

Develop a New Trauma Score for Trauma Triage in Emergency Department of Pamela Youde Nethersole Eastern Hospital

MSY Yuen (1), DHK Chow (2)

(1) Department of Accident and Emergency, Pamela Youde Nethersole Eastern Hospital, Hong Kong

(2) Department of Health and Physical Education, Education University of Hong Kong

Introduction

Trauma Scores were developed in the 80s and have been used in assessing injury severity and predicting mortality of the injured by the trauma registries, they were not used in Emergency Department (ED) because of data availability and ease of coding issues.

Objectives

To develop a trauma score for trauma triage
To test the applicability of trauma score in triage and predictive ability with mortality in ED

Method

Retrospective analysis of trauma patients from Hong Kong East Cluster Trauma Registry was conducted. Trauma score (mSETS) was developed from the trauma database of 2007 to 2009 and validated from 2010 to 2011. Potential parameters in predicting mortality were identified by univariate analysis. Mortality analysis was used to develop mSETS and compared with commonly used trauma scores using the area under receiver operating characteristics curves (AROC).

Pilot study was carried out from January 6th to February 4th 2017, training and Q-Card were provided to nurses who were interested in the study.

T-test, correlation, AROC and Mortality were employed in analysis.

| Table of Modified SETS (mSETS) | | |
|---|---------|---------------------------|
| Modified SETS (mSETS) for Trauma Patient Assessment at Triage Station | | |
| Parameters | Point | Suggested Triage Category |
| Age \geq 60 | 1 point | 1 to 4 |
| Glasgow Coma Scale (GCS) 3-8 | 1 point | 1 |
| Respiratory Rate (RR) \leq 10 / minute | 1 point | 1 |
| Suspect of having any one of the following anatomical injuries: - All penetrating trauma to head, neck, torso and extremities proximal to elbow and knee - Major burns - Open and depressed skull fracture; - Significant blunt or crush injury to chest/ abdomen - Flail chest; - Spinal injury with neurological sign (limb paralysis) - Pelvic fractures - Two or more proximal long bone fractures - Amputation proximal to wrist or ankle | 1 point | 1 to 2 |
| Score by summation. The presence of point \geq 2 suggests high risk of poor outcome in patients with trauma. It is recommended categorizing at 1 to 2 and managed in the resuscitation room. | | |

Results

1057 and 850 patients records were used in developing and validating the mSETS. Four parameters: Age, Glasgow Coma Scale (GCS), Respiratory Rate (RR) and Injury were identified; all had equal weighting. Score by summation. One point would be added if the injured had 1) \geq Age 60, 2) GCS of 3 to 8, 3) $RR \leq 10$ breaths/ minute and 4) suspect of having the listed anatomical injuries. The score ranged from 0 to 4.

At cut-off point 2, the sensitivity and specificity of mSETS were 65% and 95%, the positive predictive value and negative predictive value was 0.47 and 0.98, the percentage of accuracy was 94.4. The AROC was 0.896 which was comparable with RTS, ISS and TRISS (0.853, 0.914 and 0.962). At point ≥ 2 , the injured was considered serious and triaged at Critical or Emergency.

In application, 10 nurses participated and 135 patients were recruited in the pilot study. In triage category analysis, mSETS was marginally and negatively correlated with triage category of the injured ($r = -0.391$, $p < 0.01$). In mortality analysis, mSETS was directly proportional to the prediction of mortality, the AROC was 0.991. Nurses with less than two years of experience in ED particularly found mSETS useful and practical.

Conclusion

The new trauma score (mSETS) contains both anatomical and physiological components, all are obtainable in Triage. It is considered a relevant trauma score for trauma triage in ED.