The Geriatric Trauma Triage Project
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Abstract:
With an increasing elderly population, it is important to appropriately place those who are victims of a traumatic incident. This study aimed to determine a presence of over or under-triage of geriatric trauma patients in Lehigh County. By using a three-month period in EMS databases, a checklist was completed for each patient within those boundaries which included not only their injury but also various pre-existing medical conditions. The study suggests that the presence of under-triage is significant in Lehigh County due to the lack of EMS responders’ consideration of an elderly person’s special needs. In order to better understand geriatric trauma patients in the Lehigh Valley, further studies must be conducted to make conclusive statements based on the current rates of over and under-triage.

Background:
By 2050, 25% of the US population will consist of individuals over the age of 65 compared to the 12.5% makeup in 2000 (Daly et al 2012). There are multiple reasons for this expected substantial increase in the geriatric population including extended lifespan, decrease in overall fertility rate, and an increase in the socioeconomic level of people (Staudenmayer et al 2013). As the population of elders rises, their needs in healthcare will also become greater. The demand for aid in the older aged community is consequently increasing and will continue to as the population grows larger. In fact, as a person ages, their list of medical conditions becomes increasingly significant (Rehn et al 2013). These pre-existing comorbidities make it more difficult to determine the severity of any injury of a geriatric individual. In particular, trauma incidents in the elderly are becoming more common yet more complex due to their medical conditions. According to the San Diego County Trauma System, there was nearly a 15% increase of geriatric trauma events from 2004 to 2010 (Kahl et al 2013). In fact, trauma in the elderly was the ninth leading cause of death in that 65 and older age group in 2008 (Davis et al 2012).

There are various ways to assess a trauma patient of any age. One instrument used is the Injury Severity Score (ISS) which determines the appropriate destination based on the nature and severity of the injury (Rehn et al 2013). However, evidence suggests that elderly patients whose trauma is minor, which would indicate a low ISS, tend to have a significantly higher risk of death compared to their younger counterparts (Kahl et al 2013). Therefore, injury alone cannot be the only factor when choosing a destination for a geriatric trauma victim.

In order to better care for these patients, their pre-existing medical conditions must be understood. As a person ages, their ability to function both physically and mentally is obviously affected. Many factors come into play when it comes to an elderly trauma patient due to these comorbidities. Some of these include frailty leading to increased risk of fall, heart problems, drug usage, and overall sensory decline (Rehn et al 2013). Dementia and delirium are also factors that affect an elderly patient’s reaction to a traumatic incident.

Many states have attempted to accommodate their increasing elderly populations by creating new trauma triage criteria. For example, in 1999, Florida created a Florida Trauma Triage Algorithm (FTTA) which aimed to stop the under-triage rate of geriatric trauma victims. In 2007, a study was conducted to test this algorithm, and it found that under-triaging continued to take place in individuals 55 and older (Davis et al 2012).
The state of Ohio has done extensive research on trauma triage and created both a definition of a geriatric patient as well as a set of guidelines or checklist to be followed by Emergency Medical Services (EMS) departments. This checklist includes Glasgow Coma Score, mechanism of injury (falls, MVC, etc.), and pre-existing medical conditions such as diabetes, heart disease, and drug use, in particular anti-coagulants such as Coumadin (State of Ohio). Created in 2007, the Ohio Trauma Committee aimed to better triage elderly patients due to their increased risk of death in traumas.

The Lehigh Valley and in particular Lehigh Valley Health Network aims to create a new set of criteria to be used in conjunction with the existing ACS trauma triage criteria of the elderly. A checklist was compiled imitating the state of Ohio’s new criteria. This study uses that checklist to determine the presence of over or under-triaging when it comes to the elderly population seen by various EMS departments throughout the Lehigh Valley area.

Methods:
A retrospective Lehigh county EMS chart review was conducted in order to determine whether or not initial emergency responders are correctly and efficiently triaging geriatric trauma victims. Due to lack of time, only one station, Lehighton, was included in the study. Charts of patients who required facility transfer were not included in the study to keep it solely based on the initial response to the trauma. The identities of all patients were kept confidential and only seen by the designated chart reviewer. In addition, no individuals were harmed in this study. All data was taken from previously treated patients. The data ranged from April 1, 2014 to July 1, 2014.

