



A COMPARATIVE STUDY BETWEEN ISS AND NISS IN TRAUMA PATIENTS ATTENDING SURGERY DEPARTMENT OF RIMS RANCHI

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ABSTRACT

Trauma is one of the most common cause of mortality in developing nation. Trauma patients are increasing day by day which is attributed to increase in number of motor vehicles. Various trauma scores have been developed to predict the mortality and outcome in trauma patients. Hence this study was done to test the accuracies of ISS & NISS for predicting mortality and outcome in chest and abdominal trauma patients. A Tertiary centre hospital based prospective & observational Study was conducted from June 2021 to September 2022 in Rajendra Institute of Medical Sciences, Ranchi. A total of 204 patients were included in my study who presented with chest and abdominal trauma and fulfilled my inclusion criteria. A thorough clinical examination was performed, followed by necessary interventions, primary management and radiological investigation which were done as per patient's requirement. After that Trauma scores were computed and recorded. Data was further analysed using SPSS software.

KEYWORDS

Trauma, Injury Severity Score(ISS), New Injury Severity Score(NISS), Damage Control Orthopaedics(DCO), Abbreviated Injury Scale(AIS)

INTRODUCTION

Trauma means "any injury cause to the body". The injury may be caused due to many reasons like road accidents, fires, falls, acts of violence and crimes against vulnerable population including women, children and elderly. Amongst all the causes road traffic accident is the leading cause of trauma across the world. In India, it is estimated that one million people die and 20 million are hospitalized every year due to injuries.[1]

Scoring systems are corner stones of the trauma epidemiology. Graded according to the severity of injury is necessary for the management of trauma and as well as basic requirement for clinical trials. New injury severity score (NISS) and injury severity score (ISS) are widely used in the estimation of mortality due to injury.[2,3]

Measurable and comparable objective criteria are required for determining the severity of trauma. For this purpose many anatomical and physiological scoring systems are created.[4,5,6] These scoring systems can provide some benefits-

1. Objectively determine the level of injuries which enables the care units to classify the patients according to the specified special care they need.
2. The physiological data that are associated with mortality in the early period after an injury can be determined to follow up the at-risk patients.
3. The scores can be helpful by transporting the patients to the appropriate hospitals.
4. Patients who may benefit the most from the treatment may be primarily determined.
5. They can enable to determine the kind of health institutions, which are necessary in this region.
6. Epidemiological data bases about the injuries and its severities can be created.
7. According the results obtained in the treatment of trauma patients the effectiveness of health institutions can be compared.[4,7,8]

Trauma scores were introduced more than 30 years ago for assigning numerical values to anatomical lesions and physiological changes after an injury. Physiological scores describe changes due to a trauma and translated by changes in vital signs and consciousness. Anatomical scores describe all the injuries recorded by clinical examination, imaging, surgery or autopsy. If physiological scores are used at first contact with the patient (for triage) and then repeated to monitor patient progress, anatomical scores are used after the diagnosis is complete, generally after patient discharge or postmortem. They are used to stratify trauma patients and to measure lesion severity. Scores that include both anatomical and physiological criteria (mixed scores) are useful for patient prognosis[9].

The scoring systems which are compared are as follows:-

- Injury severity score (ISS)

- New injury severity score (NISS)

Injury Severity Score (ISS)

The injury severity score (ISS) 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 and is allocated to one of six body regions. The highest AIS score in each body region is used. The three most severely injured body regions score squared and added together to form the ISS score[9]. The ISS score takes values from 0 to 75. If an injury is assigned an AIS of 6 (Unsurvivable injury), the ISS score is automatically assigned to 75. The ISS score is virtually the only anatomical scoring system in use and correlates linearly with mortality, morbidity, hospital stay and other measures of severity. Major trauma is considered when ISS > 15.

Bolorunduro et al. categorised and validated the ISS as follows[10]:

Score < 9	Mild
Score between 9-15	Moderate
Score between 16- 24	Severe
Score ≥ 25	Profound

Disadvantage of ISS is that it only takes one injury in each body region. This leads to injuries being overlooked and to less severe injuries occurring in other body regions being included in the calculation over more serious ones in the same body region[11].

