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The EMS Contrarian

Mechanism of injury in prehospital trauma triage

EMS providers can determine severity of injury with more than just MOI during trauma triage

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I have always felt that we in EMS were a little enamored with the [mechanism of injury \(MOI\)](#) when it comes to prehospital trauma triage. The MOI is the sequence of events that results in a particular injury or injuries. At a more fundamental level, the MOI is the physical forces (acceleration, deceleration, impact, recoil, etc.) that cause injury to the body.

The original thinking was that review of the MOI would help predict the likelihood of certain injuries. But, even early trauma triage studies found MOI a poor indicator of severe injury [1]. From an EMS standpoint, the conventional wisdom was that integrating the MOI into [prehospital trauma triage](#) would help identify patients who should go to the trauma center within the so-called "Golden Hour." Well, we now know that the "[Golden Hour](#)" is basically rubbish [2]. So, what is the role of the MOI in prehospital trauma triage?

MOI USAGE IN MOTOR VEHICLE COLLISIONS

First, a review of the medical literature fails to show any significant scientific evidence supporting the use of MOI criteria for trauma management decisions [3]. In a 2004 San Francisco study, trauma researchers found MOI a very poor predictor of which patients required trauma team activation. Of the 700 trauma team activations for MOI criteria, only 54 (7.7%) patients required ICU or operating room admissions, and none resulted in death in the emergency department. The four least predictive MOI criteria were found to be "motorcycle crash with separation of rider," "pedestrian hit by motor vehicle," "[motor vehicle crash](#) with rollover," and "motor vehicle crash with death of occupant" [4].

The only MOI criteria with any degree of validity appear to be "ejection from a vehicle" and "prolonged extrication time." Several studies have shown that "ejection from a vehicle" has positive predictive value for severe injury [5]. Pediatric studies have also demonstrated that "ejection from a vehicle" is a useful predictor of severe injury and the need for a trauma center [6]. But, generally speaking, that is about it for the scientific evidence for MOI criteria.

Fast forward to the twenty-first century. Finally, we are starting to see some EMS-based research on MOI. My good friend Malcolm Boyle, presently working in the United Kingdom, has looked at MOI in detail. Boyle and his colleagues looked at all trauma transports in the state of Victoria (Australia) for 2002. He found 4,571 incidents of MOI only (62% males, median age of 28 years). Two criteria had statistically significant results: falls from greater than five meters and patients trapped greater than 30 minutes. But, although the results were statistically significant, they were not felt to be clinically significant [7].

So, how does this affect EMS? Well, the trauma triage criteria need to be revised to minimize the role of MOI in prehospital trauma triage. Following the crash of Maryland State Police's (MSP) Trooper 2 helicopter in September of 2008, the Maryland Institute of Emergency Medical Services Systems (MIEMSS) required prehospital providers to speak with a physician before calling for a helicopter for patients who had MOI criteria (C and D criteria). As of July 2009, MSP transports had decreased by 50% from the prior year and 60% from a high in 2004 [8]. Much of this reduction in Maryland was not due to MIEMSS physicians declining flights, but more due to provider education about the role of MOI in trauma needs prediction.

HISTORY OF MECHANISM OF INJURY USE IN EMS

The usage of MOI criteria in EMS occurred at a time in EMS when there was a push to "dumb down" educational standards and to develop technicians instead of professionals (remember back boarding everybody?). Now, almost 30 years later, we are reeling from the paralysis of intellect that led to the "dumbing down" of educational standards. And, guess what? EMS providers, when allowed to make decisions on their own, are pretty damn good at predicting the severity of injury and the subsequent need for trauma center care. In an Irvine, California, study, researchers found that paramedics were able to predict injury severity with 80% accuracy (based upon all parameters observed at the scene of a motor vehicle collision – not just MOI) [9].

So the days of "flying a patient because of MOI" should be a thing of the past. As educators and textbook authors, we must now teach clinical problem solving instead of robotic, reflex reactions to clinical findings. When left to their own devices, EMTs and paramedics actually do pretty well. When we start establishing rigorous reflexive protocols, we end up with overtriage and wastage of precious resources. There is an old saying in medicine, "You don't have to run a Chi-square test on common sense." This holds true for EMS as well. In summary, let common sense prevail and let's eliminate much of the dogma that has become a part of EMS practice. Always think outside the box!

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References

1. Knopp R, Yanagi A, Kallsen G, Geide A, Doehring L. [Mechanism of injury and anatomic injury as criteria for prehospital trauma triage.](#) *Ann Emerg Med.* 1988;17:895-902.
2. Lerner EB, Moscati RM. [The golden hour: scientific fact or medical "urban legend"?](#) *Acad Emerg Med.* 2001;8:758-760.
3. Boyle MJ. [Is mechanism of injury alone in the prehospital setting a predictor of major trauma - a review of the literature.](#) *J Trauma Manag Outcomes.* 2007;1:4.
4. Kohn MA, Hammel JM, Betz SW, Stangby A. [Trauma team activation criteria as predictors of patient disposition in the emergency department.](#) *Acad Emerg Med.* 2004;11:1-9.
5. Góngora E, Acosta JA, Wang DSY, Brandenburg K, Jablonski K, Jordan MH. [Analysis of motor vehicle ejection victims admitted to a level I trauma center.](#) *J Trauma.* 2001;51:854.
6. Howard A, McKeag AM, Rothman L, Comeau JL, Monk B, German A. [Ejections of young children in motor vehicle crashes.](#) *J Trauma.* 2003;55:126-129.
7. Boyle MJ, Smith EC, Archer F. [Is mechanism of injury alone a useful predictor of major trauma?](#) *Injury.* 2008;39:986-992.
8. Personal communication with Robert Bass, MD, July 27, 2009.
9. Vaca FE, Anderson CL, Herrera H, et al. [Crash injury prediction and vehicle damage reporting by paramedics.](#) *West J Emerg Med.* 2009;10:62-67.

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