Relation between Injury Severity Score and Outcome of Polytrauma Patients

AHMED A. MOHAMED, M.Sc.*; MONIRA T. ISMAIL, M.D.**; SAMEH S. AZIZ, M.D.*** and AHMED M. EL-LABAN, M.D.**
The Departments of Surgery, Dar El-Shefa Hospital, Cairo*, Emergency Medicine** and Surgery***, Faculty of Medicine, Suez Canal University

Abstract

Objective: To evaluate the effectiveness of Score Injury Severity (ISS) in the outcome of polytrauma patients.

Patients and Methods: The current study was carried out at Emergency Department of Suez Canal University Hospital during year 2013. 210 patients of polytrauma were included in our study. All patients were classified according to ISS into mild, moderate, severe and profound.

Results: Among 210 patients underwent Score Injury Severity (ISS) evaluation in our study, 30 patients were classified as profound, 52 patients were classified as severe, 52 patients were classified as moderate and 76 patients were classified as mild. All profound cases (30), all severe cases (52) and (13) moderate cases were admitted whereas there no mild cases were admitted. All deaths were among profound cases.

Conclusion: Score Injury Severity (ISS) is a good prognostic tool for polytrauma patients, as it decreases, the prognosis of the cases improve and vice versa.

Key Words: Injury severity score – Polytrauma.

Introduction

TRAUMATIC injury is the leading cause of death and disability in people aged between 1 and 40 years in the developed world [1,2] and after heart disease and cancer, a common cause of death in the older population [3].

Scoring may allow collection of data more accurately and consistently, costs may be reduced, clinical research is facilitated, epidemiologic analysis is possible, the time course of illnesses can be documented (organ dysfunction etc.) earlier determination of a problem [4].

Scoring systems were designed initially to categorize patients with single, specific diagnoses into risk and prognosis groups. Clinical assessment of severity of illness is an essential component of medical practice. It is intuitive to consider whether patterns and severity of physiological disturbance can predict patient outcome [5].

Scoring systems for use in emergency room patients have been introduced and developed over the last 30 years. They allow an assessment of the severity of disease and provide an estimate of in-hospital mortality. This estimate is achieved by collating routinely measured data specific to a patient. A weighting is applied to each variable, and the sum of the weighted individual scores produces the severity score. Various factors have been shown to increase the risk of in-hospital mortality after admission to hospital, including increasing age and severity of acute illness, certain pre-existing medical conditions (e.g. malignancy, immunosuppressant, and requirement for renal replacement therapy), and emergency admission to ICU [6].

Severity scoring systems allow generation of a score that reflects the severity of the condition resulting in ICU admission. The scores allow the factors that influence outcome and those differ between patients to be taken into account and can be standardized to allow comparison between patients [6].

A systematically organized approach to trauma evaluation and management has been shown to reduce mortality, morbidity, and length of hospital stay [7,8].

Injury scoring systems are used to determine the potential for someone having sustained a serious injury. They are useful in situations where there is more than one casualty, as they allow emergency
services and ED personnel to prioritize the more severely injured patients [9].

The Injury Severity Score (ISS) is the most commonly used measure of injury severity. It is an anatomical scoring system that provides an overall score for patients with multiple injuries. Each injury is assigned an Abbreviated Injury Scale (AIS) score [9,15].

Aim of the work:

This study aims to classify patients presented to the Suez Canal University Hospital with multiple-trauma. And try to find a relation between injury severity score and their outcome.

