**Introduction:**
Polytrauma with resulting systemic inflammatory response is associated with prolonged stay at the intensive care unit and delayed patient recovery. Early detection of the systemic inflammation might prove helpful in the treatment of the polytrauma patients. Cholinergic activity plays an important role in the inflammatory response. The activity of serum cholinesterase (butyrylcholinesterase; BChE) has been shown to correlate with extent of the acute inflammatory response. Here, we describe a correlation between the change in the BChE activity and the early systemic inflammation upon severe traumatic injury. Moreover, we assessed whether the BChE activity, when measured in patients at the hospital admission following polytrauma, could predict the patient outcome.

**Methods:**
All patients (n = 47) or their legal designees gave written informed consent to the work (Trial-Code No. S-391/2015 and No. 837.539.15/10307). The BChE activity was measured by using point-of-care-test system (Securetec Detektions-Systeme AG, Neubiberg, Germany). Levels of the routine inflammation biomarkers, i.e. C-reactive protein (CRP) and the white blood cell count (WBCC), were measured during the initial treatment period. Measurements were performed at the admission, followed by 12, 24 and 48-hour time points. Injury Severity Score (ISS) was used to assess the trauma severity.

**Results:**
The observed reduction in the BChE activity was in accordance with the change in the CRP concentration and the WBCC. The BChE activity measured at the hospital admission negatively correlated with the length of the ICU stay in patients with polytrauma (r = -0.5, Spearman’s rank correlation coefficient).

**Conclusion:**
The BChE activity might be used as an early indicator for the magnitude of the systemic inflammation following polytrauma. Moreover, the BChE activity, measured at the hospital admission, might predict the patient outcome and therefore prove useful in early identification of the high-risk patients.