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Reference Article: Gurria, JP, et. al. "Pediatric trauma undertriage in Ohio" Journal or Trauma and Acute Care Surgery 82.6. (2017); 1007-1013

PICO Question: What are the causes and effects of Pediatric Trauma undertriage in the state of Ohio?

Introduction: In the situation at hand, undertriage is considered the failure to transport patients to a trauma center when they require that level of care. This can have a negative impact on patient outcome. Canadian studies demonstrate that undertirage can result in a 40% increase in the chance of mortality at 24 and 48 hours. This article combines looking at both primary (in-field) and secondary (hospital to hospital transfer) triaging, however the primary focus seems to be on those patients who are within 30 minutes of a pediatric trauma center who are inappropriately taken to a smaller community hospital due to inappropriate triage. Astoundingly, an initial study by this same research group indicated that 80% of injured pediatric patients who were taken to a non-trauma center initially did not make it to a peds trauma center within 2 hours.

Methods: Retrospective study that used the Ohio Trauma Registry, looking at 6 years of data from 2007-2012. They actually made a valiant effort to look at how best to calculate "30 minutes" from a pediatric trauma center by incorporating population density and urbanization data into the expected travel speed. They also used the home zip code of the patient to determine if that patient was in the same zip code as their trauma was reported in, and if not these patients were excluded. They then classified primary undertriage as above – if the trauma patient was less than 30 minutes from a primary peds trauma center and they were not taken there, this was considered undertriage.

Results: 7,352 (52%) of the 14,045 patients included in this study were deemed to be undertriaged. Only 11,422 (80.3%) of these patients eventually got the proper care at a pediatric trauma enter. 224 patients needed an operation of some kind, and 93 (41%) were in the undertriaged population. Of the 4,022 patients in this cohort who live within 30 minutes of a trauma center, 2,194 (31.7%) of these were undertriaged. Favorable effects on proper triage included: age 1-4 years, no adult or pediatric trauma center within 30 minutes, high or low population density. Factors that adversely affected proper triage: age older than 10 years, 'other' race, commercial insurance, medium-density region, GCS > 4, no pediatric trauma center within 30 minutes, ISS < 15.

Discussion: Studies have consistently shown that pediatric trauma centers can address the needs of pediatric patients much better than adult trauma centers can. Because of this, it is important that we work to appropriately triage these young patients, whose appropriate treatment can result in many quality life years gained. This is particularly important in TBI patients, who have better GCSs if they are transported appropriately to a pediatric trauma center. While 80% of pediatric trauma patients are ultimately treated at a peds trauma center, ~50% of pediatric trauma patients are initially undertriaged. Only the sickest patients are more consistently appropriately triaged – ISS > 15, GCS < 4, field intubation. Even then, only 29%, 32%, and 21% are appropriately triaged, respectively. Interestingly, when examining the data, it was seen that pediatric trauma patients in more rural and resource-limited areas were appropriately triaged. Hashing out the reasons for why patients in this area are appropriately triaged will be important in understanding how best to adjust triage protocols in the future in more urban and resource-rich areas, although gut instinct seems to suggest that because they will already have prolonged travel times to the nearest facility, EMS providers are more likely to accept even slightly longer transport times in order to get to the proper level of care.

Interestingly, in the abstract the authors mention that the mortality rate within the appropriately triaged group is 5.3% while mortality rate in the undertriaged group is 0.7%. This seems to suggest that the patients in the appropriately triaged are, overall, sicker patients, which makes it much easier to take them to the appropriate facility. This is suggested of course by the data above that greater ISS and lower GCS usually get you to the right place quicker.

Limitations: Retrospective study. No unique patient identifiers in the trauma system make it difficult to track long-term outcomes, particularly TBI. There is little stated in the way of outcomes in these patients, which raises the important question of whether or not it ultimately matters… Although they do mention the Canadian studies as documented above. It is highly likely that it does matter.

Bottom Line: If you made it this far, then you likely understand that this an important topic for those interested in pre-hospital care, medical control officers, and in the field treatment and triage. There isn't much, strictly speaking, medically ground breaking information in this article, it does raise the important point that our system currently does a poor job of performing one of our most important jobs: triage. It is up to us to ensure that all patients receive the appropriate level of care.