Patients and Methods

This study was designed as a prospective study that was carried out in the period from first of April (2012) to thirty of September (2012). The sample population was drawn for patients presented to Emergency Department of Suez Canal University Hospital with multiple trauma fulfillment inclusion criteria (patients presented with multiple trauma, both sexes and age group: 18-60). All the patients were subjected to assessment and classified using Injury severity score into mild, moderate, severe and profound. The ISS is based upon the Abbreviated Injury Scale (AIS). To calculate an ISS, the body is divided into six ISS body regions. These body regions are head and neck, face, chest, abdomen, pelvis and extremities. To calculate an ISS, take the highest AIS severity code in each of the three most severely injured ISS body regions, square each AIS code and add the three squared numbers for an ISS (ISS = A^2 + B^2 + C^2 where A, B, C are the AIS scores of the three most injured ISS body regions). The ISS scores ranges from 1 to 75 (i.e. AIS scores of 5 for each category). ISS is categorized as mild (<9) moderate (9-15), severe (16-25), and profound (>25). If any of the three scores is a 6, the score is automatically set at 75. Since a score of 6 ("unsurvivable") indicates the futility of further medical care in preserving life, this may mean a cessation of further care in triage for a patient with a score of 6 in any category. Severe injury is routinely defined as an ISS >15.

Statistical analysis:

Gathered data were processed using SPSS version 15 (SPSS Inc., Chicago, IL, USA). Quantitative data were expressed as means ± SD while qualitative data were expressed as numbers and percentages (%). Student t-test was used to test significance of difference for quantitative variables and Chi Square was used to test significance of difference for qualitative variables. A probability value (p-value) <0.05 was considered statistically significant.

Results

According to relation between mode of trauma and ISS, as regard to RTA, there were 23 profound cases, 43 severe cases, 46 moderate cases and 32 mild cases. As regard FFH, there were 5 profound cases, 6 severe cases, 4 moderate cases and 2 mild cases. As regard to gunshot, there were 2 profound cases, 3 severe cases, 1 moderate case and 35 mild cases. As regard to assault, there was 1 moderate case and 7 mild cases where as there was neither profound nor severe cases (Table 1).

According to relation between length of hospital stay and ISS, the duration ranged from hours to period more than two weeks. 13 cases were admitted for hours (all of them were moderate), 49 cases were admitted for less than one week (5 of them were classified as profound and 44 as severe), 19 cases were admitted for more than one week (11 of them were classified as profound and 8 as severe) and 14 cases were admitted for more than two weeks (all of them were classified as profound) (Table 2).

According to relation between ISS and mortality, all deaths were among profound cases only and all other cases survived (Table 3).

<table>
<thead>
<tr>
<th>Mode of trauma</th>
<th>ISS</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Mild</td>
<td>Moderate</td>
</tr>
<tr>
<td>RA:</td>
<td>32</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>42.11</td>
<td>88.46</td>
</tr>
<tr>
<td>Gunshot:</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>46.05</td>
<td>1.92</td>
</tr>
<tr>
<td>FFH:</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2.63</td>
<td>7.69</td>
</tr>
<tr>
<td>Assault:</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>9.21</td>
<td>1.92</td>
</tr>
<tr>
<td>Total:</td>
<td>76</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>100.00</td>
<td>100.00</td>
</tr>
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</table>

Chi-square:

<table>
<thead>
<tr>
<th>\chi^2</th>
<th>71.514</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>
Discussion

The present study has been conducted for 6 months (from April to September) in Emergency Department of Suez Canal University Hospital to evaluate the relationship between mode of trauma and injury severity score. 210 cases (165 male and 45 female patients) were enrolled in this study.

RTA was the cause of polytrauma in 144 (68.57%) patients, FFH was the cause of polytrauma in 17 (8.10%) patients, gunshot was the cause of trauma in 41 (19.52%) patients and assault was the cause of trauma in 8 (3.81%) patients. RTA was significantly higher than other causes. In study done by Zafer \cite{9}, RTA as a cause of trauma was significantly more than falling, and this was the same result in the study done by Dibantolomeo, et al., \cite{10}, also in the study done by Goyal, et al., \cite{11} RTA was the most common cause of poly trauma patients (49%), and this was also in the study done by Hassan, et al., \cite{12}, in study done by Johannes S. et al., \cite{13}, about 68% of the patients caused by RTA. and this also was the result in the study done by Babatunde, et al., \cite{14}.

