Are bilateral tibial shaft fractures associated with an increased risk for adverse outcome?

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A R T I C L E   I N F O
Article history:
Accepted 6 October 2014

Keywords:
Bilateral tibial shaft fracture
Mortality
Systemic complications
ISS

A B S T R A C T
Introduction: Long bone fractures are assumed to be an independent risk factor for systemic complications and death after trauma. Multiple studies have identified an increased risk for mortality and morbidity in patients with bilateral femoral fractures. Data about bilateral tibial shaft fractures is rare. The aim of our study was to analyze if patients with bilateral tibial shaft fractures are at higher risk for systemic complications.

Methods: We performed a retrospective analysis of the TraumaRegister DGU® from 1993 to 2008. Inclusion criteria were unilateral or bilateral tibial shaft fractures and an age ≥16. Additionally to the overall collective we analyzed different subgroups (divided into different injury severities and treatment periods).

Results: 1899 patients with unilateral and 175 patients with bilateral tibial shaft fractures were included. Age, gender and mean ISS (25.8 vs. 26.2, p = 0.51) in the two groups were comparable. Regarding the entire study population, patients with bilateral tibial shaft fractures showed no significant higher incidence of respiratory organ failure (29.5% vs. 23.1%, p = 0.076) or mortality (20.0% vs. 16.3%, p = 0.203). However, subgroup analysis showed a significant higher rate of pulmonary organ failure for bilateral tibial shaft fractures as compared to unilateral tibial shaft fractures in the group ISS < 25 (20.7% vs. 11.7%, p = 0.023). Multivariate regression analysis identified the additional tibial shaft fracture as an independent risk factor for pulmonary organ failure (OR = 1.56) but not for mortality.

Discussion: The additional tibial shaft fracture is an independent risk factor for pulmonary organ failure but not for multiple organ failure or mortality. The impact of the additional tibial shaft fracture is especially pronounced in less severely injured patients (ISS < 25). These findings are comparable to results of bilateral femoral fracture studies and we therefore suggest to treat patients with bilateral tibial shaft fractures with the same caution as those with bilateral femoral fractures.

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Introduction

Multiply injured patients often suffer high energy injuries with long bone fractures, which are assumed to be responsible for increased morbidity and mortality [1–6]. Patients with multiple long bone fractures and accompanying thoracic trauma seem to be at high risk for respiratory complications [2,7]. Previous analysis of systemic effects and complications after long bone fractures have focused on femoral shaft fractures. Several of these studies reported a higher risk for systemic complications in patients with bilateral femoral shaft fractures in cases of comparable overall injury severity according to the Injury Severity Score (ISS) [3,8–15]. Data on systemic complications in patients with bilateral tibial shaft fractures is rare and mostly refers to small case series. To our knowledge this is the first study sampling a large number of patients that analyses the impact of bilateral tibial shaft fractures on systemic complications.

Patients and methods

TraumaRegister DGU®

The TraumaRegister DGU® (TR-DGU) of the German Trauma Society (Deutsche Gesellschaft für Unfallchirurgie; DGU) was