A risk-adapted approach is beneficial in the management of bilateral femoral shaft fractures in multiple trauma patients: An analysis based on the trauma registry of the German Trauma Society

Eva Steinhausen, MD, Rolf Lefering, PhD, Thorsten Tjardes, MD, Edmund A.M. Neugebauer, PhD, Bertil Bouillon, MD, Dieter Rixen, MD, and the Committee on Emergency Medicine, Intensive and Trauma Care (Sektion NIS) of the German Society for Trauma Surgery (DGU), Duisburg, Germany

BACKGROUND: Today, there is a trend toward damage-control orthopedics (DCO) in the management of multiple trauma patients with long bone fractures. However, there is no widely accepted concept. A risk-adapted approach seems to result in low acute morbidity and mortality. Multiple trauma patients with bilateral femoral shaft fractures (FSFs) are considered to be more severely injured. The objective of this study was to validate the risk-adapted approach in the management of multiple trauma patients with bilateral FSF.

METHODS: Data analysis is based on the trauma registry of the German Trauma Society (1993–2008, n = 42,248). Multiple trauma patients with bilateral FSF were analyzed in subgroups according to the type of primary operative strategy. Outcome parameters were mortality and major complications as (multiple) organ failure and sepsis.

RESULTS: A total of 379 patients with bilateral FSF were divided into four groups as follows: (1) no operation (8.4%), (2) bilateral temporary external fixation (ETC) (50.9%), bilateral primary definitive osteosynthesis (early total care [ETC]) (25.1%), and primary definitive osteosynthesis of one FSF and DCO contralaterally (mixed) (15.6%). Compared with the ETC group, the DCO group was more severely injured. The incidence of (multiple) organ failure and mortality rates were higher in the DCO group but without significance. Adjusted for injury severity, there was no significant difference of mortality rates between DCO and ETC. Injury severity and mortality rates were significantly increased in the no-operation group. The mixed group was similar to the ETC group regarding injury severity and outcome.

CONCLUSION: In Germany, both DCO and ETC are practiced in multiple trauma patients with bilateral FSF so far. The unstable or potentially unstable patient is reasonably treated with DCO. The clearly stable patient is reasonably treated with nailing. When in doubt, the patient is probably not totally stable, and the safest precaution may be to use DCO as a risk-adapted approach. (J Trauma Acute Care Surg. 2014;76: 1288–1293. Copyright © 2014 by Lippincott Williams & Wilkins)

LEVEL OF EVIDENCE: Therapeutic study, level IV. Epidemiologic study, level III.

KEY WORDS: Multiple trauma; femoral fracture; bilateral; damage-control orthopedics; trauma registry.

Bilateral femoral shaft fractures (FSFs) in multiple trauma patients are a rare entity with an incidence of 1% to 7%.1-3 They are caused by high-velocity accidents in approximately 80% of cases.

Today, the discussion of the optimal management of these patients continues.

Intramedullary nailing is the criterion standard for the treatment of FSF.4,5 In multiple trauma patients, the timing of definitive fracture stabilization is still controversial. Advocates of primary definitive treatment indicate a reduced ventilation time, a shorter hospital stay, and an improved early mobilization.5,5 However, there are references that multiple trauma patients may be at an increased risk for systemic complications and mortality due to the “second hit” and that they benefit from a delayed internal fixation.4,12-14 Thus, the concept of “damage-control orthopedics” (DCO) with temporary external fixation and secondary definitive osteosynthesis has been propagated with an increasing rate of DCO in the last years.9-11 However, the discussion on which patients benefit from this approach and which patients can be treated with primary definitive osteosynthesis without risk is still ongoing. Anatomic and physiologic injury severity seem to influence decision making so far (risk-adapted damage control).4,12-14 The risk-adapted approach seems to result in low acute morbidity and mortality rates.2,5

Unlike patients with unilateral FSF, multiple trauma patients with bilateral FSF are considered to be more severely injured with an increased risk to develop systemic complications.5,5,15-19

This study aimed to validate that a risk-adapted approach in the management of multiple trauma patients with bilateral

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