

RESEARCH ARTICLE

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Missed foot fractures in multiple trauma patients



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Abstract

Background: Missed or underestimated injuries are one of the central problems in trauma care. Foot injuries can easily be missed because they lay beyond the regularly screened field of a trauma computer tomography scan (CT scan). During primary and secondary survey a careful examination of the extremities often becomes of secondary interest in the severely injured patient.

Methods: Thirty-four thousand ninety-one multiple trauma patients of the TraumaRegister DGU[®] were evaluated from 2002 to 2014. We differentiated between patients with foot injuries, patients with missed foot injuries and patients without foot injuries. Included were ankle fractures, calcaneus fractures, talus fractures, metatarsal fractures, toe fractures, amputation, soft tissue injuries and/or ligamentous injuries.

Results: Summarized evaluation of 34,091 trauma patients showed a share of 2532 patients with foot injuries. Time of diagnosis was documented in 2199 cases. 2055 patients had early diagnosed foot injuries and 144 patients had initially missed foot injuries. Missed foot injuries were especially found in patients with car accidents or fall from ≥ 3 m. Patients with higher Abbreviated Injury Scale (AIS) or lower Glasgow Coma Scale (GCS) were not significantly more affected by missed foot injuries. Missing foot injuries was also not caused by injury severity or higher age.

Conclusions: Our data highlights the need of careful evaluation of the feet during primary and secondary survey particularly when a tibia or femur fracture is diagnosed. Special attention should be turned to patients after car accidents or fall from great height. Suicide victims also need major attention. Patients with early operations also need careful examination and tertiary survey is highly recommended.

Keywords: Multiple trauma, Missed foot injuries, TraumaRegister DGU[®], Primary survey, Secondary survey, Tertiary survey

Background

Missed injuries and delayed diagnosis are essential reasons for limited outcome of multiple trauma patients. Foot injuries are often missed in trauma patients and are a source of long-term limitation [1]. Injuries below the knee generally come along with high risk for unemployment, long sick leave and decreased outcome [1]. Missed injuries in trauma patients are one of the main topics in trauma care and were evaluated several times before. Especially patients with head injuries, unconsciousness with a Glasgow Coma Scale of eight or lower and a high.

Injury Severity Score (ISS) are predisposed to have missed injuries or delayed diagnosis [2]. Injuries are often missed during the primary and secondary surveys in trauma patients [3]. Careful examination in the initial stage after severe injury can especially improve outcome of multiple trauma patients with lower extremity injuries.

Depending on the localisation there is a wide spread distribution of missed injuries and delayed diagnosis incidence rates from 1.3 to 39% [2]. The integration of computed tomography (CT) has essentially improved the process of trauma care and accuracy of diagnostic procedures in the last decades [4, 5] but injuries of the foot are not routinely detected in the standard trauma scan protocol. Several studies evaluated different missed

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