There were 191 (90.95%) patients with head trauma, 151 (71.90%) patients with abdominal trauma, 49 (23.33%) patients with chest trauma and 89 (42.38%) patients with skeletal trauma. Head trauma was significantly higher than other sites of trauma. In study done by Sakran J.V. et al., \cite{16} head was the most common site of injury in poly trauma patients, while in the study done by Sakran, et al., \cite{16} head was the most common site of injury (45%), this was also the result of the study done by Demetrios Demtriodes et al., \cite{17} as head injury was the most common site of injury in polytrauma patient, also the same result was found in the study done by Hassan, et al., \cite{12} as head injury account for (44%) of cases.

As regarding the mortality rate and the relation to cause of trauma, in RTA 16 (72.72%) patients died, in gunshot 3 (13.64%) patients died while in FFH there were 3 (13.64%) patients died. Road traffic accidents had high mortality rate, which was (72.72%) this agrees with the study by Ozgur, et al., \cite{18}.

**Conclusion:**

The present study concluded that ISS is a good prognostic tool for triaging polytrauma cases.

**References**


يتم أخذ على رمق (حسب جدول الإصابة المختصر) لأن ثلاث مناطق (حسب مقياس شدة الإصابة) من حيث شدة الإصابة ثم يتم ترتيبهم وجمعهم سوياً للحصول على مقياس شدة الإصابة.

الهدف من الدراسة: تهدف هذه الدراسة إلى تصنيف مرضى الإصابات المتعددة المرتدين على قسم الطوارئ بمستشفى جامعة قنطرة السويس ومحاولة إيجاد علاقة بين شدة الإصابة ونتائج هؤلاء المرضى.

وسائل الدراسة: تم أخذ التاريخ المرضي وفحص مرضى الإصابات المتعددة وتصنيفهم باستخدام مقياس شدة الإصابة ومقارنتها بنتائج هؤلاء المرضى.

تضمن هذه الدراسة 220 حالة من حالات الإصابات المتعددة الواردة إلى مستشفى جامعة قنطرة السويس خلال فترات ثلاثة أشهر تبدأ من أول أبريل 2012 حتى 30 سبتمبر 2012 وقد أجريت دراسةً لهذه المصابين شملت:

2- وقته الوصول لقسم الطوارئ.  
3- نوع وطريقة الإصابة.  
4- الحالة العامة للمصابين وعمل الفحوصات اللازمة.  
5- معدل الوفيات والشفاء.

النتائج والاستنتاجات:

1- القياس الرئيسية للإصابة كانت حوات السيارات بنسبة 67.28%.
2- معظم الإصابات كانت في السن العمرية بين 20-25 سنة بنسبة 24.5%.
3- وجد أن الذكور أكثر عرضة للإصابة من الإناث بنسبة 78.18%.
4- الرأس كان الأكثر عرضة للإصابة بنسبة 80.2%، تليها البطن بنسبة 79.90%.
5- غالبية حالات الإصابات كانت في الفترة من الثاني من الشهر الأول إلى الثالثة من الشهر الثاني بنسبة 43.14%.
6- حوات السيارات كانت السبب الرئيسي للفوت بنسبة 87.29%.
7- مقياس شدة الإصابة كان كافياً للتنبؤ بمصير الحالات، حيث أن معدل المنخفض كان يعني مصير أفضل للحالات والعكس صحيح.

ومن هذا يمكن استنتاج الآتي:

1- الشبح، خصوصاً الذكور في عمرهم الانتاجي، يمثل الغالبية من حالات الإصابات في هذا البحث.
2- القياس الرئيسية للإصابة كانت حوات السيارات.
3- الرأس كان الأكثر عرضة للإصابة.
4- مقياس شدة الإصابة كان كافياً للتنبؤ بمصير الحالات.

توصيات الدراسة:

1- تطبيق مقياس شدة الإصابة على مرضى الإصابات المتعددة حيث يساعد الطبيب في اتخاذ قراره.
2- يجب عمل دراسة أخرى على نطاق أكبر من المرضى للحصول على نتائج أكثر دقة.
3- يجب بنزول العديد من الجهد من أجل استخدام مقياس شدة الإصابة جديد للحصول على نتائج أفضل.