Background: The prognostic relevance of blood markers in multiple trauma is still a matter of controversial debate. Besides clinical scores new biomarkers indicating the disease severity and the prognosis during the first hours of therapy are highly needed to improve individual patient management. Methods: In prospectively collected sera of 164 patients, among them 115 with multiple trauma, the values of circulating nucleosomes, high-mobility-group-box protein 1 (HMGB1) and soluble receptor of advanced glycation end products (sRAGE) were determined at time of admission to the resuscitation room. Disease severity and clinical status were quantified by injury severity score (ISS) and Glasgow Coma Scale (GCS). As controls, 24 patients with femoral neck fractures and 25 patients with ankle fractures (AFs) were included. Results: Patients with severe multiple trauma (SMT) showed significantly higher HMGB1 and sRAGE levels than patients with moderate trauma and single fractures. Interestingly, HMGB1 and nucleosomes (R=0.56; p< 0.01) as well as HMGB1 and sRAGE (R=0.44; p< 0.01) correlated significantly with each other. In multiple trauma patients, high HMGB1 and sRAGE levels were significantly associated with more severe trauma according ISS (both p< 0.01) and more severe traumatic brain injury (TBI) (GCS< 8; both p< 0.01). Thirteen of the multiple injured patients died during the first
week after trauma. Non-surviving patients showed significantly higher values of HMGB1, nucleosomes, and sRAGE than survivors (p < 0.01; p=0.01; p=0.02). Best prediction of first-week mortality was obtained in receiver operating characteristic (ROC) curves for HMGB1 that yielded an area under the curve (AUC) of 90.6%. Conclusions: HMGB1, nucleosomes and sRAGE are valuable biomarkers indicating trauma severity and prognosis of trauma patients.