The emergency charts of 124 geriatric trauma patients, 65 years and older, were reviewed and used to complete the newly established yes/no checklist of trauma triage criteria. This criteria included the age of the patient, if the case met already existing ACS triage criteria, the new criteria based on type of injury and any pre-existing comorbidities, and patient destination. The data was compiled into an excel spreadsheet and sorted to find the frequency in percent of each piece of criteria in the population. Over and under-triage were able to be determined from these percentages. Statistical analyses were then done in order to establish any relationships between criteria and triaging geriatric trauma patients.

Results:
The data was analyzed to compare destination with meeting particular criteria. Of those who met ACS criteria, 85.71% (42/49) of them did not have the destination of a trauma center. Therefore, 14.29% of those who met ACS criteria were appropriately sent to a designated trauma center. Of those who did not meet ACS criteria, none of them were inappropriately sent to a trauma center rather 100% (75/75) were sent to a typical emergency room.

For the individuals in the population that met at least one of the newly established criteria based on mechanism of injury and pre-existing medical conditions, 93.62% (88/94) of those that met one or more were not sent to a trauma center. Therefore, only 6.38% were appropriately taken to one. Of the elderly who did not meet any of the new criteria, 96.67% (29/30) of them did not have the destination of a trauma center.

Below is a graphical representation of the percentages of the population that met each piece of criteria in the checklist used to evaluate the patients in the EMS database.
The data was statistically analyzed using chi-squared tests comparing triage and ACS criteria as well as triage and the newly established criteria. In the first test, the percentage of people that were triaged to a trauma center while meeting ACS criteria was statistically significant compared to those who met and were not sent to a trauma facility. With a p-value of 0.001 (0.1%), the deviation was most likely significant with only a 0.1% chance that the difference was random.

In the second test, the p-value was found to be between 0.1 and 0.9 showing that there was a 10% to 90% chance that the deviation in data was due to random chance. Therefore, there is no significant relationship between trauma triage and whether or not the patient met established criteria.

Discussion:
The current ACS criteria does not include the evaluation of an elderly person’s pre-existing comorbidities, but when met, requires triage to a designated trauma center. The chart showing Percentage of Patients in Population Meeting Checklist Criteria suggests that despite the diversity among the patients in comorbidities and mechanisms of injury, meeting ACS criteria was the most common criteria. However, the percentage of people who met ACS criteria and were not sent to a trauma center suggests a significant amount of under-triage in Lehigh County. Obviously, ACS criteria is not enough to denote an elderly patient as a trauma alert. EMS responders may not follow this protocol, but rather take each incident on a case-by-case basis.

There was found to be no relationship between meeting the newly established criteria based on pre-existing comorbidities and whether or not the patient’s destination was a trauma center. This suggests that EMS people do not properly consider the altered state and medical conditions associated with the elderly. The checklist was not directly used by EMS departments when responding to geriatric trauma events which may indicate a lack of evaluating a patient’s pre-existing medical conditions and using them when making a destination decision. In addition, there were virtually no patients who were over-triaged, or inappropriately sent to a trauma center.

Conclusion:
The checklist established based on Ohio’s criteria must be further studied to better determine its efficiency in triaging elderly trauma patients. In order to expand this study, more
EMS departments must get involved in the data collection stage to make conclusions on over and under-triage in Lehigh County. The outcomes of patients should be analyzed to determine if under-triaging the elderly affects their mortality rate or hospital length of stay. Other studies have shown that geriatric patients who experience relatively minor traumas have a significantly higher risk of death when compared to their younger cohorts (Kahl et al 2013). It would be interesting to determine these rates to show the effects of under-triage in the Lehigh Valley.

References:
5. State of Ohio State Board of Emergency Medical Services Trauma Committee (2007). Geriatric Trauma Task Force. The State Board of EMS.