não adesão que ocorreram em 137 pacientes. Identificamos uma média de 1,61 ocorrências de não adesão por paciente, que ocorreu menos frequentemente entre os que sobreviveram (1,4) do que entre os que não sobreviveram (1,9; p=0,033). Segundo a metodologia de escore de gravidade da lesão, 54,2% dos óbitos foram considerados potencialmente evitáveis. A não adesão ocorreu 1,77 vezes mais frequentemente nos óbitos que foram considerados potencialmente evitáveis em comparação aos demais não-sobreviventes (IC 95%: 1,12 – 2,77; p=0,012) e 92,9% das ocorrências múltiplas de não adesão ocorreram no primeiro grupo (p=0,029).

Conclusões: A falta de adesão às diretrizes ocorreu com maior freqüência em pacientes com óbitos potencialmente evitáveis. O não cumprimento das recomendações das diretrizes pode ser considerado um fator contribuinte para a morte em vítimas de traumatismo, e pode levar a um maior número de mortes potencialmente evitáveis.

Descritores: Centros de traumatologia; Índices de gravidade do trauma; Mortalidade; Avaliação de resultados (Cuidados de Saúde); Causas de morte; Fatores de risco

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