HYPOTHERMIA FOR PREDICTION OF DEATH IN SEVERELY INJURED BLUNT TRAUMA PATIENTS
Heiko Trentzsch,* Stefan Huber-Wagner,† Frank Hildebrand,‡ Karl-Georg Kanz,* Eugen Faist,* Stefan Plitz,* Rolf Lefering,§ and TraumaRegistry DGU‖

*Department of Surgery, Hospital of the University of Munich–Campus Großhadern; †Department of Trauma Surgery, Klinikum rechts der Isar, Technical University of Munich–TUM, Munich; ‡Trauma Department, Hannover Medical School (MHH), Hannover; §University Witten/Herdecke, Institute for Research in Operative Medicine (IFOM), Cologne, Germany; and ‖Committee on Emergency Medicine, Intensive Care and Trauma Management (Section NIS) of the German Society for Trauma Surgery (DGU)

Abstract—Hypothermia is considered an independent predictor of death after trauma. The aim of this study was to assess these premises based on data from the TraumaRegistry DGU (TR-DGU) using its outcome predication tool, the Revised Injury Severity Classification (RISC) score, in comparison with three previously published regression models by Martin: OR, 1.43 [95% CI, 2.21–1.42]; and Wang: OR, 1.77 [95% CI, 2.21–1.42]) only, although it would drop out from the model (RISC: OR, 1.12 [95% CI, 1.41–0.89]; \( P = 0.33 \)) and Shafi: OR, 1.21 [95% CI, 1.60–0.92; \( P = 0.17 \]) as long as parameters to indicate hemorrhage and/or coagulopathy were included in sufficient number, a finding confirmed by a subsequent sensitivity analysis. We conclude that hypothermia is a result of injury severity and therefore unlikely to be an independent predictor of mortality. Our data suggest that hypothermia belongs closely to the hemorrhage/coagulopathy group of predictors.

Keywords—Hypothermia, blunt trauma, multivariate analysis, logistic models, mortality, outcome prediction, injury severity, registries

INTRODUCTION
Hypothermia is a frequently observed physiological aberrance in the sequel of severe blunt trauma. Hypothermia is considered an independent determinant of early death in critically ill patients (1). Current protocols for the treatment of severely injured patients address hypothermia with temperature preservation and active rewarming (2, 3). In a randomized controlled trial, Gentilello et al. (4) showed that active rewarming improves survival during the early phase in the clinical course. Several studies have indicated that trauma patients with body temperature of less than 35°C on admission had an increased mortality. More than 20 years ago, the first

Received 9 Jun 2011; first review completed 24 Jun 2011; accepted in final form 20 Oct 2011

ABSTRACT—Hypothermia is considered an independent predictor of death after trauma. The aim of this study was to assess these premises based on data from the TraumaRegistry DGU (TR-DGU) using its outcome predication tool, the Revised Injury Severity Classification (RISC) score, in comparison with three previously published regression models by Martin: OR, 1.43 [95% CI, 2.21–1.42]; and Wang: OR, 1.77 [95% CI, 2.21–1.42]) only, although it would drop out from the model (RISC: OR, 1.12 [95% CI, 1.41–0.89]; \( P = 0.33 \)) and Shafi: OR, 1.21 [95% CI, 1.60–0.92; \( P = 0.17 \]) as long as parameters to indicate hemorrhage and/or coagulopathy were included in sufficient number, a finding confirmed by a subsequent sensitivity analysis. We conclude that hypothermia is a result of injury severity and therefore unlikely to be an independent predictor of mortality. Our data suggest that hypothermia belongs closely to the hemorrhage/coagulopathy group of predictors.

Keywords—Hypothermia, blunt trauma, multivariate analysis, logistic models, mortality, outcome prediction, injury severity, registries

INTRODUCTION
Hypothermia is a frequently observed physiological aberrance in the sequel of severe blunt trauma. Hypothermia is considered an independent determinant of early death in critically ill patients (1). Current protocols for the treatment of severely injured patients address hypothermia with temperature preservation and active rewarming (2, 3). In a randomized controlled trial, Gentilello et al. (4) showed that active rewarming improves survival during the early phase in the clinical course. Several studies have indicated that trauma patients with body temperature of less than 35°C on admission had an increased mortality. More than 20 years ago, the first