

Editorial

Are Trauma Centers and Trauma Systems Optimized to Accommodate Changing Injury Demographics?

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In its 1966 report "Injury in America: The unrecognized epidemic", the National Academy of Sciences identified preventable deaths following trauma as major public health problem and called for a nationwide system that integrated pre-hospital and hospital resources to deliver optimal injury care [1]. Trauma centers were born of the large city hospitals that were often the knife and gun clubs associated with the teaching centers [2]. Outcomes for the severely injured were noted to be superior when delivered in centers where care was coordinated. Individual states and the ACS COT developed standards for trauma centers. Later, it was recognized that a regional system of care provided the best structural framework for efficient trauma care and regional trauma systems took shape [3]. Formal trauma systems are established in 38 states and informal ones in the remainder [4]. By 2010, most of the country and most of the population were within reach of a major trauma center. This is an astounding public health success story.

In principal, the severely injured are preferentially transported to the nearest trauma center. In instances where long distance or dire patient condition precludes primary transport, initial triage to the nearest hospital for stabilization followed by secondary transfer to the regional trauma center is adopted. This practice integrates the community hospital or minor level trauma center into the regional trauma system. Field triage guidelines were developed to identify patients at risk of severe injury. The pre-hospital criteria produced by the CDC represent the summary of this work [5]. Since severe injuries are often occult, the triage criteria are designed to be more sensitive than specific, resulting in a high but acceptable level of over triage. The paradigm that it was better to over triage than under-triage became standard [refer orange book].

Major trauma centers are often large tertiary teaching hospitals in population dense areas. As such, they not only receive the major trauma patients within their geographic catchment areas, but also treat many minor and moderately injured patients who utilize the trauma center as a local community hospital. In addition, other hospitals regularly transfer minor and moderately injured patients whose needs exceed the capabilities of those referring hospitals for a variety of reasons, a practice guaranteed by the Emergency Medical Treatment and Active Labor Act (EMTALA). This potentially enables

referring hospitals to shift the burden of all injury care to the trauma center and avoid maintaining resources needed to care for even the minor and moderately injured [6-8]. While the risk of overburdening trauma centers with care of minor injuries is a concern, so too is the shifting of the financial burden from community hospitals to the trauma centers [9]. Together, lack of specialty call coverage, EMTALA, and historically poor reimbursement for trauma care looked to threaten the sustainability of major trauma centers and regional trauma systems.

Recent years have seen dramatic changes in the trauma population. Although the number of injury related hospital discharges has risen, penetrating trauma is markedly decreased and interpersonal violence is at an all time low. Trauma mechanics have also changed dramatically. Safer roads, safer cars, improved pre-hospital systems and better medical care have resulted in fewer crashes per road mile traveled, a lower crash fatality rate, and fewer severe injuries per crash. Increased urbanization results in that fewer miles traveled at highway speed, and reduced opportunity for high-speed crash. Shifting demographics have also aged the bulk of the population out of the high energy transfer mechanism (MVC) risk group to the low energy transfer mechanism (Fall) risk group [10]. The aging US population and the higher injury related admission rate among the elderly explains the overall increase in injury related hospital discharges. The net result is an older injured population that is less male, less often a result of high-energy transfer mechanisms, less severely injured, more likely to have extremity fractures and at lower risk of death compared to historic trauma [11].

From an industry perspective, these epidemiologic trends are shifting the injured population to more favorable demographics. Older patients are better insured and less severely injured patients with extremity injuries require straightforward orthopedic operations and less resource consumption. A better-insured patient population translates to fewer post discharge planning hurdles and more efficient hospital throughput. The Affordable Care Act has further fueled the shift by providing better coverage to the historically underfunded at high-risk groups. This shift has not gone unnoticed by the healthcare industry. A number of healthcare organizations are capitalizing on this by opening trauma centers within their hospital networks. No longer deterred by fears of unprofitability, trauma centers are viewed by healthcare corporations as sound business investments to enhance hospital capabilities and prestige and increase market share. Access to trauma team activation codes provides additional incentive for opening trauma centers [12].

With fewer barriers and apparently increased demand, it seems that opening more trauma centers is in the public interest. However, it is not clear that the benefits that trauma centers and systems confer to the severely injured can be extended to the minor or moderately injured. Indeed low risk patients, particularly the elderly, transported

by EMS to trauma centers gain no survival advantage and cost substantially more than those transported to community hospitals [13,14]. The increasing injured elderly population is there for not sufficient justification for additional trauma centers. That is not to say that the injured elderly do not need specialized care. The elderly are at increased risk of post injury death primarily due to age related comorbidities and an organized approach to the injured elderly improves outcome [15,16]. Thus the fastest growing segment of the injured population seems to be less likely to need some trauma resources like trauma resuscitation teams and more likely to need others like specialty medical care.

Trauma centers and trauma systems have greatly improved trauma care. While the trauma system is designed to optimize care of the severely injured, it remains unclear whether those same resources are best suited for care of the moderately and minor injured. What is clear is that the trauma population is changing and the trauma system must recognize and adapt to these changes. More study is certainly warranted to determine how medical resources are to be best used. As with children, it is that the injured elderly are a special population that needs special resources and practices.

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