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ANALYSIS OF TRAUMA OUTCOME AT A UNIVERSITY HOSPITAL IN ZAHEDAN, IRAN USING THE TRISS METHOD

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ABSTRACT

Objective: To evaluate validity of TRISS (Trauma score and injury severity score) method in trauma outcome analysis and compare trauma care at a university hospital, with the standards reported in the Major Trauma Outcome Study (MTOS).

Design: Analytical and descriptive study.

Setting: Khatam-ol-anbia University Hospital in Zahedan, Iran, from March 22, 1997 to March 21, 1998.

Subjects: Seven hundred and sixty eight consecutive patients with multiple trauma were included in the study. Survival analysis was completed for all of the patients.

Results: The majority of patients were men (82%), and the average age was 23 years. Seven hundred and one patients (91%) sustained blunt trauma, with road traffic accidents being the most common (59%). The predicted mortality was 3.1% and the observed mortality was 8%. The M-statistics was 0.91.

Conclusion: In developing countries the same as developed countries, the TRISS methodology is an acceptable method for evaluation of the difference between predicted and observed mortality. This study shows that our mortality is significantly more than universal standards and there are weak points in our trauma care system.

INTRODUCTION

Trauma is one of the most important problems of health and the most prevalent cause of mortality to persons below 45 years (1). Two separate trauma centres were compared with each other, more than 50 trauma scoring systems have been invented (2). Measurement of trauma outcome was first addressed in 1974 by Baker *et al* (3), who proposed the injury severity score (ISS). This was based on the earlier Abbreviated Injury Scale (AIS), which attempted to rate anatomic tissue damage. Champion *et al* (4) suggested the physiological trauma score as a method of triage in 1981. Using data from the American MTOS, these two scores were combined with an adjustment for age and type of injury to form the Trauma Score and Injury

Severity Score (TRISS) method in 1987 (5). Refinements have involved the Revise Trauma Score (RTS) (5) being substituted for the trauma score and updates of the AIS.

In a study of characteristics and outcome of injured patients treated in urban trauma centres in Iran, the time expenditure and means of transportation as well as the time of stay in emergency department all seemed to be far less than optimal (6).

In this study, in Khatam-ol-anbia, the referral university hospital in Zahedan, the capital of Sistan and Balouchestan, a poor socioeconomic province of Iran, we decided to evaluate validity of TRISS method in trauma outcome analysis and determine our trauma care condition by comparison with UK data and USA data by TRISS methodology.

MATERIALS AND METHODS

In this retrospective, descriptive and analytical study we studied all the trauma patients' files (except burning and near drowning). Data were collected for a period of one year from March 22, 1997 to March 21, 1998 at Khatamn-ol-anbia hospital. The data included: sex, age, systolic blood pressure (at arrival), respiratory rate (at arrival), GCS (at arrival), mechanism of trauma, all the injuries of patients, and patients outcome. Then the RTS, ISS (according to AIS 90) (7) of each patient calculated and according to the type of trauma (blunt or penetrating) and patient's age, probability of survival compared with US and UK coefficients, means and standard deviations of probability' of survivals in both systems were calculated. According to the highest AIS in each patient they were divided into neurosurgery, general surgery, urology, ENT and orthopaedic groups and these groups compared with the observed results and analysed using T-tests.

RESULTS

There were 768 trauma patients; 701 (91.3%) had blunt trauma and 67(8.7%) penetrating trauma; 620 patients (81.7%) were male and 148 (19.3%) were female. The mean age of patients was 22.8 ± 16.1 years. Blunt trauma patients had 56 (7.99%) mortalities and penetrating had four (5.98%). The most common mechanisms of trauma were road traffic accidents (59.4%), and falling (18.1%) respectively.

We had 3.3 (70%) deaths per hundred patients more than UK data ($P < 0.0001$) and 4.9 (158%) deaths

per one hundred patients more than USA data ($P < 0.0001$), 83% of deaths belonged to neurosurgery and 17% of deaths to general surgery but there was no significant difference in orthopaedic patients mortality' with standard; we experienced less mortality in ENT and urology patients than standard; 0.3 deaths in 100 patients less than standard in urology patients and 0.7 deaths less than standard in ENT patients (Table 1). There was no significant difference in penetrating trauma.

To show that the population studied was matched with the original MTOS (Major Trauma Outcome Study) cases, the M statistic of our study was 0.91 and results are valid. A value of M less than 0.88 indicates a disparity in the severity match between the study group and the MTOS group. When the M score is more than 0.88, validity of the study is confirmed (8-10).

DISCUSSION

In 1988 the Royal College of Surgeons of England published its report on the management of patients with major injuries and concluded that at least one in five patients, presenting to hospital alive, subsequently died unnecessarily. These avoidable deaths were due to medical mismanagement at every level and through out specialties (11).

We had a mortality of 158% more than USA, so more than 58% of preventable deaths. In USA, there was a statistically significant decrease in the region-wide mortality rate, associated with a marked improvement in performance of the non trauma centres and with an increase in the proportion of patients who received definitive care at a trauma

Table 1

Trauma mortality in Khatam-ol-anbia Hospital and its match predicted in UK and USA in different departments

			Khatam		UK		USA	
	No.	(%)	S	OM%	PM%	P-value	PM%	P-value
Neurosurgery	484	69	436	9.9	6	<0.05	3.9	<0.01
General surgery	69	9.8	62	10.1	3	<0.05	1.5	<0.05
Orthopaedic	90	12.8	88	2.2	1.2	>0.05	0.7	>0.05
ENT	31	4.4	31	0	1.5	<0.05	0.7	<0.01
Urology	27	3.9	27	0	0.4	<0.01	0.3	<0.01
Total	701	100	645	8.0	4.7	<0.0001	3.1	<0.0001

S = Survived; PM = Predicted Mortality; OM = Observed Mortality

centre. This improvement may be attributable in part to changes in field triage and early transport to trauma centres (12).

Ozguç *et al* (13) showed in-hospital integrated approach to trauma made major improvements in the care of the patients with severe injuries.

In two prospective studies, the TRISS methodology was used to compare trauma care at two University Hospitals in Jakarta, Indonesia (14), Mumbai, India (15), with the standards reported in the Major Trauma Outcome Study (MTOS). The predicted mortalities were 14% and 11% and the observed mortality was 29% and 21 % respectively. The Z was 7.87 and - 14.1593 respectively and M statistics 0.84 in both of them.

The greatest problem was seen in general surgery and neurosurgery fields. Comparison with UK data mortality showed 3.9 (65%) more deaths in 100 neurosurgery patients and 7.1 (237%) more deaths in 100 general surgery patients. Regarding general surgery, it could be due to occult abdominal injuries and their late diagnosis; however it needs more evaluation.

In conclusion, in-hospital integrated approach to trauma, increasing ICU beds, personnel and our facilities in this relation, increasing neurosurgeons or short courses of emergency skills of neurosurgery to surgeons. Moreover we should educate all of the personnel that face trauma patients.

The high M statistics of our study shows that in developing countries the same as developed countries, the TRISS methodology is an acceptable method for evaluation of the difference between predicted and observed mortality.

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