Very early posttraumatic serum alterations are significantly associated to initial massive RBC substitution, injury severity, multiple organ failure and adverse clinical outcome in multiple injured patients.

BACKGROUND: Multiple severe trauma frequently leads to massive dysbalances of the human immune system. This phenomenon is known as “Systemic Inflammatory Response Syndrome (SIRS)”. SIRS is connected to multiple organ failure and thereby entails higher morbidity and mortality in trauma patients. Pro- and anti-inflammatory cytokines such as Il-6, Il-8 and Il-10 seem to play a superior role in the development of SIRS. Several studies support the hypothesis that the very early cytokine release pattern determines the patients’ subsequent clinical course. Most data about interleukins in trauma patients however refer to serum concentrations assessed sometime in the first 24h, but there is only little information about release dynamics in a small-meshed time frame in the very initial post-trauma period. PATIENTS AND METHODS: 58 multiple injured patients (Injury Severity Score> 16 points) were included. Blood samples were drawn on patient admission (not later then 90 minutes after trauma) and at 6h, 12h, 24h, 48 h and 72 h. Il-6, Il-8 and Il-10 were measured using an automated chemiluminescence assay (IMMULITE, Siemens Healthcare Diagnostics GmbH). Interleukin levels were correlated to distinct epidemiological and clinical parameters. RESULTS: Interleukin
serum concentrations are thoroughly elevated after trauma. Patients with haemorrhagic shock and consecutive massive RBC substitution (n = 27) exhibit higher IL-6, IL-8 and IL-10 levels as compared to patients with minor RBC transfusion extent (n = 31). Interleukin levels also differentiate patients with MOF (n = 43) from such without MOF (n = 15) already at the earliest post trauma time (90 minutes). IL-6, IL-8 and IL-10 concentrations also significantly distinguish patients with adverse outcome (n = 11) from such with favourable outcome (n = 47). Exclusively IL-10 has significant correlation to injury severity (ISS> 35). CONCLUSION: The current study presents an image of the serum IL-6, 8 and 10 releases in multiple trauma patients in the very early post-trauma period. We could thereby demonstrate that interleukin levels can clearly differentiate the presence of hemorrhagic shock and subsequent massive blood product substitution, the development of multiple organ failure and clinical outcome. No significant connection to age, gender and brain injury could be detected. Most importantly, changes in interleukin levels can be observed in the very early posttraumatic phase, at the earliest 90 minutes after trauma.