

Undertriage of severely injured patients in inclusive trauma systems: a scoping review

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Background

Proper triage is crucial to ensure that all severely injured patients receive vital trauma care and are transported to the appropriate level trauma center. Insight into undertriage rates is essential to evaluate and optimize triage in inclusive trauma systems. This review aimed to examine the current prehospital undertriage rate of patients in inclusive trauma systems.

Methods

Studies that examined injured patients in an inclusive trauma system, comparing level-1 to non-level-1 trauma centers conducted between 2008 and 2022 were retrieved from PubMed. Data on the level of trauma center, severe injury, emergency intervention (< 24 hours), direct ICU admission and mortality (< 24-hours) were collected.

Results

A total of fourteen studies were eligible for inclusion, all consisted of retrospective cohort study design. Studies were derived from four different inclusive trauma systems worldwide. Undertriage, defined as severely injured patients (Injury Severity Score (ISS) ≥ 16) who are not directly transported to a level-1 trauma center varied between 10.9% and 61.4% (The Netherlands: 10.9% to 34.6% (n= 4), USA: 25.4% to 39.5% (n= 7), Germany: 61.4% (n= 1), Australia: 37.6% (n= 1)). Patients requiring either direct ICU admission, emergency intervention (< 24 hours) or who died (< 24 hours) were not directly transported to a level-1 trauma center in the Dutch system in 22.7% (n= 1). Four studies reported on patients requiring ICU admission that were not directly transported to a level-1 trauma centers, rates varying between 30.5% and 59.1% (USA: 30.5 to 41.1% (n= 2), Germany: 59.1% (n= 1), Australia:

37.6% (n= 1)). In addition, based on the US trauma system, one study reported that 32.1% of patients who died (< 24 hours) were not directly transported to a level-1 trauma center. Also, of patients requiring an emergency intervention (< 24 hours), 23.2% were not directly transported to a level-1 trauma center.

Conclusion

Undertriage in trauma shows substantially varying rates worldwide. Differences in study populations, specific variations in inclusive trauma system designs, and geographical differences presumably influence these observed variations. Empirical evaluation of clinical parameters of the undertriaged could further improve the early recognition of this patient group. Studies including early resource criteria such as direct ICU admission, emergency intervention or death are scarce and require further analysis to assess if undertriage was involved in these outcomes.