New Injury Severity Score (NISS)

A simple modification to the ISS, the new injury severity score (NISS), was designed by Osler et al. in 1997 to counter this problem[12]. The ISS has an idiosyncrasy that impairs its predictive power and complicates its calculation. Due to this, a simple modification of the

ISS called the NISS was presented. The NISS is defined as the sum of squares of the AIS severity scores of a three most severe injuries, regardless of body location occur. The NISS is a modification of ISS and using both in trauma provides useful information.

Lavoie et al. (2004, 2005) have found that the NISS is better choice in trauma research than ISS for predicting ICU admission, hospital length stay and of in-hospital mortality. Balogh Z et al. declared that NISS better predicted post injury organ failure than ISS. Husum H et al. described that both the ISS and the NISS predicted short term mortality with accuracy for victims with penetrating trauma. According to them, NISS predicts post injury complications much better than ISS, but the accuracy of both tests was moderate and further studies are needed before the NISS should be adopted as the "gold standard" for severity scoring. This enhanced trauma scoring might be useful in assessment of trauma delivery with the aim optimizing treatment of multiple trauma patients. The objective assessment of injury severity helps to choose the more appropriate method for management of multi trauma patients with severe bone and pelvic fractures.

Recently, damage control orthopaedics (DCO) method has been accepted as a more appropriate tactic in the management of multiple trauma patients with severe injuries and orthopaedic injuries. The approach of DCO takes the influence of post traumatic systemic inflammatory and metabolic reactions of the organism and is targeted at decreasing both primary and secondary mortality in severely injured patients. DCO appears to be an adequate alternative to early total care for patients at high risk of developing post traumatic systemic complications such as acute respiratory distress syndrome, multiple organ failure and systemic inflammatory response syndrome (SIRS). It provides the external fixation, which is better, life-saving and safe in patients with multiple injuries.

Poole GV et al. studies show that although AIS and ISS appropriately reflect the impact of extra skeletal injuries, in patients with femur fractures they do not adequately reflect the increased morbidity associated with multiple lower extremity fractures. They suggest that AIS score for multiple long bone fractures of lower extremities may need upgradation.

RESULTS

Two hundred and four trauma patients of aged more than 18 yrs were included in my study.

Out of 204 patients 174 patients(85.3%) were male and 30 patients(14.7%) were females.

Most common age group was between 21-30 years followed by < 20 years(28%).

Most common mode of injury was road traffic accident(50%) followed by assault(24.5%).

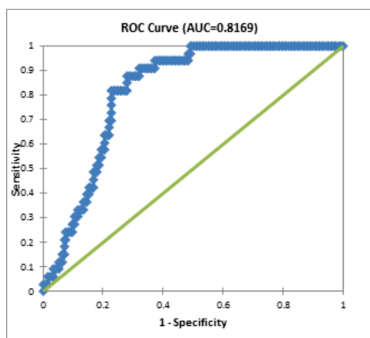
Blunt injury(83.8%) was more common than penetrating injury(16.2%).

Abdomen was more commonly affected than chest.

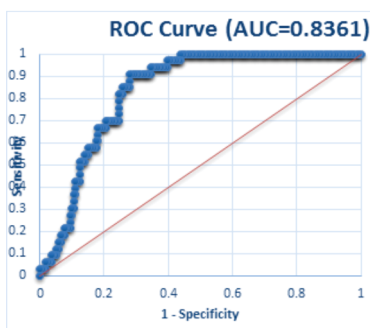
Out of all trauma patients 186 patients were discharged and 18 patients died during the follow up.

The predictive accuracies of the ISS and NISS were compared using receiver operator characteristic (ROC) curves for the prediction of mortality.

The area under ROC curve was 0.8169, 0.8361 for the ISS and NISS respectively.



Graph 1: ROC Curve For ISS



Graph 2: ROC Curve For NISS

According to logistic regression model used in my study, NISS was the strong predictor of mortality in chest and abdominal trauma patients.

CONCLUSION

Numerous scoring systems are available, each having its own shortcomings. In this study, 204 trauma patients were evaluated for the severity of injury and outcome.

1. There was a graded increase in mortality with increasing ISS and NISS scores.
2. Between ISS and NISS, NISS was better predictor of mortality than ISS.

Considering that each scoring system contains different variables possibly related to the patient's outcome, further study to update some of these prognostic scores is encouraged to make them more usable for trauma populations.

My study findings suggest that utility and applicability of injury severity scoring systems in chest and abdominal trauma patients using ISS and NISS scores can better help the surgeons in predicting the prognosis. However, NISS has maximum prediction in outcome when compared with the ISS scores.

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