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Classification of Traumatic Brain Injury Severity Complexities in Retrospective Data

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Purpose:

The primary purpose of this research was to describe traumatic brain injury (TBI) severity classification methods utilized in retrospective data in a large sample of patients within a national data bank, the National Trauma Data Bank (NTDB). Two common classification methods, the Glasgow Coma Scale (GCS) and the Abbreviated Injury Scale (AIS) head score, were compared in performance and their differences were analyzed. Secondary objectives were to compare demographic and clinical characteristics of TBI patients classified using the two methods, GCS and AIS of the head.

Methods:

Using correlational and descriptive statistics, this study examined two TBI severity classification methods across a large TBI patients sample (N=56,131), who were treated at level I and level II trauma centers in the United States and included in the 2010 National Sample Program (NSP) of the National Trauma Data Bank (NTDB®).

Results:

The study population was 67% male, 67% non-Hispanic white, treated most often in trauma centers in the South (38%), with blunt trauma (93%) and from non-MVC's (56%). Observation of the AIS classification system shows that it tends to over-score TBI severity compared to the GCS classification. The methods have a weak inverse correlation that is significant at $p < 0.001$.

Conclusion:

The study addressed the difficulties and inconsistencies associated with categorizing TBI severity when analyzing retrospective data, especially in the moderate TBI population. GCS is the most commonly used variable to classify severity in retrospective data with the head AIS variable used when GCS is missing. However, the relationship between the two scales is relatively unknown. Results show that AIS and GCS are more closely related for severely brain injured patients, however, in cases of mild and moderate injury, AIS is less predictive of GCS. This study reinforced the need for additional TBI severity classification methods, such as neuroimaging techniques and the use of biomarkers in brain injury classification. The study also encourages nurses to take advantage of the vast amount of retrospective, big data sets available to answer our many clinical questions and to ultimately improve the outcomes of our patients. However, the study demonstrates the methodological issues that one can encounter when utilizing such data.

Title:

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Keywords:

Big data, Injury classification and Traumatic brain injury

References:

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Abstract Summary:

Retrospective research utilizing big data sets is essential as we collect and examine data across the globe. However, inconsistencies are noted when classifying data such as the case of traumatic brain injury classification. This project examined inconsistencies in classification when working with big data sets and retrospective data.

Content Outline:

This presentation will discuss the importance of the nurse's role in the use and interpretation of big data sets in the research of traumatic brain injury and to ultimately improve the clinical outcomes of our patients.

Accurate classification of traumatic brain injury (TBI) severity is essential in research using retrospective data. The Glasgow Coma Scale (GCS) is commonly used to categorize injury severity as mild, moderate, or severe. When the GCS score is unavailable, the Abbreviated Injury Score (AIS) is often used. However, the relationship between the two scales is relatively unknown. Discrepancies have been noted in prior research when the two tools have been used in conjunction to classify severity as mild, moderate, and severe in patient samples. Over 56,000 patients were examined in the National Trauma Data Bank (NTDB) to look at the tool differences. This study reinforced the need for additional TBI severity classification methods for consistency in classifying brain injury severity in retrospective research.

The following objectives will be addressed:

Describe two tools currently used in the pre-hospital or acute care setting to document brain injury severity in the traumatic brain injured patient (GCS and AIS).

Examine the methodology complexities researchers encounter in combining and categorizing brain injury severity data in retrospective databases, such as in the National Trauma Data Bank (NTDB).

Critique other methods of categorizing brain injury severity in the future, including neuroimaging and biomarkers.

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Professional Experience: Sandra Rogers, PhD, MBA, RN, CNE is currently an assistant professor of nursing at Marymount University in Arlington, Virginia. Dr. Rogers has over 20-years of bedside patient care experience in the trauma intensive care setting and another 5-years in emergency departments within Level 1 trauma centers. Her research interests include traumatic brain injury (TBI); discharge destination predictors after TBI; biomarkers as predictors of TBI patients' functional outcome; quality of life after TBI; as well as caregiver burden in the families of TBI patients.

Author Summary: Dr. Rogers has presented her research in the area of brain injury and biomarkers in several professional settings, including a poster presentation at the 2013 Sigma Theta Tau International Conference held in Indianapolis, IN. Her work has also been featured in poster presentations at the 2012 Council for the Advancement of Nursing Science (CANS) Conference held in Washington DC and at the 2012 Research Day at George Mason University in Fairfax, VA.